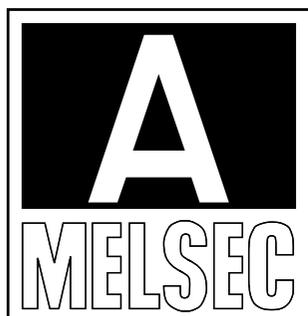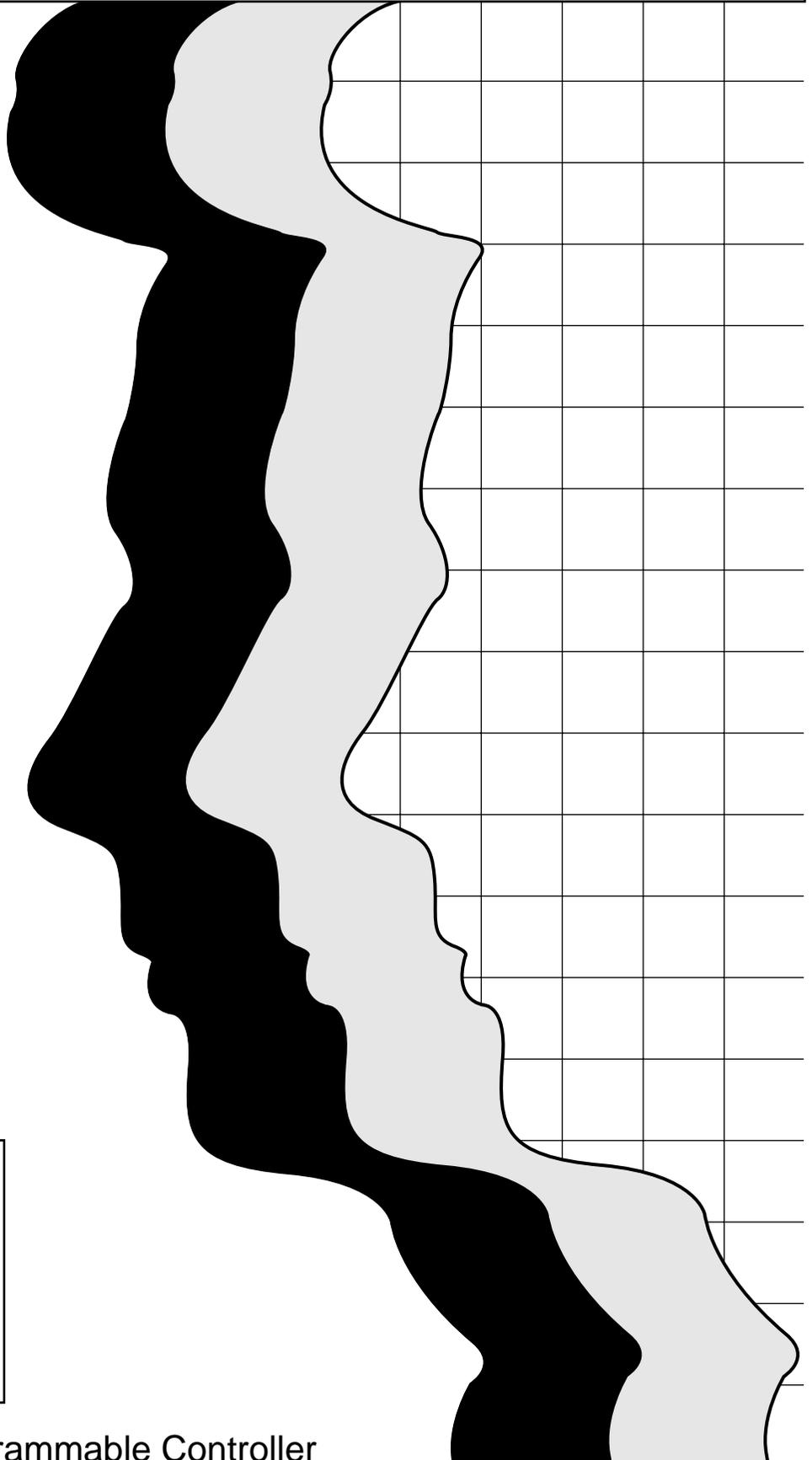# MITSUBISHI

type A6GPP/A6PHP(SW1GP-GPPK)

Operating Manual

A
MELSEC

Mitsubishi Programmable Controller

● SAFETY PRECAUTIONS ●

(Read these precautions before using.)

When using Mitsubishi equipment, thoroughly read this manual and the associated manuals introduced in the manual. Also pay careful attention to safety and handle the module properly.

These precautions apply only to Mitsubishi equipment. Refer to the CPU module user's manual for a description of the PC system safety precautions.
These ● SAFETY PRECAUTIONS ● classify the safety precautions into two categories: "DANGER" and "CAUTION".

◇ DANGER	Procedures which may lead to a dangerous condition and cause death or serious injury if not carried out properly.
⚠ CAUTION	Procedures which may lead to a dangerous condition and cause superficial to medium injury, or physical damage only, if not carried out properly.

Depending on circumstances, procedures indicated by ⚠ CAUTION may also be linked to serious results.

In any case, it is important to follow the directions for usage.

Store this manual in a safe place so that you can take it out and read it whenever necessary. Always forward it to the end user.

[DESIGHN PRECAUTIONS]

◇ DANGER

- When performing the data change, program change, and status control of the PC in operation from a peripheral device, configure an interlock circuit in a sequence program so the safety of the overall system is always maintained.
  Also, determine the troubleshooting method when data communication error occurs between the external device and the PC CPU.

[STARTING AND MAINTENANCE PRECAUTIONS]

⚠ CAUTION

- Carefully read the manual and secure operational safety especially when remote access before performing online operations to a peripheral device connected to the CPU module in operation (especially modifying a program, performing forced output, or changing the operation status).
  False operation may damage the equipment or may cause an accident.

REVISIONS

Print Date	*Manual Number	Revision
Jan., 1989	IB (NA) 66192-A	First edition

INTRODUCTION

Thank you for choosing the Mitsubishi MELSEC-A Series of General Purpose Programmable Controllers. Please read this manual carefully so that the equipment is used to its optimum. A copy of this manual should be forwarded to the end User.

CONTENTS

1. INTRODUCTION

This manual describes the operating procedure for the A6GPP intellegent programming terminal, A6PHP plasma handy display with Mitsubishi MELSEC-K series programmable controllers.

Since the GPP/PHP is a general purpose programming unit, some of the hardware is not used in conjunction with the MELSEC-K series (e.g. light pen interface and memory cassette)

Full hardware instructions and specifications are given in the GPP/PHP users manual.

The operating system for the A6GPP (or GPP) or the A6PHP (or PHP) is stored on Floppy disk, (referred to as FD) part number SW1GP-GPPK☐☐☐*.

The GPP includes two floppy disk drives (FDD) one for the system FD and one for general program storage (user FD). Specifications for the floppy disks are as follows:

1.1 Operations Available Using the SW1GP-GPPK Operating System

The GPP uses a variety of modes selected by the user. Each mode is further divided into functions depending on the mode selected. There are a total of ten modes available, most of which are divided into a series of functions. For example PC mode is divided up into the following functions WRITE, READ, VERIFY and TEST.

The following table indicates the modes available and their relevant functions:

To select the required mode, press the relevant mode key. To use COMMENT, ROM, PRINTER, CONVERSION, MICRO-COMPUTER or INITIAL DATA modes press the OTHER key and select the mode from the menu using the cursor and GO keys.

Mode keys   Function keys

Lower keyboard showing mode and function keys.   GO key
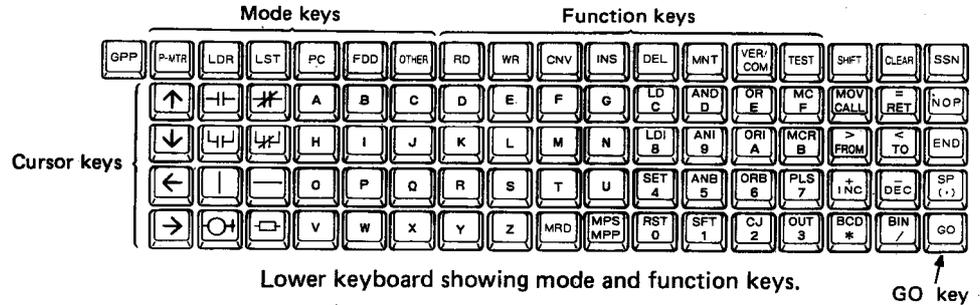
Cursor keys

Once the mode has been chosen, the function is selected using the function keys or by choosing from menu options with the cursor and GO keys.

POINT	
	When used with the SW1GP-GPPK operating system, the upper keyboard of the A6GPP is only used for FDD mode operations and comment writing.

1.2 System Configuration

Connection of the A6GPP with MELSEC-K series Programmable controllers and peripherals is as follows:

| Type | K0CPU (GPP/PHP cannot be used during data link.) | Type | K0J1CPU K0J1HCPU K0J2CPU K0J2PCPU | Type | K1CPU K1CPU-S1 | Type | K2CPU K2CPU-S1 K2CPU-S2 K2CPU-S3 K2HCPU K2NCPU K2ACPU | Type | K3NCPU K3NCPUP2 |

| Type | K6HGPF |

| Type | AC30R4, AC300R4 (RS422 cable) |

| Type | A6GPP |

| Type | A6MEF |

| Type | A6MEM1GP-GPPK |

| Type | SW1GP-GPPK (MELSEC-K system disk) SW0-GPPU (User disk) SW0-FDC (Cleaning disk) |

| Type | (EP-ROM) 1KROM 2KROM 4KROM 8KROM 16KROM |

| Type | AC30R2 (RS232C cable, 3m (9.84ft)) |

| Type | Printer K6PRE K7PRE GT-10A (OLD) GT-10A (NEW) General-purpose printer |

| Type | AC10MD (Composite video cable, 1m (3.28ft)) |

| Type | External CRT (Recommended) MIC-1202 |

Type	AC03WU		Type	A6WU

Type	A6PHP

Type	SW1GP-GPPK (MELSEC-K system disk) SW0-GPPU (User disk) SW0-FDC (Cleaning disk)

Type	AC30R2 (RS232C cable, 3m (9.84ft))

Type	A6MEM1GP-GPPK

Type	Printer K6PRE K7PRE GT-10A (OLD) GT-10A (NEW) General-purpose printer

2. STARTING PROCEDURE

2.1 GPP/PHP Starting Procedure Flow Chart

Insert SW1GP-GPPK
into FDD [A]

↓

Switch GPP/PHP power
"on"

↓

A > GPPK

↓

* INITIAL DATA *		
PC TYPE	MEMORY CAPACITY	PC NO
K0,K0J1	1K	1
K1	2K	2
K2	3K	3
K2N,K0J2,K2A	4K	
K3N	8K	
	12K	
	16K	

POINT

Select each parameter in turn using the cursor and [GO] keys. Default settings are as follows:

    K0, K0J1 → 2K
    K1   → 2K
    K2   → 4K
    K2N, K0J, K2A → 4K
    K3   → 16K

Select Auto-Write option using cursor keys, then press [GO].

POINT

If the "RESET" switch is pressed during operation, the contents of the GPP/PHP memory are lost and the operating system will be re-loaded. (This is automatic if the operating system disk is located in one of the FDDs)

↓ [GO]

* FD AUTO-WRITE *

■ YES
  NO

SELECT "YES" FOR AUTOMATIC WRITE OF PROGRAM OR COMMENT TO FD

See sect. 2.3

↓ [GO]

Mode selection

Selection of "INITIAL DATA" from "OTHER" menu.

P-MTR	LDR	LST	PC	FDD	OTHER
(Refer to Section 2.4.)	(Refer to Section 4.)	(Refer to Section 5.)	(Refer to Section 6.)	(Refer to Section 7.)	(Refer to Section 8 to 13.)

POINT

Note that if the system is started with the SW1GP-GPPK FD inserted in FDD [B], the GPP/PHP operates automatically regarding FDD [B] as [A] and FDD [A] as [B].

2.2 Initial Data Setting Procedure

Start the system in the procedure described in Section 2.1. Prior to the mode selection, it is necessary to set the initial data. Set the PC type, memory capacity, and PC number.

┌───┐
│ ┌─────────────────────┐   ┌───────────────────────────────────────┐ ┌─────────────────────┐ │
│ │ PC TYPE indicates the │   │   INITIAL DATA   │ │ Capacity of program- │ │
│ │ type of programmable │   ├──────────────┬─────────────────┬──────┤ │ mable controller memo- │ │
│ │ controller CPU con- │──▶│   PC TYPE   │ MEMORY CAPACITY │ PC NO │ │ ry.   │ │
│ │ nected to the GPP/PHP. │   ├──────────────┼─────────────────┼──────┤ └─────────────────────┘ │
│ └─────────────────────┘   │ ■K0, K0J1   │   1K   │ 1   │   │
│   │ K1   │   2K   │   │   │
│   │ K2   │   3K   │ 2   │ ┌─────────────────────┐ │
│   │ K2N, K0J2, K2A│   4K   │ 3   │ │ PC NO indicates the │ │
│   │ K3N   │   8K   │   │ │ channel number of pro- │ │
│   │   │   12K   │   │ │ grammable controller │ │
│   │   │   16K   │   │ │ CPU connected to the │ │
│   └──────────────┴─────────────────┴──────┘ │ GPP/PHP in parallel link │ │
│   *1 PRESS E/G/S <GO>, WHEN SET   │ (by use of KJ61). Since │ │
│   E : ENGLISH CHARACTERS   │ the KJ61 cannot be │ │
│   G : GERMAN CHARACTERS   │ used for the K3NCPU, │ │
│   S : SWEDISH CHARACTERS   │ PC NO1 should always │ │
│   │ be selected for the │ │
│   │ K3NCPU.   │ │
│   └─────────────────────┘ │
└───┘

Set the items in order, "PC TYPE", "MEMORY CAPACITY", "PC NO", and "CHARACTER SELECTION". To select each parameter, move the cursor with the ⬇ key and then press the GO key.

┌──┐
│ Example: For setting K2NCPU, 4K memory capacity, PC NO1, and   │
│   English characters.   │
│   │
│ [⬇] → [⬇] → [⬇] → [GO]   → [GO] → [GO] → [E] → [GO]   │
│ ────────────────────────   ──────── ─────── ──────── ──────   │
│   K2NCPU selected   Memory   PC NO 1 English   To mode   │
│   capacity of selected characters setting   │
│   4K selected   selected   │
└──┘
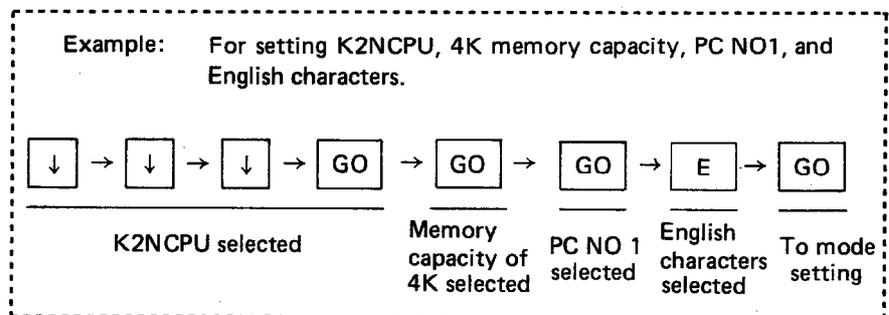
*1: Refer to Section 8.1.

2.3 Automatic FD Write Mode Selecting Method

Automatic FD write mode allows automatic data write onto FD during ladder, list or comment creation without proceeding to FDD mode. After setting the initial data, set whether or not automatic FD write mode is selected. The initial screen displays automatic FD write mode.

```
On the initial screen,
the cursor flickers on
the left of "YES".
When not using the
automatic write func-
tion, press ↓ and select
"NO".
```

```
*  AUTO  FD  WRITE  *

AUTO  WRITE          ▶■  YES
                         NO

SELECTION  OF  "YES"  SAVES  DATA
ONTO  FD  DURING  PROGRAM  OR
COMMENT  CREATION.
```

GO

```
Pressing GO on the
above screen changes
the cursor position to
"*" and displays "IF
OK, PRESS [GO]".
Then press GO.
```

```
*  AUTO  FD  WRITE  *

AUTO  WRITE          ■  YES
                        NO

IF  OK,  PRESS  [GO].  SELECTION
OF  "YES"  SAVES  DATA  ONTO  FD
DURING  PROGRAM  OR  COMMENT
CREATION.

                    **AUTO**
```

```
Selection of "YES" dis-
plays "**AUTO**"
at the bottom right of
the screen. While this is
displayed,    automatic
write  mode  is  valid.
```

2.3.1 Automatic FD write mode setting procedure

```
✻  AUTO  FD  WRITE  ✻

┌──────────────┬──────────────┐
│ AUTO  WRITE  │  ✻   YES     │
│              │      NO      │
└──────────────┴──────────────┘

IF  OK,  PRESS  (CR).  SELECTION  OF
"YES"  SAVES  DATA  ONTO  FD
DURING  PROGRAM  OR  COMMENT
CREATION.
```

o Select "YES" on the automatic FD write mode select screen.

CR

```
✻  SYSTEM  NAME  SETTING  ✻ (AUTO-WRITE)

                         DRIVE  B

┌──────────────┬──────────────┐
│ SYSTEM  NAME │      ■       │
└──────────────┴──────────────┘
```

o System name setting screen is displayed. Set the system name using alphanumeric and minus (—) keys. Up to 8 characters may be entered. (Space is invalid.) The first character must be alphabetic.
o If CR is pressed without specifying the system name, the screen shown below on the left is displayed.

CR

(System name not specified)

```
✻  SYSTEM  NAME  SETTING  ✻ (AUTO-WRITE)
                         DRIVE  B

┌──────────────┬──────────────┐
│ SYSTEM  NAME │              │
└──────────────┴──────────────┘

■  PRESS  <CR>,  WHEN  NOT  FD
   AUTO-WRITE
```

(System name specified)

```
✻  SYSTEM  NAME  SETTING  ✻ (AUTO-WRITE)
                         DRIVE  B

┌──────────────┬──────────────┐
│ SYSTEM  NAME │    A B C     │
├──────────────┼──────────────┤
│ COMMENT      │   1986-6-1   │
└──────────────┴──────────────┘

■  PRESS  <CR>,  WHEN  OK
```

o After the system name is specified, the comment column is displayed. Comments may be entered to a maximum of 20 characters using alphanumeric, special, and upper/lower-case characters. If a comment is not required, press CR after the comment column is displayed. After the system name and comment are specified, "✻✻AUTO✻✻" on the bottom right of the screen changes to the specified system name.

CR   CR

```
┌──────────────────┐   ┌──────────────────┐
│                  │   │                  │
│                  │   │                  │
│                  │   │        ✻✻AUTO✻✻  │
│  SELECT  MODE    │   │  SELECT  MODE    │
└──────────────────┘   └──────────────────┘
```

o After pressing CR, the screen on the left is displayed. "SELECT MODE" is displayed in the message column.
o When CR is pressed without specifying the system name, the screen on the left is displayed. Pressing CR cancels automatic FD write mode and deletes ✻✻AUTO✻✻. If the system name has not yet been specified, press ↑ to move the cursor to the system name column and then specify the system name.

(Mode selection)

```
┌────────┐         ┌──────┐    ┌─────────┐  ┌──────────┐
│ Ladder │         │ List │    │ Comment │  │ Micro-   │
└────────┘         └──────┘    └─────────┘  │ computer │
                                            └──────────┘
```

o When "YES" has been selected on the automatic FD write mode select screen, the system name setting screen is displayed after any of the relevant keys on the left are pressed.

```
┌────┐ ┌────┐ ┌────┐ ┌────┐   ┌────┐ ┌────┐ ┌────┐ ┌────┐   ┌────┐   ┌────┐
│ WR │ │INS │ │DEL │ │CNV │   │ WR │ │INS │ │DEL │ │CNV │   │ WR │   │ WR │
└────┘ └────┘ └────┘ └────┘   └────┘ └────┘ └────┘ └────┘   └────┘   └────┘
```

(Relevant mode screen)

(1) To select automatic FD write mode, insert the system disk into FDD [A] and the user disk into FDD [B] . If the user disk is not in FDD [B] during ladder, list, or comment creation after the GPP/PHP operation is initiated, "FLOPPY DISK ERROR" is displayed.
In this case, insert the SW0-GPPU into FDD [B] and operate properly.

(2) When an existing file name is specified, "SYSTEM NAME ALREADY USED" is displayed in the message column and then "PRESS [W] TO WRITE NEW PROGRAM PRESS [R] TO READ PROG. FROM DISK". To over-write the previous file, enter "W". To read the program from the specified file, enter "R".
When the GPP/PHP is started or reset, the contents of the internal memory is cleared. Therefore, to execute automatic write mode after selecting an existing system name, be sure to enter "R", thereby reading the program from the FD.
When R is pressed, program and comments are read (if the same system name has been specified).

(3) If an existing system name is specified after starting up or resetting the GPP/PHP, "SYSTEM NAME ALREADY USED" is displayed in the message column and then "PRESS [W] TO WRITE NEW PROGRAM PRESS [R] TO READ PROG. FROM DISK."
Press [W] to write a new program using the same system name. Press [R] to read and correct the existing program.
When executing automatic write mode after setting the same system name, [R] must be pressed to read the program from disk.
Pressing [R] reads the existing program and comments (if the same system name is specified).

2.3.2 Automatic FD write timing

In automatic FDD write mode, data is automatically written onto the FD when any of the following key operations is performed.

| Ladder mode |

o When [CNV] and [GO] are pressed during ladder write, the converted head step to END is written.
o When a ladder is deleted, the deleted head step to END is written.
o When a ladder is inserted, the inserted head step to END is written.

| List mode |

o By pressing [MELSAP] after writing a list, all sequence programs are written. In this case, if [MELSAP] is not pressed but the relevant mode key pressed after write, insertion, deletion, or conversion, all sequence programs are written automatically.

| Comment mode |

o By pressing [F9] after writing comments, all comments are written.

| Microcomputer mode |

o When [MELSAP] is pressed after writing microcomputer programs, all microcomputer programs are written. In this case, if [MELSAP] is not pressed but another mode key pressed, all microcomputer programs are written automatically.

2.3.3 System name clear timing

The system name set in automatic write mode is automatically cleared:

1) by resetting the GPP/PHP or switching the power off;
2) when read is executed in PC or ROM mode;
3) when read, write, delete, copy, or formatting is executed in FDD mode;
4) by setting the initial data;
5) by clearing the memory (writing NOPs);
6) when "NO" is selected for "AUTO-WRITE" in FDD mode; or
7) when FLOPPY DISK ERROR or WRITE-IN ERROR is displayed in automatic write mode.

| REMARKS |

For 1) to 5), automatic write mode is not cleared. For 6) and 7), automatic write mode is cleared at the same time.

2.4 Parameter Setting

For parameter setting, the GPP/PHP always verifies the GPP/PHP and PC CPU programs automatically prior to monitoring (ladder only) and displays the monitor screen. To perform the monitor operation without automatic verification, it is necessary to select "NO" in parameter mode.

Set as explained below.
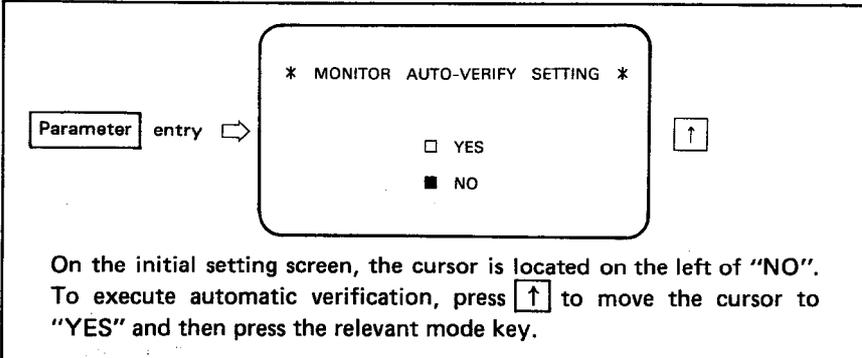
```
                              * MONITOR AUTO-VERIFY SETTING *

  Parameter  entry  ⇨                                              ↑
                                       □ YES

                                       ■ NO
```

On the initial setting screen, the cursor is located on the left of "NO". To execute automatic verification, press ↑ to move the cursor to "YES" and then press the relevant mode key.

| POINT |

Automatic FD write mode must always be set after setting the initial data. The parameter may be set before setting monitor mode. For operating convenience, it is suggested to set the parameter after the initial data setting.

2.5 Layout of Display

Approximately one quarter of the lower area of the CRT screen displayed on the GPP/PHP is occupied by the "common display area". An explanation of the common display area is given in this section and the format remains similar in all modes.

In screens shown hereafter, the "common display area" is omitted.
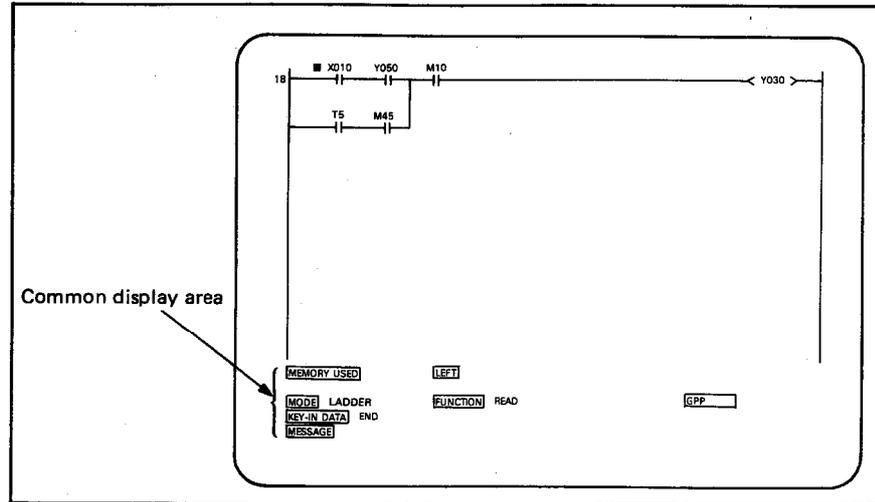
The figure below shows an expanded common display area. An explanation of each item given is below.
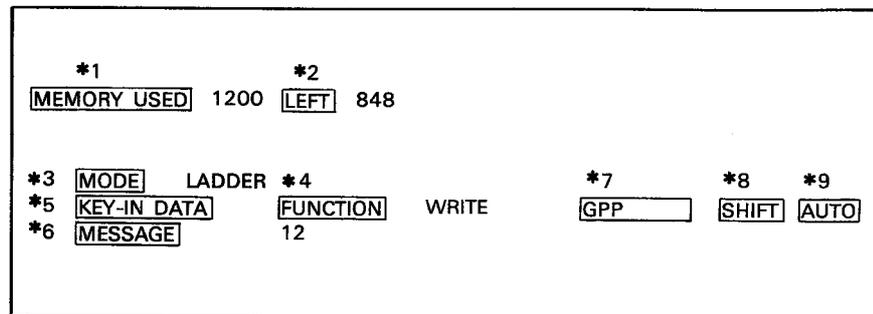
*1 and *2 The displays in these columns differ depending on modes, as indicated below.

Mode	Display	Contents
Ladder, list, ROM, printer, program conversion, microcomputer	"MEMORY USED" "LEFT"	Indicates the amount of used memory and remaining amount in step numbers
Comment	"COMMENT USED" "LEFT"	Indicates the amount of used comment and remaining amount in comment numbers.
PC, FDD	No indication	

*3 Indicates the current "MODE" of the A6GPP.

*4 Indicates the current "FUNCTION" of the A6GPP.

*5 Displays the data currently being keyed in (where appropriate).

*6 Displays error messages and other information for the user.

*7 In FDD mode or comment write mode, "MELSAP" is displayed. In other modes, "GPP" is displayed. When MELSAP is displayed, the upper (MELSAP) keyboard should be used and when GPP is displayed, the lower (GPP) keyboard should be used.

*8 "SHIFT" is displayed when the [SHIFT] key had been pressed on the "GPP" keyboard.
(Note: [SHIFT] may have been entered automatically in ladder or list mode according to the previous key strokes.)

*9 "AUTO" is displayed when automatic write to the FD has been selected.

2.6 Adjustment of A6GPP Buzzer Volume

To adjust the volume of electronic buzzer sounded when data is input:

(With MELSAP mode keys)

Input [CTRL] and [1] at the same time.
The volume is factory-set at a "low" level. By simultaneously inputting [CTRL] and [1], the volume is set to a "high" level. To return to the "low" level, input [CTRL] and [1] at the same time.

---

3. BASIC OPERATIONS FOR THE GPP/PHP

This chapter describes general description for the GPP/PHP operations.

3.1 GPP/PHP Applications

The GPP/PHP+SW1GP-GPPK system applications are classified into the following:

```
                          ┌─ 1) Program creation ─┬─ Ladder mode ·············· Create ladder using ladder
                          │                        │                            symbols.
                          │                        │
                          │                        └─ List mode ···················· Create program using
                          │                                                          instruction list.
                          │
[GPP/PHP application] ─────┼─ 2) Program check ······· Checks program operation result after program creation.
                          │
                          │
                          ├─ 3) Program storage ─┬─ FD
                          │                      └─ ROM
                          │
                          └─ 4) Print out ·············· Prints out necessary data.
```
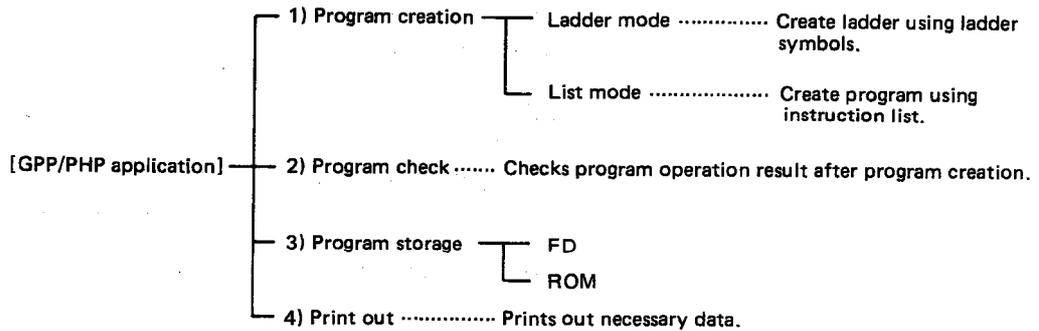
3.1.1 Program creation

The most significant application of the GPP/PHP is program creation. The program creating procedures are available in ladder and list modes.

Ladder Mode	List Mode		
Create sequence program using ladder symbols.	Create sequence program using instruction list.		
	0 LD	X000	
	1 AN I	X002	
	2 OR I	X004	
	3 MOV	K1	D1
	6 LD I	X001	
	7 OR	X005	
	8 AND	X003	
	9 MOV	K10	D2
	12 END		
The program created in ladder or list mode may be displayed in either mode, i.e. the ladder diagram may be displayed as a program list.			

3.1.2 Program check

After the program creation, always check the program. To make the most effective check, use the monitor function. By using the monitor function, write the created program into the PC and monitor the PC operation result on the GPP/PHP CRT. The monitoring methods are available in ladder and list monitorings.

Ladder Monitor	List Monitor
Monitor the ladder diagram and check the contacts and output ON/OFF status. Data register contents in the ladder may be checked.	Monitor the devices.
By specifically using the ladder and list monitors, programs can be checked properly.	

3.1.3 Program storage

Created programs can be stored onto a floppy disk (FD), ROM ,etc. Since the A6GPP memory (into which created programs are entered) is not backed up by a battery, all programs will be cleared if the power is turned off or reset is executed. For this reason, it is recommended to use automatic FD write mode. In FDD mode, the program/comment edit function is available, which is useful during program creation.

3.1.4 Print-OUT

The A6GPP provides a wide variety of print out functions. Utilize these functions according to applications, such as program data storage, used device list, program diagram creation, and monitor diagram copying.

POINT

KCPU ON LINE

KCPU ON LINE means that the K6HGPF is in the ONLINE mode and the KCPU is in the RUN mode. In the case of K3NCPU, however, **KCPU ON LINE** means that the KCPU is in the RUN or STEP-RUN mode.

---

4. LADDER MODE

4.1 Ladder Mode Introduction

The ladder (or circuit) diagram is a convenient way of logically setting out a program using standard symbols derived from conventional relay diagrams.

Essentially, the ladder diagram consists of contacts and coils each with a "device number" which identifies it and defines its function(e.g. timer, counter etc.). These devices are connected to form blocks which in turn make up the ladder diagram. The following is a short example of a ladder diagram:
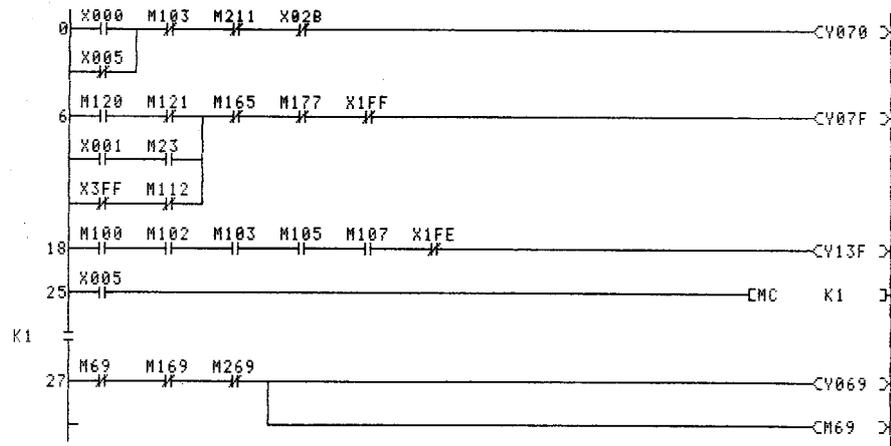
For detailed information on programming, refer to the relevant programming manual.

4.2 Ladder Mode Functions

In ladder mode sequence programs may be handled using the ladder symbol keys on the GPP key board.

The functions of ladder mode are as indicated below:

Ladder mode function

Ladder write
- Creation of new ladder . . . . Ladder is newly created. (Section 4.3.1)
- Correction of exisiting ladder . . . . . Created ladder is corrected. (Section 4.3.2)
- Insertion and/or addition of ladder block . . . . . . Ladder block is added and/or inserted to sequence circuit. (Section 4.3.3)

Ladder read
- Ladder read by step number . . . . . . Ladder is read by specified step number. (Section 4.4.1)
- Ladder read by contact or coil number . . . . Ladder is read by specified contact or coil number. (Section 4.4.2)
- Ladder read by I/O number . . . . . . Ladder is read by specified I/O number. (Section 4.4.3)
- Ladder read by instruction . . . . Ladder is read by specified instruction. (Section 4.4.4)
- The last ladder read by END instruction . . . . . . The last sequence ladder is read by END instruction. (Section 4.4.5)
- Read of ladder with comment . . . . . Entered comment is annotated to ladder and displayed. (Section 4.4.6)

Ladder insertion/ deletion
- Insertion and/or addition in units of ladder symbol . . . Insertion and/or addition is made to ladder in units of ladder symbol. (Section 4.5.1)
- Deletion of 1 ladder bolck . . . . Deletion is made from ladder per ladder block. (Section 4.5.2)
- Deletion in units of ladder symbol . . . Deletion is made from ladder in units of ladder symbol. (Section 4.5.3)

Ladder utilization
- Entry of utilized ladder . . . . Circuit pattern, which is to be utilized, is entered into FD. (Section 4.6.1)
- Utilization of entered ladder . . . . . . Entered circuit pattern is utilized for specified portion of program. (Section 4.6.2)

Ladder monitor of programmable controller CPU
- Ladder monitor . . . . Monitor in ladder mode. (Section 4.7.1)
- Stop of monitor screen . . . . Monitor screen is stopped during ladder monitor operation, irrespective of the operation of programmable controller CPU. (Section 4.7.2)
- Screen stop by monitor stop point setting . . . . Monitor screen is stopped at monitor stop point during ladder monitor operation. irrespective of the operation of programmable controller CPU. (Section 4.7.3)
- Entry monitor . . . . Used monitor devices, which are not displayed in the ladder, during ladder monitor operation. (Section 4.7.4)
- Decimal ↔ hexadecimal present value monitor . . . . T.C and D values of ladder monitor and entry monitor are displayed in decimal and hexadecimal. (Section 4.7.5)

Test operation to programmable controller CPU
- Forced output to programmable controller CPU . . . . Output is provided forcibly without regard to the operation of programmable controller CPU. (Section 4.8.1)
- Step run of K3NCPU . . . . Function which allows the program in the programmable controller CPU to perform step run per step of software processing instruction when the A6GPP is connected with the K3NCPU. (Section 4.8.2)

| POINT |

1) In ladder mode, the numbers of contacts which can be created and displayed are as follows:

    While writing a circuit, the number of parallel contacts is 22 points and that of serial contacts is 161 points.
    While reading a circuit, the number of parallel contacts is 24 points and that of serial contacts is 211 points.

2) Step numbers are displayed in decimal.
    Previously, for example, the K8GPP used for the K3NCPU displayed step "A000". However, the A6GPP displays step "10000".

4.3 Ladder Write
4.3.1 Creation of a new ladder

A new program is written. Any previous programs are deleted from the GPP memory

LADDER WRITE

BASIC OPERATION

LDR → WR → System name → CR → Comment → CR → CR → NOP → GO
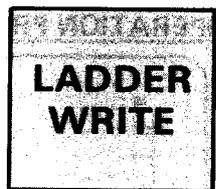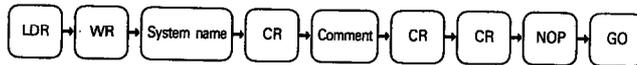
OPERATION PROCEDURE 1

```
*  SYSTEM NAME SETTING  *    (AUTO-WRITE)

                    DRIVE B

   ┌──────────────┬──────────┐
   │ SYSTEM NAME  │   EX5    │
   └──────────────┴──────────┘

   ┌──────────────┬──────────┐
   │   COMMENT    │   DEMO   │
   └──────────────┴──────────┘

   PRESS (CR), WHEN OK
```

Key in the required system name and comment on the MELSAP key board.
(Press CR to cancel auto write)

LDR → WR → E → X → 5 → CR
D → E → M → O → CR

CR →

```
CLEAR MEMORY FOR NEW PROGRAM ?

   *  IF YES, PRESS (NOP) (GO)

   *  IF NO, PRESS (RD)
```

NOP → GO Clears the program area ready for the new program.

EXPLANATION

(1) If FD Auto write has been selected (see section 2.3), the system name setting screen is displayed the first time that the LDR WR keys are pressed. The system name should be keyed in from the MELSAP Keyboard using a maximum of 8 characters, the first of which must be on alphabetic character. After pressing the CR key, a comment of up to 20 characters may be keyed in. Press the CR key to enter the comment and the message "PRESS [CR], WHEN OK" is displayed. When the CR key is pressed a file with the designated system name is opened on the FD.

If a file already exists for the specified name "SYSTEM NAME ALREADY USED" is displayed in the message column followed by "PRESS [W] TO WRITE NEW PROGRAM, PRESS [R] TO READ PROG. FROM DISK". To overwrite the existing file, press "W". To read the program from the specified file, enter "R".

To cancel the auto-write function, press the CR key when the system name setting screen is displayed. In this case "PRESS [CR] TO CANCEL AUTO-WRITE" is displayed, when the CR key is pressed a second time, auto-write is cancelled.

(2) Declare the start of a new circuit.

NOP → GO . . . . .The previous programs are cleared and the work area prepared for a ladder.

RD . . . . .If the previous program must not be cleared, press the RD key to proceed to read mode.

4-4

OPERATION PROCEDURE 2

```
 ■
0 ├                                          ┌───┐ ┌───┐
  ┤                                          │NOP├─┤GO │
  ┤                                          └───┘ └───┘
  ┤
  ┤
  ┤
  ┤
  ┤
  ┤
  ┤
  ┤
  ┬
```
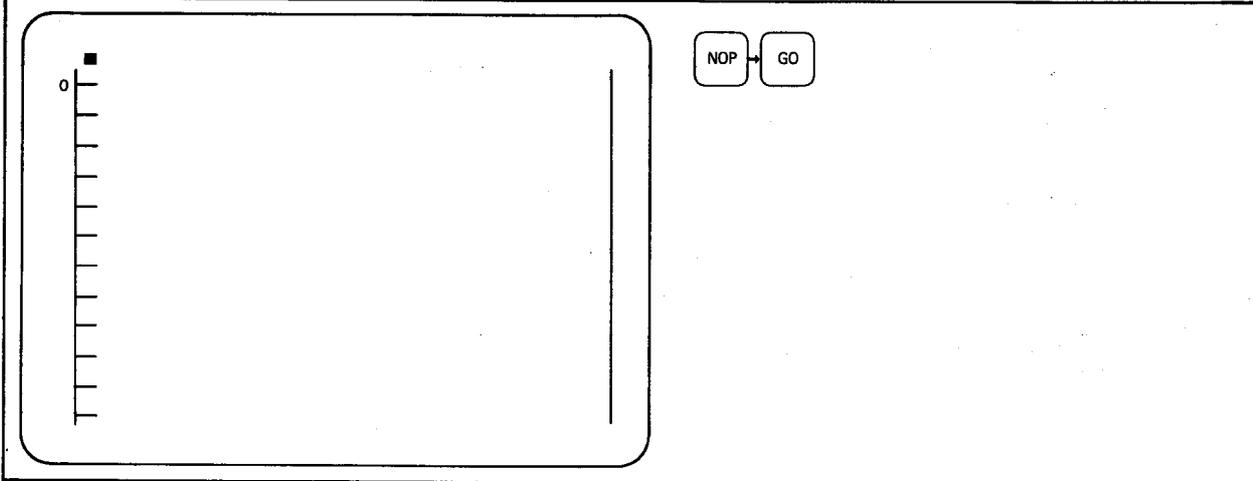
EXPLANATION

(1) After the previous programs have all been cleared, the new ladder screen is displayed.

Write the ladder, starting at the cursor position.

| REMARKS |

It is necessary to always start with a contact symbol, i.e.:

Example: ┤├ or ┤/├ → [X] → [O] → [GO]

SUMMARY

(1) After ladder creation, be sure to press the [CNV] and [GO] keys. By pressing the [CNV] and [GO] keys, the ladder pattern is checked, converted into a list pattern, and then stored in the work area. If you have forgotten to press the [CNV] and [GO] keys and selected another function, "PRESS CNV?" is displayed in the message column. If it is not required to make the conversion, press the function key again.

(2) Perform the conversion operation for every two screens written.

(3) During conversion, the message column displays "EXECUTING". After the completion of conversion, the message column displays "COMPLETED ✗ STEP NOS CHANGED".

(4) When the [WR], [+], and [GO] keys are pressed after the [CNV] and [GO] keys are pressed, the created ladder display is cleared, the next step number is displayed, and the creation of the next ladder block can be performed.

(5) If FD automatic write operation has been set, the program is automatically stored onto the FD when the [CNV] and [GO] keys are pressed. (For automatic write operation to the FD, refer to Section 7.11 and 2.3.)

(6) If, during the write procedure, an incorrect device or number is keyed in, this may be erased from the key-in data column by using the [CLEAR] key.

REMARKS

(1) When creating a new ladder, if is recommended to write ⊣☐⊢ , CJ, K, 0, for the jump destination step number.   Be sure to press 0.◄┘

    (Reason: If the jump destination of CJ instruction is other than K0, the execution of conversion after ladder write changes the jump destination of CJ instruction.)

    After writing all ladders, press RD, ⊣☐⊢ , CJ, and GO keys to search for the CJ and change them to normal jump destination step numbers.

(2) If an invalid jump destination step number (i.e. outside the range set on the initial data screen) is selected "CJ STEP NO. ERROR" is displayed.

(3) Once a normal jump destination step has been set this is automatically changed if step numbers change due to ladder correction, etc.

(4) The jump destination step of CJ instruction should always be located after the step of CJ (i.e. a higher step number) and before END.

    In ladder mode, the error check of CJ instruction jump destination step (check if a jump destination step is located before or after CJ step) is not made.

The instruction input procedures in ladder mode are classified into five types.

(1) LD, LDI, AND, ANI, OR, ORI, and OUT (except OUT T, C) instructions (sequence instructions)

| Ladder symbol | [SP] | Device | Device number | [GO] |

Example: LD X00 ⇒ [⊣⊢] [SP] [X] [0] [GO]

(2) OUT T, C instruction (sequence instruction)

| Ladder symbol | [SP] | Device | Device number | [SP] | Set value | [GO] |

Example: OUT T0 K10 ⇒ [⊣O⊢] [SP] [T] [0] [SP] [K] [1] [0] [GO]

(3) MC, MCR, SET, RST, SFT, CJ, and PLS instructions (sequence instructions)

| Ladder symbol | [SP] | Instruction | [SP] | Device | Device number | [GO] |
↓
[⊣□⊢]

Example: SET Y0 ⇒ [⊣□⊢] [SP] [SET] [SP] [Y] [0] [GO]

(4) =, <, >, +, −, MOV, BIN, and BCD instructions (data instructions)

| Ladder symbol | [SP] | Instruction | [SP] | Source data | [SP] | Destination data | [GO] |
↓
[⊣□⊢]

Example: MOV D0 D1 ⇒ [⊣□⊢] [SP] [MOV] [SP] [D] [0] [SP] [D] [1] [GO]

(5) Vertical line and horizontal line

| Ladder symbol | [GO] |

Example: Vertical line ⇒ [I] [GO]

REMARKS

In the above, the [SP] (space) key can be omitted.
The following pages show examples of key inputs.

Instruction Input Procedure Examples

Instruction	Key Input	Screen Display	
		Before key input	After key input
LD	⊣⊢ [X] [SFT 1] [RST 0] [GO] ↳ Device number	■ ←Cursor	⊣⊢X010 ■
LDI	⊣⊬ [M] [CJ 2] [ANB 5] [GO]	■	⊣⊬M25 ■
AND	⊣⊢ [M] [SFT 1] [CJ 2] [ANB 3] [GO]	⊣⊢ ■	⊣⊢⊣⊢M125 ■
ANI	⊣⊬ [M] [CJ 2] [CJ 2] [ANB 5] [GO]	⊣⊢ ■	⊣⊢⊣⊬M225 ■
OR	⊔⊔ [Y] [ANB 5] [RST 0] [GO]	⊣⊢⊣⊢ ■	⊣⊢Y050 ■
ORI	⊔⊬⊔ [Y] [PLS 7] [RST 0] [GO]	⊣⊢⊣⊢ ■	⊣⊢Y070 ■
OUT (Only Y, M, F)	⊸O⊢ [Y] [ANB 5] [RST 0] [GO]	⊣⊢⊣⊢ ■	⊣⊢⟨Y050⟩ ■
OUT	⊸O⊢ [T] [SFT 1] [RST 0] [SP (,)] [K] [CJ 2] [CJ 2] [RST 0] [GO]	⊣⊢ ■	⊣⊢⟨K220 T10⟩ ■
OUT For timer (T)	⊸O⊢ [T] [CJ 2] [RST 0] [SP (,)] [D] [SFT 1] [SFT 1] [ANB 5] [GO]	⊣⊢ ■	⊣⊢⟨D115 T20⟩ ■
OUT	⊸O⊢ [C] [ANB 5] [ANB 5] [SP (,)] [K] [CJ 2] [RST 0] [GO]	⊣⊢ ■	⊣⊢⟨K20 C55⟩ ■
OUT For counter (C)	⊸O⊢ [C] [SFT 1] [RST 0] [SP (,)] [D] [SFT 1] [RST 0] [GO]	⊣⊢ ■	⊣⊢⟨D10 C10⟩ ■

Instruction	Key Input	Screen Display	
		Before key input	After key input
MC	[□─] [MC F] [K] [RST 0] [GO]	├┤├─■ ← Cursor	⟹ ├┤├─[MC K0] ⟱ CNV GO K0─├┤├─[MC K0]
MCR	[□─] [MCR 8] [K] [RST 0] [GO]	■	⟹ ├─[MCR K0]
SET	[□─] [SET 4] [M] [CJ 2] [ANB 5] [ORB 6] [GO]	├┤├─■	⟹ ├┤├─[SET M255]
RST	[□─] [RST 0] [M] [OUT 3] [ANB 5] [RST 0] [GO]	├┤├─■	⟹ ├┤├─[RST M350]
SFT	[□─] [SFT 1] [M] [SFT 1] [RST 0] [RST 0] [GO]	├┤├─■	⟹ ├┤├─[SFT M100]
CJ	[□─] [CJ 2] [K] [RST 0] [GO]	├┤├─■	⟹ ├┤├─[CJ K0]
PLS	[□─] [PLS 7] [M] [SFT 1] [RST 0] [GO]	├┤├─■	⟹ ├┤├─[PLS M10]
=	[□─] [= RET] [K] [SET 4] [X] [RST 0] [SP (,)] [D] [SFT 1] [GO]	├┤├─■	⟹ ├┤├─[= K4 X0 D1]■
	[□─] [= RET] [K] [ANB 5] [RST 0] [SP (,)] [T] [SFT 1] [RST 0] [RST 0] [GO]	├┤├─■	⟹ ├┤├─[= K50 T100]■

Instruction	Key Input	Screen Display — Before key input	Screen Display — After key input
<	[□] [< T0] [D] [RST 0] [SP (,)] [D] [SFT 1] [RST 0] [GO]	⊦⊦■	⊦⊦[< D0 D10]■
>	[□] [> FROM] [D] [RST 0] [SP (,)] [C] [SFT 1] [RST 0] [RST 0] [GO]	⊦⊦■	⊦⊦[> D0 C100]■
+	[□] [+ INC] [K] [SET 4] [X] [RST 0] [SP (,)] [D] [SFT 1] [GO]	⊦⊦■	⊦⊦[+ K4 X000 D1] ■
+	[□] [+ INC] [K] [ANB 5] [RST 0] [SP (,)] [D] [PLS 7] [RST 0] [GO]	⊦⊦■	⊦⊦[+ K 50 D70] ■
−	[□] [− DEC] [D] [SFT 1] [SP (,)] [D] [SFT 1] [RST 0] [GO]	⊦⊦■	⊦⊦[− D1 D10] ■
MOV	[□] [MOV CALL] [K] [ANB 5] [RST 0] [SP (,)] [D] [OUT 3] [RST 0] [GO]	⊦⊦■	⊦⊦[MOV K 50 D30] ■
BIN	[□] [BIN /] [K] [SET 4] [X] [RST 0] [SP (,)] [D] [ANB 5] [GO]	⊦⊦■	⊦⊦[BIN K4 X000 D5] ■
BCD	[□] [BCD X] [D] [ANB 5] [SP (,)] [D] [SFT 1] [RST 0] [GO]	⊦⊦■	⊦⊦[BCD D5 D10] ■
Vertical line	[│] [GO]	⊦⊦■ ─(Y010)	⊦⊦ ■ ─(Y010)
Horizontal line	[─] [GO]	⊦⊦⊦⊦⊦⊦ ─(M5) ⊦⊦■	⊦⊦⊦⊦⊦⊦ ─(M5) ⊦⊦ ■

4.3.2 Correction of existing ladder
To correct a ladder.

LADDER WRITE

BASIC OPERATION
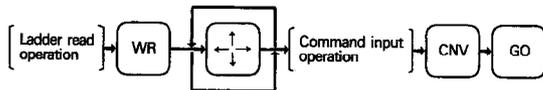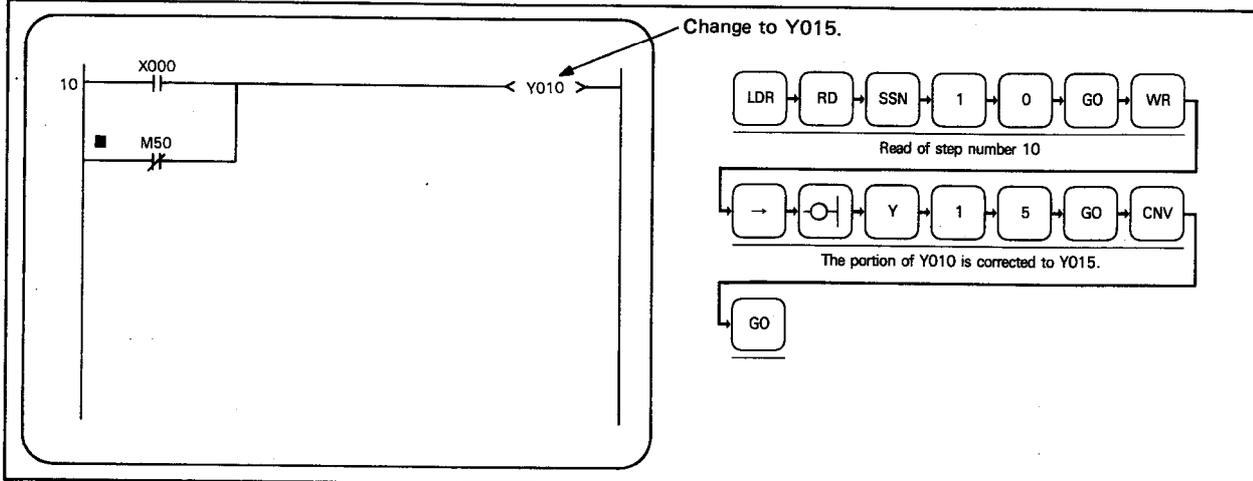
$$\left[\begin{array}{c} \text{Ladder read} \\ \text{operation} \end{array} \right] \rightarrow \boxed{\text{WR}} \rightarrow \boxed{\begin{array}{c}\uparrow\\ \leftarrow\rightarrow\\ \downarrow\end{array}} \rightarrow \left[\begin{array}{c} \text{Command input} \\ \text{operation} \end{array} \right] \rightarrow \boxed{\text{CNV}} \rightarrow \boxed{\text{GO}}$$

OPERATION PROCEDURE

Change to Y015.

```
       X000
  10 ---| |--------------------< Y010 >
  ■    M50
      --|/|--
```

LDR → RD → SSN → 1 → 0 → GO → WR

Read of step number 10

→ → -O- → Y → 1 → 5 → GO → CNV

The portion of Y010 is corrected to Y015.

GO

EXPLANATION

(1) By performing the read operation, display the ladder block, which is to be corrected.

(2) Move the cursor to the head of the block to be corrected and then press the [WR] key. This causes the ladder block to be displayed at the top of the screen and the other ladder blocks to be cleared.
Move the cursor to the symbol to be corrected, by use of the cursor keys and then perform the instruction input operation.

(3) After the correction of a ladder, be sure to press the [CNV] and [GO] keys.

(4) Immediately after the [GO] key is pressed, "EXECUTING" is displayed in the message column. Upon completion of the conversion, "COMPLETED ✗ STEP NOS. CHANGED" is displayed and the corrected ladder is displayed on the screen.

(5) If the FD automatic write operation has been set, the program in the range from the corrected step to the END is automatically stored onto the FD. (For automatic write operation to the FD, refer to Section 2.3 and 7.11.)

POINT
If a ladder change involves the addition of lines of program between a conditional jump instruction and its relevant destination step number, then the "K" value associated with the CJ instruction is automatically adjusted to allow for the change in step number.

(6) A data instruction may be corrected using the following procedure: (This does not apply to contact, coil, timer, and counter.)

By moving the cursor to the head of a data instruction and pressing ⊣□⊢ and ⌷GO⌷, that data instruction and the cursor are displayed at the key-in data column.

(If ⊣□⊢ and ⌷GO⌷ are pressed with the cursor anywhere other than the head of the data instruction, "OPERATOR ERROR" is displayed in the message column.)

The instruction may then be corrected by moving the cursor to the relevant part of the instruction and over writing it (Note the state of the shift key, displayed at lower right of screen). When the ⌷GO⌷ key is pressed after correction the corrected ladder is displayed.

This data instruction correcting procedure is applicable only to a write function (not applicable to an insert function).

POINT

Replacing a contact with a horizontal line, as in the example below, causes a NOP instruction to be placed at the end of the circuit block concerned. Hence the step numbers of other circuit blocks do not change.

---
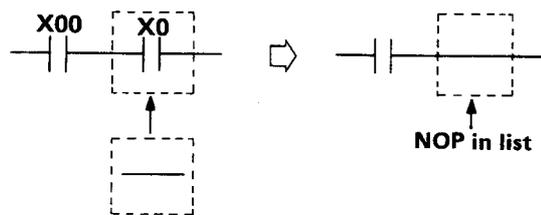
(7) Line return for more than 11 contacts

1) Writing a 12th series contact during ladder creation automatically causes the return shown below.
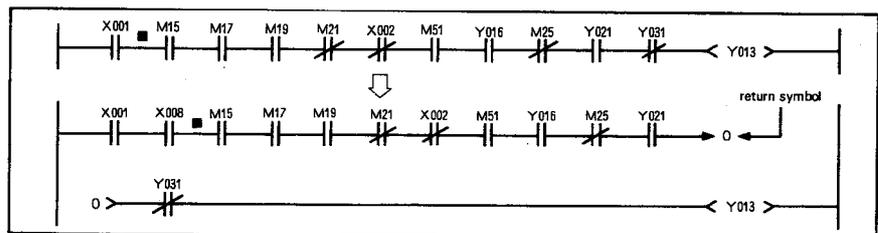
2) The return symbol can also be written by pressing ⊟, ⌷K⌷, ⌷0⌷, and ⌷GO⌷ keys.

A return symbol can be written only to the 1st and 12th columns. For return symbols, serial numbers K0 to K255 are used in order, starting at 0. For OUT (→) and IN (>—), a pair of numbers should always be used and the same numbers cannot be used repeatedly. Other ladder symbols cannot be inserted between OUT (→) and IN (>—) lines.

3) A maximum of 15 returns can be made in one ladder block (161 contacts). If restrictions described in above 2) and 3) are not followed, "LADDER CONTINUATION ERROR" is displayed at conversion and conversion cannot be made.

REMARKS

Shown below is a correct key input operation for the setting of return number in Appendix
1. example (6) "ILLOGICAL LADDER EXAMPLES."

(Key input operation example)

4.3.3 Insertion and addition of ladder block
A ladder block is inserted or added to the program.

```
LADDER
WRITE
```

BASIC OPERATION

[Ladder read operation] → WR → + / − → GO → [Command input operation] → CNV → GO

OPERATION PROCEDURE

X005
50 ──┤├──────────────< Y015 >──

LDR → RD → SSN → 5 → 0 → GO → WR → − → GO

Read of step number 50 / Ladder is inserted in front of read circuit block.

┤├ → X → 5 → GO → O → Y → 1 → 5 → GO

The ladder of X005 and Y015 written

CNV → GO

(Example: Addition of X005 and Y015 ladder
block to step number 50)
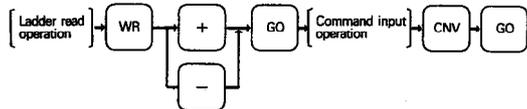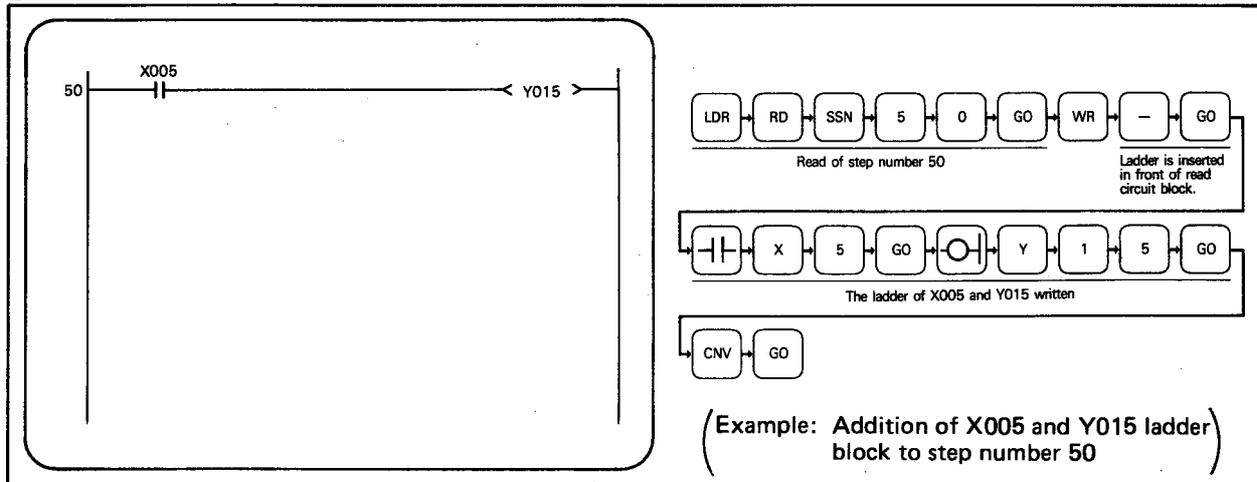
EXPLANATION

(1) The read operation displays the ladder block, to which insertion or addition is desired, on the CRT.

(2) When a ladder block other than the one at the top of the read ladder is to be corrected, move the cursor to the head of the block to be corrected and then press the WR key. This causes the ladder block to be displayed at the top of the screen and the other ladder blocks to be cleared.

The + and GO keys allow a ladder block to be inserted after the specified step number.

(The − and GO keys allow a ladder block to be inserted before the specified step number.)

(3) By performing the instruction input operation, write the additional ladder blocks.

(4) After the addition or insertion of a ladder block, be sure to press the CNV and GO keys.

POINT

When the ladder block is inserted or added, the succeeding step numbers of the program and any jump destination of CJ instruction are automatically changed.

(5) If the automatic write operation has been set, the program in the range from the corrected step to the END is automatically written to the FD (For the automatic write operation to the FD, refer to sections 2.3 and 7.11) when the CNV and GO keys are pressed.

4.4 Ladder Read
4.4.1 Ladder read by step number
The ladder diagram is read from the specified step number.

LADDER
READ

BASIC OPERATION

LDR → RD → SSN → Step number → GO

OPERATION PROCEDURE


```
        ■ X000    X001
100 ├──┤↑├────┤↑├──────────────< Y010 >──┤

        X002
103 ├──┤↑├──────────────────────< Y011 >──┤
        │
        X003
     ├──┤↑├──┘
```

LDR → RD → SSN → 1 → 0 → 0
                      Step number

└→ GO

(Example: Read program from step number 100)
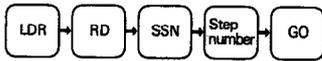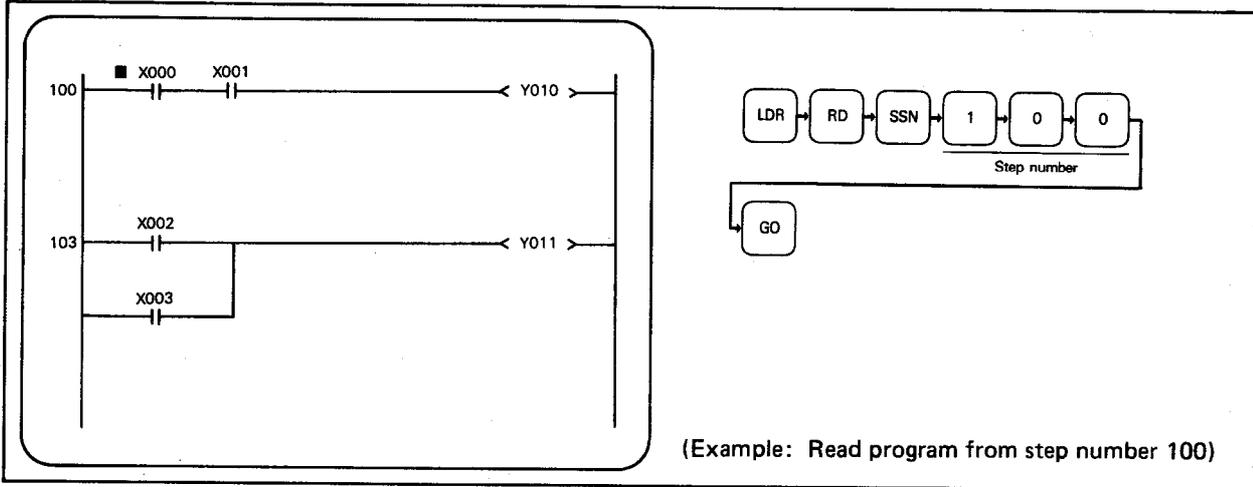
EXPLANATION

(1) A ladder, max. 12 lines, is displayed on the CRT, beginning with the specified step number.

(2) If the specified step number is inside one ladder block, the ladder is displayed, beginning with the head step number of that ladder block.

(3) By performing the basic operation and then pressing the [GO] key, the screen displays the next ladder block and succeeding ones.

(4) When the [−] and [GO] keys are pressed, the CRT returns to the previous ladder display screen. When the [+] and [GO] keys are pressed, the CRT changes to the next ladder display.

(5) If there are two or more ladder blocks and the 12th line is in the middle of a ladder block, only the first ladder block is displayed. By pressing the [GO] key after one screen is displayed, the rest of the ladder is displayed.

- By pressing the [↓] key with the cursor located at the bottom line, the screen is scrolled upward by one line and the first line of the succeeding circuit is added to the screen.
- By pressing the [↑] key with the cursor located at the top line, the screen is scrolled downward by one line and the 12th line of the preceding ladder is added to the screen.

REMARKS

If the ladder does not extend beyond the screen, the screen can be scrolled upward or downward by use of the [↑] or [↓] key. In this case, however, the screen merely moves up or down and the succeeding or preceding ladder is not displayed automatically.

---

(7) When a ladder block consists of 25 or more lines, its 25th and subsequent lines cannot be displayed. (These lines can be displayed in list mode.) In the message column, "LADDER DISPLAYED OVERFLOWS" is displayed.

(8) When there are two or more END instructions in a program, the ladder blocks below the first END instruction can be displayed only in the case of ladder read by step number.

| REMARKS |

The amount of used memory is displayed in number of steps to the first END instruction.

4.4.2 Ladder read by contact or coil number

The ladder block containing the specified contact or coil number is displayed.
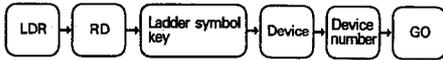
LADDER
READ

BASIC OPERATION

$\boxed{\text{LDR}} \rightarrow \boxed{\text{RD}} \rightarrow \boxed{\text{Ladder symbol key}} \rightarrow \boxed{\text{Device}} \rightarrow \boxed{\text{Device number}} \rightarrow \boxed{\text{GO}}$

OPERATION PROCEDURE

```
        ■ X010
45      ─┤ ├─                              < Y010 >

        M15
        ─┤/├─
```

$\boxed{\text{LDR}} \rightarrow \boxed{\text{RD}} \rightarrow \boxed{\dashv\vdash} \rightarrow \boxed{X} \rightarrow \boxed{1} \rightarrow \boxed{0}$

Contact X010 is specified.

$\boxed{\text{GO}}$

(Example: Read of contact X010)
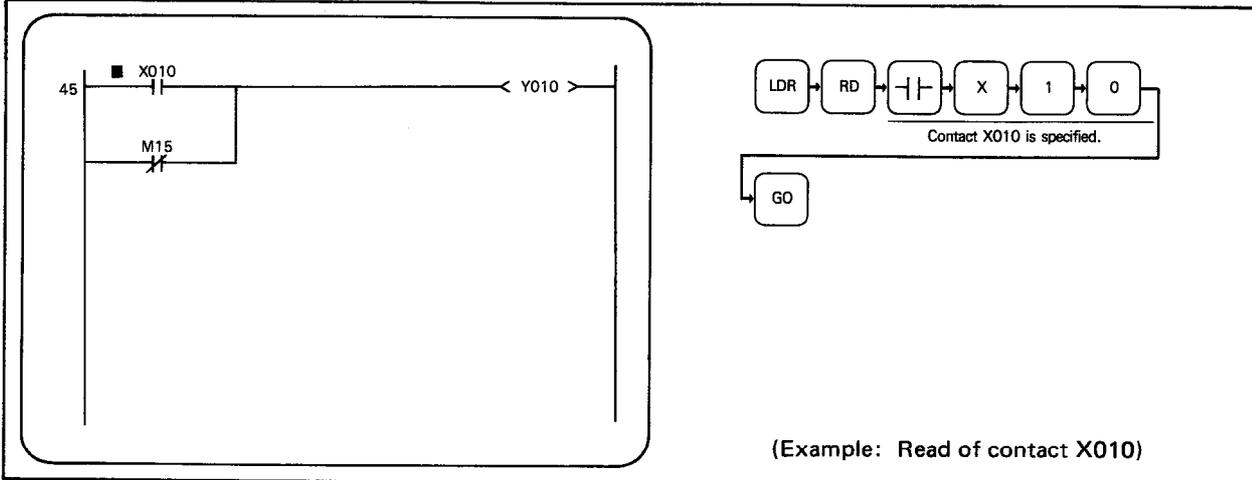
EXPLANATION

(1) If there are several ladder blocks which include the specified contact or coil number, the ladder block with the lowest step number is displayed. Then, by pressing the $\boxed{\text{GO}}$ key, the next ladder block is displayed below the preceding one. When the $\boxed{\text{GO}}$ key is pressed after the screen has become full, the ladder block located at the top of screen is cleared and the succeeding ladder blocks scroll in due order.

(2) If the specified contact or coil number has been changed during the operation, the ladder block with the new contact or coil number is displayed below the preceding ladder block.

(3) When all the relevant ladder blocks have been displayed, "NOT FOUND" is displayed in the message column.

(4) When the $\boxed{\dashv\vdash}$ device has been specified in the search by contact, only "N/O" contacts are displayed. When the $\boxed{\dashv\!/\!\vdash}$ device has been specified in the search by contact, only the "N/C" contacts are displayed.

(5) When the $\boxed{\dashv\!O\!\vdash}$ device has been set, the OUT, SET, RST, SFT, and PLS instructions are read.

$\boxed{\text{REMARKS}}$

When there are two or more END instructions in a program, the program is valid up to the first END instruction.

4.4.3 Ladder read by I/O number

A ladder block containing the specified device number is displayed.

LADDER
READ

BASIC OPERATION

[LDR] → [RD] → [Device] → [Device number] → [GO]

OPERATION PROCEDURE

```
      ■ X010    Y050    M10
18     ┤├      ┤├      ┤├                    < Y030 >

        T5      M45
       ┤├      ┤├
```

[LDR] → [RD] → [Y] → [3] → [0] → [GO]
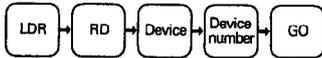
Output Y030 is specified.
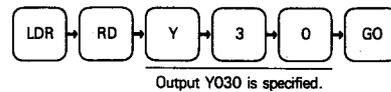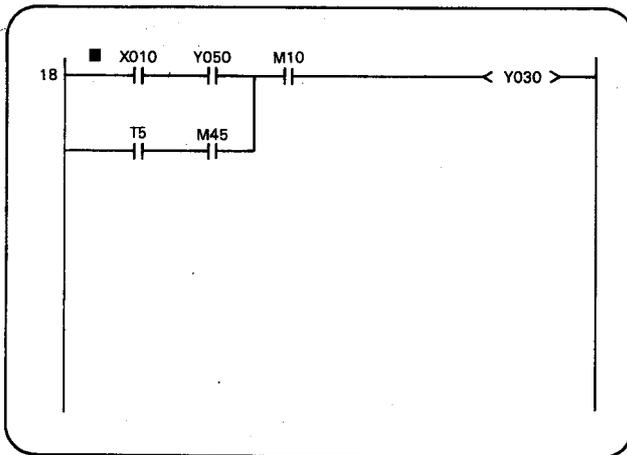
(Example: Read of output Y030)

EXPLANATION

(1) If there are several ladder blocks which include the specified device number, the ladder block with the lowest step number is displayed. Then, by pressing the [GO] key, the next ladder block is displayed below the preceding display. When the [GO] key is pressed after the screen has become full, the ladder block located at the top of the screen is cleared and the succeeding ladder blocks scroll in due order.

(2) If the specified device number has been changed to another one during the operation, the ladder block with the new device number is displayed below the preceding ladder block.

(3) After all the corresponding ladder blocks have been displayed, "NOT FOUND" is displayed in the message column.

| REMARKS |

When there are two or more END instructions in a program, I/O numbers used in the program are valid up to the first END instruction.

4.4.4 Ladder read by instruction

A sequence ladder is read by use of the specified instruction and device number.

LADDER
READ

BASIC OPERATION

LDR → RD → Ladder symbol key → Command key → Device → Device number → GO

OPERATION PROCEDURE

```
        X006   M51
    30 ──┤├────┤├────────────< SET M10 >──
```

Device number

LDR → RD → ─□─ → SET → M → 1 → 0 → GO

SET M10 is specified

(Example: Read of instruction SET M10)
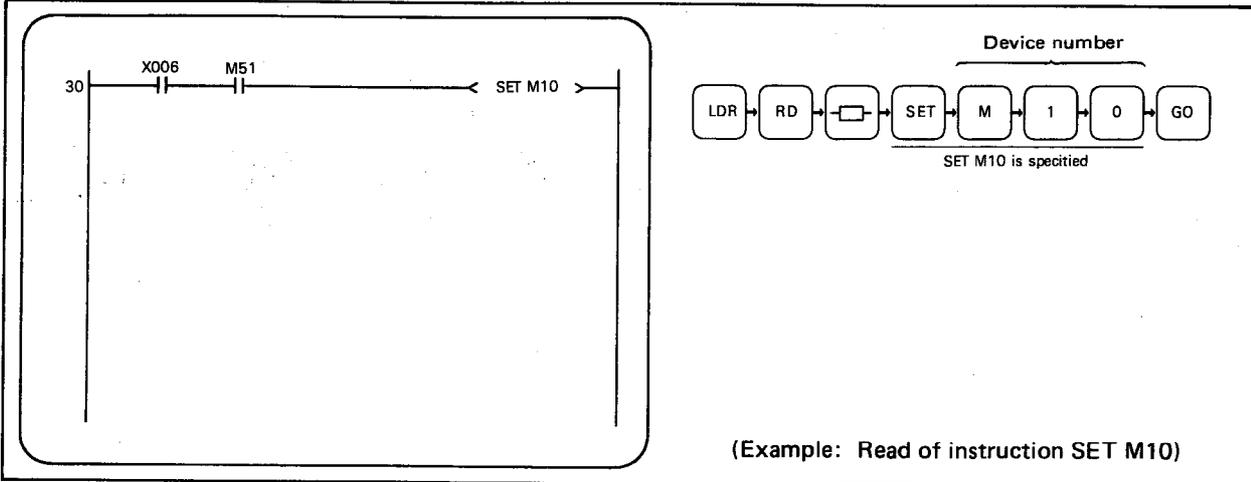
EXPLANATION

(1) If there are several ladder blocks which include the specified instruction and device number, the ladder block with the lowest step number is displayed. The specification of device number is not required for data instructions (MOV, >, <, =, +, −, BCD, BIN) and the CJ instruction.

(2) By performing the basic operation and then pressing the ⎡GO⎤ key, the screen displays the ladder block with the next lowest step number, which includes the specified instruction and device number, below the preceding display.

(3) If the specified instruction has been changed during the operation, the ladder block with the new instruction is displayed below the preceding ladder block.

(4) When the screen is full, the ladder block located at the top of screen is cleared and the succeeding ladder blocks scroll in due order.

(5) After all the corresponding ladder blocks have been displayed, "NOT FOUND" is displayed in the message column.

⎡ REMARKS ⎤

When there are two or more END instructions in a program, I/O numbers used in the program are valid up to the first END instruction.

4.4.5 Reading the final ladder block using "END" instruction
The ladder block immediately before the END instruction is displayed.

LADDER
READ

BASIC OPERATION

[LDR] → [RD] → [END] → [GO]

OPERATION PROCEDURE

```
        M10
200  ───┤├─────────────────────< Y100 >──
```

[LDR] → [RD] → [END] → [GO]
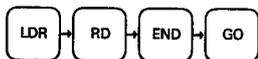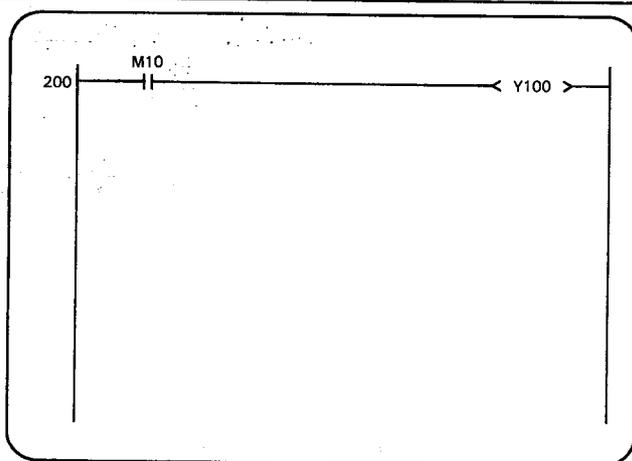
(Example: Read of END instruction)

EXPLANATION

(1) When there are two or more END instructions, the first END instruction is searched and the ladder blocks below the first END instruction are ignored and are not displayed.

(2) By performing the basic operation and then pressing the [CLEAR], [−], and [GO] keys, the displayed ladder shifts downward and the preceding ladder block is displayed above that ladder.

4.4.6 Read of ladder with comment
The comment is displayed together with the ladder.

LADDER
READ

BASIC OPERATION

$$\left[\begin{array}{c}\text{Ladder read}\\\text{operation}\end{array}\right] \rightarrow \boxed{\begin{array}{c}\text{VER/}\\\text{COM}\end{array}}$$

OPERATION PROCEDURE

```
10  ■ M17     Y015                                    < M75 >
      ┤├      ┤├                                      MOTOR
     MOTOR    FOR                                     CW
     START    POSIT
      T5      CONT
14    ┤├

      M21                     K
      ┤├           { =  50   D10 }          < Y031 >
     CYCLE                  MOTOR            OUT-
     CHECK                  MOVE             PUT
      T5      M8            VALUE            1
      ┤/├     ┤├
     TIMER    WORK
     SET.2    LIGHT
      M16     C10
      ┤├      ┤/├
     SPEED    COUNT
     VARI     SET.2
     COM
```

$$\boxed{\text{LDR}} \rightarrow \boxed{\text{RD}} \rightarrow \boxed{\text{SSN}} \rightarrow \boxed{1} \rightarrow \boxed{0} \rightarrow \boxed{\text{GO}} \rightarrow \boxed{\begin{array}{c}\text{VER/}\\\text{COM}\end{array}}$$

Step number 10 is specified

$$\left(\begin{array}{l}\text{Example: Display of ladder with comment}\\\qquad\quad\text{beginning with step number 10}\end{array}\right)$$

EXPLANATION

(1) After reading the ladder, press the $\boxed{\text{VER/COM}}$ key. This causes the top five lines of displayed ladder to be displayed as a ladder with comment. Any of the ladder read procedures described in Section 4.4.1 to Section 4.4.5 can be used.

(2) By performing the basic operation and then pressing the $\boxed{\text{GO}}$ key, the next five lines are similarly displayed.

(3) The display of ladder with comment is performed only for the upper five lines of the normal ladder display. The remainder of the 12 lines can be displayed by using the $\boxed{\uparrow}$ and/or $\boxed{\downarrow}$ keys.

(4) To return the ladder with comment to the normal ladder, press the $\boxed{\text{VER/COM}}$ key again.

(5) Operations such as write, insert, and erase cannot be performed on a ladder with comments. To perform these operations, return the display to that of a normal ladder.

4.5 Insertion and Deletion of Ladder Blocks

4.5.1 Insertion and addition in units of ladder symbols

A block of ladder is added or inserted into the programme.

```
LADDER
INSERT
```

BASIC OPERATION

$$\left[\begin{array}{c}\text{Ladder read}\\\text{operation}\end{array}\right] \rightarrow \boxed{\text{INS}} \rightarrow \boxed{\leftarrow\overset{\uparrow}{\underset{\downarrow}{\ }}\rightarrow} \rightarrow \left[\begin{array}{c}\text{Command input}\\\text{operation}\end{array}\right] \rightarrow \boxed{\text{CNV}} \rightarrow \boxed{\text{GO}}$$

OPERATION PROCEDURE

```
        ■ Y015   X008   M15
18 ├──────┤├─────╫────┤├──────────────< Y050 >──┤

          X001          M10
        ──┤├──────────┤├──
```

$$\boxed{\text{LDR}} \rightarrow \boxed{\text{RD}} \rightarrow \boxed{\text{SSN}} \rightarrow \boxed{1} \rightarrow \boxed{8} \rightarrow \boxed{\text{GO}}$$

Read of step number 18

$$\boxed{\text{INS}} \rightarrow \boxed{\rightarrow} \rightarrow \boxed{\rightarrow\!\!\!\!\rlap{\diagup}\vdash} \rightarrow \boxed{\text{X}} \rightarrow \boxed{8} \rightarrow \boxed{\text{GO}}$$

⟨N/C⟩ contact of X008 is inserted to the back of Y015.

$$\boxed{\text{CNV}} \rightarrow \boxed{\text{GO}}$$

$$\left(\begin{array}{c}\text{Example: Read of step number 18 and insertion}\\\text{of X008 to the back of Y015.}\end{array}\right)$$
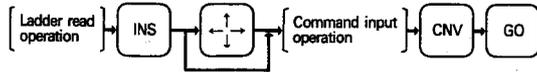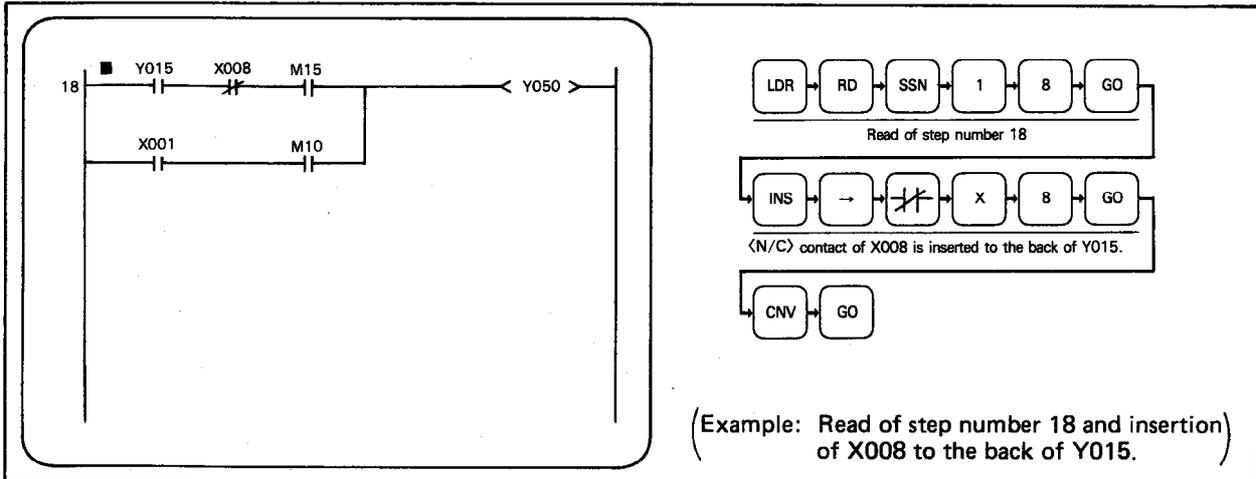
EXPLANATION

(1) Display the ladder block to which insertion or addition is to be made using the read operation.

(2) Move the cursor to the head of the block to be corrected and then press the ⟨INS⟩ key. This causes the ladder block to be displayed at the top of the screen and the other ladder blocks to be cleared.

(3) Move the cursor to the relevant position, and then perform the instruction input operation.

When a contact is inserted or added to a line which consists of 11 serial contacts, the line is automatically returned as shown below.

```
     X001 ■ M15   M17   M19   M21   X002   M51   Y016   M25   Y021   Y031
   ├──┤├──┤├───┤├───┤├───┤├───╫───╫───┤├───┤├───╫───┤├───╫──<Y013>──┤

                              ⇩

     X001   X008 ■ M15   M17   M19   M21   X002   M51   Y016   M25   Y021
   ├──┤├───┤├───┤├───┤├───┤├───┤├───╫───╫───┤├───┤├───╫───┤├──→ 0

            Y031
    0 >──╫──────────────────────────────────────────────────<Y013>──┤
```
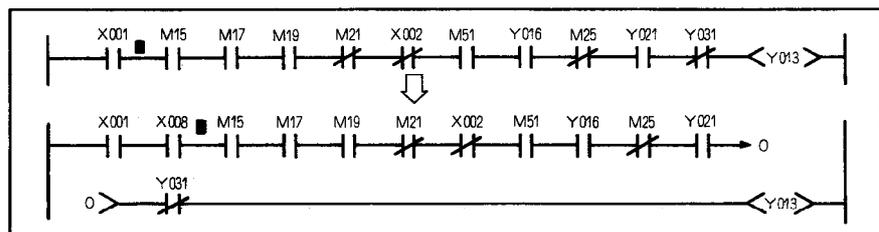
(4) After the insertion or addition of a ladder block, be sure to press the ⟨CNV⟩ and ⟨GO⟩ keys.

Immediately after the ⟨GO⟩ key is pressed, "EXECUTING" is displayed in the message column. Upon completion of the conversion, "COMPLETED ✻ STEP NOS. CHANGED" is displayed and the corrected ladder is displayed on the CRT.

(5) Insertion cannot be made at the beginning or end of a ladder rung.

> **POINT**
>
> When ladder instructions are inserted or added, the succeeding step numbers of the program and the jump destination of CJ instructions are automatically changed.

(5). If FD automatic write has been set, the program in the range from the corrected step to the END is automatically written to the FD. (For the automatic write operation to the FD, refer to Sections 2.3 and 7.11.)

(6) The addition and insertion procedures in units of ladder symbols are shown in the following table.

Addition/ Insertion	Key Input	Screen Display	
		Before key input	After key input
Contact insertion	INS → ⊣⊢ X 1 0 GO	■ M10 —⊣⊢—< Y050 >—	M10 X010 ■ —⊣⊢—⊣⊢—< Y050 >—
		■ X001 X003 —⊣⊢—⊣⊢—< Y010 >— X002 X004 —⊣⊢—⊣⊢—	X001 X010 ■ X003 —⊣⊢—⊣⊢—⊣⊢—< Y010 >— X002 X004 —⊣⊢————⊣⊢—
		X001 ■ X003 —⊣⊢—⊣⊢—< Y010 >— X002 X004 —⊣⊢—⊣⊢—	X001 X003 X010 ■ —⊣⊢—⊣⊢—⊣⊢—< Y010 >— X002 X004 —⊣⊢—⊣⊢—
		■ M1 M2 M3 M11 —⊣⊢⊣⊢⊣⊢--⊣⊢—< Y020 >— 11 contacts	M1 X10 ■ M2 M11 —⊣⊢—⊣⊢—⊣⊢————⊣⊢—▶ 0 0 >—⊣⊢—M10—< Y020 >—
	INS ⊔⊦⊥ X 1 0 GO	X001 X003 —⊣⊢—⊣⊢—< Y020 >— ■ X002 X004 —⊣⊢—⊣⊢—	X001 X003 —⊣⊢—⊣⊢—< Y020 >— X010 ■ —⊣⊢— X002 X004 —⊣⊢—⊣⊢—
Horizontal line insertion	INS — GO	X001 ■ X003 —⊣⊢—⊣⊢—< Y010 >— X002 X004 —⊣⊢—⊣⊢—	X001 ■ X003 —⊣⊢——⊣⊢—< Y010 >— X002 X004 —⊣⊢—⊣⊢—
Vertical line insertion	INS │ GO	X001 X003 —⊣⊢—⊣⊢—< Y010 >— ■ X002 X004 —⊣⊢—⊣⊢—	X001 X003 —⊣⊢—⊣⊢—< Y010 >— ■ X002 X004 —⊣⊢—⊣⊢—

4.5.2 Deletion of one ladder block
One ladder block is deleted.

LADDER DELETE

BASIC OPERATION
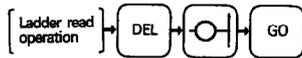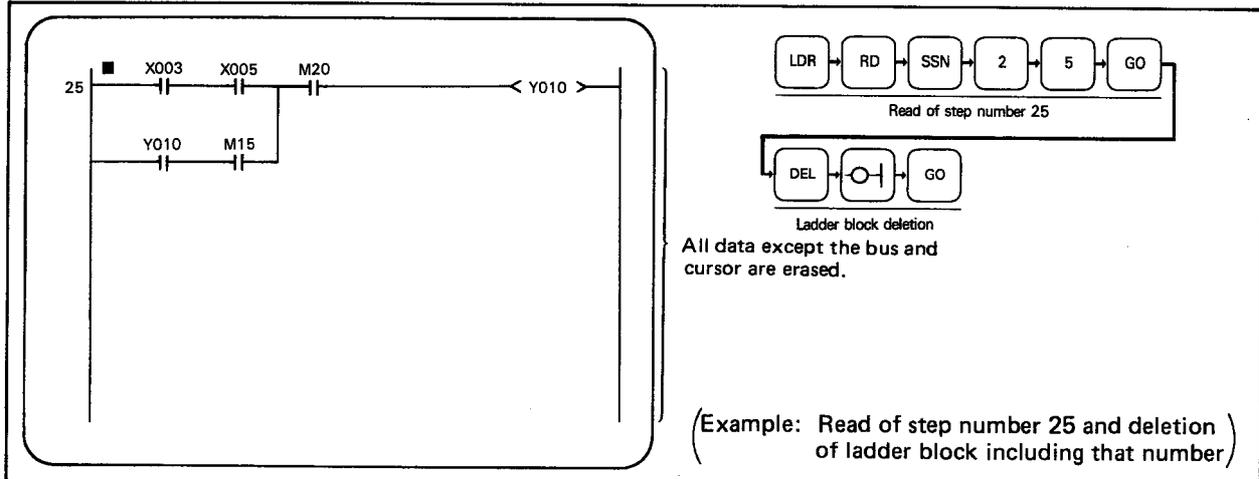
[Ladder read operation] → [DEL] → [-O-] → [GO]

OPERATION PROCEDURE

```
         ■  X003   X005   M20
     25  ─┤ ├──┤ ├──┤ ├─────────────< Y010 >─

         Y010   M15
         ─┤ ├──┤ ├─
```

[LDR] → [RD] → [SSN] → [2] → [5] → [GO]

Read of step number 25

[DEL] → [-O-] → [GO]

Ladder block deletion
All data except the bus and cursor are erased.

(Example: Read of step number 25 and deletion of ladder block including that number)

EXPLANATION

(1) By performing the read operation, display the ladder block, which is to be deleted, on the CRT.

(2) Move the cursor to the head of the block to be corrected and then press the [DEL] key. This causes the ladder block to be displayed at the first stage of the screen and the other ladder blocks to be cleared.

(3) By pressing the [-O-] or [-□-] key and then pressing the [GO] key, the ladder block displayed on the screen is deleted. (At this time, "DELETE 1-CIRCUIT" is displayed in the message column.)

POINT

When the ladder block is deleted, the succeeding step numbers of the program and the jump destination of CJ instruction are automatically changed.

---

(4) Even if the output device of a ladder block, which is to be deleted, is a data instruction, one ladder block can be deleted by pressing the [DEL], [-O-] and [GO] keys.
Since deleted steps change to NOPs, the number of steps does not change.

(5) For the deletion of one ladder block, it is not required to perform the conversion operation after deletion.

(6) If the FD automatic write operation has been set, the program in the range from the corrected step to the END is automatically stored into the FD. (For the automatic write operation to the FD, refer to Section 2.3 and 7.11.)

MELSEC-A

POINT
If, in ladder write, several ladder blocks are created and converted and then one ladder block deletion operation is performed, all the ladder blocks displayed on the CRT will be deleted. To perform one ladder block deletion after conversion, perform the read operation and then proceed to the one ladder block deletion operation.

4.5.3 Deletion in units of ladder symbols
The ladder is deleted in units of symbols.

LADDER
DELETE

BASIC OPERATION
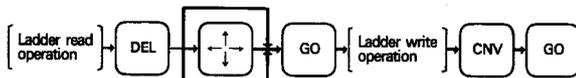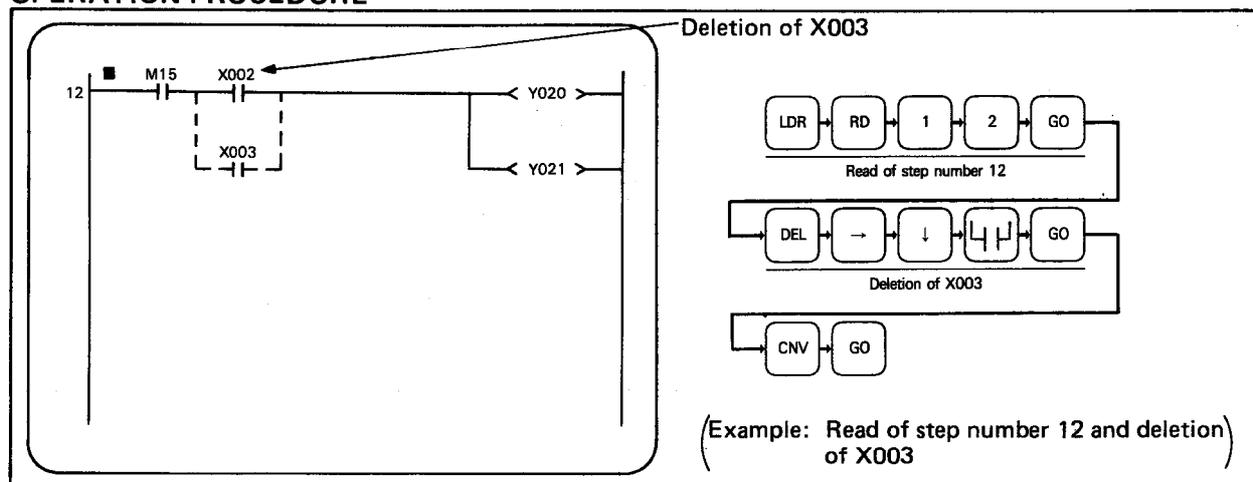
[Ladder read operation] → DEL → ┤↑├ → GO → [Ladder write operation] → CNV → GO

OPERATION PROCEDURE

Deletion of X003

```
       M15    X002
  12 ──┤ ┤──┤ ┤──┬──────────< Y020 >
            X003 │
       ┌──┤ ┤──┘ └──────────< Y021 >
```

LDR → RD → 1 → 2 → GO
Read of step number 12

DEL → → → ↓ → ┤┤├ → GO
Deletion of X003

CNV → GO

(Example: Read of step number 12 and deletion of X003)

EXPLANATION

(1) By performing the read operation, display the ladder block, which is to be corrected.

(2) Move the cursor to the head of the block to be corrected and then press the DEL key. This causes the ladder block to be displayed at the first stage of the screen and the other ladder blocks to be cleared from the screen.

(3) By use of the cursor keys, move the cursor to the symbol which is to be deleted, delete the ladder symbol, and correct the ladder by performing the write operation.

(4) After the correction of a ladder, be sure to press the CNV and GO keys. Immediately after the GO key is pressed, "EXECUTING" is displayed in the message column. Upon completion of the conversion, "COMPLETED ✗ STEP NOS. CHANGED" is displayed and the corrected ladder is displayed on the CRT.
After correction, deleted instructions automatically change to NOPs and the number of steps does not change.

> **POINT**
>
> When deletion is in units of ladder symbols, the succeeding step numbers of the program and the jump destination of CJ instructions are automatically changed.

(5) If the FD automatic write operation has been set, the program in the range from the corrected step to the END is automatically stored into the FD. (For the automatic write operation to the FD, refer to Sections 2.3 and 7.11.)

● The deletion procedure in units of ladder symbols (example) is shown below.

Deletion	Dey Input	Screen Display	
		Before key input	After key input
Contact deletion	DEL → → GO or DEL → → ⊣⊢ GO		
	DEL → ↓ ⊣⊢ GO		
	DEL → ↓ ⊣⊢ GO		
Vertical line insertion	DEL → │ GO		

4.6 Circuit Utilization

This allows the basic layout of a frequently occurring ladder block or circuit to be repeated as required.

Enter the circuit onto the FD in advance. When required, the circuit layout entered to the FD can be utilized.
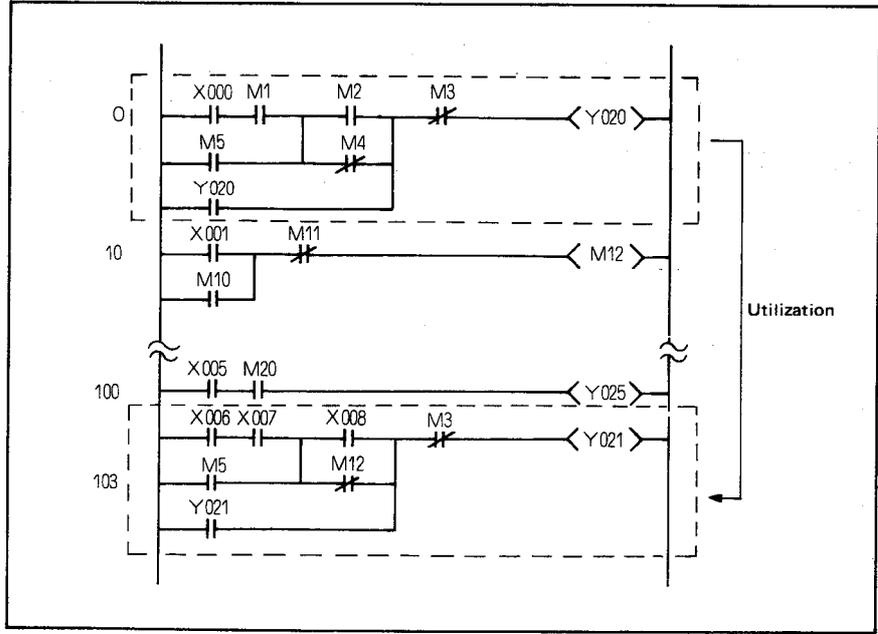
For example, suppose that the circuit layout of steps 0 to 9 in the above diagram are to be repeated at steps 103 to 112. The circuit may be "utilized" as follows.

4.6.1 Entry of utilized circuit

The circuit pattern, which is to be utilized, is entered onto the FD.

CIRCUIT
UTILIZATION

BASIC OPERATION

```
[Ladder read   ]→ WR → CNV → S → Circuit pattern → N → D → GO
[operation     ]                 number n

[Ladder write  ]
[operation     ]
```

OPERATION PROCEDURE

The device name inside [_ _ _] is deleted.

```
        ┌─X000─┐                      ┌─Y011─┐
10   ───┤ ├─────────────────────────<┤     ├>──
        └──────┘
        ┌─Y011─┐
     ───┤ ├────
        └──────┘
```

```
LDR → RD → SSN → 1 → 0 → GO
        Read of step number 10

WR → CNV → S → 2 → GO
     Entered as Circuit pattern number 2
```

(Example: Read of step number 10 and entry of
         circuit from step numbers 10 to 12)
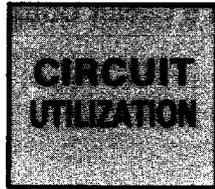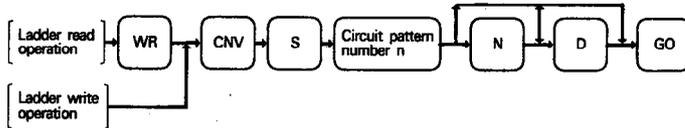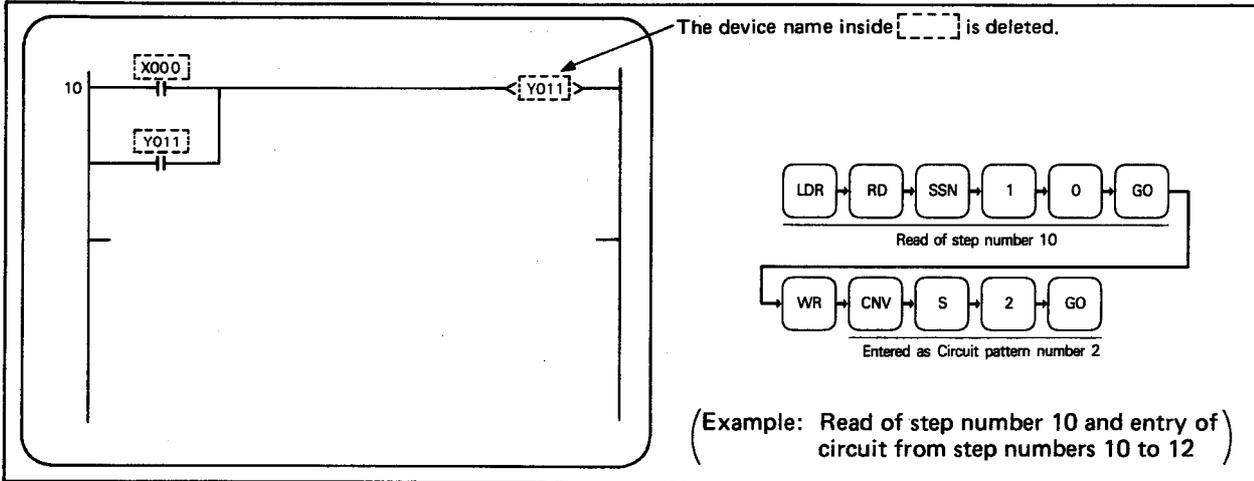
EXPLANATION

(1) By performing the ladder read or write operation, display the circuit pattern, which is to be utilized.

(2)

```
CNV
 ↓
 S
 ↓            ┌→ GO
Circuit ──────┤
pattern       ├→ N → GO
number n      │
              ├→ D → GO
              │
              └→ N → D → GO
```
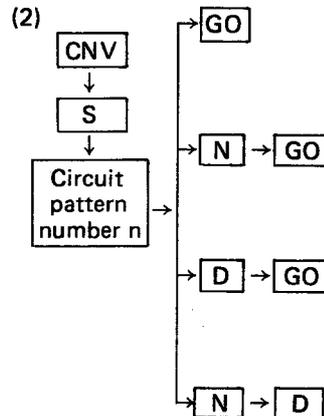
1) "Convert" the circuit pattern (into the list pattern) and enter it to the FD as the "n"th circuit pattern (with no device specification).

2) Enter the circuit pattern to the FD as the "n"th circuit pattern, without making circuit conversion (no device specification).

3) "Convert" the circuit pattern and then enter it to the FD as the "n"th circuit pattern with device names and numbers.

4) Enter the circuit pattern to the FD as the "n"th circuit pattern with device names and numbers, without making ladder conversion.

REMARKS

In the above, the meanings of N and D are as follows:
  N: Circuit pattern is entered to the FD without making circuit conversion.
  D: Circuit pattern is entered to the FD with device name.
When the utilized circuit has been entered by pressing the N and GO keys or the N, D, and GO keys, the program is not stored in the internal memory of GPP. Therefore, when the program is required, it is necessary to read it from the FD.

(3) A maximum of 30 circuit pattern numbers "n" (n = 0 to 29) can be entered, and circuit patterns up to two screens long can be entered as one circuit pattern number.

(4) Before entering the utilized circuit, be sure to insert the user FD into FDD B.
If the FD is not inserted in FDD B, "FLOPPY DISK ERROR" is displayed in the message column.

(5) If the number selected for the utilized circuit has already been used, the message "SYSTEM NAME ALREADY USED" is displayed.

(6) The utilized circuit is entered onto the FD under file name KRYUUYO. DAT.

4.6.2 Incorporating the utilized circuit into the program

The frequently occuring circuit block pattern entered onto the FD by the procedure described in the previous section, is utilized in the program.

CIRCUIT
UTILIZATION

BASIC OPERATION

[Ladder read operation] → [WR] → [+] / [-] → [L] → [Circuit pattern number n] → [GO] → [Device, device number key depression] → [CNV] → [GO]

OPERATION PROCEDURE

40

Enter the device and device number into 〔⎯⎯〕 of utilized ladder.

[LDR] → [RD] → [SSN] → [4] → [0] → [GO]

Read of step number 40

[WR] → [—] → [L] → [2] → [GO]

Circuit pattern number 2 is inserted immediately in front of the ladder block which includes step number 40.

[Device] → [Device number] → [GO] → [CNV] → [GO]

Write of device name

Example: Read of step number 40 and insertion of circuit pattern number 2 immediately in front of the ladder block which includes that step number.

EXPLANATION

(1) Display the portion of circuit at which the entered utilized circuit, is to be inserted on the screen.

(2) By pressing the [WR], [+], [L], [Circuit pattern number "n"], and [GO] keys, insert the circuit pattern number "n" behind the circuit block displayed.

(3) By pressing the [WR], [—], [L], [Circuit pattern number "n"], and [GO] keys, insert the circuit pattern number "n" immediately in front of the ladder block displayed.

(4) If the utilized circuit has been entered by pressing the [CNV], [S], [Circuit pattern number "n"], [D], and [GO] keys, the entered ladder is inserted with all device names.

If the utilized circuit does not include device and device number information, the relevant circuit symbol is displayed in the "key-in data" column. If necessary, this may be changed by keying in the appropriate data. If an instruction includes device details and is to remain unchanged and subsequent instructions are to be altered, press the [CLEAR] key and move the cursor with the [→] [↑] [↓] [←] keys to the head of the required instruction. If the instruction is of the ⊣☐⊢ type, press the ⊣☐⊢ and [GO] keys to display the original data which may then be amended; otherwise re-write the complete instruction.

(5) After the correction of a ladder, be sure to press the [CNV] and [GO] keys. Immediately after the [GO] key is pressed, "EXECUTING" is displayed in the message column. Upon completion of the conversion, "COMPLETED ✳ STEP NOS CHANGED" is displayed and the corrected ladder is displayed on the CRT.

POINT

When the entered circuit is utilized, the succeeding step numbers of the program and the jump destination of CJ instructions are automatically changed.

4.7 Programmable Controller Ladder Monitor

When the GPP/PHP and programmable controller CPU are placed online, the operation of the programmable controller CPU can be monitored in ladder mode. This section describes the monitor operation.

| POINT |

(1) In addition to the ladder diagram, the monitor screen shows, at the bottom, the present values and set values of T, C, and D in order from top to bottom during the display of ladder (a maximum of eight values). For the K3NCPU, scan time (maximum value) is displayed.
(For other K PLCs, scan time is not displayed.)

(2) The ON and OFF statuses of ladder symbols are as shown below:

OFF status ─| |─   ─|/|─   ─< >─   ─[   ]─

(Continuity) ON status ─■─   ─■/─   ─◀ ▶─   ─■   ■─

(3) The monitor of RST instruction changes depending on the status of device be reset as indicated below:

Device to be reset is at OFF status ─■   ■─

Device to be reset is at ON status ─[   ]─

(4) The monitor displays of timer and counter are as indicated below:
(The set value is displayed only for OUT T, C)

```
   T10                       C25
   500 ← Indicates present value → 10
   750 ←    Indicates set value   → 30
```

When the set value is a data register, the contents of the data register are monitored as a set value.

(5) The MCR instruction is always displayed as ─■   ■─ during monitor.

(6) The monitor display of a data register is (e.g.) D123
100 ← Present value

For the display, the contents of data register are converted into BCD. Therefore, if the value is stored in the data register in BCD, a misleading value will be displayed.
(0 to 65535 will be displayed.)

(7) When the programmable controller CPU is reset during the monitor operation, the message column displays "PC COMMUNICATION ERROR". If the RESET is very fast, the GPP/PHP may not display this message and continue to show the "monitor" screen. If this occurs, the MNT button should be pressed again.

(8) If keying operation is performed during monitoring or monitoring test, monitoring is stopped. Pressing [GO] resumes monitoring.

4.7.1 Ladder monitor
Monitor in ladder mode.

LADDER
MONITORING

BASIC OPERATION

```
                  ┌─[ Ladder read by step number ]──────┐
                  ├─[ Ladder read by contact or coil number ]──┤
  ┌─────┐ ┌─────┐ ├─[ Ladder read by I/O number ]──────┤ ┌────┐    ┌ ─ ─ ┐
  │ LDR │→│ MNT │─┤                                     │→│ GO │──→ │ GO │
  └─────┘ └─────┘ ├─[ Ladder read by instruction ]──────┤ └────┘    └ ─ ─ ┘
                  ├─[ The last ladder read by END instruction ]──┤
                  └─[ Read of ladder with comment ]─────┘
```

OPERATION PROCEDURE


```
┌─────┐ ┌─────┐ ┌─────┐ ┌───┐ ┌────┐
│ LDR │→│ MNT │→│ SSN │→│ 0 │→│ GO │
└─────┘ └─────┘ └─────┘ └───┘ └────┘
```

(Example: Monitor beginning with step number 0)

EXPLANATION

(1) A maximum of eight present values or set values of T, C, and D used in the display screen are shown at the bottom of the monitor screen. Other values can be displayed by the entry monitor operation. (Refer to Section 4.7.4.)

The monitor of present values and set values is displayed after conversion into BCD. Therefore, the display of data stored in BCD will be misleading.

Example: | BCD | K99 | D0 | The display of D0 will be 153.

(2) While monitoring, the GPP/PHP interrupts the programmable controller CPU. Therefore, a slight delay occurs between a CPU operation and the monitored result.

(3) By pressing the GO key, the next program area is displayed and monitored.

4-33

(4) The program area to be monitored may also be called up as follows:
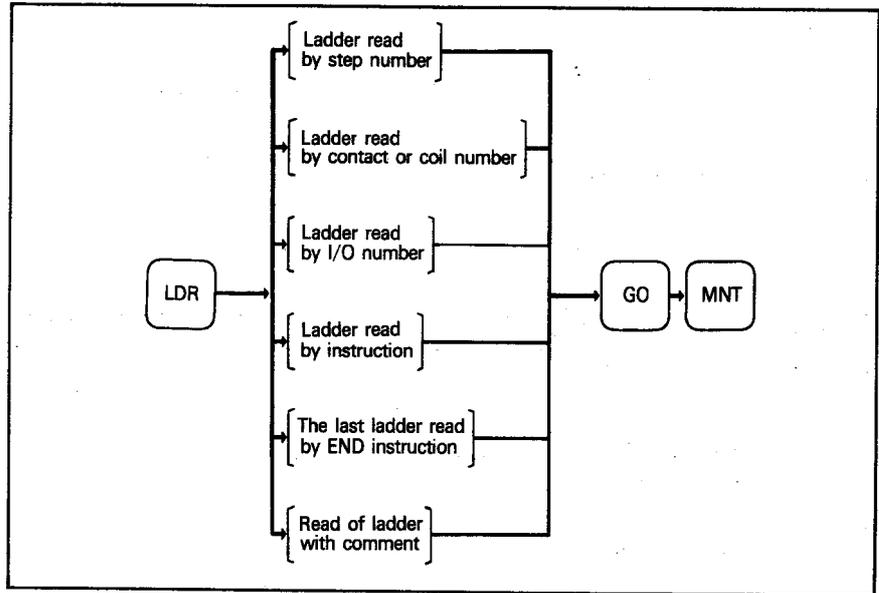
(5) The MNT key may be pressed after the ladder read operation to monitor the ladder area READ - pressing the GO key will stop monitoring - pressing the MNT key will resume monitoring.

4.7.2 Stop of monitor screen

The monitor screen may be frozen during monitoring independently of the PC.

LADDER
MONITORING

BASIC OPERATION

```
┌─[ Ladder monitor ]─[CLEAR]─┐
└─  operation              ─┘
```

OPERATION PROCEDURE

```
LDR → MNT → SSN → 0 → GO → CLEAR
```
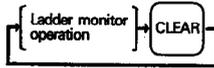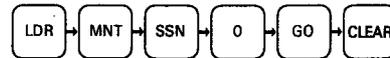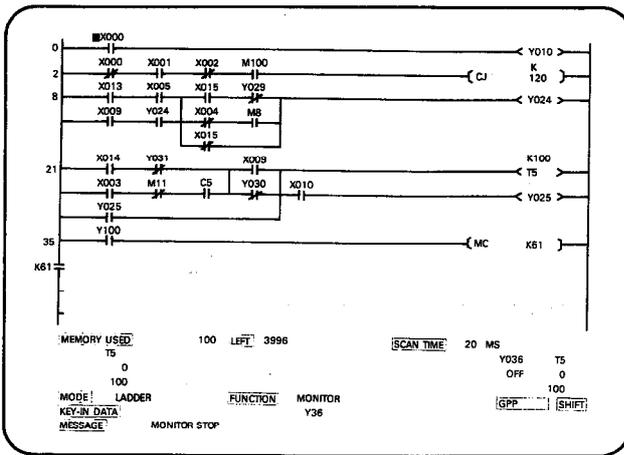
/Example: Monitor starting at step number 0
 and freeze the screen by pressing
 [CLEAR] key

EXPLANATION

(1) When it is necessary to stop the monitor screen, press the [CLEAR] key. The monitor screen stops and displays the device states as they were when the [CLEAR] key was pressed. By pressing the [MNT] key again, the monitor operation is resumed.

4.7.3 Screen stop by setting of monitor stop point

During ladder monitoring, the screen may be frozen on the activation of a given device.

BASIC OPERATION
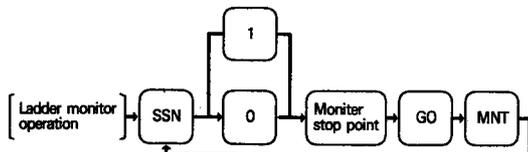
OPERATION PROCEDURE
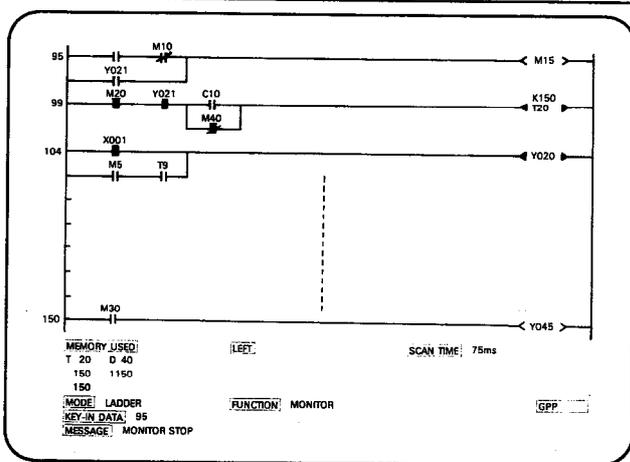
(Example: Stop monitor screen when T20 has timed up)

EXPLANATION

(1) When a given device is operated, the monitor screen is frozen. The stop is triggered either by the rise (OFF → ON) or fall (ON → OFF) of the signal.

(2) Only one stop point can be set at one time.

(3) The stop point can be set only for devices which have an OUT instruction or contact instruction and can also be set for devices which do not appear in the current monitor screen. Inputs may also be used to define stop points.

(4) When setting the stop point, be sure to press the ⊣├ key before pressing keys to define the device.
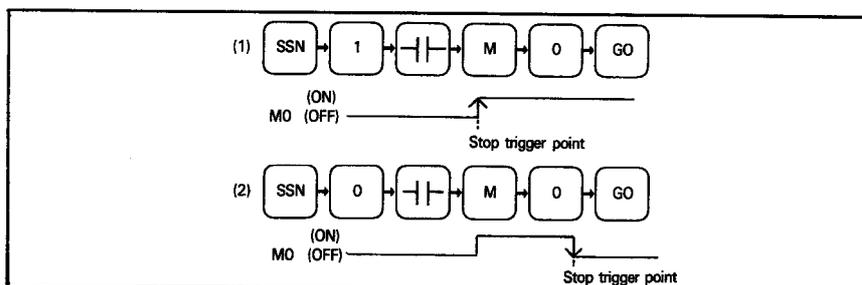
Fig. 7.1 Stop Trigger Point

(5) When the defined stop point changes state at high speed (e.g. pulse instruction or timer/counter which resets itself), the GPP/PHP may not be able to respond fast enough. When the stop trigger point is activated, the buzzer "beeps", and the monitor screen stops.

4.7.4 Entry monitor

This function is used to monitor devices which are not displayed on the monitor screen.
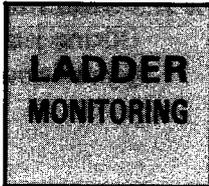
BASIC OPERATION
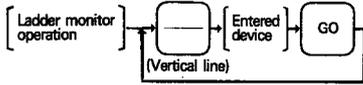
OPERATION PROCEDURE

Entry monitor of T5

Entry monitor of Y30

} → Entry monitor display

(Example: Entry monitor of T5 and Y036)

EXPLANATION

(1) A maximum of 8 devices may be used for entry monitor on one screen. If a 9th device is entered, the displayed devices shift to the right by one device, the 9th one is displayed at the left end, and the first one is cleared.

(2) Set up the entry monitor as follows: LDR → MNT → ———— → [Entered device] → GO

(3) To reset the entry monitor, press ———— and then the GO key. This operation deletes the entry monitor display.

4.7.5 Present value monitor of decimal number ↔ hexadecimal number

The monitor of present values or set values of T, C, and D displayed during ladder monitor and entry monitor operations are normally displayed in decimal. This function is used to display the required data in hexadecimal.

LADDER MONITORING

BASIC OPERATION

[Ladder monitor operation] → [Entry monitor operation] → (H) (GO)

OPERATION PROCEDURE

(H) (GO)
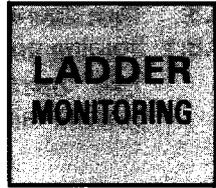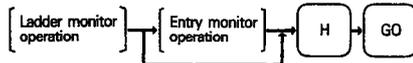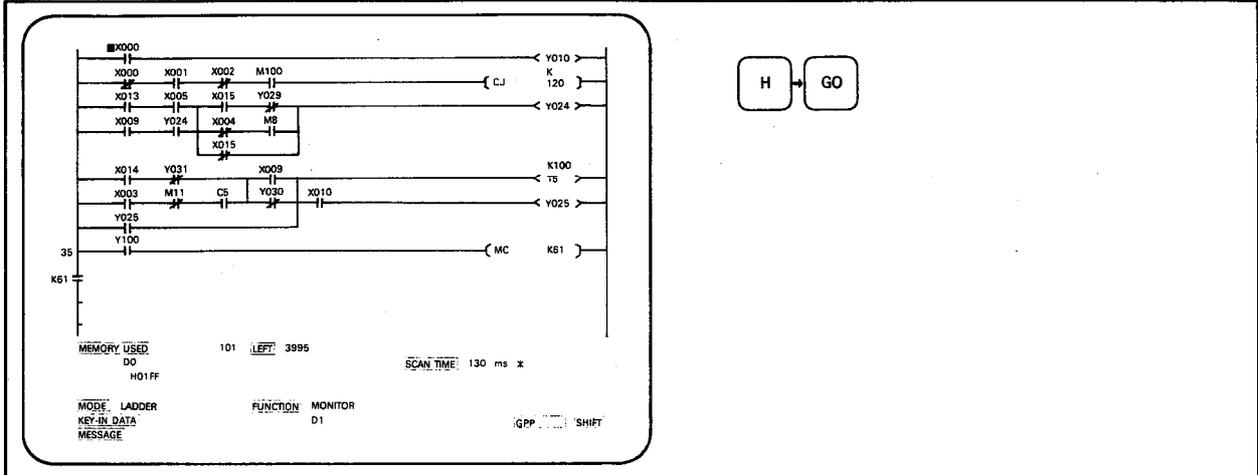
EXPLANATION

(1) When data is displayed in hexadecimal, H is shown in front of the data.

⟨Display example⟩	
D10	D10
255	H00FF
(Decimal)	(Hexadecimal)
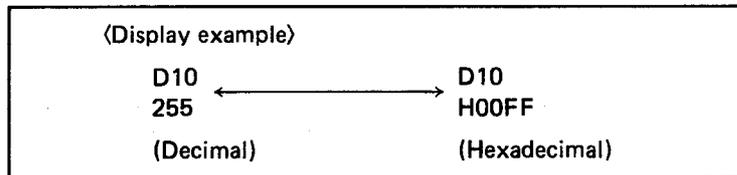
(2) To return the hexadecimal display to decimal display, press [K] and then [GO] or press the [MNT] key.

4.8 Test Operation to Programmable Controller
4.8.1 Forcing programmable controller devices

Test operation during ladder monitor forces devices and changes the present values of T, C, and D.
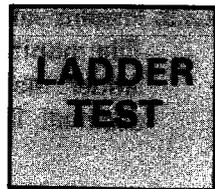
BASIC OPERATION
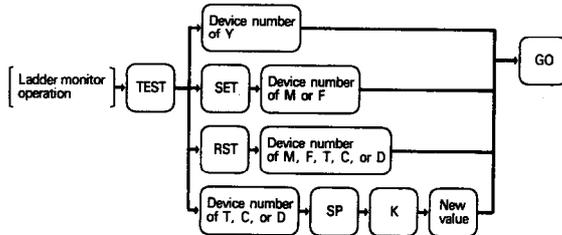
OPERATION PROCEDURE
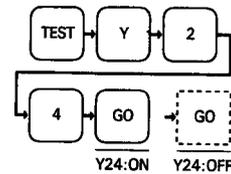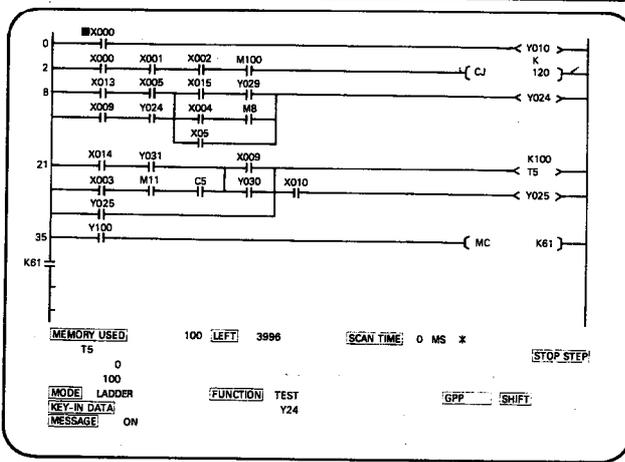
EXPLANATION

(1) Forcing programmable controller devices is useful for checking the wiring from output terminals, debugging programs, etc.

(2) Forced output operation is classified into the following four as indicated in the Basic Operation above.

- Forced output Y
- Forced set of temporary memory M and failure element F
- Forced reset of temporary memory M, failure element F, timer T, counter C, and data register D
- Changing of the present values of timer T and counter C

To change a present value in decimal, input the new value after pressing K.
To make a change in hexadecimal, input the new value after pressing H.

(3) Pressing CLEAR during a test and pressing TEST after stopping monitoring allows the execution of monitoring and the resumption of test.

POINT
(1) If forcing a coil with the programmable controller in RUN mode, the execution of the program has priority. Therefore, if the contact driving the coil is off, the coil turns on instantaneously and then immediately turns off.
(2) When the [SET □] instruction is used for forced set, the device remains on after the execution of the instruction and does not turn off unless reset.

4.8.2 K3NCPU step run

This function allows a K3NCPU program to be run step by step when the A6GPP and K3NCPU are connected together.

LADDER
STEP RUN

BASIC OPERATION

[Ladder monitor operation] → TEST → G → Stop step number → SP → Loop count → GO ┈ GO ┈ GO ┈→

OPERATION PROCEDURE

TEST → G → 1 → 0 → 0 → SP → 10

Stop step number   Loop count

(Example: Stop at step number 100 at a loop count of 10)
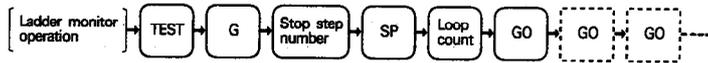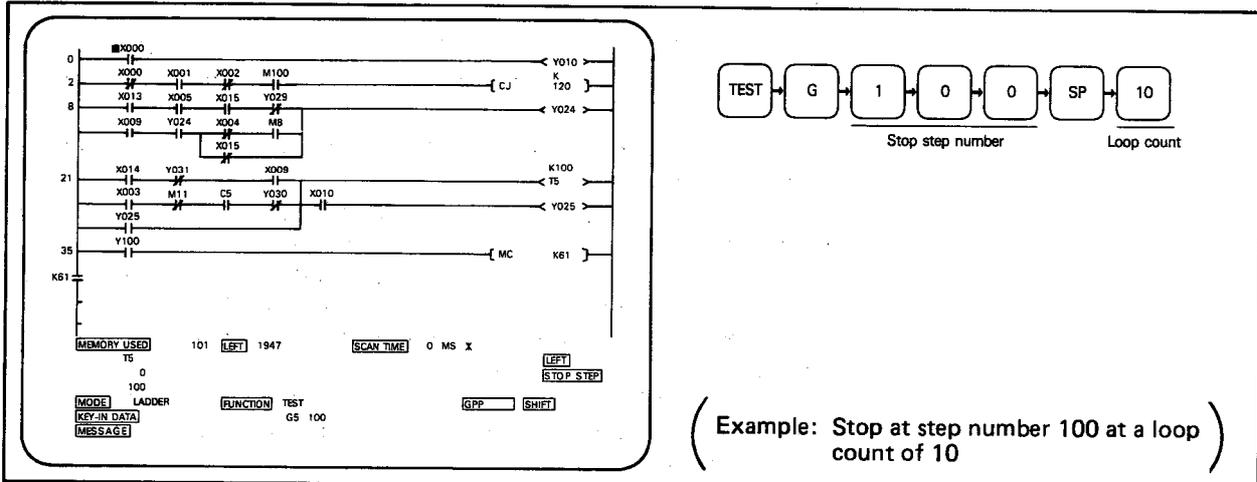
EXPLANATION

(1) To perform the step run, move the RUN switch of the K3NCPU to the STEP-RUN position. With the GPP/PHP, monitor the relevant ladder area to be checked using the procedure given in Section 4.7.1.

(2) The step run is performed after the program has run at least 1 scan. It is therefore necessary to set the number of loops required. Set the number of loops in the range 1 to 9999.

(3) By pressing the [GO] key after setting the number of loops, the programmable controller CPU runs the program according to the number of loops (The set value is displayed on the left of the screen of the GPP/PHP and "1" is subtracted from this value for every loop until it reaches 0). When processing is completed, the step run stops at the specified step number. (However, when the stop step number is a hardware processing instruction, the step run stops at the step number of the first software processing instruction below the specified number.)

When processing is complete (i.e. after the set number of loop times), the value in the LEFT column of the screen is cleared to zero and the buzzer beeps. Thereafter, each time the [GO] key is pressed, the step run is performed at each of the next software processing instructions.

"Software processing instructions" . . . .(Step run possible)

SET F	OUT F	RST Y000 to Y255	=
RST F	OUT T	CJ	+
RST C	OUT C	MOV	−
SFT M	MC	>	BCD
PLS M	MCR	<	BIN

"Hardware processing instructions" . . . .(Step run is performed at the first software processing instruc-
tion following these instructions)

LD	ANB	SET Y	RES Y256 to 7FF
LDI	OR	SET M	OUT Y
AND	ORI	RST M	OUT M
ANI	ORB	NOP	END

(4) During step run, the 10ms timer adds "1" per scan and the 100ms timer adds "1" per 10 scans.

(5) During step run with a data link, the K3NCPU performs a dummy communication with the linked station every 50 ms. This is because, without dummy communication, the linked station output is turned off by the "communication stop timer" in the remote I/O or local PC.

X/Y information and data information transferred through the link does not change.

(6) If the step specified as a stop step has not been executed because it has been passed due to a CJ, interrupt program, etc., that step is not counted as one operation loop time.

For example, if at step 800, there is an instruction which causes a conditional jump to step 1200 with the stop step set to 1000 and the number of loops is 1, the processor cannot stop at the stop step.

(7) When changing between "RUN", "STEP RUN" and "STOP" conditions it is advisable to "RESET" the CPU.

(8) The message "K1, K2, K3 SETTING ERROR" appears if any PC other than a K3NCPU is connected to the A6GPP during this procedure.

5. LIST MODE

5.1 List Mode Introduction

List mode programming uses a set of instructions based on standard logic state-
ments such as AND, OR etc. to build up programs. The following is an example
of a program listing.

0	LD	X000	16	ANI	X1FF
1	ORI	X005	17	OUT	Y07F
2	ANI	M103	18	LD	M100
3	ANI	M211	19	AND	M102
4	ANI	X02B	20	AND	M102
5	OUT	Y070	21	AND	M105
6	LD	M120	22	AND	M107
7	ANI	M121	23	ANI	X1FE
8	LD	X001	24	OUT	Y13F
9	AND	M23	25	LD	X005
10	ORB		26	MC	K1
11	LDI	X3FF	27	LDI	M69
12	ANI	M112	28	ANI	M169
13	ORB		29	ANI	M269
14	ANI	M165	30	OUT	Y069
15	ANI	M177	31	OUT	M69

For full details on programming, see the relevant programming manual.

5.2 List Mode Functions

In list mode, the program writing, correction, reading, monitoring, and other operations are performed with the list instruction keys.

The list mode functions include the following.

```
List ──┬─ List write ──┬─ All clear of memory . . . . . . . . . . .All clear of memory and continuous write of NOP
mode    │              │                                          in list mode                      (Section 5.3.1)
function│              └─ Write of program list . . . . . . . . . .Program is newly created or corrected in list mode.
        │                                                                                            (Section 5.3.2)
        │
        ├─ List read ──┬─ List read by step number. . . . . . . .With step number specified, program list containing
        │              │                                          that step number is displayed on CRT.
        │              │                                                                              (Section 5.4.1)
        │              ├─ List read by device . . . . . . . . . . .With device number specified, program list containing
        │              │                                          that device number is displayed on CRT.
        │              │                                                                              (Section 5.4.2)
        │              ├─ List read by instruction . . . . . . . .With instruction specified, program list containing
        │              │                                          that instruction is displayed on CRT. (Section 5.4.3)
        │              ├─ Read by list with comment . . . . . .Read program list is annotated with comment and
        │              │                                          displayed on CRT.                    (Section 5.4.4)
        │              ├─ Display of device use list . . . . . . .Device use status in program is displayed per speci-
        │              │                                          fied device.                         (Section 5.4.5)
        │              ├─ Display of contact coil list . . . . . . .Device use status in program is displayed per speci-
        │              │                                          fied device number.                  (Section 5.4.6)
        │              └─ Display of T, C set value list . . . . . .Set values of timers and counters in program are
        │                                                          displayed.                          (Section 5.4.7)
        │
        ├─ Insertion and deletion ──┬─ Insertion of program list . . . . . . . .Insertion of list instruction input to ptogram list
        │   of list                 │                                                                  (Section 5.5.1)
        │                           └─ Deletion of program list . . . . . . . .Deletion of specified list instruction from program
        │                                                          list                                (Section 5.5.2)
        │
        ├─ Change of device ──┬─ Batch change of devices . . . . . . . .Batch change of devices used for program
        │                     │                                                                        (Section 5.6.1)
        │                     └─ Batch change of "N/O" and "N/C". . .Batch change of "N/O" and "N/C" contacts used in
        │                        contacts                           program                            (Section 5.6.2)
        │
        └─ List monitor ──┬─ Device batch monitor. . . . . . . . .Monitor of each device is displayed on list basis
                          │                                                                            (Section 5.7.1)
                          └─ Display of device memory . . . . . . .Status of device memory read from programmable
                             contents in GPP                        controller CPU to internal memory of A6GPP is
                                                                    displayed.                         (Section 5.7.2)
```

5.3 Write of Program List
5.3.1 All clear of memory (Continuous write of NOP)

To clear the program memory in list mode (i.e. write NOP to all step numbers).

LIST
WRITE

BASIC OPERATION

LST → WR → [System name → CR → Comment → CR → CR] → SSN → Step number → GO → NOP → K → Step number → GO
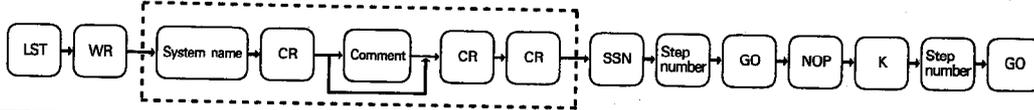
OPERATION PROCEDURE

```
 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
14  NOP
15  NOP
16  NOP
17  NOP
18  NOP
19  NOP
20  NOP
21  NOP
22  NOP
```

SSN → 0 → GO

Specifying step number 0

NOP → K → 4 → 0 → 9 → 5 → GO

Specification of the final step number of NOP write.
(depends on memory sye)
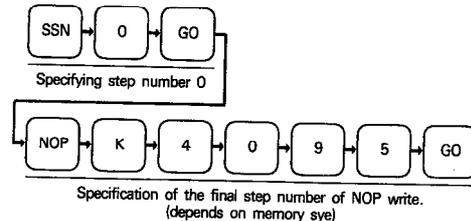
(Example: Continuous NOP write from step
numbers 0 to 4095)

EXPLANATION

(1) If auto-write has been selected (see Section 2.3 and 7.11) then by pressing [LST] [WR] the system name setting screen described in Section 7.11 is displayed. If the auto-write function is not required press the [CR] key instead of entering a system name. Otherwise follow the procedure described in Section 7.11. This procedure is only required for the first time that the [LST] [WR] keys are pressed after auto-write has been selected.

(2) By pressing the [LST], [WR], [SSN], [Step number], and [GO] keys, read the first step number to which the NOP instruction will be written. By pressing the [NOP], [K], [Step number], and [GO] keys, the last step number is specified and the NOP write operation is performed.

(3) The all clear operation may also be performed by pressing the [LDR], [WR], [Auto-write Setting], [NOP], and [GO] keys. However, in the all clear operation in ladder mode, the END instruction is auto matically written at step 0.

(4) When FD automatic write mode has been set and the [MELSAP] key is pressed, continuous NOPs are written to the FD. (For the automatic write operation to the FD, refer to Sections 2.3 and 7.11.)

5.3.2 Write of program list
In list mode, a program is written or corrected.

BASIC OPERATION

LST → WR → [System name → CR → Comment → CR → CR] → SSN → Step number → GO → [Command input operation]
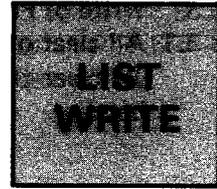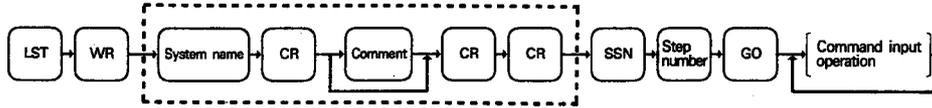
OPERATION PROCEDURE

```
     0  LD    X001
  ■  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
    14  NOP
    15  NOP
    16  NOP
    17  NOP
    18  NOP
    19  NOP
    20  NOP
    21  NOP
    22  NOP
```

LD X001 is inserted into step 0 and the cursor moves to step 1.

SSN → 0 → GO
Specify step number 0

LD → X → 1 → GO
Write of LD X1 to step number 0.
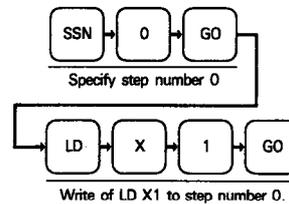
(Example: Write of LD X1 to step number 0)

EXPLANATION

(1) If auto-write has been selected (see Section 2.3 and 7.11) then by pressing LST WR the system name setting screen described in Section 7.11 is displayed. If the auto-write function is not required press the CR key instead of entering a system name. Otherwise follow the procedure described in Section 7.11. This procedure is only required for the first time that the LST WR keys are pressed after auto-write has been selected.

(2) By pressing the LST, WR, SSN, Step number, and GO keys, read the write step number and write the instruction by performing the instruction input operation. After reading the required step number, it is possible to move the cursor by use of the ↑ and ↓ keys and then write the instruction to the line at which the cursor is located, or make correction. (After writing the instruction, the cursor automatically moves to the next step number.)

(3) Note that certain instructions, (for example data handling) require more than one step. Hence, care must be taken when a program line is being overwritten. Note the following example:

```
Example
                   Write OUT TO K100
                                           0   LD        X000
 0   LD        X000           ┐           1   OUT       TO          K100
 1   OUT       Y010 ◄─────────┘           3   COMMAND   ERROR
 2   MOV       D1         D2  ⇨           4   COMMAND   ERROR
 5   END                                  5   END
 6   NOP                                  6   NOP
```
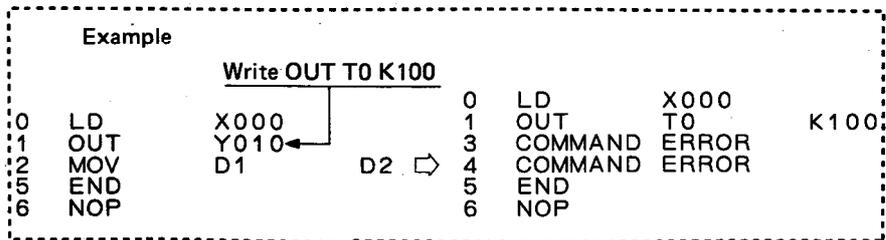
The instruction OUT TO K100 is two steps long and is being written over OUT Y10 which is one step long. The constant, K100 is therefore written over the first part of the data handling instruction MOV D1 D2. This will cause "COMMAND ERROR" to be displayed at steps 3 and 4.
When the opposite case applies and an instruction with fewer steps is written over one with several steps, the remaining steps should be overwritten with NOP instructions.

(4) To write NOP in the range of specified step numbers, press the [LST], [WR], [SSN], [Step number], and [GO] keys, thereby reading the head step number of NOP write. By pressing the [NOP], [K], [Step number], and [GO] keys, the last step number is specified and the NOP write operation is performed.

(5) When FD automatic write mode has been set and the [MELSAP] key is pressed, all the programs in the work area are written to the FD. (For the automatic write operation to the FD, refer to Sections 2.3 and 7.11.)

(6) If a coil with the same device number is used twice during the creation of program, "COIL ALREADY USED ERROR STEP = " is displayed in the message column. Therefore, check the error step and make correction. (When the [GO] key is pressed, write operation is performed even if the same coil is used twice.)

Instruction Input Procedures

This section explains the input procedures for instructions in list mode. The instruction input procedures in list mode are classified into three types.

(1) LD, LDI, AND, ANI, OR, ORI, OUT (except OUT T, C), MC, MCR, SET, RST, SFT, CJ, and PLS instructions (sequence instructions)

| Instruction | [SP] | Device | Device number | GO |

Example: LD X00 ⇒ | LD | [SP] | X | 0 | GO |

(2) OUT T and C instructions (sequence instructions)

| Instruction | [SP] | Device | Device number | [SP] | K | Set value | GO |

Example: OUT T0 K10 ⇒ | OUT | [SP] | T | 0 | [SP] | K | 1 | 0 | GO |

(3) =, <, >, +, −, MOV, BIN, and BCD instrictions (data instructions)

| Instruction | [SP] | Source data | [SP] | Destination | GO |

Example: MOV K255 D0 ⇒ | MOV | [SP] | K | 2 | 5 | 5 | [SP] | D | 0 | GO |

REMARKS

In the above instruction input, the key input of [SP] can be omitted.

5.4 Read of Program List
5.4.1 Read of list by step number

By specifying a step number, a program list containing the specified step number is displayed on the CRT.
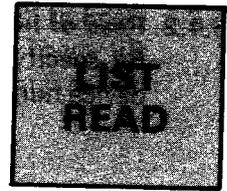
BASIC OPERATION
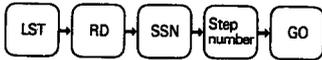
LST → RD → SSN → Step number → GO

OPERATION PROCEDURE

```
     19   AND   Y070
     20   AND   Y0AF
     21   ORB
     22   OUT   F102
     23   LD    X2A0
     24   AND   X31F
     25   AND   X000
     26   AND   X07F
     27   LD    Y2A0
     28   AND   Y2DF
     29   AND   Y000
  ■  30   AND   Y02F
     31   ORB
     32   OUT   F103
     33   LD    X340
     34   AND   X38F
     35   AND   X000
     36   AND   X04F
     37   LD    Y390
     38   AND   Y3BF
     39   AND   Y050
     40   AND   Y07F
     41   ORB
```

LST → RD → SSN → 3 → 0 → GO
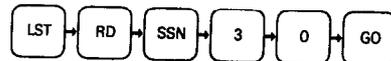
Specification of step number 30.

(Example: Read of program at step number 30)

EXPLANATION

(1) A list of 23 lines is displayed on the CRT with the specified step number located at the center.

(2) After performing the basic operation, press the $\boxed{GO}$ key and the next 23 lines are displayed.

By use of the $\boxed{\uparrow}$ and $\boxed{\downarrow}$ keys instead of the $\boxed{GO}$ key, the preceding screen and the succeeding screen can be displayed, respectively.

1) By pressing the $\boxed{\downarrow}$ key when the cursor is located at the last line, the screen is scrolled one line upward and the first line of the succeeding list is added.

2) By pressing the $\boxed{\uparrow}$ key when the cursor is located at the top line, the screen is scrolled one line downward and the last line of the preceding list is displayed.

5.4.2 Read of list by device

By specifying a device number, the program list containing the specified device number is displayed on the CRT.

LIST READ

BASIC OPERATION

LST → RD → Device → Device number → GO
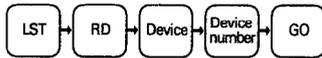
OPERATION PROCEDURE

```
          39  AND  Y050
          40  AND  Y077
          41  ORB
          42  OUT  F104
          43  LD   X3E0
          44  AND  X42F
          45  AND  X000
          46  AND  X04F
          47  LD   Y430
          48  AND  Y45F
          49  AND  Y050
        ■ 50  AND  Y07F
          51  ORB
          52  OUT  F105
          53  LD   X460
          54  AND  X4AF
          55  AND  X000
          56  AND  X04F
          57  LD   Y4B0
          58  AND  Y4DF
          59  AND  Y050
          60  AND  Y07B
          61  ORB
```

LST → RD → Y → 7 → F → GO
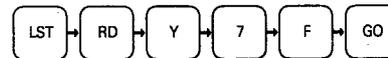
Specification of device Y7F.

(Example: Read of device Y7F)

EXPLANATION

(1) A list of 23 lines is displayed on the CRT with the specified device number located at the center.

When the device number is used more than once in the program, the lowest step number is displayed. Then, by pressing the GO key, the next occurrence is displayed.

(2) After all occurrences have been displayed, "NOT FOUND" is displayed in the message column.

5.4.3 Read of list by instruction

By specifying an instruction, the program list containing the specified instruction is displayed on the CRT.

LIST READ

BASIC OPERATION

LST → RD → Command → Device → Device number → GO
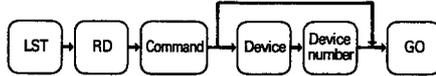
OPERATION PROCEDURE

```
       59   AND   Y050
       60   AND   Y07F
       61   ORB
       62   OUT   F106
       63   LD    X500
       64.  AND   X52F
       65   AND   X000
       66   AND   X02F
       67   LD    Y530
       68   AND   Y55F
       69   AND   Y030
    ■  70   AND   Y05F
       71   ORB
       72   OUT   F107
       73   LD    X570
       74   AND   X59F
       75   AND   X000
       76   AND   X02F
       77   LD    Y5A0
       78   AND   Y50F
       79   AND   Y030
       80   AND   Y05F
       81   ORB
```

LST → RD → AND → Y → 5 → F → GO
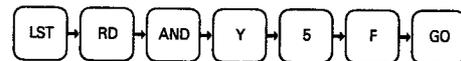
Specification of AND Y5F.

(Example: Read of instruction AND Y5F)

EXPLANATION

(1) A list of 23 lines is displayed on the CRT with the specified instruction located at the center.
When the specified instruction is used more than once, the occurrence with the lowest step number is displayed. By pressing the [GO] key, the next occurrence is displayed.

(2) The following instructions may be read in this way. LD, LDI, OR, ORI, AND, ANI, OUT, PLS, SFT, SET, RST, MC, and MCR.

(3) After all occurrences have been displayed, "NOT FOUND" is displayed in the message column.

5.4.4 Read of list with comments
The read program list is displayed on the CRT, with comments.

LIST
READ

BASIC OPERATION

[List read operation] → (VER/COM)

OPERATION PROCEDURE

```
119  LDI  X107      START
120  ORI  X108      STOP
121  ORI  X109      STANDBY
122  OUT  M385      AUTO
123  LDI  X743      MOVABLE
124  OUT  M325      SEMI-AUTO
125  LDI  X744      BACKWORD
126  OUT  M326      FORWORD
127  LDI  X745      RESET
128  OUT  M327      AUTO
129  LDI  X743      SEMI-AUTO
■ 130  ORI  X744      FORWORD
131  ORI  X745      ERROR
132  OUT  M392      FAILURE
133  LDI  X136      LEFT
134  OUT  M329      POSITIONING
135  LDI  X137      RIGHT
136  OUT  M330      COMPLETION
137  LDI  X138      READY
138  OUT  M331      FAILURE
139  LDI  X136
140  ORI  X137
141  ORI  M332
```

(LST) → (RD) → (SSN) → (1) → (3) → (0) → (GO) → (VER/COM)
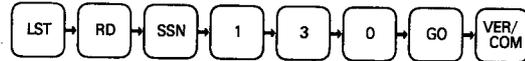
Read of step number 130.

(Example: Read of list with comment at step
             number 130)

EXPLANATION

(1) By pressing the |VER/COM| key after reading the list, the comments of devices are displayed to the right of the list display.
The comment of one device is displayed per line. (Not for the CJ instruction.)
(When the destination data of data instruction or the set value of OUT T/C instruction is data register D, the comment of T/C is displayed.)

(2) To return the list with comments to the normal list, press the |VER/COM| key again.
Each time the |VER/COM| key is pressed, the screen repeats displaying the "normal list" and the "list with comments" alternately.

(3) Operations such as write, insertion, and deletion cannot be performed to the list with comments. To perform such operations, therefore, return the display to the normal list.

5.4.5 Read of device used list
The device used status in the program is displayed per specified device.

LIST READ

BASIC OPERATION

```
LST → RD →┬─ -O┤ ─┬→ Device → Device number → GO
          │        │
          └─ -□- ──┘
```
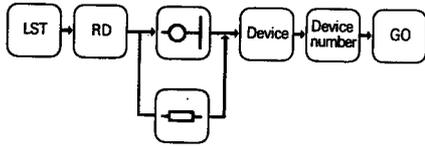
OPERATION PROCEDURE

```
DEVICE USED LIST

    (-| |-  -<>-  = USED)   (BLANK = UNUSED)   (E = ERROR  )
  0
Y 000 -| |- -<>- 1    Y 010    Y 020    Y 030 -| |- -<>-    1
Y 001 -| |-       E    Y 011    Y 021    Y 031       -<>-    2
Y 002       -<>- 1E    Y 012    Y 022    Y 032
Y 003                  Y 013    Y 023    Y 033
Y 004                  Y 014    Y 024    Y 034
Y 005                  Y 015    Y 025    Y 035 -| |- -<>-    1
Y 006                  Y 016    Y 026    Y 036
Y 007                  Y 017    Y 027    Y 037
Y 008                  Y 018    Y 028    Y 038
Y 009                  Y 019    Y 029    Y 039
Y 00A                  Y 01A    Y 02A    Y 03A
Y 00B                  Y 01B    Y 02B    Y 03B
Y 00C -| |- -<>- 1    Y 01C    Y 02C    Y 03C
Y 00D                  Y 01D    Y 02D    Y 03D -| |- -<>-    4
Y 00E                  Y 01E    Y 02E    Y 03E
Y 00F                  Y 01F    Y 02F    Y 03F -| |- -<>-    1
```
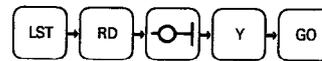
```
LST → RD → -O┤ → Y → GO
```
Specification of output Y.

(Example: Reading of devices used from output)
            Y000 to Y03F

EXPLANATION

(1) When [Device] and [Device] number are specified, a list of 64 points are displayed, beginning with the specified device number. In this case, be sure to press the [-O┤] or [-□-] key and then press the keys in order of [Device] and [Device number], as shown in Basic Operation.
To display the specified device list of 64 points beginning with number 0, it is not required to specify the device number. (Refer to Operation Procedure.)
The device used list of 64 points is displayed beginning with the head of specified devices.

(2) When the [GO] key is pressed after performing the Basic Operation, the device used list of the next 64 points is displayed.

(3) Devices which may be searched are X, Y, M, F, T, C, D, and K (for MC and MCR).
(When the number of digits is specified, e.g. "K4X0", in a data instruction, a list is displayed assuming that X000 to X00F have been used.)

(4) In the device used list, the number of coils used (-<>-) is displayed up to a maximum of 9. When the number of coils is 10 or more, "✳" is displayed.

(5) To stop the display of device used list, press the [CLEAR] key. To resume the display, press the [GO] key. To complete the display, press the [END] and [GO] keys.

(6) In the device used list, displays indicated in the -| |- column, -<>- column, and Error column are as shown in the following table.

	⊣ ⊢Column Display	⊣<>⊢Column Display	Error Condition *
X		None	
Y M T C	LD, LDI, OR, ORI, AND, ANI Source of data instruction	OUT, SET (except T, C), RST SFT (only M), PLS (only M) Destination of data instruction	
K	MC	MCR	
F	LD, LDI, OR, ORI, AND, ANI	OUT, SET, RST	
D	Source of data instruction	Destination of data instruction Set value of OUT T, C	

⊣⊢	⊣<>⊢	Error
Unused	Unused	
Unused	Used	Error
Used	Unused	Error
Used	Used	

For comparison instructions, >, = and <, both the second word and third word are treated as source and displayed in the ⊣ ⊢column. For other data instructions, the second word is treated as source and the third word as destination.

○ There is no error display for X.

○ When M254 or M255 is used for the K1 or K2 or when MA23 or MA24 is used for the K3, error is displayed.

*: Although "ERROR" may be indicated, this simply means that only coils or contacts for a given device have been used. This may not necessarily be a true error.

5.4.6 Read of contact and coil list

The device use status in the program is displayed per specified device number.

LIST
READ

BASIC OPERATION

LST → RD → ┤├ → Device → Device number → GO

┤╱├
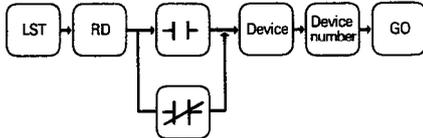
OPERATION PROCEDURE

```
CONTACT AND COIL LIST      Y  000

STEP:LADDER SYMBOL  STEP:LADDER SYMBOL   STEP:LADDER SYMBOL  STEP:LADDER SYMBOL

   0 ┤├            13 ┤├              30 ┤├              50 ┤├

 100 ─<>─         150 ─[ ]─ SET      1250 ─[ ]─ MOV     1300 ─[ ]─ MOV
```

LST → RD → ┤├ → Y → 0 → GO
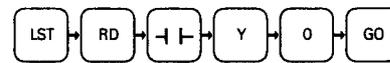
Specification of output Y0.

(Example: Read of contact and coil list of output Y0)

EXPLANATION

(1) When the contact and coil list cannot be displayed on one screen, "DISPLAY OVERFLOW" is displayed. In this case, by pressing the [GO] key, the reset of the contact and coil list can be displayed. (A maximum of 40 pieces are displayed on one screen.)

When the display of contact and coil list has been completed, "COMPLETED" is displayed.

Then, by pressing the [GO] key, the first contact and coil list is displayed again.

(2) When [Device number] is omitted, the device number is regarded as zero (0).

(3) Devices which may be searched are X, Y, M, F, T, C, D, and K (for MC and MCR).

(When the number of digits is specified, e.g. "K4X0", in a data instruction, a list is displayed assuming that X000 to X00F have been used.)

(4) To stop the display of the contact and coil list, press the [CLEAR] key. To resume the display, press the [GO] key. To complete the display, press the [END] and [GO] keys.

5.4.7 Read of T/C setting value list

The set values of timers and counters used in the program are displayed.

LIST READ

BASIC OPERATION

```
LST → RD → ○ ┬ T ┬ SP → K → GO
          └ ─ ┘ └ C ┘
```
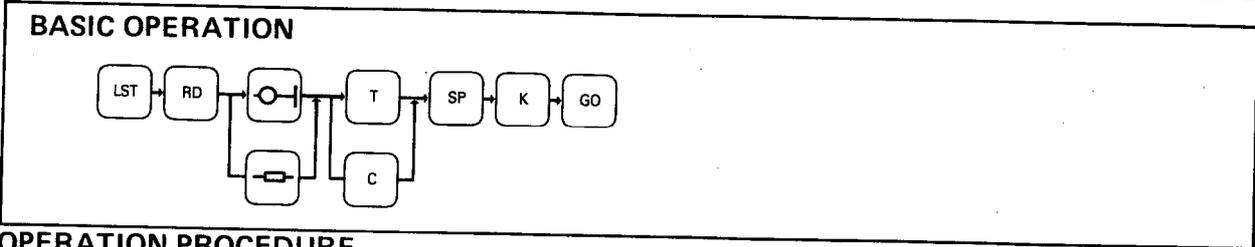
OPERATION PROCEDURE

```
T.C SETTING LIST

T    0   K 100    TC  16          TC  32   K 200   TC  48
TC   1   D90      TC  17          T   33           TC  49
T    2            TC  18          TC  34           T   50   K 100
TC   3            C   19  K9999   TC  35           TC  51
TC   4            TC  20          TC  36           TC  52
TC   5            TC  21          TC  37           TC  53
TC   6            TC  22          TC  38           TC  54
TC   7            TC  23          TC  39           TC  55
TC   8            TC  24          TC  40           C   56   K  40
T    9   K 100    TC  25          TC  41           TC  57
TC  10            TC  26          TC  42           TC  58
TC  11            TC  27          TC  43           TC  59
TC  12            T   28  K  55   TC  44           TC  60
TC  13            TC  29          TC  45           TC  61
TC  14            TC  30          TC  46           TC  62
TC  15            C   31  K  10   TC  47           T   63   K 500
```

```
LST → RD → ○ → T → SP → K → GO
```

(Example: Read of setting value list which begins
          with T0 or C0)

EXPLANATION

(1) The T/C set value list of 64 points is displayed.

(2) By pressing the [GO] key after performing the Basic Operation, the T/C setting value list of the next 64 points is displayed.

(3) When [T] and [Device number] are specified instead of [T] alone, the T/C setting value list of 64 points is displayed, beginning with the specified device number.

5.5 Insertion and Deletion of Program List
5.5.1 Insertion of program list

An instruction is inserted into the program in list mode.

LIST INSERTION

BASIC OPERATION
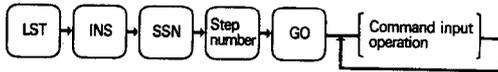
```
LST → INS → SSN → Step number → GO → [Command input operation]
```

OPERATION PROCEDURE

```
19   AND   Y070
20   AND   Y0AF
21   ORB
22   OUT   F102
23   LD    X2A0
24   AND   X31F
25   AND   X000
26   AND   X07F
27   LD    Y2A0
28   AND   Y2DF
29   AND   Y000
■ 30   AND   Y02F
31   ORB
32   OUT   F103
33   LD    X340
34   AND   X38F
35   AND   X000
36   AND   X04F
37   LD    Y390
38   AND   Y3BF
39   AND   Y050
40   AND   Y07F
41   ORB
```
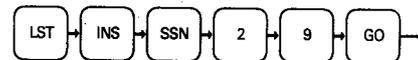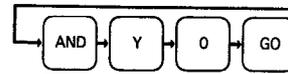
```
LST → INS → SSN → 2 → 9 → GO
      Specification of step number 29

→ AND → Y → 0 → GO
      Insertion of AND Y0
```

(Example: Insertion of AND /0 between step numbers 28 and 29)

EXPLANATION

(1) By pressing the [LST], [INS], [SSN], [Step number], and [GO] keys, read the step number where the instruction will be inserted. Then by performing the instruction input operation, insert the instruction. After the step number is read, the instruction can be inserted into the line of step number, where the cursor is located, by moving the cursor by use of the [↑] and/or [↓] key. (After the instruction is inserted, the cursor automatically moves to the next step number.)

(2) The step numbers of program located below the insertion position are shifted downward in due order.
(The jump destination step number of CJ instruction is also changed automatically.)

(3) When FD automatic write mode has been set and the [MELSAP] key is pressed, all the programs in the work area are written to the FD. (For the automatic write operation to the FD, refer to Sections 2.3 and 7.11.)

5.5.2 Deletion of program list

The specified instruction is deleted from the program.

BASIC OPERATION

LST → DEL → SSN → Step number → GO → GO
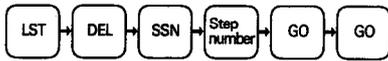
OPERATION PROCEDURE

39	AND	Y050
40	AND	Y07F
41	ORB	
42	OUT	F104
43	LD	X3E0
44	AND	X42F
45	AND	X000
46	AND	X04F
47	LD	Y430
48	AND	Y45F
49	AND	Y050
■ 50	AND	Y07F
51	ORB	
52	OUT	F105
53	LD	X460
54	AND	X4AF
55	AND	X000
56	AND	X04F
57	LD	Y4B0
58	AND	Y4DF
59	AND	Y050
60	AND	Y07F
61	ORB	

LST → DEL → SSN → 5 → 0 → GO

Read of step number 50

GO
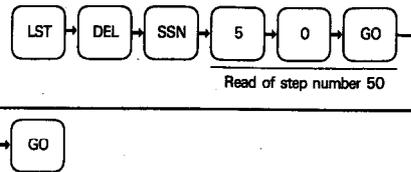
The line of step number 50 is deleted and the succeeding instructions are shifted upward.

(Example: Deletion of program at step number 50)

EXPLANATION

(1) By pressing the LST, DEL, SSN, Step number, and GO keys, the step number to be deleted is read. Then, by pressing the GO key, that line is deleted. After the step number to be deleted is read, the cursor may be moved by use of the ↑ and/or ↓ key and the line, where the cursor is located, can be deleted.

(2) The step numbers of program located below the deletion position are shifted upward in due order.
(The jump destination step number of CJ instruction is also changed automatically.)

(3) To delete NOPs in the program in blocks, press the LST, DEL, NOP, and GO keys to delete all the NOPs from step 0 to END, thereby shifting the program upward.

(4) When FD automatic write mode has been set and the MELSAP key is pressed, all the programs in the work area are written to the FD. (For automatic write to the FD, refer to Sections 2.3 and 7.11.)

5.6 Conversion of Devices
5.6.1 Batch change of devices
Changes the device types and numbers for a specified series of elements.

BASIC OPERATION

[LST] → [CNV] → [Device] → [Device number] → [SP] → [Device] → [Device number] → [SP] → [K] / [H] → [Quantity] → [GO]

Head device number to be converted.　Head device number to be converted.　Quantity of specified conversion

---

OPERATION PROCEDURE

```
        * COMMAND CONVERSION *


    ▶   BATCH DEVICE CONVERSION

        BATCH N/O,N/C CONVERSION
```

[LST] → [CNV] → [X] → [0] → [SP]

Specification of X0

→ [M] → [3] → [0] → [SP] → [K] → [1] → [6] → [GO]

Specification of M30　　　　Quantity 16 is specified.

(Example: Elements X000 to X00F change to M30 to M45)
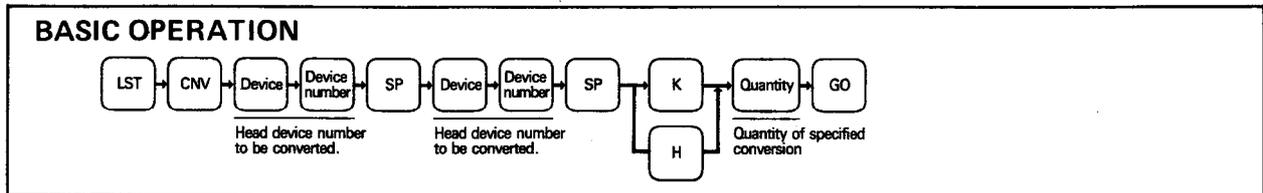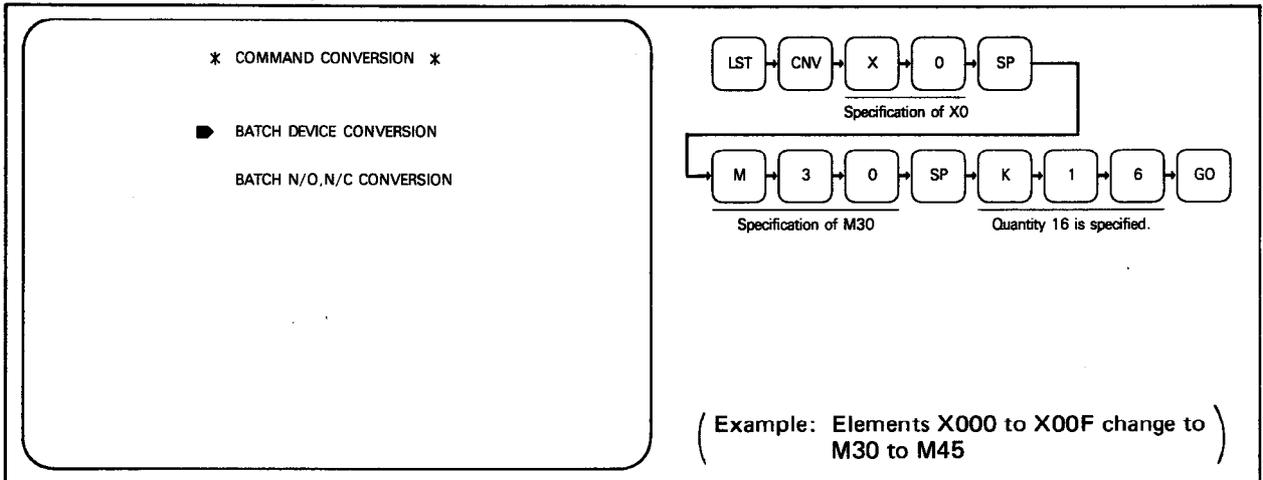
EXPLANATION

(1) By pressing the [LST] and [CNV] keys, the screen shown above is displayed on the CRT. By use of the [↑] and/or [↓] key, move the cursor to "BATCH DEVICE CONVERSION" and then perform the Basic Operation. This changes the device numbers for the specified elements. (If a device number outside the range is specified, "DEVICE NUMBER ERROR" is displayed.)

(2) When [K] and [Quantity] are specified during the Basic Operation, the quantity is specified in decimal. When [H] and [Quantity] are specified, the quantity is specified in hexadecimal.

(3) When the batch change of devices is made, the comments are also changed at the same time provided the comments are within the new set range. (In the Operation Procedure example, 16 comments of X000 to X00F are changed to the comments of M30 to M45 and the comments of X000 to X00F remain unchanged.)

(4) The step range, in which the batch change of devices will be made, can be specified. The specifying method is as shown below:

[LST] [CNV] [Device] [Device number] [SP] [Device] [Device number] [SP]

[K] [Quantity] [SP] [Start step number] [SP] [Final step number] [GO]

Step range specification

(When the [END] key Is pressed instead of the final step number, change is made from the start step number to the END instruction.)

(5) When FD automatic write mode has been set and the [MELSAP] key is pressed, all the programs in the work area are written to the FD. (For the automatic write operation to the FD, refer to Sections 2.3 and 7.11.)

---

(6) Convertible device list

⟨Meanings of symbols⟩

1. ○ : Convertible
2. ✕ : Not convertible
3. △ : The third word is not convertible.
4. For instance, in regards to LD among the instructions in the first line, LD X can be converted into LD Y, LD M, LD F, LD T, or LD C. However, it cannot be converted into LD D.
5. All columns of OUT instruction in the second line are provided with the X marks because the device X does not have the OUT X instruction.

Device before conversion: X

Instruction	Devices after conversion						
	X	Y	M	F	T	C	D
LD, LDI, OR, ORI, AND, ANI	○	○	○	○	○	○	✕
OUT	✕	✕	✕	✕	✕	✕	✕
SET	✕	✕	✕	✕	✕	✕	✕
RST	✕	✕	✕	✕	✕	✕	✕
SFT, PLS	✕	✕	✕	✕	✕	✕	✕
MOV, BCD, BIN, +, −	○	○	○	✕	✕	✕	✕
=, >, <	○	○	○	✕	✕	✕	✕
Set value of OUT T/C (indirect specification)	✕	✕	✕	✕	✕	✕	✕

Device before conversion: Y

Instruction	Devices after conversion						
	X	Y	M	F	T	C	D
LD, LDI, OR, ORI, AND, ANI	○	○	○	○	○	○	✕
OUT	✕	○	○	○	✕	✕	✕
SET	✕	○	○	○	✕	✕	✕
RST	✕	○	○	○	✕	✕	✕
SFT, PLS	✕	✕	✕	✕	✕	✕	✕
MOV, BCD, BIN, +, −	△	○	○	✕	✕	✕	✕
=, >, <	○	○	○	✕	✕	✕	✕
Set value of OUT T/C (indirect specification)	✕	✕	✕	✕	✕	✕	✕

Device before conversion: M

Instruction	Devices after conversion						
	X	Y	M	F	T	C	D
LD, LDI, OR, ORI, AND, ANI	○	○	○	○	○	○	✕
OUT	✕	○	○	○	✕	✕	✕
SET	✕	○	○	○	✕	✕	✕
RST	✕	○	○	○	✕	✕	✕
SFT, PLS	✕	✕	○	✕	✕	✕	✕
MOV, BCD, BIN, +, −	△	○	○	✕	✕	✕	✕
=, >, <	○	○	○	✕	✕	✕	✕
Set value of OUT T/C (indirect specification)	✕	✕	✕	✕	✕	✕	✕

Device before conversion: F

Instruction	Devices after conversion						
	X	Y	M	F	T	C	D
LD, LDI, OR, ORI, AND, ANI	O	O	O	O	O	O	X
OUT	X	O	O	O	X	X	X
SET	X	O	O	O	X	X	X
RST	X	O	O	O	X	X	X
SFT, PLS	X	X	X	X	X	X	X
MOV, BCD, BIN, +, −	X	X	X	X	X	X	X
=, >, <	X	X	X	X	X	X	X
Set value of OUT T/C (indirect specification)	X	X	X	X	X	X	X

Device before conversion: T

Instruction	Devices after conversion						
	X	Y	M	F	T	C	D
LD, LDI, OR, ORI, AND, ANI	O	O	O	O	O	O	X
OUT	X	X	X	X	O	X	X
SET	X	X	X	X	X	X	X
RST	X	X	X	X	X	X	X
SFT, PLS	X	X	X	X	X	X	X
MOV, BCD, BIN, +, −	X	X	X	X	O	O	O
=, >, <	X	X	X	X	O	O	O
Set value of OUT T/C (indirect specification)	X	X	X	X	X	X	X

Device before conversion: C

Instruction	Devices after conversion						
	X	Y	M	F	T	C	D
LD, LDI, OR, ORI, AND, ANI	O	O	O	O	O	O	X
OUT	X	X	X	X	X	O	X
SET	X	X	X	X	X	X	X
RST	X	X	X	X	X	O	X
SFT, PLS	X	X	X	X	X	X	X
MOV, BCD, BIN, +, −	X	X	X	X	O	O	O
=, >, <	X	X	X	X	O	O	O
Set value of OUT T/C (indirect specification)	X	X	X	X	X	X	X

Device before conversion: D

Instruction	Devices after conversion						
	X	Y	M	F	T	C	D
LD, LDI, OR, ORI, AND, ANI	X	X	X	X	X	X	X
OUT	X	X	X	X	X	X	X
SET	X	X	X	X	X	X	X
RST	X	X	X	X	X	X	X
SFT, PLS	X	X	X	X	X	X	X
MOV, BCD, BIN, +, −	X	X	X	X	O	O	O
=, >, <	X	X	X	X	O	O	O
Set value of OUT T/C (indirect specification)	X	X	X	X	X	X	O

5.6.2 Batch conversion of "N/O" and "N/C" contacts

This function allows the logic of contacts to be reversed, i.e. Normally open (N/O) contacts become normally closed (N/C) and vice versa.

BASIC OPERATION

[LST] → [CNV] → [↓] → [Device] → [Device number] → [GO]

OPERATION PROCEDURE

```
*  COMMAND CONVERSION  *


   BATCH DEVICE CONVERSION

► BATCH N/O,N/C CONVERSION
```

[LST] → [CNV] → [↓] → [X] → [0] → [GO]

Specification of X0

(Example: Conversion of "N/O" contacts and "N/C" contacts of X0)
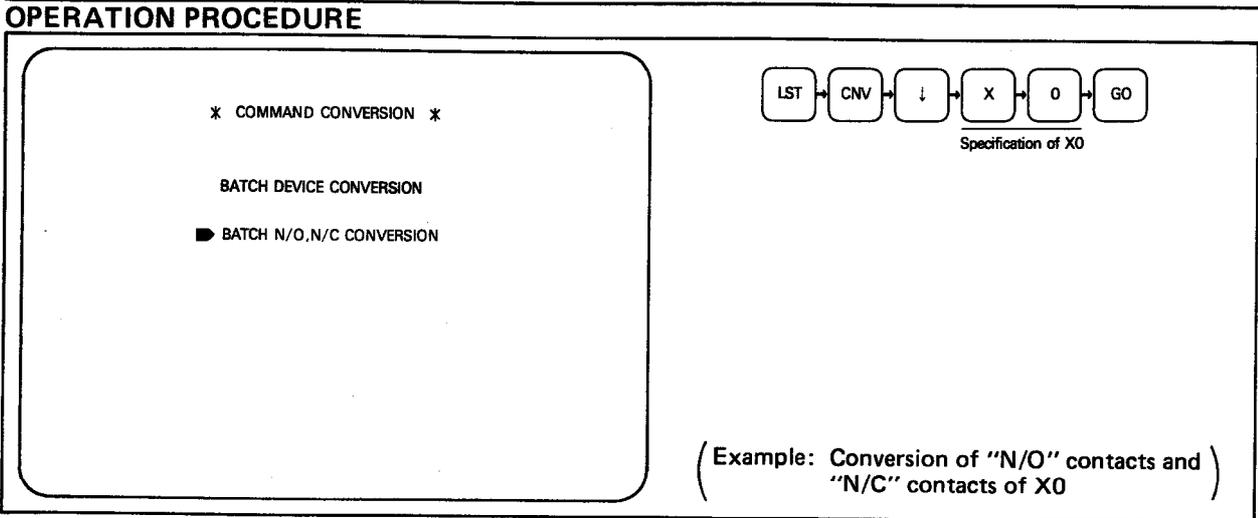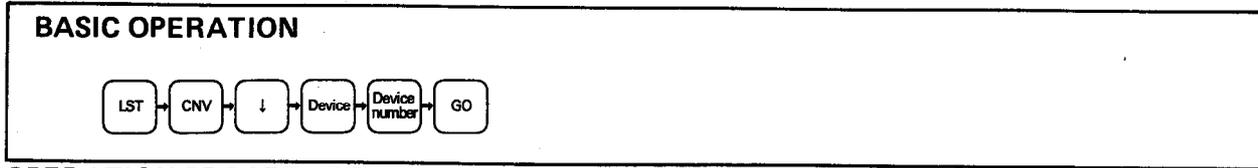
EXPLANATION

(1) By pressing the [LST] and [CNV] keys, the screen shown in the Operation Procedure is displayed on the CRT. By use of the [↑] and/or [↓] key, move the cursor to "BATCH N/O, N/C CONVERSION" and then perform the Basic Operation. This reverses the state of the device contact, i.e.:

LD, OR, and AND are changed to LDI, ORI, and ANI, respectively.
LDI, ORI, and ANI are changed to LD, OR, and AND, respectively.

(2) The step range, in which the batch change of "N/O""N/C" contacts will be made, can be specified. The specifying method is as shown below:

[LST] [CNV] [↓] [Device] [Device number]

[SP] [Start step number] [SP] [Final step number] [GO]

Step range specification

(When the [END] key is pressed instead of the final step number, change is made from the start step number to the END instruction.)

(3) When FD automatic write mode has been set and the [MELSAP] key is pressed, all the programs in the work area are written to the FD. (For the automatic write operation to the FD, refer to Sections 2.3 and 7.11.)

5.7 List Monitor
5.7.1 Batch monitor of devices

In list mode, a batch of devices (X, Y, M, F, K for MC, MCR, T, C, or D) may be monitored.

BASIC OPERATION

[LST] → [MNT] → [Device] → [Device number] → [GO]

OPERATION PROCEDURE

```
                * BATCH MONITORING LIST *

D   0   1234   D   8    0   D   16     0   D      0   D   32      0
D   1      0   D   9    0   D   17    10   D      0   D   33      0
D   2      0   D  10    0   D   18    12   D   1000   D   34      0
D   3      0   D  11    0   D   19    13   D    999   D   35     10
D   4  32000   D  12   10   D   20    14   D     11   D   36     15
D   5      0   D  13   11   D   21     0   D     23   D   37  10000
D   6      0   D  14  100   D   22     0   D    100   D   38  60000
D   7      0   D  15    0   D   23     0   D     11   D   39      0
```

[LST] → [MNT] → [D] → [0] → [GO]

Specification of D0

(Example: Batch monitor of devices from D0 to D39)

EXPLANATION

POINT
Any elements (X, Y, T, C, etc.) monitored will not be in real-time.

(1) For X, Y, M, F, and K, 112 points are displayed on one screen with their respective ON/OFF states. (Refer to Fig. 5.1.)
For T and C, 16 points are displayed on one screen with the ON/OFF states of contacts and coils and the set values and present values. (Refer to Fig. 5.3.)
For D, 40 points are displayed on one screen with the data register values. (Refer to Fig. 5.2.)

(2) The present values of device D and the set values and present values of T/C are displayed in decimal. By pressing the [H] and [GO] keys, these values are displayed in hexadecimal. By pressing the [BIN] and [GO] keys, these values are displayed in binary. To return the values to decimal numbers, press the [K] and [GO] keys.

(3) Device T/C is displayed as T or C when used for OUT T or OUT C, respectively. Otherwise, it is displayed as TC.

(4) During batch monitoring of devices, the verify operation is not performed.

(5) Batch monitoring is stopped by pressing the [CLEAR] key.

```
                    ✱ BATCH MONITORING LIST ✱
Y 000     Y 010     Y 020     Y 030     Y 040     Y 050     Y 060
Y 001 ■   Y 011 ■   Y 021 ■   Y 031 ■   Y 041 ■   Y 051 ■   Y 061 ■
Y 002 ■   Y 012 ■   Y 022     Y 032     Y 042 ■   Y 052     Y 062
Y 003 ■   Y 013 ■   Y 023 ■   Y 033 ■   Y 043 ■   Y 053 ■   Y 063 ■
Y 004     Y 014 ■   Y 024     Y 034     Y 044     Y 054     Y 064
Y 005 ■   Y 015 ■   Y 025 ■   Y 035 ■   Y 045 ■   Y 055 ■   Y 065 ■
Y 006 ■   Y 016 ■   Y 026     Y 036     Y 046 ■   Y 056     Y 066
Y 007 ■   Y 017 ■   Y 027 ■   Y 037 ■   Y 047 ■   Y 057 ■   Y 067 ■
Y 008     Y 018     Y 028     Y 038     Y 048     Y 058     Y 068
Y 009 ■   Y 019 ■   Y 029 ■   Y 039 ■   Y 049 ■   Y 059 ■   Y 069 ■
Y 00A     Y 01A     Y 02A     Y 03A     Y 04A     Y 05A     Y 06A
Y 00B ■   Y 01B ■   Y 02B ■   Y 03B ■   Y 04B ■   Y 05B ■   Y 06B ■
Y 00C     Y 01C     Y 02C     Y 03C     Y 04C     Y 05C     Y 06C
Y 00D ■   Y 01D ■   Y 02D ■   Y 03D ■   Y 04D ■   Y 05D ■   Y 06D ■
Y 00E     Y 01E     Y 02E     Y 03E     Y 04E     Y 05E     Y 06E
Y 00F ■   Y 01F ■   Y 02F ■   Y 03F ■   Y 04F ■   Y 05F ■   Y 06F ■
```

In this case, 112 points from Y000 to Y06F have been monitored. The ■ mark on the right side of device number indicates ON status. No mark indicates OFF status.

Fig. 5.1 Batch List Monitor of Y

```
                    ✱ BATCH MONITORING LIST ✱

D 0     0   D 8   168   D 16   336   D 24   504   D 32   672
D 1    21   D 9   189   D 17   357   D 25   525   D 33   693
D 2    42   D 10  210   D 18   378   D 26   546   D 34   714
D 3    63   D 11  231   D 19   399   D 27   567   D 35   735
D 4    84   D 12  252   D 20   420   D 28   588   D 36   756
D 5   105   D 13  273   D 21   441   D 29   609   D 37   777
D 6   126   D 14  294   D 22   462   D 30   630   D 38   798
D 7   147   D 15  315   D 23   483   D 31   651   D 39   819
```

In this case, 40 points from D0 to D39 have been monitored. The contents of devices are indicated on the right side of device numbers.

Fig. 5.2 Batch List Monitor of D

```
                    ✱ BATCH MONITORING LIST ✱

              SETTING PRESENT                        SETTING PRESENT
     CONTACT COIL VALUE VALUE          CONTACT COIL  VALUE  VALUE
T   0  ■    ■    10    10      TC   8                        0
T   1            12     0      TC   9                        0
T   2       ■   800    50      C   10         40             0
T   3           999     0      TC  11                        0
TC  4                   0      TC  12                        0
TC  5                   0      TC  13                        0
TC  6                   0      TC  14                        0
TC  7                   0      C   15         10             0
```

In this case, 16 points from T(C)0 to T(C)15 have been monitored. The contents of contacts, coils, set values, and/or present values are indicated.
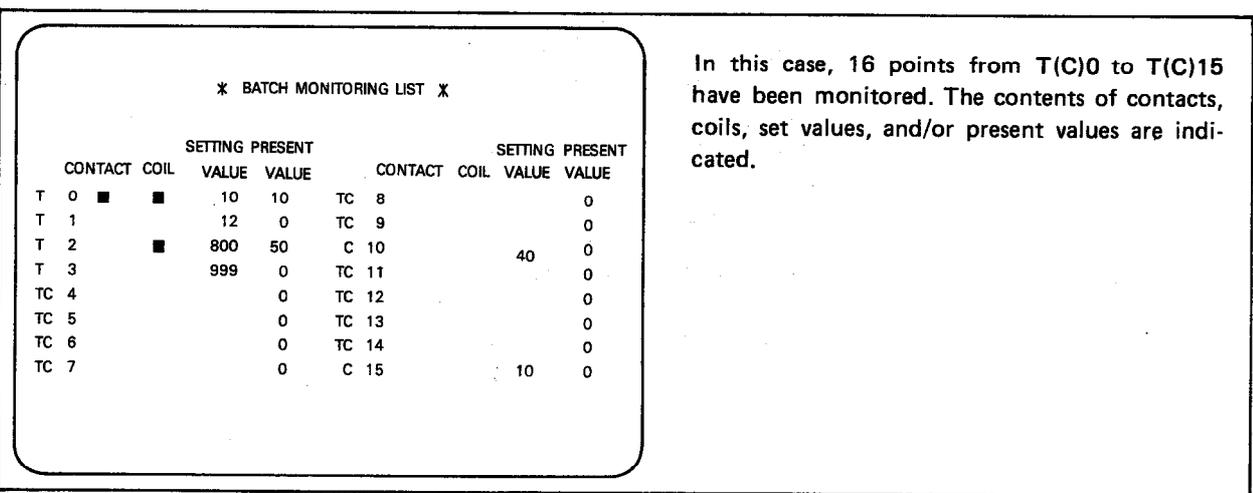
Fig. 5.3 Batch List Monitor of T(C)

5.7.2 Display of device memory contents in GPP/PHP

Allows the device memory contents of the PC to be stored in the GPP/PHP. Hence the states and/or data of all devices may be read from the PC to the GPP/PHP and these values will remain in their read state (i.e. they are not monitored.)

BASIC OPERATION

[LST] → [TEST] → [Device] → [Device number] → [GO]
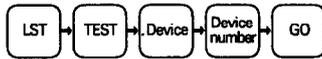
OPERATION PROCEDURE

```
                    * BATCH MONITORING LIST *

D   0   1234   D   8    0   D   16    0   D   24    0   D   32      0
D   1     0    D   9    0   D   17   10   D   25    0   D   33      0
D   2     0    D  10    0   D   18   12   D   26  1000  D   34      0
D   3     0    D  11    0   D   19   13   D   27   999  D   35     10
D   4   32000  D  12   10   D   20   14   D   28    11  D   36     15
D   5     0    D  13   11   D   21    0   D   29    23  D   37   10000
D   6     0    D  14  100   D   22    0   D   30   100  D   38   60000
D   7    12    D  15    0   D   23    0   D   31    11  D   39      0
```

[LST] → [TEST] → [D] → [0] → [GO]

Specification of D0
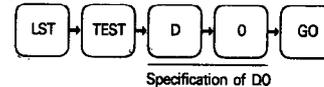
Example: Display of the contents of device memory inside GPP/PHP from D0 to D39

EXPLANATION

(1) Applicable devices are Y, M, F, K (for MC, MCR), T, C, and D as described below.

For Y, M, F, and K, 112 points are displayed on one screen with the relevant ON/OFF states. (Refer to Fig. 5.1.)

For T and C, 16 points are displayed on one screen with the relevant ON/OFF states of contacts and coils and the set values and present values. (Refer to Fig. 5.3.)

For D, 40 points are displayed on one screen with the relevant data register values. (Refer to Fig. 5.2.)

(2) The present values of device D and the set values and present values of T/C are displayed in decimal. By pressing the [H] and [GO] keys, these values are displayed in hexadecimal. By pressing the [BIN] and [GO] keys, these values are displayed in binary. To return the values to decimal numbers, press the [K] and [GO] keys.

(3) Device T/C is displayed as T or C when used for OUT T or OUT C. In other cases, it is displayed as TC.

(4) If it is necessary to store the data in the GPP/PHP memory, this may be done using the FD.

---

6. PC MODE

PC mode allows communication between the GPP/PHP and programmable controller (GPP/PHP connected to the programmable controller).

6.1 Functions in PC Mode

The functions in PC mode are indicated below:

```
<Mode>      <Function>                              <Menu Selection>

              ┌─Write─┐   ┌─Program ──────────────────────┬─All area range setting
              │       │   │                               └─Range setting
              │       │   ├─Comment
              │       │   │ (K3NCPU + K3MB1 only)
   ┌─PC─┬─────┤─Read──┤   ├─File register
              │       │   │ (K3NCPU + K3MB1 only)
              │       │   │  *1
              │       │   └─Device memory ──┬─All area
              ├─Verify┘     (Y, M, T, C, F, D, K) └─Each device ──┬─All area range setting
              │                                                    └─Range setting
              │             (Refer to Fig. 6.1)
              │                                          (Refer to Fig. 6.2)
              │
              └─Test ──┬─Forced output          (Y)
                       ├─Forced set (M, F), forced reset (M, F, T, C, D)
                       ├─Present value change   (T, C, D)
                       └─Error step read
```

*1 : Device memory indicates the ON/OFF status of each device or present value, set value, numeric value, etc.
In this case, the write operation of Y (to programmable controller CPU) cannot be performed.

6.2 Menu Selection in Write, Read, and Verify

```
╭─────────────────────────────────────────────────╮
│                                                   │
│              ✗  MEMORY AREA SELECTION  ✗          │
│        ┌──────────────────┬──────────────────┐    │
│        │     MEMORY       │  DEVICE MEMORY    │    │
│        ├──────────────────┼──────────────────┤    │
│        │   ✗  PROGRAM     │  ALL AREA(W/O.Y)  │    │
│        │                  │                   │    │
│        │     COMMENT      │     X. Y          │    │
│        │                  │                   │    │
│        │    FILE REGISTER │       M           │    │
│        │                  │                   │    │
│        │                  │      T.C          │    │
│        │                  │                   │    │
│        │                  │       F           │    │
│        │                  │                   │    │
│        │                  │       D           │    │
│        │                  │                   │    │
│        │                  │       K           │    │
│        └──────────────────┴──────────────────┘    │
│                                                   │
╰─────────────────────────────────────────────────╯
```
PC , WR and VER only
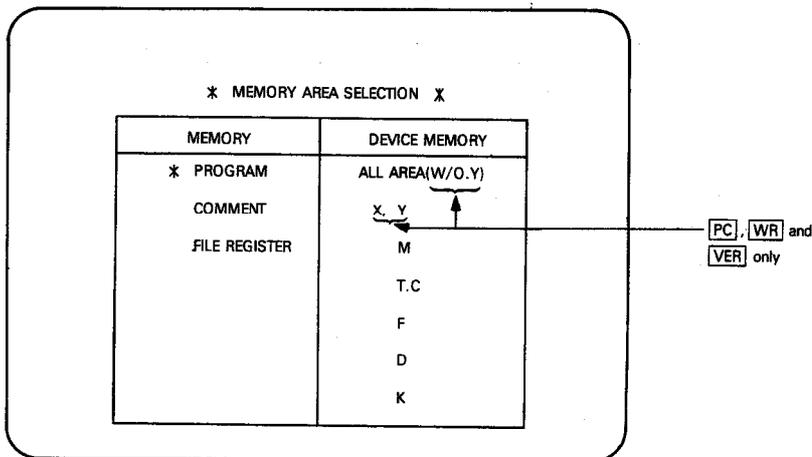
Fig. 6.1

(1) By pressing the [PC] and function ([WR], [RD], or [VER]) keys, the screen shown in Fig. 6.1 is displayed. By use of the [↑], [↓], [→], and/or [←] key, move the cursor to the item required and press the [GO] key. "✗" is displayed at the position of the item which is to be executed.

REMARKS

Menu selection items are as described below, and are classified into:—
1) Program, device (Y, M, T, C, F, D, K) . . . . Range setting required
2) All area of device memory, comment, file register . . . . Range setting is not required

---

(2) When "ALL AREA" is specified, "PRESS 〈GO〉, WHEN☐ " (☐= "WRITE" "READ", or "VERIFY") is displayed above the mode column. By pressing the [GO] key, "EXECUTING" is displayed in the message column. During execution, "✗ ✗ ✗ ·····" is displayed (not for verify) above the mode column indicating execution progress. When execution is completed, "COMPLETED" is displayed.

REMARKS

The "✗" indicates 512 steps. In the case of a 4K-step sequence program, eight are displayed, and each time 512 steps are completed, one mark disappears.

```
⟨RANGE SETTING⟩      PROGRAM

■ ALL AREA

  RANGE SETTING

     START  =

     FINAL  =
```
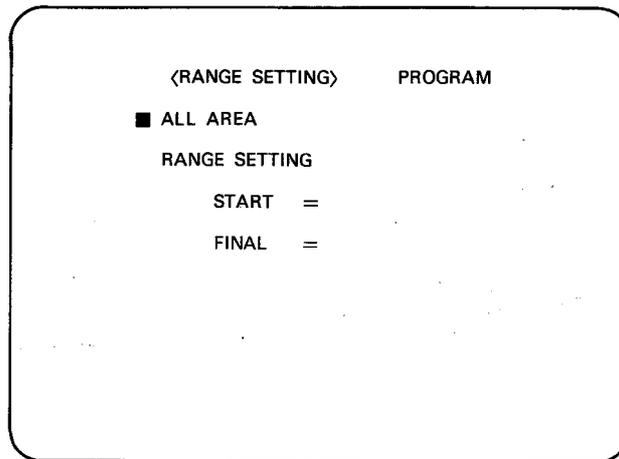
Fig. 6.2

(3) If range setting is required, the screen shown in Fig. 6.2 is displayed. Using the ↑ and/or ↓ key, move the cursor to "ALL AREA" or "RANGE SETTING" as required and press the GO key. The "✕" mark is displayed at the selected position.
When "RANGE SETTING" has been selected, move the cursor to "START" and "FINAL" by use of the ↑ and/or ↓ keys, set the required numbers, and press the GO key.
"PRESS ⟨GO⟩, WHEN⌷" is then displayed above the mode column. Press the GO key and "EXECUTING" is displayed in the message column. During execution, "✕ ✕ ✕·····" is displayed above the mode column. When execution is completed, "COMPLETED" is displayed.

(4) If it is necessary to make a correction, press the GO key after the completion of setting, "PRESS ⟨GO⟩, WHEN⌷" is displayed. By using the ↑ and/or ↓ key, the cursor may be moved to the data to be corrected.

6.3 Write to Programmable Controller

The internal memory contents of the A6GPP are written to the programmable controller CPU.
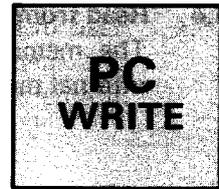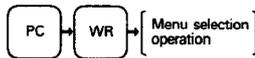
PC
WRITE

BASIC OPERATION

(PC) → (WR) → [Menu selection operation]

OPERATION PROCEDURE

```
* MEMORY AREA SELECTION *
```

MEMORY	DEVICE MEMORY
* PROGRAM	ALL AREA(W/O.Y)
COMMENT	X, Y
FILE REGISTER	M
	T, C
	F
	D
	K

⟨PROGRAM⟩ is selected.　　　⟨RANGE SETTING⟩ is selected.

(PC) → (WR) → (GO) → (↓) → (GO)

(0) → (↓) → (4) → (0) → (9) → (5) → (GO) → (GO)

Step 0 to step 4095 are set.

Write is executed.

(Example: Key operation when the range setting of program has been selected)

EXPLANATION

(1) This writes the internal memory contents of A6GPP to the programmable controller CPU. This includes program, comments, file register, and device memory. (Write of Y cannot be performed.)

(2) Before performing the write operation to the programmable controller CPU, be sure to move the WRITE IN CPU switch to the PERMIT Position. If the switch is located at the FORBID position, "WRITE-IN FORBIDDEN" is displayed.
(There are other communication error messages, refer to the error message list in Section 15.)

(3) When non-coincidence occurs during the write operation, "WRITE-IN ERROR" is displayed.

(4) When the write operation to a PC which is in RUN mode is performed, "PRESS ⟨Y⟩ TO WRITE TO PC WHILE IT IS RUNNING, PRESS ⟨N⟩ TO STOP" is displayed. Pressing the [Y] key causes the write operation to be performed during run.

POINT

It is recommended to restrict this write operation in RUN mode to changing the set values of timers/counters. Write operations which do not involve changing step numbers, such as changing "N/O" and "N/C" contacts and X, Y, M, etc., can be performed. However, such operation may cause control trouble.

Write operations which do involve changing step numbers in RUN mode may cause a CPU error, which stops the execution of the program and causes the RUN lamp to flicker. If this should occur, set the CPU to "STOP" mode before performing the write operation.

---

(5) When the verify operation is performed after writing the file register or device memory, perform the verify operation in STOP state.
(Reason: In RUN mode, the file register and device memory will change, giving a non-coincidence error.)

6.4 Read from Programmable Controller

The memory contents of programmable controller CPU are read to the internal memory of GPP/PHP.

PC READ

BASIC OPERATION

PC → RD → [Menu selection operation]

OPERATION PROCEDURE

＊ MEMORY AREA SELECTION ＊

MEMORY	DEVICE MEMORY
＊ PROGRAM	ALL ARER
COMMENT	Y ·
FILE RESISTER	M
	T, C
	F
	D
	K

■ PRESS (GO). WHEN READ

〈PROGRAM〉 is selected.   〈RANGE SETTING〉 is selected.

PC → RD → GO → ↓ → GO →

→ 0 → ↓ → 4 → 0 → 9 → 5 → GO → GO

Step 0 to step 4095 are set.   Read is executed.
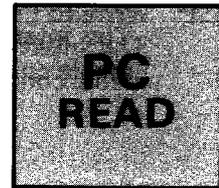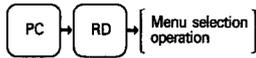
(Example: Key operation when the range setting of program has been selected)

EXPLANATION

(1) The memory contents of programmable controller CPU are read to the internal memory of GPP/PHP.
This includes the program, comments, file register, and device memory.

(2) The programmable controller CPU can be in either RUN or STOP mode. However, when the device memory is read from the programmable controller CPU in STOP mode, the device memory for Y is read with all Ys OFF.

(3) To perform the verify operation after reading the file register or device memory, set the CPU to STOP mode and then perform the read and verify operations.
(Reason: While in RUN mode, the file register and device memory will be changing, resulting in a non-coincidence error.)

6.5 Verify with Memory Contents of Programmable Controller

The memory contents of programmable controller CPU and GPP/PHP are verified.
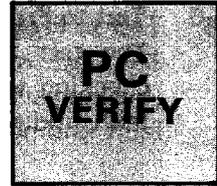
PC VERIFY

BASIC OPERATION

PC → VER/COM → [Menu selection operation]

OPERATION PROCEDURE

```
*  MEMORY AREA SELECTION  *

| MEMORY           | DEVICE MEMORY    |
|------------------|------------------|
| * PROGRAM        | ALL AREA(W/O.Y)  |
| COMMENT          | Y                |
| FILE RESISTER    | M                |
|                  | T, C             |
|                  | F                |
|                  | D                |
|                  | K                |

■ PRESS ⟨GO⟩ ,WHEN VERIFY
```
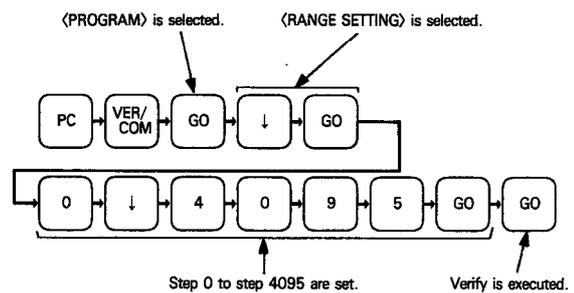
⟨PROGRAM⟩ is selected.   ⟨RANGE SETTING⟩ is selected.

PC → VER/COM → GO → ↓ → GO →

→ 0 → ↓ → 4 → 0 → 9 → 5 → GO → GO

Step 0 to step 4095 are set.   Verify is executed.

(Example: Key operation when the range setting of program has been selected)

EXPLANATION

(1) The verify operation is performed between the memory contents of the programmable controller CPU and the internal memory contents of the GPP/PHP. This includes the program, comments, file register, and device memory.

(2) Verifying of program and comment can be carried out with the PC in RUN mode. However, verification of file register of device memory with the PLC in RUN mode, may result in non-coincidence error because their values are constantly changing. Therefore, perform verification of file register and device memory in STOP mode.

(3) When there are several non-coinciding portions after the verify operation, the non-coinciding ladder block with the lowest step number, the two pieces of non coincident data, and the number of remaining noncoinciding portions are displayed above the mode column. By pressing the GO key, the contents of the next non-coinciding portion is displayed.
A maximum of 32 non-coinciding portions may be displayed. If more than 32 non-coinciding portions are suspected, correct the first 32 non-coinciding portions and then perform the verify operation again.

(4) When the set value of a device range does not coincide after verifying comments, only the contents of the non-coinciding portion (the head number of device and the number of points) are displayed and the verify operation of comment data is not performed.
When there are no non-coinciding portions in the device range set values of comments but the comment data does not coincide, the comment data of non-coinciding portions are displayed.
A maximum of 16 non-coinciding portions in the comment data may be displayed. If there are more than 16 non-coinciding portions, "NO. OF MISMATCHES" is displayed in the message column. By pressing the GO key, the succeeding non-coinciding portions are displayed.

(5) If non-coincidence has occurred in the verify operation of file register and device memory, "NO. OF MISMATCHES" is displayed in the message column.

6.6 Test to Programmable Controller

The test operation to the programmable controller CPU is useful for checking wiring from output terminals, for debugging programs, and for fault finding should any errors occur in the PC.

BASIC OPERATION

OPERATION PROCEDURE

```
        * TEST MODE *        * RESULT *

      FORCED OUTPUT          Y 25 ON

          SET                Y 25 OFF

          RST

      DEVICE FOR PRESENT
        VALUE CONVERSION
      SETTING

      ERROR STEP
```

PC → TEST → Y → 2 → 5 → GO → GO

Y25:ON Y25:OFF

20 lines can be displayed.
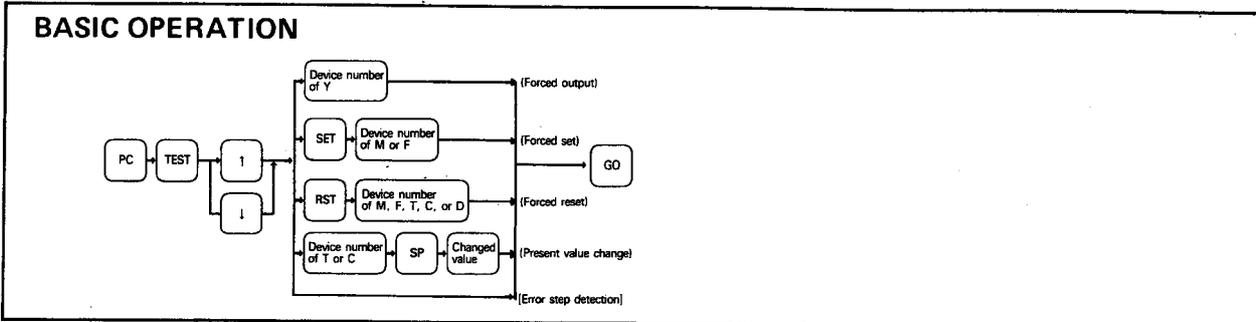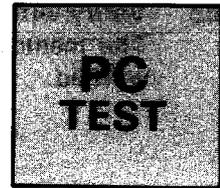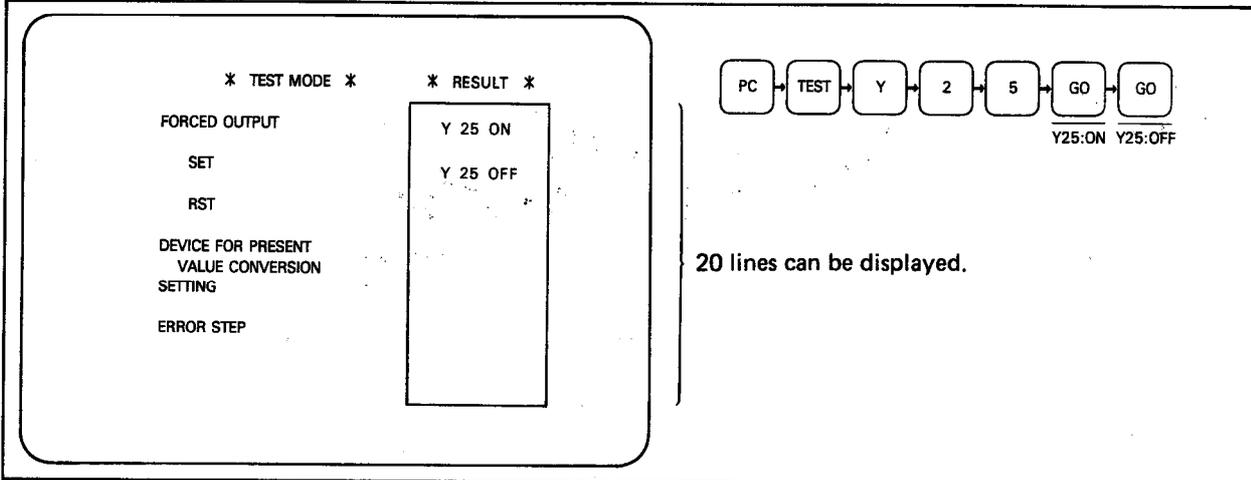
EXPLANATION

(1) The following five functions are available:
   o   Forced output of device Y
   o   Forced set of temporary memory M and failure number F
   o   Forced reset of temporary memory M, failure number F, timer T, counter C, and data register D
   o   Change of the present values of timer T and counter C and change of the contents of data register D
   o   Detection of error step and error number if an error has occurred in the programmable controller CPU.

REMARKS

For the meaning of error numbers, refer to the Instruction Manual of each CPU.
Conventionally, the error number is indicated by four digits. When the A6GPP is used for the K3NCPU, however, the error number may be indicated in five digits. For example, FA26 is indicated 16026.
The upper two digits of the above appear in hexadecimal as defined below:
   A: 10, B: 11, C: 12, D: 13, E: 14, F: 15

MELSEC-A

POINT

(1) When forcing outputs in RUN mode, the execution of the program has priority.
(When the [GO] key is pressed repeatedly after performing the Basic Operation, ON and OFF are repeated alternately.)

(2) When the instruction is ─[SET   ]─ and this device is forced, it remains on after the execution of the instruction and does not turn off unless it is reset.

(3) If the present value is changed after a timer has timed up or a counter has counted up and the present value is smaller than the set value, the timer or counter does not start to re-count.

(4) When error steps have been detected, performing the Basic Operation and then pressing the [GO] key displays the error steps in due order.

(5) Up to 20 lines are displayed in the result column on the right hand side of the display. When the 21st is set, the contents of the first line are cleared and the screen scrolls up.
The RESULT display is deleted by pressing the [SSN] key.

7. FDD MODE

In FDD mode, communication is made between the FDs, which are loaded in two FDDs mounted to the GPP/PHP, and the internal memory of the GPP/PHP.

7.1 FDD Functions and File Names

7.1.1 FDD functions

```
┌──────────────────────────────────────────────────────────────────────────────┐
│                         ┌─ Directory . . . . . . . . . . .Read of directory of program file names
│                         │                                                 (Section 7.2)
│                         │
│                         ├─ Read from FD . . . . . . .Read of file from FD    (Section 7.3 to 7.5)
│                         │
│                         ├─ Write to FD . . . . . . . . . .Write of the contents of internal memory
│                         │                                 area of GPP/PHP to FD      (Section 7.6)
│                         │
│                         ├─ Vertify with FD . . . . . . .Verify between file in FD and internal
│   ┌──────────────────┐  │                                 memory of GPP/PHP       (Section 7.7)
│   │ ✻ FUNCTION  SELECTION ✻ │
│   │                  │  ├─ Deletion of file on FD . . .Deletion of file in FD        (Section 7.8)
│   │ ■ DIRECTORY      │  │
│   │   READ           │  ├─ Copy between FDs . . . . .Copy between FDD [A] ↔ FDD [B]
│   │   WRITE          │  │                              Copy between FDD [A] ↔ FDD [A]
│[FDD] ⇨ │   VERIFY    │  │                              Copy between FDD [B] ↔ FDD [B]
│   │   DELETE         │  │                                                 (Section 7.9)
│   │   COPY           │  │
│   │   FORMAT         │  ├─ Formatting of FD . . . . . .Formatting of FD (unformatted)
│   │   AUTO-WRITE     │  │                                                 (Section 7.10)
│   │   CLEANING DISK  │  │
│   │    SAVE PRINTER DATA │  ├─ Automatic write to FD. . .During creation or correction of ladder,
│   └──────────────────┘  │                                 list, or comment, write to FD can be
│                         │                                 performed without transferring to FD mode
│                         │                                                 (Section 7.11)
│                         │
│                         ├─ Cleaning disk . . . . . . . .Cleaning of FDD head       (Section 7.12)
│                         │
│                         └─ Save printer data . . . . . .Write and entry of data set in printer mode
│                                                          onto FD               (Section 7.13)
└──────────────────────────────────────────────────────────────────────────────┘
```

REMARKS

For FDD operations the MELSAP (upper) Keyboard is used.

┌───┐
│ **POINT**   │
│   │
│ (1) Data which can be written to the FD with the FDD operation, are │
│ the main program, comment, device memory, file register (only │
│ K3NCPU), and printer data. │
│ The internal memory of A6GPP is not backed up by a battery. │
│ Therefore, when the power is turned off or reset is performed, │
│ the contents of internal memory are erased. Be sure to store the │
│ contents of internal memory of A6GPP into the FD after the │
│ creation or correction of program. More convenience is offered │
│ by setting the FD automatic write function. │
│ The storage method of utilized circuits is not included in FDD │
│ mode. Refer to Section 4.6. │
│   │
│ (2) FD data storage capacity. │
│   │
│ The usable memory area per FD is 640K bytes. │
│   │
│ ┌───┐ │
│ │ Main program . . . . .1K step → 2K bytes │ │
│ │   Example: 16K steps → 32K bytes │ │
│ │ Comment. . . . . . . .32K bytes (fixed) │ │
│ │ Data memory . . . . .8K   bytes (variable) │ │
│ │ File register . . . . . .8K   bytes (fixed) │ │
│ │ Utilized ladder . . . .80K bytes (fixed) │ │
│ └───┘ │
│   │
│ For example, when all data is stored on the FD for the K3NCPU, │
│ a total of 160K (32K + 32K + 8K + 8K + 80K) bytes are used. │
│ However, if a small amount of data is stored, a maximum of │
│ 128 file names can be used. More than 128 file names cannot be │
│ stored. │
└───┘

7.1.2 Structure and contents of file name

(1) The file name is always necessary when data, such as program, is stored onto the FD. It is an index to the files on the FD.

(2) Structure of file name ⇒ │ System name │ . │ Identifier │

(3) The system name is set by the user. Alphanumeric characters and the − (minus) key are effective and a maximum of eight characters can be entered. (Space cannot be used.) The first character should always be an alphabetic character.

---

(4) The identifier indicates the type of file contents. It is automatically added to the system name.

Identifier	Description
MPR	Main program
COT	Comment
ADM	File register
ADM	All area
ADM	Output
ADM	Temporary memory
ADM	Timer, counter
ADM	Failure number
ADM	Data register
ADM	K

POINT
When printer data entry is made, a file name "PRINTERK. DAT" is automatically written (fixed).

7.2 Directory

The directory of file names of programs stored on the FD is read.

FDD DIRECTORY

BASIC OPERATION

FDD → CR → [Specified file name] → CR
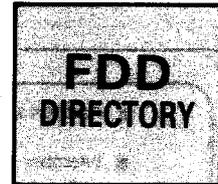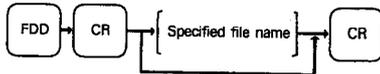
OPERATION PROCEDURE

```
         * FILE DIRECTORY *
            DRIVE B:

  NO.    FILE NAME     SECTORS      COMMENT

  1      TR1   .MPR     252         DEMO
  2      TR2   .MPR     252
  3      TR3   .MPR     252         DEMO DATA 5
  4      TR4   .MPR     252         DEMO SHIFT
  5      TR5   .MPR     252         CLOCK

                                           LINE 15
```

SHIFT

FDD → CR → T → R → . * → . > .

Model name

↳ M → P → R → CR

Identifier

(Example: Directory of system name called TR)

EXPLANATION

(1) Read the directory of file names of programs stored on the FD. 15 lines are displayed on the screen. When there are more than 15 file names, press the |CR| key again. The next 15 lines are displayed.

(2) There are two types of directory reading procedures. One is to read all file names by performing the operation of |FDD|→|CR|→|CR| keys as shown in the Basic Operation. The other is to read only the specified file name by performing the operation of |FDD|→|CR|→|Specified file name|→|CR| keys.

(3) Flow of display screen

```
  * FUNCTION SELECTION *

  ■ DIRECTORY
    READ
    WRITE
    VERIFY
    DELETE
    COPY
    FORMAT
    AUTO-WRITE
    SAVE PRINTER DATA
```
Directory Selection

⇨

```
  * FILE DIRECTORY *


  DRIVE  B : ■
```
Specification of File Name

⇨

```
          * FILE DIRECTORY *
          DRIVE B:

  NO.  FILE NAME  SECTORS  COMMENT
  1    TR1  .MPR     252    DEMO
  2    TR2  .MPR     252
  3    TR3  .MPR     252    DEMO DATA
  4    TR4  .MPR     252    DEMO SHIFT 5
  5    TR5  .MPR     252    CLOCK         LINE
                                          15
```
Directory Display

[FDD]→[CR]

[SHIFT]

[T]→[R]→[.*]→[.>]→[M]→[P]→[R]→[CR]

REMARKS

When it is desired to change the drive,
press the [↑] and [A] keys.

POINT

Reading procedures when you are uncertain of the file name
(1) You are uncertain of the full system name (a maximum of eight
    characters) stored in the FD in drive B and you know only the first
    three characters and also that the identifier is the main program.

[SHIFT]

[X] [Y] [Z] [.*] [.>] [M] [P] [R] [CR]
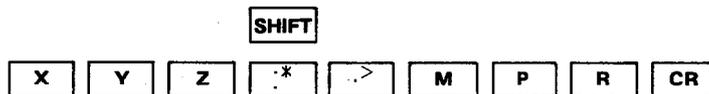
All the file names, of which first three characters of system name
are X, Y, and Z and the identifier is the main program, are read.
(2) The system name stored in the FD in drive B is unknown and the
    identifier is the main program.

[SHIFT]

[.*] [.>] [M] [P] [R] [CR]
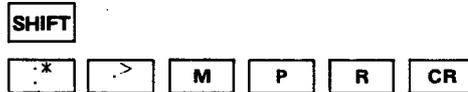
All the file names, of which identifier is the main program, are
read.

(4) By pressing the [CAN] key, the "FUNCTION SETTING" screen is restored.

7.3 Read from FD [I]

Required data is read from the FD to the internal memory of the A6GPP.

FDD
READ[I]

BASIC OPERATION
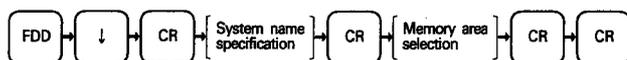
FDD → ↓ → CR → [System name specification] → CR → [Memory area selection] → CR → CR

OPERATION PROCEDURE

✕ MEMORY AREA SELECTION ✕

MEMORY	DEVICE MEMORY
✕ PROGRAM	ALL AREA
COMMENT	Y
FILE REGISTER	M
	T, C
	F
	D
	K

■ PRESS ⟨GO⟩ ,WHEN READ

FDD → ↓ → CR
Read selection

T → R → 1 → CR → ↓ → ↓ → CR → CR

System name specification   File register   Program specification
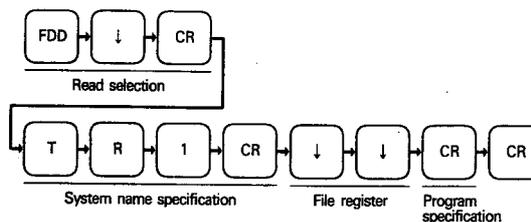
(Example: Read of the data of system name called TR1)

EXPLANATION

(1) If the power is turned off or reset is performed, the contents of internal memory of A6GPP will be cleared. Therefore, it is necessary to read required data (other than programs and comments) from the FD.

(2) During the read operation, "EXECUTING" is displayed in the message column on the CRT. Upon completion, "COMPLETED" is displayed.

(3) To return to the "SYSTEM NAME SETTING" screen after the completion of operation, press the CAN key.

(4) To return to a function other than the FDD function, return the CRT to the "SYSTEM NAME SETTING" screen and then press the CAN key again. This returns the CRT to the "FUNCTION SETTING" screen.

When the PC type, which has been set in the initial screen during the write operation to the FD, and the PC type, which has been set during the read operation from the FD, do not coincide with each other, "PC SELECTION ERROR" message is displayed when the execution of read operation is initiated. To continue the read operation, press the CR key again.

(5) The flow of display screen is as shown below.

```
*  FUNCTION SELECTION  *

     DIRECTORY
  ■  READ
     WRITE
     VERIFY
     DELETE
     COPY
     FORMAT
     AUTO-WRITE
     SAVE PRINTER DATA
```

Read Selection

```
┌─────┐  ┌─────┐  ┌─────┐
│ FDD │→ │  ↓  │→ │ CR  │
└─────┘  └─────┘  └─────┘
```

```
*  SYSTEM NAME SETTING  *

                            DRIVE  B

┌──────────────┬──────────────┐
│ SYSTEM NAME  │  TR 1        │
└──────────────┴──────────────┘
```

Specification of System Name

```
┌─────┐  ┌─────┐  ┌─────┐  ┌─────┐
│  T  │→ │  R  │→ │  1  │→ │ CR  │
└─────┘  └─────┘  └─────┘  └─────┘
```

REMARKS

When it is desired to change the drive,
press the ↑ and A keys.

```
*  MEMORY AREA SELECTION  *

┌──────────────┬──────────────┐
│    MEMORY    │ DEVICE MEMORY│
├──────────────┼──────────────┤
│ *· PROGRAM   │   ALL  AREA  │
│    COMMENT   │      Y       │
│ FILE RESISTER│      M       │
│              │     T, C     │
│              │      F       │
│              │      D       │
│              │      K       │
└──────────────┴──────────────┘
■  PRESS ⟨GO⟩ ,WHEN READ
```

Memory Area Selection
(Program selection example)

```
┌─────┐  ┌─────┐
│ CR  │→ │ CR  │
└─────┘  └─────┘
```
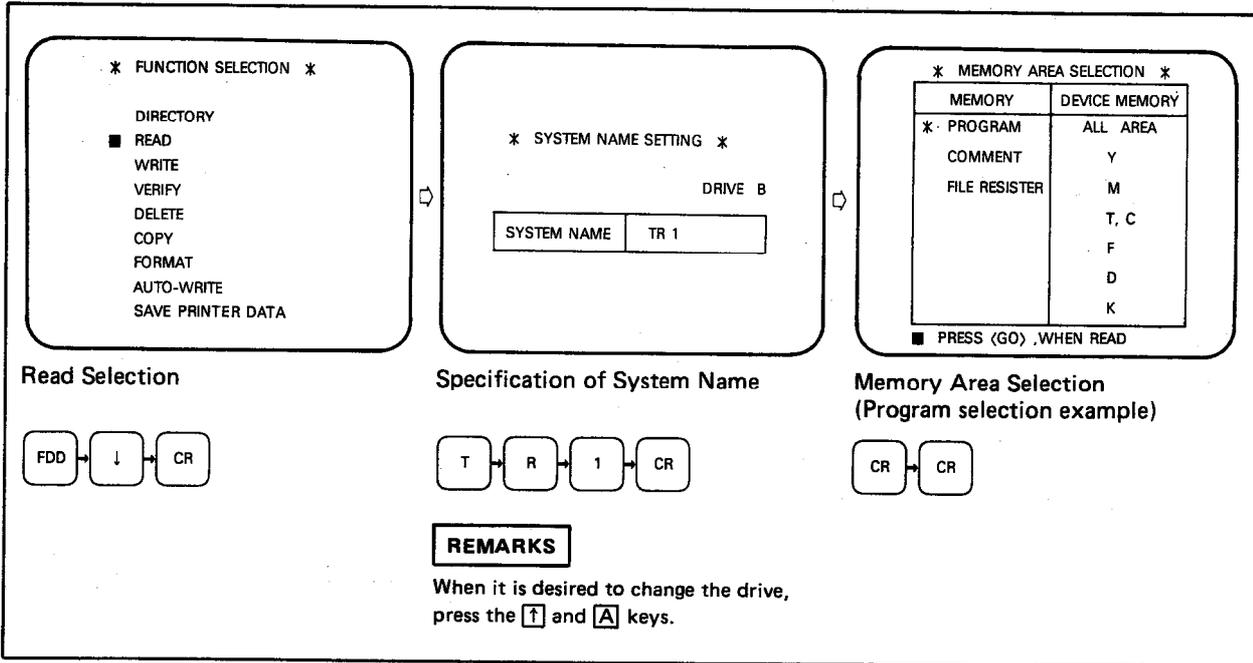
7.4 Read from FD [Ⅱ] (For program)

Program is read from the memory area of FD to the internal memory of A6GPP.
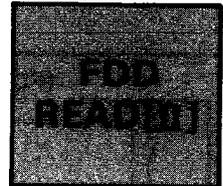
BASIC OPERATION
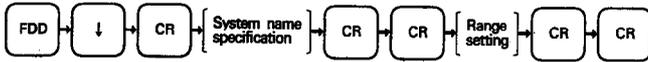
FDD → ↓ → CR → [System name specification] → CR → CR → [Range setting] → CR → CR

OPERATION PROCEDURE

```
        〈RANGE SETTING〉 MAIN PROGRAM

        ALL AREA

     ＊RANGE SETTING

        START          =     0

        FINAL          =  1023

        START FOR GPP =     0
```

FDD → ↓ → CR → T → R → 1
Read selection   System name specification

CR → CR → ↓ → CR
Program   Range specification
specification

0 → CR → 1 → 0 → 2 → 3 → CR
Start step 0   Final step 1023

0 → CR —————— CR
Start step 0 of internal memory   Execution
where program will be stored.
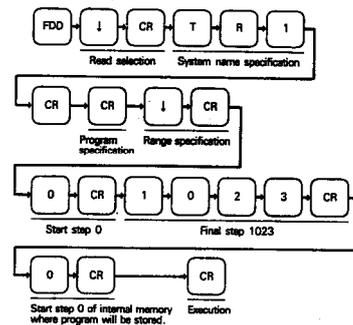
Example: Store the program of system name TR1 from step 0 to step 1023 into the internal memory of A6GPP, starting at step 0.

EXPLANATION

(1) When "PROGRAM" has been selected on the "MEMORY AREA SELECTION" screen, the "RANGE SETTING" screen is displayed.

To read all programs of the specified system name from the FD and store them into the program area of A6GPP memory, starting at step 0.

To specify the program range of the specified system name and store it into the program area of A6GPP memory, starting at the specified step.

```
        〈RANGE SETTING〉 PROGRAM ◄

     ► ALL AREA

      ► RANGE SETTING

        START          =  [      ] ◄

        FINAL          =  [      ] ◄

        START FOR GPP =  [      ] ◄
```

Specified memory area display

Specification of read start step

Specification of read final step

Specification of start step where program will be stored (internal memory of A6GPP)

(2) By read operation, it is possible to edit two or more programs stored on the FD.

(FD)	(A6GPP memory)	
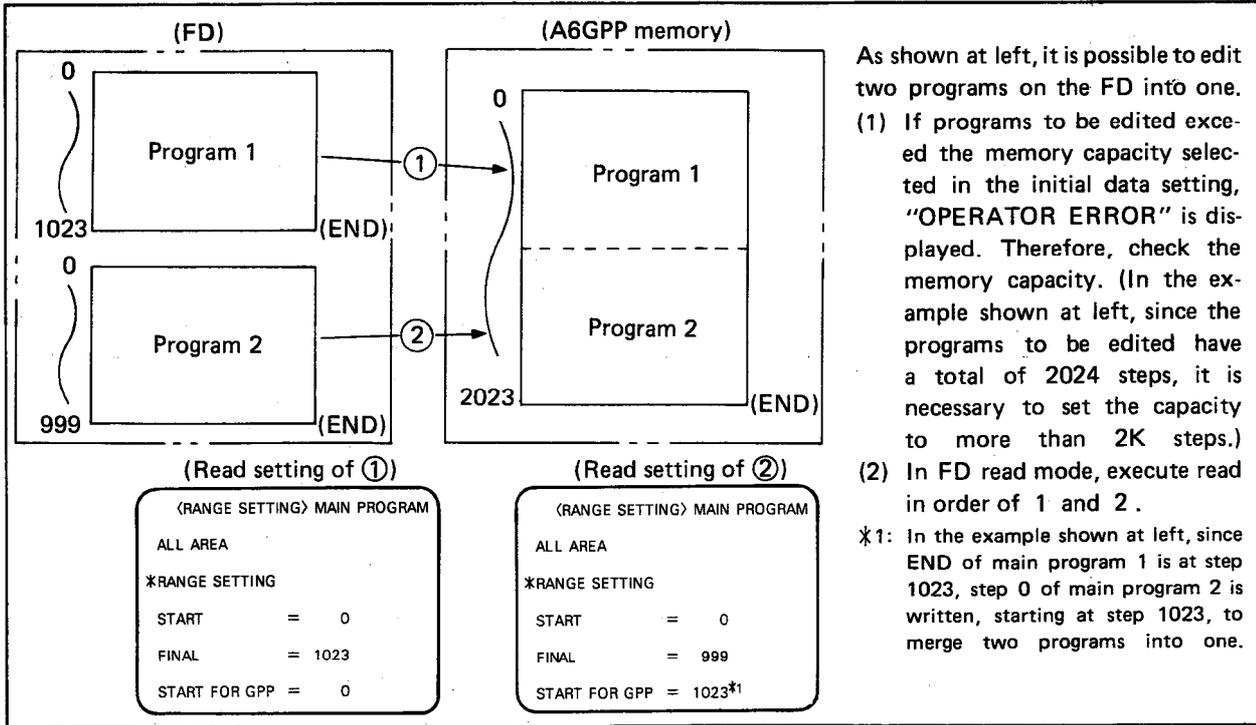
As shown at left, it is possible to edit two programs on the FD into one.

(1) If programs to be edited exceeded the memory capacity selected in the initial data setting, "OPERATOR ERROR" is displayed. Therefore, check the memory capacity. (In the example shown at left, since the programs to be edited have a total of 2024 steps, it is necessary to set the capacity to more than 2K steps.)

(2) In FD read mode, execute read in order of 1 and 2.

✳1: In the example shown at left, since END of main program 1 is at step 1023, step 0 of main program 2 is written, starting at step 1023, to merge two programs into one.

(Read setting of ①)

〈RANGE SETTING〉 MAIN PROGRAM

ALL AREA

✳RANGE SETTING

START = 0

FINAL = 1023

START FOR GPP = 0

(Read setting of ②)

〈RANGE SETTING〉 MAIN PROGRAM

ALL AREA

✳RANGE SETTING

START = 0

FINAL = 999

START FOR GPP = 1023✳1

(3) During the read operation, "EXECUTING" is displayed in the message column on the CRT. Upon completion, "COMPLETED" is displayed.

(4) To return to the "SYSTEM NAME SETTING" screen during operation, press [CAN].

(5) To select a function other than FDD, return the CRT to the "SYSTEM NAME SETTING" screen and then press [CAN] again. This returns the CRT to the "FUNCTION SELECTION" screen.

(6) The sequence of display screens is as shown below.

Read Operation

[FDD] → [↓] → [CR]

System Name Specification

[T] → [R] → [1] → [CR]

REMARKS

To change a drive, press [↑][A].

Memory Area Selection (Program selection example)

[CR]

Range Specification

/Step 0 to 1023 of program on FD are stored into the internal memory, starting at step 0./

[↓] → [CR] → [0] → [CR]

[1] → [0] → [2] → [3]

[CR] → [0] → [CR] → [CR]
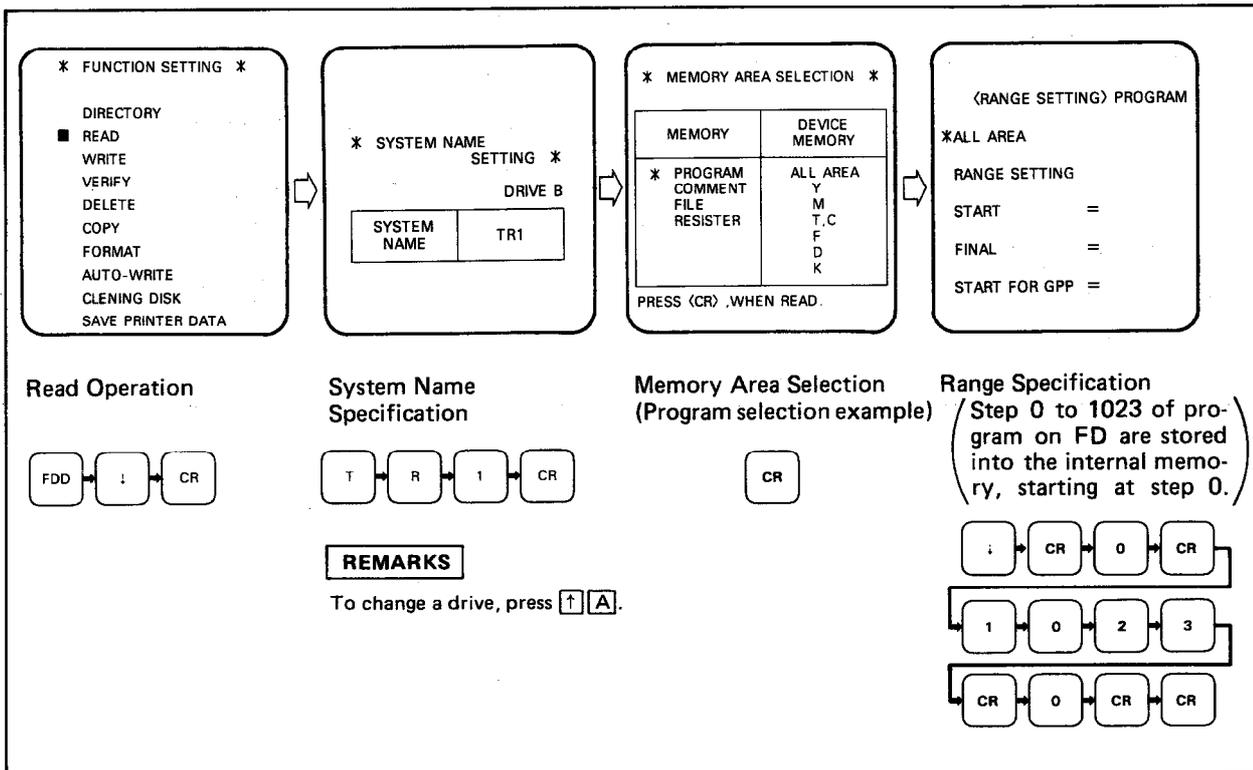
POINT

(1) If the following operations are performed for range setting, "OPERATOR ERROR" is displayed. Input correct data again.

   1) Start step is larger than final step.

   2) Specified step number exceeds the program capacity as set in the initial data setting.

(2) If range setting data has an error, move the cursor to the incorrect data and press HOMECLR.

(3) When a program is read with the range specified, only the set values of timers and counters used in the specified range are read.

7.5 Read from FD [Ⅲ] (For comment)

Comment data is read from the memory area of FD to the internal memory of A6GPP.

FDD
READ[Ⅲ]

BASIC OPERATION

FDD → ↓ → CR → [System name specification] → CR → ↓ → ↓ → CR → [Range setting] → CR → CR

OPERATION PROCEDURE

```
        〈RANGE SETTING〉 COMMENT

        ALL AREA

       *RANGE SETTING

        DEVICE        = X

        START         = 000

        FINAL         = 00F

        START FOR GPP = 020
```

FDD → ↓ → CR → T → R → 1 → CR
Read selection ─── System name specification

↓ → CR → ↓ → CR → X → CR → 0 → CR
Comment specification Range specification Device specification Start number 0

F → CR → 2 → 0 → CR → CR
Final number 0F   Start number 20 of internal memory   Execution
                  where data will be stored.

Example: Store comment data of system name TR1 from X00 to X0F into X20 to X2F of A6GPP memory.

EXPLANATION

(1) When "COMMENT" has been selected on the "MEMORY AREA SE-LECTION" screen, the "RANGE SETTING" screen is displayed.

To read all comments of the specified system name from FD and store them into the internal memory of A6GPP.

To specify the device and range of the specified system name and store them into the internal memory of the A6GPP, starting at the specified number.

```
        〈RANGE SETTING〉 COMMENT

        ALL AREA

        RANGE SETTING

            DEVICE        = [......]

            START         = [......]

            FINAL         = [......]

            START FOR GPP = [......]
```

Specification of device to be read (X, Y, M, ...)

Specification of read start number

Specification of read final number

Specification of start number where data will be stored (internal memory of A6GPP)

(FD)
```
X00
)
)  Comment data
(
X0F
```

⇒

(A6GPP memory)
```
X20
)
)  Comment data
(
X2F
```

Comments written for a given range of devices may be transferred to a different range of devices using the procedure shown on the left.

(2) Error messages displayed during range setting operation and their definitions are as described below.

Description	Error Message
Special M or D has been specified at "DEVICE." (Special M and D cannot be specified.)	OPERATOR ERROR
Comment range has not been set in A6GPP comment mode for that device.	DEVICE READOUT ERROR (When device has been specified) or DEVICE NOT FOUND
Comment range selected in FDD read does not match the range initially set in A6GPP comment mode.	DEVICE NO. ERROR (When device number has been specified)
Comment range (start number to final number), which does not exist on FD, has been specified.	COMMENT RANGE UNMATCHED (When CR has been pressed)

| REMARKS |

If range setting data has an error, move the cursor to the incorrect data and press |HOMECLR|.

(3) If no comment ranges have been set in comment mode before the comment data is read from the FDD, "all area" must be selected on the range setting screen.

If "Range setting" is attempted for reading the comment data without having previously defined the usable comment range in comment mode, "DEVICE READOUT ERROR" or "DEVICE NOT FOUND" is displayed.

7.6 Write to FD

The contents of the internal memory of the A6GPP are written to the FD.
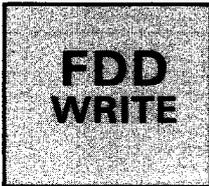
FDD WRITE

BASIC OPERATION

FDD → ↓ → ↓ → CR → [System name specification] → CR → [Memory area selection] → CR → CR → CR

OPERATION PROCEDURE

```
        * MEMORY AREA SELECTION *
   ┌──────────────┬──────────────┐
   │   MEMORY     │ DEVICE MEMORY │
   ├──────────────┼──────────────┤
   │ * PROGRAM    │   ALL AREA   │
   │              │              │
   │   COMMENT    │      Y       │
   │              │              │
   │   FILE RESISTER │   M       │
   │              │              │
   │              │    T, C      │
   │              │              │
   │              │      F       │
   │              │              │
   │              │      D       │
   │              │              │
   │              │      K       │
   └──────────────┴──────────────┘
   ■ PRESS ⟨GO⟩ ,WHEN WRITE
```

FDD → ↓ → ↓ → CR
Write selection

T → R → 1 → CR
System name selection

D → E → M → O → CR
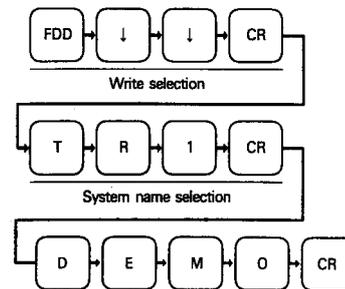
(Example: Storage of the main program inside A6GPP to the FD as system name TR1)

EXPLANATION

(1) When the power is turned off or reset is performed, the contents of the internal memory of the A6GPP will be cleared. Therefore, be sure to write the contents to the FD. Data which may be written are the main program, comment, device memory, and file register.

(2) To return to the "SYSTEM NAME SETTING" screen after the completion of operation, press the [CAN] key.

(3) To return to a mode other than the FDD mode, return the CRT to the "SYSTEM NAME SETTING" screen and then press the [CAN] key again. This returns the CRT to the "FUNCTION SETTING" screen. screen.

(4) The following system names are reserved and should not be used for general program storage etc:
   KRUUYO
   CPM
   PRINTERK

POINT
When "WRITE-IN ERROR" or "TOO LARGE FOR MEMORY CA-PACITY" is displayed during the write operation to the FD, the remaining memory capacity of the FD is insufficient. In this case, check the directory, delete any unnecessary files, and perform the write operation again.

---

(4) The flow of display screen is as shown below.

```
  * FUNCTION SELECTION *                   * MEMORY AREA SELECTION *

                                         | MEMORY        | DEVICE MEMORY |
   DIRECTORY                             |---------------|---------------|
   READ               * SYSTEM NAME SETTING *  | * PROGRAM | ALL AREA |
 ■ WRITE                                 |   COMMENT     | Y         |
   VERIFY                     DRIVE B     |   FILE REGISTER | M       |
   DELETE                                 |               | T, C    |
   COPY          SYSTEM NAME |  TR1       |               | F       |
   FOMAT                                 |               | D       |
   AUTO-WRITE        COMMENT  |  DEMO     |               | K       |
   SAVE PRINTER DATA
```

Write Selection

[FDD]→[↓]→[↓]→[CR]

Specification of System Name and Comment

[T]→[R]→[1]→[CR]

[D]→[E]→[M]→[O]→[CR]

REMARKS

When it is desired to change the drive, press the [↑] and [A] keys.

Memory Area Selection (Program selection example)

[CR]→[CR]

REMARKS

(1) Utilized circuits can also be written to the FD. However, this operation is not performed in FDD mode. Refer to Section 4.6.

(2) In FDD mode, FD automatic write function is also available. Refer to Section 7.11 and 2.3.

(3) The system name is made up of a maximum of 8 characters. (First character must be a letter)

(4) The comment, which is displayed next to the system name in the directory listing, is made up of a maximum of 20 characters.

7.7 Verify with FD
The contents of the internal memory of the A6GPP and the contents of the FD are verified.

BASIC OPERATION

FDD → ↓ → ↓ → ↓ → CR → System name specification → CR → Memory area selection → CR → CR → CR

OPERATION PROCEDURE

```
        X  MEMORY AREA SELECTION  X

    MEMORY          DEVICE MEMORY

  X PROGRAM           ALL AREA

    COMMENT              Y

    FILE RESISTER        M

                        T, C

                         F

                         D

                         K

  ■ PRESS ⟨GO⟩ ,WHEN VERIFY
```

FDD → ↓ → ↓ → ↓ → CR
_____
Verify selection

T → R → 1 → CR → CR → CR
_____   ____
System name specification   Program selection
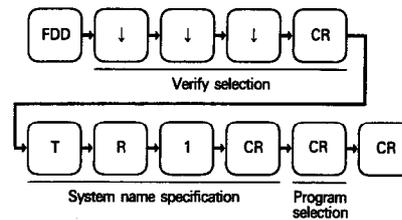
EXPLANATION

(1) When the contents coincide with each other as a result of the verify operation, "COMPLETED" is displayed. When they do not coincide, "DATA UNMATCHED" is displayed.

(2) To return to the "SYSTEM NAME SETTING" screen during the operation, press the $\boxed{\text{CAN}}$ key.

(3) To return to a mode other than FDD mode, return the CRT to the "SYSTEM NAME SETTING" screen and then press the $\boxed{\text{CAN}}$ key again. This returns the CRT to the "FUNCTION SETTING" screen.

(4) The flow of display screen is as shown below.

```
*  FUNCTION  SELECTION  *

    DIRECTORY
    READ
    WRITE
 ■  VERIFY
    DELETE
    COPY
    FORMAT
    AUTO-WRITE
    SAVE PRINTER DATA
```

Verify Selection

```
*  SYSTEM NAME SETTING  *

                         DRIVE  B

    SYSTEM NAME    TR1
```

Specification of System Name

```
            X  MEMORY AREA SELECTION  X

            | MEMORY       | DEVICE MEMORY |
            | * PROGRAM    | ALL ARER      |
            | COMMENT      | Y             |
            | FILE RESISTER| M             |
            |              | T, C          |
            |              | F             |
            |              | D             |
            |              | K             |

         ■  PRESS ⟨GO⟩ ,WHEN VERIFY
```

Memory Area Selection
(Program selection example)

```
FDD → ↓ → ↓ → ↓ → CR
```

```
T → R → 1 → CR
```

```
CR
```

REMARKS

When it is desired to change the drive,
press the [↑] and [A] keys.
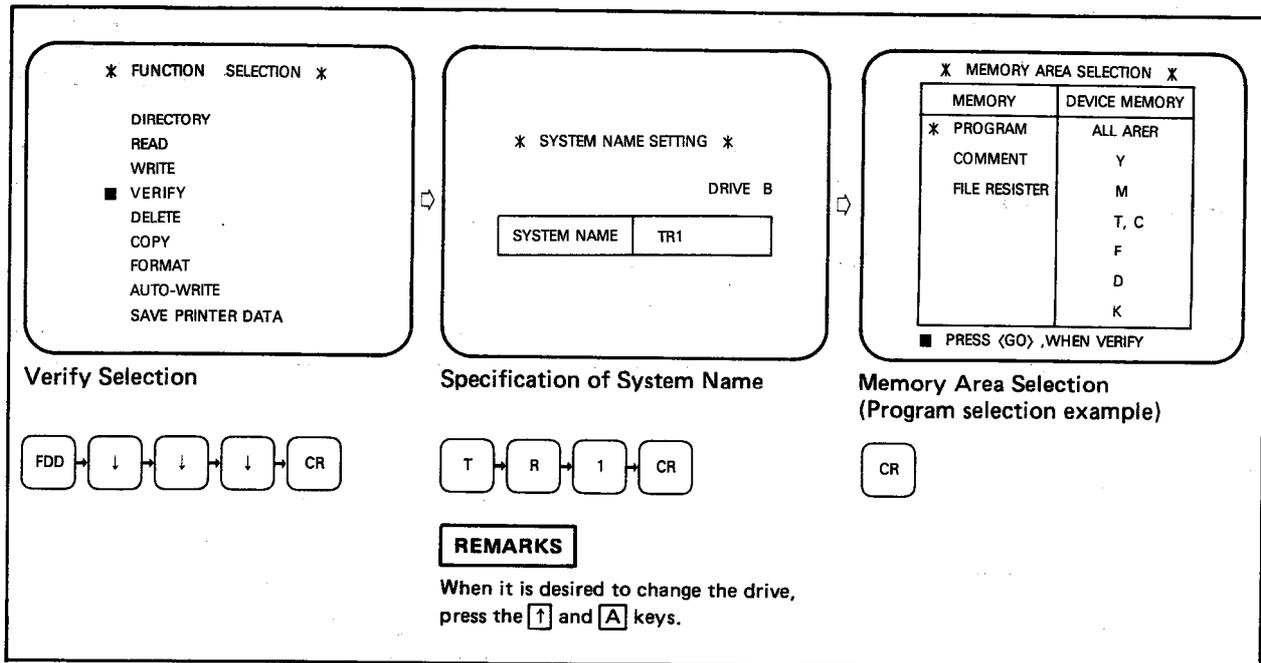
(5) When the programs in the A6GPP and on the FD are not identical, a portion of ladder diagram is displayed corresponding to the part of the program which has not been verified. If the two programs have several differences, the message "NO. OF MISMATCHES [n]" is displayed (where n is the number of different instructions between the two programs.) and the first portion of non-verified ladder is displayed. Pressing the [CR] key will cause the remaining non-verified ladder portions to be displayed in order.
The maximum number of non-verified instructions which may be recognized is 32, if more than this number are suspected, the first 32 should be corrected and the verify procedure repeated.
The display for a non-verified command includes two columns headed GPP and FDD, the instructions under these represent the two respective pieces of non-coincident data.

(6) When the set value of device range does not coincide when using comments, only the contents of non-coinciding portion setting between the GPP and FD (the head number of device and the number of points) are displayed and the verify operation of comment data is not performed.
When there are no non-coinciding portion in the device range set values of comments but the comment data does not coincide, the comment data of non-coinciding portions between the GPP and FD are displayed.
A maximum of 16 non-coinciding portions in the comment data are displayed. If more than 16 non-coinciding portions are suspected, pressing the [CR] key causes the succeeding non-coinciding portions to be displayed.

(7) When the PC type, which has been set in the initial screen, and the PC type, which has been set during the read operation from the FD, do not coincide with each other, "PC SELECTION ERROR" error message is displayed when the execution of verify operation is initiated. To continue the read operation, press the [CR] key again.

7.8 Detetion of File on FD
Deletion of unnecessary files on the FD.

FDD
DELETION

BASIC OPERATION

FDD — ↓ — ↓ — ↓ — ↓ — CR — [File name specification] — CR
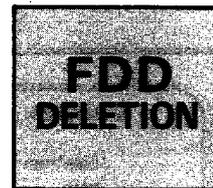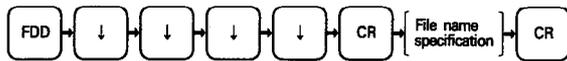
OPERATION PROCEDURE

```
            * FILE NAME SETTING *


                        DRIVE  B
        ┌─────────┬──────────────┐
        │FILE NAME│  TR15 , MPR   │
        └─────────┴──────────────┘
        ■ PRESS (CR) ,WHEN DELETE
```

FDD — ↓ — ↓ — ↓ — ↓ — CR
Delection selection

. T — R — 1 — 5 — .>
System name specification

M — P — R — CR — CR
Identifier is the program.

EXPLANATION

(1) When all memory areas in the FD have been used and further memory is required, memory area may be freed by deleting unnecessary files.

(2) If a file name has been selected and the [CR] key pressed, the deletion procedure may be aborted by pressing the [↑] key. This allows the file name to be changed as required.

(3) When the [CAN] key is pressed during the operation, the CRT returns to the "FUNCTION SETTING" screen.

(4) The flow of display screen is as shown below.

```
*  FUNCTION   SELECTION  *

   DIRECTORY
   READ
   WRITE
   VERIFY
■  DELETE
   COPY
   FOMAT
   AUTO-WRITE
   SAVE PRINTER DATA
```

⇨

```
*  FILE NAME SETTING  *
                 DRIVE  B

 FILE NAME  | T  R  15      .MPR

■  PRESS ⟨CR⟩ ,WHEN DELETE
```

⇨

```
*  FILE NAME SETTING  *
                 DRIVE  B

 FILE NAME  | T  R  15      .MPR

■  PRESS ⟨CR⟩ ,WHEN DELETE
```

Deletion Selection

[FDD]→[↓]→[↓]→[↓]→[↓]→[CR]

Specification of File Name

[T]→[R]→[1]→[5]→[.>]┐
┌────────────────────┘
└→[M]→[P]→[R]→[CR]

Execution

[CR]

| REMARKS |

When it is desired to change the drive,
press the [↑] and [A] keys.
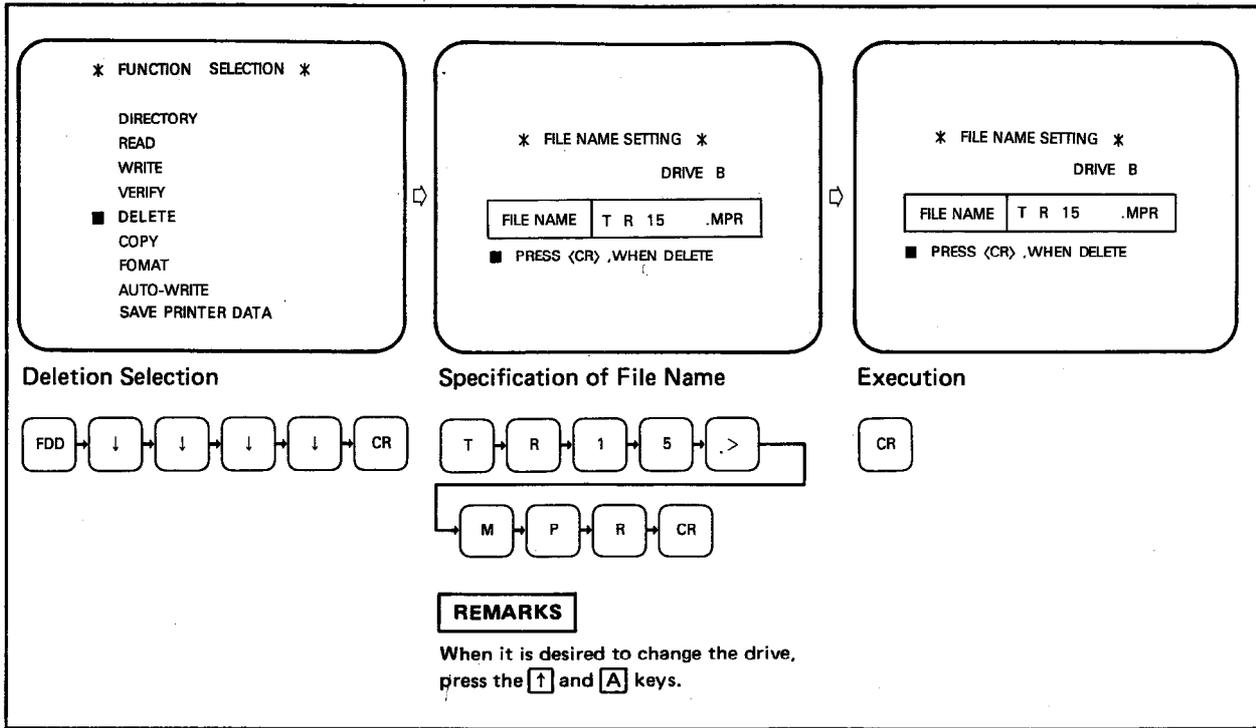
| POINT |

To delete print data, specify file name "PRINTERK.DAT".

7.9 File Copy

The file copy operation is used to copy the contents of the specified file from the specified FDD.

FDD COPY

BASIC OPERATION 1 (GPP)

[FDD] → [↓] → [↓] → [↓] → [↓] → [↓] → [CR] → [Copy source system name specification] → [CR] → [Copy destination system name specification] → [CR]
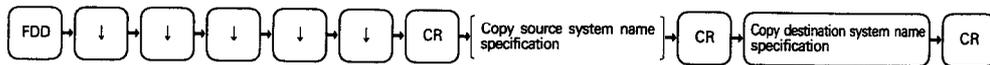
OPERATION PROCEDURE 1-1

```
        * SYSTEM NAME SETTING *

                FROM        TO
    DRIVE         A          B
    SYSTEM NAME  TR  15     TR  15

        ■ PRESS (CR) ,WHEN COPY
```

[FDD] → [↓] → [↓] → [↓] → [↓] → [↓] → [CR]
Copy selection

[↑] → [A] → [T] → [R] → [1] → [5] → [CR]
Copy source system name specification

[T] → [R] → [1] → [5] → [CR] → [CR]
Copy destination system name specification
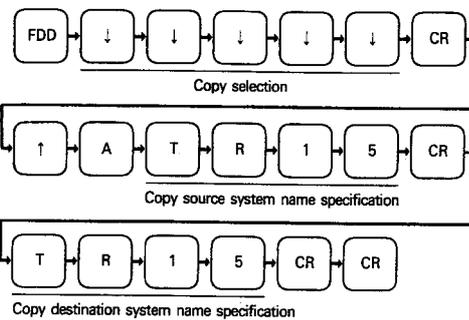
EXPLANATION

(1) Combinations for copy operation are as follows:
   Copy from FDD[A] to FDD[B]
   Copy from FDD[B] to FDD[A]
   Copy from FDD[A] to FDD[A] (Copy inside the same FD)
   Copy from FDD[B] to FDD[B] (Copy inside the same FD)

(2) When the copy operation is performed between two FDDs, e.g. from FDD[A] to FDD[B] or FDD[B] to FDD[A], the system name of copy destination (TO) may be different from that of copy source (FROM). However, in this case, it is recommended to use the same system name. However, when the copy operation is performed within the same FD, the system name of copy source (FROM) should always be different from that of copy destination (TO). If the system names are the same, "SYSTEM NAME ERROR" is displayed.

(3) When the [CAN] key is pressed after the completion of operation or during the operation, the CRT returns to the "FUNCTION SETTING" screen.

(4) If the original file has a comment associated with its system name, that comment is also copied to the new system name.

```
*  FUNCTION SETTING  *

   DIRECTORY
   READ
   WRITE
   VERIFY
   DELETE
 ■ COPY
   FORMAT
   AUTO-WRITE
   SAVE PRINTER DATA
```

Copy Selection

```
     *  SYSTEM NAME SETTING  *

                    FROM        TO
      DRIVE           B          B
      SYSTEM NAME     ■
           ■  PRESS (CR) ,WHEN COPY
```

Specification of System Name and
Change of Source FDD.

```
     *  SYSTEM NAME SETTING  *

                    FROM        TO
      DRIVE           A          B
      SYSTEM NAME    TR  15     TR  15
           ■  PRESS (CR) ,WHEN COPY
```

Execution

FDD → ↓ → ↓ → ↓ → ↓

↓ → CR

↑ → A → T → R → 1 → 5

CR → T → R → 1 → 5 → CR

CR
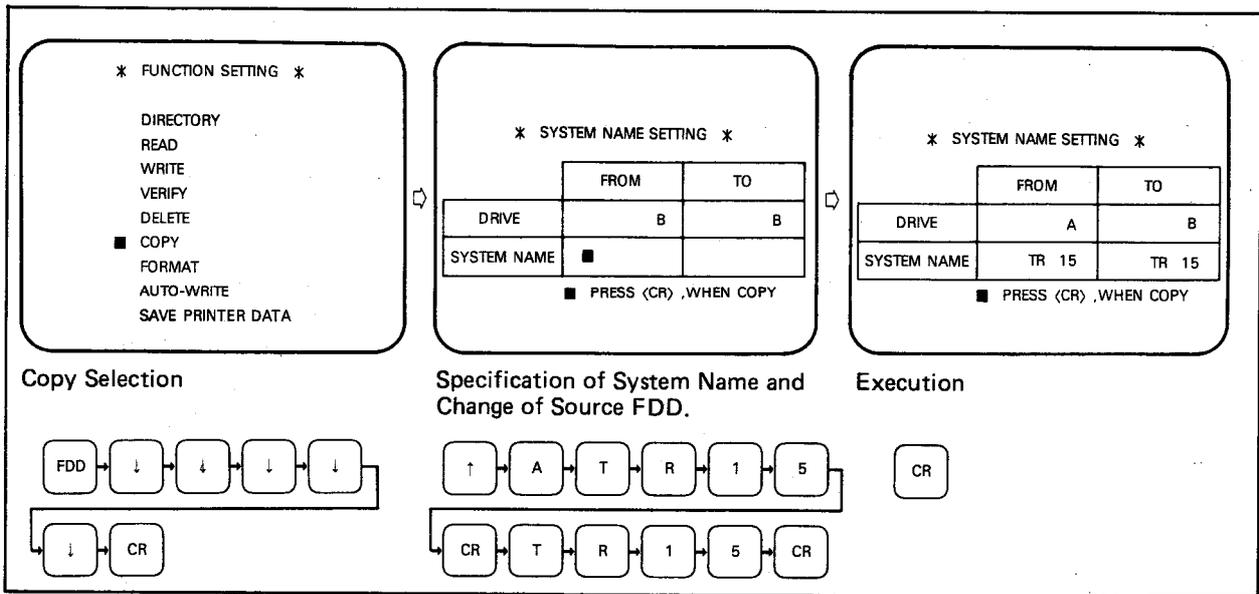
OPERATION PROCEDURE 1-2 (BATCH COPY)

```
     *  SYSTEM NAME SETTING  *

                    FROM        TO
      DRIVE           A          B
      SYSTEM NAME    CPM        CPM
           ■  PRESS (CR) ,WHEN COPY
```

FDD → ↓ → ↓ → ↓ → ↓ → ↓

Copy selection

CR → ↑ → A → C → P → M

CR → C → P → M → CR → CR
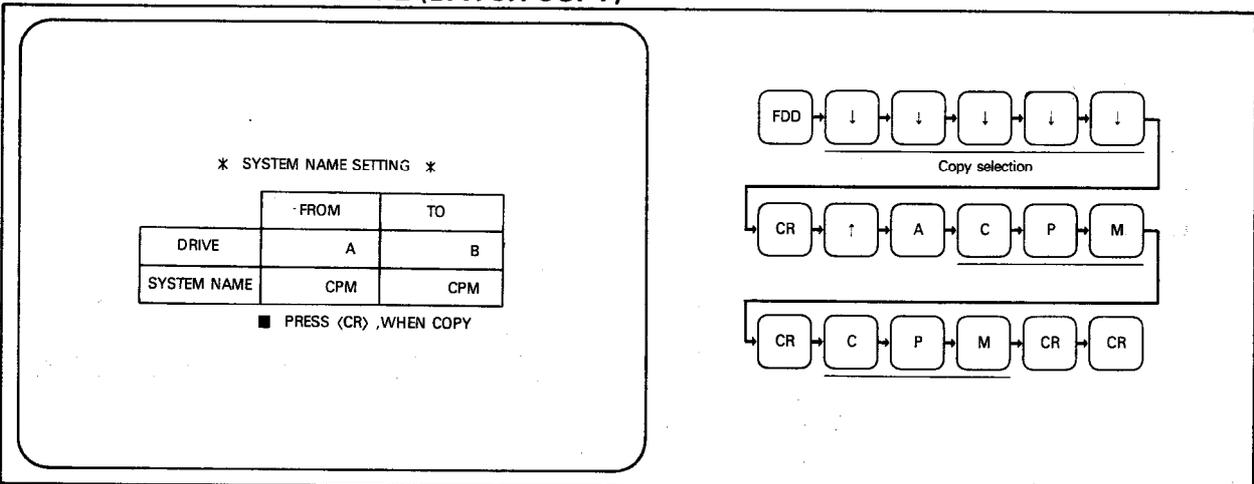
EXPLANATION

(1) It is possible to copy all the contents of a FD to a second FD for back-up.
Set COPY on the "FUNCTION SELECTION" screen, enter CPM to the
SYSTEM NAME columns of FROM and TO on the "SYSTEM NAME
SETTING" screen, and then press the [CR] key.

REMARKS

CPM cannot be used as a general system name. This name is reserved as part of the operating
system.

IMPORTANT

The FD containing the O.S. must only be copied for use as a back up
by the user. It should not be passed on or copied for other purposes.

BASIC OPERATION 2 (PHP)

FDD → ↓ → ↓ → ↓ → ↓ → ↓ → CR → [Insert system FD into FDD] → CR → [Insert copy source FD into FDD] → CR → [Insert copy destination FD into FDD] → CR → [Insert system FD into FDD] → GPP
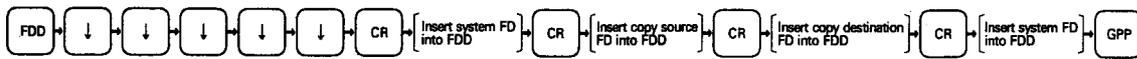
IMPORTANT

When the copy function is executed, all data (such as sequence programs and comments) in the PHP memory is lost. Before executing the copy function, store data from the PHP memory to the user FD (SW0-GPPU).

OPERATION PROCEDURE 2-1

```
          ✳ COPY ✳
 ✳ WHEN COPY IS EXECUTED, DATA SUCH AS PROGRAMS
   AND COMMENTS WILL BE LOST.
 ✳ COPY DESTINATION FD MUST HAVE BEEN FORMATTED.




   TO EXECUTE COPY, INSERT SYSTEM DISK AND
   PRESS <CR>
   TO CANCEL, PRESS <CAN>
```

FDD → ↓ → ↓ → ↓ → ↓ → ↓ → CR → [Insert system FD into FDD] → CR

Copy selection

EXPLANATION

(1) Select "COPY" to copy FD contents in blocks.

(2) To execute copy, insert the GPPK system disk into FDD and press CR. The GPPK system disk must be inserted into FDD if the system has been started up by the memory card. Pressing CR reads the copy function OS from the GPPK system disk and displays the screen shown in OPERATION PROCEDURE 2-2.

(3) When copy is not to be executed, press CAN to return to the "FUNCTION SETTING" screen.

OPERATION PROCEDURE 2-2

```
          ✳ COPY ✳



 TO READ DATA FROM COPY SOURCE FD IN FDD, PRESS <CR>




 TO TERMINATE COPY,
 INSERT SYSTEM DISK AND PRESS <GPP>
```

[Insert copy source FD into FDD] → CR → [Insert copy destination FD into FDD] → CR → [Insert system FD into FDD] → GPP

Read from copy source FD / Write to copy destination FD / System start-up

POINT

The FD where data will be copied (copy destination FD) must have been formatted. Otherwise, copy cannot be executed.

EXPLANATION

(1) Insert the FD from which data will be copied (copy source FD) into FDD and press CR. Data to be copied is read from the FD to the PHP memory.

(2) Insert the copy destination FD into FDD and press CR. Data is written from the PHP memory to this FD.

(3) After completion of copying or when stopping the copy function, insert the GPPK system disk into FDD and press GPP. The GPPK system data is read to the PHP and the "INITIAL MENU" screen is displayed.

7.10 Formatting of FD
The formatting operation of unformatted floppy disk.

FDD
FORMAT

BASIC OPERATION 1 (GPP)

[FDD]→[↓]→[↓]→[↓]→[↓]→[↓]→[↓]→[CR]→[CR]→[CR]→[CR]
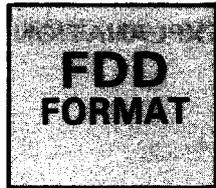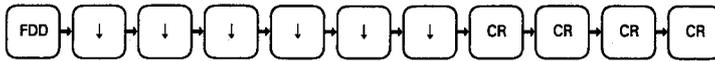
OPERATION PROCEDURE 1-1

```
            * FORMAT *

INSERT SYSTEM DISK INTO DRIVE A, THEN PRESS <CR>

INSERT USER DISK INTO DRIVE B, THEN PRESS <CR>

TO FORMAT DISK IN DRIVE B, PRESS <CR>

FORMATTING TRACK = 0
```

[FDD]→[↓]→[↓]→[↓]→[↓]→[↓]↴
↳[↓]→[CR]→[CR]→[CR]→[CR]

BASIC OPERATION 2 (PHP)

[FDD]→[↓]→[↓]→[↓]→[↓]→[↓]→[↓]→[CR]→[CR]→[CR]
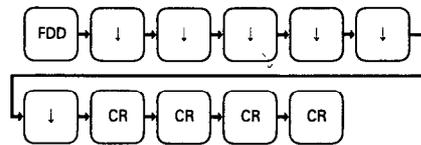
OPERATION PROCEDURE 2-1

```
            * FORMAT *

INSERT USER DISK INTO DRIVE, THEN PRESS <CR>
TO FORMAT DISK IN DRIVE, THEN PRESS <CR>




FORMATTING TRACK = 0
```

[FDD]→[↓]→[↓]→[↓]→[↓]→[↓]→[↓]→[CR]→[CR]→[CR]
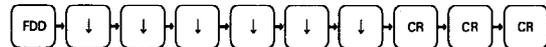
EXPLANATION

(1) The FD cannot be used unless it has been formatted.
(2) Before performing the formatting operation, be sure to insert the system start FD into drive ⒜ and the unformatted FD into drive ⒝.
(3) During execution, "Formatting TRACK" is displayed on the screen. The number of tracks changes from 0 to 159 in due order. When the number of tracks reaches 159, the formatting operation is completed and the CRT returns to the FORMAT initial screen.
(4) By pressing the | CAN | key after the completion of the formatting operation, the CRT returns to the "FUNCTION SETTING" screen.

| IMPORTANT |

If an FD is already formatted and the format procedure is repeated, all data will be cleared. Therefore, caution should be exercised.

7.11 Automatic Write to FD

Setting of automatic write to the FD in ladder, list, or comment mode.

BASIC OPERATION

$$\boxed{FDD} \to \boxed{\downarrow} \to \boxed{\downarrow} \to \boxed{\downarrow} \to \boxed{\downarrow} \to \boxed{\downarrow} \to \boxed{\downarrow} \to \boxed{\downarrow} \to \boxed{CR} \to \boxed{\text{System name specification}} \to \boxed{CR} \to \boxed{CR} \to \boxed{GPP}$$
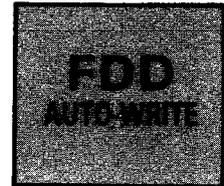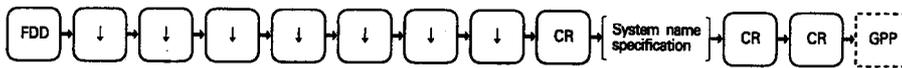
REMARKS

After setting the initial screen, proceed to the Basic Operation.

OPERATION PROCEDURE

```
         * FD AUTO-WRITE *

              ■ YES
                NO

    PRESS (CR), WHEN OK

    SELECT "YES" FOR AUTOMATIC WRITE

    OF PROGRAM OR COMMENT TO FD
```

$$\boxed{FDD} \to \boxed{\downarrow} \to \boxed{\downarrow} \to \boxed{\downarrow} \to \boxed{\downarrow} \to \boxed{\downarrow}$$
$$\to \boxed{\downarrow} \to \boxed{\downarrow} \to \boxed{CR} \to \boxed{CR} \to \boxed{A} \to \boxed{B} \to \boxed{C}$$
$$\to \boxed{CR} \to \boxed{D} \dashrightarrow \boxed{E} \to \boxed{M} \to \boxed{0}$$
$$\to \boxed{CR} \dashrightarrow \boxed{GPP}$$

EXPLANATION

(1) Automatic write to the FD may be selected in two ways as follows:

   (a) After selecting the PC type on the initial setting screen, the option to select FDD AUTO-WRITE is displayed. (see Section 2.3)

   (b) By selecting AUTO-WRITE on the FDD menu. This section describes method (6).

(2) Select AUTO-WRITE on the FDD selection screen by using the cursor and $\boxed{GO}$ keys. Specify the system name and a comment (if required) as for FDD write mode. If auto-write has been set previously it may be cancelled by selecting "NO" on the auto-write menu or alternatively by pressing $\boxed{CR}$ instead of specifying a system name.

(3) When automatic write to the FD has been selected, be sure to insert the system FD into FDD$\boxed{A}$ and the user FD into FDD$\boxed{B}$. If the user FD is not inserted into FDD$\boxed{B}$, "FLOPPY DISK ERROR" will be displayed.

(4) During automatic write mode to the FD, $\boxed{AUTO}$ is displayed at the bottom right of the screen. The initiation of automatic write to the FD in each mode is as described below:

$\boxed{\text{Ladder Mode}}$

   1) When the $\boxed{CNV}$ key is pressed during ladder writing or editing (write from the head step of conversion to END).

   2) After NOP clear operation.

   3) After the deletion of one ladder (write from the head step of deletion to END).

$\boxed{\text{List Mode}}$

   1) After writing a program in list mode, the program is written onto the FD by pressing the $\boxed{MELSAP}$ key.

Comment Mode

1) After the comment write operation, all comments are written onto the FD by pressing the F9 key.

(5) o AUTO-WRITE to a specified file name is cancelled by any of the following operations.
   a) Press RESET button or turn power off.
   b) Execute the PC READ operation.
   c) Execute FDD READ, WRITE, DELETE, COPY or FORMAT.
   d) Change the PC designation on the initial screen. (AUTO-WRITE is not cancelled if the initial data is read but not changed.)
   e) Delete, the A6GPP memory contents by using the NOP GO operation prior to writing a ladder diagram.
   f) Execute the ROM READ operation.
   g) Specify a new file name for the AUTO-WRITE operation in FDD mode.

o After all of the above operations the AUTO-WRITE function is still selected, however the file name for the write operation must be re-defined.

o The following processes completely cancel the AUTO-WRITE option.
   a) Select "NO" on the AUTO-WRITE option menu. (See section 2.3)
   b) Any "WRITE-IN ERROR" occurs during AUTO-WRITE.

(6) When FD automatic write has been selected, the flow of display screen is as shown below.

Automatic Write Selection

System Name Specification

To Execute Comment

Comment
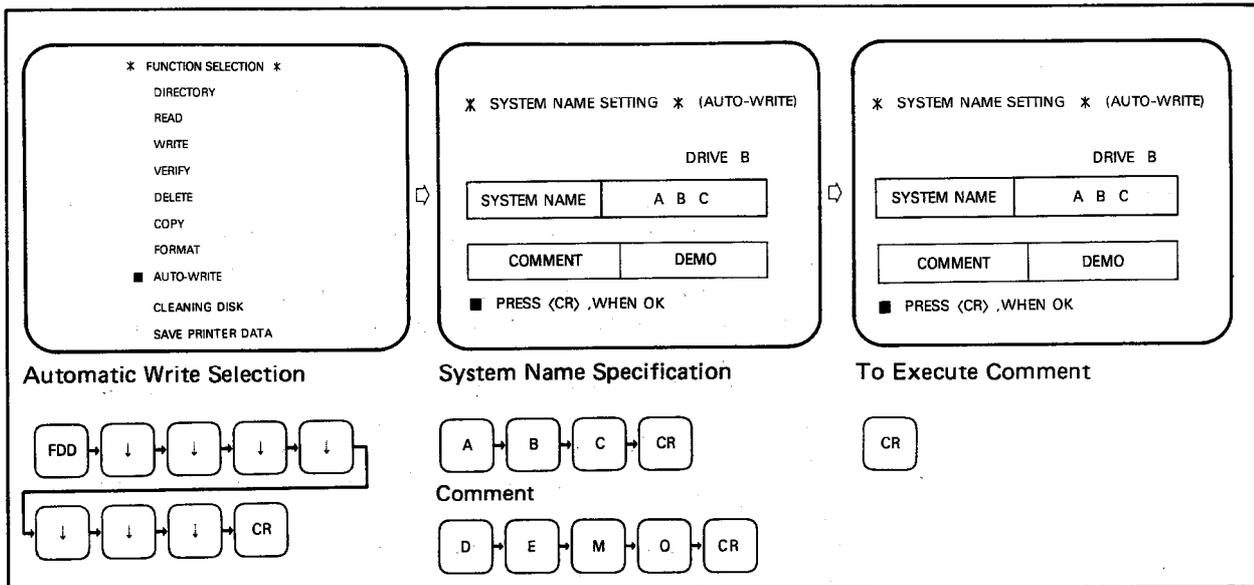
(7) When an existing file name is specified, "SYSTEM NAME ALREADY USED" is displayed in the message column and then "PRESS [W] TO WRITE NEW PROGRAM PRESS [R] TO READ PROG. FROM DISK". To over-write the previous file, enter "W". To read the program from the specified file, enter "R".

When the A6GPP is started or reset, the contents of the internal memory is cleared. Therefore, to execute automatic write mode after selecting an existing system name, be sure to enter "R", thereby reading the program from the FD.

When R is pressed, program and comments are read (if the same system name has been specified).

7.12 Cleaning Disk

Cleaning operation of the FDD head by use of the SW0-FDC.

BASIC OPERATION

(FDD)→(↓)→(↓)→(↓)→(↓)→(↓)→(↓)→(↓)→(↓)→(CR)

OPERATION PROCEDURE

```
        * CLEANING DISK *

           ■ DRIVE A
             DRIVE B
```

(FDD)→(↓)→(↓)→(↓)→(↓)→(↓)→(↓)→(↓)
⟨CLEANING DISK⟩ selection

→(↓)→(CR)→(CR)
Drive A selection

(Example: Cleaning of FDD [A])

EXPLANATION

(1) The cleaning disk is used as follows:

   1) Periodic cleaning . . . . . . .Use the cleaning disk approximately every three months to clean the head of the FDD. (Maximum of four times a month)

   2) Frequent read errors . . . .If read errors occur frequently, a possible cause is a dirty FDD head. Perform cleaning operation once. If this does not rectify the problem, perform the cleaning operation a maximum of five times. If there are still errors, the FD or FDD are faulty.

(2) To perform the cleaning disk operation, insert the SW0-FDC into the FDD to be cleaned ([A] or [B]), select "DRIVE A" or "DRIVE B", and then press the [CR] key. During execution of cleaning disk operation, "EXECUTING" is displayed in the message column. Upon completion, "COMPLETED" is displayed. If the SW0-FDC is not inserted, "FLOPPY DISK ERROR" is displayed.

(3) The service life of the cleaning disk is approximately one hour (30 times). After the service life has expired, change the cleaning disk.

IMPORTANT

The cleaning disk (SW0-FDC) has been selected to match the FDD of GPP/PHP. Never use other cleaning disks.

7.13 Save Printer Data

Enters data set in printer mode onto the FD (SW0-GPPU).

```
FDD
SAVE
PRINTER
DATA
```

BASIC OPERATION

```
FDD → ↑ → CR ─┬→ ↑ ─┬→ CR
              └──────┘
```
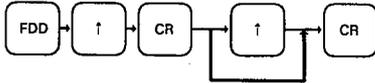
OPERATION PROCEDURE

```
        * SAVE PRINTER DATA *

            DRIVE A

      [*]   DRIVE B
```

```
FDD → ↑ → CR → CR
```
‹Save printer data›   ‹Drive A› is specified and entry is executed.
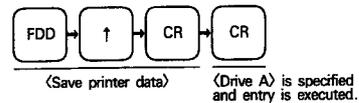
(Example: Save printer data onto FD in FDD [B].)

EXPLANATION

(1) Enters data (such as printer used, communication mode, paper length, and print starting position) set in printer mode onto the FD. Entered data is automatically read to the internal memory of GPP/PHP when printer mode is selected.

(2) When the "SAVE PRINTER DATA" screen is read, the cursor is located at "DRIVE B." if the FD is in drive [A], move the cursor with [↑] and press [CR].

(3) When printer data is entered, a file name "PRINTERK. DAT" is automatically written onto the FD.

8. COMMENT MODE

In comment mode, a comment, such as a definition or application, may be written for each device, to give better understanding of the circuit on print-outs and CRT display.

8.1 Comment Mode Functions

The functions of comment mode are as indicated below.

```
                  ┌ Read of comment data . . . . .Comment contents of A6GPP internal memory
                  │                               are displayed on CRT.
     Comment      │
     mode      ───┤ Write of comment data . . . . .Comment is written to internal memory of
     function     │                               A6GPP.
                  │
                  └ Deletion of comment data . . .Comment contents of A6GPP internal memo-
                                                  ry are deleted.
```
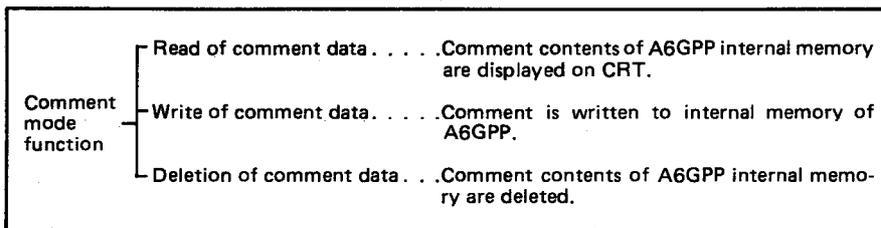
Characters specified in the initial data setting are valid for comment entry.
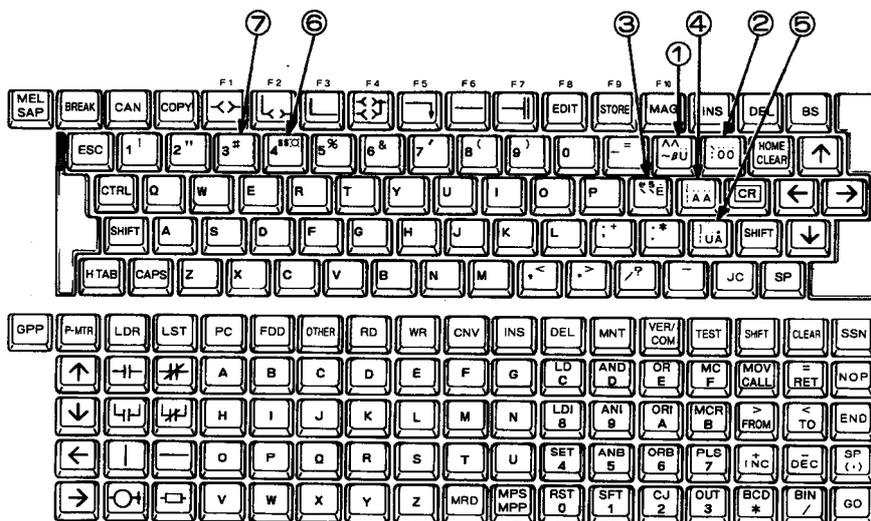
	English	German	Swedish
①	∧ ~	∧ β	ü ü
②	‾ :	Ö Ö	Ö Ö
③	@ ‾	§ ~	É è
④	[{	Ä ä	Ä à
⑤	] }	Ü ü	Å å
⑥	$	$	Å
⑦	&	#	#

8.2 Comment Mode - General Information

(1) Usable characters for comments

Capital letters from A to Z (The key input of small alphabetic letter is regarded as that of a capital letter.)

● (period), +, —, =, ?

For other than the above keys, "WRONG KEY FOR COMMENT" is displayed in the message column.

(2) Device ranges for use with more than one PLC (except K3NCPU)

When PC No. are 1,2, and 3, the device ranges are as shown below and the key input and device display are within these ranges.

Device	PC No. 1	PC No. 2	PC No. 3
K	0 to 63	300 to 363	600 to 663
X, Y	0 to 1FF	300 to 4FF	600 to 7FF
M	0 to 255	300 to 555	600 to 855
T, C	0 to 127	300 to 427	600 to 727
F	0 to 127	0 to 127	0 to 127
D	0 to 127	300 to 427	600 to 727

(3) Comment data displayed is 16 characters for X and Y and 20 characters for the other devices.

(4) By use of the GPP/PHP, comment data can be written, stored to the FD, and printed.

8.3 Comment Mode Selection and Range Setting Operation
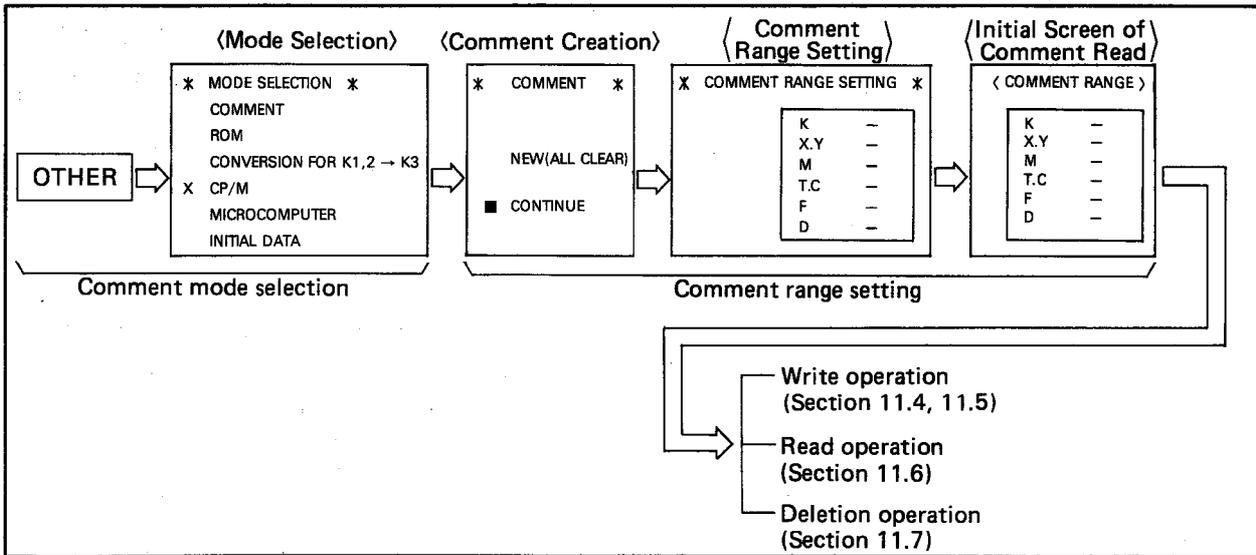
(1) When "NEW" is selected on the COMMENT screen, the previously set comment ranges and comment contents are deleted (in the internal memory of A6GPP).

When "NEW" is selected, the COMMENT RANGE SETTING screen is displayed. Set the ranges by performing key input operation. First, the cursor is displayed at device K. For instance, to set 0 to 10, press the ⓪, →, ①, ⓪, and GO keys. Then, the cursor moves to the next device. Perform the setting operation in due order. (By moving the cursor to the next device by use of the ↑, ↓, →, and/or ← key instead of the GO key, setting is also completed.)

When all the devices have been set and the END key is pressed, the cursor is displayed at "END".

By pressing the GO key, the setting of comment ranges is completed and entered into the internal memory of A6GPP.

(2) When "CONTINUE" is selected on the COMMENT screen, the current comment range can be corrected or continued.

When "CONTINUE" is selected, the COMMENT RANGE SETTING screen, showing the set ranges, is displayed and the cursor is located at "END". If required, move the cursor to the position of any device to be corrected, and make correction.

After that, proceed with the same operation as "NEW". (When correction is not required, simply press the GO key.) When comment ranges have been changed and another screen is displayed, entered comments outside the set comment ranges are deleted.

(3) When the number of comments exceeds 2048 in the comment range setting, "COMMENT MEMORY EXCEEDED" is displayed.

8.4 Write of New Comment Data

To write new comment data or clear existing comment data and comment ranges.

BASIC OPERATION

[Comment selection and limit setting operation] → [Read operation] → WR → [Comment input operation] → CR

OPERATION PROCEDURE

```
                12345✱67890✱12345        ⟨ COMMENT RANGE ⟩

    X. Y  000    START MOTOR  1          K          —
    X. Y  001    ■                       X.Y        0—1FF
    X. Y  002                            M          —
    X. Y  003                            T.C        —
    X. Y  004                            F          —
    X. Y  005                            D          —
    X. Y  006
    X. Y  007
    X. Y  008
    X. Y  009
    X. Y  00A
    X. Y  00B
    X. Y  00C
    X. Y  00D
    X. Y  00E
    X. Y  00F
```

OTHER → GO → · → GO
Comment selection "NEW" selection

→ 0 → · → 1 → F → F → END → GO
X0 to X1FF setting

→ RD → X → GO → WR → [Auto write system name setting]
Comment display of device X

→ CAPS → S → T → A → R → T
Capital letter specification

→ M → O → T → O → R → 1 → CR
Comment ⟨START MOTOR 1⟩ is written.

EXPLANATION

(1) To write new comment data, select "NEW" on the "COMMENT" screen. After "NEW" is selected, the CRT screen changes to the COMMENT RANGE SETTING screen. Perform the range setting of devices, for which comment data will be written, as described in Section 8.3.

> **REMARKS**
>
> 1) If, at power-on, comments are not read from the FD or "NEW" is not selected, "COMMENT MEMORY EXCEEDED" is displayed.
> 2) Perform setting so that the total number of comments in the comment range setting does not exceed 2048.

(2) After setting the comment range, read the device where comment data will be written by pressing the RD and Device keys, then press the WR key. If FD auto-write has been specified the Auto write system name setting screen is displayed. In this case follow the procedure given in Section 7.11. The cursor flickers at the head device column of displayed comment data write table and the key input of comment data is valid at the cursor position. (Perform key input with the keys on the MELSAP keyboard.) A maximum of 15 characters can be used for one device as comment data. When the CR key is pressed after the completion of comment data input, the cursor moves to the next device.

(3) To change the device where comment data will be written, press the GPP, RD, and Device keys and then proceed to the write operation.

(4) For other than the creation of new comment data, "NEW" on the "COMMENT" screen is also selected to clear the existing comment data and comment ranges in blocks. Therefore, for the correction of comment data, be sure to select "CONTINUE".

---

(5) When FD automatic write mode has been set, entering $\boxed{F9}$ allows all comment data to be stored into the FD. However, this is valid only when "WRITE" is displayed in the "FUNCTION" column on the screen. (For the automatic write to FD, refer to Section 7.11.)

REMARKS

1) When the key input of one comment has been completed and the $\boxed{CR}$ key pressed, the cursor moves to the next device.
The same function is also provided when the cursor is moved to the head position of comment entry column of the next device number by use of the cursor keys.

2) When the comment ranges are set in hexadecimal (device X, Y) 16 elements are displayed on one screen. When the comment ranges are set in decimal (device K, M, T, C, F, D), 20 elements are displayed on one screen.

3) For the movement of cursor

$\boxed{\downarrow}$ $\boxed{\uparrow}$ . . . . . .The cursor is moved from line 1 to line 16 (20). When the $\boxed{\uparrow}$ key is pressed with the cursor located at line 1, the screen scrolls down. When the $\boxed{\downarrow}$ key is pressed with the cursor located at line 16 (20), the screen scrolls up.

$\boxed{\leftarrow}$ $\boxed{\rightarrow}$ . . . . . .The cursor is moved in the horizontal direction. When the cursor is located at the first character, pressing the $\boxed{\leftarrow}$ key moves the cursor to the 15th character in the preceding line. When the cursor is located at the 15th character, pressing the $\boxed{\rightarrow}$ key moves the cursor to the first character in the next line. When the $\boxed{\leftarrow}$ key is pressed with the cursor located at the first character in line 1, the screen scrolls down and the cursor moves to the 15th character in the top line. When the $\boxed{\rightarrow}$ key is pressed with the cursor located at the 15th character in line 16 (20), the screen scrolls up and the cursor moves to the first character in the bottom line.

4) If comments for devices are to be input consequtively, devices appear in the following order within their specified ranges K, X (Y), M, T (C), F and D.

5) A comment can be written with a maximum of 15 characters for one device number. When the comment is displayed in the ladder diagram, 15 characters are displayed in three stages of five characters.

6) If a comment with more than 15 characters is written, those after the 15 characters are written in the next device number. Therefore, be sure to write a comment with a maximum of 15 characters for one device number.

7) If $\boxed{F3}$ is pressed during write, the screen is scrolled down 8 to 10 comments (depending on devices), starting at the cursor position. By pressing $\boxed{F4}$, the screen is scrolled up 8 to 10 comments.

8) To make insertion during write, press $\boxed{INS}$. This puts the GPP in insert mode and allows a keyed-in character to be inserted at the cursor position. Each time the character is inserted, the character string on the right of the cursor is shifted one character. In this case, note that the character forced out of the line will be invalid.

9) To make deletion during write, press $\boxed{DEL}$ or $\boxed{BS}$. Pressing $\boxed{DEL}$ deletes the character at the cursor position and shifts the character string on the right of the cursor one character to the left. Pressing BS deletes the character at the cursor position but does not shift the character string on the right of the cursor.

8.5 Write of Comment Data (Select "CONTINUE" on COMMENT screen)
The correction of comment data and comment range data of each device.

COMMENT
WRITE

BASIC OPERATION

[Comment selection and range setting operation]→[Read operation]→(WR)→[Comment input operation]→(CR)

OPERATION PROCEDURE

```
                12345*67890*12345     < COMMENT RANGE >

    X. Y 000    START MOTOR  1        X         —
    X. Y 001    START                 X.Y      0— 1FF
    X. Y 002    ■                     M         —
    X. Y 003                          T.C       —
    X. Y 004                          F         —
    X. Y 005                          D         —
    X. Y 006
    X. Y 007
    X. Y 008
    X. Y 009
    X. Y 00A
    X. Y 00B
    X. Y 00C
    X. Y 00D
    X. Y 00E
    X. Y 00F
```

(OTHER)→(GO)→(GO)———→(GO)———
Comment selection   "CONTINUE"   Limit setting completion
                     selection

→(RD)→(X)→(GO)→(WR)→(↓)—
Comment display of device X

→(CAPS)→(S)→(T)→(A)→(R)→(T)→(CR)
Capital display   Comment <START> is written.
of device X

EXPLANATION

(1) To correct the existing comment data and comment range data, be sure to select "CONTINUE" on the "COMMENT" screen. If "NEW" is selected by mistake, all the existing comment data will be cleared.

(2) To correct the comment range data, move the cursor to the device column to be corrected on the "COMMENT RANGE SETTING" screen and then correct the range. On the initial screen, the cursor is located at bottom right of the comment range setting table. By moving the cursor to the portion to be corrected and then pressing the [CLEAR] key, the comment range data is blanked out. Enter new comment range data. (Correction can also be made by rewriting the data without pressing the [CLEAR] key.)

(3) To correct the comment data, read the device to be corrected in the procedure of [RD] → [Device] → [Device number], then press the [WR] key, and make correction with the keys on the [MELSAP] keyboard. By moving the cursor to the portion to be corrected and then pressing the [CAN] key, the comment data is blanked out. Enter new comment data. (Correction can also be made by rewriting the data without pressing the [CAN] key.)

OPERATION PROCEDURE 2 (Utilization of comment)

```
                 12345*6789*12345    <COMMENT RANGE>
   X.Y 000    START  MOTOR  1      K        -
   X.Y 001    ⓢTART  MOTOR  1      X.Y      0- 1FF
   X.Y 002                          M        -
   X.Y 003                          T.C      -
   X.Y 004                          F        -
   X.Y 005                          D        -
   X.Y 006
   X.Y 007
   X.Y 008
   X.Y 009
   X.Y 00A
   X.Y 00B
   X.Y 00C
   X.Y 00D
   X.Y 00E
   X.Y 00F
```

F1 → ↓ → F2

Example: Utilize the comment data of X00 for X01

EXPLANATION

(1) To utilize comment data, select write mode, move the cursor to the comment device to be utilized, and press F1. By pressing F1, the comment data is transferred to the internal buffer of the A6GPP. Then, move the cursor to the line of device for which the data will be utilized, and press F2.

When F2 is pressed, the comment data stored in the internal buffer is written to the device at which the cursor is located.

(2) A comment may be cleared from a device by pressing the CAN key.

(3) Comment can also be utilized for other than the same device. (For instance, the comment of X0 may be utilized for M0.)

POINT

Comment data transferred to the internal buffer of A6GPP by pressing F1 is cleared when comment mode is left.

---

(4) When FD automatic write mode has been set in advance, entering F9 allows all comment data to be written to the FD. However, this is valid only when "WRITE" is displayed in the "FUNCTION" column on the screen. (For FD automatic write, refer to Sections 2.3 and 7.11.)

8.6 Read of Comment Data

Read operation of the contents of comment data and comment range data of each device.
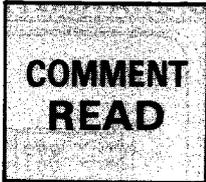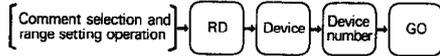
COMMENT
READ

BASIC OPERATION

```
┌─────────────────────┐   ┌────┐   ┌────────┐   ┌────────┐   ┌────┐
│Comment selection and│ → │ RD │ → │ Device │ → │ Device │ → │ GO │
│range setting operation│  └────┘   └────────┘   │ number │   └────┘
└─────────────────────┘                          └────────┘
```

OPERATION PROCEDURE

```
      12345✱67890✱12345    〈 COMMENT RANGE 〉

┌──────────┐ ┌──────────────────┐  ┌──────────────┐
│ X.Y  000 │ │ ABCDE  FGHIJ  KLMNO│ │ X      —     │
│ X.Y  001 │ │ PQRST  UVWXY Z     │ │ X.Y    0— 1FF│
│ X.Y  002 │ │ 12345  67890       │ │ M      —     │
│ X.Y  003 │ │ STOP   SW          │ │ T.C    —     │
│ X.Y  004 │ │ START  SW          │ │ F      —     │
│ X.Y  005 │ └──────────────────┘ │ D      —     │
│ X.Y  006 │                       └──────────────┘
│ X.Y  007 │
│ X.Y  008 │
│ X.Y  009 │
│ X.Y  00A │
│ X.Y  00B │
│ X.Y  00C │
│ X.Y  00D │
│ X.Y  00E │
│ X.Y  00F │
└──────────┘
```

```
┌───────┐   ┌────┐   ┌────┐      ┌────┐
│ OTHER │ → │ GO │ → │ GO │ ───→ │ GO │
└───────┘   └────┘   └────┘      └────┘
Comment selection "CONTINUE"   No correction
                   selection
      ┌────┐   ┌───┐   ┌────┐
   ───│ RD │ → │ X │ → │ GO │
      └────┘   └───┘   └────┘
Comment display of 16 comments
beginning with device X0
```

EXPLANATION

(1) Among the specified device numbers, the comment data of 20 devices (16 devices for X, Y) are displayed. When only the device has been specified without specifying the device numbers, the comment data is displayed, beginning with the head number of device setting range. If a device number outside the device range setting has been specified, "DEVICE NUMBER ERROR" is displayed in the message column.

(2) By pressing GO after the Basic Operation, the next 20 comments are displayed.
   By pressing ↑, ↓, −, and + instead of GO, the preceding and next screens can be displayed.

   ↓ with cursor in bottom line . . .The screen is scrolled up one line and the next comment is added.

   ↑ with cursor in top line . . . . . .The screen is scrolled down one line and the preceding comment is added.

   − . . . . . .The screen is scrolled down 8 or 10 lines (depending on devices).

   + ...The screen is scrolled up 8 or 10 lines (depending on devices).

(3) To change the device to be read, first enter the device.
   However, when the entered device and device number are wrong, press the CLEAR key before pressing the GO key. This clears the entered device and device number. Enter correct device and device number again.

| REMARKS |

When the device number is outside the specified range or when the start number is larger than or equal to the final number in the range setting, "DEVICE NUMBER ERROR" is displayed in the message column.

8.7 Deletion of Comment Data and Comment Range Data

The deletion of existing comment data or comment range data.

COMMENT
DELETION

BASIC OPERATION

[Comment selection and limit setting operation] → [Comment read operation] → WR → ↑ → CAN
                                                                              → ↓ →

OPERATION PROCEDURE

```
        12345✳67890✳12345        ⟨ COMMENT RANGE ⟩

X. Y 000   ABCDE  FGHIJ  KLMNO      X      ~
X. Y 001   PQRST  UVWXY Z          X.Y    0—  1FF
X. Y 002   12345  67890            M      ~
X. Y 003                           T.C    ~
X. Y 004   START  SW               F      ~
X. Y 005                           D      ~
X. Y 006
X. Y 007
X. Y 008
X. Y 009
X. Y 00A
X. Y 00B
X. Y 00C
X. Y 00D
X. Y 00E
X. Y 00F
```

OTHER → GO → GO → END → GO

Comment selection "CONTINUE"   No correction
                   selection

RD → X → GO

Comment display of device X

WR → ↓ → ↓ → ↓ → CAN

Comment X3 is deleted.

EXPLANATION

(1) To delete the existing comment range data, select "CONTINUE" on the "COMMENT" screen, read the "COMMENT RANGE SETTING" screen, move the cursor to the device to be deleted, and press the CLEAR key. After the completion of deletion, press the END and GO keys.

(2) To delete existing comment data, read the relevant device and its comment data, then proceed to write mode, move the cursor to the column of device number to be deleted, and press the CAN key.

(3) The selection of "NEW" on the "COMMENT" screen deletes all data.

(4) When FD automatic write mode has been set, entering F9 allows all comment data to be stored into the FD. However, this is valid only when "WRITE" is displayed in the "FUNCTION" column on the screen. (For FD automatic write, refer to Sections 2.3 and 7.11.)

9. ROM MODE

The ROM mode refers to the operations of write (GPP/PHP → EP-ROM), read (GPP/PHP ← EP-ROM), verify (GPP/PHP ↔ EP-ROM), and erase check (GPP/PHP → EP-ROM) between the EP-ROM loaded to the ROM socket and the internal memory of the GPP/PHP. Only programmable controller programs may be written onto the ROM.

9.1 ROM Mode Functions

9.1.1 A6GPP

```
┌─────────────────────────────────────────────────────────────────────────┐
│                                                        ┌ Read.......The contents of EP-ROM are
│                                                        │            read to the internal memory
│                                                        │            of A6GPP.
│         ┌ X  MODE SELECTION X ┐      ┌ *  FUNCTION SELECTION  * ┐
│         │   COMMENT           │      │                          │  ├ Write......Sequence  program  in the
│         │   ROM               │      │   ■  READ                │              internal memory of A6GPP
│ ┌OTHER┐ ⇨ │  PRINTER          │  ⇨  │      WRITE               │              are written to EP-ROM.
│ └─────┘ │   CONVERSION FOR K1,2 → K3 │  │   VERIFY              │  ─►
│         │ X CP/M              │      │      ERASE CHECK         │
│         │   MICROCOMPUTER     │      │                          │  ├ Verify......The contents of internal
│         │   INITIAL DATA      │      │                          │              memory of A6GPP and the
│         └─────────────────────┘      └──────────────────────────┘              contents of EP-ROM are
│                                                                                verfied.
│                                                        └ Erase check ..Check is made that nothing
│                                                                       is written on the EP-ROM.
└─────────────────────────────────────────────────────────────────────────┘
```

9.1.2 PHP

(1) The A6WU allows the following functions to be executed:

1) Read........The contents of EP-ROM are read to the PHP memory.
2) Write........The contents of the PHP memory are written to EP-ROM.
3) Verify.......The contents of the PHP memory and those of EP-ROM are verified.
4) Erase check ...Check is made that nothing is written on the EP-ROM.

(2) Set and reset ROM mode in the following procedure:

```
┌─────────────────────────────────────────────────────────────┐
│  ┌OTHER┐ ►┌ ↓ ┐►┌ GO ┐►┌Read, write, verify, erase ┐►┌OTHER┐ │
│  └─────┘  └───┘  └────┘ └check by A6WU operation    ┘ └─────┘ │
└─────────────────────────────────────────────────────────────┘
```
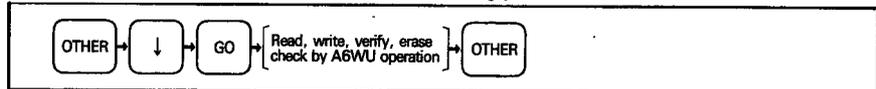
(3) Sequence of the display screen is as shown below:

```
┌──────────────────────┐      ┌──────────────────────┐      ┌──────────────────────┐
│  * MODE SELECTION *  │      │ OPERATE A6WU         │      │  * MODE SELECTION *  │
│                      │      │                      │      │                      │
│    COMMENT           │      │ FOR SEQUENCE PROGRAM,│      │    COMMENT           │
│    ROM               │      │ SELECT OTHER DATA    │      │    ROM               │
│    PRINTER           │  ⇨   │ AND OPERATE AT       │  ⇨   │    PRINTER           │
│    CONVERSION FOR    │      │ ADDRESS 10000-17CFF  │      │    CONVERSION FOR    │
│    K1, 2 → K3        │      │ FOR COMMENT, SELECT  │      │    K1, 2 → K3        │
│  × CP/M              │      │ OTHER DATA AND       │      │  × CP/M              │
│    MICROCOMPUTER     │      │ OPERATE              │      │    MICROCOMPUTER     │
│    INITIAL DATA      │      │ AT ADDRESS 18000-    │      │    INITIAL DATA      │
│                      │      │ 1FFFF                │      │                      │
│                      │      │ AFTER COMPLETION,    │      │                      │
│                      │      │ PRESS <OTHER>        │      │                      │
└──────────────────────┘      └──────────────────────┘      └──────────────────────┘

  [OTHER]→[↓]→[GO]                 [OTHER]
```
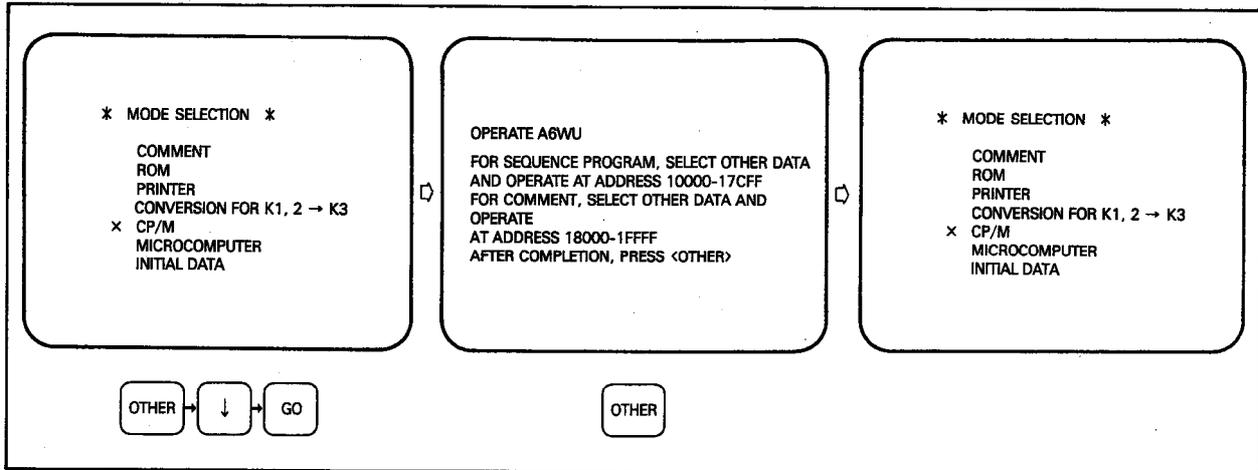
REMARKS

The A6WU may be kept operated if "A0J2" is displayed in the CPU type column during operation.

9.2 Usable EP-ROMs and Memory Capacities

According to the memory capacity, use the appropriate EP-ROM as indicated below.

Type	Equivalent	Memory Capacity (Step numbers)
1KROM	2716	0 to 1023
2KROM	2732	0 to 2047
	2732A	
4KROM	2764	0 to 4095
8KROM	27128	0 to 8191
16KROM	27256	0 to 16383

9.3 Setting of Memory Capacity

For ROM operation, the memory capacity must be set. There are two types of setting methods; setting by step number and setting in units of K (1024 steps)

(1) If setting by step number, set the memory capacity in the range from 0 to 16383.

(2) If setting in units of K (1024 steps), set the memory capacity as shown below:

K	Step Numbers
1	0 to 1023
2	0 to 2047
3	0 to 3071
4	0 to 4095
5	0 to 5119
6	0 to 6143
7	0 to 7167
8	0 to 8191
9	0 to 9215
10	0 to 10239
11	0 to 11263
12	0 to 12287
13	0 to 13311
14	0 to 14335
15	0 to 15359
16	0 to 16383

9.4 Read from ROM

The read operation from the ROM to the internal memory of GPP/PHP.
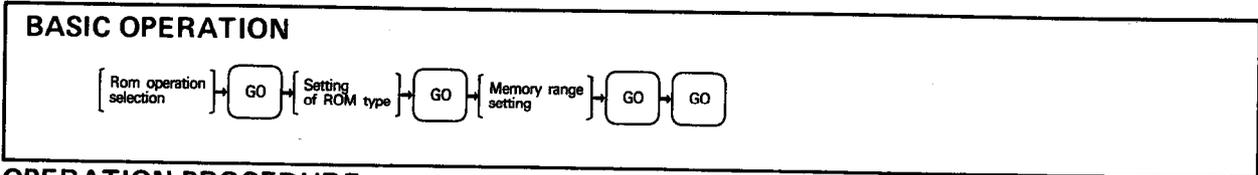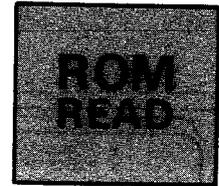
BASIC OPERATION

[Rom operation selection] → (GO) → [Setting of ROM type] → (GO) → [Memory range setting] → (GO) → (GO)

OPERATION PROCEDURE

```
        * ROM SETTING *

  ┌──────────┬──────────────────────┐
  │   TYPE   │      STEP  NO.        │
  ├──────────┼──────────────────────┤
  │   2716   │  START STEP  =    0   │
  │ * 2732   │  FINAL STEP  = 2047   │
  │   2732A  │                       │
  │   2764   │                       │
  │  27128   │                       │
  │  27256   │                       │
  └──────────┴──────────────────────┘

     PRESS (GO) ,WHEN READ
```

(1) Step number setting

(GO) → (↓) → (GO) → (0) → (↓)

Read selection · 2732 selection · Starting step 0

(2) → (0) → (4) → (7) → (GO) → (GO)

Last step 2047

(2) K unit setting

(GO) → (↓) → (GO) → (0) → (K)

(↓) → (2) → (K) → (GO) → (GO)

EXPLANATION

(1) The contents of the ROM are read to the internal memory of the GPP/PHP within the set memory range.

(2) During execution, a series of "✳" are displayed below the "ROM SETTING" screen to represent execution. One "✳" mark represents a unit of 256 steps. During execution, one "✳" disappears per processing of 256 steps. (For example, when the memory range is 4096 steps, 16 "✳" marks are displayed.)

(3) To change the setting after selecting the final step number, press the ⊟ and GO keys. The cursor returns to the position of set ROM type and re-setting can be performed.

(4) When the GO key is pressed after setting the final step number, a step number check is performed. Possible errors are as follows:

Error Contents	Error Message
1) 16384 or more, or 17K or more steps have been selected.	STEP NUMBER ERROR
2) When memory capacity is set in units of K, the K should be written after the number, e.g. 2K.	
3) The start step number is larger than the final step number.	
4) Set memory capacity (start step number − final step number) is larger than ROM capacity.	MEMORY OVERFLOW

If an error has occurred, press the CLEAR key, then press the ⊟ and GO keys, and re-set.

---

(5) If it is necessary to change the setting while setting the step number, press the CLEAR key and then change the step number.

(6) The flow of display screen is as shown below.

```
┌─────────────────────────────────────────────────────────────────────────────────┐
│                                                                                   │
│   * FUNCTION SELECTION *          * ROM SETTING *              * ROM SETTING *     │
│                                                                                   │
│    ■ READ                     ┌──────────┬──────────┐    ┌──────────┬──────────┐  │
│                               │  TYPE    │ STEP NO: │    │  TYPE    │ STEP NO. │  │
│      WRITE                    ├──────────┼──────────┤    ├──────────┼──────────┤  │
│                               │  2716    │START STEP =│  │  2716    │START STEP =  0│
│      VERIFY                   │ ■ 2732   │FINAL STEP =│  │ * 2732   │FINAL STEP = 2047│
│                               │  2732A   │          │    │  2732A   │          │  │
│      ERASE CHECK              │  2764    │          │    │  2764    │          │  │
│                               │  27128   │          │    │  27128   │          │  │
│                               │  27256   │          │    │  27256   │          │  │
│                               └──────────┴──────────┘    └──────────┴──────────┘  │
│                                                          PRESS ⟨GO⟩ WHEN READ     │
│                                                                                   │
│ Read Selection                ROM Type Selection         Memory Range Specification│
│  ┌────┐                        ┌──┐ ┌────┐               ┌─┐ ┌─┐ ┌─┐ ┌─┐ ┌─┐      │
│  │ GO │                        │ ↓│ │ GO │               │0│ │↓│ │2│ │0│ │4│      │
│  └────┘                        └──┘ └────┘               └─┘ └─┘ └─┘ └─┘ └─┘      │
│                                                          ┌─┐ ┌────┐ ┌────┐        │
│                                                          │7│ │ GO │ │ GO │        │
│                                                          └─┘ └────┘ └────┘        │
└─────────────────────────────────────────────────────────────────────────────────┘
```
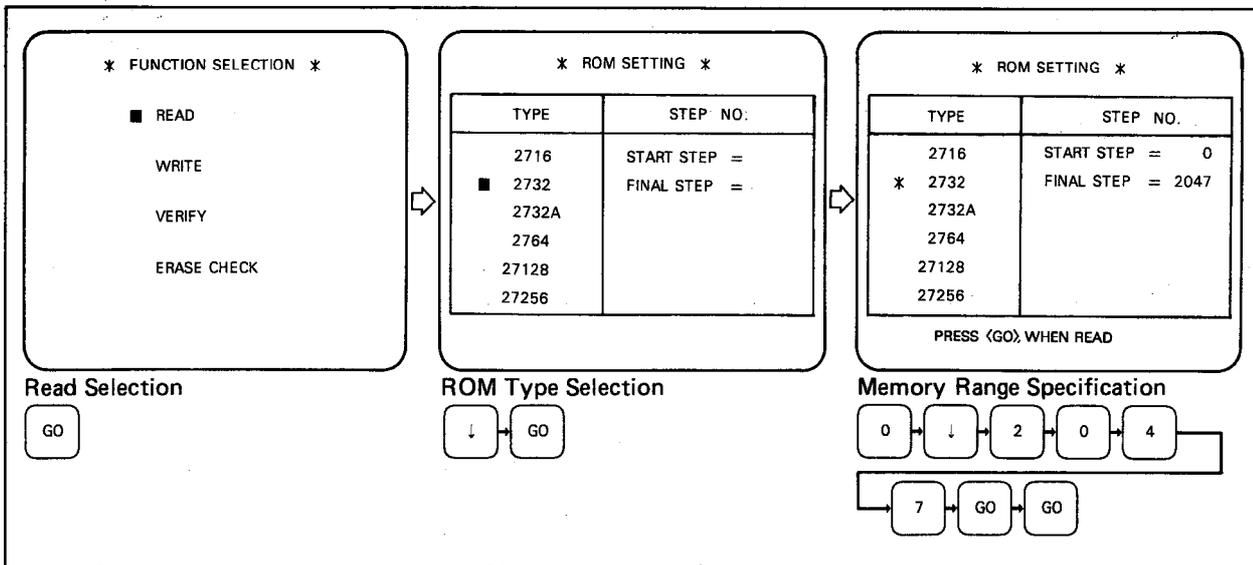
9.5 Write to ROM

The write operation of the internal memory contents of GPP/PHP to the ROM.
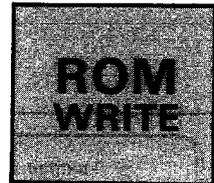
BASIC OPERATION
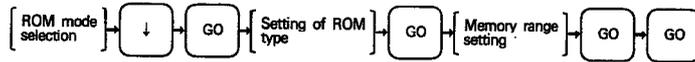
[ROM mode selection] → [↓] → [GO] → [Setting of ROM type] → [GO] → [Memory range setting] → [GO] → [GO]

OPERATION PROCEDURE

```
              * ROM SETTING *

      TYPE              STEP NO.

      2716          START STEP =    0

   *  2732          FINAL STEP = 2047

      2732A

      2764

      27128

      27256

      PRESS (GO), WHEN READ
```

(1) Step number setting

[↓] → [GO] → [↓] → [GO] → [0] → [↓]

Write selection   2732 selection   Starting select 0

→ [2] → [0] → [4] → [7] → [GO] → [GO]

Final step 0

(2) K unit setting

[↓] → [GO] → [↓] → [GO] → [0] → [K]

→ [↓] → [2] → [K] → [GO] → [GO]

EXPLANATION

(1) This is the write operation from the internal memory of GPP/PHP to the ROM within the set memory range. (After the write operation, automatic verification is executed.)

(2) During execution, a series of "�" are displayed below the "ROM SETTING" screen to represent execution. One "✻" mark represents a unit of 256 steps. During execution, one "✻" disappears per processing of 256 steps. (For example, when the memory range is 4096 steps, 16 "✻" marks are displayed.)

(3) To change the setting after selecting the final step number, press the ⊟ and ⌐GO⌐ keys. The cursor returns to the position of set ROM type and re-setting can be performed.

(4) When the ⌐GO⌐ key is pressed after setting the final step number, a step number check is performed. Possible errors are as follows:

Error Contents	Error Message
1) 16384 or more, or 17K or more steps have been selected.	STEP NUMBER ERROR
2) When memory capacity is set in units of K, the K should be written after the number, e.g. 2K.	STEP NUMBER ERROR
3) The start step number is larger than the final step number.	
4) Set memory capacity (start step number − final step number) is larger than ROM capacity.	MEMORY OVERFLOW

If an error has occurred, press the ⌐CLEAR⌐ key, then press the ⊟ and ⌐GO⌐ keys, and re-set.

(5) If it is necessary to change the setting while setting the step number, press the CLEAR key and then change the step number.

(6) The flow of display screen is as shown below.

Write Selection

```
* FUNCTION SELECTION *

    READ

 ■ WRITE

    VERIFY

    ERASE CHECK
```

| ↓ | → | GO |

ROM Type Selection

```
    * ROM SETTING *

  | TYPE   | STEP NO.       |
  |--------|----------------|
  | 2716   | START STEP =   |
  ■ 2732   | FINAL STEP =   |
  | 2732A  |                |
  | 2764   |                |
  | 27128  |                |
  | 27256  |                |
```

| ↓ | → | GO |

Memory Range Specification

```
       * ROM SETTING *

  | TYPE   | STEP NO.          |
  |--------|-------------------|
  | 2716   | START STEP =   0  |
  ✗ 2732   | FINAL STEP = 2047 |
  | 2732A  |                   |
  | 2764   |                   |
  | 27128  |                   |
  | 27256  |                   |

  PRESS ⟨GO⟩ ,WHEN WRITE
```

| 0 | → | ↓ | → | 2 | → | 0 | → | 4 |

| 7 | → | GO | → | GO |

(7) The message "WRITE-IN ERROR" appears if the EPROM is faulty or is inserted incorrectly.

9.6 Verify with ROM
To verify contents of GPP/PHP memory with ROM.

ROM VERIFY

BASIC OPERATION

[ROM mode selection] → [↓] → [↓] → [GO] → [Setting of ROM type] → [GO] → [Memory range setting] → [GO] → [GO]

OPERATION PROCEDURE

```
        * ROM SETTING *

   ┌──────────┬──────────────────────┐
   │   TYPE   │      STEP NO.        │
   ├──────────┼──────────────────────┤
   │   2716   │  START STEP  =   0   │
   │ * 2732   │  FINAL STEP  = 2047  │
   │   2732A  │                      │
   │   2764   │                      │
   │   27128  │                      │
   │   27256  │                      │
   └──────────┴──────────────────────┘

   PRESS ⟨GO⟩ ,WHEN VERIFY
```

(1) Step number setting

[↓] → [↓] → [GO] → [↓] → [GO] → [0] → [.]

Read selection — 2732 selection — Starting step 0

[2] → [0] → [4] → [7] → [GO] → [GO]

Final step 2047

(2) K unit setting

[↓] → [↓] → [GO] → [↓] → [GO] → [0] → [K]

[↓] → [2] → [K] → [GO] → [GO]

EXPLANATION

(1) This is the verify operation between the contents of GPP/PHP internal memory and the ROM.

(2) During execution, a series of "✶" are displayed below the "ROM SETTING" screen to represent execution. One "✶" mark represents a unit of 256 steps. During execution, one "✶" disappears per processing of 256 steps. (For example, when the memory range is 4096 steps, 16 "✶" marks are displayed.)

(3) To change the setting after selecting the final step number, press the ⊟ and [GO] keys. The cursor returns to the position of set ROM type and re-setting can be performed.

(4) When the [GO] key is pressed after setting the final step number, a step number check is performed. Possible errors are as follows:

Error Contents	Error Message
1) 16384 or more, or 17K or more steps have been selected.	
2) When memory capacity is set in units of K, the K should be written after the number, e.g. 2K.	STEP NUMBER ERROR
3) The start step number is larger than the final step number.	
4) Set memory capacity (start step number − final step number) is larger than ROM capacity.	MEMORY OVERFLOW

If an error has occurred, press the [CLEAR] key, then press the ⊟ and [GO] keys, and re-set.

---

(5) If it is necessary to change the setting while setting the step number, press the CLEAR key and then change the step number.

(6) If the contents of the internal memory of the GPP/PHP do not coincide with those of the ROM, "VERIFY ERROR" is displayed in the message column. In this case, check contents of both and correct the non-coinciding portions.

(7) The flow of display screen is as shown below.

✳ FUNCTION SELECTION ✳

READ

WRITE

■ VERIFY

ERASE CHECK

Read Selection

↓ → ↓ → GO

✳ ROM SETTING ✳

TYPE	STEP NO.
2716	START STEP =
■ 2732	FINAL STEP =
2732A	
2764	
27128	
27256	

ROM Type Selection

↓ → GO

✳ ROM SETTING ✳

TYPE	STEP NO.
2716	START STEP = 0
✳ 2732	FINAL STEP = 2047
2732A	
2764	
27128	
27256	

PRESS ⟨GO⟩ ,WHEN VERIFY

Memory Range Specification

0 → ↓ → 2 → 0 → 4 →

→ 7 → GO → GO
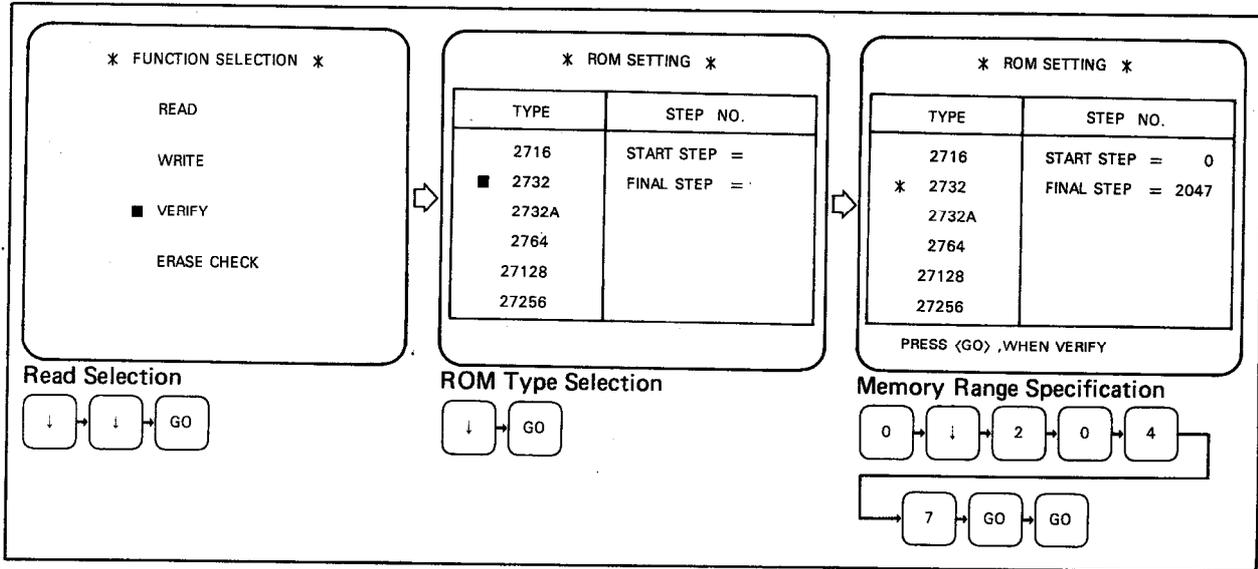
9.7 ROM Erasure Check

For checking whether the ROM has been erased or not.

ROM
ERASE CHECK

BASIC OPERATION

[ROM mode selection] → ↓ → ↓ → ↓ → GO → [Setting of ROM type] → GO → GO

OPERATION PROCEDURE

```
            ✱  ROM SETTING  ✱

                  TYPE
            ┌──────────────┐
            │    2716      │
            │ ■  2732      │
            │    2732A     │
            │    2764      │
            │   27128      │
            │   27256      │
            └──────────────┘
        PRESS ⟨GO⟩ ,WHEN ERASE CHECK
```

↓ → ↓ → ↓ → GO
Erasure selection

↓ → GO → GO
2732 selection

(Example: Selection of 2732)
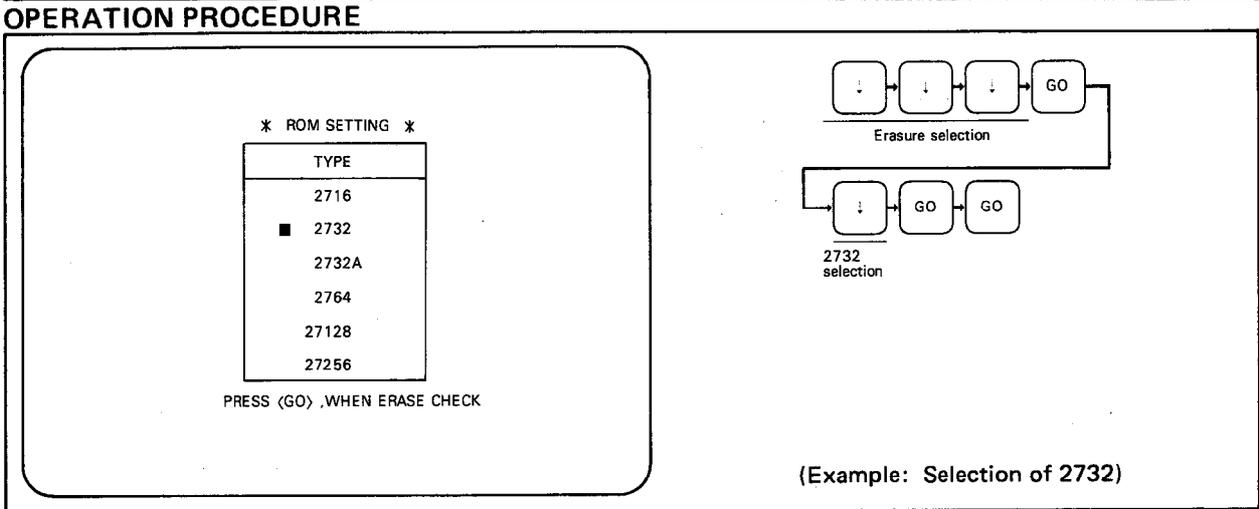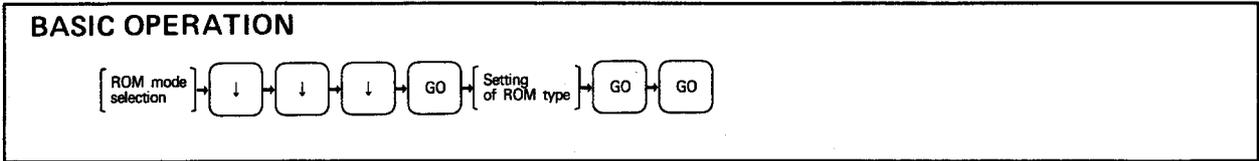
EXPLANATION

(1) This operation is used to check that no data is written on the ROM. Make the erasure check before ROM writing.

(2) During execution, the status is displayed by the "✱" marks as in the read operation, etc.

(3) If "ROM NOT ERASED" is displayed in the message column after the check, the write operation cannot be performed with that ROM. Erase or replace the ROM.

(4) A damaged ROM may appear normal after an erase check, however if the write operation is attempted, "WRITE-IN ERROR" is displayed.

(5) The flow of display screen is as shown below.

```
    ✱ FUNCTION SELECTION ✱


         READ

         WRITE

         VERIFY

      ■  ERASE CHECK
```

⇨

```
      ✱ ROM SETTING ✱
            TYPE
      ┌──────────────┐
      │    2716      │
      │ ■  2732      │
      │    2732A     │
      │    2764      │
      │   27128      │
      │   27256      │
      └──────────────┘
   PRESS ⟨GO⟩ ,WHEN ERASE CHECK
```

⇨

```
      ✱ ROM SETTING ✱
            TYPE
      ┌──────────────┐
      │    2716      │
      │ ■  2732      │
      │    2732A     │
      │    2764      │
      │   27128      │
      │   27256      │
      └──────────────┘
   PRESS ⟨GO⟩ ,WHEN ERASE CHECK
```

Erase Check Selection

↓ → ↓ → ↓ → GO

ROM Type Selection

↓ → GO

Execution

GO
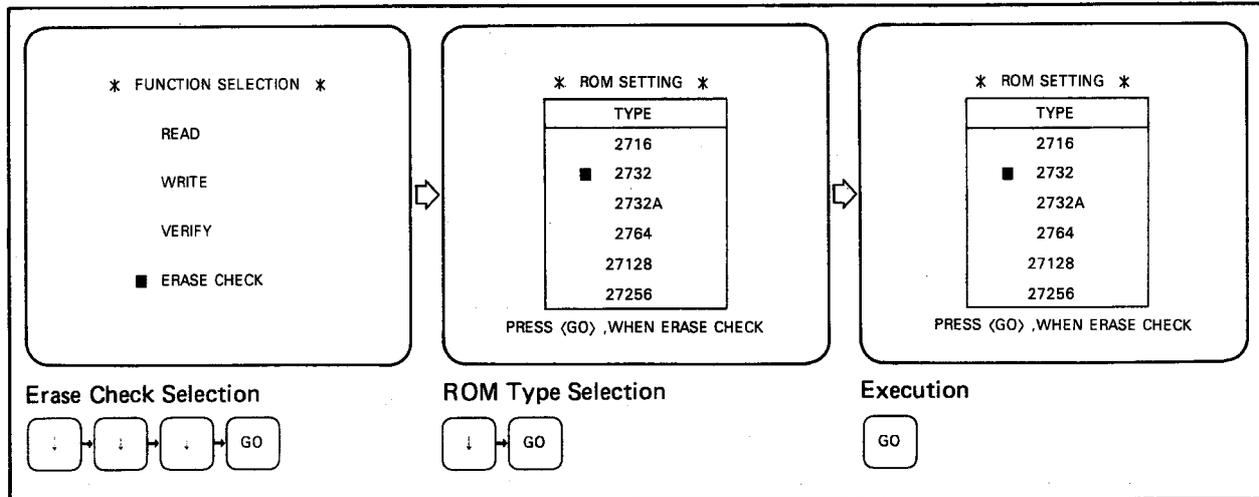
10. PRINTER MODE

The printer mode refers to the following operations: Ladder print, command list print, contact and coil list print, device used list print, comment list print, utilized ladder print, multiple print, screen copy using an external printer with RS232C interface.

10.1 Printer Mode and Functions
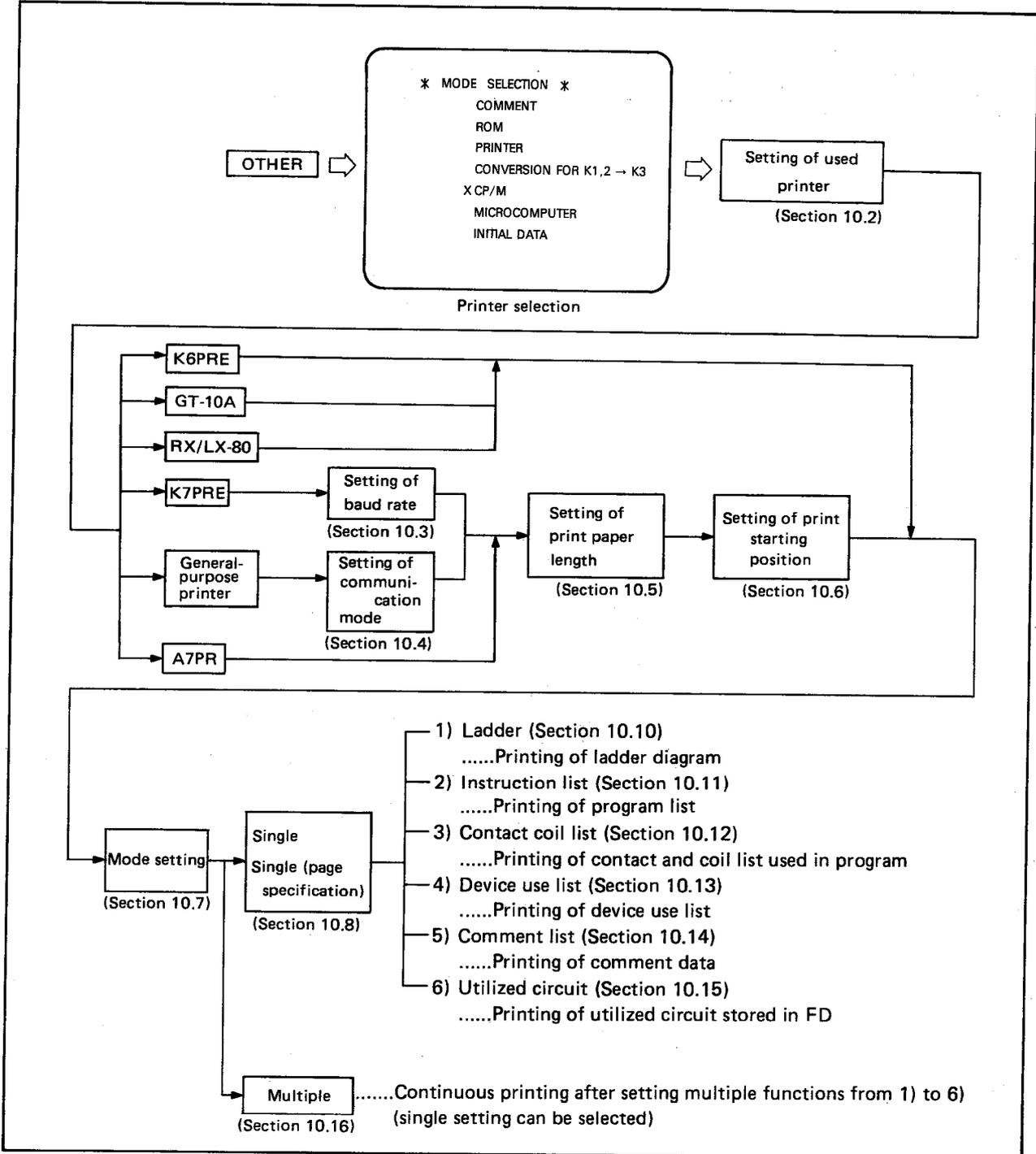
REMARKS

To prevent electric shock, ensure that the printer is grounded.

IB (NA) 66192-A

Before printing begins, the above selection procedure is required. Explanations are given in due order from Section 10.2 to Section 10.8, beginning with the setting of printer used.

POINT

(1) When "PRINTER" is selected on the mode selection screen, the GPP/PHP accesses FDD B. If printer data exists on the FD in FDD B, data is read and the CRT proceeds to the "PRINTER SETTING" screen. If printer data does not exist on the FD, search is made in order of FDD B and A, and then the CRT proceeds to the "PRINTER SETTING" screen. (Refer to Section 7.13.)

(2) Check the GPP/PHP for the following points, 1) to 3), before starting the printer. Any of these will cause "PRINTER CHECK" to appear in the message column.

1) The printer power is off.

2) The cable is not connected properly.

3) The printer is "off line."

When the GO key is pressed again after the above has been checked and corrected, printing starts.

(3) To stop the execution of printing

1) Press the CLEAR key. The printing operation is stopped (when the printer buffer is empty) and "STOP. PRESS [GO] TO RESTART. PRESS [END] [GO] TO END" is displayed. This is not applicable to screen copy.

2) To proceed to another mode after stopping the printing operation, press the END and GO keys to complete the printing. After that, press the required mode key. (Except screen copy)

(4) Before starting to print, ensure that the data to be printed, such as the sequence program and comment data, is stored in the internal memory of the GPP/PHP.

(5) If the printer is of a grounding type, be sure to ground the printer.

10.2 Setting of Used Printer
To set the printer required.

PRINTER
SETTING

BASIC OPERATION

[Printer mode selection operation]→[Printer setting]→(GO)

OPERATION PROCEDURE

```
✻  PRINTER SETTING  ✻

■  K6PR      (PICA)        ┌─────────────────────┐
   K6PR      (ELITE)       │ PRINTER         —   │
                           │ BAUD RATE       —   │
   K6PR-K    (PICA)        │ PARITY          —   │
   K6PR-K    (ELITE)       │ DATA LENGTH     —   │
                           │ STOP BIT        —   │
   K7PR                    │ PAPER LENGTH    —   │
                           │ START-POSITION  —   │
   A7PR                    │ MODE            —   │
                           │ PAGE            —   │
   GT-10A (NEW)            │ PRINT MODE      —   │
                           └─────────────────────┘
   GT-10A (OLD)

   RX/LX-80

   OTHER
```

(GO)

(Example: Setting of K6PR (Pica))
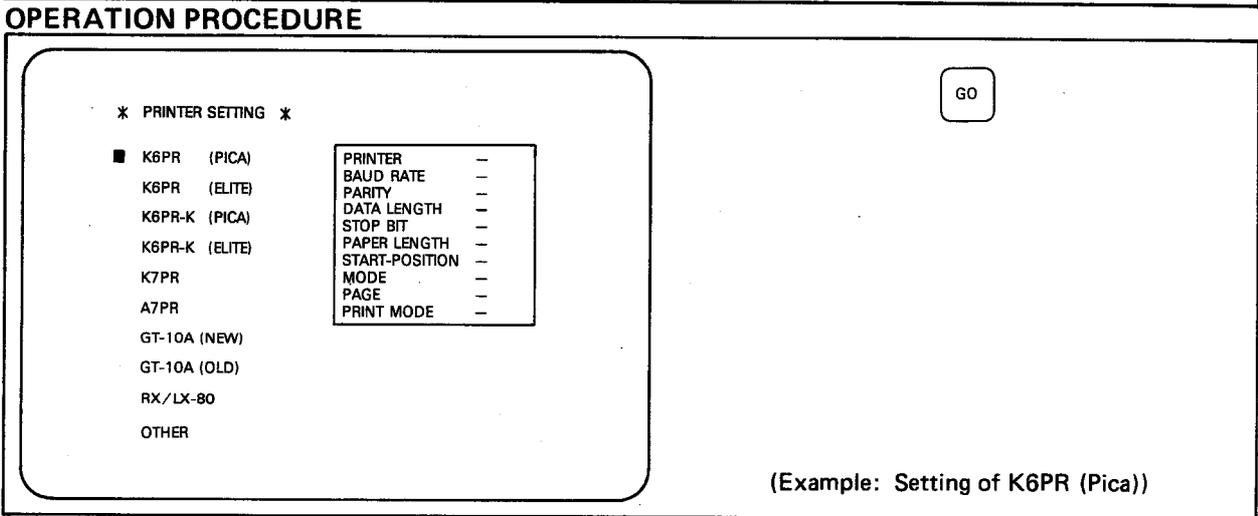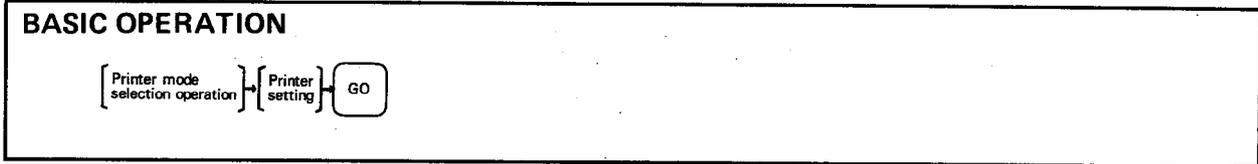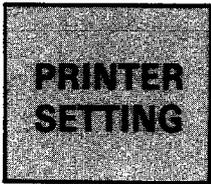
EXPLANATION

(1) To set the printer, move the cursor with the ⬇ key to the required printer and press the GO key. This sets the printer type.

(2) The next screens, which differ depending on the printer setting, are explained in the following sections:
  1) For the K6PR, K6PR-K, GT-10A, and RX/LX-80 refer to Section 10.7.
  2) For the K7PR, refer to Section 10.3.
  3) For the general-purpose printer, refer to Section 10.4.
  4) For the A7PR, refer to Section 10.5.

(3) To change the printer setting after the completion of setting, pressing the — and GO keys returns the CRT to the initial "PRINTER SETTING" screen.

10.3 Setting of Baud Rate (For K7PR)
The setting operation of baud rate.

PRINTER
BAUD RATE

BASIC OPERATION

$$\left[\begin{array}{l}\text{Printer setting}\\\text{operation}\end{array}\right] \rightarrow \boxed{\downarrow} \rightarrow \boxed{GO}$$
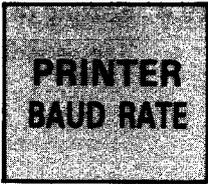
REMARKS

Set K7PR by the printer setting operation.

OPERATION PROCEDURE

```
      ✻  BAUD RATE SETTING  ✻

     300        ┌─────────────────┐
     600        ┆ PRINTER      −K7PR ┆
    1200        ┆ BAUD RATE    −9600 ┆
   ·2400        ┆ PARITY        −    ┆
    4800        ┆ DATE LENGTH   −    ┆
  ■ 9600        ┆ STOP BIT      −    ┆
                ┆ PAPER LENGTH  −    ┆
                ┆ START-POSITION −   ┆
                ┆ MODE          −    ┆
                ┆ PAGE          −    ┆
                ┆ PRINT MODE    −    ┆
                └─────────────────┘
```

$$\boxed{\downarrow} \rightarrow \boxed{GO}$$

(Example: Setting of 9600 bauds)

EXPLANATION

(1) When K7PR has been selected, it is necessary to set the baud rate. For the K7PR, the baud rate is 2400 or 9600 (the cursor cannot move to any other baud rate positions).

(2) After setting the baud rate, NO PARITY, DATA LENGTH 8, and STOP BIT 2 are automatically displayed in the communication mode column.

(3) After pressing the ⌐GO⌐ key in the baud rate setting, proceed to the operation described in Section 10.5.

(4) When the ⌐−⌐ and ⌐GO⌐ keys are pressed during the operation, the CRT returns to the "PRINTER SETTING" screen. The cursor is displayed at the previously set position.

10.4 Setting of Communication Mode (For general-purpose printer)
The setting operation of baud rate, parity check, data length, and stop bit.

PRINTER COMMUNICATION MODE

BASIC OPERATION

Printer setting operation → Baud rate setting → (GO) → Parity check setting → (GO) → Data length and stop bit setting → (GO)

REMARKS

Set the general-purpose printer by the printer setting operation.

OPERATION PROCEDURE

```
     * DATA LENGTH &
         STOP BIT SETTING *

          7&1      PRINTER          —OTHER
                   BAUD RATE        —2400
          7&2      PARITY           —ODD
                   DATA LENGTH      —8
          8&1      STOP BIT         —2
                   PAPER LENGTH     —
          8&2      START-POSITION   —
                   MODE             —
                   PAGE             —
                   PRINT MODE       —
```

(↓)→(↓)→(↓)→ GO
2400 setting

(↓)→(↓)→ GO
Odd number setting

(↓)→(↓)→(↓)→ GO
Data length 8 and stop bit 2 setting

(Example: Setting of baud rate 2400, odd parity,)
(data length 8 and stop bit 2   )

EXPLANATION

(1) When the general-purpose printer has been selected by moving the cursor to "OTHER" and pressing ☐GO☐ on the printer setting screen, set the communication mode according to the specific printer used. The communication mode setting includes the setting of baud rate, parity check, data length, and stop bit.

(2) When the ☐—☐ and ☐GO☐ keys are pressed during any setting operation, the CRT returns to the preceding setting screen.

(3) The flow of display screen is as shown below.

```
     * BAUD RATE SETTING *

          300      PRINTER          —OTHER
          600      BAUD RATE        —
                   PARITY           —
          1200     DATA LENGTH      —
                   STOP BIT         —
          2400     PAPER LENGTH     —
                   START-POSITION   —
          4800     MODE             —
                   PAGE             —
          9600     PRINT MODE       —
```

⇨

```
     * PARITY CHECK SETTING *

        WITHOUT    PRINTER          —OTHER
                   BAUD RATE        —2400
        EVEN       PARITY           —
                   DATA LENGTH      —
        ODD        STOP BIT         —
                   PAPER LENGTH     —
                   START-POSITION   —
                   MODE             —
                   PAGE             —
                   PRINT MODE       —
```

⇨

```
     * DATA LENGTH &
         STOP BIT SETTING *

          7&1      PRINTER          —OTHER
                   BAUD RATE        —2400
          7&2      PARITY           —ODD
                   DATA LENGTH      —8
          8&1      STOP BIT         —2
                   PAPER LENGTH     —
          8&2      START-POSITION   —
                   MODE             —
                   PAGE             —
                   PRINT MODE       —
```

Baud Rate Setting

(·)→(·)→(·)→ GO

Parity Check Setting

(·)→(·)→ GO

Data Length and Stop Bit Setting

(↓)→(↓)→(·)→ GO

10.5 Setting of Print Paper Length
(For K7PR, A7PR, and general-purpose printer)
Setting of print paper length.

```
PRINTER
PAPER LENGTH
```

BASIC OPERATION

$$\left[\begin{array}{l}\text{Nomal mode}\\\text{setting operation}\end{array}\right] \rightarrow \left[\begin{array}{l}\text{Paper length}\\\text{setting}\end{array}\right] \rightarrow \boxed{\text{GO}}$$

REMARKS

Set the K7PR, A7PR or general-purpose printer by the printer setting operation.

OPERATION PROCEDURE

```
✳    PAPER LENGTH SETTING    ✳

■ 11  INCHES
                   PRINTER        —OTHER
  12  INCHES       BAUD RATE      —2400
                   PARITY         —ODD
  16  INCHES       DATA LENGTH    —8
                   STOP BIT       —2
                   PAPER LENGTH   —11
                   START-POSITION —
                   MODE           —
                   PAGE           —
                   PRINT MODE     —
```

```
GO
```

(Example: Setting of 11 inches)

EXPLANATION

(1) When the K7PR, A7PR, or general-purpose printer has been selected, it is necessary to set the length of page used. Usable page lengths are; 11 inches, 12 inches, and 16 inches.

(2) If the ⊟ and ⌷GO⌷ keys are pressed during this operation, the display screen changes to the following setting screen:

K7PR	→ "BAUD RATE SETTING " (Section 10.3)
A7PR	→ "PRINTER SETTING" (Section 10.2)
General-purpose printer	→ "DATA LENGTH & STOP BIT SETTING" (Section 10.4)

(3) For initial setting, the cursor is located at the "11 INCHES" position. Subsequently, the cursor is displayed at the previously set position.

POINT

Paper feed of general-purpose printer
Page changing conditions

Paper Length	Print Lines
11 inches	66
12 inches	72
16 inches	96

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10.6 Setting of Print Starting Position
(For K7PR, A7PR, and general-purpose printer)
The setting operation of print starting position.

BASIC OPERATION

$$\left[\begin{array}{c} \text{Communication mode} \\ \text{setting operation} \end{array} \right] \rightarrow \left[\begin{array}{c} \text{Paper length} \\ \text{setting operation} \end{array} \right] \rightarrow \left[\begin{array}{c} \text{Setting of print} \\ \text{starting position} \end{array} \right] \rightarrow \boxed{\text{GO}}$$
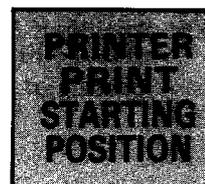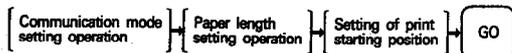
REMARKS

When the A7PR has been set, it is not required to perform the communication mode setting operation.

OPERATION PROCEDURE

```
✳ START POSITION FOR PRINT-OUT ✳

    START POSITION = 10     ┌──────────────────────┐
                            │ PRINTER       —OTHER │
                            │ BAUD RATE     —2400  │
                            │ PARITY        —ODD   │
                            │ DATA LENGTH   —8     │
                            │ STOP BIT      —2     │
                            │ PAPER LENGTH  —11    │
                            │ START-POSITION —     │
                            │ MODE           —     │
                            │ PAGE           —     │
                            │ PRINT MODE     —     │
                            └──────────────────────┘
```

$$\boxed{1} \rightarrow \boxed{0} \rightarrow \boxed{\text{GO}}$$
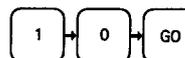
Print starting position

$$\left(\begin{array}{l} \text{Example: Setting of print starting position} \\ \qquad\qquad \text{to 10} \end{array} \right)$$

EXPLANATION

(1) When the K7PR, A7PR, or general-purpose printer has been selected, the print out starting address must be set. On the initial setting screen, "START-POSITION = 0" is displayed. When the print starting position is set to zero, printing starts from the left. By setting the print starting position, it is possible to move the printing position to the center of paper.

(2) The effective set values of print starting position are 0 to 99.

(3) Data output from the A6GPP is 80 characters per line. If, for example, 130 characters are effective per line on the printer and the print starting position is set to 60, 80 plus 60 equals 140 and the excess of 10 characters are printed in the same line or at the head of the next line. (132 characters in the case of K7PR paper)

(4) On subsequent settings, the previously set value is displayed.

(5) To change the set value, press the $\boxed{\text{CLEAR}}$ key and enter the set value again.

10.7 Mode Setting

Mode setting to single, single (page setting), and multiple modes.
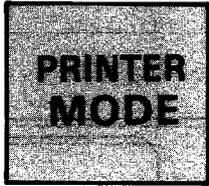
PRINTER MODE

BASIC OPERATION

[Mode setting]→[GO]

OPERATION PROCEDURE

```
* MODE SETTING *

    SINGLE                    PRINTER        —OTHER
                              BAUD RATE      —2400
    SINGLE(PAGE SETTING)      PARITY         —ODD
                              DATA LENGTH    —8
    MULTIPLE                  STOP BIT       —2
                              PAPER LENGTH   —11
                              START-POSITION —10
                              MODE           —
                              PAGE           —
                              PRINT MODE     —
```

[↓]→[GO]

(Example: Setting of single (page setting))

EXPLANATION

(1) There are three modes; single, single (page setting), and multiple.

1) Single setting . . . .Select one mode from the print modes (LADDER, COMMAND LIST, CONTACT AND COIL LIST, DEVICE USED LIST, COMMENT LIST, UTILIZED CIRCUIT) and execute.

```
* MODE SETTING *

    SINGLE                    PRINTER        —OTHER
                              BAUD RATE      —2400
    SINGLE(PAGE SETTING)      PARITY         —ODD
                              DATA LENGTH    —8
    MULTIPLE                  STOP BIT       —2
                              PAPER LENGTH   —11
                              START-POSITION —10
                              MODE           —
                              PAGE           —
                              PRINT MODE     —
```

⇨

```
* PRINT MODE SETTING *

    LADDER                    PRINTER        —OTHER
                              BAUD RATE      —2400
    COMMAND LIST              PARITY         —ODD
                              DATA LENGTH    —8
    CONTACT,COIL LIST         STOP BIT       —2
                              PAPER LENGTH   —11
    DEVICE USED LIST          START-POSITION —10
                              MODE           —SINGLE
    COMMENT LIST              PAGE           —1
                              PRINT MODE     —
    UTILIZED CIRCUIT
```

2) Single (page setting) setting . . . . .This is the same as the single setting except that the print starting page can be specified as 0 to 99999 on the "PAGE SETTING" screen.

✻ MODE SETTING ✻

SINGLE

SINGLE(PAGE SETTING)

MULTIPLE

PRINTER	—OTHER
BAUD RATE	—2400
PARITY	—ODD
DATA LENGTH	—8
STOP BIT	—2
PAPER LENGTH	—11
START-POSITION	—10
MODE	—
PAGE	—
PRINT MODE	—

⇨

✻ PAGE SETTING ✻

PAGE NO = 1

PRINTER	—OTHER
BAUD RATE	—2400
PARITY	—ODD
DATA LENGTH	—8
STOP BIT	—2
PAPER LENGTH	—11
START-POSITION	—10
MODE	—SINGLE(PAGE)
PAGE	—
PRINT MODE	—
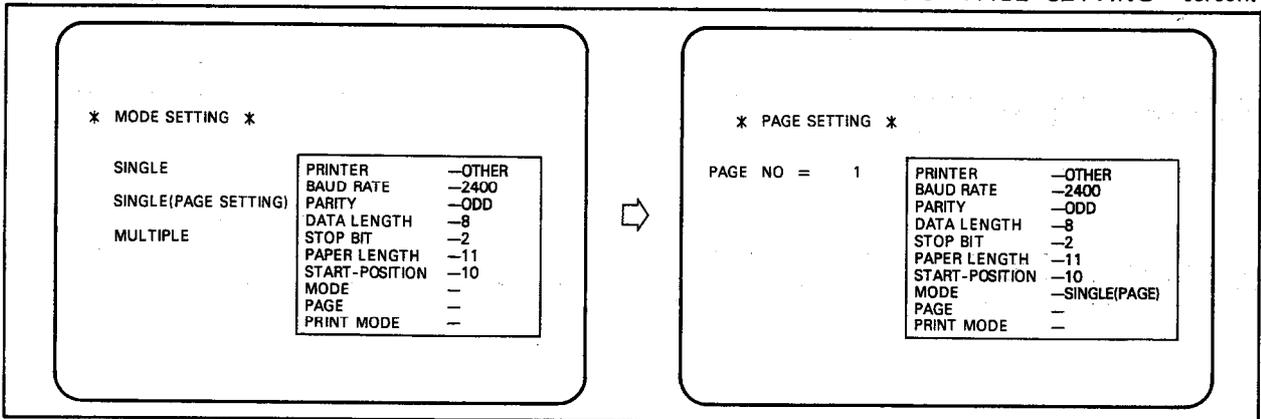
3) Multiple setting . . . .Multiple print mode functions can be set at the same time. (See Section 10.16.)

✻ MODE SETTING ✻

SINGLE

SINGLE(PAGE SETTING)

MULTIPLE

PRINTER	—OTHER
BAUD RATE	—2400
PARITY	—ODD
DATA LENGTH	—8
STOP BIT	—2
PAPER LENGTH	—11
START-POSITION	—10
MODE	—
PAGE	—
PRINT MODE	—

⇨

✻ MULTIPLE MODE SETTING ✻

LADDER	INSTRUCTION LIST	CONTACT.COIL	DEVICED USED		COMMENT
(COMMENT) WITHOUT WITH	(COMMENT) WITHOUT WITH	K —	K —		K —
(STEP NO.FOR CONTACT) WITHOUT WITH	(RANGE SETTING) ALL AREA RANGE SETTING	X — Y —	X — Y —		X.Y — M —
(RANGE SETTING) ALL AREA RANGE SETTING	(STEP NO)	M — T —	M — T —		T.C — F —
(STEP NO)	START=	C — F —	C — F —		D —
START=	END =	D —	D —		
END =					

PRINT-OUT START NOT PRINT-OUT	PRINTER —OTHER BAUD RATE —2400 PARITY —ODD	DATA LENGTH —8 STOP BIT —2 PAPER LENGTH —11	START-POSITION —10 MODE —MULTIPLE PAGE —1	

(2) By pressing the ⊟ and GO keys during the operation, the CRT returns to the preceding screen.

10.8 Setting of Print Starting Page (For single (page setting) setting)
To set the starting page of the print out.
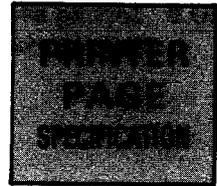
BASIC OPERATION

[Page number specification]—[GO]

REMARKS

Set single (page setting) by the mode setting.

OPERATION PROCEDURE

✻ START POSITION FOR PRINT-OUT ✻

START POSITION

PRINTER	—OTHER
BAUD RATE	—2400
PARITY	—ODD
DATA LENGTH	—8
STOP BIT	—2
PAPER LENGTH	—11
START-POSITION	—
MODE	—
PAGE	—
PRINT MODE	—

[1]—[0]—[GO]

EXPLANATION

(1) When "SINGLE (PAGE SETTING)" is selected, the starting page for the print out may be specified.
To specify the page, use the number keys. This must be within the range 0 to 99999.

(2) In the initial setting, "1" is displayed as the page number. In subsequent settings, a value obtained by adding 1 to the last printing page in the previously set mode, is displayed.

(3) By pressing the [—] and [GO] keys during the operation, the CRT returns to the preceding screen.

10.9 Setting of Printer Mode

Setting the print-out mode. (i.e. ladder, list etc.)

PRINTER
MODE
SETTING

BASIC OPERATION

[Printer mode setting] → (GO)
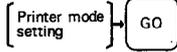
OPERATION PROCEDURE

```
�҂   PRINT MODE SETTING  ✻

■ LADDER            ┌─────────────────────────┐
                    │ PRINTER        —OTHER    │
   COMMAND LIST     │ BAUD RATE      —2400     │
                    │ PARITY         —ODD      │
   CONTACT,COIL LIST│ DATA LENGTH    —8        │
                    │ STOP BIT       —2        │
                    │ PAPER LENGTH   —11       │
   DEVICE USED LIST │ START-POSITION —10       │
                    │ MODE           —SINGLE(PAGE)│
   COMMENT LIST     │ PAGE           —10       │
                    │ PRINT MODE     —         │
   UTILIZED LIST    └─────────────────────────┘
```

(GO)

(Example: Setting of ladder)

EXPLANATION

(1) When single or single (page setting) is selected, it is necessary to set the printer mode (LADDER, COMMAND LIST, CONTACT AND COIL LIST, DEVICE USED LIST, COMMENT LIST, UTILIZED CIRCUIT LIST). Move the cursor to the required mode and press the | GO | key to set.

(2) By pressing the | — | and | GO | keys, the CRT returns to the preceding screen.

(3) In the initial setting, the cursor is located at "LADDER". At subsequent settings, the cursor is displayed at the previously set position.

(4) After the mode setting, the flow of display screen is as shown below.

✳ PRINT MODE SETTING ✳

LADDER	
COMMAND LIST	
CONTACT,COIL LIST	
DEVICE USED LIST	
COMMENT LIST	
UTILIZED LIST	

PRINTER	—OTHER
BAUD RATE	—2400
PARITY	—ODD
DATA LENGTH	—8
STOP BIT	—2
PAPER LENGTH	—11
START-POSITION	—10
MODE	—SINGLE
PAGE	—1
PRINT MODE	—

GO → ✳ LADDER PRINT SETTING ✳

(COMMENT)	(RANGE SETTING)
WITHOUT	ALL AREA
✳ WITH	✳ RANGE SETTING
(CROSSREF)	(STEP NO)
✳ WITHOUT	START STEP = 0
WITH	FINAL STEP = 0

(PRINT START)
■ YES
NO

PRINTER	—OTHER
BAUD RATE	—2400
PARITY	—ODD
DATA LENGTH	—8
STOP BIT	—2
PAPER LENGTH	—11
START-POSITION	—10
MODE	—SINGLE(PAGE)
PAGE	—10
PRINT MODE	—LADDER

⇨ Section 10.10

(Circuit print setting)

↓ GO → ✳ COMMAND LIST PRINT SETTING ✳

(COMMENT)	(RANGE SETTING)
WITHOUT	ALL AREA
WITH	RANGE SETTING

(STEP NO)
START STEP = 0
FINAL STEP = 0
(PRINT START)
YES
NO

PRINTER	—OTHER
BAUD RATE	—2400
PARITY	—ODD
DATA LENGTH	—8
STOP BIT	—2
PAPER LENGTH	—11
START-POSITION	—10
MODE	—SINGLE(PAGE)
PAGE	—10
PRINT MODE	—COMMAND LIST

⇨ Section 10.11

(Command list print setting)

↓ ↓ GO → ✳ CONTACT,COIL LIST RANGE SETTING ✳

K —
X —
Y —
M —
T —
C —
F —
D —

(PRINT START)
YES
NO

PRINTER	—OTHER
BAUD RATE	—2400
PARITY	—ODD
DATA LENGTH	—8
STOP BIT	—2
PAPER LENGTH	—11
START-POSITION	—10
MODE	—SINGLE(PAGE)
PAGE	—10
PRINT MODE	—CONTACT,COIL

⇨ Section 10.12

(Contact and coil list range setting)

↓ ↓ ↓ GO → ✳ DEVICE USED LIST RANGE SETTING ✳

K —
X —
Y —
M —
T —
C —
F —
D —

(START)
YES
NO

✳ PRESS (END) WHEN SET ✳

PRINTER	—OTHER
BAUD RATE	—2400
PARITY	—ODD
DATA LENGTH	—8
STOP BIT	—2
PAPER LENGTH	—11
START-POSITION	—10
MODE	—SINGLE(PAGE)
PAGE	—10
PRINT MODE	—DEVICE USED

⇨ Section 10.13

(Device used list range setting)

↓ ↓ ↓ ↓ GO → ✳ COMMENT LIST RANGE SETTING ✳

K —
X.Y —
M —
T.C —
F —
D —

(START)
YES
NO

✳ PRESS (END) WHEN SET ✳

PRINTER	—OTHER
BAUD RATE	—2400
PARITY	—ODD
DATA LENGTH	—8
STOP BIT	—2
PAPER LENGTH	—11
START-POSITION	—10
MODE	—SINGLE(PAGE)
PAGE	—10
PRINT MODE	—COMMENT LIST

⇨ Section 10.14

(Comment list range setting)

↓ ↓ ↓ ↓ ↓ GO → ✳ UTILIZED CIRCUIT PRINT ✳

PRINTER	—OTHER
BAUD RATE	—2400
PARITY	—ODD
DATA LENGTH	—8
STOP BIT	—2
PAPER LENGTH	—11
START-POSITION	—10
MODE	—SINGLE(PAGE)
PAGE	—10
PRINT MODE	—UTILIZED CIRCUIT

(START)
■ YES
NO

⇨ Section 10.15

(Utilized circuit print setting)

10.10 Ladder Print
Prints the program in ladder form.

```
PRINTER
LADDER
```

BASIC OPERATION

$$\left[\begin{array}{c}\text{Printer mode}\\\text{setting}\end{array}\right] \rightarrow \left[\begin{array}{c}\text{Ladder print}\\\text{setting}\end{array}\right] \rightarrow \boxed{GO}$$

OPERATION PROCEDURE

```
            * LADDER PRINT SETTING *

〈 COMMENT 〉        〈 RANGE SETTING 〉   PRINTER        —OTHER
WITHOUT              ALL AREA            BAUD RATE      —2400
                                         PARITY         —ODD
* WITH              * RANGE SETTING      DATA LENGTH    —8
                                         STOP BIT       —2
〈 CROSSREF 〉       〈 STEP NO 〉         PAPER LENGTH   —11
* WITHOUT           START STEP  =   0    START-POSITION —10
                                         MODE           —SINGLE(PAGE)
WITH               FINAL STEP  = 100     PAGE           —10
                                         PRINT MODE     —LADDER
                   〈 PRINT START 〉
                   ■ YES
                     NO
```

With comment   No contact   Range setting
               use destination

$$\boxed{\downarrow} \rightarrow \boxed{GO} \rightarrow \boxed{GO} \rightarrow \boxed{\downarrow} \rightarrow \boxed{GO}$$

Starting step   Final step

$$\boxed{0} \rightarrow \boxed{GO} \rightarrow \boxed{1} \rightarrow \boxed{0} \rightarrow \boxed{0} \rightarrow \boxed{GO}$$

$$\boxed{GO}$$

Print start

(Example: Printing of ladder with comment from
            step 0 to 100)

EXPLANATION

(1) To obtain a ladder diagram print out, the following four items must be set;
"COMMENT", "CROSS REF", "RANGE SETTING", and "START".

1) "COMMENT". . . . . . . .Select print out with or without comments.

2) "CROSS REF". . . . . . . .Provides a cross reference between devices used in the program and where their relevant OUT or data instructions occur (see following example.)

```
                                                    "N/O" (normally open)
                                              Y10  contact at step 1
   0 ● T5 |├────────●──────────〈Y10〉─┤      A | 1 ╱
                                                 B | 3 |
     Y10 |├──────────┘                            |
                                                  ╱
   3 ● Y10 ╱├                               "N/C" (normally closed)
                                            contact at step 3
```
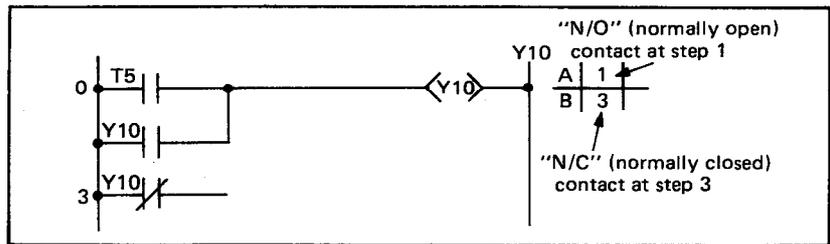
⟨2⟩ Data instruction
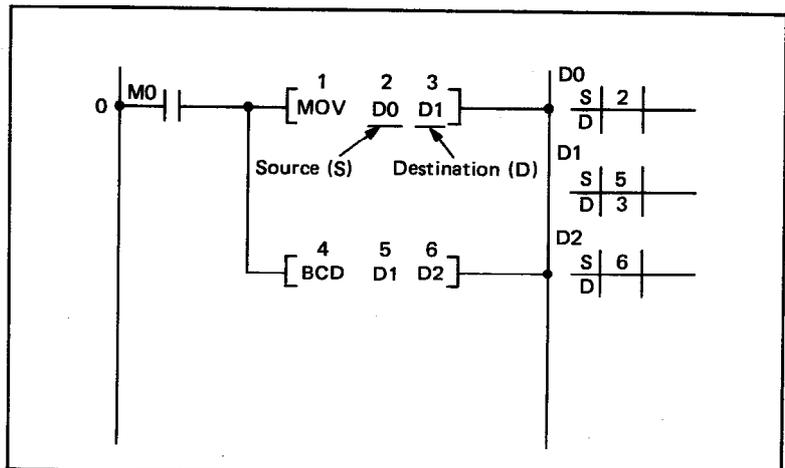
Note: *CROSS REF setting cannot be selected if K6PR (pica), K6PR-K (pica), or GT-10A (old) has been selected.*
If tried, "SETTING ERROR" is displayed.

3) "RANGE SETTING". . . .Sets the printing range. To print all steps, select "ALL AREA". To set the range, select "RANGE SETTING" and set the start step number and the final step number.

4) "START" . . . . .By pressing the ⟦GO⟧ key with the cursor located at YES, printing begins.
By pressing the ⟦GO⟧ key with the cursor located at NO, the CRT returns to the "MODE SETTING" screen.

(2) By pressing the ⟦—⟧ and ⟦GO⟧ keys during selection, the CRT returns to the preceding parameter.
When the cursor is located at the YES or NO position, pressing the ⟦—⟧ and ⟦GO⟧ keys moves the cursor to the "RANGE SETTING" position.

(3) Print out example

Ladder print out example (1)
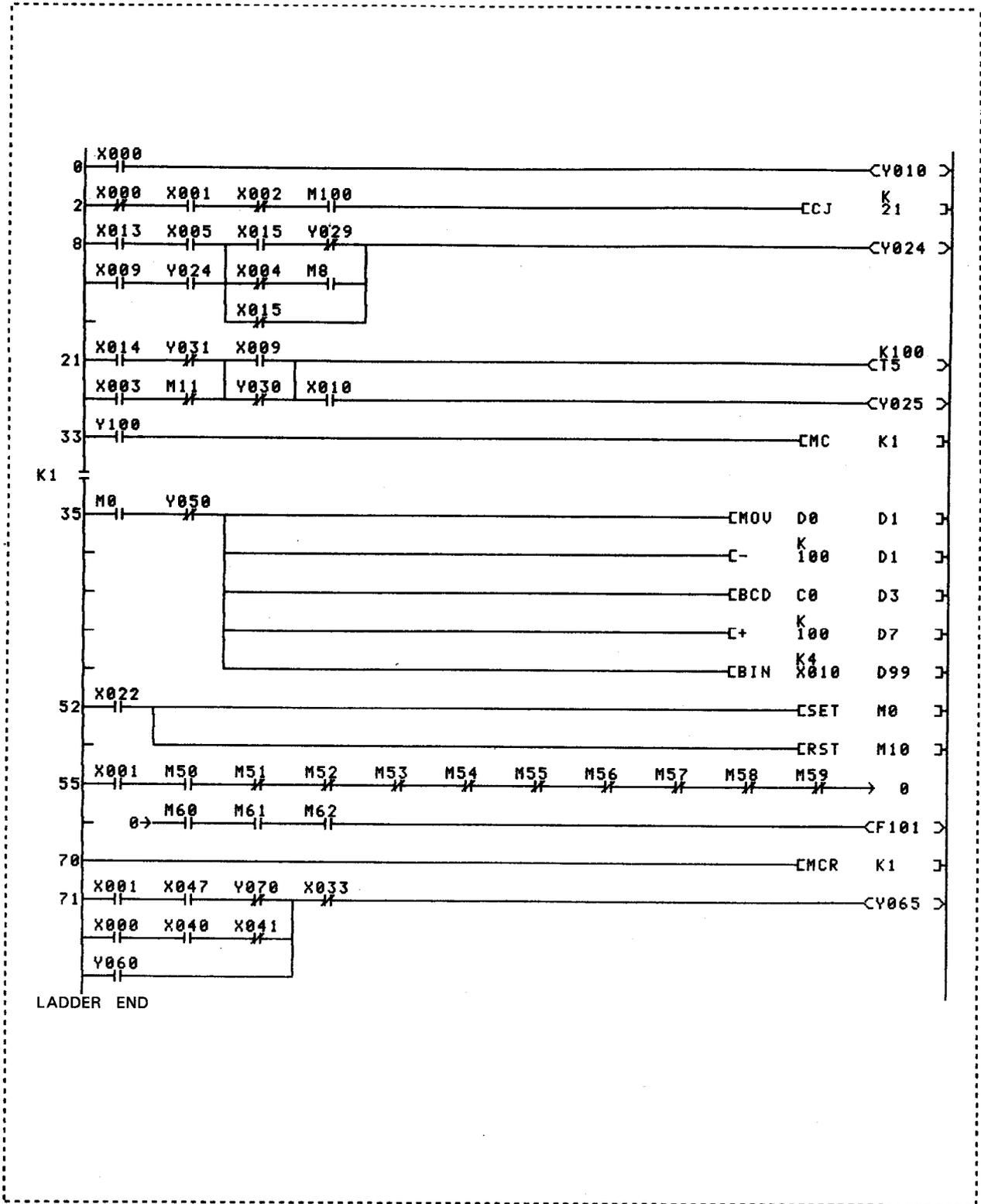
Conditions
K6PR (Pica)
Single

LADDER END

Ladder print out example (2)

Conditions
K6PR (Pica)
Single
With comments

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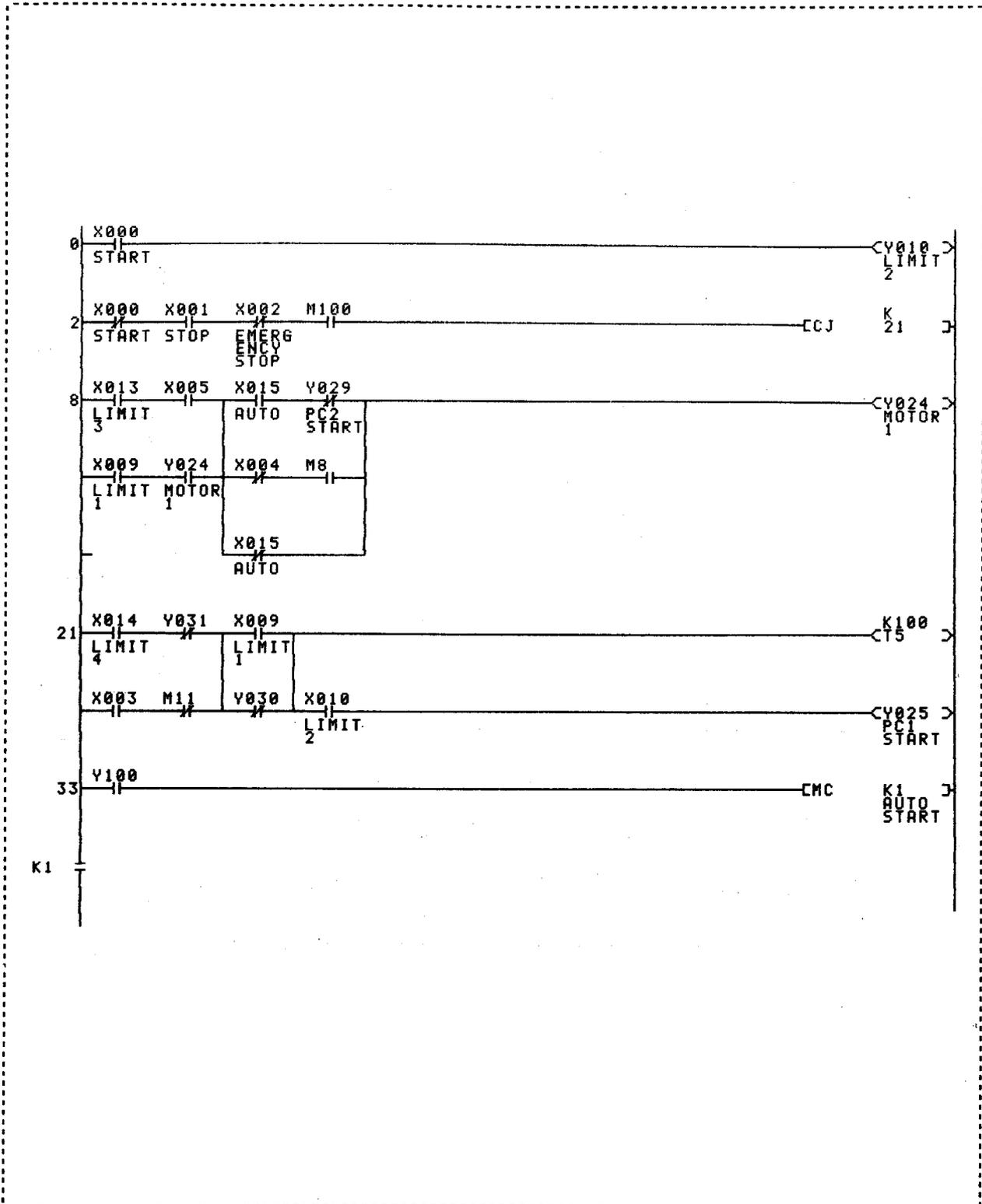
Ladder print out example (3)

Conditions
K6PR (Elite)
Single
With cross ref.
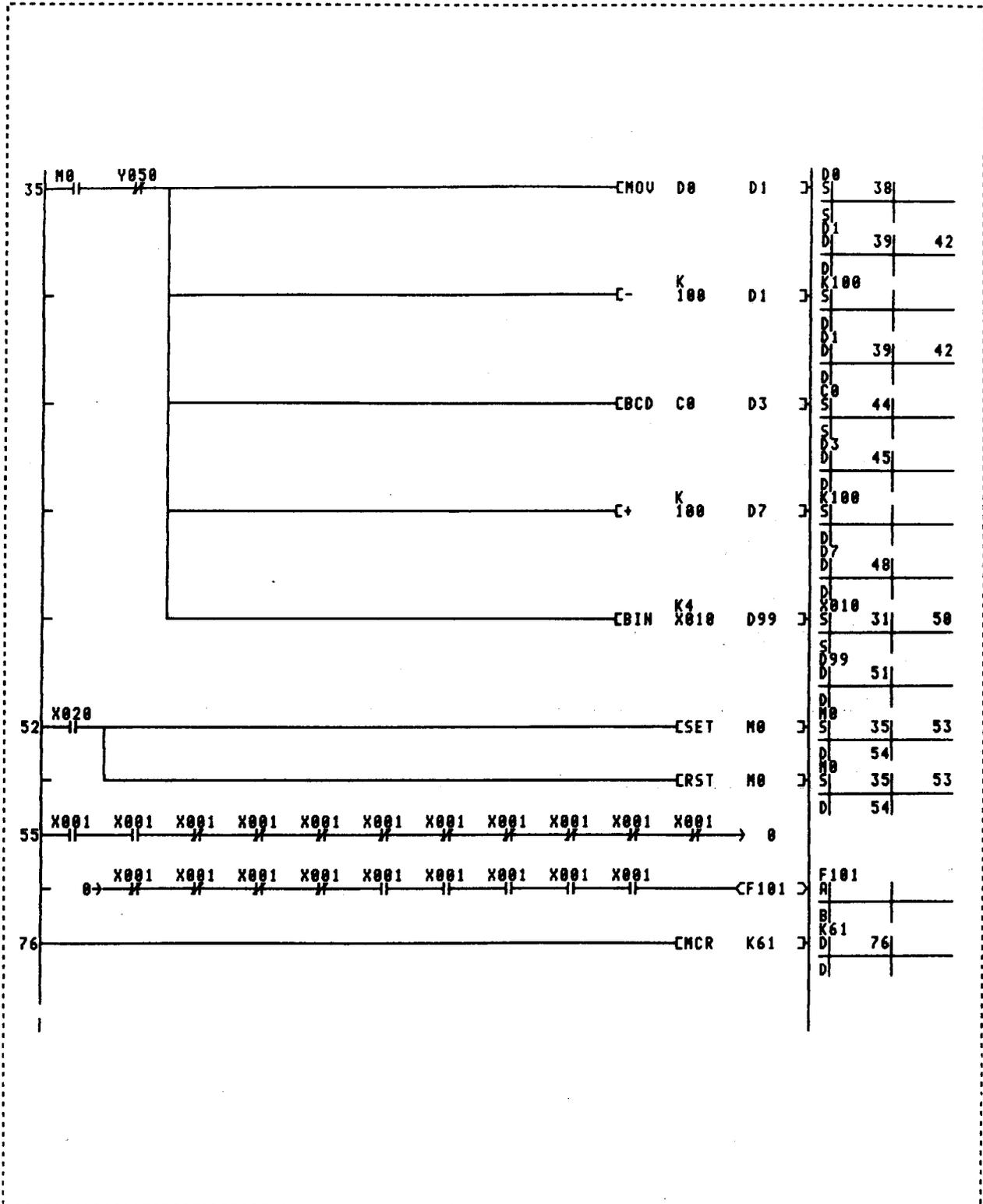
10.11 Command List Print Setting
Prints the program in list mode.

PRINTER
INSTRUCTION
LIST

BASIC OPERATION

$$\left[\begin{array}{c}\text{Printer mode}\\\text{setting}\end{array}\right] \rightarrow \left[\begin{array}{c}\text{Command list}\\\text{print setting}\end{array}\right] \rightarrow \boxed{\text{GO}} \rightarrow \boxed{\text{GO}}$$
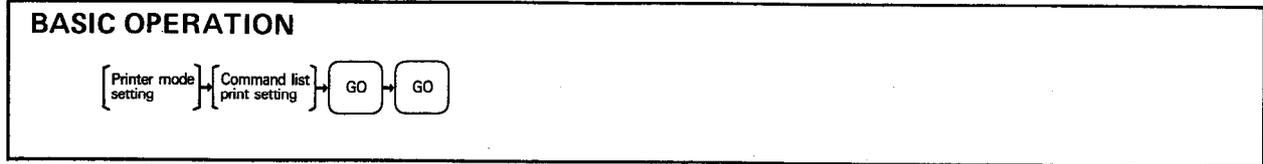
OPERATION PROCEDURE

```
                    *  COMMAND LIST PRINT SETTING  *

  〈 COMMENT 〉    〈 RANGE SETTING 〉  ┌─────────────────────────────┐
                                     │ PRINTER          —OTHER      │
    WITHOUT        *  ALL AREA        │ BAUD RATE        —2400      │
                                     │ PARITY           —ODD       │
  *  WITH            RANGE SETTING    │ DATA LENGTH      —8         │
                                     │ STOP BIT         —2         │
                                     │ PAPER LENGTH     —11        │
                  〈 STEP NO 〉        │ START-POSITION   —10        │
                                     │ MODE             —SINGLE(PAGE)│
                  START STEP  =   0   │ PAGE             —10        │
                                     │ PRINT MODE       —COMMAND LIST│
                  FINAL STEP  = 1023  └─────────────────────────────┘

                     〈 PRINT START 〉

                        ■ YES

                          NO
```

$$\boxed{\downarrow} \rightarrow \boxed{\text{GO}} \rightarrow \boxed{\text{GO}} \rightarrow \boxed{\text{GO}}$$

⎛Example: Printing of command list with⎞
⎝   comment   ⎠

EXPLANATION

(1) To obtain a program list print out, the following three items must be set: "COMMENT", "RANGE SETTING", and "START".

   1) "COMMENT". . . . . .Prints program list with comments.

   2) "RANGE SETTING". . . .Sets the printing range. To print the whole program, select "ALL AREA". To set the range, select "RANGE SETTING" and set the start step number and the final step number.

   3) "START" . . . . .By pressing the $\boxed{\text{GO}}$ key with the cursor located at YES, printing begins.
By pressing the $\boxed{\text{GO}}$ key with the cursor located at NO, the CRT returns to the "MODE SETTING" screen.

(2) By pressing the $\boxed{-}$ and $\boxed{\text{GO}}$ keys during selection, the CRT returns to the preceding parameter.

(3) Command list print out example

Print out example (1)

Conditions
K6PR (Pica)
Single

```
 0  LD      X000
 1  OUT     Y010
 2  LDI     X000
 3  AND     X001
 4  ANI     X002
 5  AND     M100
 6  CJ      K21
 8  LD      X013
 9  AND     X005
10  LD      X009
11  AND     Y024
12  ORB
13  LD      X015
14  ANI     Y029
15  LDI     X004
16  AND     M8
17  ORB
18  ORI     X015
19  ANB
20  OUT     Y024
21  LD      X014
22  ANI     Y031
23  LD      X003
24  ANI     M11
25  ORB
26  LD      X009
27  ORI     Y030
28  ANB
29  OUT     T5      K100
31  AND     X010
32  OUT     Y025
33  LD      Y100
```

Print out example (2)

Conditions
K6PR (Pica)
Single
With comments

```
 0  LD    X000         START
 1  OUT   Y010         LIMIT2
 2  LDI   X000         START
 3  AND   X001         STOP
 4  ANI   X002         EMERGENCY STOP
 5  AND   M100
 6  CJ    K21

 8  LD    X013         LIMIT3
 9  AND   X005
10  LD    X009         LIMIT1
11  AND   Y024         MOTOR1
12  ORB
13  LD    X015         AUTO
14  ANI   Y029         PC2  START
15  LDI   X004
16  AND   M8
17  ORB
18  ORI   X015         AUTO
19  ANB
20  OUT   Y024         MOTOR1
21  LD    X014         LIMIT4
22  ANI   Y031
23  LD    X003
24  ANI   M11
25  ORB
26  LD    X009         LIMIT1
27  ORI   Y030
28  ANB
29  OUT   T5    K100
31  AND   X010         LIMIT2
32  OUT   Y025         PC1  START
33  LD    Y100
```

10.12 Contact and Coil List Print

Prints a list showing how and where each of the contacts and coils have been used.

```
PRINTER
CONTACT, COIL
```

BASIC OPERATION

$$\left[\begin{array}{c}\text{Printer mode}\\\text{setting}\end{array}\right] \rightarrow \left[\begin{array}{c}\text{Contact/coil range}\\\text{setting}\end{array}\right] \rightarrow \boxed{\text{END}} \rightarrow \boxed{\text{GO}}$$
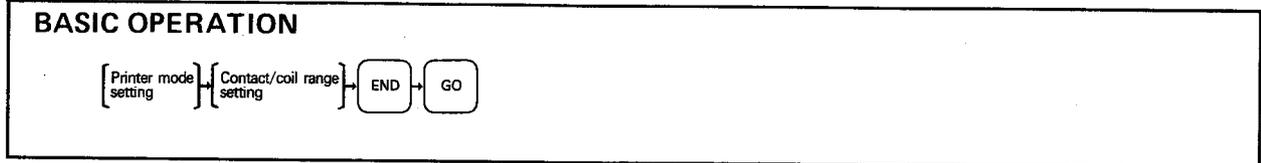
OPERATION PROCEDURE

```
✻  CONTACT,COIL LIST RANGE SETTING  ✻

      K    —          PRINTER         —OTHER
                      BAUD RATE       —2400
      X  000—00F      PARITY          —ODD
                      DATA LENGTH,     —8
      Y  010—01F      STOP BIT         —2
                      PAPER LENGTH    —11
      M    —          START-POSITION  —10
                      MODE            —SINGLE(PAGE)
      T.   —          PAGE            —10
                      PRINT MODE      —CONTACT, COIL
      C    —

      F    —

      D    —        〈 PRINT START 〉
                         YES

                         NO

✻  PRESS (END), WHEN SET  ✻
```

```
↓ → 0 → → → 0 → F → GO
X specification    X00 to X0F specification
```

```
1 → 0 → → → 1 → F
        Y10 to Y1F
```

```
GO → END → GO
```

⎛Example: Specification of only X00 to X0F⎞
⎝   and Y10 to Y1F.   ⎠

REMARKS

For the keying of 0F, only F key need be pressed.

EXPLANATION

(1) Set the ranges of K, X, Y, M, T, C, F, and D individually to print the ladder symbols against their relevant step numbers.

(2) On the initial setting screen, the cursor is located at the K's start number column. After entering the starting number, press the ☐→ key to move the cursor to the final number column and then enter the number. After that, press the ☐GO☐ key to move the cursor to the next device position. If setting is not necessary for a device, move the cursor to the next device by pressing the ☐↓☐ key. After the completion of setting, press the ☐END☐ key and proceed to "START".

(3) By pressing the ☐GO☐ key with the cursor located at YES, printing begins. By pressing the ☐GO☐ key with the cursor located at NO, the CRT returns to the "MODE SETTING" screen.

(4) Contact and coil list print out example

Conditions
K6PR (Pica)
Single

```
CONTACT COIL LIST
            STEP  LADDER      STEP  LADDER      STEP  LADDER      STEP  LADDER
    Y 100     11 —< >—         49 —[]— -         65 —[]— BCD
    Y 101     49 —[]— -        65 —[]— BCD
    Y 102     49 —[]— -        65 —[]— BCD
    Y 103     49 —[]— -        65 —[]— BCD
    Y 104     49 —[]— -        65 —[]— BCD
    Y 105     49 —[]— -        65 —[]— BCD
    Y 106     49 —[]— -        65 —[]— BCD
    Y 107     49 —[]— -        65 —[]— BCD
    Y 108     49 —[]— -        65 —[]— BCD
    Y 109     49 —[]— -        65 —[]— BCD
    Y 10A     49 —[]— -        65 —[]— BCD
    Y 10B     49 —[]— -        65 —[]— BCD
    Y 10C     49 —[]— -        65 —[]— BCD
    Y 10D     49 —[]— -        65 —[]— BCD
    Y 10E     49 —[]— -        65 —[]— BCD
    Y 10F     49 —[]— -        65 —[]— BCD
```

MELSEC-A

10.13 Device Used List Print
Prints a list of devices used.

```
PRINTER
DEVICE
```

BASIC OPERATION

[Printer mode setting] → [Device used list range setting] → [END] → [GO]
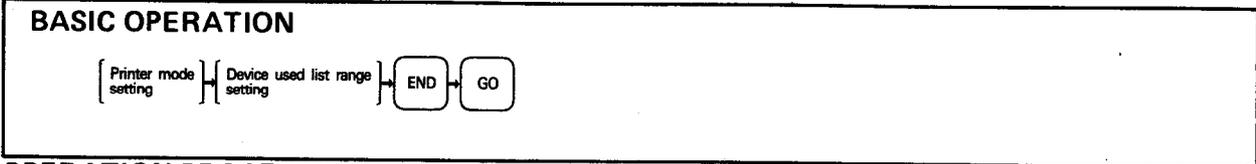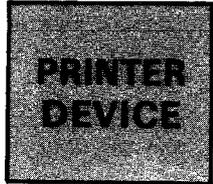
OPERATION PROCEDURE

```
✴ DEVICE USED LIST RANGE SETTING ✴

   K    —       PRINTER        —OTHER
   X  000—00F   BAUD RATE      —2400
                PARITY         —ODD
   Y  010—01F   DATA LENGTH    —8
                STOP BIT       —2
   M    —       PAPER LENGTH   —11
                START-POSITION —10
   T    —       MODE           —SINGLE(PAGE)
                PAGE           —10
   C    —       PRINT MODE     —DEVICE USED
   F    —
   D    —       〈 PRINT START 〉
                     YES
                     NO

✴  PRESS (END), WHEN SET ✴
```

[↓] → [0] → [→] → [0] → [F] → [GO]

X specification   X00 to X0F specification

[1] → [0] → [→] → [1] → [F]

Y10 to Y1F

[GO] → [END] → [GO]

(Example: Specification of X00 to X0F and)
(Y10 to Y1F.   )

EXPLANATION

(1) On the initial setting screen, the cursor is located at the K's start number column. After entering the start number, press the [→] key to move the cursor to the final number column and then enter the number. After that, press the [GO] key to move the cursor to the next device position. If setting is not necessary for a device, move the cursor to the next device by pressing the [↓] key. After the completion of setting, press the [END] key and proceed to "START".

(2) By pressing the [GO] key with the cursor located at YES, printing begins. By pressing the [GO] key with the cursor located at NO, the CRT returns to the "MODE SETTING" screen.

---

(3) Device used list print out example

Conditions
K6PR (Pica)
Single

```
DEVICE USE LIST
              (-||-  -< >-  = USED)  (BLANK =UNUSED)  (E = ERROR)
Y 060 -||-          E   Y 070 -||-          E   Y 080              Y 090
Y 061                   Y 071                   Y 081              Y 091
Y 062                   Y 072                   Y 082              Y 092
Y 063                   Y 073                   Y 083              Y 093
Y 064    -< >- 1 E      Y 074                   Y 084              Y 094
Y 065 -||- -< >- 1      Y 075                   Y 085              Y 095
Y 066    -< >- 1 E      Y 076                   Y 086              Y 096
Y 067                   Y 077                   Y 087              Y 097
Y 068    -< >- 1 E      Y 078                   Y 088              Y 098
Y 069                   Y 079                   Y 089              Y 099
Y 06A                   Y 07A                   Y 08A              Y 09A
Y 06B                   Y 07B                   Y 08B              Y 09B
Y 06C                   Y 07C                   Y 08C              Y 09C
Y 06D                   Y 07D                   Y 08D              Y 09D
Y 06E                   Y 07E                   Y 08E              Y 09E
Y 06F                   Y 07F                   Y 08F              Y 09F
```

10.14 Comment List Print Setting
Prints a list of comments used.

PRINTER
COMMENT

BASIC OPERATION

[Printer mode setting] → [Comment list print range setting] → (END) → (GO)
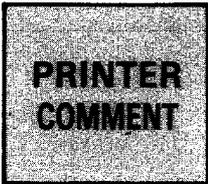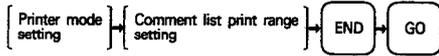
OPERATION PROCEDURE

```
*  COMMENT LIST RANGE SETTING  *

        K     —        PRINTER          —OTHER
                       BAUD RATE        —2400
      X.Y   000—07F    PARITY           —ODD
                       DATA LENGTH      —8
        M   0—100      STOP BIT         —2
                       PAPER LENGTH     —11
      T.C   0— 20      START-POSITION   —10
                       MODE             —SINGLE(PAGE)
        F     —        PAGE             —10
                       PRINT MODE       —COMMENT LIST
        D   0— 15
                     ( PRINT START )

                          ■ YES

                            NO

*  PRESS (END) , WHEN SET  *
```

(I)→(O)→(—)→(7)→(F)→(GO)
X/Y00 to X/Y7F specification

(O)→(—)→(1)→(O)→(0)→(GO)
M0 to M100 specification

(O)→(—)→(2)→(O)→(GO)→(I)→(O)→(—)
T/C0 to T/C20 specification

(1)→(5)→(GO)→(END)→(GO)
D0 to D15 specification

Example: Specification of X/Y00 to X/Y7F,
M0 to M100, T/C0 to T/C20, and
D0 to D15

EXPLANATION

(1) On the initial setting screen, the cursor is located at the K's start number column. After entering the start number, press the →] key to move the cursor to the final number column and then enter the number. After that, press the GO key to move the cursor to the next device position. If setting is not necessary for a device, move the cursor to the next device by pressing the ↓ key. After the completion of setting, press the END key and proceed to "START".

(2) By pressing the GO key with the cursor located at YES, printing begins. By pressing the GO key with the cursor located at NO, the CRT returns to the "MODE SETTING" screen.

(3) Comment list print out example

Conditions
K6PR (Pica)
Single

```
    COMMENT LIST
    DEVICE        COMMENT              DEVICE         COMMENT              DEVICE         COMMENT
                 12345*67890*12345                  12345*67890*12345                  12345*67890*12345
    X.Y000   START                    X.Y010   LIMIT 2                    X.Y020
    X.Y001   STOP                     X.Y011                              X.Y021
    X.Y002   EMERG ENCY   STOP        X.Y012                              X.Y022
    X.Y003                            X.Y013   LIMIT 3                    X.Y023
    X.Y004                            X.Y014   LIMIT 4                    X.Y024   MOTOR 1
    X.Y005                            X.Y015   AUTO                       X.Y025   PC1    START
    X.Y006                            X.Y016                              X.Y026
    X.Y007                            X.Y017                              X.Y027
    X.Y008                            X.Y018                              X.Y028
    X.Y009   LIMIT 1                  X.Y019                              X.Y029   PC2    START
    X.Y00A                            X.Y01A                              X.Y02A
    X.Y00B                            X.Y01B                              X.Y02B
    X.Y00C                            X.Y01C                              X.Y02C
    X.Y00D                            X.Y01D                              X.Y02D
    X.Y00E                            X.Y01E                              X.Y02E
    X.Y00F                            X.Y01F                              X.Y02F
```

IB (NA) 66192-A

10.15 Utilized Circuit Print

Provides a circuit print out of the utilized circuit stored on the FD (which must be in drive B). See Section 4.6.

```
PRINTER
UTILIZED
CIRCUIT
```

BASIC OPERATION

[Printer mode selection] → (GO)

OPERATION PROCEDURE

```
*   UTILIZED CIRCUIT PRINT   *

              ┌─────────────────────────────────────┐
              │ PRINTER           —OTHER             │
              │ BAUD RATE         —2400              │
              │ PARITY            —ODD               │
              │ DATA LENGTH       —8                 │
              │ STOP BIT          —2                 │
              │ PAPER LENGTH      —11                │
              │ START-POSITION    —10                │
              │ MODE              —SINGLE(PAGE)      │
              │ PAGE              —10                │
              │ PRINT MODE        —UTILIZED CIRCUIT  │
              └─────────────────────────────────────┘
    ( PRINT START )

      ■ YES

        NO
```

(GO)
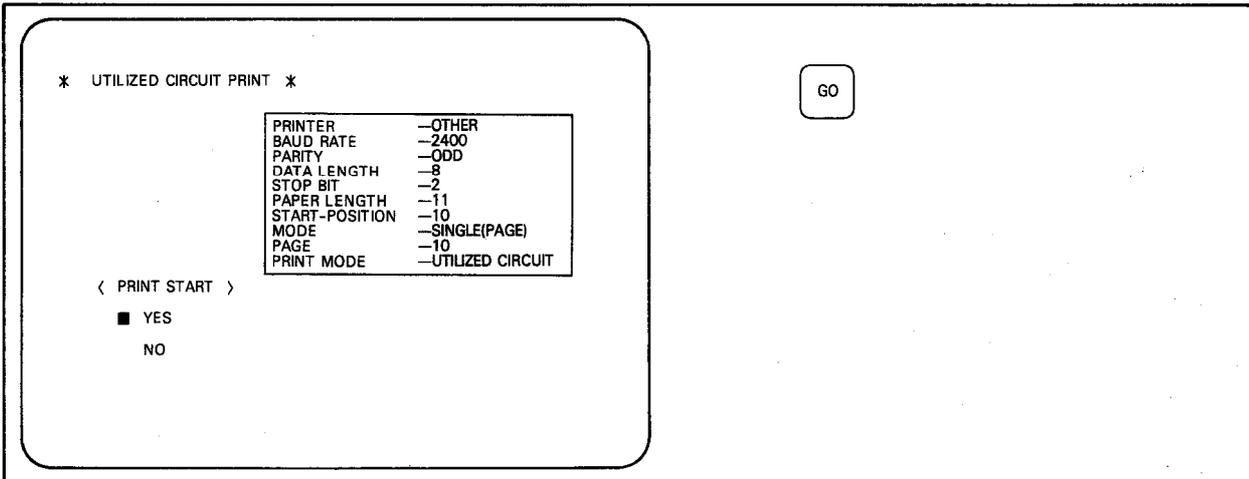
EXPLANATION

(1) By pressing the [GO] key with the cursor located at YES, printing begins. By pressing the [GO] key with the cursor located at NO, the CRT returns to the "MODE SETTING" screen.

/MELSEC-**A**

(2) Utilized circuit print out example

Conditions
K6PR (Pica)
Single

UTILIZED CICUIT   PATTERN = 0

```
 X000
  +|+----+                                              -[MOV  K4    K4   ]-
         |                                                     X000  Y010
         +------------------------------------------------------[MOV  K4    K4   ]-
         |                                                     X000  M10
         +------------------------------------------------------[MOV  K4    T10  ]-
         |                                                     X000
         +------------------------------------------------------[MOV  K4    C10  ]-
         |                                                     X000
         +------------------------------------------------------[MOV  K4    D10  ]-
         |                                                     X000
         +------------------------------------------------------[MOV  K4    K4   ]-
         |                                                     Y000  Y011
         +------------------------------------------------------[MOV  K4    K4   ]-
         |                                                     Y000  M11
         +------------------------------------------------------[MOV  K4    T11  ]-
         |                                                     Y000
         +------------------------------------------------------[MOV  K4    C11  ]-
         |                                                     Y000
         +------------------------------------------------------[MOV  K4    D11  ]-
                                                               Y000
```

IB (NA) 66192-A
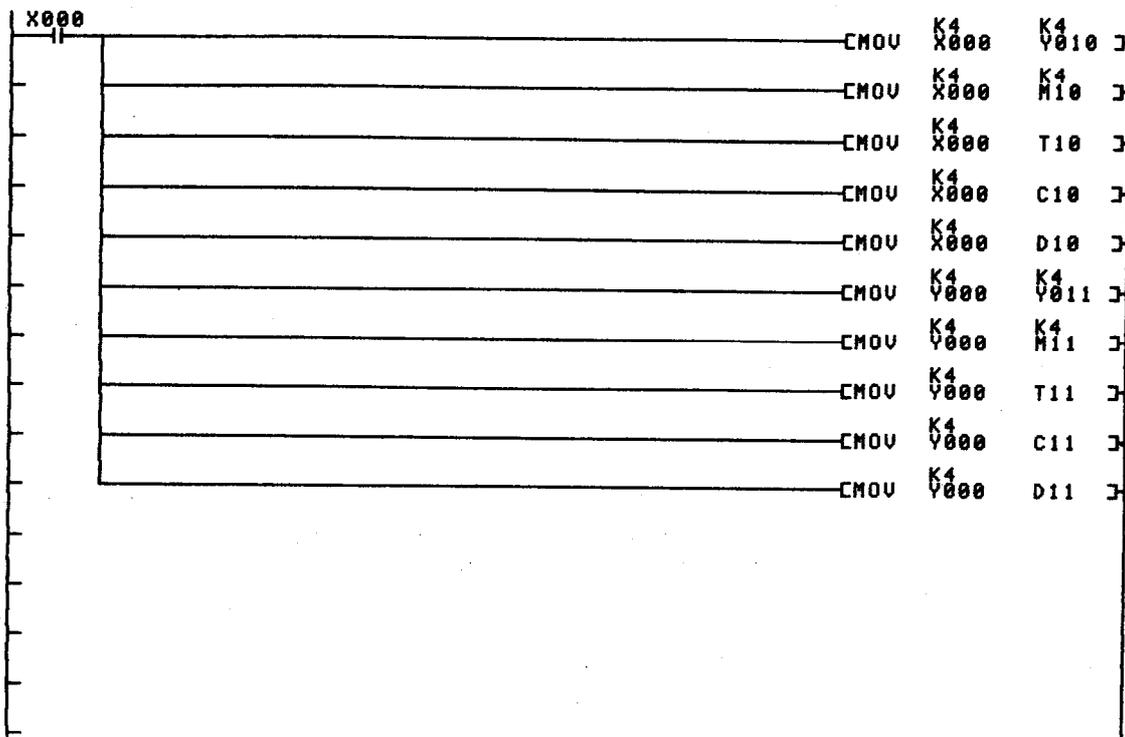
10.16 Multiple Mode Print

Allows all or some of the previous print out modes to be selected simultaneously.

**PRINTER
MULTIPLE**
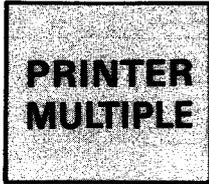
BASIC OPERATION

$$\left[\begin{array}{c}\text{Selection of multiple mode}\\\text{by the mode setting}\end{array}\right] \rightarrow \left[\begin{array}{c}\text{Each mode}\\\text{range setting}\end{array}\right] \rightarrow \left(\text{END}\right) \rightarrow \left(\text{GO}\right)$$

OPERATION PROCEDURE

```
                         * MULTIPLE MODE SETTING *
  * LADDER              INSTRUCTION LIST     * CONTACT, COIL  DEVICE USED  * COMMENT LIST

    (COMMENT)             (COMMENT)          K    -          K    -        K    -
  * WITHOUT              WITHOUT
    WITH                 WITH               X  000- 00F     X    -        X, Y  000- 01F
    (STEP NO. FOR CONTACT)
  * WITHOUT              (RANGE SETTING)     Y  010- 01F    Y    -        M    -
    WITH
                        ALL AREA            M    -          M    -        T, C  -
    (RANGE SETTING)     RANGE SETTING
  * ALL AREA                                T    -          T    -        F    -
    RANGE SETTING       (STEP NO)
                                            C    -          C    -        D    -
    (STEP NO)           START=
                                            F    -          F    -             -
  START=    0           END  =
                                            D    -          D    -             -
  END  =  1023


  ■ PRINT-OUT START   PRINTER   —OTHER     DATA LENGTH  -8   START-POSISTION  -10
    NOT PRINT-OUT     BAUD RATE —2400      STOP BIT     -2   MODE             —MULTIPLE
                      PARITY    —ODD       PAPER LENGTH -11  PAGE             -1
```

(GO)→(GO)→(GO)→(GO)→(GO)→(GO)→(GO)→(GO)

Ladder setting — No comment — No comment contact use destination — All area — Setting — Command No list setting comment — All area

(—)→(GO)→(↓)→(0)→(→)→(0)→(F)→(GO)

Contact, coil setting — K pass — X00 to X0F specification

(1)→(0)→(→)→(1)→(F)→(GO)→(END)

Y10 to Y1F specification — Setting

(—)→(GO)→(↓)→(0)→(→)→(1)

Device used list setting pass — Comment list setting — K pass — X/Y00 to X/Y1F specification

(F)→(GO)→(END)→(END)→(GO)

Example: Printing of ladder, command list, contact and coil list, and comment

---

EXPLANATION

(1) In multiple mode setting, ladder, command list, contact and coil list, device used list, and/or comment list modes may be printed one after the other.

(2) The setting procedure for each mode is the same as described in Section 10.10 to 10.14. When changing to the next mode, press the $\boxed{\rightarrow}$ key to move the cursor. After the final setting, press the $\boxed{\text{END}}$ key.

(3) When the $\boxed{-}$ and $\boxed{\text{GO}}$ keys are pressed during the selection of each mode, the CRT returns to the preceding mode setting.

(4) After the $\boxed{\text{END}}$ key has been pressed for the final setting and the cursor is located at "PRINT-OUT START", pressing the $\boxed{\text{GO}}$ key starts printing. Pressing the $\boxed{\text{GO}}$ key with the cursor located at "NOT PRINT-OUT" returns the CRT to the "MODE SETTING" screen.

(5) If setting has been done previously for each type of print out, these settings are entered automatically for the multiple print out.

10.17 Screen Copy

Prints the entire A6GPP screen.

PRINTER
SCREEN
COPY

BASIC OPERATION

[Printer setting operation] → [COPY]
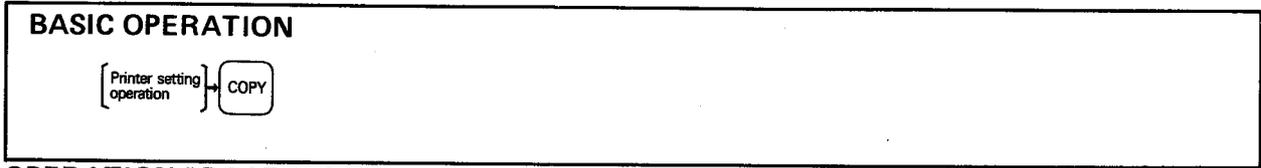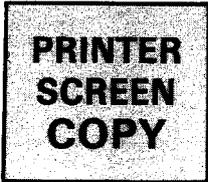
OPERATION PROCEDURE
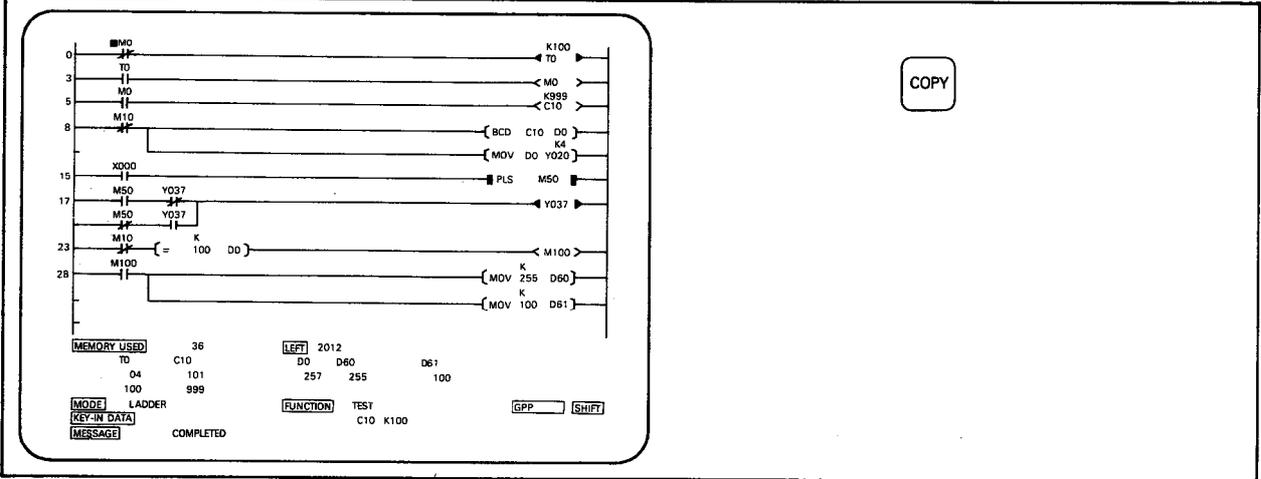
EXPLANATION

(1) To obtain a print out of the display, press the COPY key. This "freezes" the display and starts printing. After the completion of printing, normal operation is automatically resumed. When the GT-10A (old), GT-10A (new), or general-purpose printer has been selected, screen copies cannot be made.

(2) Set the printer required in advance using the printer setting procedure. Then, when a screen copy is required, press the COPY key on the MELSAP keyboard. (The copy key on the A6KB has a different function, always use the MELSAP keyboard COPY key to call off a screen copy.)

(3) To proceed to another mode after the completion of screen copy, press the required mode key.

(4) If a screen copy has been initiated, it cannot be aborted from the keyboard.

(5) To copy the screen using the general-purpose printer, select the K7PR if the used printer specifications are the same as those shown below.

Baudrate	9600 or 2400	Data length	8
Parity	None	Stop bit	2

Description	ESC Sequence	Code
Paper feed setting	ESC A+n	[1B] H [41] H [n] OR [27] 10 [65] n [n]
Elite size setting	ESC M	[1B] H [4D] H OR [27] 10 [77] 10
Pica size setting	ESC P	[1B] H [50] H OR [27] 10 [80] 10
Bit image mode selection	ESC X+m+n1+n2	[1B] H [2A] H [m] [n1] [n2] OR [27] 10 [A2] 10 [m] [n1] [n2]

Screen copy print out example


```
Conditions

  K6PR (Pica)
  Single
```



```
    ■M0                                                              K100
  0 ─┤↑├───────────────────────────────────────────────────────────〔T0 〕
    T0
  3 ─┤ ├───────────────────────────────────────────────────────────〈M0 〉
    M0                                                               K999
  5 ─┤ ├───────────────────────────────────────────────────────────〈C10 〉
    M10
  8 ─┤↑├──────────────────────────────────────────────────〔BCD  C10   D0 〕
                │                                                     K4
                │                                           ─〔MOV  D0   Y020〕
    X000
 15 ─┤↑├─────────────────────────────────────────────────────■PLS  M50 ■
    M50    Y037
 17 ─┤ ├────┤/├───────────────────────────────────────────────────〔Y037〕
    M50    Y037
    ─┤↑├────┤↑├
    M10
 23 ─┤↑├──〔=  100   D0 〕─────────────────────────────────────────〈M100〉
                                                                     K
    M100                                                            K
 28 ─┤ ├────────────────────────────────────────────────〔MOV  255  D60〕
                │                                                    K
                │                                          ─〔MOV  100  D61〕
    ─
```
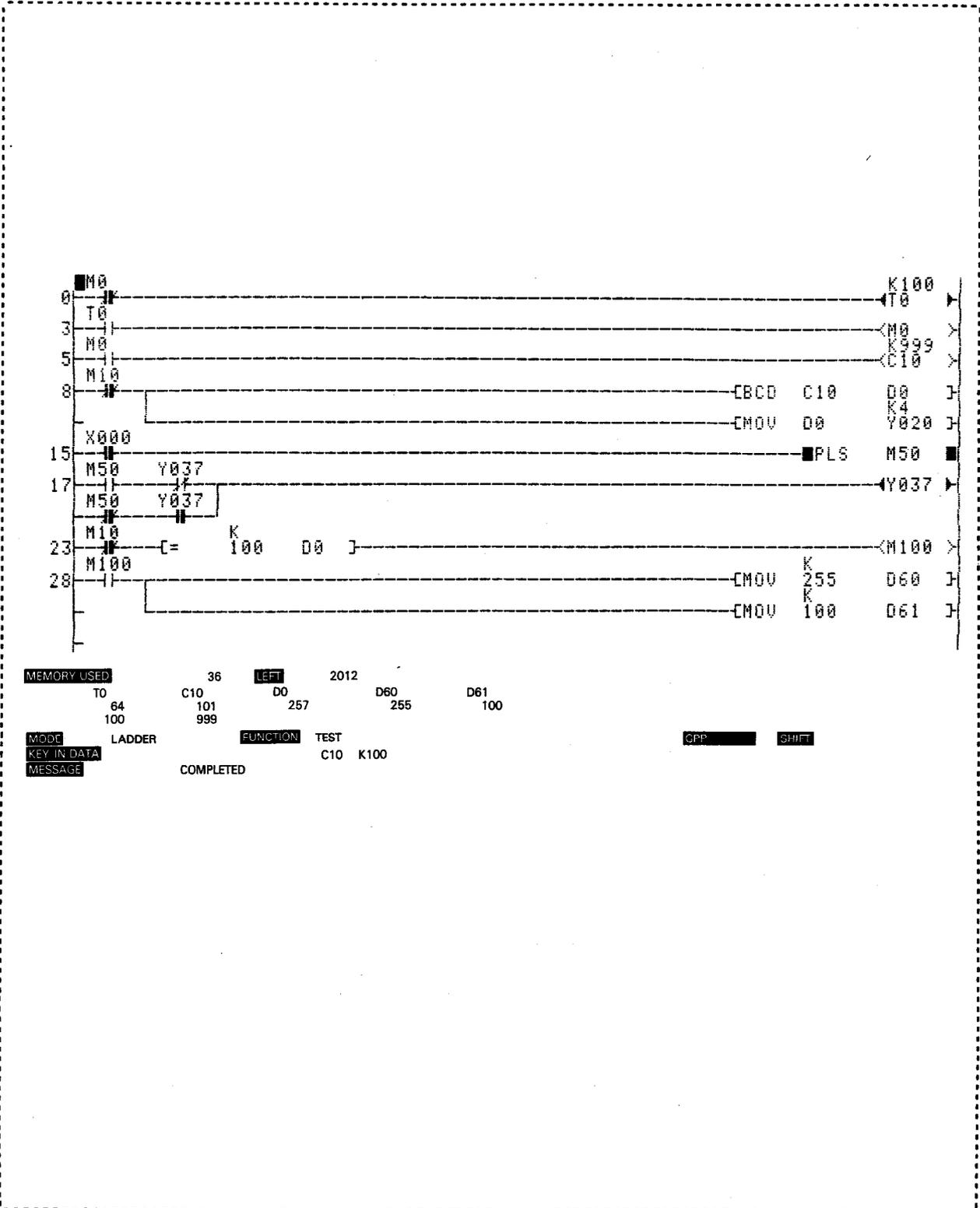
```
MEMORY USED       36   LEFT     2012
         T0        C10      D0          D60        D61
         64        101          257         255        100
        100        999
MODE     LADDER       FUNCTION  TEST                      CPP       SHIFT
KEY IN DATA                     C10  K100
MESSAGE              COMPLETED
```

11. CONVERSION TO PROGRAM FOR K3

In order to use programs written for K0, K0J, K1, and K2 on the K3NCPU, it is necessary to convert them to K3NCPU programs.

Since the instruction codes used for the K3N are different from those of other CPUs, the existing programs (K0, K0J, K1, and K2) cannot be used on the K3NCPU without performing the following conversion operation.

POINT

(1) After conversion into a K3 program, be sure to insert an END instruction in front of "OUT F100". ("OUT F100" is not automatically inserted by the program conversion procedure.)

(2) Since the application instructions for the K0, K2, etc. are not converted into application instructions for K3NCPU, note the following points:

    1) After conversion to K3N program, change the application instruction numbers, data register numbers, etc. to those of K3N.

    2) Some of the application instructions for the K0J and K2 are not available on the K3NCPU.

       For example, conversion of a program using F111 to K3N program (dissociation of 16-bit data to two 8-bit datas)

          ⟨Before conversion⟩   ⟨After conversion⟩

```
MO                                    MO
 ┤├┬[MOV K5  D110]┤        ⇨          ┤├┬[MOV K5  D110]┤
   ├[MOV K20 D111]┤                     ├[MOV K20 D111]┤
   └────────⟨F111⟩┤                     └────────⟨F111⟩┤
```

                                       ⇩
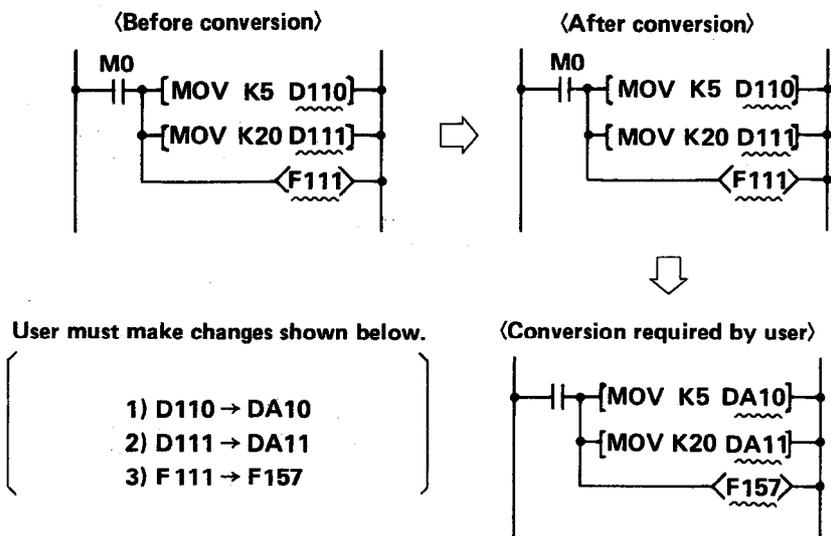
User must make changes shown below.   ⟨Conversion required by user⟩

```
⎧                          ⎫        ┤├┬[MOV K5  DA10]┤
⎪  1) D110 → DA10          ⎪          ├[MOV K20 DA11]┤
⎪  2) D111 → DA11          ⎪          └────────⟨F157⟩┤
⎩  3) F111 → F157          ⎭
```

(3) The reverse conversion procedure: K3NCPU program to K0, K0J, K1, K2 program cannot be executed.

(4) For full details on K3NCPU programs refer to the programming manual.

11.1 Conversion to K3 Program

Conversion of programs of K0, K0J, K1, and K2 to K3NCPU program.

PROGRAM
CONVERSION

BASIC OPERATION

[OTHER]→[↓]→[↓]→[↓]→[GO]→[GO]

OPERATION PROCEDURE

```
K1
K0,K0J1,K0J1H
K0J2,K0J2P    →   K3
K2,K2H,K2N,K2A

 PROGRAM COVERSION

PRESS ⟨GO⟩ ,WHEN OK

PRESS MODE KEY,WHEN NO
```

[OTHER]→[↓]→[↓]→[↓]→[GO]→[GO]

Conversion
execution

EXPLANATION

(1) To convert a program, set the PC to K3N on the "INITIAL DATA" screen.

(2) Read the program for K0, K0J, K1, and K2 from the FD or ROM, to the A6GPP and perform the conversion operation.
(After program conversion, the K3NCPU program is stored in the internal memory of the A6GPP and the program prior to the conversion no longer exists within the A6GPP memory.)

⎣REMARKS⎦

When K3N is selected in the initial setting and the program to be converted is read from the FD to the internal memory, "PC SELECTION ERROR" is displayed in the message column. However, when the [CR] key is pressed again, the read operation is initiated. (Refer to Section 7.3.)

(3) When the [GO] key is pressed to execute program conversion, "EXE-CUTING" is displayed in the message column. Upon completion of the conversion up to the memory capacity selected on the initial data screen, "COMPLETED" is displayed.

(4) If there are instruction codes which cannot be converted into instructions for the K3NCPU, these are converted to NOPs, "COMMAND ERROR, ERROR STEP = ✳✳✳✳" is displayed, and "COMPLETED" is not displayed.
If "COMMAND ERROR" is displayed, read the indicated error step numbers and make corrections.

(5) To cancel program conversion, select another mode key before pressing the [GO] key to start conversion.
When program conversion has been completed, select another mode key to proceed to the next operation.

(6) To abort conversion, press the [CLEAR] key. To resume the conversion, press the [GO] key. To complete the conversion, press the [END] and [GO] keys.

(7) The sequence of display screens is as shown below.

```
        * MODE SELECTION *

            COMMENT

            ROM

            PRINTER

        ■ CONVERSION OF K1,2 → K3

            CP/M

            MICROCOMPUTER

            INITIAL DATA
```

Conversion Selection

[OTHER] → [↓] → [↓] → [↓] → [GO]

```
                K1
                K0,K0J1,K0J1H
                K0J2,K0J2P    →    K3

                 PROGRAM CONVERSION

                PRESS ⟨GO⟩ ,WHEN OK

                PRESS MODE KEY,WHEN NO
```

Conversion Execution

[GO]
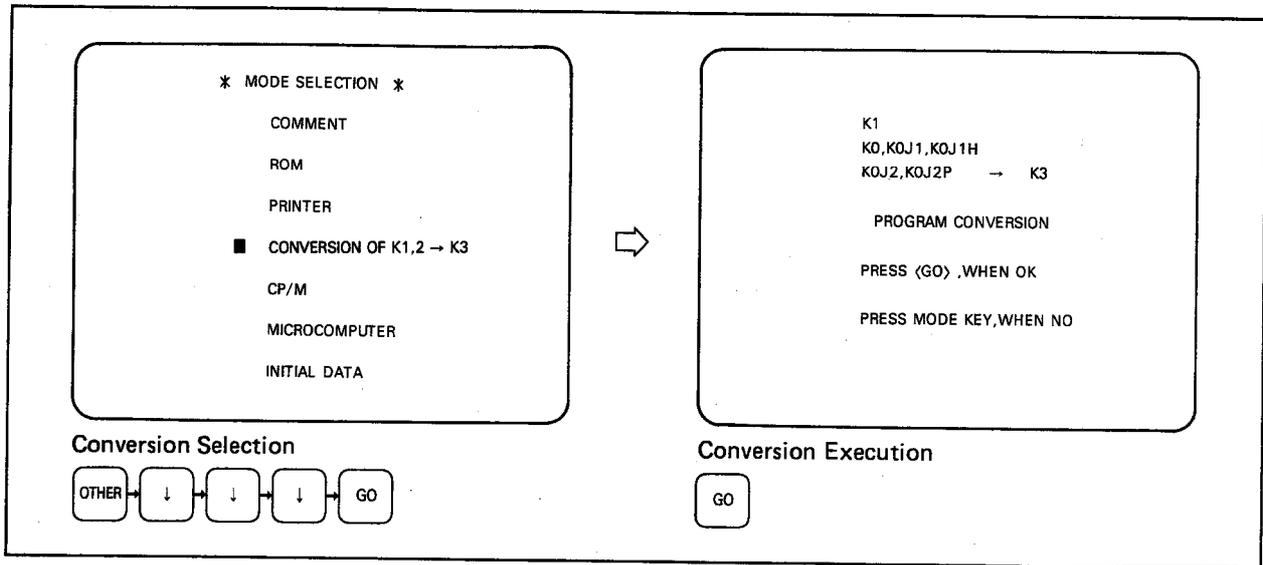
12. MICROCOMPUTER MODE

In microcomputer mode, the program stored in A6GPP memory can be read in hexadecimal. When connected to one of the following PCs: K2CPU-S1, S3, K2HCPU, K2NCPU, or K3NCPU(P2), a program can be written with microcomputer instructions. The write and read operations to and from the programmable controller are the same as those in PC mode.

12.1 Memory Map of Each CPU
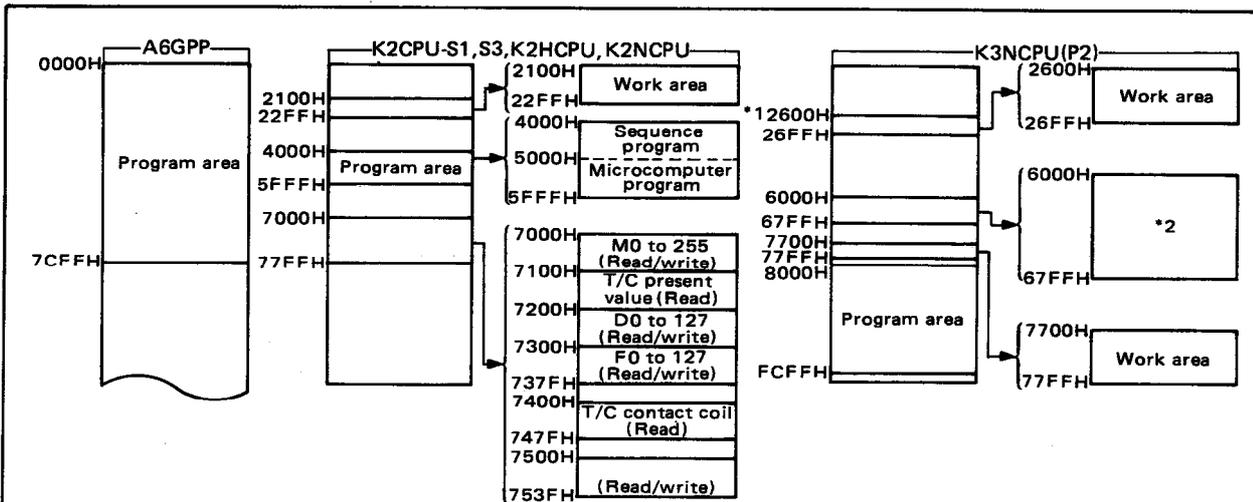
*1: When a microcomputer program is written, the program area for each CPU is as indicated below:

K2CPU-S1, S3, K2HCPU, K2NCPU:
  4000H to 4FFFH = sequence program
  5000H to 5FFFH = microcomputer program

K3NCPU(P2):
  8000H to 9FFFH = sequence program
  A000H to FCFFH = microcomputer program

*2: The 6000H to 67FFH data memory area (K3NCPU(P2)) is used as four memory areas: data register (D), input image (X), output image (Y), and data area (M, T, C, F). Since each area is managed as a subroutine, read and write operations for each area are done using the CALL instruction.
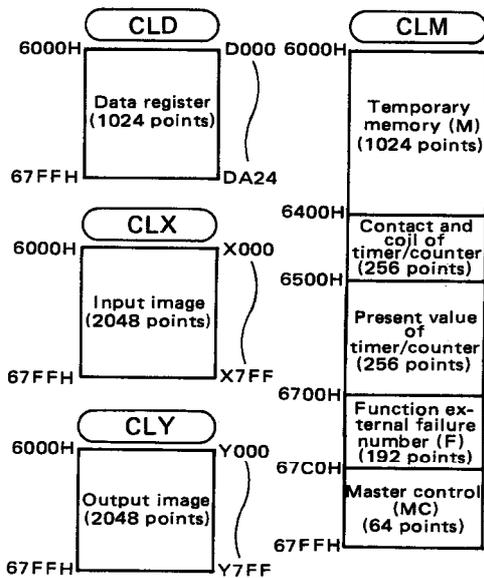
Subroutines for Read and Write of Data Memory Areas

Memory Area Name	Subroutine Name	Instruction Word	Machine Word
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 PSW LD A. F0H 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

12.2 Internal Configuration of Data Memory

| Data register (D) |

● The data register consists of 2 bytes.

```
B7                                      B0
┌──────────────────────────────────────┐
│                  (L)                   │
├──────────────────────────────────────┤
│                  (H)                   │
└──────────────────────────────────────┘
B15                                     B8
```
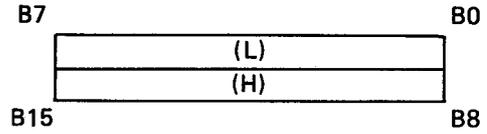
| Input image memory |

● The input image memory consists of 1 byte.
● B0 contains ON/OFF data.
● Use the*marked B1 to B7 after masking them.

```
B7  B6  B5  B4  B3  B2  B1  B0
┌───┬───┬───┬───┬───┬───┬───┬───┐
│ * │ * │ * │ * │ * │ * │ * │0/1│
└───┴───┴───┴───┴───┴───┴───┴───┘
```
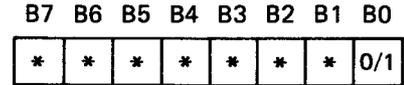
| Output image memory |

● The output image memory consists of 1 byte.
● B0 contains ON/OFF data.
● Use the * marked B1 to B7 after masking them.

```
B7  B6  B5  B4  B3  B2  B1  B0
┌───┬───┬───┬───┬───┬───┬───┬───┐
│ * │ * │ * │ * │ * │ * │ * │0/1│
└───┴───┴───┴───┴───┴───┴───┴───┘
```
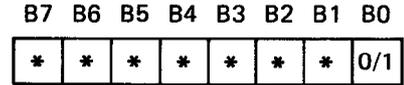
| M, F, MC |

● M, F, and MC consist of 1 byte each.
● B0 contains ON/OFF data.
● Use the * marked B1 to B7 after masking them.

```
B7  B6  B5  B4  B3  B2  B1  B0
┌───┬───┬───┬───┬───┬───┬───┬───┐
│ * │ * │ * │ * │ * │ * │ * │0/1│
└───┴───┴───┴───┴───┴───┴───┴───┘
```
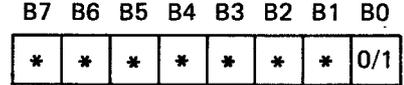
| Contact and coil of timer and counter |

● The contact and coil of timer and counter consist of 1 byte each.
● B0 contains ON/OFF data of contact.
● B7 contains ON/OFF data of coil.
● Use the * marked B1 to B6 after masking them.

```
B7  B6  B5  B4  B3  B2  B1  B0
┌───┬───┬───┬───┬───┬───┬───┬───┐
│0/1│ * │ * │ * │ * │ * │ * │0/1│
└───┴───┴───┴───┴───┴───┴───┴───┘
```
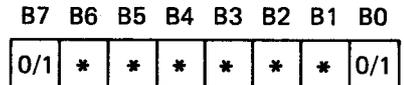
| Present value of timer and counter |

● The present value of timer and counter consists of 2 bytes.

```
B7                                      B0
┌──────────────────────────────────────┐
│                  (L)                   │
├──────────────────────────────────────┤
│                  (H)                   │
└──────────────────────────────────────┘
B15                                     B8
```
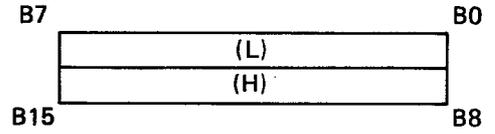
12.3 Microcomputer Program Call Example

Calling a microcomputer program during a sequence is as follows:

K2CPU-S1, S3, K2HCPU, K2NCPU

```
Xn
─┤├──────  [ MOV │ K※1 │ D127 ]
                                      ○※1: Step number following the final
                                           memory address of the sequence
                                           program, e.g. K2048 for 2K step
                                           sequence

Xn
─┤/├──────  [ MOV │ K0  │ D127 ]      ○ D127, special data register
                                         If D127 = 0, the microcomputer pro-
                                         gram is not executed.

─┤├─ ─ ─ ─

                                      ○ Return destination after the execution
                                        of microcomputer program
```

K3NCPU(P2)

```
                                      ○ Set 1 to 3 as below:
                                         ┌ 1 = A000H to FCFFH
                                         ┤ 2 = C000H to FCFFH
                                         └ 3 = E000H to FCFFH
Xn
─┤├──────  [ MOV │ K※1 │ DA23 ]
                                      ○ 1 to 3 above is held in DA23 specifying
                                         the block used for the microcomputer
                                         program.
                                      ○ Set the program start address inside the
           [ MOV │ K※2 │ DA02 ]         microcomputer program block speci-
                                         fied in DA23.

                                      ○ Holds the address specified in ※2.
              ( F172 )
                                      ○ When OUT F172 turns on, the speci-
                                         fied microcomputer program head ad-
                                         dress is called and executed.

─┤├─ ─
                                      ○ Return destination after the execution
                                        of microcomputer program.
```

POINT

If insertions or deletions are made to the sequence program after the creation of the microcomputer program, the addresses of the microcomputer program will change. Therefore, be sure to read the initial data setting screen and re-set the memory capacity to the sequence program capacity (the microcomputer program capacity excluded), and after completion of the insertion or deletion operation, set the memory to "sequence program + microcomputer program" capacity again.

12.4 Microcomputer Mode Read

Reads hexadecimal data representing the contents of specified program addresses.

MICRO MODE READ

BASIC OPERATION

[OTHER] → [Microcomputer selection] → [RD] → [Address number] → [GO]
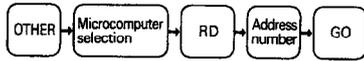
OPERATION PROCEDURE

```
1000  =00 =00 =00 =00 =00 =00 =00 =00 =00 =00 =00 =00 =00 =00 =00 =00

1010  =00 =00 =00

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

[OTHER] → [↓] → [↓] → [↓] → [↓] → [↓]

Microcomputer selection

[GO] → [RD] → [1] → [0] → [0] → [0]

Address to be read

[GO] → [GO]
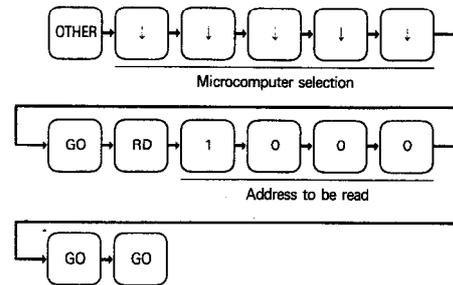
(Example: Read contents of address 1000)

EXPLANATION

(1) By pressing the [OTHER] key, read the "MODE SELECTION" screen, select MICROCOMPUTER, and press the [RD] key. Then, specify the address number to be read and press the [GO] key. Each time the [GO] key is pressed, the contents of the next address number to the specified one is read.

(2) The readable address range is 0000 to 7CFF (step 0 to step 15999). If an address outside of this range is specified, "OPERATOR ERROR" is displayed. In this case, press the [RD] key and set a valid address number.

12.5 Microcomputer Mode Write

Allows machine code programs to be written into the specified memory location.

BASIC OPERATION

OTHER → Microcomputer selection → RD → Address number → GO → WR → Machine language → GO

OPERATION PROCEDURE

1000=30=01

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

OTHER → ↓ → ↓ → ↓ → ↓ → ↓
Microcomputer selection

GO → RD → 1 → 0 → 0 → 0
Address to be read

GO → WR → 3 → 0 → GO → GO
Data to be read
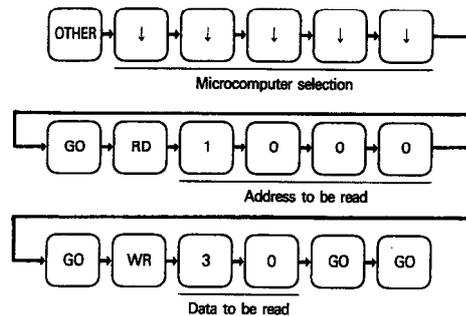
(Example: Write of machine language 30 to address 1000)

EXPLANATION

(1) Specify the address, into which the data is to be written using the read function in microcomputer mode. After the read operation, press the WR key and write the code required.

(2) After pressing the GO key, the display screen shows the next address (specified address + 1) and so the write operation can be performed continuously.

| IMPORTANT |

In microcomputer mode, the read and write operations can be performed for address 0 to 15999. However, since the sequence program is stored in the first half of these addresses, never perform the write operation to the sequence program area as the CPU may act unpredictably.

13. INITIAL DATA READING OR "SOFT RESTART"
Re-read of initial setting data.

BASIC OPERATION

[OTHER] → [↓] → [↓] → [↓] → [↓] → [↓] → [↓] → [GO]

OPERATION PROCEDURE

```
*  MODE SELECTION  *

      COMMENT

      ROM

      PRINTER

      CONVERSION FOR K1, 2 → K3

   ×  CP/M

      MCROCOMPUTER

   ■  INITIAL DATA
```

[OTHER] → [↓] → [↓] → [↓] → [↓] → [↓] → [↓] → [GO]
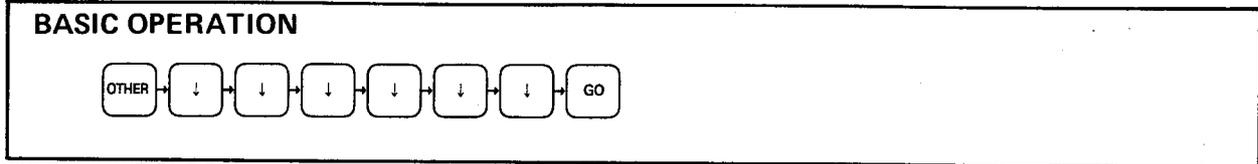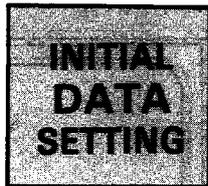
⟨INITIAL DATA SETTING⟩ selection
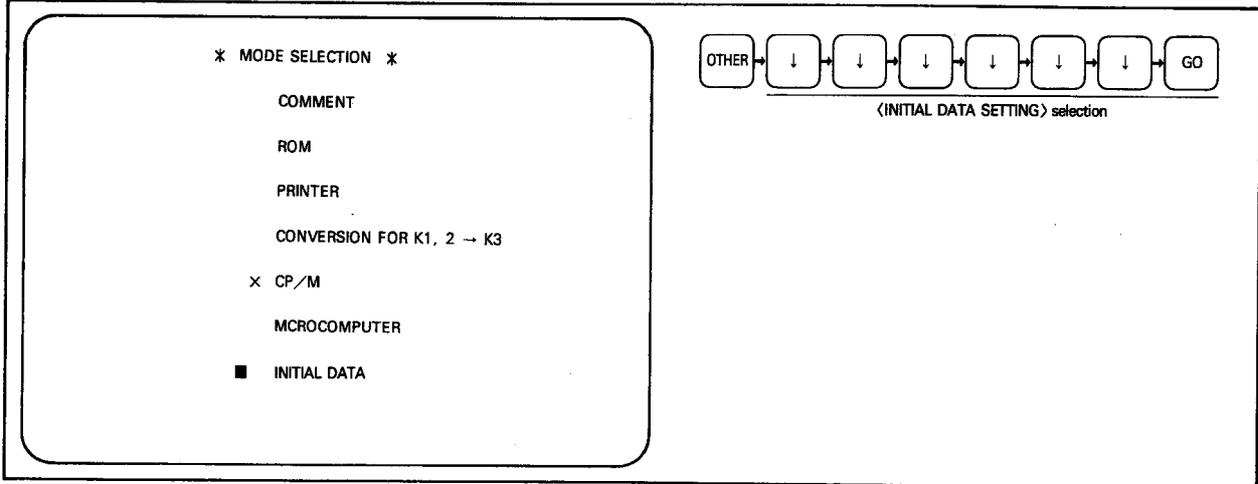
EXPLANATION

(1) The initial data setting screen is displayed when the power of A6GPP is turned on or the reset button is pressed. However, it is possible to read the initial screen again without clearing the contents of the internal memory. This function is useful for changing the PC type during conversions to K3 programs or for changing memory capacity during the creation of programs.

POINT
1) If a program has been written for a K3NCPU and the PC type is then changed using the initial screen, attempting to read a ladder will result in "LADDER ERROR" or "NO END Instruction" being displayed.
2) If a program has been written for a CPU other than K3NCPU and the PC type is then changed using the initial screen, attempting to read a ladder will result in "DEVICE NO. ERROR" being displayed.

(2) The sequence of display screens is as shown below.

```
          ╭──────────────────────────────╮        ╭──────────────────────────────╮
          │                              │        │        * INITIAL DATA *       │
          │      * MODE SELECTION *       │        │ ┌──────────┬──────────────┬────────┐
          │                              │        │ │ PC TYPE  │MEMORY CAPACITY│ PC NO. │
          │         COMMENT              │        │ ├──────────┼──────────────┼────────┤
          │                              │        │ │ K0, K0J1 │     1K       │   1    │
          │         ROM                  │        │ │          │              │        │
          │                              │        │ │ K1       │     2K       │   2    │
          │         PRINTER              │   ⇨    │ │          │              │        │
          │                              │        │ │ K2       │     3K       │   3    │
          │         CONVERSION FOR K1, 2 → K3 │    │ │          │              │        │
          │                              │        │ │K2N,K0J2,K2A│   4K       │        │
          │      x  CP/M                 │        │ │          │              │        │
          │                              │        │ │ K3N      │     8K       │        │
          │         MICROCOMPUTER        │        │ │          │     12K      │        │
          │                              │        │ │          │     16K      │        │
          │      ■  INITIAL DATA         │        │ └──────────┴──────────────┴────────┘
          │                              │        │
          ╰──────────────────────────────╯        ╰──────────────────────────────╯
   [OTHER]→[↓]→[↓]→[↓]→[↓]→[↓]→[↓]→[GO]
```

PC TYPE	MEMORY CAPACITY	PC NO.
K0, K0J1	1K	1
K1	2K	2
K2	3K	3
K2N, K0J2, K2A	4K	
K3N	8K	
	12K	
	16K	

14. TROUBLESHOOTING

14.1 Troubleshooting when Loading the SW1-GPPK

```
                          ┌──────────────────────┐
                          │ Turn on the power.   │
                          │ (Set POWER switch to │
                          │ ON position.)        │
                          └──────────────────────┘
              ①───────────────────┤
                              ╱ Initial ╲      No display
                             ╱ screen display ╲────────────┐
                              ╲             ╱               ╱ Error ╲   No. display
                               ╲         ╱      ╲ message display ╲─────────┐
                                │ Display            ╲         ╱            │
                          ┌──────────────────────┐     (Display)           │
                          │ A6GPP is normal. Start│        │               │
                          │ operation.            │        │               │
                          └──────────────────────┘        │               │
Display in error message column                            │               │
```

BOOT ERROR	NOT READY	NONE SYSTEM ERROR	DISC READ ERROR

| Hardware failure of FDD or A6GPP unit | Insert FD into FDD[A]. | Insert correct FD into FDD[A]. | FD is damaged. |

```
┌──────────────────────┐
│ Set the POWER switch  │
│ to OFF position, and  │
│ while pressing the GO │
│ key, set the POWER    │
│ switch to ON position.│
└──────────────────────┘
```

"1AR" or "2AR" is displayed at top left of screen.	No display	"1AR MITSUBISHI MELSEC A6GPP" is displayed at top left of screen.

Operation fault of FDD 1AR = fault of FDD[A] 2AR = fault of FDD[B]	Failure of A6GPP unit	Fault of inserted FD

```
                                                    ╱ Is POWER LED ╲  On
                                                    ╲   off?      ╱────┐
                                                         │ Off        │
                                                    ╱ Is the power fuse ╲  NO
                                                    ╲    off?         ╱────┐
                                                         │ YES            │
┌──────────────────────┐                                │                │
│ Correctly insert the FD│                              │                │
│ for system start to   │                               │                │
│ FDD [A] or FDD [B].   │                               │                │
└──────────────────────┘                               │                │
┌──────────────────────┐                          ╱ Is line ╲  NO        │
│ Perform reset by the  │                          ╲ voltage 85 to ╲─────┐
│ RESET switch.         │                          ╲  132V AC? ╱         │
└──────────────────────┘                               │ YES            │
          │                                             │               │
          ①                         ┌──────────────┐  ┌──────────────────┐
                                     │ Change fuse. │  │ Adjust the line voltage. │
                                     └──────────────┘  └──────────────────┘
```

```
                                              ┌──────────────────────┐
                                              │ Please forward the de-│
                                              │ tails of fault to the │
                                              │ nearest sales represent-│
                                              │ ative.                │
                                              └──────────────────────┘
```

14.2 Troubleshooting during Communication with Programmable Controller (PC)

Communication error occurrence

Display in error message column

PC COMMUNICA-TION ERROR

WRITE FORBID

WRITE ERROR

PC VERIFY ERROR

MEMORY PROTECT

Power of connected PC is off.

ON

OFF

Turn on the PC power.

The WRITE IN CPU switch of A6GPP is located at FORBID position.

Set the WRITE IN CPU switch to PERMIT position.

When the connected PC is K2H or K2N, the MEMORY PROTECT switch of CPU is located at ON position.

Set the MEMORY PROTECT switch to OFF position.

The memory inside the programmable controller CPU is ROM, or fault of RAM.

Change the ROM to the RAM or change with normal RAM.

The PC name selected on the initial screen does not coincide with the connected PC name.

Select the connected PC name on the initial screen again.

The MEMORY PROTECT switch of K3NCPU is located at ON position.

Set the MEMORY PROTECT switch to OFF position.

Is it the K3NCPU?

NO

YES

Is K6HGPF online?

NO

YES

Set the K6HGPF to online mode.

Is connection cable correct? (AC30R4/AC300R4)

NO

YES

Change to AC30R4 or AC300R4.

Does the status change after the cable is changed with another RS422 cable?

Error [1]

Normal

Fault of connection cable. Change with new cable.

Consult the nearest sales representative.

Perform communication operation again.

14.3 Troubleshooting during FDD Operation

```
┌─────────────────────────┐
│ Error occurrence during FDD │
│ operation               │
└─────────────────────────┘
            │
            ▼
      ╱ Is FDD ACCESS ╲      Off
     ╱  indicator LED   ╲──────────┐
     ╲  turned on?      ╱          │
      ╲                ╱           │
            │ On                   │
            ▼                      │
      ╱    Is           ╲  Display │
     ╱ "FLOPPY ERROR"    ╲─────────┼──────────────────────┐
     ╲ displayed in error ╱        │                      │
      ╲ message column?  ╱         │                      │
            │ No display           │                      │
            ▼                      ▼                      │
                          ┌─────────────────────┐         │
                          │ Check fault according to │    │
                          │ troubleshooting at the start │ │
                          │ of system in Section 14.1 │  │
                          │ and make correction.   │      │
                          └─────────────────────┘         │
      ╱                 ╲   NO                             │
     ╱ Has FD been inserted? ╲──────┐                      │
     ╲                ╱             │                      │
            │ YES                   ▼                      │
            │             ┌─────────────────────┐          │
            │             │ Correctly insert FD into the │  │
            │             │ FDD to be accessed.  │         │
            │             └─────────────────────┘          │
            ▼                                              │
      ╱                 ╲   NO                             │
     ╱ Is the inserted FD ╲──────┐                         │
     ╲ in write forbid mode? ╱    │                        │
            │ YES                 ▼                        │
            │              ╱ Has the correct FDD ╲  NO     │
            │             ╱   been accessed?     ╲─────┐   │
            │             ╲                      ╱      │   │
            │                   │ YES                   ▼   │
            ▼                   │            ┌──────────────┐│
   ┌─────────────────┐         │            │ Select correct FDD. ││
   │ Set the FD to write │     │            └──────────────┘│
   │ permit mode.    │         │                            │
   └─────────────────┘         └────────────────────────────┘
```

┌───┐
│ **POINT**   │
│   │
│ (1) Insert the FD with care and in the right direction. Do not force the │
│   FD into the FDD.   │
│   │
│ (2) If an FD, storing formatted data, is formatted again by mistake, all │
│   data will be cleared. Therefore, caution should be exercised. │
└───┘

14.4 Troubleshooting during ROM Operation

```
                    ┌─────────────────────────┐
                    │ Error occurrence during │
                    │ ROM operation           │
                    └─────────────────────────┘
        ┌──────────────────┬───────────────────────────┐
        ▼                  ▼                            ▼
┌─────────────────┐ ┌─────────────────┐      ┌─────────────────┐
│ Read cannot be  │ │ Verify cannot   │      │ Write cannot be │
│ per-formed.     │ │ be per-formed.  │      │ per-formed.     │
└─────────────────┘ └─────────────────┘      └─────────────────┘
                                                      │
                                                      ▼
                                              ╱ "WRITE ERROR"  ╲   NO
                                             ╱   is displayed in ╲──────┐
                                             ╲   message column. ╱      │
                                              ╲                 ╱       │
                                                  │ YES                 │
                                                  ▼                     │
        ┌──────────────────────────┐                                   │
        ▼                          ▼                                   │
  ╱ Is the ROM correctly ╲  NO   ╱ Is the ROM correctly ╲  NO          │
  ╲ loaded?              ╱─────┐ ╲ loaded?              ╱────┐          │
        │ YES                 │       │ YES               │            │
        ▼                     ▼       ▼                   │            │
  ╱ After changing ╲    ┌──────────────┐                  │            │
  ╱ to another ROM,╲ NO │ Load correctly.                 │            │
  ╲ can read or    ╱────┐└──────────────┘                  │            │
  ╲ verify be      ╱    │                                  │            │
    performed?          │  ╱ After changing ╲  NO          │            │
        │ YES           │  ╱ to another ROM,╲──────┐       │            │
        ▼               │  ╲ can write be   ╱       │       │            │
  ┌──────────────┐      │  ╲ performed?    ╱        │       │            │
  │ Fault of     │      │      │ YES                │       │            │
  │ used ROM     │      │      ▼                    │       │            │
  └──────────────┘      │  ┌──────────────┐         │       │            │
                        │  │ Fault of     │         │       │            │
                        │  │ used ROM     │         │       │            │
                        │  └──────────────┘         ▼       │            │
                        │               ┌──────────────────────┐         │
                        │               │ Perform erasure check│         │
                        │               │ operation.           │         │
                        │               └──────────────────────┘         │
                        │                       │                         │
                        │                       ▼                         │
                        │               ╱ Is "ERASE ERROR" ╲  NO          │
                        │               ╱ displayed in message╲───────────┤
                        │               ╲ column?           ╱             │
                        │                       │ YES                     │
                        │                       ▼                         │
                        │               ┌──────────────────┐              │
                        │               │ Re-erase the used│              │
                        │               │ ROM or change    │              │
                        │               │ with new ROM.    │              │
                        │               └──────────────────┘              │
                        ▼                                                 ▼
              ┌──────────────────────┐                     ┌──────────────────────┐
              │ Consult the nearest  │                     │ Consult the nearest  │
              │ sales representative.│                     │ sales representative.│
              └──────────────────────┘                     └──────────────────────┘
```
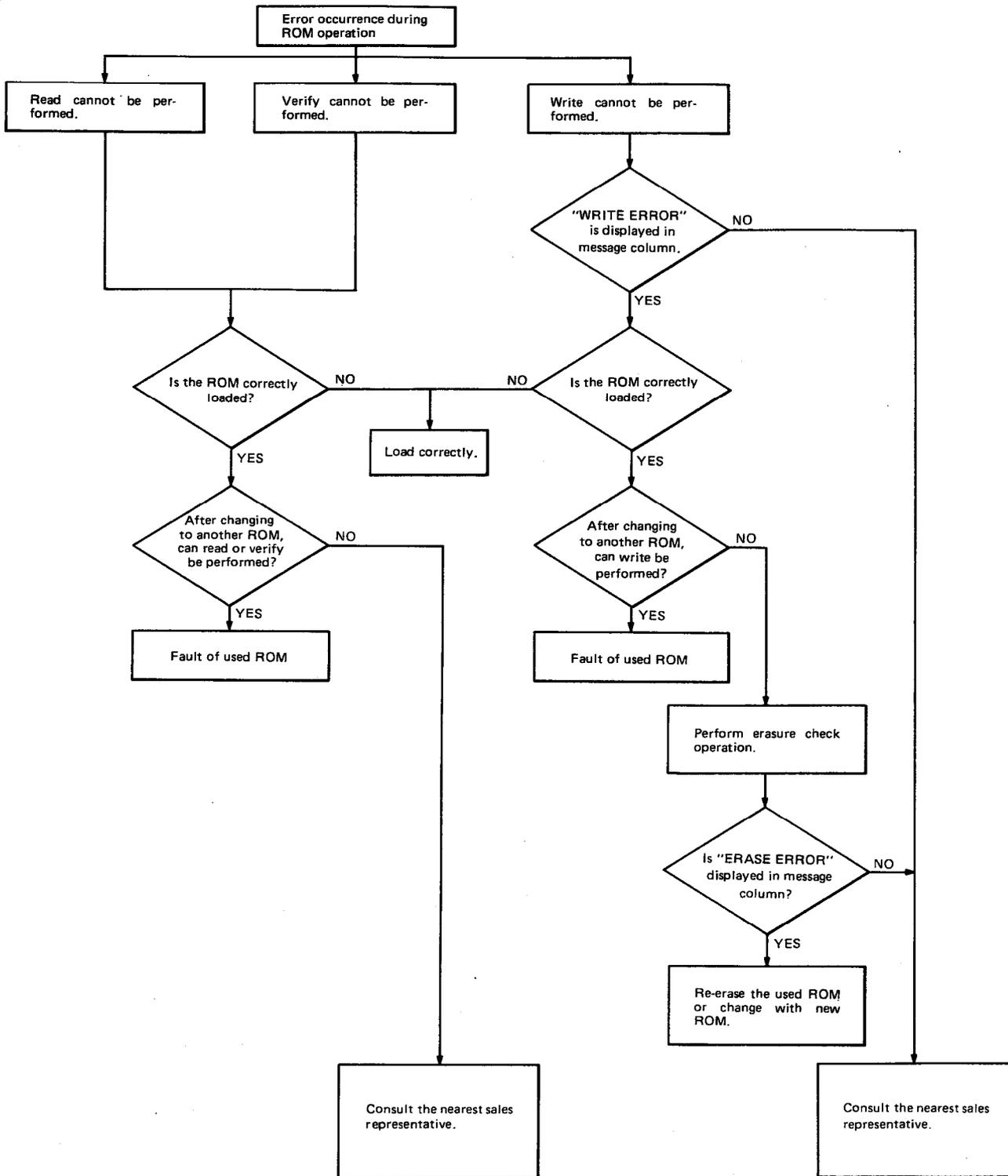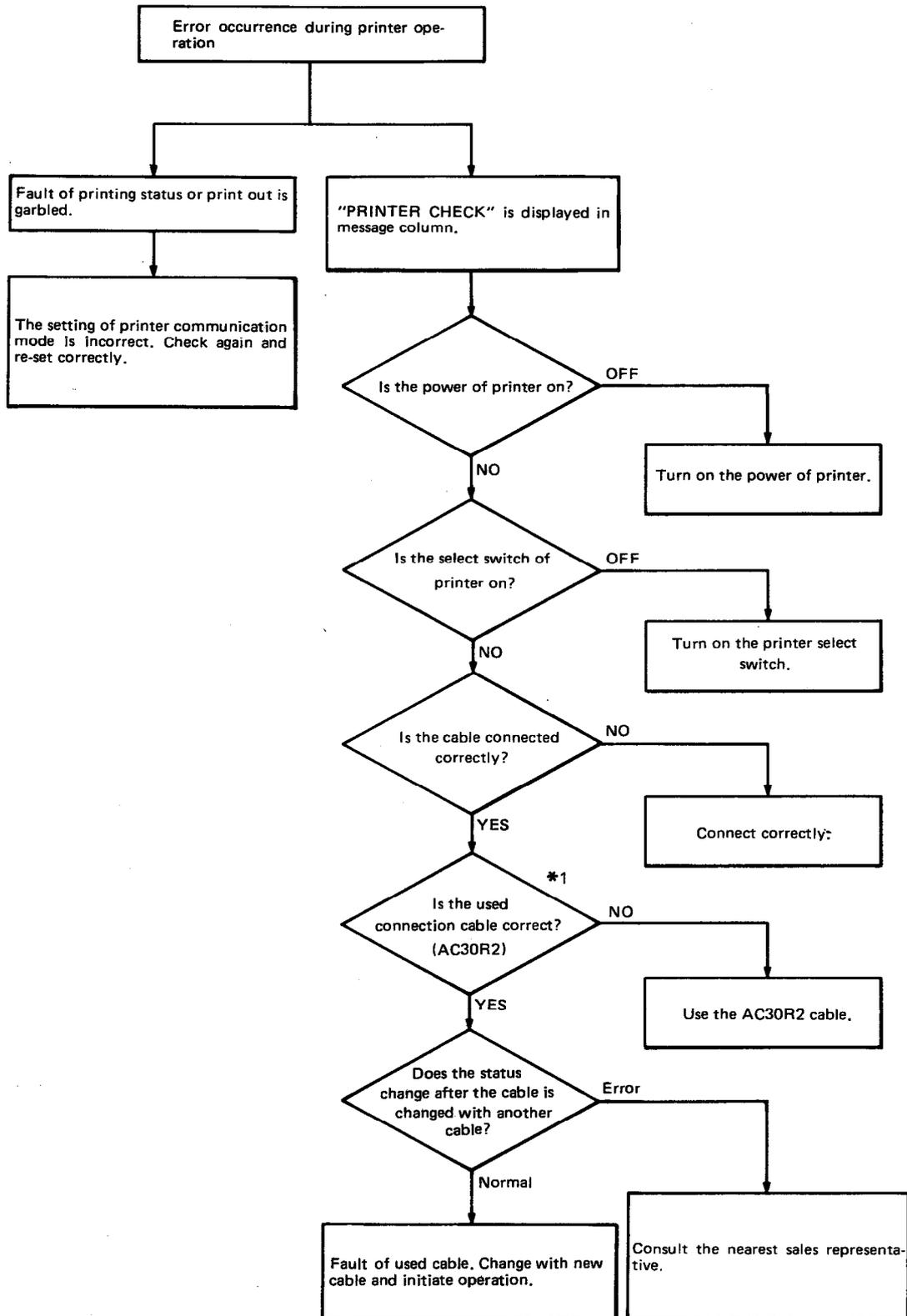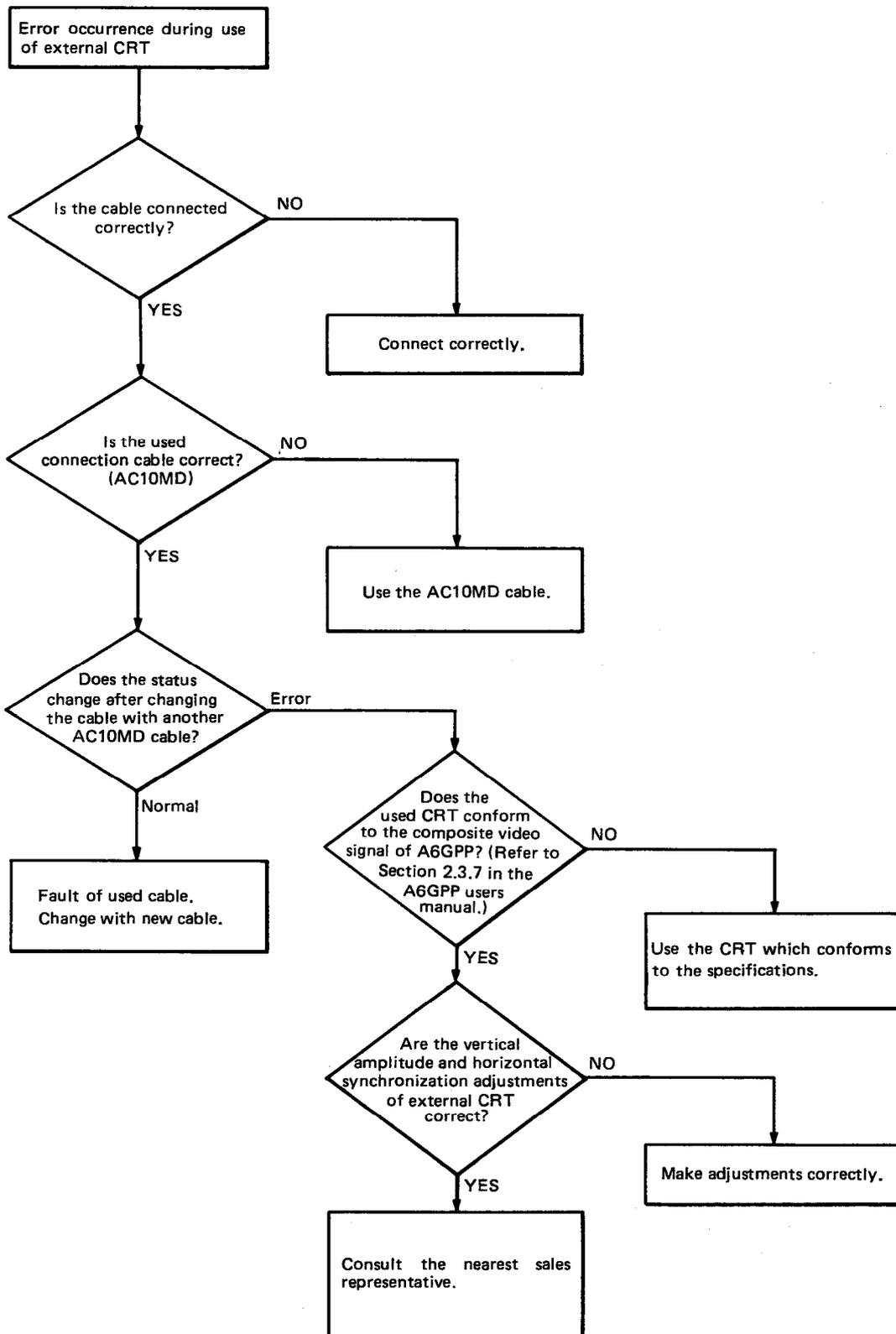
*1: Re-load correctly.
    1) Is the loading direction correct?
    2) Is the ROM securely inserted in the socket?
    3) Is the ROM socket lever correctly set?
    4) Has the ROM been damaged by being incorrectly loaded or used?

14.5 Troubleshooting during Printer Operation

```
                    ┌─────────────────────────────────┐
                    │ Error occurrence during printer ope- │
                    │ ration                           │
                    └─────────────────────────────────┘
                                    │
            ┌───────────────────────┴───────────────────────┐
            │                                                │
┌───────────────────────────┐          ┌───────────────────────────┐
│ Fault of printing status or print out is │          │ "PRINTER CHECK" is displayed in │
│ garbled.                  │          │ message column.           │
└───────────────────────────┘          └───────────────────────────┘
            │                                                │
┌───────────────────────────┐                               │
│ The setting of printer communication │                  ◇ Is the power of printer on? ◇──OFF──┐
│ mode is incorrect. Check again and │                     │                              │
│ re-set correctly.         │                            NO│                     ┌───────────────────────────┐
└───────────────────────────┘                              │                     │ Turn on the power of printer. │
                                                           │                     └───────────────────────────┘
                                          ◇ Is the select switch of ◇──OFF──┐
                                          ◇ printer on?            ◇         │
                                                           │                ┌───────────────────────────┐
                                                         NO│                │ Turn on the printer select │
                                                           │                │ switch.                   │
                                          ◇ Is the cable connected ◇──NO──┐ └───────────────────────────┘
                                          ◇ correctly?            ◇       │
                                                           │             ┌───────────────────────────┐
                                                        YES│             │ Connect correctly.        │
                                                  *1       │             └───────────────────────────┘
                                          ◇ Is the used           ◇──NO──┐
                                          ◇ connection cable correct? ◇   │
                                          ◇ (AC30R2)              ◇       │
                                                           │             ┌───────────────────────────┐
                                                        YES│             │ Use the AC30R2 cable.     │
                                          ◇ Does the status        ◇──Error──┐
                                          ◇ change after the cable is ◇       │
                                          ◇ changed with another   ◇         │
                                          ◇ cable?                ◇          │
                                                           │               ┌───────────────────────────┐
                                                     Normal│               │ Consult the nearest sales representa- │
                                          ┌───────────────────────────┐     │ tive.                     │
                                          │ Fault of used cable. Change with new │   └───────────────────────────┘
                                          │ cable and initiate operation. │
                                          └───────────────────────────┘
```

*1: When a cable selected by user (other than the AC30R2) is used for the general-purpose printer, check the wiring of the cable. (Refer to Section 2.3.4 in the A6GPP user manual.)

14.6 Troubleshooting during Use of External CRT

Error occurrence during use of external CRT

↓

Is the cable connected correctly? — NO → Connect correctly.

↓ YES

Is the used connection cable correct? (AC10MD) — NO → Use the AC10MD cable.

↓ YES

Does the status change after changing the cable with another AC10MD cable? — Error →

↓ Normal

Fault of used cable. Change with new cable.

Does the used CRT conform to the composite video signal of A6GPP? (Refer to Section 2.3.7 in the A6GPP users manual.) — NO → Use the CRT which conforms to the specifications.

↓ YES

Are the vertical amplitude and horizontal synchronization adjustments of external CRT correct? — NO → Make adjustments correctly.

↓ YES

Consult the nearest sales representative.

15. MESSAGE LIST

This chapter describes error messages which are displayed in the message column on the screen. (Error messages displayed at the start of the system are not included see Section 14.1.)

15.1 Error Message List

When the error message is displayed, take corrective action and then proceed to the next operation.

Number	Display	Description	Corrective Action
1	CJ STEP NO. ERROR	The specified jump destination step number is lower than the step number of CJ instruction or it exceeds the memory capacity initially set.	Check the jump destination step number and change accordingly.
2	NO "END" COMMAND	The END instruction is not present in the program.	Select list mode and add the "END" instruction.
3	PC COMMUNICATION ERROR	The PC power is off.	Turn the PC power on.
		The ONLINE switch of K6HGPF is at "OFFLINE" position.	Set to "ONLINE".
		The cable is not connected or is defective.	Check the cable. Re-insert the cable. Check continuity of cable with a circuit tester, etc.
		The programmable controller CPU has been reset during communication.	Repeat the operation.
		RUN LED of programmable controller CPU has flickered during communication.	After correcting the cause of flickering, reset the programmable controller CPU and repeat the operation.
4	PRESS [Y] TO WRITE TO PC WHILE IT IS RUNNING PRESS [N] TO STOP	Write has been performed in PC mode when the programmable controller CPU is in RUN mode.	To execute write, press the "Y" key. To stop write, press the "N" key.
5	OPERATOR ERROR	An invalid key has been used An invalid operation has been attempted.	Use correct key. Check operating procedure.
6	PC SELECTION ERROR	The programmable controller selected on the initial screen is different from the PC connected to the A6GPP.	"Reset" the A6GPP and correct initial setting.
		Comment data has been written to a programmable controller CPU other than K3NCPU(P2).	Comment data can only be written to the K3NCPU.
		The cable or K6HGPF is defective.	Re-connect the cable or K6HGPF. Check continuity of cable with a circuit tester, etc.
		Comment data has been read or verified with a programmable controller CPU other than K3NCPU(P2).	Comment data can only be read from and verified with a K3NCPU(P2).

Number	Display	Description	Corrective Action
7	DEVICE NUMBER ERROR	An invalid device has been specified. The PC number has been set to other than "1" in the initial setting and a device number matching the PC number has not been specified.	Check the device number and perform the operation again.
8	LADDER ERROR	Illogical or incomplete ladder diagram which cannot be converted.	Correct the ladder.
9	LADDER OVERFLOW (OR) LADDER DISPLAYED OVERFLOWS	Conversion of the following circuits has been attempted: Ladder block consists of 23 lines or more. Ladder which has 161 or more serial contacts. Ladder which has eight or more ANB and/or ORB instructions continuously. Ladder which as nine or more LD instructions.	Re-write ladder concerned.
10	WRITE-IN FORBIDDEN	Write has been performed in PC mode when WRITE IN CPU switch of A6GPP is at FORBID position.	Set the WRITE IN CPU switch to PERMIT position.
11	COMMENT MEMORY EXCEEDED	The capacity of the comment memory has been exceeded (2049).	Reduce the comment memory used to 2048 or less.
12	STEP NUMBER ERROR	A step number, which exceeds the memory capacity set in the initial setting, has been specified.	Re-select the initial setting or change the specified step number.
13	PROGRAM TOO LARGE	During ladder conversion, the memory capacity set in the initial setting has been exceeded.	Increase the memory capacity in the initial setting or reduce the number of steps.
14	DATA UNMATCHED	The memory capacity selected at the start is different from the memory capacity of PC.	Re-select memory capacity.
15	PRINTER ERROR (OR) CHECK "PRINTER"	The POWER or SEL switch of printer is at "OFF" position.	Set the POWER or SEL switch to "ON" position.
		The printer has run out of paper.	Load paper.
		The cable is not connected.	Connect the cable.
16	VERIFY ERROR	The contents of A6GPP and those of EP-ROM do not coincide with each other during ROM verify.	Correct non-coinciding program areas.
17	WRITE-IN ERROR	When in PC mode and writing to the programmable controller CPU, the memory for storing the sequence program in the programmable controller CPU is not loaded or the memory capacity is insufficient, or ROM is loaded. When comment data has been written, Type K3MB1 auxiliary memory card is not loaded in the K3NCPU(P2). The ROM is not suitable or wrongly inserted in the socket.	Load the RAM or K3MB1 to the programmable controller CPU. Check ROM.

Number	Display	Description	Corrective Action
18	COMMAND CODE ERROR	An error code, i.e. F device which cannot be converted into sequence instruction, has been used.	Change to normal instruction.
19	COMMAND ERROR	An invalid instruction has been used.	Rewrite the instruction.
20	MEMORY PROTECT	Write has been attempted in PC mode with the MEMORY PROTECT switch of K3NCPU turned on.	Set the MEMORY PROTECT switch to "OFF" position.
21	COIL ALREADY USED	The same coil has been specified twice or more.	Although the same coil can be written twice or more in certain situations, this should be avoided.
22	NOT FOUND	Specified parameter does not exist.	Proceed.
23	CIRCUIT CONTINUATION ERROR	Return fault has occurred during the creation of ladder.	Perform correct returning operation.
24	WRONG KEY FOR COMMENT	A key, which cannot be used for a comment, has been used.	Press a character which can be used for comments.
25	ROM NOT ERASED	The contents of ROM have not been erased.	Erase the contents of ROM or use a new ROM.
26	FLOPPY DISK ERROR	No FD in accessed drive. FD in write forbid state. FD is defective.	Insert FD or access correct drive. Set the write protect tab of FD to "OK" position. Change the FD.
27	SYSTEM NAME ALREADY USED	The same system name already exists on that FD. This may apply to a program name or to a utilized circuit designation. (i.e. S0, S1, S2, etc.)	Press CR key to overwrite on the same system name, or change the system name.
28	FILE MISSING	The specified file name is not on the FD.	Check the file name in the directory.
30	SYSTEM NAME ERROR	Same system name for source and/or destination.	Change the system name of copy destination.
31	TOO LARGE FOR MEMORY CAPACITY	The remaining FD memory capacity is too small to write.	Change to a new FD or delete unnecessary data.
		The set memory capacity is larger than the ROM capacity.	Re-set the memory capacity.

15.2 Message List

Number	Display	Description
1	DELETE 1-CIRCUIT	Indicates that a circuit block is to be deleted.
2	LADDER END	Ladder display has reached the program end.
3	DISPLAY OVERFLOW	A ladder which has a ladder block consisting of 13 or more lines has been read.
4	LADDER DISPLAYED OVERFLOWS	A ladder which has a ladder block consisting of 25 or more lines has been read. (Although a ladder display of 25 lines or more cannot be made, list display can be made.)
5	COMPLETED	Read, write, verify, or ladder conversion operation for PC, ROM, or FD has been completed. Printing is complete.
6	COMPLETED ✗ STEP NOS. CHANGED	Step numbers have changed.
7	PRESS ⟨CNV⟩?	The RD key or mode key has been pressed without making ladder conversion. Press CNV GO to write program to A6GPP internal memory.
8	SELECT READ	Press the RD key for the next operation.
9	EXECUTING	Read, write, verify, or ladder conversion operation for PC, ROM, or FD is being performed.
10	SELECT MODE	Select mode for the next operation.
11	SELECT FUNCTION	Select function for the next operation.
12	ON/OFF	Forced on or off of output Y has been performed in the ladder test.
13	VERIFYING	Verify is being performed.
14	MONITOR STOP	Trigger stop has been effected or the CLEAR key has been pressed during ladder monitor.
15	EXECUTING ✗ PRESS ⟨CR⟩ TO STOP	Printing, device used list display, or contact and coil list display is being performed.
16	STOP ✗ PRESS ⟨GO⟩ TO RESTART PRESS ⟨END⟩ ⟨GO⟩ TO END	The CLEAR key has been pressed during printing, device used list display, or contact and coil list display.

15.3 Error Messages and Messages Printed on Print Paper

One of the following error messages may be printed. When the error message has been printed, check the error contents and correct.

Error Message	Description	Corrective Action
ILLOGICAL DIAGRAM	Printing of illogical program has been performed in ladder mode.	Correct the illogical portion.
INSTRUCTION CODE ERROR	The sequence instructions have not been converted to normal internal code (during conversion).	Correct errors.
MISSING END INSTRUCTION	END instruction has been omitted.	Check the step number of END instruction. Write END at the last step of program.
NOT FOUND	The program is not in the internal memory or there is END instruction at step 0.	Create a correct program.
DEVICE OVER	If the device specified in cross ref. appears more than 500 times, this message appears.	This is not an error. However, the step number for contact of 500th device or devices with higher numbers cannot be printed.
DEVICE NO. ERROR	The PC type set during the creation of program is different from the PC type set for printing.	Check the PC type and correct.

Message	Description
LADDER END	Printing of the last ladder block is complete (printed at the bottom left of print paper).
LADDER CONTINUES	When one ladder block extends over two or more pages, the message is printed at the bottom left of print paper.

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APPENDICES

APPENDIX 1   Illogical Ladder Examples

The following circuits are illogical.

Incorrect Ladder ⇨	Correct Ladder
(1)Ladder which has no contact in front of data instruction.	
	M100 is unused dummy M.
(2)Ladder which has a branch coil in front of contact.	
(3)Ladder which includes "OR".	
(4)"Sneak" path	
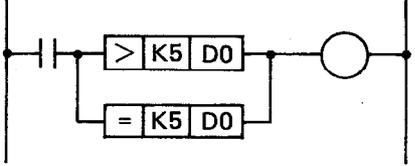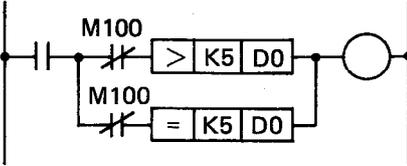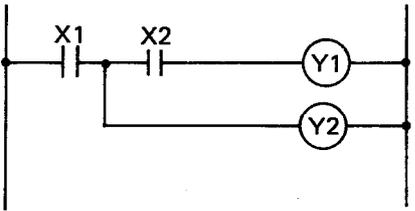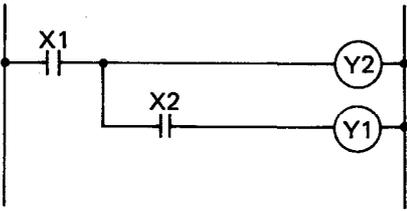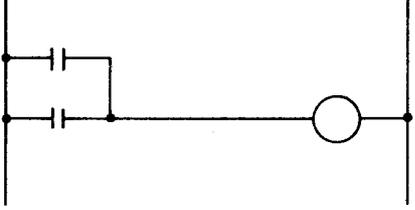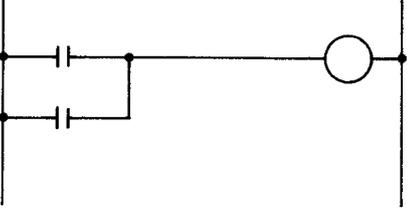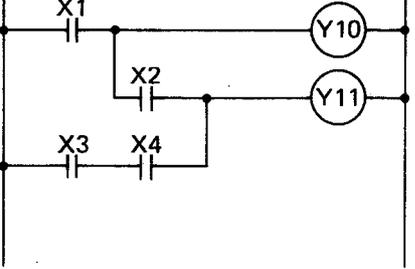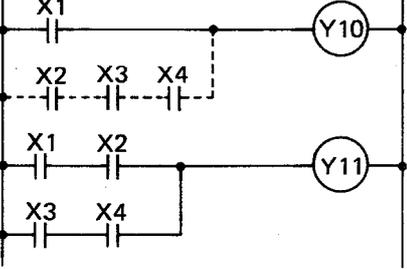
| Incorrect Ladder ⇨	Correct Ladder
(5) Ladder which has improperly located return numbers	
(6) Correction of return number setting.	
(7) In the following ladder, X1 is ignored.	
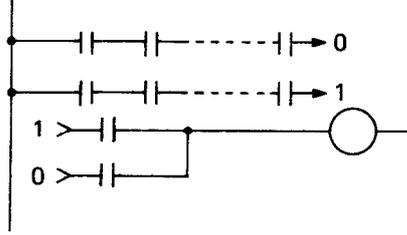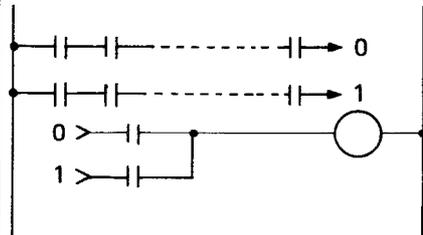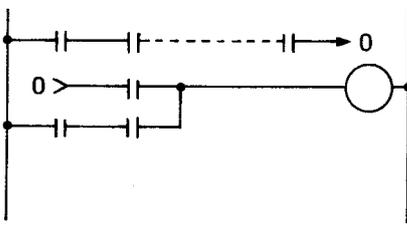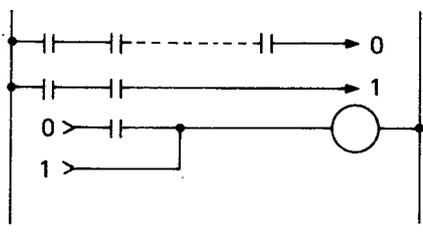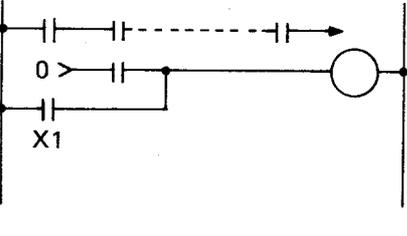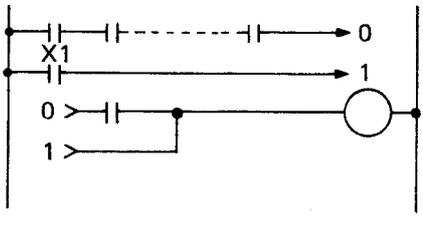
(8)

1)
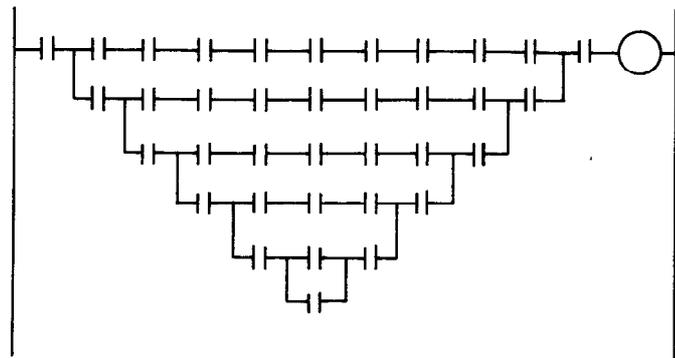
2)
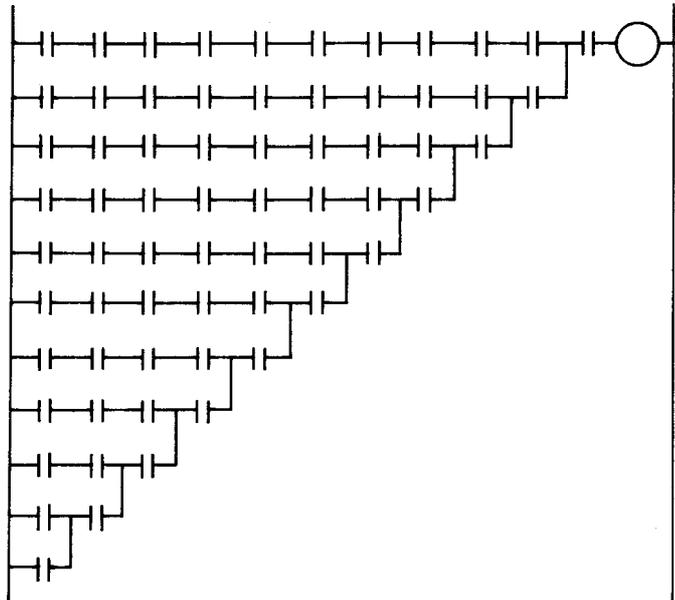
The above circuits would contain more than 8 ANB or ORB instructions; this is invalid and must be corrected using auxiliary elements to split up the ladder.
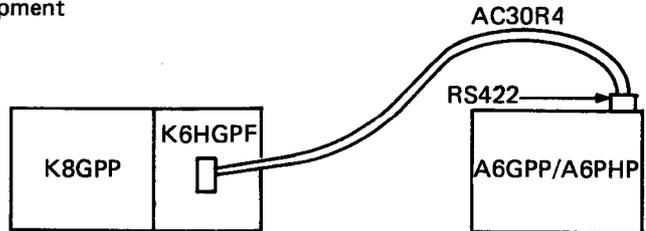
3)

Display after conversion   Display by   RD
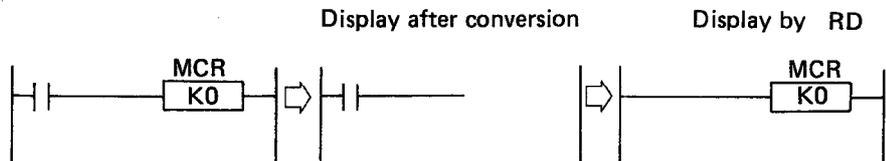
As MCR instructions are omitted during the conversion process, do not proceed them with a contact.

APPENDIX 2 Reading Data from K8GPP to GPP/PHP

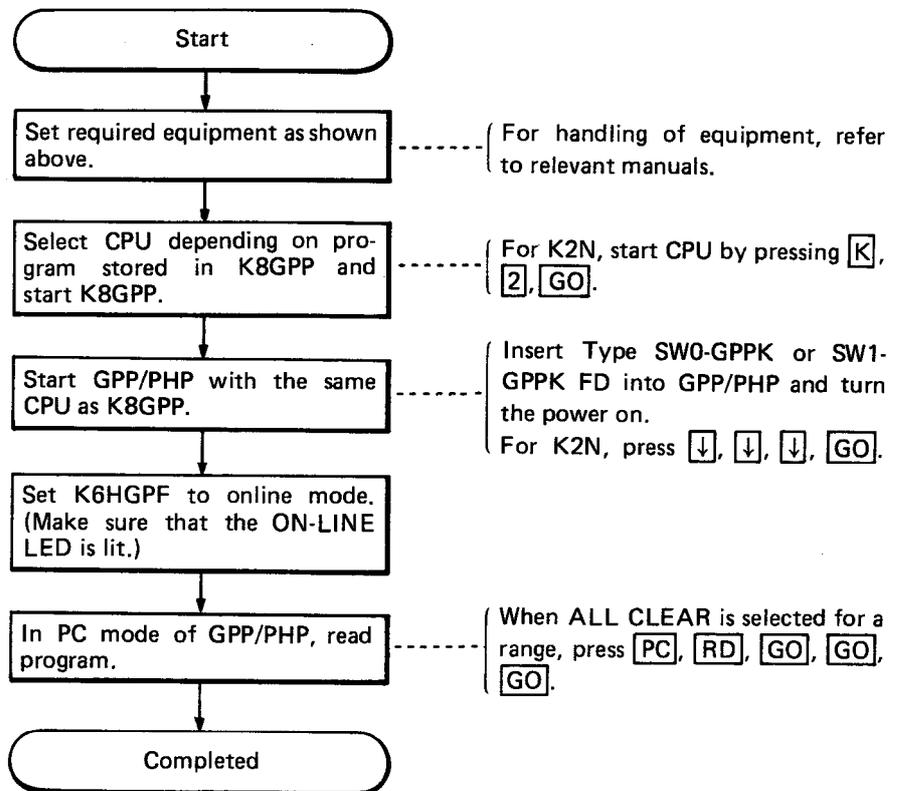Read programs and comments stored in K8GPP to the internal memory of GPP/PHP as described below.
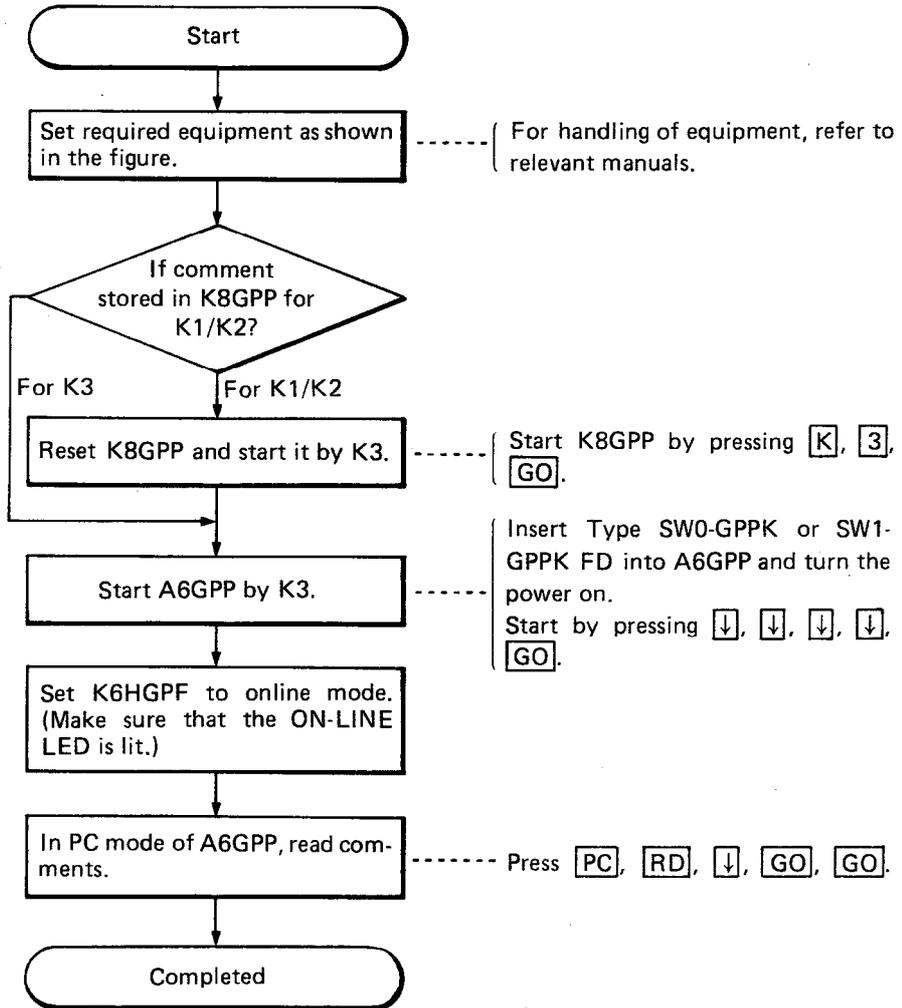
(1) Required equipment

1) K8GPP
2) A6GPP
3) K6HGPF
4) AC30R4

```
              K6HGPF                    AC30R4
                                 RS422
 K8GPP         □                        A6GPP/A6PHP
```

(2) To read programs stored in K8GPP to the internal memory of GPP/PHP

```
              ┌──────────────────────┐
              │        Start         │
              └──────────────────────┘
                         │
  ┌────────────────────────────────────┐
  │ Set required equipment as shown    │------  ⎰ For handling of equipment, refer
  │ above.                             │        ⎱ to relevant manuals.
  └────────────────────────────────────┘
                         │
  ┌────────────────────────────────────┐
  │ Select CPU depending on pro-       │------  ⎰ For K2N, start CPU by pressing Ⓚ,
  │ gram stored in K8GPP and           │        ⎱ ②, GO.
  │ start K8GPP.                       │
  └────────────────────────────────────┘
                         │
  ┌────────────────────────────────────┐        ⎧ Insert Type SW0-GPPK or SW1-
  │ Start GPP/PHP with the same        │------  ⎪ GPPK FD into GPP/PHP and turn
  │ CPU as K8GPP.                      │        ⎨ the power on.
  └────────────────────────────────────┘        ⎩ For K2N, press ↓, ↓, ↓, GO.
                         │
  ┌────────────────────────────────────┐
  │ Set K6HGPF to online mode.         │
  │ (Make sure that the ON-LINE        │
  │ LED is lit.)                       │
  └────────────────────────────────────┘
                         │
  ┌────────────────────────────────────┐        ⎧ When ALL CLEAR is selected for a
  │ In PC mode of GPP/PHP, read        │------  ⎨ range, press PC, RD, GO, GO,
  │ program.                           │        ⎩ GO.
  └────────────────────────────────────┘
                         │
              ┌──────────────────────┐
              │      Completed       │
              └──────────────────────┘
```

(3) To read comments stored in K8GPP to the internal memory of A6GPP

```
        ┌─────────────────────────────┐
        │            Start            │
        └─────────────────────────────┘
                      │
        ┌─────────────────────────────┐        ┌ For handling of equipment, refer to
        │ Set required equipment as shown│ ------ ┤
        │ in the figure.              │        └ relevant manuals.
        └─────────────────────────────┘
                      │
                ╱──────────────╲
               ╱  If comment     ╲
              ╱  stored in K8GPP for ╲
               ╲    K1/K2?       ╱
                ╲──────────────╱
    For K3 │        │ For K1/K2
           │        │
           │  ┌─────────────────────────────┐        ┌ Start K8GPP by pressing [K], [3],
           │  │ Reset K8GPP and start it by K3.│ ------ ┤
           │  └─────────────────────────────┘        └ [GO].
           │        │
           └────────┤
                    │                                  ┌ Insert Type SW0-GPPK or SW1-
        ┌─────────────────────────────┐               │ GPPK FD into A6GPP and turn the
        │     Start A6GPP by K3.       │ ------        ┤ power on.
        └─────────────────────────────┘               │ Start by pressing [↓], [↓], [↓], [↓],
                      │                                 └ [GO].
        ┌─────────────────────────────┐
        │ Set K6HGPF to online mode.  │
        │ (Make sure that the ON-LINE │
        │ LED is lit.)                │
        └─────────────────────────────┘
                      │
        ┌─────────────────────────────┐
        │ In PC mode of A6GPP, read com-│ ------- Press [PC], [RD], [↓], [GO], [GO].
        │ ments.                      │
        └─────────────────────────────┘
                      │
        ┌─────────────────────────────┐
        │          Completed          │
        └─────────────────────────────┘
```

REMARKS

Data other than programs and comments (file register and device memory) cannot be read.
(If such data is read, "OPERATOR ERROR" is displayed.)

APPENDIX 3 Comparison of Functions between A6GPP (SW1-GPPK) and K8GPP

Item	K8GPP	A6GPP
ROM mode	The ROM mode functions are not provided. For the storage of internal program to ROM, K6WU or K6PRT is required.	The ROM socket is standard. Read, write, verify, and erase check functions are incorporated.
Printer mode	The printer mode functions are not provided. For printing, K6PRF or K6PRT is required.	The RS232C interface is standard and direct connection to the printer is possible without the interface unit. Built-in functions • Ladder print • Ladder print with comment • Ladder print with step number for contact (only A6GPP) • Command list print • Command list print with comment (only A6GPP) • Device used list print • Contact and coil list print (with T/C setting value) (only A6GPP) • Comment list print • Plural print (only A6GPP) • Print starting page specification (only A6GPP) • Print starting position specification (only A6GPP)
FDD mode	The FDD mode function are not provided.	Two FDDs are standard-equipped. Built-in functions • Directory • Read from FD • Write to FD • Verify with FD • File deletion • File copy • Formatting • Automatic write
PC mode	Built-in fuctions RD — Read of sequence program / Read of comment data WR — Write of sequence program / Write of comment data VER — Verify of sequence program / Verify of comment data TEST — Forced output / Forced set, reset / Present value change / Display of error step number	Built-in functions RD — Read of sequence program / Read of comment data / Read of device memory data WR — Write of sequence program / Write of comment data / Write of device memory data VER — Verify of sequence program / Verify of comment data / Verify of device memory data TEST — Forced output / Forced set, reset / Present value change / Display of error step number

Item	K8GPP	A6GPP
List mode	Built-in functions RD ┤ ┌ Read by step number ├ Read by I/O number ├ Read by instruction ├ Display of device used list └ Display of contact and coil list WR ┤ ┌ Memory clear └ New/correction INS ── Insertion by instruction DEL ┤ ┌ Deletion per instruction └ Batch NOP deletion	Built-in functions RD ┤ ┌ Read by step number ├ Read by I/O number ├ Read by instruction ├ Display of device used list ├ Display of contact and coil list └ Display of command list with comments WR ┤ ┌ Memory clear └ New/correction INS ── Insertion by instruction DEL ┤ ┌ Deletion per instruction └ Batch NOP deletion MNT (Test) ┤ ┌ Batch list monitor └ Display of device memory contents in GPP CNV ┤ ┌ Batch device conversion └ Batch "N/O" "N/C" contact conversion
Ladder mode	Built-in functions RD ┤ ┌ Read by step number ├ Read by I/O number ├ Read by contact or coil number ├ Read by instruction ├ Read by the last ladder block ├ Read of preceding ladder block and succeeding ladder block ├ Read of upper and lower ladder blocks outside the range of screen display └ Display of circuit with comment WR ┤ ┌ Creation of new ladder ├ Correction of existing ladder ├ Insertion/addition of ladder block └ Circuit utilization INS ── Insertion in units of ladder symbols DEL ┤ ┌ Deletion of one ladder block └ Deletion in units of ladder symbols MNT ┤ ┌ Ladder monitor by step number ├ Ladder monitor by I/O number ├ Ladder monitor by contact or coil number ├ Ladder monitor by instruction search ├ Last ladder block monitor by END instruction ├ Ladder monitor of preceding ladder block and succeeding ladder block ├ Ladder monitor with comment └ Monitor screen stop TEST (Monitor) ┤ ┌ Step run for K3CPU ├ Forced output ├ Forced set, reset └ Present value change	Built-in functions RD ┤ ┌ Read by step number ├ Read by I/O number ├ Read by contact or coil number ├ Read by instruction ├ Read by the last ladder block ├ Read of preceding ladder block and succeeding ladder block ├ Read of upper and lower ladder blocks outside the range of screen display └ Display of ladder with comment WR ┤ ┌ Creation of new ladder ├ Correction of existing ladder ├ Insertion/addition of ladder block (Addition to the front of ladder possible) └ Ladder utilization INS ── Insertion in units of ladder symbols DEL ┤ ┌ Deletion of one ladder block └ Deletion in units of ladder symbols MNT ┤ ┌ Ladder monitor by step number ├ Ladder monitor by I/O number ├ Ladder monitor by contact or coil number ├ Ladder monitor by instruction search ├ Last ladder block monitor by END instruction ├ Ladder monitor of preceding ladder block and succeeding ladder block ├ Ladder monitor with comment ├ Monitor screen stop ├ Entry monitor └ Monitor of present value of data register, timer and counter in hexadecimal

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Item	K8GPP	A6GPP
Ladder mode		┌ Step run for K3NCPU TEST ┤ Forced output (Monitor) ┤ Forced set, reset └ Present value change
Parameter mode	The parameter mode functions are not provided. The automatic verify of sequence program is always performed before ladder monitor operation.	The parameter mode functions are incorporated. The execution or non-execution of automatic verify can be selected before ladder monitor operation.
CRT display	Ladder read: 11 lines List read: 20 lines	Ladder read: 12 lines List read: 23 lines
External CRT display	The external CRT display function is not provided.	Composite video interface is standard. An external CRT can be connected.
CRT	9 inches	7 inches
Internal memory	32K bytes. Backed up by battery.	960K bytes. No battery backup. Remarks: Save to FD is required.
Key depression	Continuous depression of the same key cannot be made.	Continuous depression of the same key can be made.
Operating ambient temperature	0°C to 65°C	10°C to 45°C
Storage ambient temperature	−10°C to 65°C	−10°C to 45°C

APPENDIX 4 Processing Time List

This chapter describes the processing time of programmable controller CPU, FD, ROM, and printer, for operations with the GPP/PHP.

4.1 Programmable Controller CPU

Memory Capacity	Processing Time (Second)		
	Read	Write	Verify
2K bytes	6	12	6
4K bytes	10	25	12
8K bytes	20	44	23
16K bytes	40	69	45
32K bytes	79	109	83

4.2 Floppy Disk

Memory Capacity	Processing Time (Second)				
	Read	Write	Verify	Copy	Format
2K bytes	1	3	7	11	
4K bytes	2	4	16	12	
8K bytes	3	5	33	14	67
16K bytes	4	7	65	18	
32K bytes	5	10	130	24	

(The processing time in the above table applies also to the "automatic write to FD" function in the FDD mode.)

4.3 ROM

Memory Capacity (Type)	Processing Time (Second)		
	Read	Write	Verify
2K bytes (2716)	0.05	99	0.05
4K bytes (2732)	0.1	198	0.1
8K bytes (2764)	0.2	43	0.2
16 bytes (27128)	0.6	85	0.6
32K bytes (27256)	1.5	133	1.5

(Since high-speed write can be performed for ROM types 2764, 27128, and 27256, write time is shorter than the above in regards to the above indicated ROM types.)

4.4 Printer

Processing Mode		Processing Time (Second)
Circuit	Pica	3/line
	Elite	5/line
List	Pica	47/page
	Elite	63/page

(By use of K6PRE printer)

APPENDIX 5 Printer Output Codes

1. Printer Output Codes

The codes of alphanumeric characters output from the GPP/PHP to the printer conform to the $*_1$ JIS code specifications (excluding the GT-10A).

HEX

Col-umn\Line	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0			SP	0	@	P	`	p			SP	—				
1			!	1	A	Q	a	q			○					
2			"	2	B	R	b	r								
3			#	3	C	S	c	s								
4			$	4	D	T	d	t								
5			%	5	E	U	e	u								
6			&	6	F	V	f	v								
7			'	7	G	W	g	w								
8	BS		(	8	H	X	h	x								
9	HT		)	9	I	Y	i	y								
A	LF		*	:	J	Z	j	z								
B		ESC	+	;	K	[	k	{								
C			,	<	L	¥	l										
D	CR		—	=	M	]	m	}								
E	SO		○	>	N	^	n	—								
F	SI		/	?	O	_	o	DEL								

JIS Code Specifications

For required symbols, such as contacts and coils, the following codes are output.

Display of A6GPP	Output Code to Printer (Hexadecimal)	
	K6PRE	**K6PRE general-purpose printer**
⊣ ⊢	80, 81	5D, 5B
⊣/⊢	82, 83	5D, 2F, 5B
⊣( )⊢	84, 85	28, 29
⊣[ ]⊢	86, 87	5B, 5D
(horizontal line)	99	2D
(vertical line)	9A	7C
⟶	9E	2D, 3E

*1 : JIS : Japanese Industrial Standard

2. GT-10A Printer Output Codes

Codes output from the GPP/PHP to the GT-10A are as indicated in the following table.

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	⚌	P	SP	0			▨ ▪		NUL		!	←	SP	p	⌐	⌐
1	A	Q	⊣	1			◪				#		a	q	L	SP
2	B	R	⊢	2			◀			DC2	$	SP	b	r	⌐	SP
3	C	S	⊐	3			▶				%	SP	c	s	⌐	SP
4	D	T	⊨	4			▨			DC4	&	SP	d	t	⌐	SP
5	E	U	⊏	5			▪				(	SP	e	u	L	SP
6	F	V	⊃	6							)	SP	f	v		SP
7	G	W	⊏	7			▪		BEL		*	SP	g	w		SP
8	H	X	⊏	8					BS		~	SP	h	x		SP
9	I	Y	⊐	9							/	SP	i	y	⊤	SP
A	J	Z	⊐	⊢					LF		⟨	SP	j	z	⊥	SP
B	K	¹	+	⌐					VT	ESC	⟩	SP	k	{	⎯	SP
C	L	⎮ ▪	⎯	⌐					FF		=	SP	l	⎮	▪	SP
D	M	⎮	⎯	⊨					CR		:	SP	m	}	⊣	SP
E	N	▪ ▪	⊨						SO		;	SP	n	SP	⎮	SP
F	O	▪⎯ ⎮	?	□					SI		→	SP	o	SP	⎮	SP

GT-10A Code Specifications

REMARKS

In the above table, the "shaded" codes cannot be used when the GT-10A (old) is employed. Among symbols printed by the GT-10A (old), the symbols shown in the following table are different from those of the GT-10A (new).

GT-10A (NEW)	GT-10A (OLD)
*	X
/	l
>	]
<	[
→ ⟩⎯	▮⎯

REMARKS

To identify the GT-10A (old) and the GT-10A (new), check the name plate located at the rear of GT-10A printer. "GT-10A" is indicated on the name plate of old type GT-10A. "GT-10A 1" is indicated on the name plate of new type.

APPENDIX 6 PC Availably

O indicates that these K-series models may be available in the following countries.

	MODEL	COUNTRY	JAPAN	U.S.A	U.K	EUROPE	AUSTRALIA	TAIWAN	KOREA
CPU		K0CPU	O			O	O		
		K0J1CPU	O						
		K0J1HCPU	O						
		K0J2CPU	O	O	O	O	O	O	O
		K0J2PCPU	O	O	O	O	O	O	O
		K1CPU	O						
		K1CPU-S1	O						
		K2CPU	O						
		K2CPU-S1	O						
		K2CPU-S2	O						
		K2CPU-S3	O	O	O	O	O	O	O
		K2HCPU	O	O	O	O	O	O	O
		K2NCPU	O	O	O	O	O	O	O
		K2ACPU	O						
		K3NCPU	O	O	O	O	O	O	O
		K3NCPUP2	O	O	O	O	O	O	O
I/F	K6HGPF	K6HGPFE	O	O	O	O	O	O	O
		K6HGPF	O						
CBL	AC30R4		O	O	O	O	O	O	O
GPP	A6GPP	A6GPPE	O	O	O	O	O	O	O
		A6GPP	O						
FD		SW1-GPPKEE	O	O	O		O	O	O
		SW1-GPPKEG				O			
		SW0-GPPU	O	O	O	O	O	O	O
		SW0-FDC	O	O	O	O	O	O	O

MODEL		COUNTRY	JAPAN	U.S.A	U.K	EUROPE	AUSTRALIA	TAIWAN	KOREA
ROM		1KROM	O	O	O	O	O	O	O
		2KROM	O	O	O	O	O	O	O
		4KROM	O	O	O	O	O	O	O
		8KROM	O	O	O	O	O	O	O
		16KROM	O	O	O	O	O	O	O
CBL		AC30R2	O	O	O	O	O	O	O
PRINTER	K6PR	K6PRE	O	O	O	O	O	O	O
		K6PR	O						
		K6PR-K	O						
	K7PR	K7PRE	O	O	O	O	O	O	O
		K7PR	O						
		A7PR	O						
		GT-10A (OLD)	O		O	O			
		GT-10A (NEW)	O		O	O			
CBL		AC10MD	O	O	O	O	O	O	O

APPENDIX 7 Quick Reference Summary

Mode	Function Selection	Function	Basic Operation
LDR or CIRCUIT	Write	Creation of new circuit	[LDR]→[WR]→[NOP]→[GO]→[Command input]→[CNV]→[GO]
		Correction of existing circut	[Circuit read operation]→[WR]→[·]→[Command input operation]→[CNV]→[GO] (with branch keys ·, ·, →, ←)
		Insertion/addition of circuit block	[Circuit read operation]→[WR]→[+/−]→[GO]→[Command input operation]→[CNV]→[GO]
	Read	Circuit read by step number	[LDR]→[RD]→[SSN]→[Step number]→[GO]
		Circuit read by contact or coil number	[LDR]→[RD]→[Circuit symbol key]→[Device]→[Device number]→[GO]
		Circuit read by I/O number	[LDR]→[RD]→[Device]→[Device number]→[GO]
		Circuit read by instruction	[LDR]→[RD]→[Circuit symbol key]→[Command key]→[Device]→[Device number]→[GO]
		The last circuit read by END instruction	[LDR]→[RD]→[END]→[GO]
		Display of circuit with comment	[Circuit read operation]→[VER/COM]
	Insertion	Insertion/addition of circuit symbols	[Circuit read operation]→[INS]→[↑/↓/→/←]→[Command input operation]→[CNV]→[GO]
	Deletion	Deletion of circuit block	[Circuit read operation]→[DEL]→[○]→[GO]
		Deletion of circuit symbols	[Circuit read operation]→[DEL]→[↑/↓/→/←]→[GO]→[Circuit write operation]→[CNV]→[GO]

○ : Must be (or recommended to be) selected to perform this operation.
△ : Not applicable to the function concerned.
✕ : PC communication modes, care must be taken not to accidently change the pc program.

Mode	Function Selection	Function	Basic Operation
LDR or **CIRCUIT**	Conversion	**Entry of utilized circuit**	[Ladder read operation] → WR → CNV → S → Circuit pattern number n ... [Ladder write operation] ... → N → D → GO
	Write	**Utilization of entered circuit**	[Ladder read operation] → WR → + / − → L → Circuit pattern number n → GO ; [Device, device number key depression] → CNV → GO
	Monitor	**Circuit monitor**	LDR → MNT → { Circuit read by step number / Circuit read by contact or coil number / Circuit read by I/O number / Circuit read by instruction / The last circuit read by END instruction / Read of circuit with comment } → GO ⇢ GO
		Stop of monitor screen	[Circuit monitor operation] → CR
		Screen stop by monitor stop point setting	[Circuit monitor operation] → SSN → { 1 / 0 } → Monitor stop point → GO → MNT
		Entry monitor	[Circuit monitor operation] → ─── (Vertical line) → [Entered device] → GO
		Decimal-hexadecimal present value monitor	[Circuit monitor operation] → [Entry monitor operation] → H → GO

O : Must be (or recommended to be) selected to perform this operation.
△ : Not applicable to the function concerned.
✕ : PC communication modes, care must be taken not to accidently change the pc program.

Mode	Function Selection	Function	Basic Operation
CIRCUIT	Monitor	Forced output to programmable controller CPU	[Circuit monitor operation] → TEST → (Device number of Y) → GO ; SET → (Device number of M or F) ; RST → (Device number of M, F, T, C, or D) ; (Device number of T, C, or D) → SP → (Changed value)
CIRCUIT	Monitor	Step run of K3NCPU	[Circuit monitor operation] → TEST → G → (Stop step number) → SP → (Loop count) → GO → GO → GO →
LIST	Write	All clear of memory (Continuous write of NOP)	LST → WR → SSN → (Step number) → GO → NOP → K → (Step number) → GO
LIST	Write	Write of program list	LST → WR → SSN → (Step number) → GO → [Command input operation]
LIST	Read	List read by step number	LST → RD → SSN → (Step number) → GO
LIST	Read	List read by device	LST → RD → Device → (Device number) → GO
LIST	Read	List read by command	LST → RD → Command → Device → (Device number) → GO
LIST	Read	Read of list with comment	[List read operation] → VER/COM
LIST	Read	Display of device used list	LST → RD → ⊣○⊢ / ⊣ ⊢ → Device → (Device number) → GO

O : Must be (or recommended to be) selected to perform this operation.
Δ : Not applicable to the function concerned.
X : PC communication modes, care must be taken not to accidently change the pc program.

Mode	Function Selection	Function	Basic Operation
LST or LIST	Read	Display of contact, coil list	LST → RD → ⊣⊢ / ⊣／⊢ → Device → Device number → GO
		Display of T/C setting value list	LST → RD → ⊶ / ⊏⊐ → T / C → SP → K → GO
	Insertion	Insertion of program list	LST → INS → SSN → Step number → GO → [Command input operation]
	Deletion	Deletion of program list	LST → DEL → SSN → Step number → GO → GO
	Conversion	Batch conversion of devices	LST → CNV → Device → Device number → SP → Device → Device number → SP → K / H → Quantity → GO
		Batch conversion of "N/O" and "N/C" contacts	LST → CNV → ↓ → Device → Device number → GO
	Monitor	Batch monitor of device	LST → MNT → Device → Device number → GO
	Test	Display of device memory contents in GPP	LST → TEST → Device → Device number → GO
PC	Write	Write to programmable controller	PC → WR → [Menu selection operation]

O : Must be (or recommended to be) selected to perform this operation.
△ : Not applicable to the function concerned.
✕ : PC communication modes, care must be taken not to accidently change the pc program.

Mode	Function Selection	Function	Basic Operation
PC	Read	Read from programmable controller	PC → RD → [Menu selection operation]
PC	Verify	Verify with programmable controller memory contents	PC → VER/COM → [Menu selection operation]
PC	Test	Test to programmable controller	PC → TEST → ... Device number of Y → (Forced output); SET → Device number of M or F → (Forced set); RST → Device number of M, F, T, C, or D → (Forced reset); Device number of T or C → SP → Changed value → (Present value change); [Error step detection] → GO
FDD	Directory	Directory	FDD → CR → [Specified file name] → CR
FDD	Read	Read from FD	FDD → ↓ → CR → [System name specification] → CR → [Memory area selection] → CR → CR
FDD	Write	Write to FD	FDD → ↓ → ↓ → CR → [System name specification] → CR → [Memory area selection] → CR → CR → CR
FDD	Verify	Verify with FD	FDD → ↓ → ↓ → ↓ → CR → [System name specification] → CR → [Memory area selection] → CR → CR → CR
FDD	Deletion	Deletion of file on FD	FDD → ↓ → ↓ → ↓ → ↓ → CR → [File name specification] → CR
FDD	Copy	File copy	FDD → ↓ → ↓ → ↓ → ↓ → ↓ → CR → [Copy source system name specification] → CR → [Copy destination system name specification] → CR
FDD	Format	Formatting of FD	FDD → ↓ → ↓ → ↓ → ↓ → ↓ → ↓ → CR → CR → CR → CR

○ : Must be (or recommended to be) selected to perform this operation.
△ : Not applicable to the function concerned.
✕ : PC communication modes, care must be taken not to accidently change the pc program.

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Mode	Function Selection	Function	Basic Operation
FDD	Automatic write	Automatic write to FD	FDD → ↓ → ↓ → ↓ → ↓ → ↓ → ↓ → ↓ → CR ; [System name specification] → CR → CR → ⌐GPP¬
	Cleaning	Cleaning disk	FDD → ↓ → ↓ → ↓ → ↓ → ↓ → ↓ → ↓ → ↓ → CR
COMENT (OTHER)	Write	Write of comment data	[Comment selection and range setting operation] → [Read operation] → WR → [Comment input operation] → CR
	Read	Read of comment data	[Comment selection and range setting operation] → RD → Device → [Device number] → GO
	Deletion	Deletion of comment data	[Comment selection and range setting operation] → [Comment read operation] → WR → ↑ / ↓ → CAN
ROM (OTHER)	Read	Read from ROM	[Rom operation selection] → GO → [Setting of ROM type] → GO → [Memory range setting] → GO → GO
	Write	Write to ROM	[ROM mode selection] → ↓ → GO → [Setting of ROM type] → GO → [Memory range setting] → GO → GO
	Verify	Verify with ROM	[ROM mode selection] → · → ↓ → GO → [Setting of ROM type] → GO → [Memory range setting] → GO → GO
	Erase check	Check of ROM erasure	[ROM mode selection] → · → ↓ → ↓ → GO → [Setting of ROM type] → GO → GO

O : Must be (or recommended to be) selected to perform this operation.
△ : Not applicable to the function concerned.
X : PC communication modes, care must be taken not to accidently change the pc program.

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Mode	Function Selection	Function	Basic Operation
PRINTER (OTHER)	Setting	Used printer setting	[Printer mode selection operation] → [Printer setting] → GO
	Baud rate	Baud rate setting	[Printer setting operation] → [↓] → GO
	Communication mode	Communication mode setting	[Printer setting operation] → [Baud rate setting] → GO → [Parity check setting] → GO → [Data length and stop bit setting] → GO
	Paper lenghth	Print paper length setting	[Nomal mode setting operation] → [Paper length setting] → GO
	Print starting position	Print starting position setting	[Communication mode setting operation] → [Paper length setting operation] → [Setting of print starting position] → GO
	Mode	Mode setting	[Mode setting] → GO
	Page setting	Print starting page setting	[Page number specification] → GO
	Mode setting	Print mode setting	[Printer mode setting] → GO
	Ladder	Circuit print setting	[Printer mode setting] → [Circuit print setting] → GO
	Command list	Command list print setting	[Printer mode setting] → [Command list print setting] → GO → GO
	Contact, coil list	Contact, coil list print setting	[Printer mode setting] → [Contact/coil range setting] → END → GO
	Device used list	Device used list print setting	[Printer mode setting] → [Device used list range setting] → END → GO
	Comment list	Comment list print setting	[Printer mode setting] → [Comment list print range setting] → END → GO

O : Must be (or recommended to be) selected to perform this operation.
△ : Not applicable to the function concerned.
X : PC communication modes, care must be taken not to accidently change the pc program.

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Mode	Function Selection	Function	Basic Operation
PRINTER (OTHER)	Utilized circuit	Utilized circuit print setting	[Printer mode selection] → GO
PRINTER (OTHER)	Plural mode	Setting of plural mode	[Selection of plural mode by the mode setting] → [Each mode range setting] → END → GO
PRINTER (OTHER)	Screen copy	Screen copy	[Printer setting operation] → COPY
CONVERSION (OTHER)	Conversion	Conversion to program for K3	OTHER → ↓ → ↓ → ↓ → GO → GO
MICRO COMPUTER (OTHER)	Read	Read in microcomputer mode	OTHER → [Microcomputer selection] → RD → [Address number] → GO
MICRO COMPUTER (OTHER)	Write	Write in microcomputer mode	OTHER → [Microcomputer selection] → RD → [Address number] → GO → WR → [Machine language] → GO
INITIAL (OTHER)	Reread	Re-read initial data setting screen	OTHER → ↓ → ↓ → ↓ → ↓ → ↓ → ↓ → GO

O : Must be (or recommended to be) selected to perform this operation.
△ : Not applicable to the function concerned.
✕ : PC communication modes, care must be taken not to accidently change the pc program.

APPENDIX 8 Floppy Disk Using Instructions
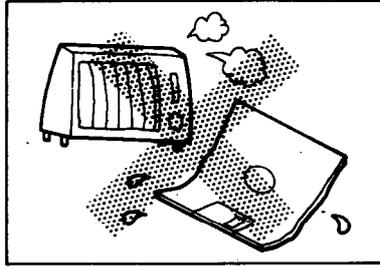
Do not place the FD in a place where temperature and/or humidity is high. If adversely affected by high temperature and/or humidity, the FD may be warped. Also, if temperature and/or humidity change considerably, dew condensation may occur, resulting in error. Therefore, do not immediately use a FD, which has been mailed or brought into a room from outside, but use it after adjusting the FD to the operating environment for 30 to 60 minutes.
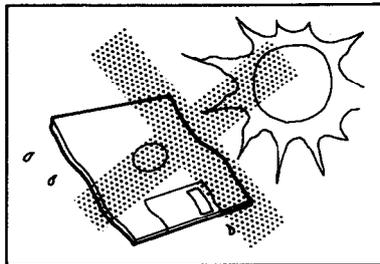
Do not expose the FD to the direct rays of the sun.
The FD may be warped.
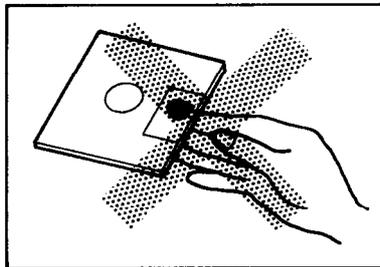
Do not touch the recording surface. The grease of fingers will stick to the magnetic head, resulting not only in error but also in the damage of magnetic disk. Also, fingerprints will lead to the reduction of output, the adhesion of dirt and dust, and the growth of mold.
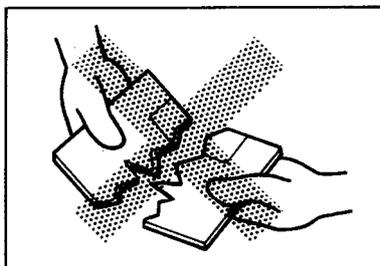
Do not bend or break the FD.
If bent or broken, the FD will be deformed, resulting in uneven rotation, error, etc.
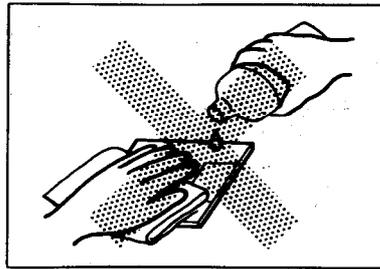
Do not use thinners, alcohol, freon, and the like to clean a FD.
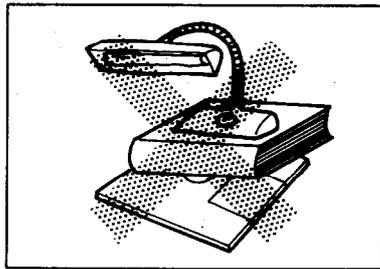
Do not place objects on the FD.
If a heavy object is placed on the FD, the FD may be deformed.
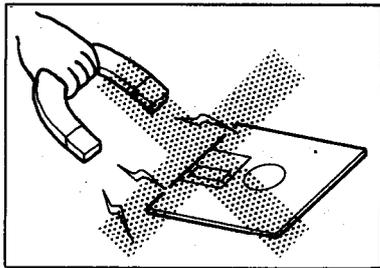
Do not bring the FD near to a magnet.
If the FD is brought near to an object which generates strong magnetism, stored data will be corrupted depending on the presence and direction of magnetism.
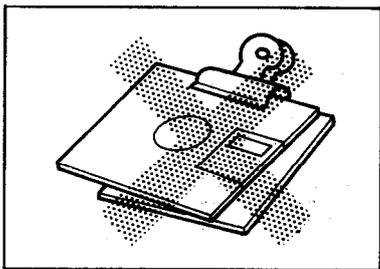
Do not clip the FD.
If a memorandum or the like is clipped to the FD, the FD may be damaged.
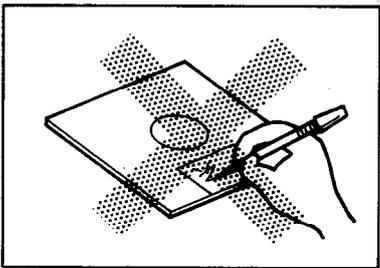
Do not write directly on the jacket. Be sure to make an entry in the index label before applying the label to the jacket. If it is necessary to make an entry after the application of index label or make an entry on a permanent label, use a soft-tipped pen. Direct entry in the jacket results in damage and deformation.
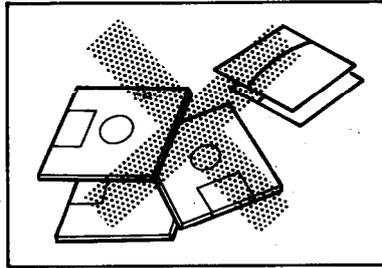
Do not leave the FD uncovered.
Be sure to put the FD in the envelope and store it vertically. Also, during use, place the envelope in the plastic box.
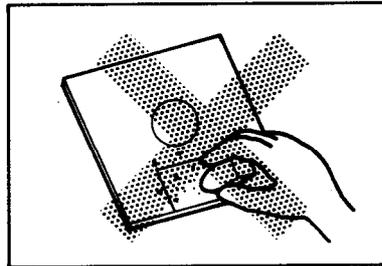
Do not use an eraser.
If the waste rubber of an eraser attaches to the magnetic disk, error may result. Do not use an eraser near the FD.
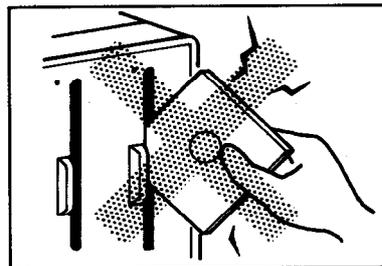
Do not handle the FD roughly.
Insert the FD into the FDD carefully and gently, being careful not to damage the FD. Rough handling also damages the magnetic head of the drive.
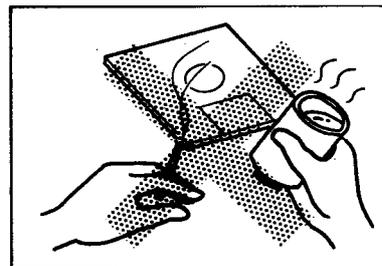
Do not eat, drink, or smoke near the FD. Cigarette smoke will also result in error. Especially, never use a FD which is wet.

IB (NA) 66192-A

type A6GPP/A6PHP(SW1GP-GPPK)

Operating Manual

MITSUBISHI ELECTRIC CORPORATION

When exported from Japan, this manual does not require application to the
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Specifications subject to change without notice.