

# FANUC SYSTEM P-MODEL G

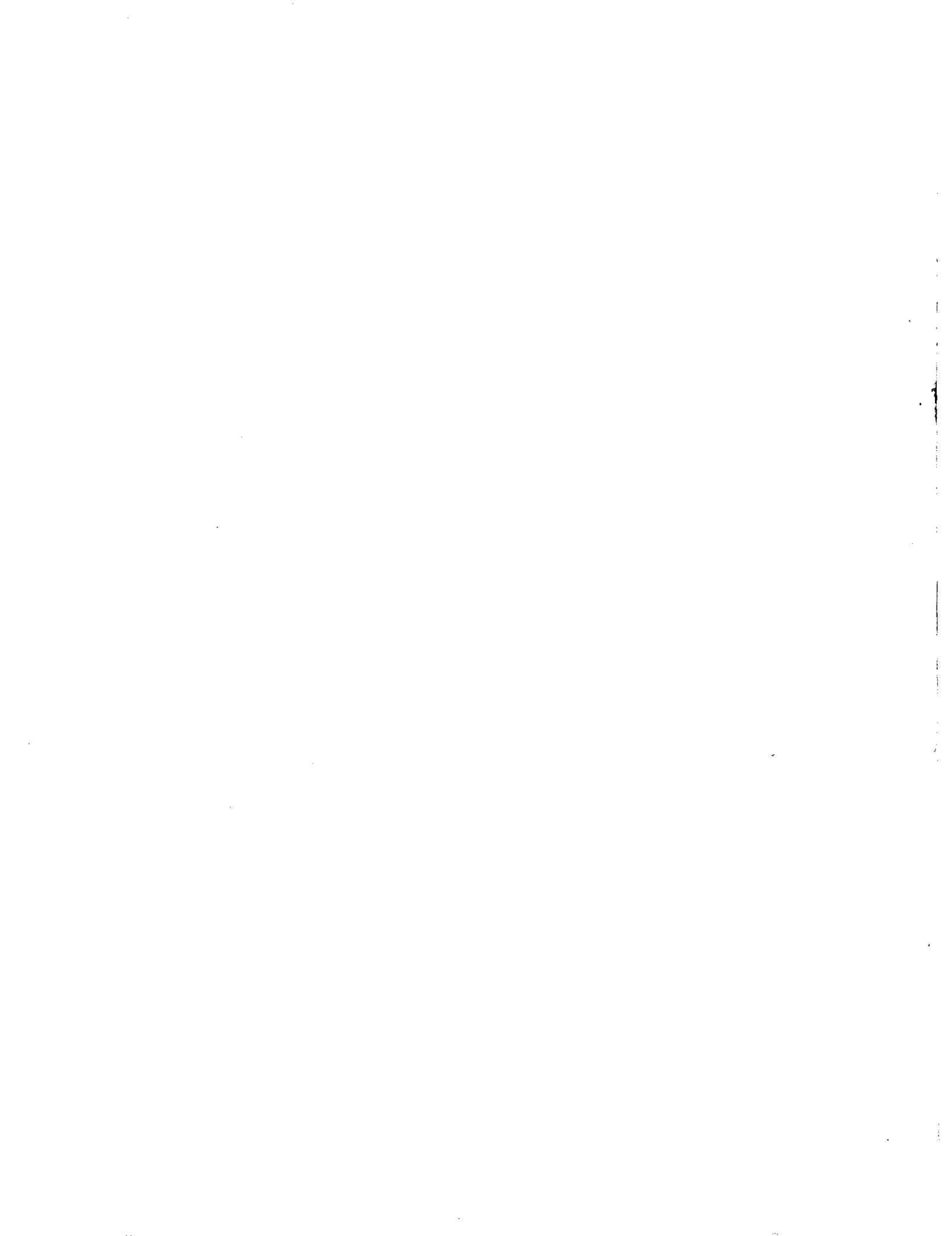
## OPERATOR'S MANUAL

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## PREFACE

The FANUC SYSTEM P-MODEL G (hereinafter referred to as P-G) consists of the main unit incorporating a graphic display unit, floppy disk unit, and a keyboard, and the FANUC PPR incorporating a paper tape punch, a printer, and a paper tape reader.

The P-G main unit is also provided with four external interfaces, to which an X-Y plotter, a memory cassette adapter, an external printer, and other I/O units are connectable in addition to the FANUC PPR. All functions are processed by the FAPT software being loaded in the floppy disk.

This operator's manual describes the operation methods of the P-G main unit, FANUC PPR, and major I/O units out of various functions of the P-G. For the operation methods of individual software, refer to the following operator's manuals.

- (1) Operator's manual for FANUC SYSTEM P-MODEL G FAPT TURN/MILL (B-54112E)
- (2) Operator's manual for FANUC SYSTEM P-MODEL G FAPT CUT (B-54113E)
- (3) Operator's manual for FANUC SYSTEM P-MODEL G FAPT PUNCH-I (B-54114E)
- (4) Operator's manual for FANUC SYSTEM P-MODEL G FAPT PUNCH-II (B-54115E)
- (5) Operator's manual for FANUC SYSTEM P-MODEL G FAPT TRACER (B-54116E)
- (6) Operator's manual for FANUC SYSTEM P-MODEL G FAPT DIGITIZER (B-54117E)
- (7) Operator's manual for FANUC SYSTEM P-MODEL G FAPT TEACHER (B-54126E)
- (8) Operator's manual for FANUC SYSTEM P-MODEL G 220S FAPT MILL (B-54127E)
- (9) Operator's manual for FANUC SYSTEM P-MODEL G Symbolic FAPT TURN (B-54132E)
- (10) Operator's manual for FANUC SYSTEM P-MODEL G Symbolic FAPT MILL (B-54134E)
- (11) Operator's manual for FANUC SYSTEM P-MODEL G Symbolic FAPT CUT (B-54136E)
- (12) Operator's manual for FANUC SYSTEM P-MODEL G FAPT DIE-II (Volume 1) (B-54122E)
- (13) Operator's manual for FANUC SYSTEM P-MODEL G FAPT DIE-II (Volume 2) (B-54122E-1)

# 1. WHAT IS P-G?

## 1.1 General

The FANUC SYSTEM P-MODEL G (hereinafter referred to as P-G) is a portable desk-top type NC tape preparation system with a built-in graphic display. This high-performance system has been developed based on FANUC's abundant experience in manufacturing and employing a number of CNC and CNC machine tools as a partner system for accurately and efficiently producing an NC tape to smoothly operate CNC machine tools.

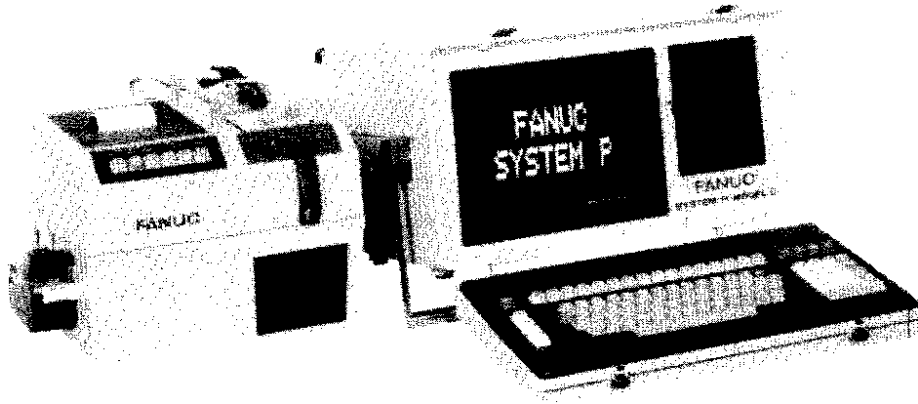


Fig. 1.1 FANUC SYSTEM P-MODEL G (P-G)

## 1.2 Hardware

### 1.2.1 Configuration

The FANUC SYSTEM P-G hardware consists of the following units.

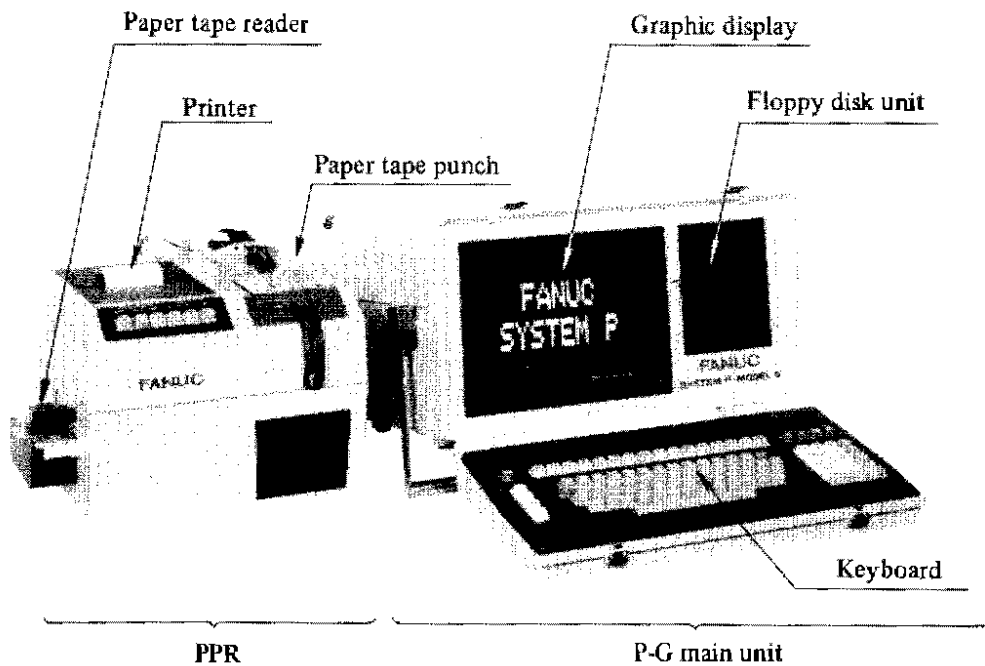


Fig. 1.2.1 Major units

**(1) Main control unit**

This unit is provided with various component parts, such as microcomputer and semiconductor memory to execute various calculations and data transfer to and from the keyboard and other I/O units for the purpose of producing an NC tape. This unit is mounted inside the main unit.

**(2) Keyboard unit**

This unit is used for instructing the job and inputting data. It contains a typewriter keyboard convenient for producing part programs, numeric input keys convenient for numerical input, and job keys for efficiently instructing the job commands.

**(3) Display unit**

The display unit is a CRT display to indicate characters and figures. It can quickly display the kinds of job, part programs, NC tape data, and tool paths.

It immediately replies to keyboard operations.

**(4) Floppy disk unit**

This unit is used for storing and inputting FAPT and other system programs. It is also employable for storing and inputting/outputting part programs and other data.

**(5) Printer unit (FANUC PPR)**

This is used for printing data to be stored. It can print part programs and NC tape data.

**(6) Tape reader unit (FANUC PPR)**

This unit is used for inputting part programs and other data from a paper tape.

**(7) Tape punch unit (FANUC PPR)**

This unit is used for punching part programs, NC tape, etc.

**(8) FANUC cassette adapter (option)**

This is used for inputting/outputting NC programs to the FANUC cassette.

**(9) FANUC selector (option)**

This is used for mini-DNC system.

**(10) The following units are connectable (option)**

- External printer (external mounting type, 80 digits/line)
- X-Y plotter
- Tablet

### 1. 2. 2 Performance specifications

Table 1.2.2 shows major performance specifications of FANUC SYSTEM P-MODEL G hardware.

**Table 1. 2. 2 P-G performance specifications**

Units		Specifications
P-G main unit	Main control unit	Microprocessor, semiconductor memory
	Keyboard unit	Alphanumeric keys, ten keys, job keys
	Graphic display CRT	Size: 12" Character display: 64 character x 24 lines/CRT Figure display: 512 x 384 dots/CRT
	Floppy disk unit	Recording density: 5876 BPI Transfer speed: 250K bits/sec Storage capacity: 327.7 KB
PPR	Tape punch	8-unit paper tape (JIS) Punch speed: 50 characters/sec
	Printer	No. of characters/line: 40 characters Printing speed: 1.2 lines/sec
	Tape reader	8-unit paper tape (JIS) Reading speed: 250 characters/sec or over
Option I/O units	FANUC cassette adapter 1	Transfer speed: 4.8K bits/sec Cassette capacity: Tape length conversion 80 m, 160 m
	FANUC cassette adapter 2	Transfer speed: 4.8K bits/sec Cassette capacity: Tape length conversion 20 m
	FANUC selector	Selector circuit: 4 or 8
	X-Y plotter	A3 size
	Tablet	A3, A0 size
	External printer	No. of characters/line: 80 characters



### 1. 2. 3 External dimensions

Fig. 1.2.3 (a) and (b) show external dimensions of P-G main unit and FANUC PPR.

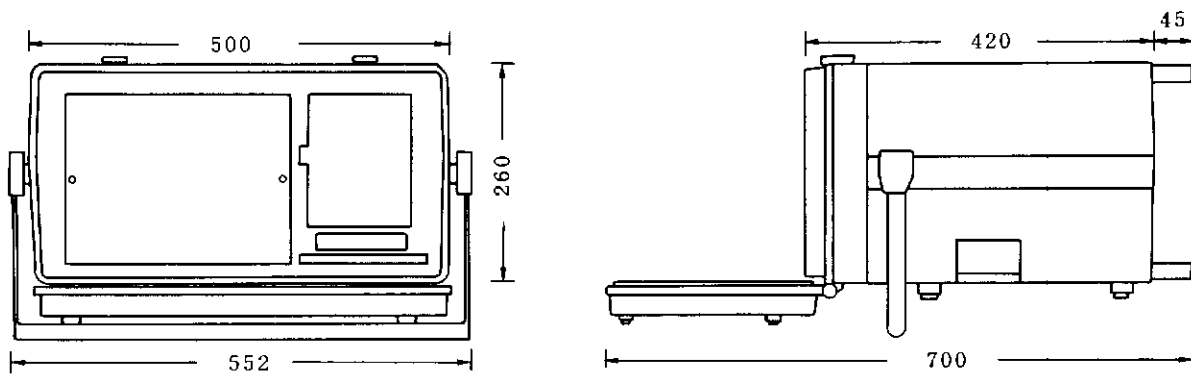


Fig. 1. 2. 3 (a) External dimensions of P-G main unit

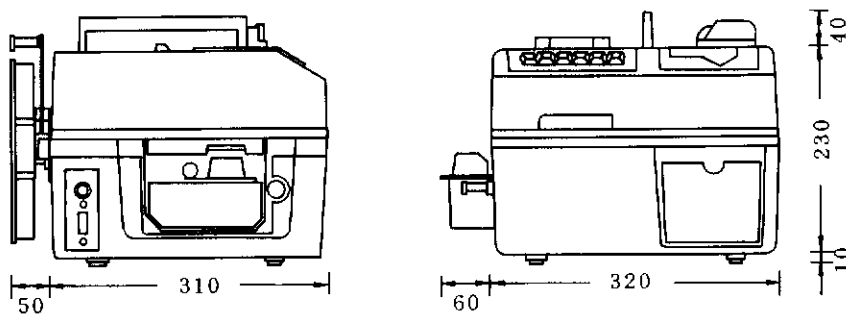


Fig. 1. 2. 3 (b) External dimensions of FANUC PPR

## 1. 3 System Configuration

### 1. 3. 1 System program

The P-G system consists of the hardware introduced in the previous paragraph. However, it does not display any specified functions without inputting a system program (software).

This system program is loaded into one floppy disk according to its types. As an example, for utilizing the automatic programming for milling, the FAPT MILL floppy disk is mounted on the P-G and loaded into the P-G memory.

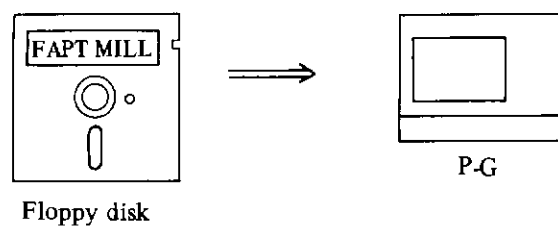


Fig. 1. 3. 1 Loading of system program

### 1.3.2 Types of software

The P-G system prepares various types of software for preparing an NC tape. For details, refer to the descriptions and operator's manuals for individual software.

**Table 1.3.2 Software libraries**

	Types	Description
Language input type automatic programming	FAPT TURN	Area cutting, finish allowance compensation, tool nose radius compensation, etc. in turning
	FAPT MILL	Curve fitting, patterning, etc. in milling Three-dimensional cutting of combined profiles of sphere, cone, cylinder, etc. is also possible
	FAPT DIE-II	Applies to the cutting of three dimensional die sculptured surface. Sectional curves only are input. Area specification, pure three-dimensional tool offset, etc.
	FAPT CUT	Applies to wire cut electric discharge machining. Most suitable to produce extreme precise tape. Involute curve processing, etc.
	FAPT PUNCH-I	Applies to turret punch press. Drawing of die profile and cutting profile.
	FAPT PUNCH-II	Applies to turret punch press. Curve nibbling is also possible.
Figure input type automatic programming	FAPT DIGITIZER	Applies to produce an NC tape by inputting coordinate values of a drawing. Calculations of circumferential length and center of gravity.
	Symbolic FAPT TURN	Conversational figure input by symbolic system. Programming can be done easily, while monitoring CRT. Family program, and tooling file.
Support system	FAPT TRACER	Applies to drawing, editing, and modifications of NC data and calculations of machining time.
	FAPT TEACHER	Applies to the self-teaching of FAPT language. Consists of turning course and milling course.
	FAPT DOCTOR	Fault diagnosis.

#### 1.4 Attachments and Consumables

The following attachments are delivered as standard attachments together with FANUC SYSTEM P MODEL G.

**Table 1.4 (a) Standard attachments for P-G main unit**

Item	Name	Specifications	Q'ty	Remarks
1	Fuse 5A	A60L-0001-0039#M-5	5	For input power supply
2	Fuse DM32	A60L-0001-0172#DM32	3	For power supply PCB DC output
3	Fuse DM03	A60L-0001-0172#DM03	1	For power supply PCB DC output
4	Floppy disk	A87L-0001-0035#1	1	Dual-face double density, 1 sheet
5	Plate	A370-8009-0001	1	For FAPT
6	Plate	A370-8009-0002	1	For Symbolic FAPT
7	Plate	A370-8009-0003	1	For DOCTOR
8	Plate	A370-8009-0004	1	For TEACHER
9	Cabinet cover	A98L-0001-0394#A	1	For main unit
10	Cabinet cover	A98L-0001-0394#B	1	For keyboard unit
11	Floppy disk protect board	A99L-0098-0001	2	For mailing

**Table 1.4 (b) Standard attachments for FANUC PPR**

Item	Name	Specifications	Q'ty	Remarks
1	Fuse 4A	A60L-0001-0039#M-4	5	For input power supply
2	Fuse DM32	A60L-0001-0172#DM32	3	For power supply PCB DC output
3	Fuse DM03	A60L-0001-0172#DM03	1	For power supply PCB DC output
4	Paper tape (black)	A87L-0001-0083#BL	1	8-unit, 275m
5	Printer form	A99L-0091-0001	1	20m/roll, 5 rolls
6	Printer ink ribbon	A99L-0091-0002	1	2 pcs.
7	Cabinet cover	A98L-0001-0394#C	1	

In addition to the above attachments, a 3m power cord is attached to the P-G main unit.

The following consumables are purchasable at option.

**Table 1.4 (c) Consumables**

Division	Name	Specifications	Remarks
For P-G main unit	Floppy disk	A87L-0001-0035	Dual face double density, 10 sheets
For FANUC PPR	Paper tape (black)	A87L-0001-0083#BL	8-unit, 275m
	Printer form	A99L-0091-0001	20m/roll, 5 rolls
	Printer ink ribbon	A99L-0091-0002	2 pcs.

## 2. SYSTEM OPERATION

### 2.1 Cautions on Daily Handling

The P-G is designed to be employable in an atmosphere in general offices or the like. Observe the following cautions so that the P-G is operated under a stable condition for a long time.

- (1) For the installation of P-G, see chapter 6.
- (2) Don't expose P-G to dust, moisture, and direct sunlight, but cover it whenever it is not used.
- (3) Clean the reading part of the paper tape reader and other parts periodically.
- (4) Discard punched waste of paper tape at an earlier opportunity.
- (5) Keep the front door of the floppy disk unit closed, except when the floppy disk is replaced. Remove the floppy disk if the floppy disk unit is not used for a long time.
- (6) Particularly be careful with handling of the floppy disk. Refer to item 2. 4. 5.
- (7) Avoid changing the ambient temperature and ambient humidity abruptly, even if they satisfy the installation conditions of P-G. If they have changed abruptly, leave the system as it is for about one hour before turning on the power switch, otherwise the system may be corroded due to the attachment of steam on its surface.
- (8) Don't use P-G at a place exposed to direct sunlight or near a stove. Don't put it at a vibrating place.

### 2.2 Basic Operation Procedure

Fig. 2.2 shows general operating procedure for P-G.

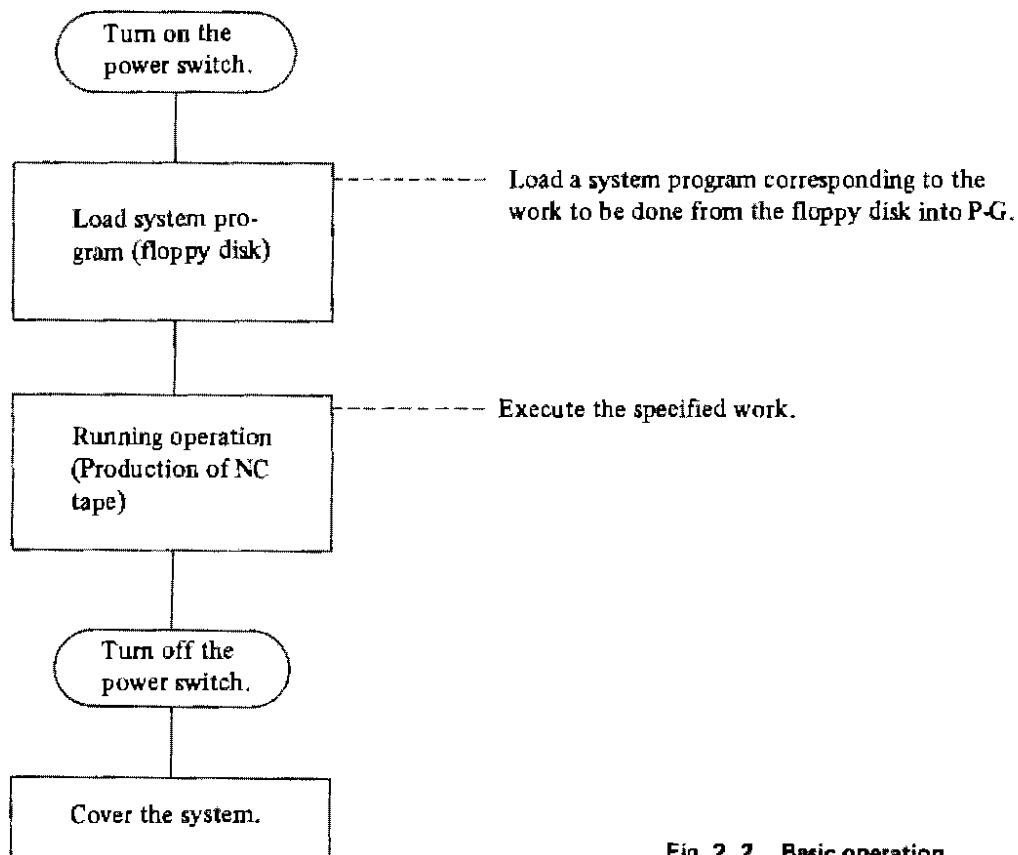


Fig. 2. 2 Basic operation

## 2.3 Turning On and Off the Power Supply

### (1) Power switch

A power switch is mounted on the right side face of the P-G main unit and on the left side face of FANUC PPR.

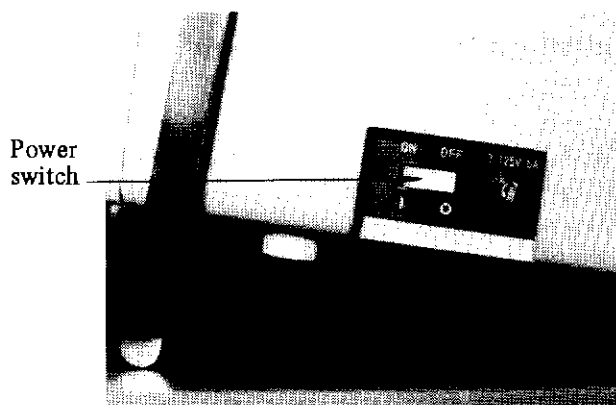


Fig. 2.3 (a) P-G main unit power supply

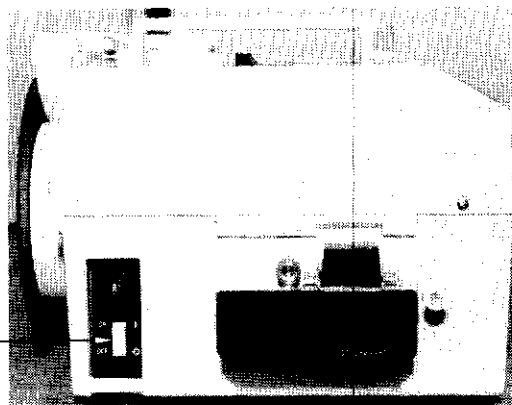


Fig. 2.3 (b) FANUC PPR power supply

### (2) Procedure of turning on the power supply

Turn on the power supply according to the following procedure.

- (a) Apply the primary power supply to P-G and FANUC PPR from the installation room power source.
- (b) Turn on the FANUC PPR power switch.
- (c) Turn on the P-G main unit power switch. The picture shown in Fig. 2.3(c) will appear on the graphic display after about 8 seconds.
- (d) Now, power has been applied to the system.



Fig. 2.3 (c) CRT after turning on the power supply

### (3) Procedure of turning off the power supply

Turn off the power supply according to the following procedure. (Reverse the procedure of turning on the power supply)

- (a) Turn off the P-G main unit power switch.
- (b) Turn off FANUC PPR power switch.
- (c) Turn off the primary power source.
- (d) Now, power has been turned off. Cover the system without fail whenever it is not used.

### (4) Cautions

- (a) Wait for about 8 seconds until the pattern in Fig. 2.3(c) appears on CRT after turning on the power switch. This waiting time is necessary for internal diagnosis, and it does not mean any trouble.
- (b) Keep an interval of at least 2 seconds when turning on and off the power supply. Don't turn on and off the power switch within a short time.
- (c) If the pattern shown in Fig. 2.3(c) does not appear on CRT after turning on the power supply, refer to item 3.2.1.

## 2.4 Operation of Component Units

### 2.4.1 General

The P-G system is operated by combining the operations of its component units. FANUC recommends you to fully understand the operation methods of individual units before using this system. Check these units periodically referring to the routine check procedures in section 2.7.

### 2.4.2 Keyboard

#### (1) Functions

The keyboard is mounted at the front of P-G, and it consists of the typewriter keyboard for inputting data, numeric input keys, and job keys.



Fig. 2.4.2 Keyboard

#### (2) Operation

A corresponding character can be input by depressing a key. The input character is displayed at the cursor position on the graphic display. For the cursor, refer to item. 2.4.4.

- (a) **UC** indicates upper-stage characters, while **LC** indicates lower-stage characters. When **UC** is depressed once, it remains unchanged as the upper-stage key until **LC** is depressed.

This rule also applies to **LC**, correspondingly. The keyboard is set to the lower stage when turning on the power supply.

- (b) In the case that keys are scribed with one character only like **A**, input these keys by the lower stage.

In the case that keys are scribed with 2 characters like **\$**/**4**, input \$ by the upper stage and input 4 by the lower stage. **\_** shows an underline, **/** of **?** shows a slash, and **-** of **=** shows minus.

- (c) Numeric keys are arranged at the center and right end. Numerics can be input by either keys. The keys arranged at the right end are irrespective of the upper and lower stages.
- (d) When depressing **CAN** (cancel of one line), one line is deleted on the graphic display, and the cursor returns to the left end of the same line.
- (e) When depressing **BS** (cancel of one character), one character is deleted on the graphic display, and the cursor returns leftward by one character.
- (f) The **DEL** key represents ■.
- (g) The long bar at the bottom serves as a space bar.
- (h) For **LOAD**, **R0** ..... **F0** ..... on the top stage, refer to item 2.4.3.

### 2.4.3 Job keys and job plates

#### (1) Functions

The job keys are provided to instruct how to work in producing an NC tape. The meanings of these job keys depend upon FAPT, Symbolic FAPT, FAPT TEACHER, and FAPT DOCTOR. The job plates are prepared to specify the meanings of these work.

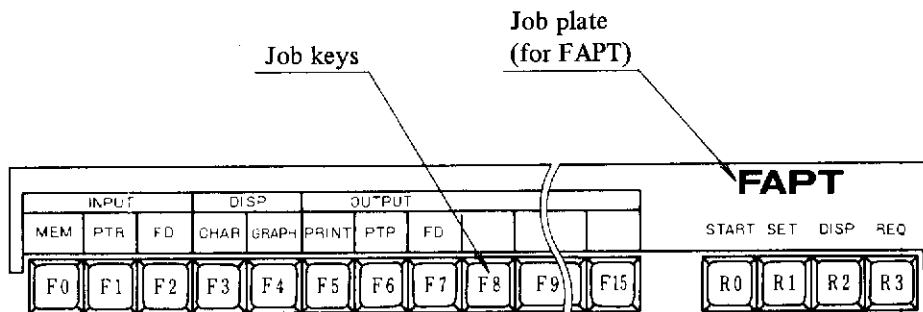


Fig. 2.4.3 Job keys and job plate

#### (2) Operation

Use job keys according to the instructions to be displayed on the graphic display every system such as FAPT, etc. For details, refer to individual operator's manuals. These keys mean as follows.

- LOAD** This key is used to load FAPT and other system programs from floppy disk into P-G memory.
- R0** ..... **R3** These keys are used to start the job or interrupt it halfway.
- F0** ..... **F7** These keys are used to select or instruct how to work or the type of I/O units to be employed.

### 2.4.4 Graphic display

#### (1) Functions

The graphic display provides a function of displaying characters and figures, and it is used to visually check the information for producing an NC tape while operating the P-G.

Fig. 2.4.4 shows a display example.

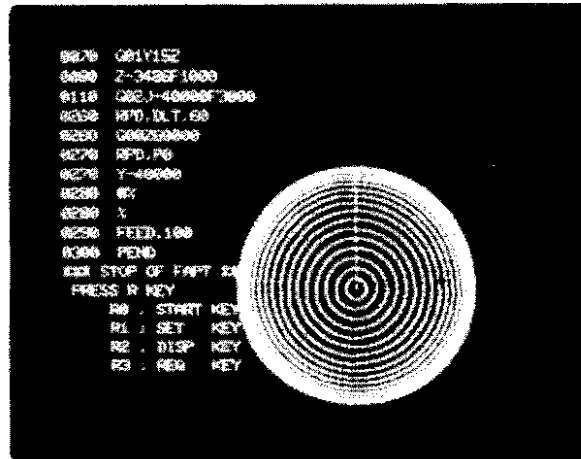


Fig. 2. 4. 4 Display example by graphic display

**(2) Operation**

The graphic display can display various pieces of information by operating the keyboard according to FAPT and other systems. The underline — showing the input position by keying operation is called cursor. Data and information required for control can be input from the keyboard while this cursor is flickering.

**(3) Caution**

Characters “katakana” can be displayed in the system to be employed in Japan only.

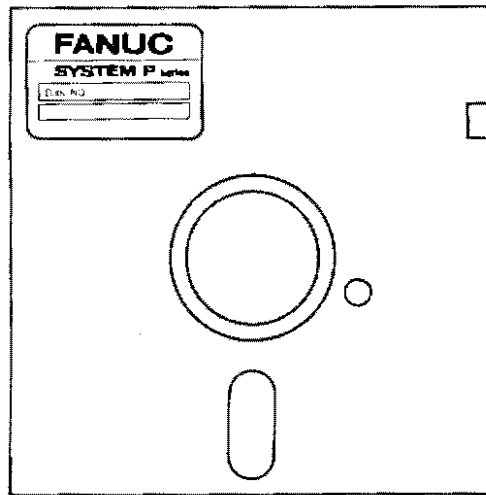
**2. 4. 5 Floppy disk unit and floppy disk**

**(1) Functions**

The floppy disk (diskette) is shown in Fig. 2.4.5 (a). It is divided into the system floppy disk for loading FAPT and other system programs and the work floppy disk for storing NC data, etc. to be processed by FAPT.

The floppy disk unit is used to read data from the floppy disk and write data into the floppy disk. It is used for inputting FAPT and other system programs from the system floppy disk into the system program memory, and also for reading or writing data into work floppy disk.



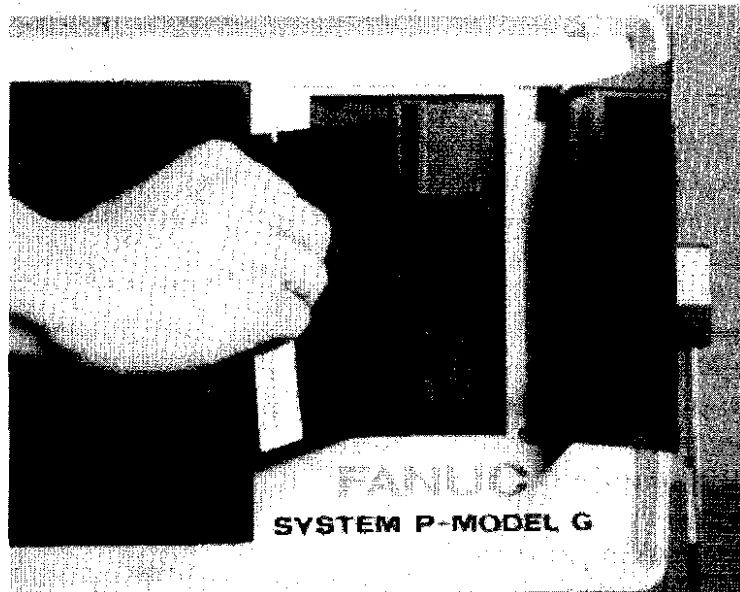


**Fig. 2. 4. 5 (a) Floppy disk**

**(2) Mounting method of floppy disk**

Mount the floppy disk into the floppy disk unit according to the following procedure, referring to Fig. 2.4.5 (b).

- (a) Open the front cover of the system.
- (b) Open the front door of the floppy disk unit.
- (c) Insert the floppy disk into the floppy disk unit with its disable notch facing upward. Be careful not to face the floppy disk in a wrong direction. Carefully insert it until it cannot be inserted any longer.
- (d) Close the front door of the floppy disk unit.
- (e) Close the front cover of the system.



**Fig. 2. 4. 5 (b) Mounting of floppy disk**

### (3) Unloading of floppy disk

Unload the floppy disk according to the following procedure after making sure that the floppy disk unit is not operating.

- (a) Open the front cover of the system.
- (b) Open the front door of the floppy disk unit.
- (c) Carefully take out the floppy disk by holding it by fingers.
- (d) Close the front door of the floppy disk unit.
- (e) Close the front cover of the system.

### (4) Write disable notch

The floppy disk is provided with a write disable notch to protect data from being deleted by a wrong operation. Data cannot be loaded into the disk by labeling the attached protect seal to the write disable notch.

Label this protect to the system floppy disk without fail.

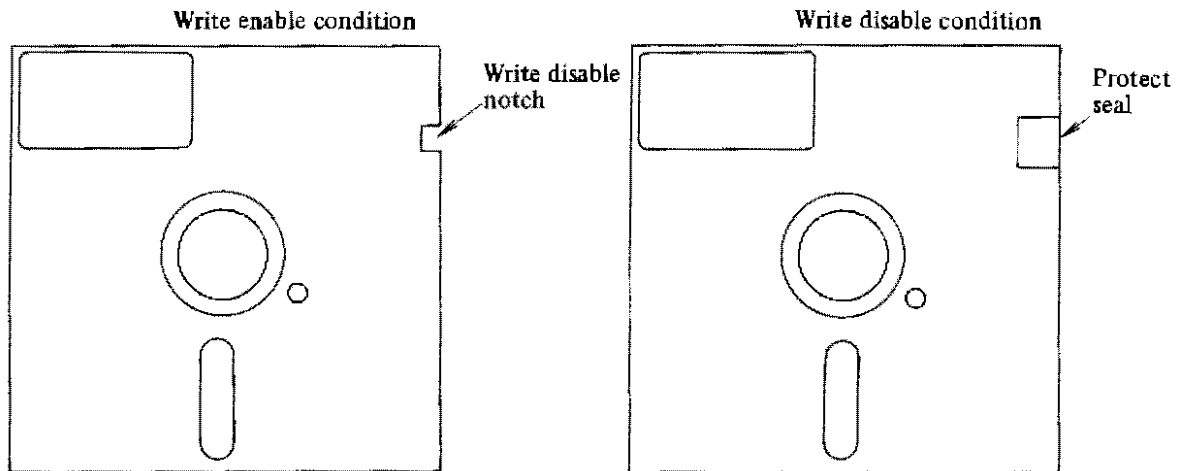


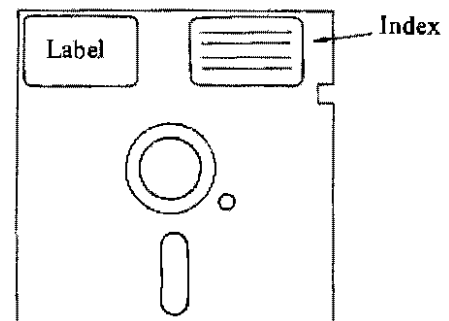
Fig. 2. 4. 5 (c) Write disable condition

### (5) Cautions on handling

Be careful with the following items when handling the floppy disk.

- (a) Never touch the magnetic face by hand.
- (b) Never apply any solvents (thinner, alcohol, freon, etc.) to the magnetic face.
- (c) Don't put a magnet near the floppy disk.
- (d) Don't bend or fold the floppy disk.
- (e) Don't put a heavy article on the floppy disk.
- (f) Don't clip the floppy disk.
- (g) Label the index at the specified position.
- (h) For entry to the index, use a soft felt pen ("sign" pen) or the like. Don't use any pencil and ball-point pen.
- (i) Don't use any eraser.
- (j) Carefully insert the floppy disk into the unit.
- (k) Use an envelope without fail.
- (l) Erect the floppy disk upright when storing it in the case.
- (m) Don't put the floppy disk at a place exposed to direct sunlight or near a heater.
- (n) Storage circumstances

Temperature    4° ~ 53°C  
Humidity        8 ~ 80%RH



## 2.4.6 FANUC PPR

FANUC PPR consists of the printer, paper tape punch, and paper tape reader. For functions and operations, see section 2.6.

## 2.5 Loading of System Programs

In the P-G system, FAPT and other system programs are recorded in the floppy disk (system floppy disk), and they must be transferred from the system floppy disk to the internal memory of P-G main unit after turning on the power switch.

This is called loading of system programs.

For loading a system program, observe the following procedure.

- (1) Mount the system floppy disk on the floppy disk unit (See item 2.4.5)
- (2) Depress **LOAD** key on the keyboard. Keep depressing this **LOAD** key for 2 to 3 seconds. In order to prevent the loaded system programs from being invalidated by depressing the **LOAD** key by mistake, the **LOAD** key is designed to be effective after keeping it depressed for a certain time.
- (3) The system program is loaded. This loading time is 10 to 30 seconds according to the kinds of systems.
- (4) After loading, a pattern corresponding to the job contents is displayed on the graphic display as shown in Fig. 2.5.

*(Note)* The system program is not loaded by depressing the **LOAD** key until FANUC SYSTEM P appears on the graphic display after turning on the power supply.

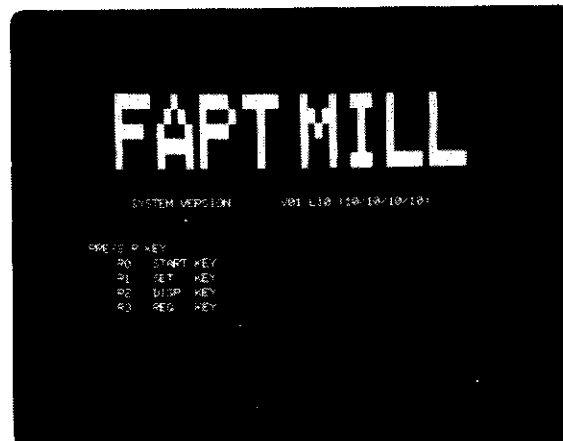


Fig. 2.5 Pattern showing the end of loading (Example of FAPT MILL)

For the operation to be observed after loading, refer to the operator's manuals for individual software.

## 2.6 Operation of FANUC PPR

The FANUC PPR consists of the paper tape reader, printer, and paper tape punch as shown in the following figure. The PPR operating conditions can be displayed or commands can be given to PPR by the pushbuttons and lamps of the switch unit.

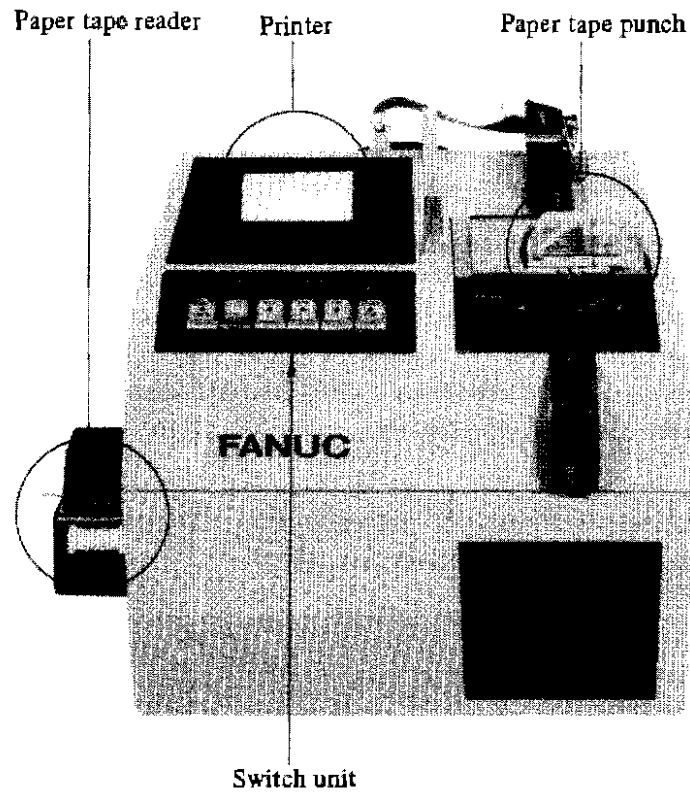


Fig. 2.6 Names of component parts of FANUC PPR

*(Note) "FANUC PPR" is hereafter referred to as PPR in the following description.*

*Also, its component units are abbreviated as follows.*

*Paper tape reader → Tape reader*

*Printer → Printer*

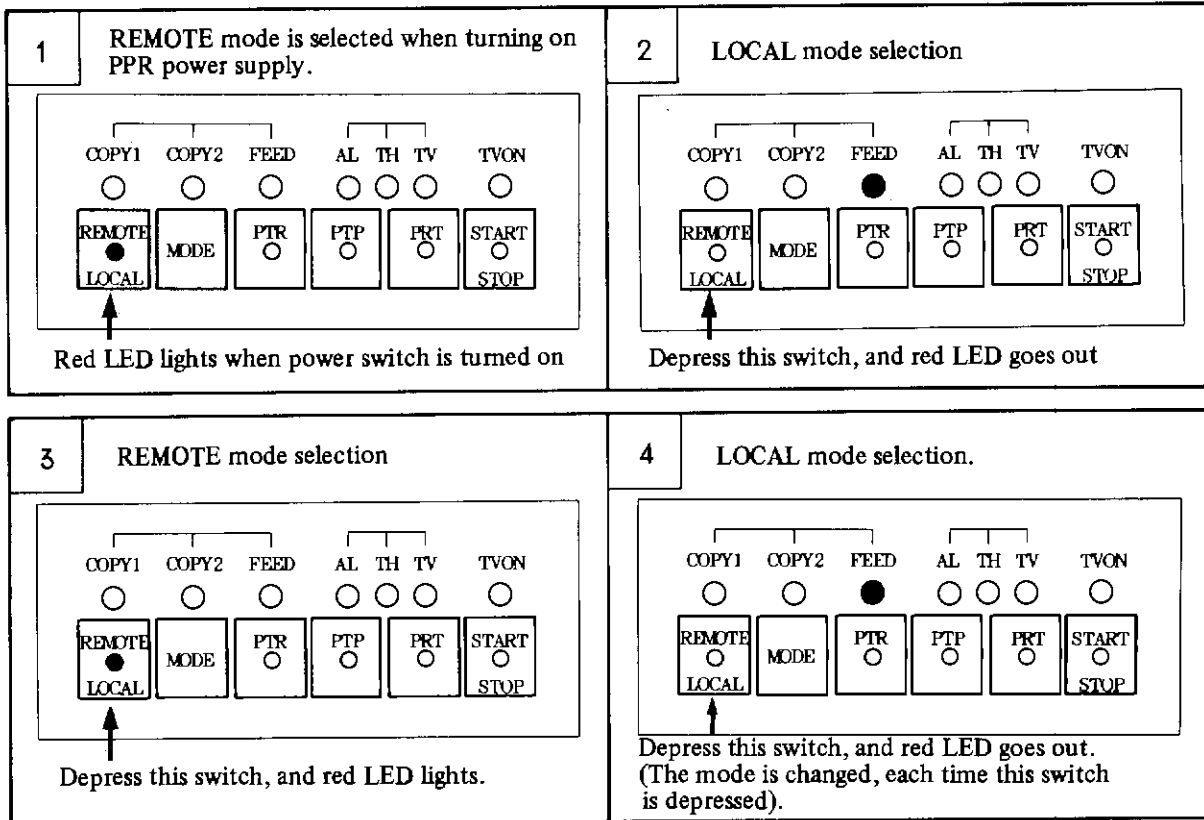
*Paper tape punch → Puncher*

### 2.6.1 Selection of PPR modes

PPR has the following two operation modes.

- (1) REMOTE mode: PPR is operated according to commands from the P-G main unit.
- (2) LOCAL mode : PPR is operated by the key switch operation on PPR.

The operation methods differ according to these modes. Use PPR correctly according to the following operation procedures. When turning on the PPR power supply, the REMOTE mode is selected. Observe the following procedure for selecting the REMOTE mode to the LOCAL mode.



*(Note) When the printer, puncher or tape reader is operated, don't depress REMOTE/LOCAL key switch.*

## 2. 6. 2 PPR operation, display, and setting (in remote mode)

### (Operation)

In the REMOTE mode, all key switches other than the remote-local selector switch on PPR become ineffective, and PPR is operated according to the commands from the P-G main unit.

### (Display)

The following four displays are made on the PPR key switch unit in the remote mode. (R/L key indicates the remote-local selector switch in the following explanation).

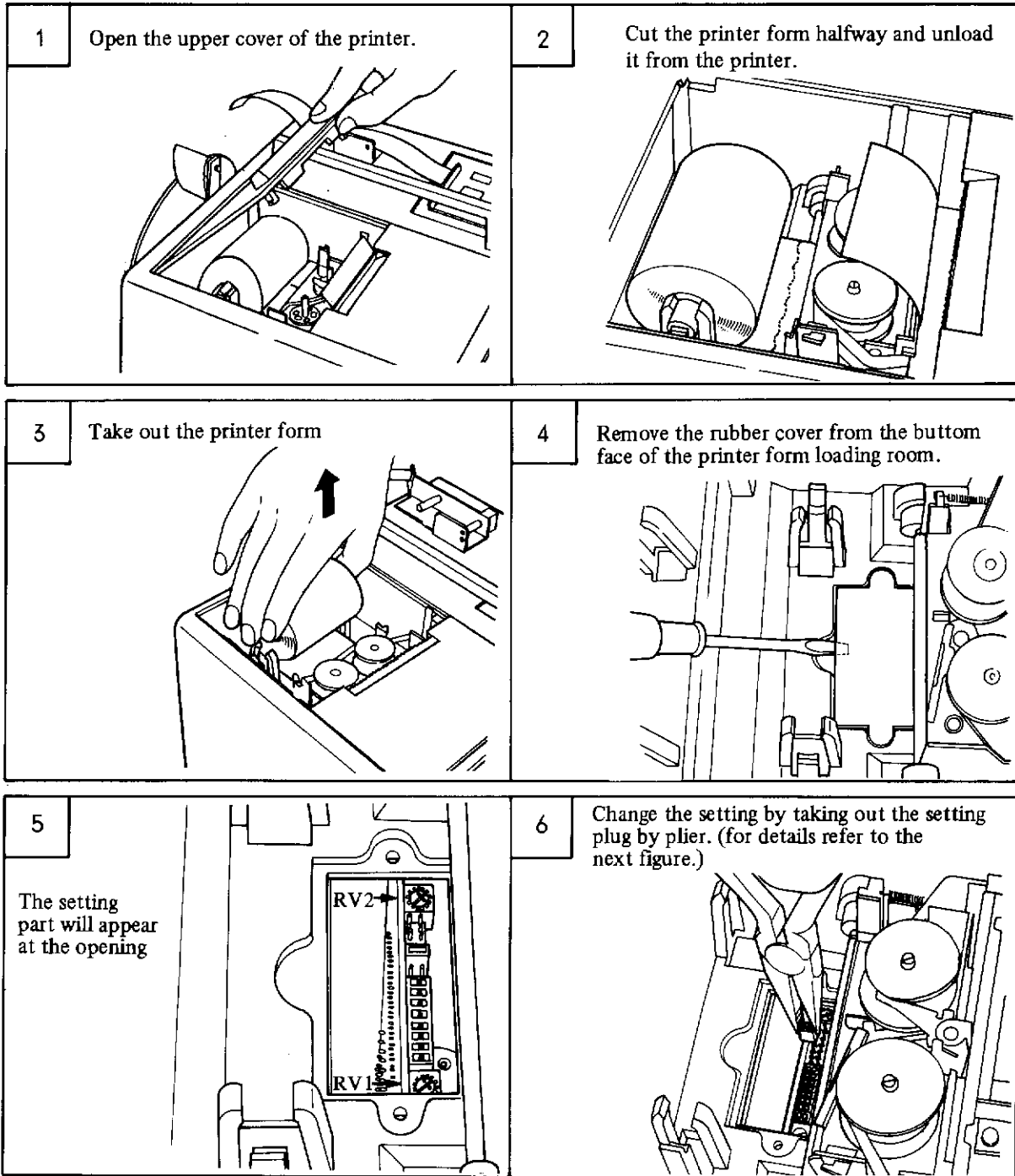
	Display	Meanings
1		<p>REMOTE mode status display</p> <p>Built-in red LED of R/L key switch lights.</p>
2		<p>Printer is operating.</p> <p>Red LED of PRT key switch lights.</p> <p>This lamp lights when the printer is being operated by the commands from P-G main unit.</p>
3		<p>Puncher is operating.</p> <p>Red LED of PTP key switch lights.</p> <p>This lamp lights when the puncher is being operated by the commands from the P-G main unit.</p>
4		<p>Tape reader is operating,</p> <p>Red LED of PTR key switch lights.</p> <p>This lamp lights when the tape reader is being operated by the commands from P-G main unit.</p>

(Note 1) The LED other than specified above are not lit in the REMOTE mode.

(Note 2) Don't depress the switch other than R/L key switch.

**(Setting)**

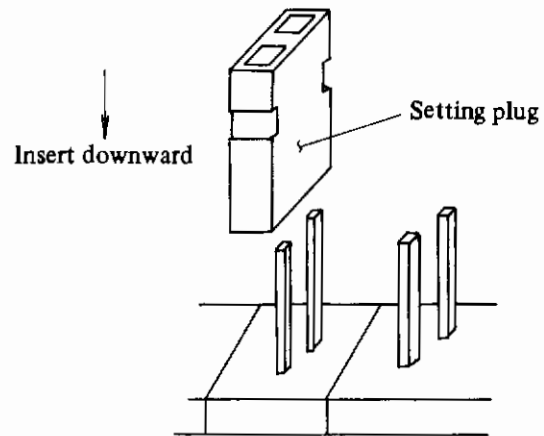
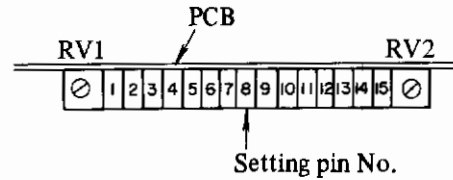
For handling data control codes on interface and resetting the baud rate, observe the following procedure. (It is no longer necessary to reset the baud rate, if the PPR is used at the standard setting of 4800 bauds)



7

Set the baudrate as follows.

Setting Pin No.	Meanings of setting
1	Automatic alarm reset in REMOTE mode. (Alarm is reset by depressing the R/L key, if the automatic alarm reset is not preset.) For details, See section 2.6.3 (4)
2 3 4 5 6	For meanings of these setting, refer to item 2.6.3.
8	Stop bit 2 (Stop bit 1 is set, if this setting is neglected.)
9	_____
10	_____
11	4800 bauds (standard setting)
12	2400 bauds
13	1200 bauds
14	_____
15	_____



*Note 1: A corresponding baudrate is set by inserting the setting plug into the place having the setting number.*

*(Note) Turn off the power switch before setting. This setting becomes effective when the power switch is turned on again. If this setting is changed with the power switch turned on, it is not effective.*

#### (1) Printer

##### (Functions)

Since the work can be advanced while monitoring the graphic display, this printer is not used during the work. Use this printer, if you want to print work data after completing the work.

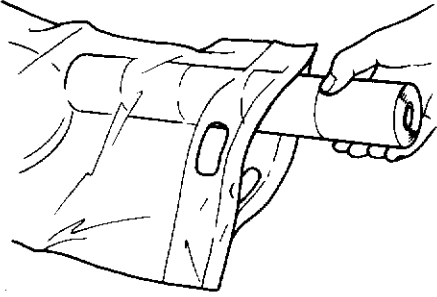
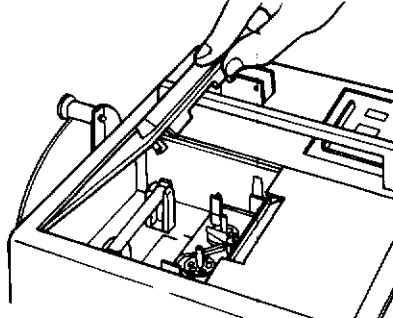
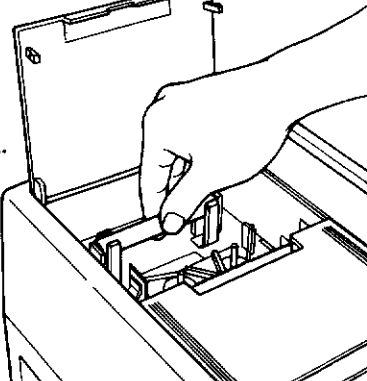
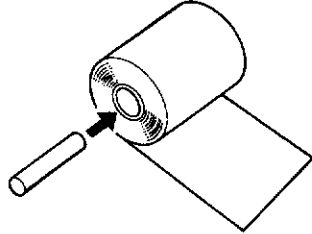
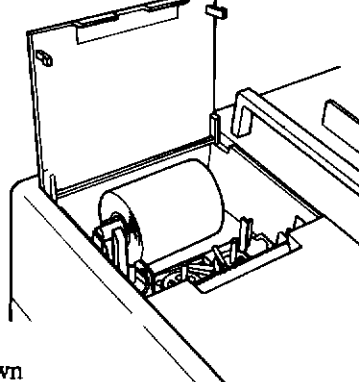
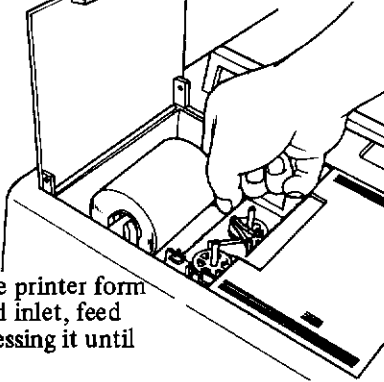
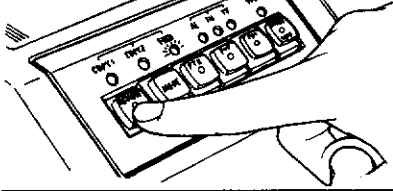
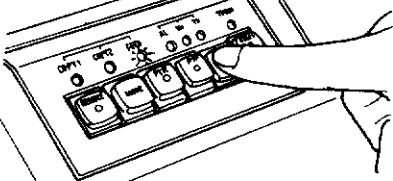
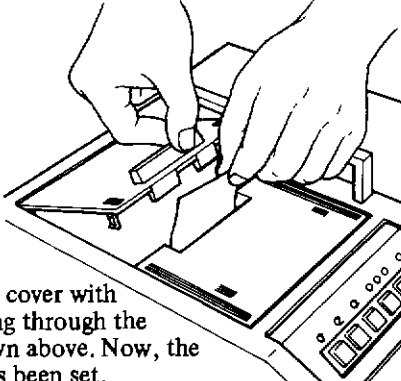
##### (Operation)

Data to be printed and their printing time are predetermined by FAPT and other system programs. Refer to individual operation methods.



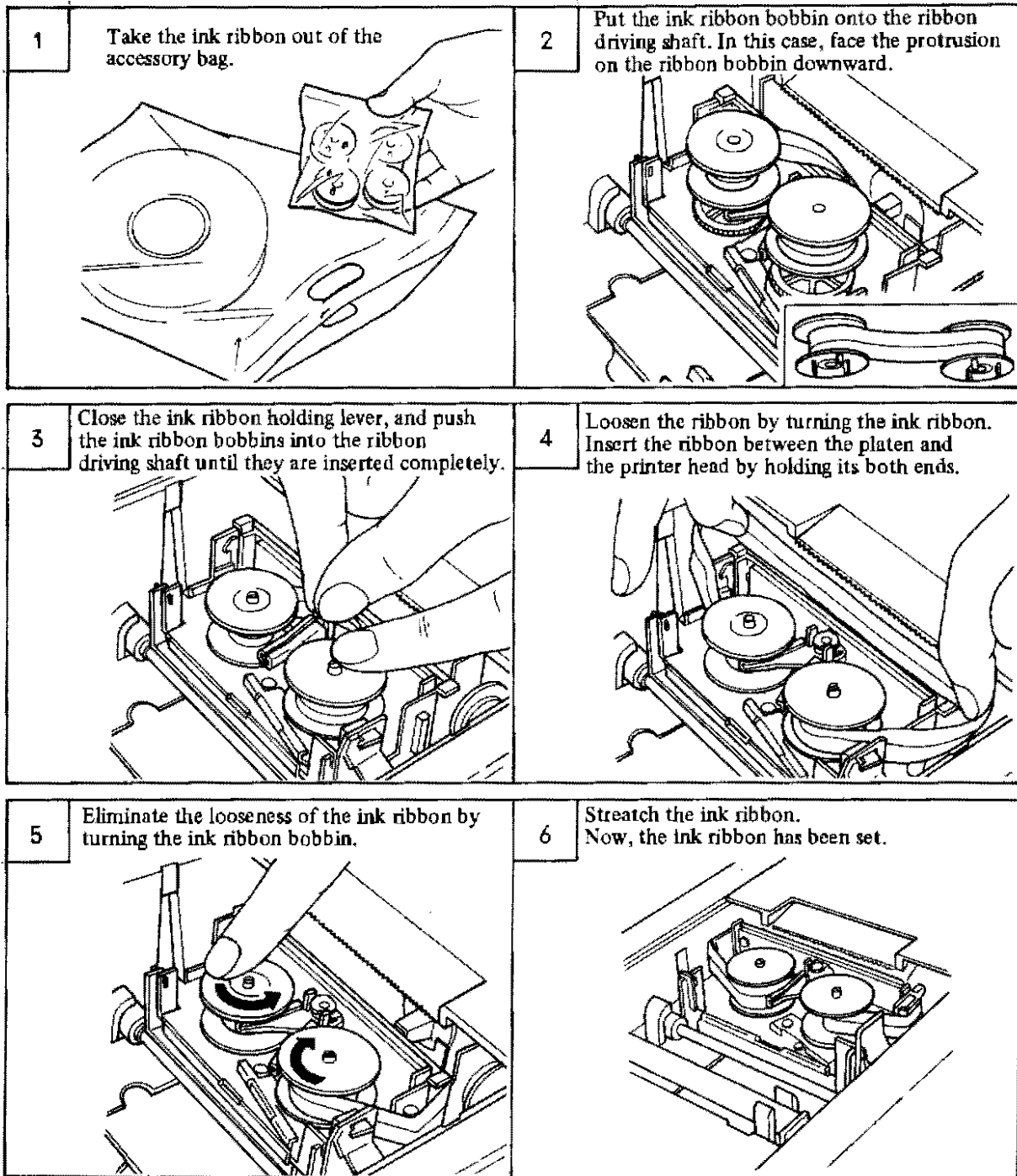
**(Replacement and loading of printer form)**

Observe the following procedure.

<p>1</p> <p>Take the printer form out of the accessory bag.</p> 	<p>2</p>  <p>Open the upper cover of the printer form loading room</p>
<p>3</p> <p>Take the roll shaft out of the printer form loading room.</p> 	<p>4</p> <p>Insert the roll shaft into the center of the printer form.</p> 
<p>5</p>  <p>Mount the printer form into the roll shaft holder as shown</p>	<p>6</p>  <p>After inserting the printer form into the form feed inlet, feed the form by depressing it until it stops.</p>
<p>7</p>   <p>Set the FEED mode in the LOCAL mode, and depress PRT button to feed the form until it reaches higher than the paper cutter.</p>	<p>8</p>  <p>Close the upper cover with the paper passing through the opening as shown above. Now, the printer form has been set.</p>

**(Replacement and loading of ink ribbon)**

Observe the following procedure.



**(Cautions on handling)**

- (a) Check if the printer form has been loaded properly before using the printer. If the printer is operated without loading any printer form, it may become defective.
- (b) Close the upper cover of the printer during use of PPR, otherwise ingress of dust and foreign substance may cause a printer trouble.
- (c) The printer head is consumable. Replace it after printing about 200 rolls of chart, referring to item 6.6.1 in the maintenance manual (B-54159E).

**(2) Puncher**

**(Functions)**

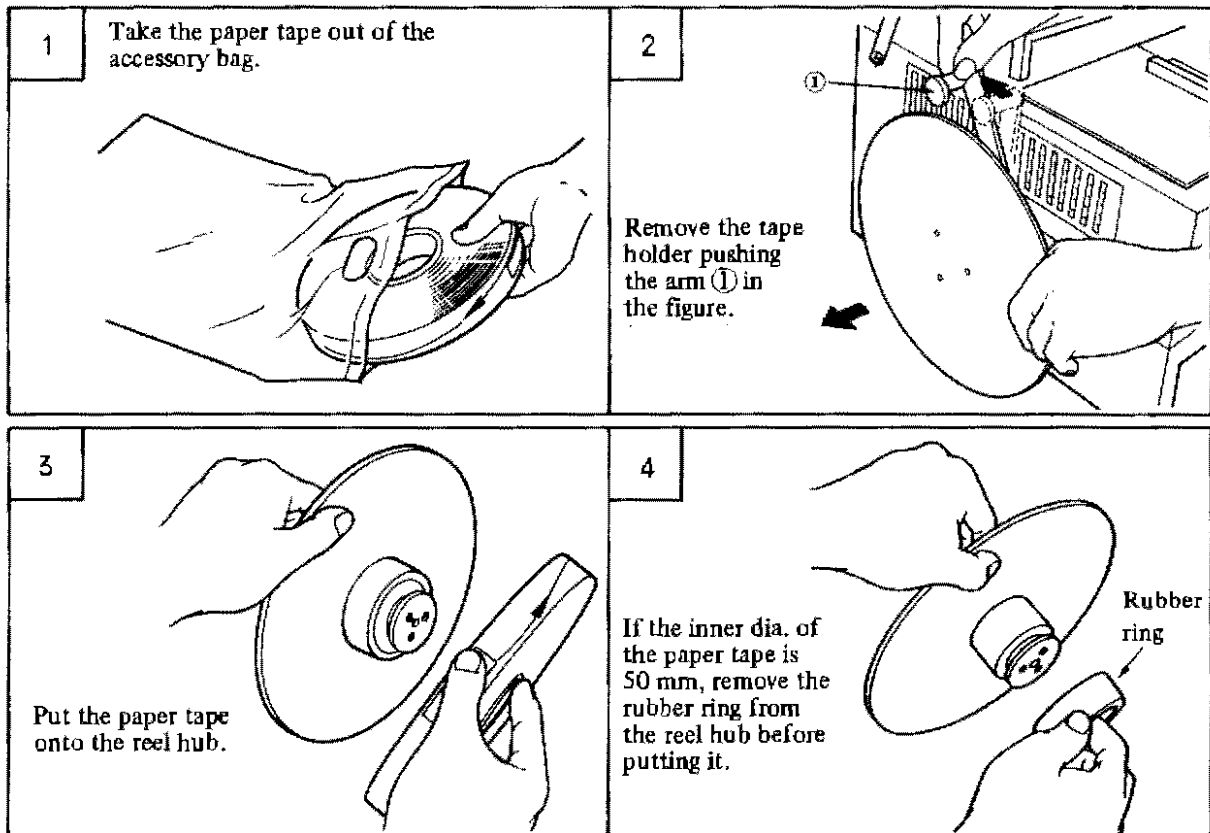
The puncher is used to punch part programs and NC command data on the paper tape.

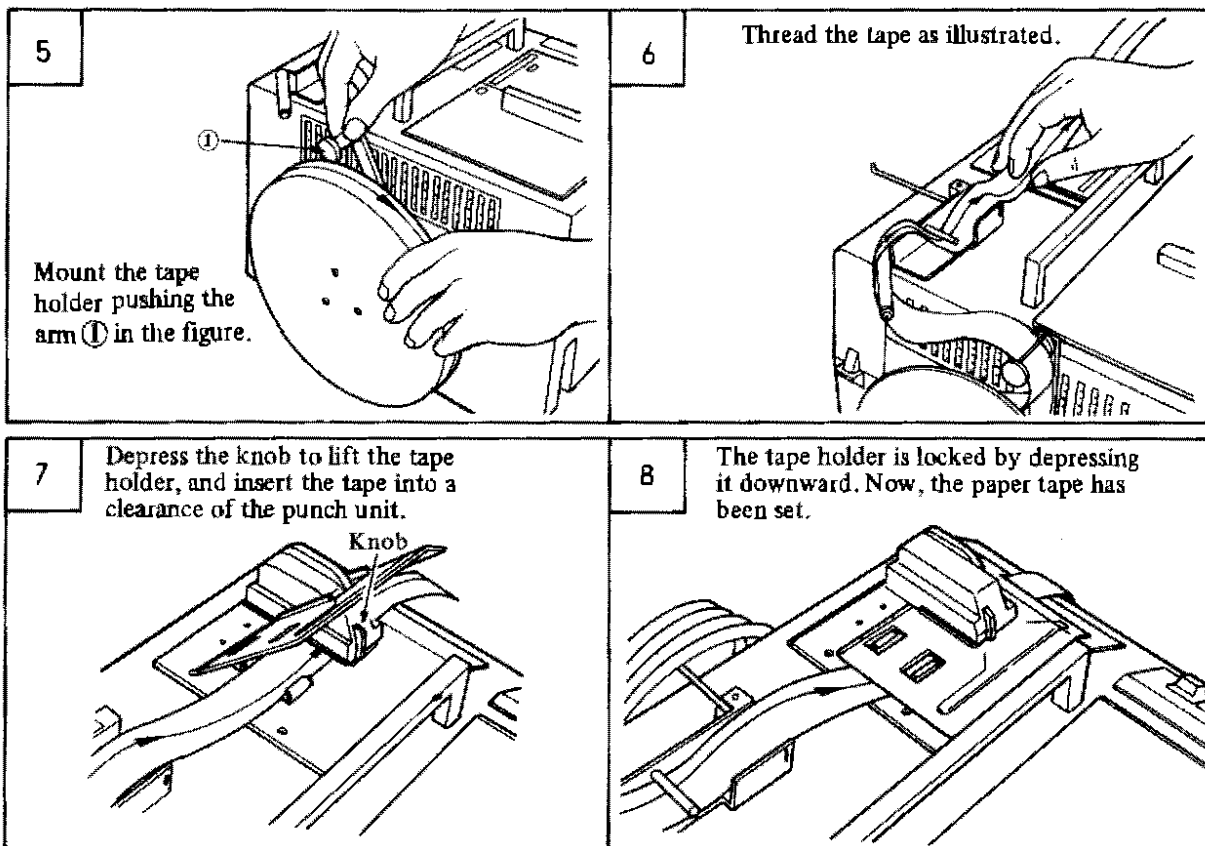
**(Operation)**

Data to be punched and their punch time are predetermined according to system programs. Refer to their operator's manuals.

**(Replacement and loading of paper tape)**

Observe the following procedure.





**(Cautions on handling)**

- (a) Use the 8-unit information exchange tape conforming to JIS C 6243.
- (b) The punch block is consumable. Replace it referring to item 6.6.2 in the maintenance manual (B-54159E)
 

Black tape	After punching about 100 rolls
Other color tape	After punching about 500 rolls

### (3) Tape reader

#### (Functions)

This is used for inputting part programs and NC command data for preparing an NC tape.

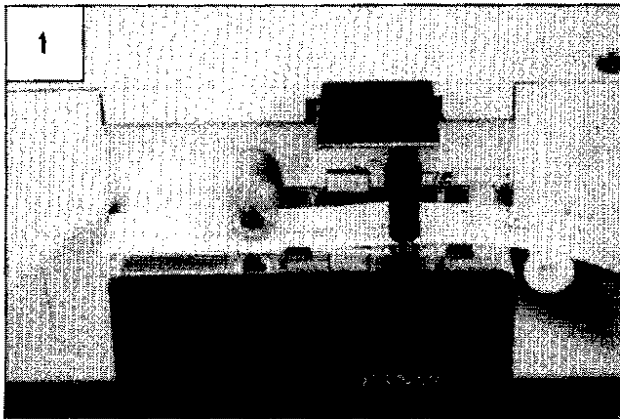
#### (Operation)

The start/stop methods and the start/stop timing of the tape reader are predetermined according to system programs. Refer to their operator's manuals.

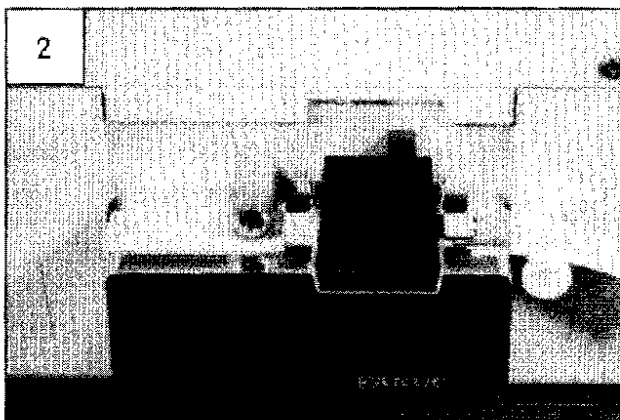
#### (Loading and unloading of paper tape)

Observe the following procedure.

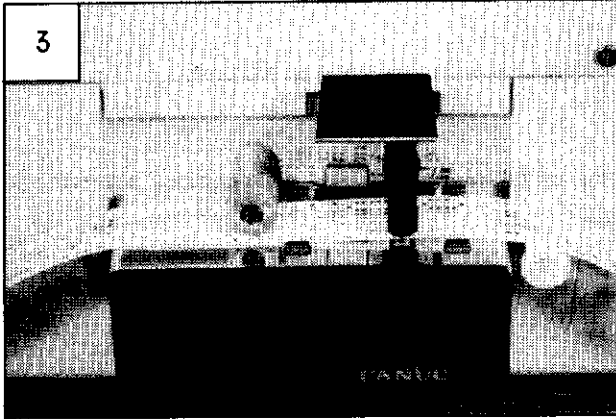
Make sure that the tape reader and paper tape are kept clean without any dust. Clean them, if required.



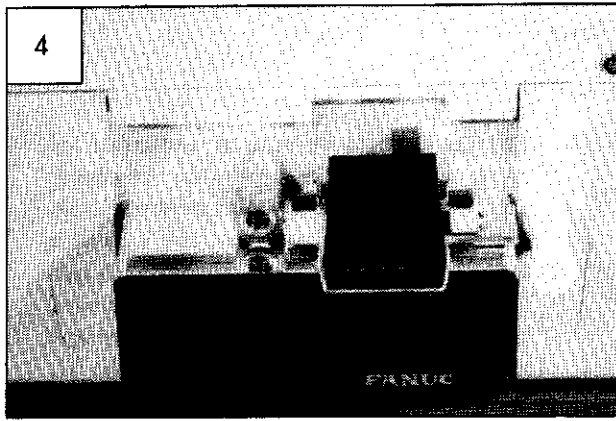
Lift the tape holder upward, and insert the paper tape below the tape holder. The paper tape travels from right to left as viewed from the front. Insert the paper tape in such a way as the sprocket holes (small holes perforated at certain intervals) are positioned this side from the center of the paper tape and the left end of the paper tape on the left side of the capstan roller.



Lower the tape holder after making sure that the paper tape has been securely inserted into the paper tape guide. If the paper tape is not inserted into its guide properly, it may be damaged or a read error may result.



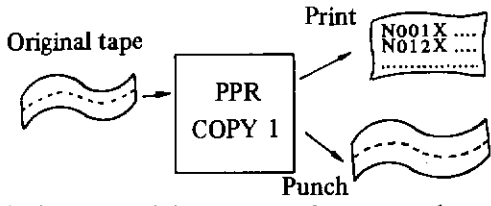
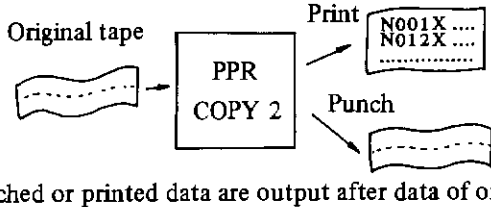
For unloading the paper tape, lift the tape holder. In this case, wait for about 2 seconds until the stop magnet has been stopped after stopping the paper tape.



Lower the tape holder after unloading the paper tape. This tape holder should be lowered without fail to prevent ingress of dust.

### 2. 6. 3 PPR operation, display, and setting (in LOCAL mode)

All commands from the P-G main unit are ineffective in the local mode, and PPR is operated by its key switches. PPR provides the following functions in the local mode.

No.	Items	Functions
1	COPY 1	 <p>Punched or printed data are just the same as data of the original tape.</p>
2	COPY 2	 <p>Punched or printed data are output after data of original tape have been processed (For the instruction method, refer to item (2)).</p>
3	FEED	<p>Paper tape or printer form is fed.</p> <ol style="list-style-type: none"> <li>(1) Paper tape is fed in case of tape reader.</li> <li>(2) Sprocket holes only are punched on paper tape, and paper tape is fed in case of puncher.</li> <li>(3) Printer form is fed in case of printer.</li> </ol>
4	TV ON (Tape check)	<p>Tape data can be checked as a part of "COPY 2" function. (TH and TV check are made, if preset)</p>

#### (1) COPY 1

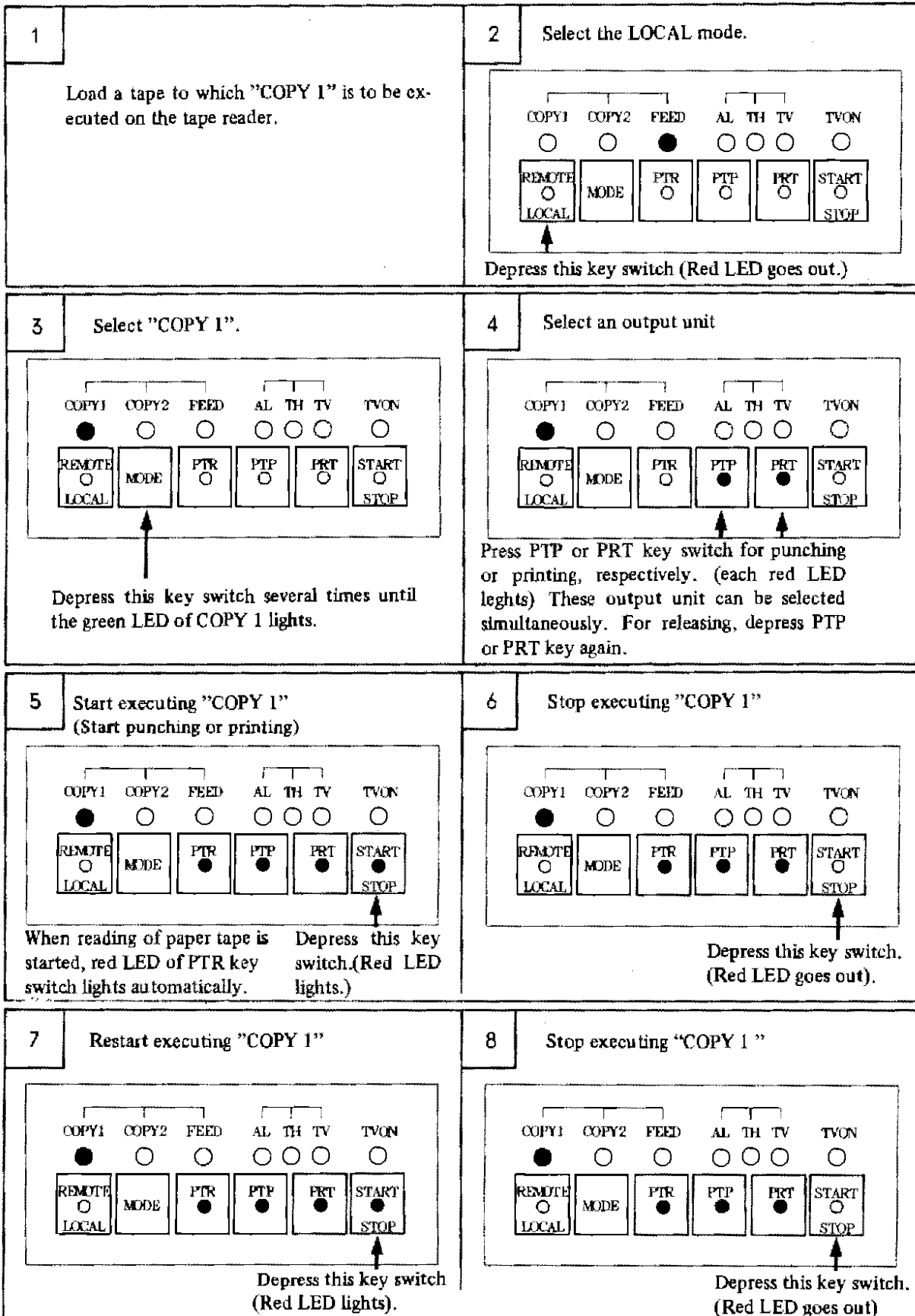
##### (Functions)

Select this "COPY 1" function, if you want to prepare a tape having just the same data as in the original tape being set on the tape reader. If an original tape punched by EIA codes is employed, the output tape is punched by EIA codes. If an original tape punched by ISO codes is employed, the output tape is punched by ISO codes. If an original tape punched by codes other than EIA and ISO, the output data are punched in just the same as in the original tape.

If printing is made concurrently, the printed characters conform to the EIA codes table and ISO codes (ISO 840) table. However, CR in ISO code is not printed and become space. Special symbols (■) are printed in case of codes which are not covered by these tables.

(Operation)

For executing "COPY 1", observe the following procedure.



(Note) When the printer, puncher or tape reader is operating, don't depress MODE key switch. Stop operating by depressing START/STOP key to change the mode, such as COPY1 to COPY2.



(2) COPY 2

(Functions)

Data of original tape are processed to output or print paper tape according to the functions being preset by setting plugs. The following functions are settable.

Setting pin No.	Setting		Functions
	Provided	Not provided	
2	<input type="radio"/>		Performs TH check of the original tape being set to the tape reader. TH check is also done even if the original tape is being read into the reader for punching or printing.
		<input type="radio"/>	Does not perform any TH check of the original tape being set to the tape reader.
3	<input type="radio"/>		Prints the number of punch characters (inclusive of the first CR (LF) and last ER(%)) and the tape length from first CR (LF) to an ER (%) of the output tape; provided that these characters are limited up to max. 65535.
		<input type="radio"/>	Don't print the number of punch characters from first CR (LF) to ER of output tape.
4	<input type="radio"/>		Prints characters by shifting the start of the 2nd and subsequent lines from the start of the 1st line for easy-to-see printing when printing characters exceeding 40 digits. N001 X ..... T ..... S .....
		<input type="radio"/>	Prints characters by aligning the start of the 2nd and subsequent lines with the start of the 1st line when printing characters exceeding 40 digits. N001 X ..... T ..... S .....
5	<input type="radio"/>		Adds TV parity to the original tape, and punches to output tape. When the pin No.6 is set, don't set this pin.
		<input type="radio"/>	Punches data on output tape without adding TV parity to the original tape.
6	<input type="radio"/>		Replaces LF (ISO code) being punched on the original tape with CR LF (ISO code), and punches data on output tape. When the pin No.5 is set, don't set this pin.
		<input type="radio"/>	Punches data to output tape together with LF (ISO code) being punched on the original tape.
7	<input type="radio"/>		Deletes "delete" codes (both EIA and ISO codes) being punched on the original tape, and punches data on output tape.
		<input type="radio"/>	Punches data on output tape together with "delete" codes being punched on the original tape.

The output tape is punched by EIA codes when the original tape employed is punched by EIA codes, and it is punched by ISO codes when the original tape employed is punched by ISO codes. If "COPY 2" is executed by using an original tape punched by codes other than EIA and ISO, PPR executes processing, assuming that EIA or ISO code is input. As a result, it is uncertain how the output paper tape is punched.

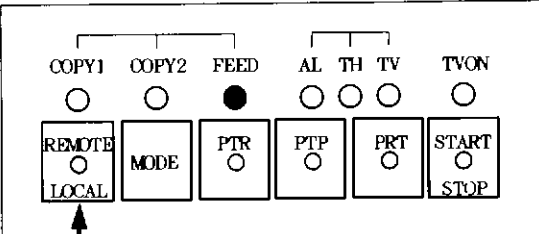
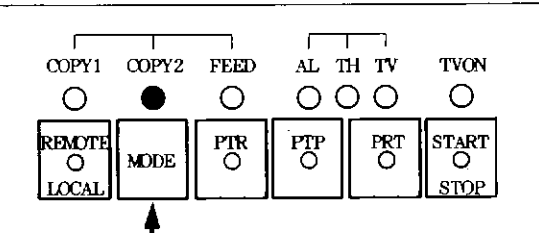
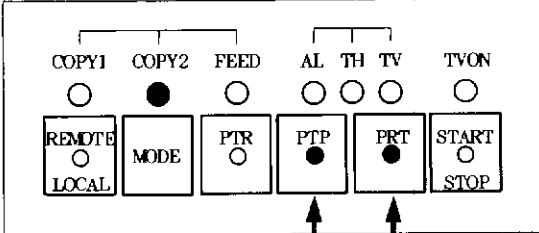
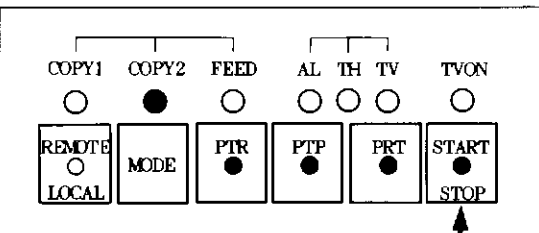
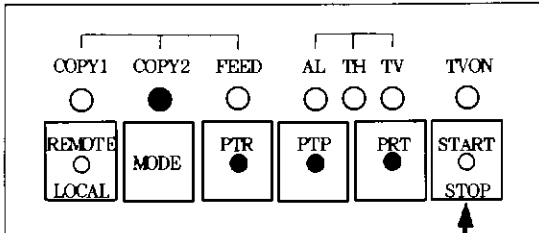
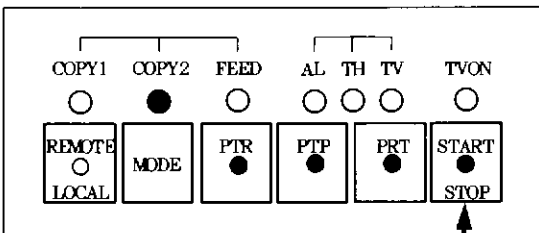
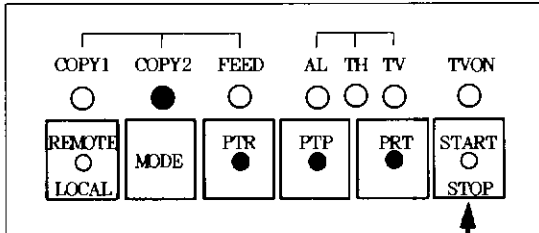
Don't use any original tape punched by codes other than EIA and ISO codes.

Printing characters conforming to the EIA codes table and ISO codes (ISO 840) table are printed, if printing is done concurrently. CR in ISO code is not printed and becomes space. Special symbols (■) are printed, if codes are not covered by these tables.

Both TH check and TV check are executed for the original tape being set to the tape reader, if these check functions are preset.

**(Operation)**

Observe the following procedure when executing "COPY 2"

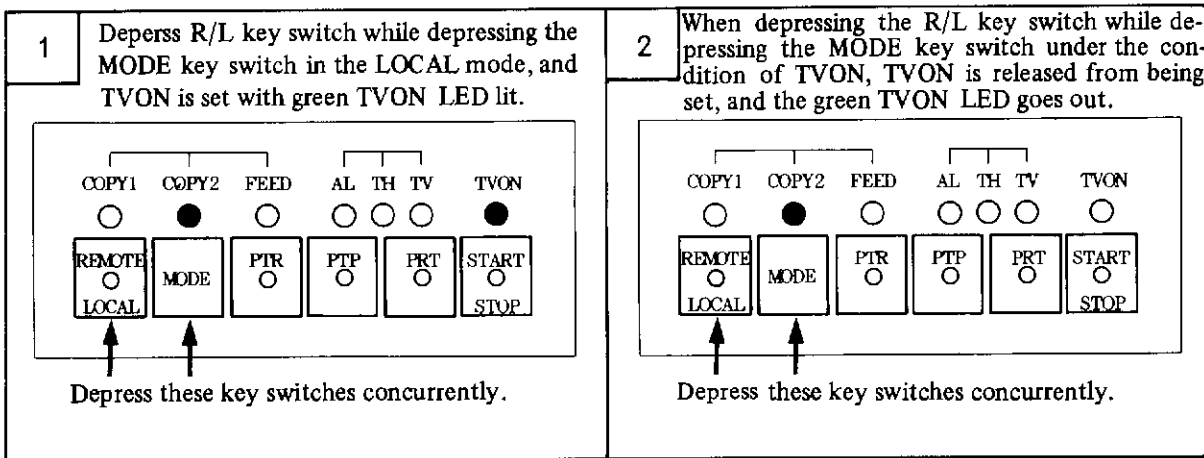
<p>1</p> <p>Load a tape to which "COPY 2" is to be executed onto the tape reader. When "%" in ISO code or "ER" in EIA code is read, the tape reader stops.</p>	<p>2 Select the LOCAL mode.</p>  <p>Depress this key switch (Red LED lights)</p>
<p>3 Select "COPY 2"</p>  <p>Depress this key switch several times until the green LED of COPY 2 lights.</p>	<p>4 Select an output unit</p>  <p>Press PTP or PRT key switch for punching or printing, respectively. (each red LED lights) These output unit can be selected simultaneously. For releasing, depress PTP or PRT key again.</p>
<p>5 Start executing "COPY 2" (Start punching or printing)</p>  <p>When reading of paper tape is started, red LED of PTR key switch lights automatically. (Red LED lights)</p> <p>Depress this key switch</p>	<p>6 Stop executing "COPY 2"</p>  <p>Depress this key switch (Red LED goes out)</p>
<p>7 Restart executing "COPY 2"</p>  <p>Depress this key switch (Red LED lights)</p>	<p>8 Stop executing "COPY 2"</p>  <p>Depress this key switch (Red LED goes out)</p>

(Note 1) If you want to check tape data only without any punching and printing, select the tape reader only by depressing PTR key switch or by starting the execution of "COPY 2" in process 5 without selecting any output unit.

The tape reader only is started to input tape, and tape data are checked. An error, if detected, is displayed. (No display means that no error has been produced.) In addition, the TH check and TV check are made, if preset.

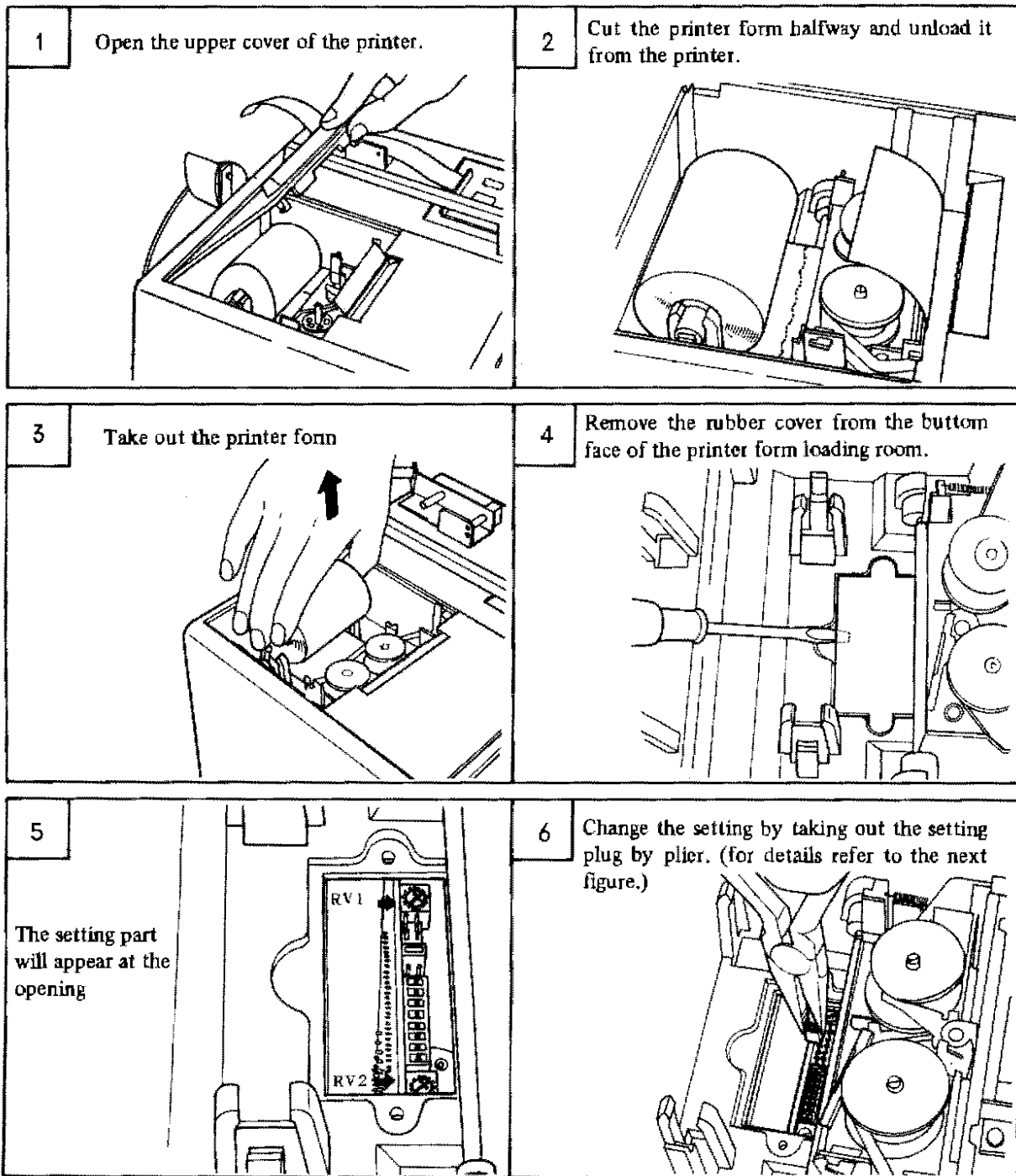
(Note 2) When the printer, puncher or tape reader is operating, don't depress MODE key switch. Stop operating by depressing START/STOP key to change a mode, such as COPY1 to COPY2.

For the TV check of the original tape being set to the tape reader in "COPY 2", set TVON according to the following procedure.



**(Setting)**

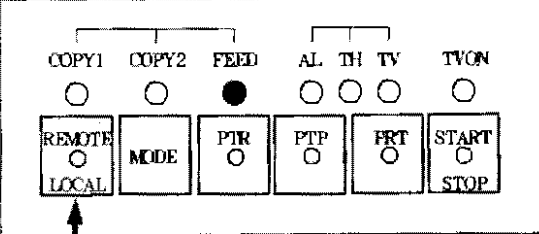
For changing of function setting in COPY 2, observe the following procedure.



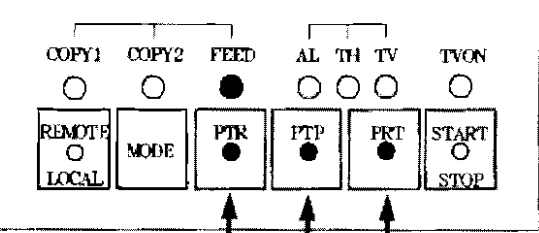


### (3) Feed

For "feed", observe the following procedure.

<b>1</b>	<p>Observe the following procedure, assuming that paper tape is set to the tape reader or puncher, or a printer form is set to the printer.</p>
<b>2</b>	<p>Select the LOCAL mode</p>  <p>The diagram shows a control panel with two rows of indicators and switches. The top row has six indicators: COPY1, COPY2, FEED, AL, TH, TV, and TVON. The FEED indicator is a solid black circle, while the others are open circles. The bottom row has six switches: REMOTE/LOCAL, MODE, PTR, PTP, PRT, and START/STOP. The LOCAL switch is currently selected. An arrow points to the LOCAL switch.</p>

Depress this key switch, (Red LED goes out) Green FEED LED lights to be ready for feed operation.

<b>3</b>	<p>Feed paper tape or printer form.</p>  <p>The diagram shows the same control panel as in step 2. In addition to the FEED indicator being lit, the PTR, PTP, and PRT switches are also shown as being depressed (indicated by solid black circles). Arrows point to these three switches.</p>
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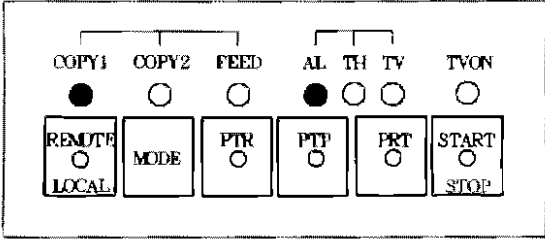
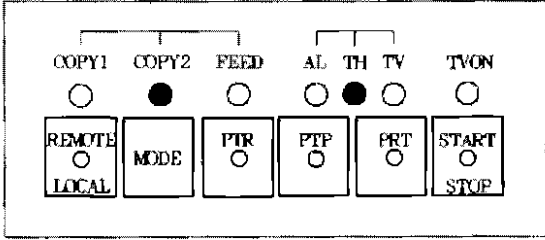
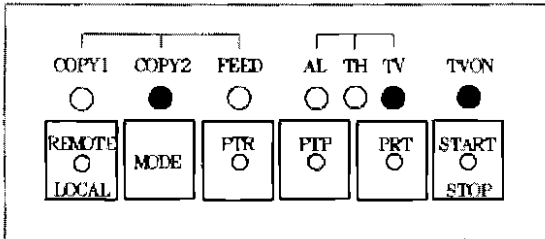
For feeding the paper tape on the tape reader, depress the PTR key switch. For feeding the paper tape on the puncher, depress PTP key switch. For feeding the printer form on the printer, depress PRT key switch. The paper tape and printer form are fed while depressing the corresponding key switches, and stopped feeding when releasing these key switches.

*(Note) For feeding paper tape of puncher, the feed operation starts 2 seconds after PTP key switch is pushed. Push the PTP key switch for feeding 2 seconds or more.*

(4) Alarm (in LOCAL mode)

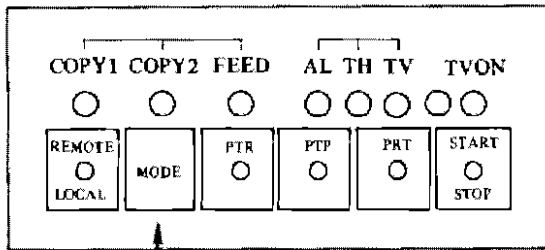
(Alarm display)

PPR displays the following alarms

	Display	Causes of alarm
1	 <p>Green LED of selected mode and red LED of selected unit are lighting.</p>	<p>(1) A printer signal is in trouble.                  (2) RS232C line is in trouble.                  (3) A read error is occurs in tape reader.                  (4) The end of paper tape passed the read part of tape reader during read of paper tape on the tape reader.                  (5) PPR control circuit is in trouble.</p>
2	 <p>Red LED of selected unit is lighting.</p>	<p>Tape in tape reader is in TH error during "COPY2"                  (Note) Assume that TH error detection is preset in advance.</p>
3	 <p>Red LED of selected unit is lighting.</p>	<p>Tape on tape reader is in TV error during "COPY 2" when green TVON LED is lighting.                  (Note) Assume that TV error detection is preset in advance.</p>
4	<p>All LEDs light and then go out during operation (except when power is turned on )                  (Display of alarm causes and reset of alarm are ineffective)</p>	<p>Control PCB is defective.</p>
5	<p>Red AL LED flickers when power is turned on.                  (Display of alarm causes and reset of alarm are ineffective.)</p>	<p>Control PCB is defective.</p>
6	<p>Red AL LED lights when power is turned on.                  (Display of alarm causes and reset of alarm are ineffective.</p>	<p>Control PCB is defective.</p>

(Display of causes of alarms)

If the red AL LED lights due to the occurrence of an alarm, a cause of the alarm can be located according to the following procedure.



Depress this key switch  
The following LEDs indicate  
causes of the alarm.

(Note 1) This function is effective only when the red AL LED is lighting. If this red AL LED is went out by resetting an alarm after it lit once, the cause of this alarm is not displayed.

Display LED	Contents of alarm	Details
TVON	Printer alarm	Printer malfunctions.
TV	_____	_____
TH	Buffer full alarm	RS232C line is defective.
AL	Tape end alarm	Tape has come to an end during the tape reader operation.
FEED	Receiving data alarm	RS232C line data is defective. Baud rate or stop bit is wrongly set.
COPY2	Tape reader alarm	Tape readout error or faulty tape hole.
COPY1	Binary mode alarm	RS232C line data contents are faulty.

(Note 2) When an alarm occurs, the red AL LED goes out soon after it lit once.

In such a case, it is difficult to display a cause of the alarm (because it is difficult to depress the MODE key switch before the red AL LED goes out.)

If the setting pin No. 1 described in item 2.6.2 is drawn out, the red AL LED remains lit when an alarm occurs.

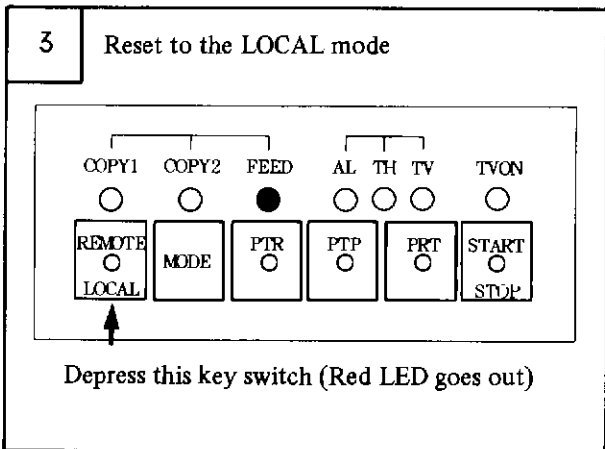
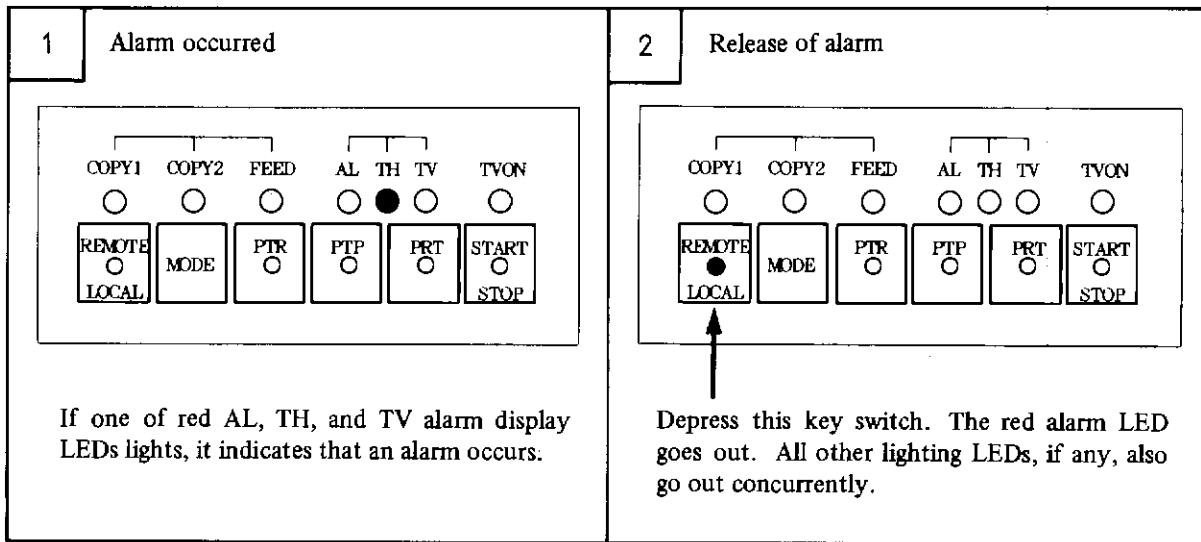
Accordingly, draw out this setting pin for locating a cause of an alarm. For resetting the alarm after locating its cause, depress the REMOTE/LOCAL key switch.

Don't draw out this pin during normal use.



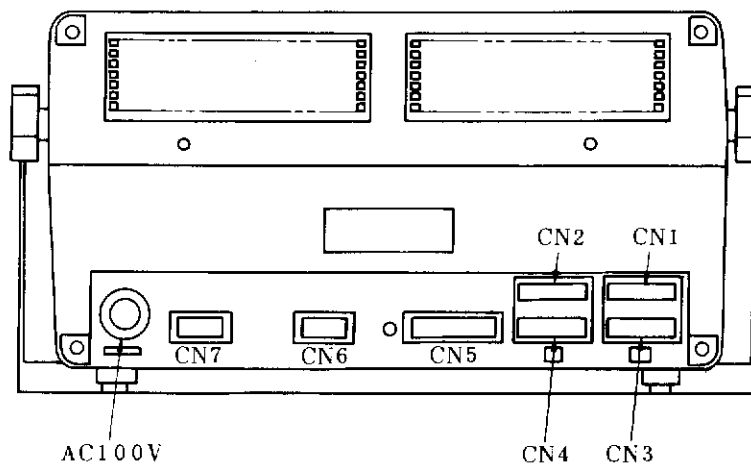
**(Remedy when an alarm occurred)**

If an alarm occurred, locate its cause, and reset it according to the following procedure.



**2.7 Connection of Input/Output Devices**

FANUC SYSTEM P-MODEL G (FSP-G) is provided with four connectors (CN1, CN2, CN3, CN4) for connecting various input/output devices as shown in the following figure.



**Mounting Layout of Connectors**

Connect these connectors normally as follows.

CN1 ..... FANUC PPR  
CN2 ..... FANUC cassette  
CN3 ..... XY plotter  
CN4 ..... Tablet

It is, however, necessary for connecting FSP-G to an external printer or connecting FSP-G to an NC system as an on-line connection to change these connector connections suitably. Accordingly, various pieces of software of P-G prepare IO commands for changing these connector connections.

(1) Designation Method

Depress **R3** key with the initial CRT for individual software. A message "REQUEST =" will be displayed at the lower left part of the CRT. Key in an IO command from the keyboard.

(2) IO command

IO command has the following format.

IO\_name, CNi [, Fj [, Fk [, FI ] ] ] **NL**

name ..... Name of device to be connected

One of the following devices is assignable.

PPR (FANUC PPR)  
BCA (FANUC cassette/hubble cassette)  
PRT (External printer)  
XYP (XY plotter)  
TAB (Tablet)  
NC (NC system)  
AUX (Others)

CNi ..... Number of connector which connects the device designated by " name ".  
(i = 1 ~ 4)

Fj ..... Number of F key (j = 1, 8 ~ 14) which designates an input

Fk ..... Number of F key (k = 5, 6, 8 ~ 14) which designates an output

FI ..... Number of F key (I = 5) which designates printing (PPR)

FANUC PPR and XY plotter are assembled in each software, so that they are connected to connectors CN1 and CN3, without specifying the above command.

In this case, the following F keys are used to designate input/output devices. The input/output operation to a corresponding device can be done by turning on an F key.

FANUC PPR	:	PTR (Paper tape reader)	F1
	:	PTP (Paper tape punch)	F6
	:	PRT (Printing)	F5
XY plotter	:		F10

(Note) TAB (tablet) is applicable to FAPT DIGITIZER only at present. Since the tablet is programmed to be connected to connector CN4, no IO command is required normally.

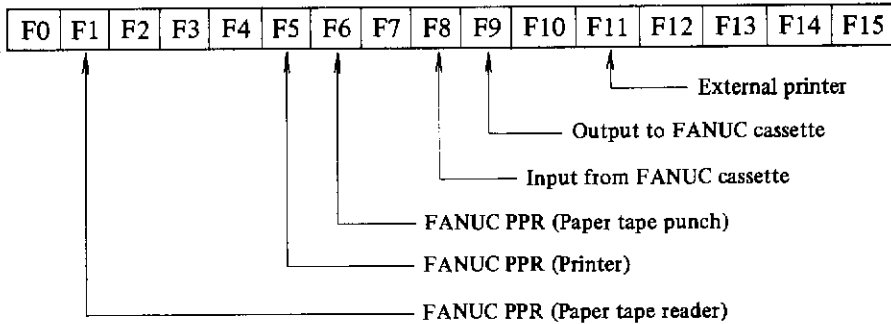
(3) Application Example

CN1 ..... FANUC PPR  
CN2 ..... External printer  
CN3 ..... FANUC cassette

For the above configuration, designate IO commands after loading an aimed software floppy.

- ① IO  $\sqsubset$  PRT, CN2, F11  $\boxed{\text{NL}}$
- ② IO  $\sqsubset$  BCA, CN3, F8, F9  $\boxed{\text{NL}}$

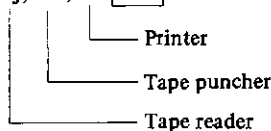
For FANUC PPR, the designation of a command is not necessary because of the standard specification. F keys correspond to I/O devices as follows after inputting these commands.



(4) Supplements

- (a) F1, F5, F6 and F8~F14 can designate IO commands. If I/O commands were designated doubly, the I/O device designated later becomes effective.  
 If "IO  $\sqsubset$  PRT, CN2, F5  $\boxed{\text{NL}}$ " is designated, for example, data are printed to an external printer by depressing F5 key and data cannot be printed on the FANUC PPR printer.  
 If connector numbers were designated doubly, the I/O device designated later becomes effective.
- (b) The F key number to be designated differs according to the I/O devices to be connected.

FANUC PPR : IO  $\sqsubset$  PPR, CN<sub>i</sub>, F<sub>j</sub>, F<sub>k</sub>, F<sub>l</sub>  $\boxed{\text{NL}}$



FANUC cassette	}	: IO	{	BCA	,	CN <sub>i</sub> , F <sub>j</sub> ,	F <sub>k</sub>	$\boxed{\text{NL}}$	}	Output	
NC system				NC							Input
Others				AUX							

For XYP (XY plotter), PRT (external printer) and TAB (tablet), designate one F key number only, since these devices are either input or output device/only.

- (c) If F key is omitted, the following F keys are regarded to have been designated.

FANUC PPR	(PPR)	: F1, F6, F5
FANUC cassette	(BCA)	: F8, F9
NC system	(NC)	: F8, F9
Others	(AUX)	: F8, F9
XY plotter	(XYP)	: F10
External printer	(PRT)	: F5

- (d) A user's dedicated system floppy with above IO commands assembled can be prepared by using the SAVE command.

## 2.8 Cleaning and Periodic Maintenance

### 2.8.1 Cleaning of P-G main unit and PPR

To keep the P-G and PPR clean and use them correctly, wipe up them by using a soft cloth such as gauze, if they becomes dirty.

If it cannot be removed, wipe up by using wet cloth. Don't use neutral detergent, alcohol, thinner, tri-chloroethylen, ketone, and the other solvents, because they may injure plastic parts and coating.

### 2.8.2 Cleaning of air filter of P-G

#### (1) Cleaning period

Clean the air filter once every month, since the air flow decrease, if the air filter is dusty.

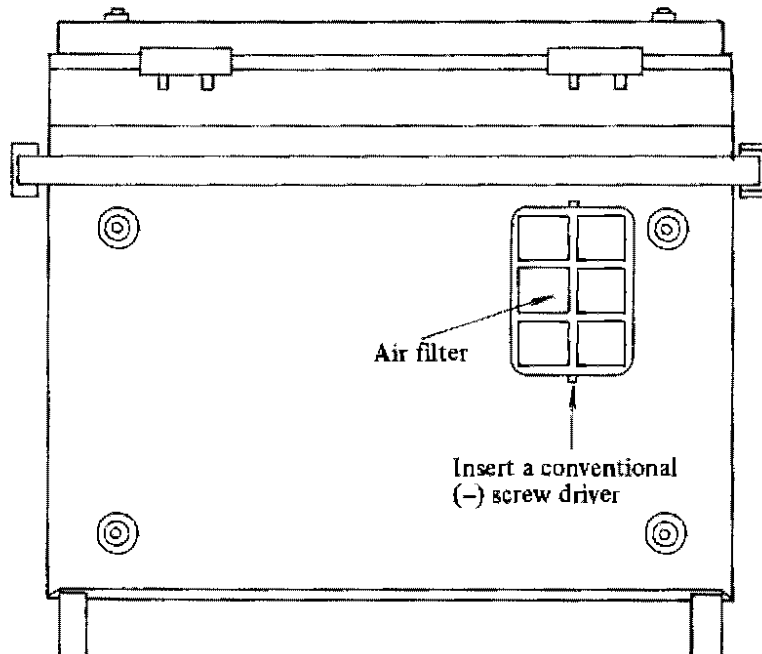
#### (2) Cleaning method

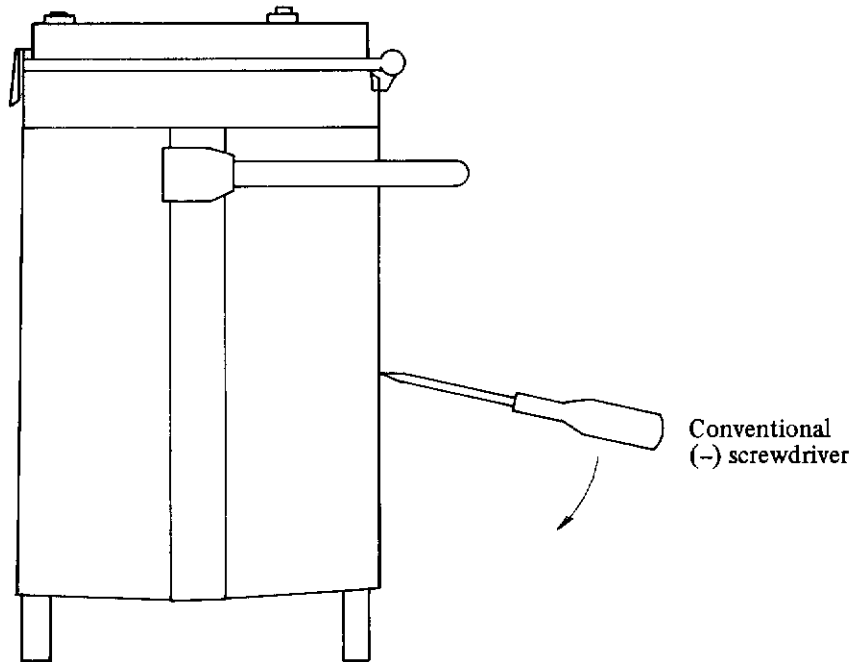
After removing the air filter from the system (see the following figure), blow off dust with compressed air from the inside, while shaking the air filter lightly.

If the air filter is seriously dusty, immerse it in to 2~4 g/liter of synthetic cleaner solvent for several minutes, and then, rinse it with pressure.

Avoid rubbing it when washing it.

After drying it in the shade, mount it at the bottom of the system.





**Fig. 2.8.2 Removal of Air Filter**

**2. 8. 3 Periodical maintenance of PPR**

Following four units require periodical maintenance. Clean and lubricate mechanical moving parts of these units periodically.

Item	Units requiring periodical maintenance
1	Printer
2	Puncher
3	Tape reader
4	Air filter

For removing dirt from the surfaces of these units, be careful with the following caution.

1	Employable	Neutral detergent and alcohol
2	Not employable	Thinner, trichloroethylene, ketone-base solvents

(1) Printer

(a) Cleaning

① Cleaning frequency

Remove dust and paper dust after printing 10 rolled printer forms or once every 3 months.

② Cleaning method

After removing the PRT cover with paper cutter and PRT form cover, remove attached paper dust from the ribbon, form guide, form platen, and other surrounding parts of the printer by means of an electric vacuum cleaner.

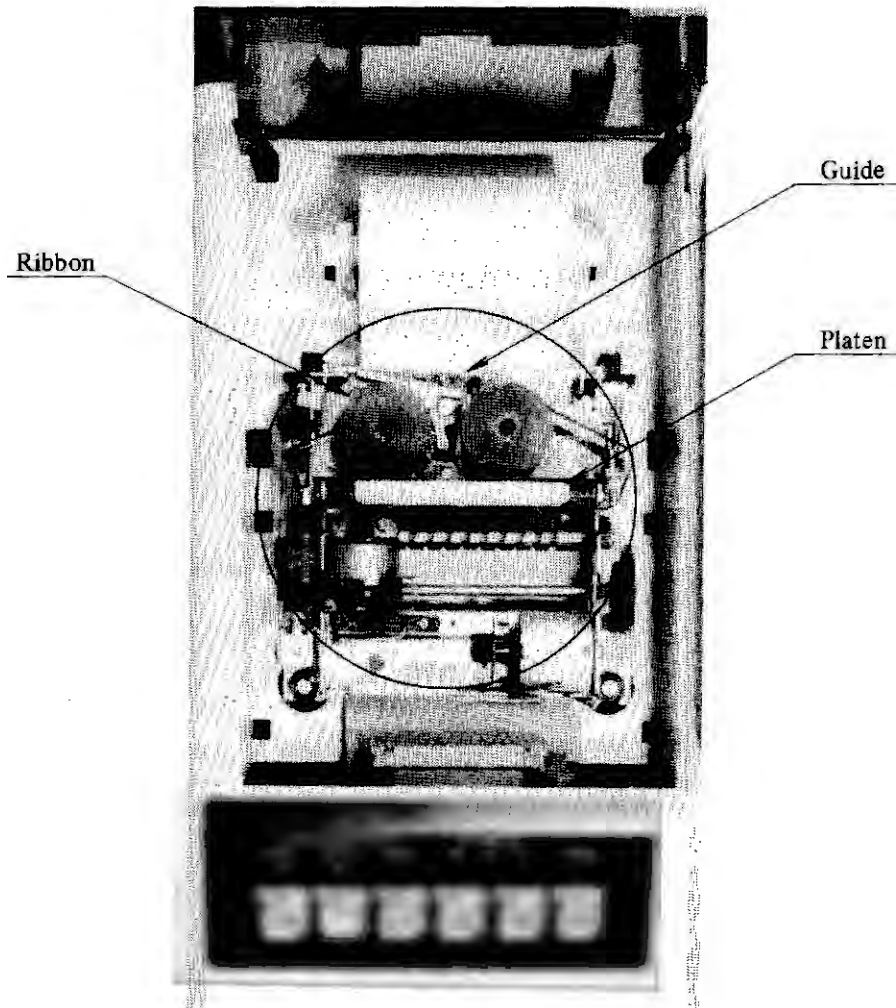
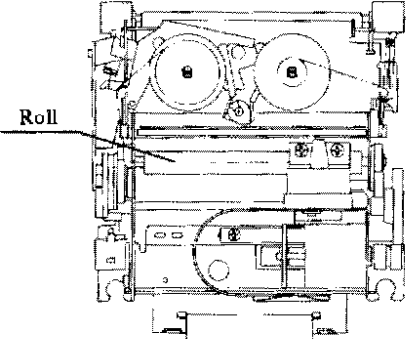
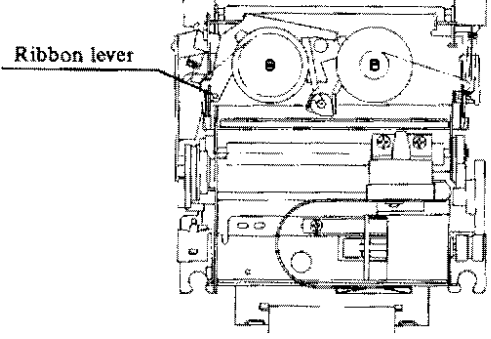


Fig. 2.8.3 (a) Cleaning of Printer

(b) Lubrication

Table 2.8.3 (a) shows lubricating parts of the printer.

Table 2.8.3 (a)

Item	Lubricating parts	Frequency	Kind of oil	Oil quantity
1	<p data-bbox="321 394 370 426">Roll</p>  <p data-bbox="451 583 500 615">Roll</p>	3 months	MULTEMP	A little
2	<p data-bbox="321 877 459 909">Ribbon lever</p>  <p data-bbox="370 1003 492 1035">Ribbon lever</p>	3 months	MULTEMP	A little

**(2) Paper tape puncher**

**(a) Cleaning**

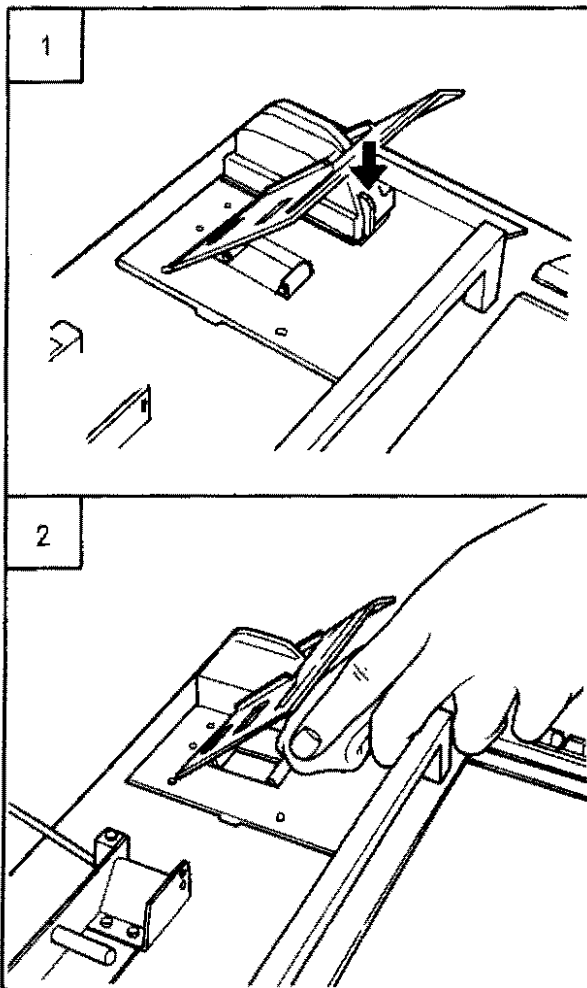
**① Cleaning Frequency**

Remove punch waste, fluff, dust and dirt from the unit after punching about 50 rolled tape or once every 3 months.

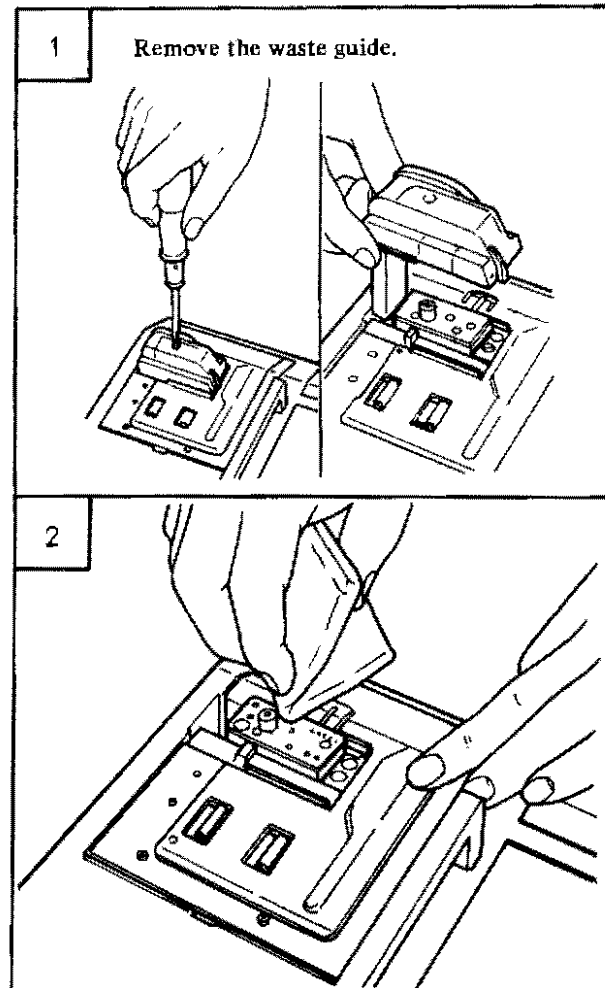
**② Cleaning method**

After removing the punch waste guide, wipe off punch waste, fluff, dust, and dirt from the tape transport face as well as the waste inside the guide by using a brush or a soft paper, or remove them by means of an electric vacuum cleaner.

**Cleaning of tape transport face**



**Removing method of punch waste guide**





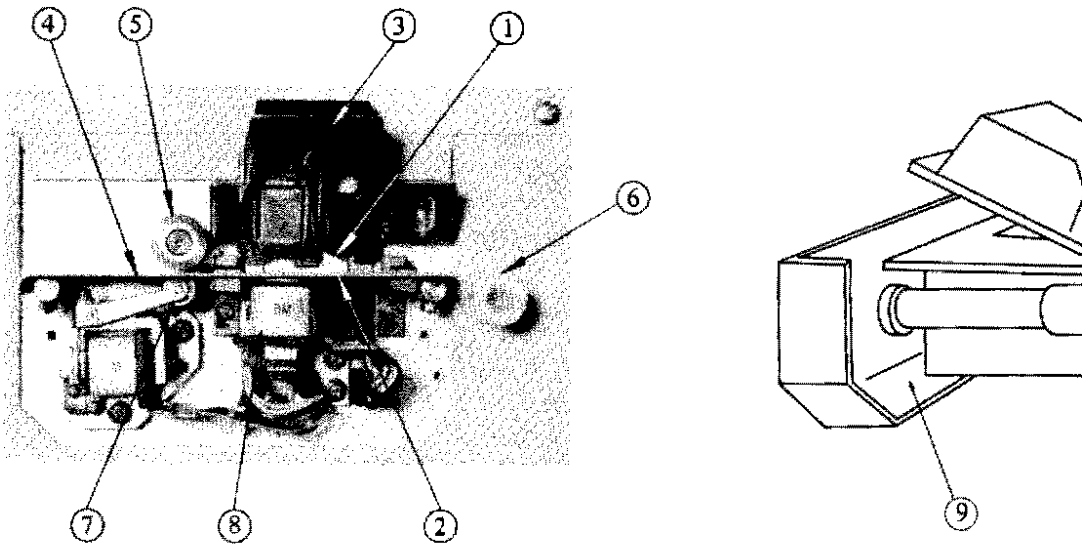
**(3) Paper tape reader**

**(a) Cleaning**

Table 2. 8. 3 (b) shows the parts to be cleaned in the paper tape reader.

**Table 2. 8. 3 (b) Parts to be cleaned in paper tape reader**

Item No.	Parts to be cleaned	Reference figure	Cleaning frequency	Cleaning method
1	Read head surface (Light receiving part)	Fig. 2.8.3(b) ①	Every day	Clean with gauze or a thin brush wetted with absolute alcohol.
2	Read head surface (Light emitting part)	Fig. 2.8.3(b) ②	Every day	
3	Tape holder plate	Fig. 2.8.3(b) ③	Every day	
4	Tape transport surface	Fig. 2.8.3(b) ④	Every day	
5	Capstan roller	Fig. 2.8.3(b) ⑤	Every week	
6	Roller guide	Fig. 2.8.3(b) ⑥	Every week	
7	Pinch roller	Fig. 2.8.3(b) ⑦	Every week	
8	Assembly part of machine mounted below the tape transport plate	Fig. 2.8.3(b) ⑧	Every month	Clean with a cloth or a brush.
9	Inside the tape reader cover	Fig. 2.8.3(b) ⑨	Every month	

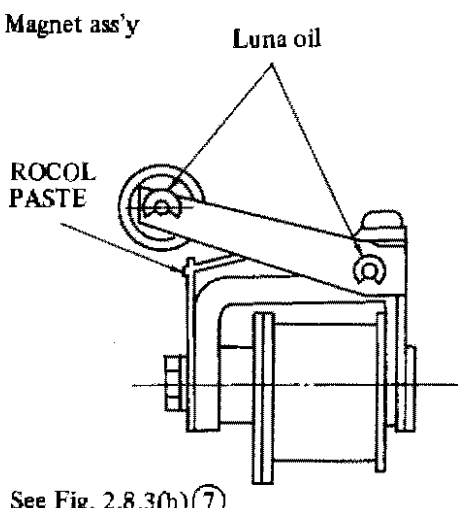


**Fig. 2.8.3 (b) Parts to be Cleaned in Paper Tape Reader**

(b) Lubrication

Table 2.8.3 (c) shows the parts to be lubricated in paper tape reader.

**Table 2. B. 3 (c) Parts to be lubricated in paper tape reader**

Item No.	Parts to be lubricated	Frequency	Kind of oil	Oil quantity
1		3 months	Luna oil	One drip
		1 year	ROCOL PASTE	To such an extent as oil forms a thin film

(Note) *Kinds of oil*

Item	Name	Brand	Maker
1	Luna oil	Luna 40	Nippon Oil
2	ROCOL PASTE	LOCOL PASTE	Sumitomo Kinzoku Kozan Co.
		ROCOL ASP	ROCOL CO. LTD. (UK)

Item	Name	Type	Volume
1	Luna Oil	WT7004A	50 cc
2	ROCOL PASTE	WT7022	50 g

**(4) Air filter**

**(a) Cleaning**

**① Cleaning frequency**

Clean the air filter once every month, since the air flow decreases, if the air filter is dusty.

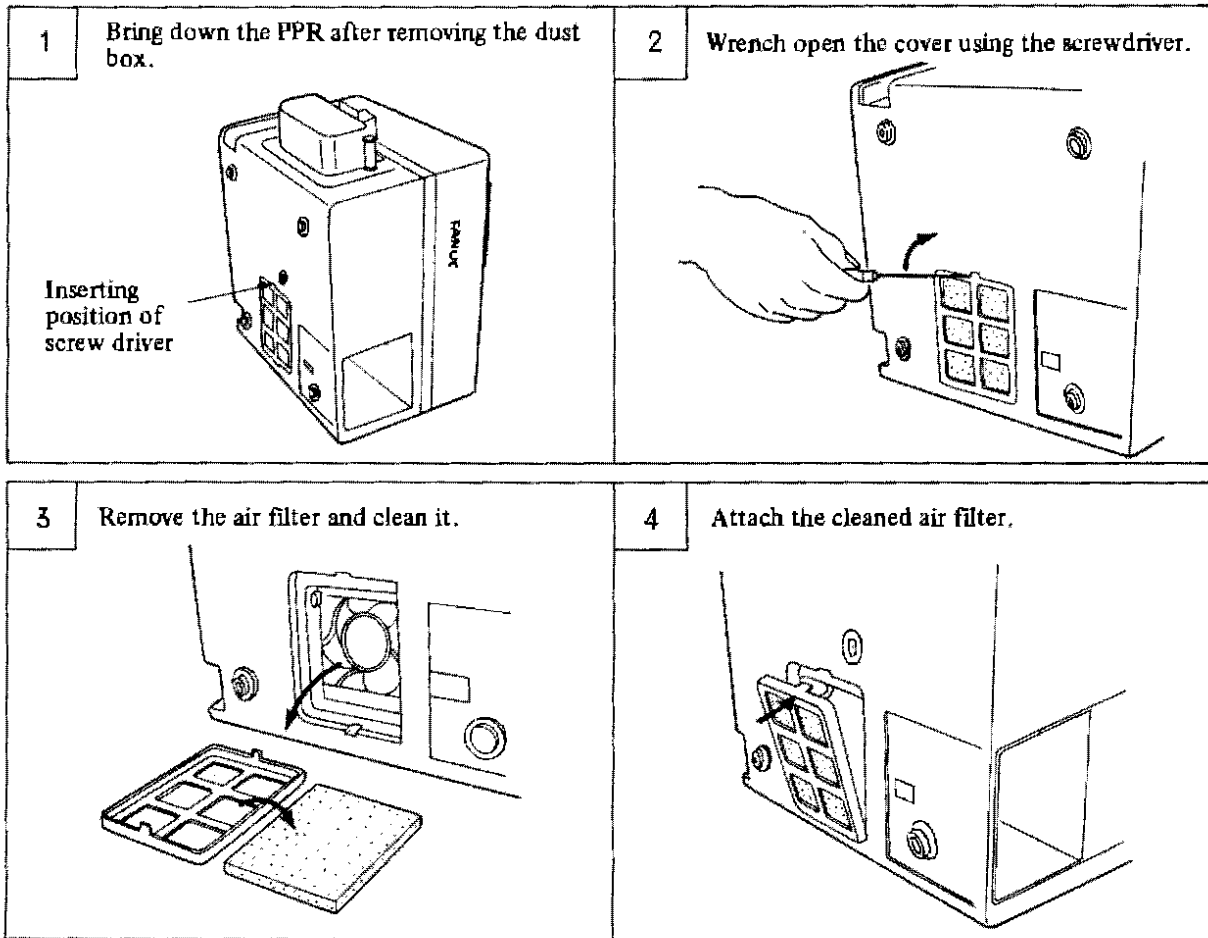
**(b) Cleaning method**

Remove the air filter and clean it according to the following procedure.

If the air filter is not so dirty, blow off compressed air from the inside while shaking the air filter, and eliminate clogging due to dust. If it is seriously dirty, immerse it into 2 ~ 4g/liter of synthetic cleaner, and then, wash it with pressure.

Don't rub it during washing.

Dry it in the shade after rinsing it with fresh water.



## 2.9 Consumables and Spare Parts

You are requested to use the consumables and spare parts satisfying their specifications for the purpose of operating P-G under a good operating condition. These consumables and spare parts are introduced below.

Item	Consumables/ spare parts	Manufacturer	Types	Specifications	Remarks
1	Diskette	Hitachi Maxcell Co. (TEL: 03-567-6221)	Mini-floppy diskette MD2-256D	Dual-face density IBM format 1 track=16 sectors 1 sector=256 bytes 48 TPI	
2	Printer form	CBM Co. (TEL: 03-200-6291)	RP-69/50	69 x 50φ 20 rolls unit	¥5.000.-/20 rolls
3	Printer ink ribbon	CBM Co. (TEL: 03-200-6291)	IR-01 B/R	13 x 30φ 12 pcs.	¥9.000.-/12 pcs.
4	Paper tape	Kobayashi Chart Sales Co. (TEL: 03-553-4131)	Information ex- change 8-unit tape	JIS C6243	
5	Paper tape releaser	Uchida Yoko Co. (TEL: 03-555-4281)	271-0104 S type	For tape diameter 160 mm	This unit is used for feeding a long paper tape. Besides, KOKUYO's pro- duct, etc. are available.
			271-0105 L type	For tape diameter 230 mm	
6	Paper tape winder	Uchida Yoko Co. (TEL: 03-553-4131)	271-0112 B type		This unit is used to wind paper tape by hand. Besides, KOKUYO's pro- duct, etc. are available.

### 3. TROUBLESHOOTING

#### 3.1 FAPT DOCTOR

The P-G can easily execute programs and obtain processing data by loading a system program after turning on the power supply. However, if a part of the system is defective or in trouble, processing will not be done at all or processing will stop halfway. This system provides a diagnostic function called FAPT DOCTOR so as to quickly locate a defective or trouble part and reduce the recovery time in such a case.

This function is also employable for function tests of units when the system is installed.

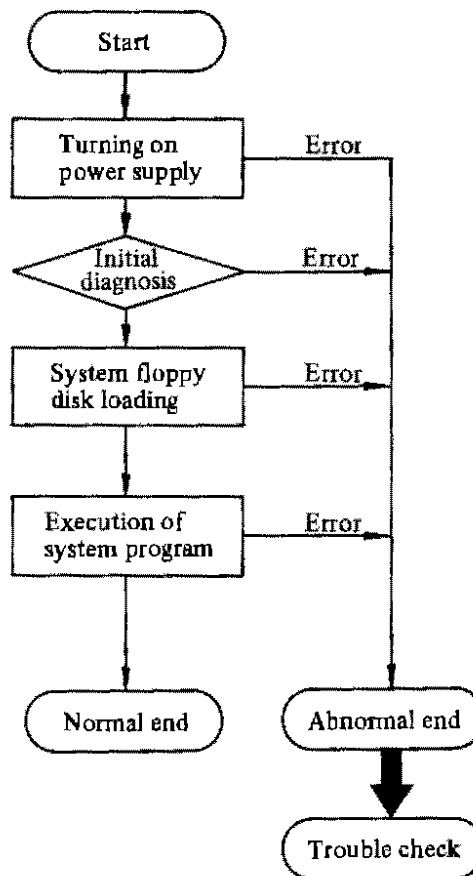


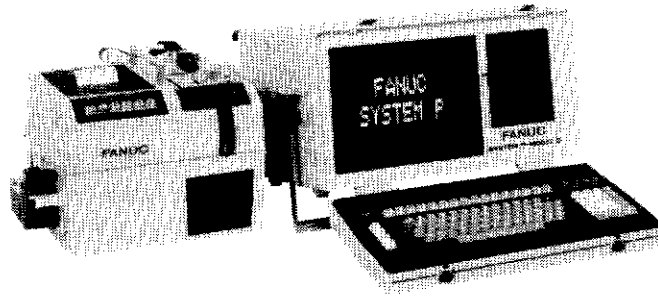
Fig. 3.1 Troubleshooting

The FAPT DOCTOR can execute the system diagnosis by using the display unit for locating a cause of a trouble, if the specified data cannot be obtained due to a defect of hardware or the occurrence of a trouble during operation.

#### 3.2 Trouble Check

##### 3.2.1 Troubles after turning on the power supply

When the system is operating normally after turning on the power supply, the pattern shown in Fig. 3.2.1 appears on the graphic display.



**Fig. 3. 2. 1 Initial condition after turning on the power supply**

However, if one of the following troubles was detected, check it according to Table 3.2.1.

- (a) The message pattern indicating the system being ready for operation (pattern in Fig. 3.2.1) does not appear at all after turning on the power supply.
- (b) A wrong message is displayed.
- (c) An error message is displayed to indicate an abnormal condition.

**Table 3. 2. 1 Troubleshooting after turning on the power supply**

Symptoms	Check points
FANUC SYSTEM P does not appear on CRT.	<ul style="list-style-type: none"> <li>• It takes several ten seconds until a stable display appears on CRT when CRT is not warmed up sufficiently in the initial stage.</li> <li>• Check if power cord is properly connected.</li> <li>• Check if fuse is blown out.</li> </ul>
None of F key lamps lights on the keyboard after turning on the power supply.	<ul style="list-style-type: none"> <li>• Memory diagnosis is made inside the system after power has been applied. A part of F key lamps light during memory diagnosis (7 ~ 8 seconds)</li> <li>• All lamps go out after diagnosis has finished normally.</li> <li>• Check if cable is connected normally between the main unit and the keyboard without any looseness.</li> </ul>
A part of F key lamps remain lit.	<ul style="list-style-type: none"> <li>• A fault is detected in internal diagnosis. An error message is displayed concurrently.</li> </ul>
An error message is displayed.	<ul style="list-style-type: none"> <li>• Check the system according to the error message being displayed on CRT. Refer to 3.18 "Error messages and diagnosis".</li> </ul>

### 3. 2. 2 Troubles during loading of system floppy disk

All the work using this system should be started with the system floppy disk loading. Check the operation according to the following procedure during loading.

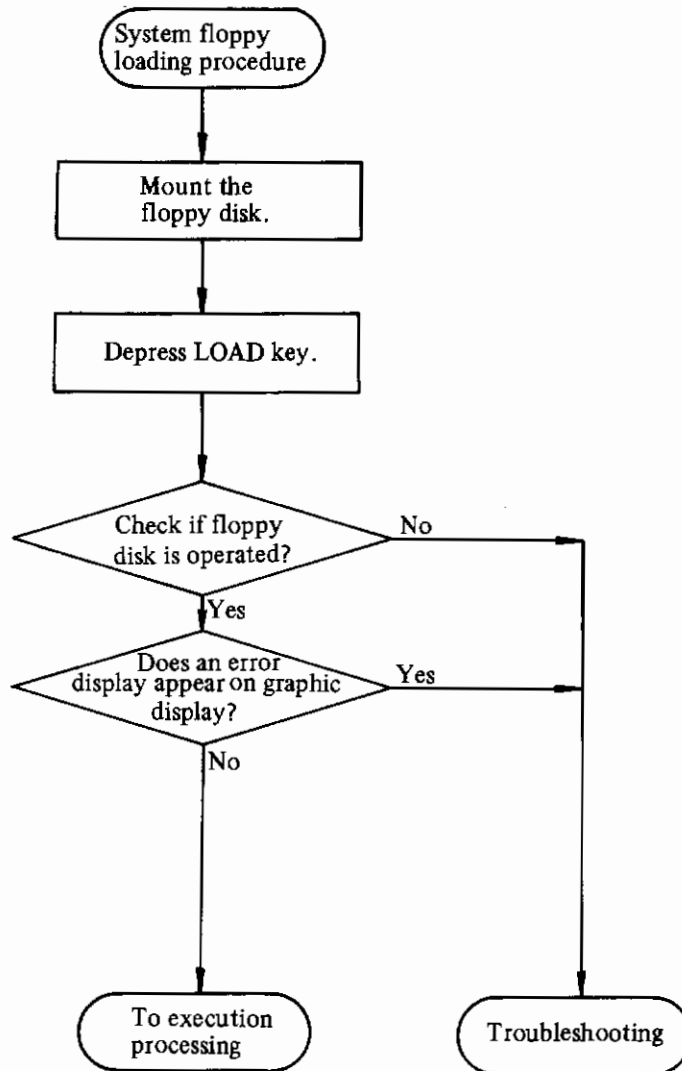


Fig. 3. 2. 2 (a) System floppy loading procedure

When the system floppy disk loading has been completed normally by the LOAD key, the "FAPT DOCTOR" is displayed on the CRT of P-G. If a trouble occurred, check the system according to Table 3.2.2.

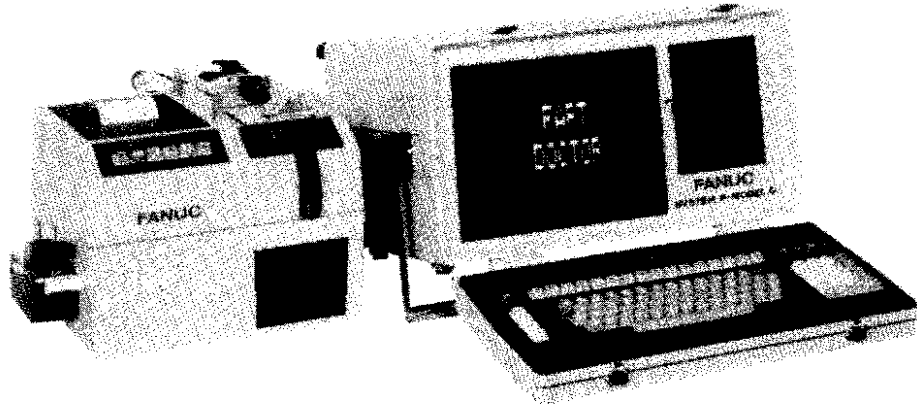


Table 3. 2. 2 (b) System condition at loading the system floppy disk

Symptoms	Check points
<ul style="list-style-type: none"> <li>• "FAPT DOCTOR" is not displayed.</li> </ul>	<ul style="list-style-type: none"> <li>• Is the "FAPT DOCTOR" displayed on the CRT?</li> <li>• Is the cable between the P-G main unit and keyboard disconnected?</li> </ul>
<ul style="list-style-type: none"> <li>• Error message is displayed.               <ul style="list-style-type: none"> <li>* E00 FD NOT FOUND</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• The floppy disk is not set or the front door of floppy disk unit is not closed fully, and LOAD key is pushed.</li> <li>• Check the inserting direction of the floppy disk.</li> <li>• Is the set floppy disk the system floppy disk? (Is the work floppy disk set?)</li> </ul>
<ul style="list-style-type: none"> <li>• Error message is displayed.               <ul style="list-style-type: none"> <li>* E01 FD DATA ERROR (OO .....)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Is the floppy disk deteriorated or injured. Retry by another system floppy disk for comparison.</li> </ul>



### 3. 2. 3 Troubles during system execution

If one of the following troubles occurred, check it according to Table 3.2.3.

Examples of abnormal conditions during system execution

- (1) Data don't appear on CRT at all.
- (2) The condition remains unchanged, and no answer appears when depressing optional keys.
- (3) I/O unit runs always, and it does not stop.

Example:

- A display pattern is disturbed continuously.
- Line feed of printer does not stop.
- Tape reader or tape puncher continues operating.

- (4) Processing results differ after executing the same processing, or processing is impossible.
- (5) An error message is displayed during execution.

Check the following items, and inform the service center of check results.

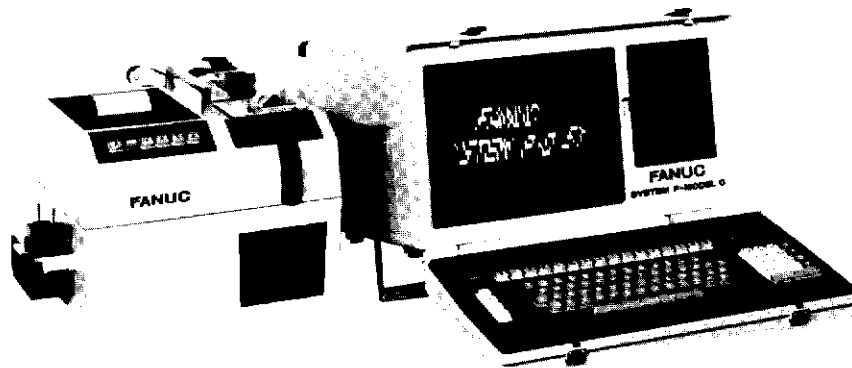


Fig. 3. 2. 3 Abnormal condition during execution (example)

Table 3.2.3 Troubles during system execution

Symptoms	Check points
Condition remains unchanged, and no answer appears on CRT when depressing optional keys.	<ul style="list-style-type: none"> <li>• Check if tape has slipped out during reading the paper tape. Set the tape again, if it has slipped out.</li> <li>• Check if operation has been done correctly without mistake.</li> <li>• Check if the same symptom appears during retry.</li> </ul>
I/O unit runs away	<ul style="list-style-type: none"> <li>• Check if input operation has been done correctly without mistake.</li> <li>• Check if the system operates normally in retry.</li> </ul>
An error message appears during execution, and processing stops.	<ul style="list-style-type: none"> <li>• Message and check items               <ol style="list-style-type: none"> <li>(1) *EXX MEMORY ERROR                    (OOOO OOOO ..... OOOO)                    (OOOO OOOO ..... OOOO)                    Check if the same error display appears at the same time during retry.</li> <li>(2) *E20 OVER HEAT                    Check if room temperature and P-G main unit temperature are abnormal.</li> </ol> </li> </ul>

### **3.3 FAPT DOCTOR Floppy Disk**

#### **3.3.1 General**

This floppy disk is loaded with programs having a system diagnostic function, and it can execute detailed diagnosis together with the built-in diagnostic function of the system.

It also includes fault detection programs for I/O units, and it diagnoses I/O operations of each unit by using test data, if these I/O units are in trouble.

These diagnostic functions can be executed individually, while an operator dialogues with the graphic display.

#### **3.3.2 Functions**

The system floppy disk contains diagnostic programs to test the following two functions.

##### **(1) Internal control unit test**

This system floppy disk tests the operations of the built-in control unit, memory unit, and arithmetic unit of the system.

##### **(2) I/O unit test**

This system floppy disk tests the operations of the following I/O units.

- |                              |                      |
|------------------------------|----------------------|
| (a) Graphic display          | (g) X-Y plotter      |
| (b) Keyboard                 | (h) FANUC cassette   |
| (c) Printer (FANUC PPR)      | (i) Tablet           |
| (d) Tape reader (FANUC PPR)  | (j) External printer |
| (e) Tape puncher (FANUC PPR) | (k) Interface        |
| (f) Floppy disk unit         |                      |

### 3. 3. 3 Operation method

Observe the following procedure.

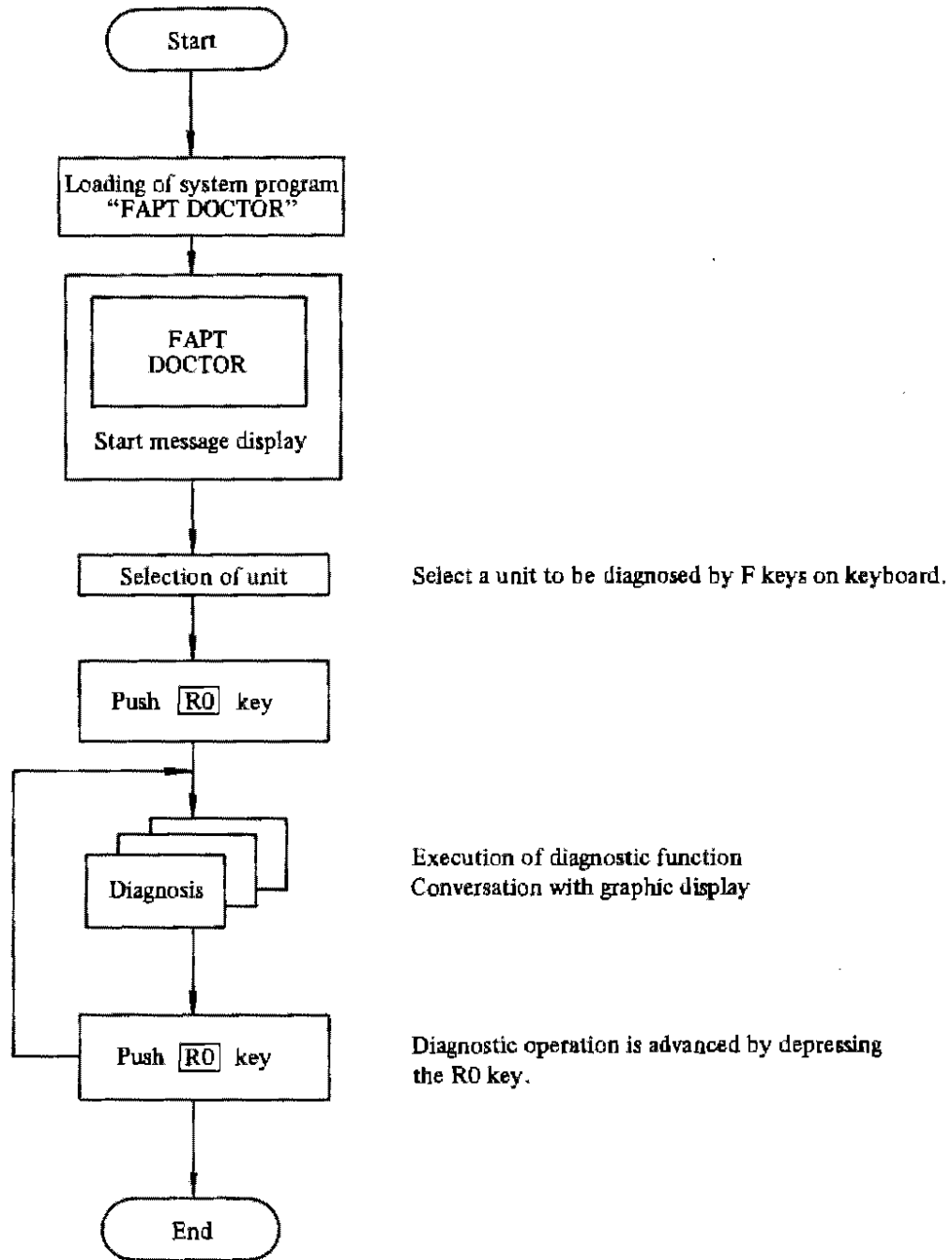


Fig. 3. 3. 3 (a) Operation procedure

(1) FAPT DOCTOR instructs operations and selects a unit to be diagnosed by depressing job keys (R0 ~ R3, F0 ~ F15) arranged on the keyboard. A job plate is prepared as shown in Fig. 3. 3. 3 (b) for the convenience of operations.

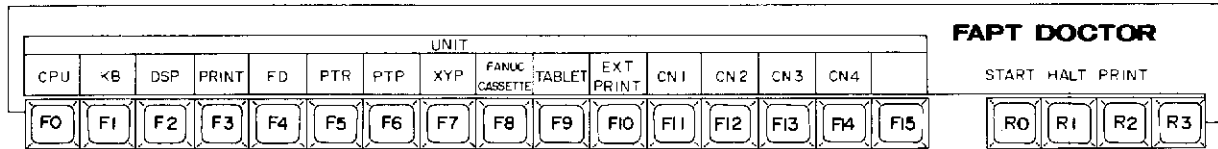


Fig. 3. 3. 3 (b) Job plate

**R Keys**

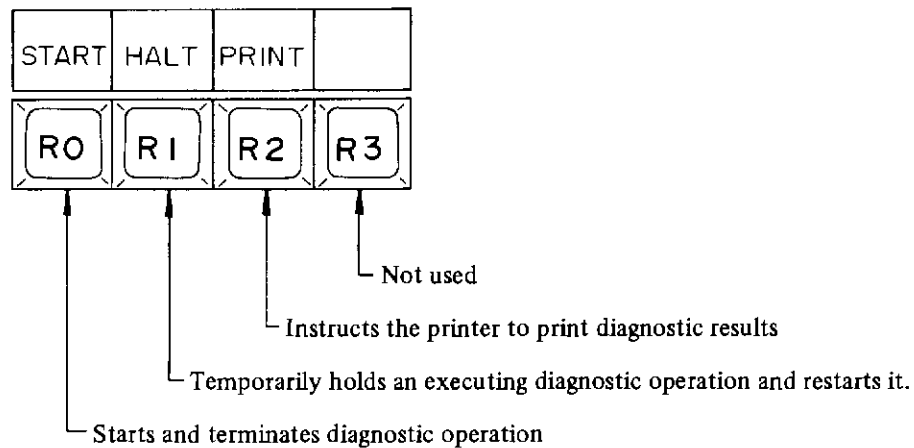


Fig. 3. 3. 3 (c) R keys

(a) START key (R0 key)

This key is used to start and terminate diagnostic operation. It also instructs the start of execution during diagnostic processing.

(b) HALT key (R1 key)

When depressing this key during diagnostic operation, diagnostic processing is temporarily stopped at a breakpoint of the executing diagnostic operation. When depressing this key again, diagnostic processing is started again.

(c) PRINT key (R2 key)

When depressing this key during diagnostic operation, diagnostic information is printed on the printer.

When depressing this key again, printing remains stopped until it is operated again.

## F Keys

UNIT														
CPU	KB	DSP	PRINT	FD	PTR	PTP	XYP	FANUC CASSETTE	TABLET	EXT PRINT	CN1	CN2	CN3	CN4
F0	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13	F14

Fig. 3.3.3 (d) F keys

These F keys select the unit to be diagnosed.

- Overall diagnosis  
When all keys are turned off (built-in lamp goes off), all units other than option are diagnosed according to the programmed sequence.
- Individual diagnosis  
Individual units selected by F0 ~ F14 are diagnosed one by one. (If plural units are selected concurrently, the unit selected by a left switch is effective)

(a) Control (F0 key)

Diagnoses built-in various control units, arithmetic units, and memory unit in the main unit.

(b) Key entry (F1 key)

Diagnoses input functions of keyboard.

(c) Display (F2 key)

Diagnoses functions of graphic display unit.

(d) Printer (F3 key)

Diagnoses functions of FANUC PPR printer.

(e) Floppy disk (F4 key)

Diagnoses functions of floppy disk unit.

(f) Paper tape reader (F5 key)

Diagnoses functions of PPR tape reader unit.

(g) Paper tape punch (F6 key)

Diagnoses functions of PPR tape punch unit.

(h) XY plotter (F7 key)

Diagnoses functions of XY plotter.

(i) FANUC Cassette (F8 key)

Diagnoses functions of FANUC cassette.

(j) Tablet (F9 key)

Diagnoses functions of the tablet.

(k) External printer (E10 key)

Diagnoses printing functions of external printer.

(l) Interface (F11 ~ F14)

Diagnoses functions of interface CN1, CN2, CN3, and CN4 which connect various I/O units (FANUC PPR, for example.)

### (2) Connection of I/O units

Connect I/O units to be diagnosed to the P-G main unit before starting FAPT DOCTOR. The connector numbers are predetermined as follows.

CN1 . . . . . FANUC PPR signal cable

CN2 . . . . . FANUC cassette adapter or external printer cable

CN3 . . . . . X-Y plotter signal cable

CN4 . . . . . Tablet signal cable

These connectors are arranged as shown in Fig. 3.3.3(e) as viewed from the rear panel of the P-G main unit.

Two kinds of units are connectable to CN2.

Connect I/O units to be diagnosed to corresponding connectors before starting FAPT DOCTOR.

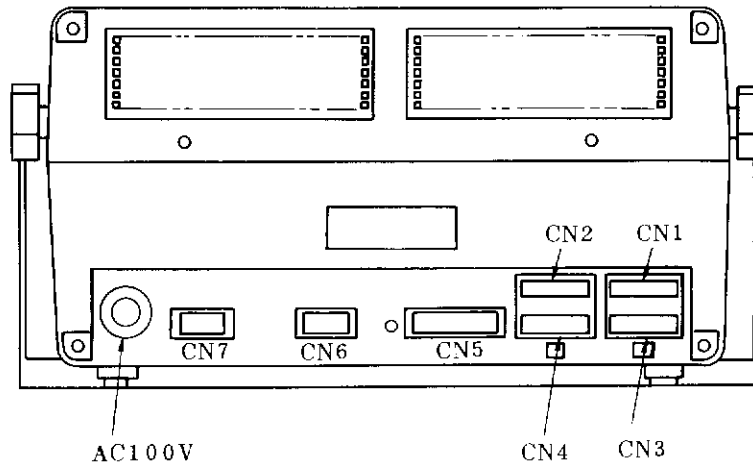


Fig. 3. 3. 3 (e) Mounting layout of connectors (Rear panel of the main unit)

### (3) Start

When FAPT DOCTOR has been loaded from the floppy disk, the following pattern appears on the graphic display.



Fig. 3. 3. 3 (f) Initial pattern

For overall diagnosis of all units, turn off all keys (F0 ~ F15). For individual diagnosis of these unit, turn on a corresponding key. Then, depress the start key (R0) to start FAPT DOCTOR.

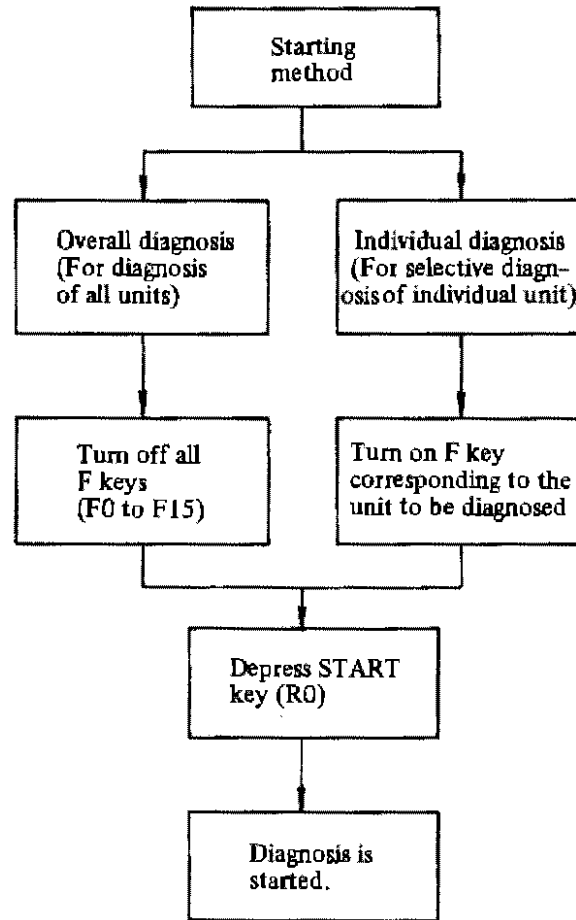


Fig. 3. 3. 3 (g) Start of FAPT DOCTOR

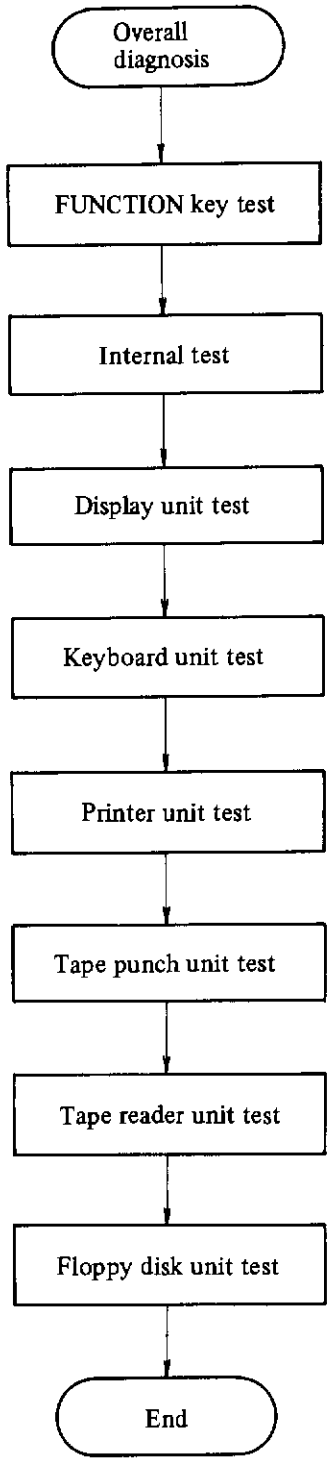
### 3. 4 Overall Diagnosis

#### (1) Functions

Overall diagnosis is to diagnose all units to locate a trouble according to the programmed number of diagnostic times and sequence of all units. This diagnosis can easily be advanced according to the instructions being displayed on the graphic display.

#### (2) Operation method

Turn off all unit select keys (F0 ~ F15), and depress the START key (R0). Diagnosis is done in the sequence shown in the following figure. These operations are repeated for each check during diagnosis of functions of each unit. For stopping the repetition and proceeding to the next diagnosis, depress the START key (R0).



- Operations of job keys (F0 ~ F15) mounted at the upper part of the keyboard unit are diagnosed.

- Memory and internal control unit are diagnosed.

- I/O units are diagnosed.

*(Note) When depressing R0 key during diagnosis, the operation is stopped at the delimiter of the executing operation to proceed to the next diagnosis.*



### 3.5 Individual Diagnosis

#### (1) Functions

Individual diagnosis is to diagnose a unit individually by selecting the unit to be diagnosed. This diagnosis is started, stopped, and processed by an operator.

#### (2) Operation method

After depressing one of the unit selection keys (F0 ~ F14) corresponding to the unit to be diagnosed, depress the START key (R0), and the diagnostic program for the corresponding unit is started. If the diagnostic sequence of a unit consists of a single step, depress the START key (R0) again, and the execution ends to return processing to the initial condition.

If the diagnostic sequence consists of plural steps, the diagnostic processing advances each time the START key (R0) is depressed, and it returns to the initial condition.

### 3.6 Control Unit Test

#### (1) Functions

This program tests FUNCTION keys and internal memory of the main unit.

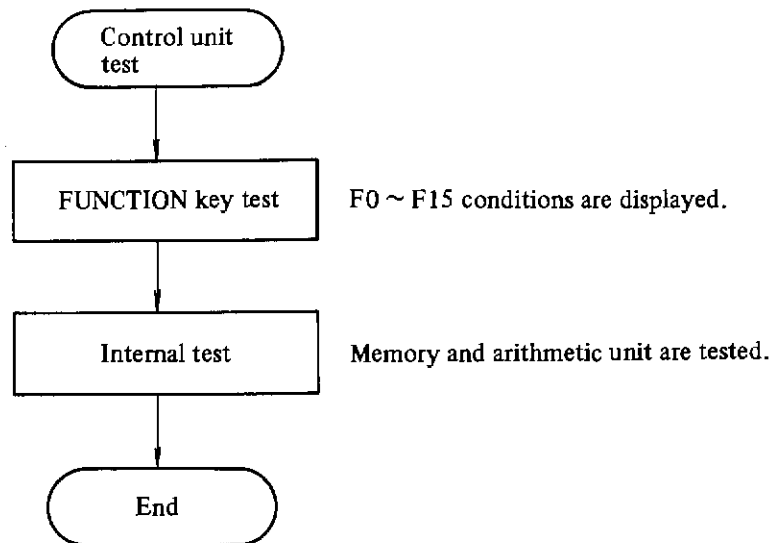


Fig. 3.6 Control unit test

#### 3.6.1 FUNCTION key test

##### (1) Functions

Turn on and off function keys F0 to F15. The key conditions are displayed on the graphic display.

##### (2) Diagnostic method

When F0 to F15 lock keys are turned on, the built-in lamps light. When these lock keys are turned off, the built-in lamps go out. Check if these ON/OFF conditions are displayed on the graphic display.

### (3) Display

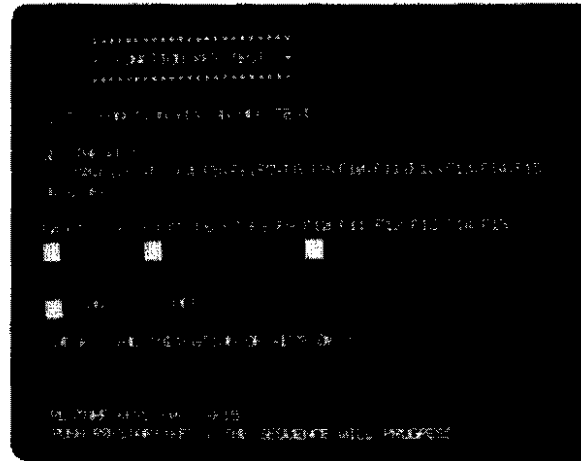


Fig. 3. 6. 1 Function key test

#### Check items

Check if the ON/OFF operation of keys is displayed on the graphic display. Make sure F key lamps are lighting when they are displayed to have been turned "ON" on the graphic display.

### 3. 6. 2 Internal test

#### (1) Functions

This program tests internal memory and arithmetic control unit.

#### (2) Diagnostic method

The diagnostic information is sequentially displayed on the graphic display when diagnostic results are correct during diagnosis. If an error is produced, an error message is displayed.

It takes about 10 minutes to complete this diagnosis. When F15 key is turned on during memory diagnosis, the memory condition is displayed. However, if diagnosis is continued while keeping this F15 key turned on, the required time will amount to several hours. Keep this F15 key turned off under normal condition.

### (3) Display

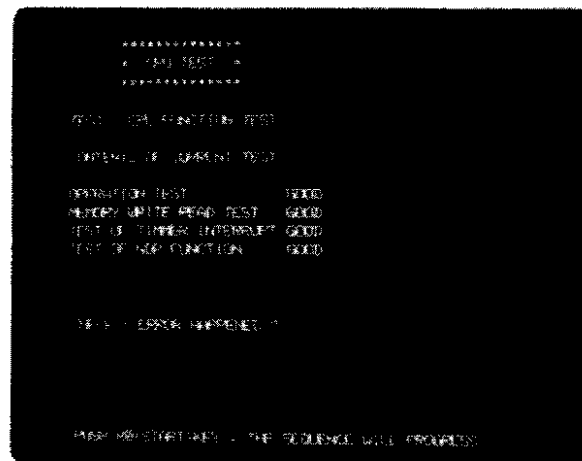


Fig. 3. 6. 2 Internal test

#### Check items

Check if an error message appears during execution of the diagnostic work. For details of errors, refer to item 3.18 "Error messages and diagnosis".

### 3.7 Display Unit Test

#### (1) Functions

This program tests various functions of the display unit according to the following sequence.

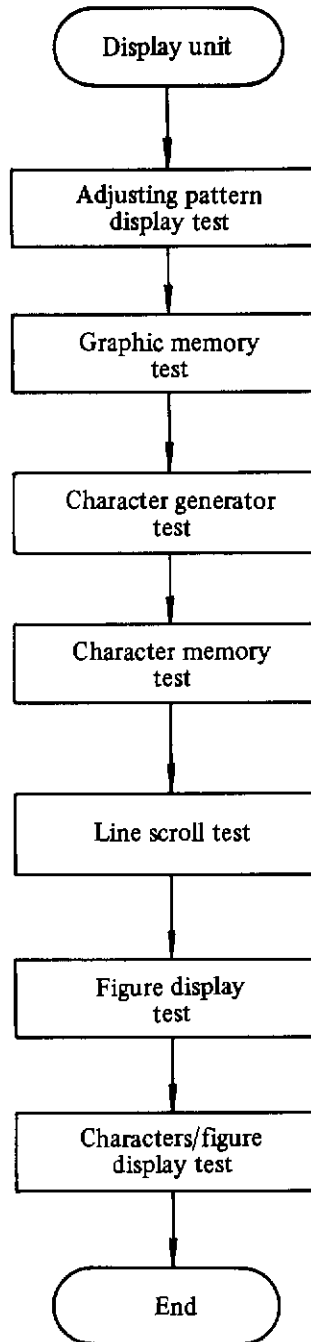


Fig. 3. 7. 1 Graphic display test

#### (2) Diagnostic method

The diagnosis in (1) is executed by the number of times specified by the program, and it sequentially proceeds to the next test sequence.

### 3. 7. 1 Adjusting pattern display test

A pattern is displayed as shown in Fig. 3.7.1 for adjusting the patterns on the graphic display.

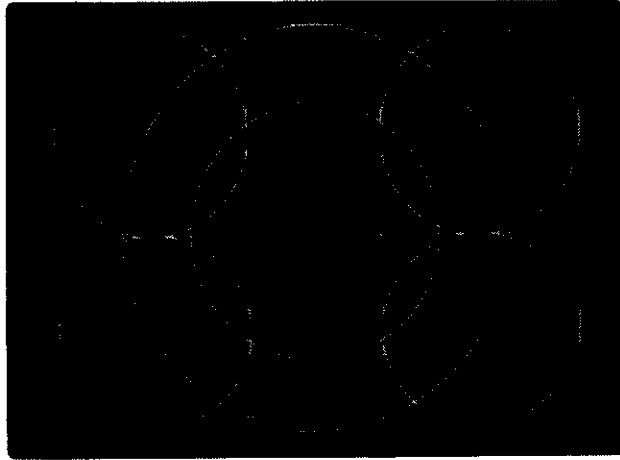


Fig. 3. 7. 1 Adjusting pattern

#### Check items

Check the displayed pattern for extreme distortion.

### 3. 7. 2 Graphic memory test

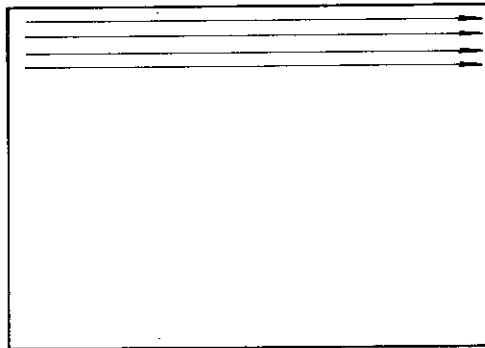


Fig. 3. 7. 2 Graphic memory test

Straight lines are sequentially displayed starting with the upper left part of the graphic display until the entire graphic display is covered with these straight lines. Then, these straight lines are deleted one by one, starting with the lower right part.

#### Check items

Check the straight lines displayed on the graphic display for missing lines.

### 3. 7. 3 Character generator test

After the entire picture has been deleted, all alphanumeric characters employed in the graphic display are displayed.

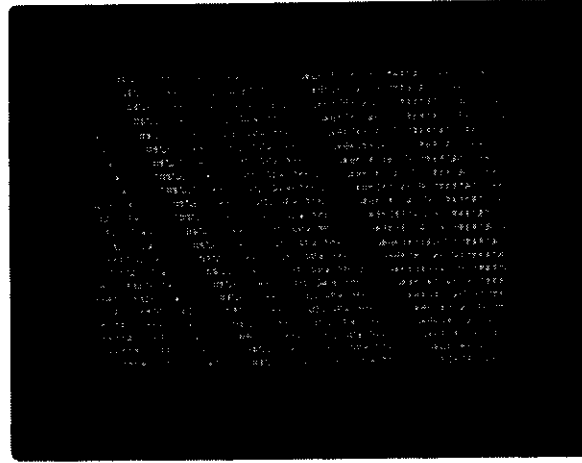


Fig. 3. 7. 3 Character generator test

#### Check items

Check if characters are arranged in good order on the graphic display.

### 3. 7. 4 Character memory test

The following characters are displayed over the entire graphic display at fixed time intervals.

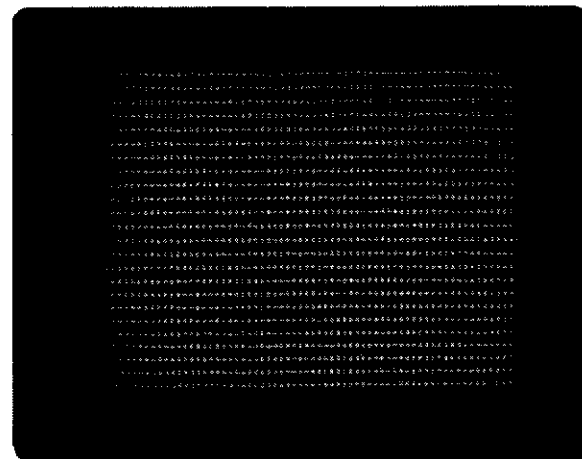
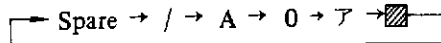


Fig. 3. 7. 4 Character memory test

#### Check items

Check if displayed characters are normal.

### 3. 7. 5 Scroll test

Displayed picture shifts (scrolls) upward every line.



Fig. 3. 7. 5 Scroll test

### 3. 7. 6 Figure display test

The previous picture is deleted, and concentric circles are drawn.

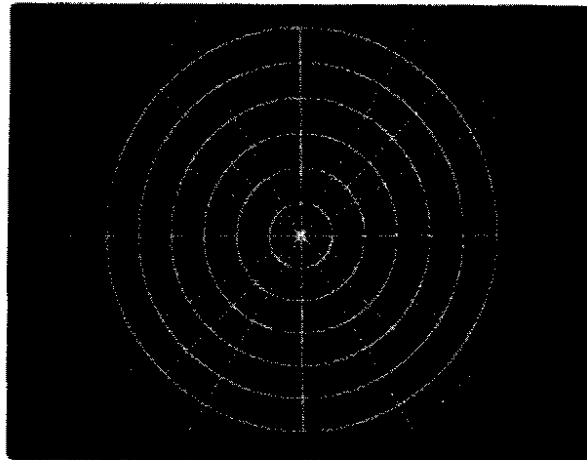


Fig. 3. 7. 6 Figure display test

#### Check items

Check if straight lines extend in  $45^\circ$  and  $90^\circ$  direction correctly.

Check concentric circles for noticeable distortion.

### 3.7.7 Character/figure display test

This test displays figures and characters mentioned in item 3.7.3 and 3.7.6 together or separately by repeating the following cycle.

- Both figures and characters are displayed.
- Only figures are displayed.
- Only characters are displayed.

#### Check items

Check if figures or characters only are displayed at all times.

## 3.8 Keyboard Unit Test

### (1) Functions

This program tests the keyboard unit to make sure that the input information is correctly sent to the system from the keyboard.

### (2) Diagnostic method

Key in optional characters from the keyboard unit, and input characters will be displayed on the graphic display. The cursor indicates the position where an input character is displayed next.

When depressing **[NL]** key, the cursor shifts to the start of the next line.

When depressing **[BS]** key, the cursor moves backward by one character.

When depressing **[CAN]** key, the whole line is deleted.



Fig. 3.8 Keyboard test

#### Check items

Check if keyed in characters are displayed normally on the graphic display.

If a character is keyed in after depressing R2 (PRINT) key in advance, input data are also printed on the printer, each time the **[NL]** key is depressed. If input data are not printed, check the printer by the printer test.

### (3) Error display

If an error message is displayed halfway during test, refer to item 3.18 "Error messages and diagnosis".

### 3.9 Printer Unit Test

#### (1) Functions

This program prints test data on FANUC PPR printer unit, and checks the printer form feed mechanism during printing, error printing, and missing characters. (Connect FANUC PPR to connector CN1 of P-G).

#### (2) Diagnostic method

When the FANUC PPR printer unit diagnosis is started, the printer control unit is diagnosed, and test data are printed, if diagnostic results are normal.

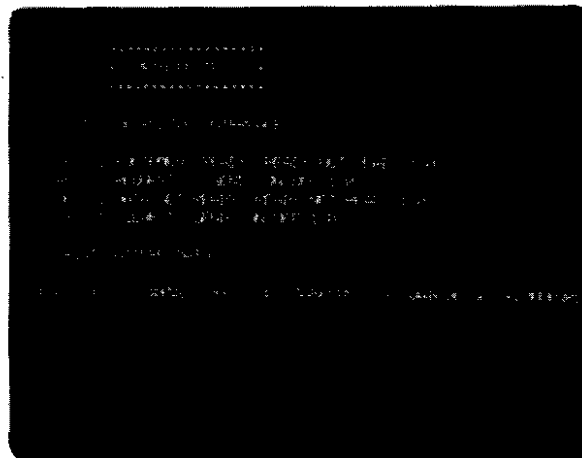


Fig. 3.9 (a) Printer unit test

#### Check items

Check printed list for uneven characters, error characters, and missing characters.

Examples of wrong printing on printer

- Either upper or lower part is missing
- Character intervals or line intervals are not even.
- Printed character depth is uneven.

#### (3) Test data

Forty characters are printed in one line. Characters are printed in the next line by shifting them rightward by one digit.

When the shifted character returns to the head, the next characters (40 characters) are printed similarly.

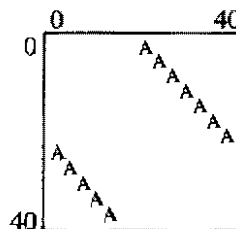
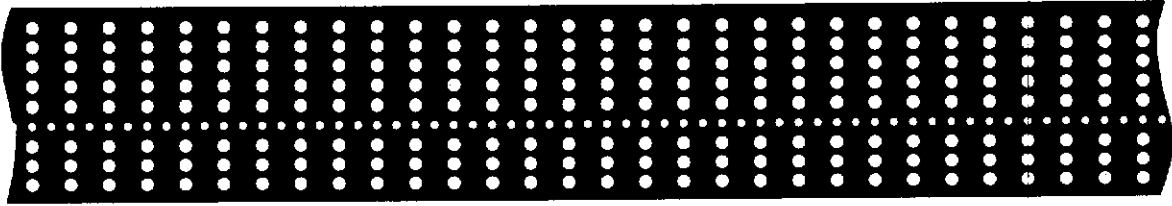


Fig. 3.9 (b) All characters printing test

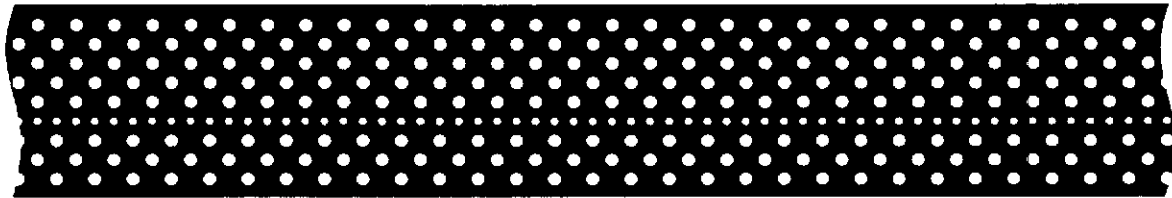




③ Alternate punch of all performed punch/zero



④ Zig-zag punch



⑤ Pattern punch

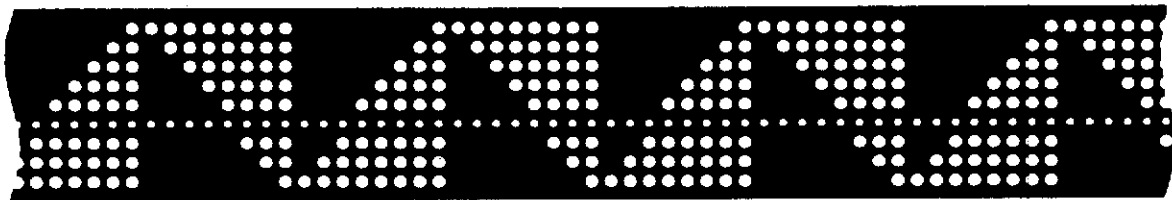


Fig. 3. 10 (b) Punch data

### (3) Error display

If an error message is displayed halfway during test, refer to 3.18 “Error messages and diagnosis”.

## 3. 11 Tape Reader Unit Test

### (1) Functions

This program tests the FANUC PPR tape reader unit to check if its read operation is correct.  
(FANUC PPR is connected to connector CN1 of P-G)

### (2) Diagnostic method

After setting the feed part of the paper tape produced by the tape punch unit test to the paper tape reader, depress the START key (R0).

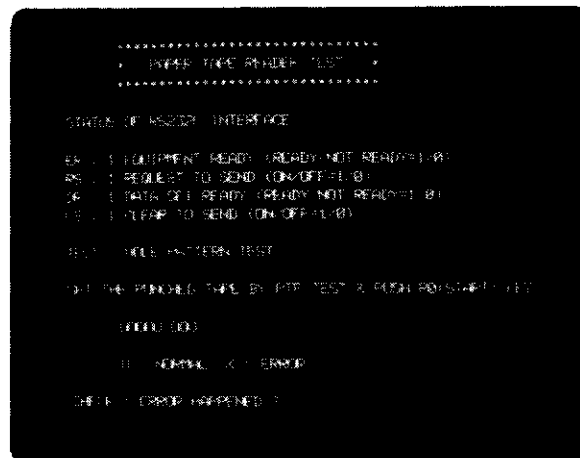


Fig. 3. 11 Tape reader test

### Check items

Paper tape is read to compare data with memory data, and check results are displayed every channel.  
Check if an error is produced in a channel.

#### (3) Error display

If an error message appears during test, refer to item 3.18 "Error messages and diagnosis".

## 3.12 Floppy Disk Unit Test

#### (1) Functions

This program tests if the floppy disk unit functions normally by giving various commands to the unit.

#### (2) Diagnostic method

Mount the floppy disk (writable floppy disk) for work, and depress START key (R0).

#### (3) Display

The information showing the unit condition is displayed on the graphic display during test.  
This is used for maintenance.

#### (4) Error display

If an error message is displayed during test, refer to item 3.18 "Error messages and diagnosis".

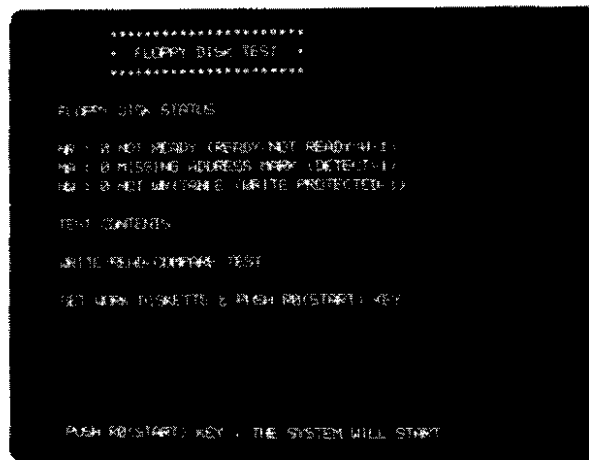


Fig. 3.12 Floppy disk unit test

*(Note) Be careful since data of floppy disk employed for this diagnosis are rewritten with test data.*

## 3.13 XY Plotter Test

#### (1) Functions

The data shown in Fig. 3.13(b) are drawn on the XY plotter. (Connect the XY plotter cable to connector CN3 of P-G)



#### (4) Error display

If an error message is displayed during test, refer to item 3.18 “Error messages and diagnosis”.

### 3. 14 FANUC Cassette Test

#### (1) Functions

This program tests the FANUC cassettes to see if the adapter functions normally by giving various commands to the FANUC cassette. It also checks if the cassette is readable and writable.

(Connect the cassette adapter cable to connector CN2 of P-G)

#### (2) Diagnostic method

After setting the FANUC cassette to be writable, mount it to the adapter. (Both green and red lamps of the adapter light) Depress the START key (R0) to start testing.

#### (3) Display

The information showing the cassette adapter conditions is displayed on the graphic display during test.

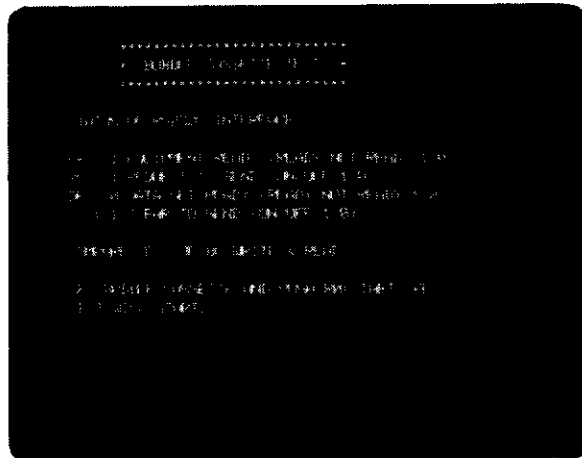


Fig. 3. 14 FANUC cassette test

ER, RS .... When this P-G side signal turns to 1, the FANUC cassette is ready for use.

DR, CS ..... When this FANUC cassette signal turns to 1, the FANUC cassette is ready for test.

*(Note) Be careful since data of FANUC cassette employed for this diagnosis are rewritten with test data.*

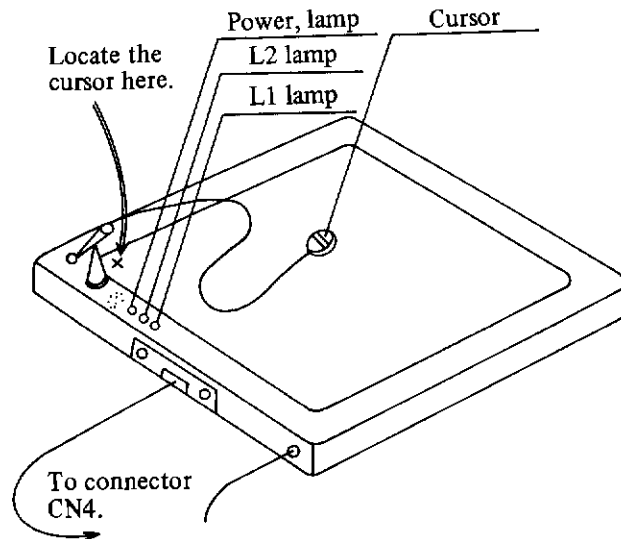
### 3. 15 Tablet Test

#### (1) Functions

The valid tablet read operation is checked. Attach the tablet cable to connector CN4 which locates at the rear of the P-G.

#### (2) Diagnostic method

Make sure that the tablet L1 lamp lights (when the lamp lights, coordinate data can be entered). Before data entry, place the cursor (or stylus pen) at the right-most end of the tablet. This allows the system to provide the full-scale screen for coordinate data reading.



**Fig. 3. 15 Tablet test**

Place a test chart (a sheet on which a test pattern and characters are written) on the tablet, and move the cursor or stylus pen on the figure.

To do so, place the cursor on the start point on the tablet, hold down switch 1, and move the cursor with switch 1 held down. The associated figure will appear on the screen by tracing the figure. When you turn the switch 1 off or when the cursor is removed from the valid read area, the screen image stops. (Press the stylus pen to start tracing a figure.)

When switch 2 is turned on, a dotted line appears between the current cursor position and the point recently specified. To continue the dotted line, turn the switch off, shift the cursor, and press the switch again. If you shift the cursor while pressing switch 2, no line continues.

**Check items**

Make sure that the test pattern appears on the screen correctly.

### 3. 16 External Printer Test

**(1) Functions**

Test data is printed on an external printer (a peripheral device) to check for valid form feeding and character printing. The same FANUC PPR printer unit test occurs. Attach the printer cable to connector CN2 which locates at the rear of the P-G.

**(2) Diagnostic method**

After the printer diagnostic program has initiated, ensure the correct cable and wiring with the system and start printing the test data.

**Check items**

Check the print characters for misalignment, missing or illegal character printing.

Typical print errors are as follows:

- Upper or lower part of line space is not identical.
- Character space or line space is not identical.
- Print character density is not identical.

### (3) Test data

Print 80 characters on a line. Print the same character string on the next line by shifting one character to the right.

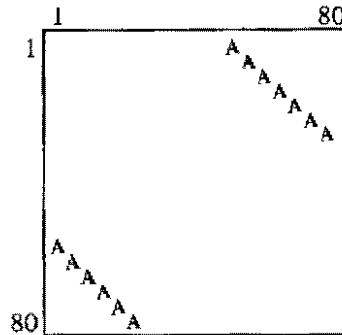


Fig. 3. 16 Test pattern

## 3. 17 Interface Test

### (1) Functions

Various I/O devices are attached to P-G connectors CN1 through CN4 at the rear side. The interface test allows you to determine whether the problem occurred inside the system or outside the P-G interface. Because this test involves the specific FANUC PPR diagnostic features, you have to perform the paper tape punch (F6 key) and paper tape reader (F5 key) test before initiating the interface test.

### (2) Diagnostic method

Attach the FANUC PPR cable to the interface (connector) under test. To select the F11 key, for example, attach the cable to P-G connector CN1. The following gives the cable attachment information.

To turn on F11 key:	Attach the FANUC PPR cable to connector CN1.
To turn on F12 key:	Attach the FANUC PPR cable to connector CN2.
To turn on F13 key:	Attach the FANUC PPR cable to connector CN3.
To turn on F14 key:	Attach the FANUC PPR cable to connector CN4.

After the cable has been attached, press the START (R0) key.

### (3) Display

During interface test, the status information appears on the screen.

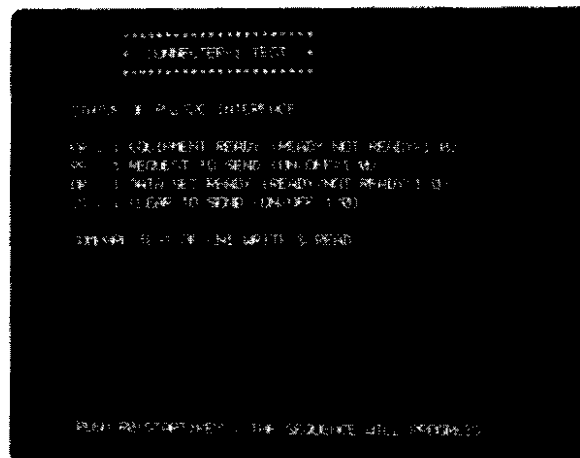
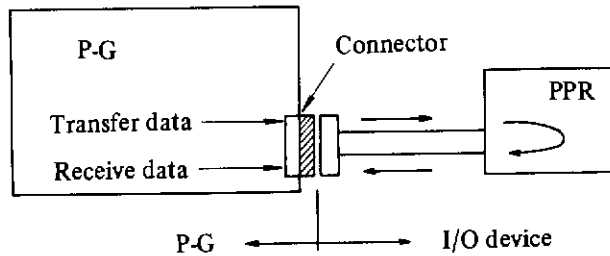


Fig. 3. 17 (a) Interface test (in connector CN1)

**(4) Explanation**

When data is sent from the P-G via the interface, it is returned to the P-G via the FANUC PPR cable and the interface. The P-G compares the transfer and receive data, if these data is identical, the system including the interface operates normally. In other words, the interface test gives information to determine the problem location inside or outside the system, when the problem occurs at I/O device.



**Fig. 3. 17 (b) Interface test**

**3. 18 Error Messages and Diagnosis**

**3. 18. 1 General message format**

(1) When the power is turned on or the system is stored.

\* E ○○○ ○○○○ ... ( ○○○○ ○○○○ ... )  
 Error Code    Message            Error information

The error message of this format is displayed on uppermost line.

(2) During execution of FAPT DOCTOR

\* E ○○○ ○○○○ ... ( ○○○○ ○○○○ ... )  
 Error code    Message            Error information

An error, when detected during execution of FAPT DOCTOR, is displayed on the lowest line.

**3. 18. 2 Error message when the power is turned on and the system is stored**

(1) \*E00   FD   NOT   FOUND  

(Meaning)            LOAD key was pushed before the system floppy disk is loaded.

(Countermeasure)    Check the following points.  
 • Floppy disk is set correctly.  
 • The floppy disk other than system floppy disk is set.

(2) \*E01   FD   DATA   ERROR   (○○   ○○)

(Meaning)            Floppy disk error is found during system program loading and the processing is interrupted.

(Countermeasure)    • Check the following points.  
 • The floppy disk is deteriorated or injured.  
                           Another system floppy disk has the same appearance.



- (3) \*E11 MEMORY ERROR (00 00)  
 \*E12 MEMORY ERROR (00 00)  
 (Meaning) Memory area (dynamic RAM, common RAM) where system operates doesn't operate normally.  
 (Countermeasure) Inform the error message mentioned above to the maintenance engineer.
- (4) \*E13 MEMORY ERROR (000)  
 \*E14 MEMORY ERROR (000)  
 (Meaning) The content of memory, which stores control information put into P-G is destroyed.  
 (Countermeasure) If this appearance occurs again, contact the maintenance engineer.
- (5) \*E20 OVER HEAT  
 (Meaning) P-G interior is overheated.  
 (Countermeasure) Check the following points.
- Is the room a high temperature?
  - Does the fan motor of P-G stop?
  - If this appearance occurs again, contact the maintenance engineer.

### 3. 18. 3 Error message during execution of FAPT DOCTOR

- (1) \*E100 MEMORY ERROR D-RAM (0000 00 00)  
 \*E101 MEMORY ERROR C-RAM (0000 00 00)  
 (Meaning) Memory area (dynamic RAM, common RAM) where system operates doesn't operate normally.  
 (Countermeasure) Contact the maintenance engineer if this appearance occurs again.
- (2) \*E102 MEMORY ERROR EROM (000)  
 \*E103 MEMORY ERROR EROM (000)  
 (Meaning) The content of memory, which stores control information put into P-G is destroyed.  
 (Countermeasure) Inform the error message mentioned above to the maintenance engineer.
- (3) \*E110 INSTRUCTION ERROR (000)  
 \*E120 INTERRUPTION ERROR (000)  
 \*E130 NDP ERROR (000)  
 (Meaning) Processing unit controlling P-G is unusual.  
 (Countermeasure) Inform the error message mentioned above to the maintenance engineer.
- (4) \*E201 KEYBOARD PARITY ERROR (00)  
 \*E202 KEYBOARD INVALID CODE (00)  
 (Meaning) Keyed in data is not read correctly.  
 (Countermeasure) Check the following point and inform the maintenance engineer.
- Is it a special key or all keys that errors occur?
- (5) \*E400 PRINTER NOT READY  
 \*E401 PRINTER TIME OVER  
 (Meaning) The printer control is abnormal.  
 (Countermeasure) Check the following point and inform the maintenance engineer.
- The condition of printer when the above messages are displayed.
  - Does the printer operate?

(6) \*E500 FLOPPY DISK NOT READY

(Meaning) Floppy disk is not in the ready condition.

(Countermeasure) Is the floppy disk set correctly?

(7) \*E501 RECALIBRATE ERROR

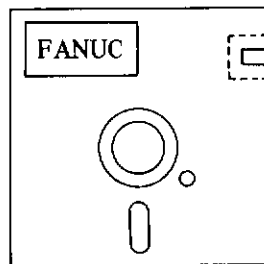
(Meaning) Head of floppy disk unit cannot be initialized.

(Countermeasure)

(8) \*E502 FLOPPY DISK WRITE PROTECT

(Meaning) Writing operation cannot be done for floppy disk which is write protected.

(Countermeasure) Check the protect seal of the floppy disk.



If the protect seal is put, writing can not be done.

(9) \*E503 FD WRITE ERROR (OO OO)

(Meaning) While the running test of floppy disk error occurs.

(Countermeasure) Check the floppy disk is injured or deteriorated.

(10) \*E505 FD COMPARE ERROR (OO OO)

(Meaning) If the content put into the floppy disk is read again, they cannot be collated.

(Countermeasure) Check the floppy disk is injured or deteriorated.

(11) \*E600 TAPE READER NOT READY

(Meaning) The paper tape reader is not in the usable condition.

(Countermeasure) Check that the REMOTE/LOCAL switch of FANUC PPR is set to REMOTE mode.

(12) \*E601 TAPE READER TIME OVER

(Meaning) The paper tape reader operation doesn't end within the specified time.

(Countermeasure)

- Is the paper tape put off from the tape reader?
- Inform the maintenance engineer that the color of the paper tape and the punched status of the tape when the error message mentioned above is displayed.

(13) \*E602 TAPE READER READ ERROR (OO OO)

(Meaning) While the paper tape reader operates, data cannot be input normally.

(Countermeasure) Clean the reader part of paper tape reader and check whether or no the paper tape is stained or injured. Then retry.

(14) \*E700 TAPE PUNCH NOT READY

(Meaning) The paper tape punch is not ready for use.

(Countermeasure)

- Check the following points and inform the maintenance engineer.
- Is the motor of the paper tape punch fan is working? (Is there motor sound?)
- Is the connect cable between PPR and P-G connected rightly?

(15) \*E800 □ XY □ PLOTTER □ NOT □ READY

(Meaning) The XY plotter is not ready for use.

(Countermeasure) Check the following points and inform them to the maintenance engineer.

- Is the cable between the XY plotter and P-G connected rightly?
- Is the confidential test of the XY plotter normally?

(16) \*E801 □ XY □ PLOTTER □ TIME □ OVER

(Meaning) The operation of XY plotter doesn't end within the specified time.

(Countermeasure) Check the following point and inform the maintenance engineer.

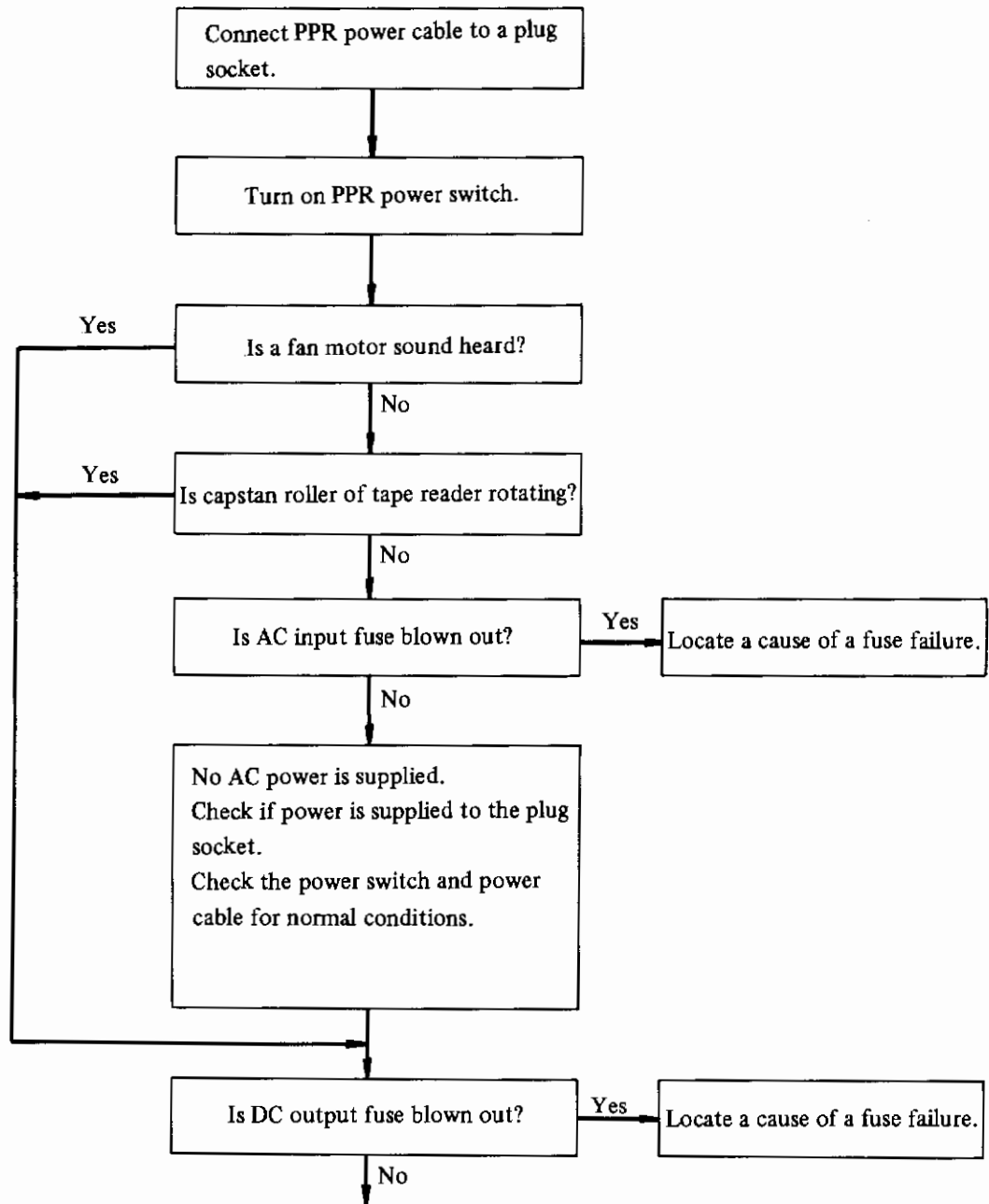
- Is the confidential test of XY plotter normal?

**3. 18. 4 Information to the maintenance engineer**

If any error is found during testing FAPT DOCTOR, or error message in mentioned the previous section is displayed, inform the maintenance engineer of these contents in detail as much as possible.

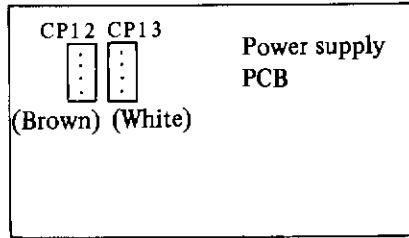
### 3. 19 Troubleshooting of FANUC PPR

#### 3. 19. 1 Power supply

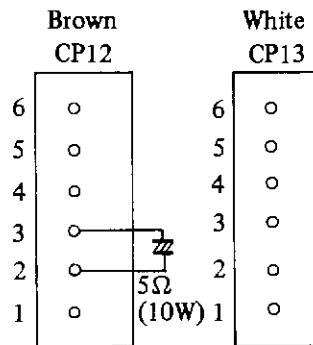


Check the power voltage as follows.

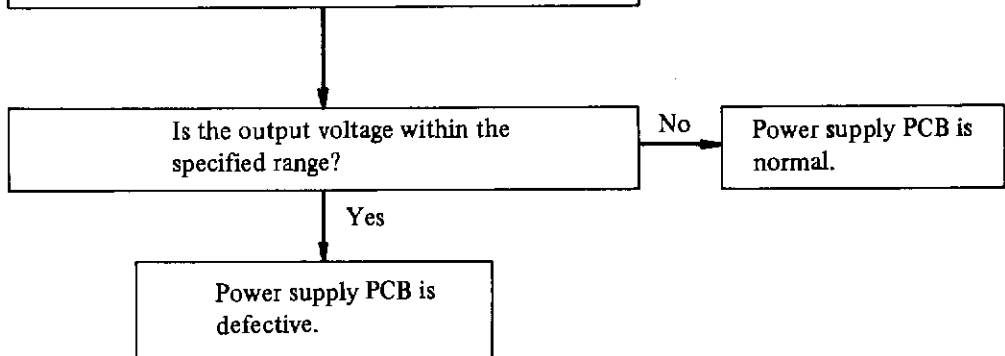
- (1) Disconnect cables from the following connectors.



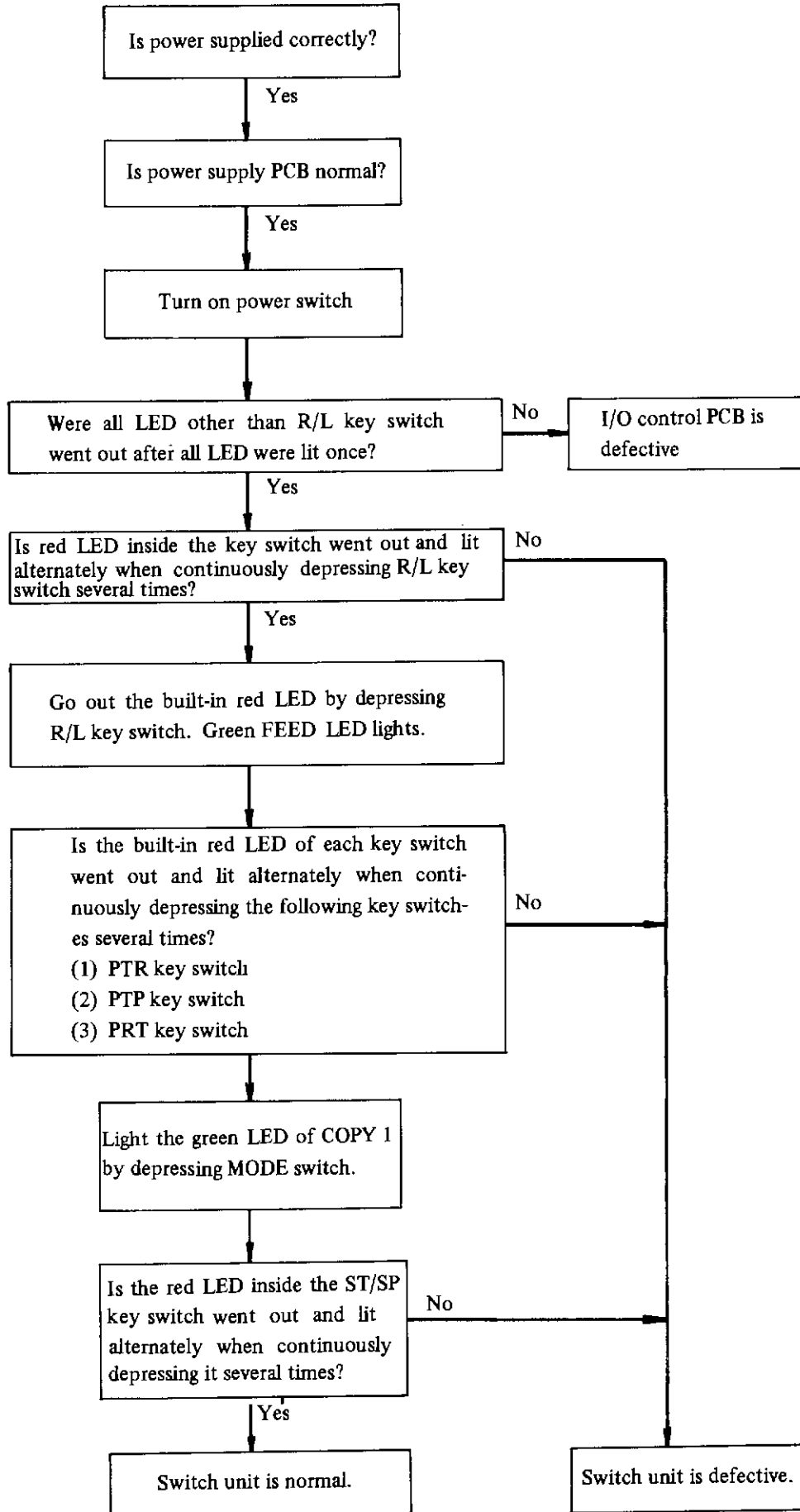
- (2) Measure the voltage by using a circuit tester with a  $5\Omega$  (1 kW) resistor connected as shown below.



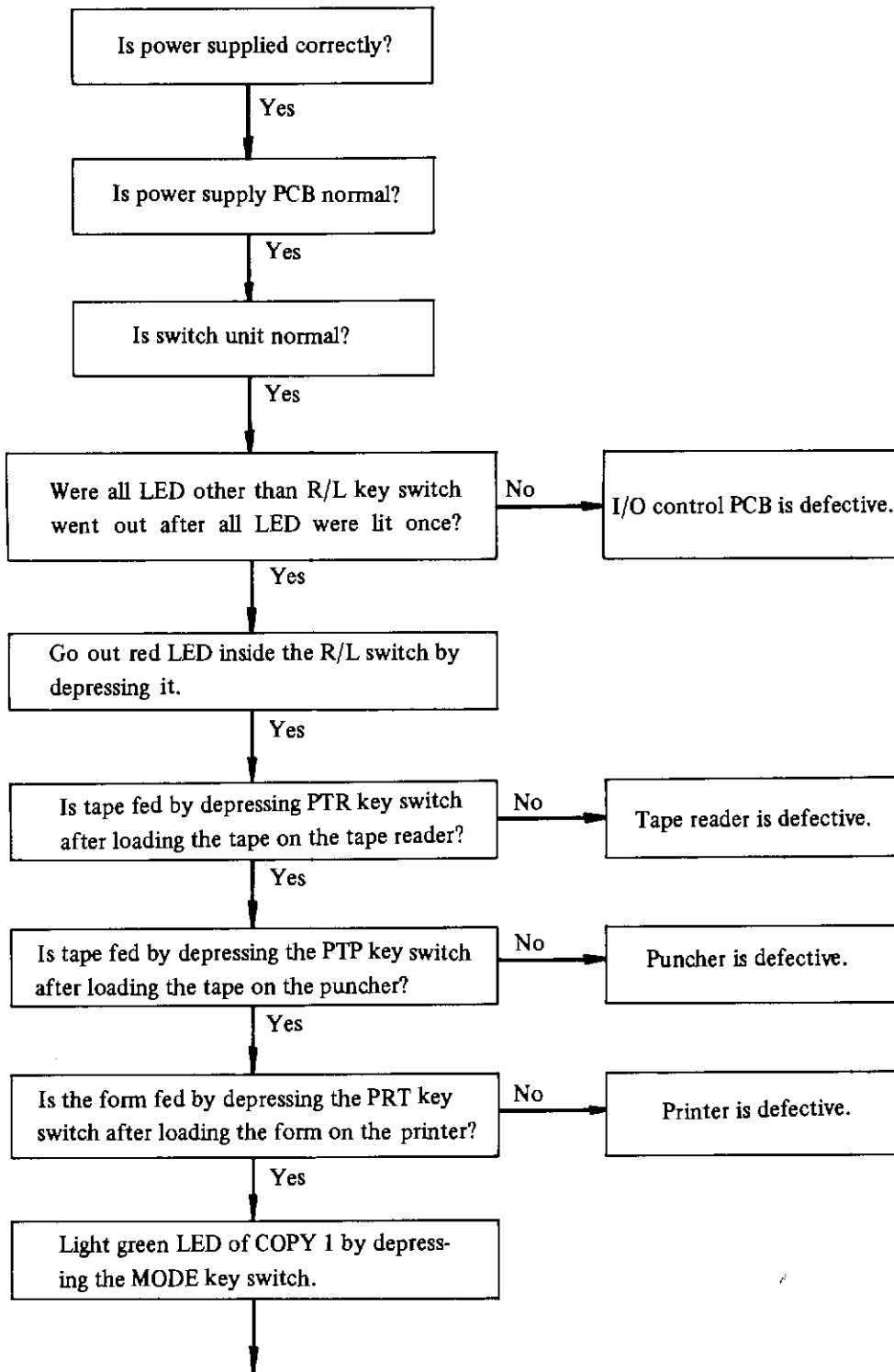
	Output terminal	Output voltage range
24V	CP12-5, 6	$24V + 2.4V$ $- 3.0V$
17V	CP13-3	$17V \pm 1V$
12V	CP13-1	$12V \pm 0.6V$
5V	CP12-1, 2	$5V \pm 0.15V$
-12V	CP13-6	$12V \pm 1.2V$
0V	CP12-3, 4 CP13-2, 5	

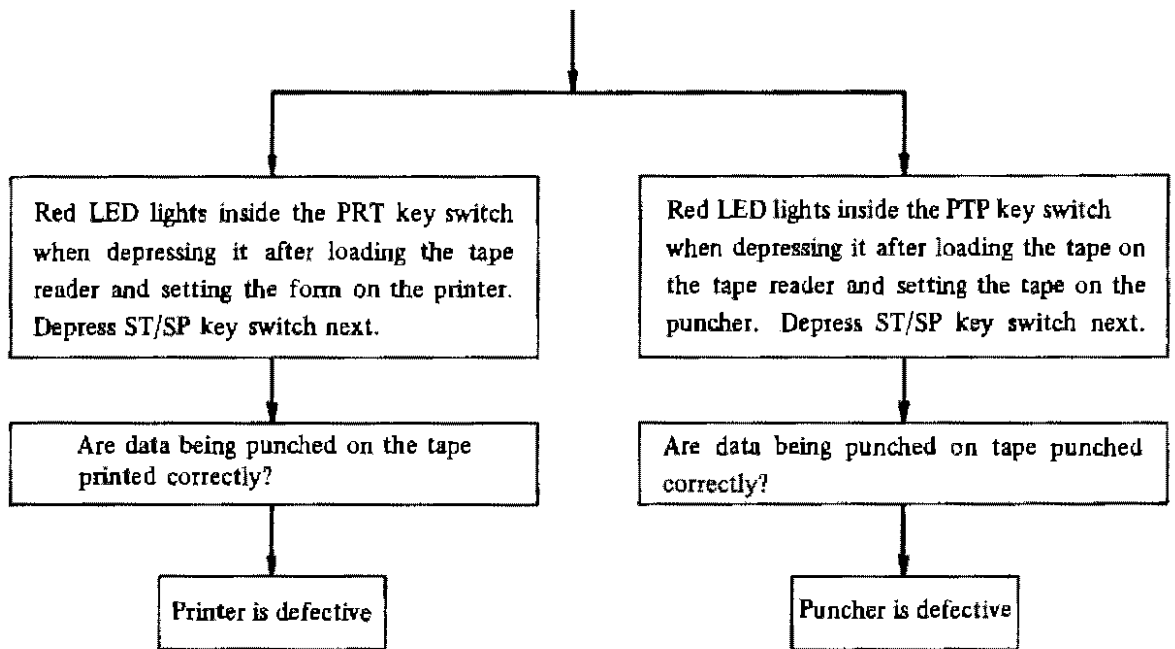


### 3. 19. 2 Switch unit



### 3. 19. 3 I/O control PCB and units







## 4. FANUC CASSETTE OPERATION

### 4.1 General

This chapter describes the operation of FANUC SYSTEM P-MODEL G when data are transferred between the P-G and FANUC cassette B1/B2/P1. FANUC cassette B1/B2/P1 is called memory cassette, FANUC cassette adapter is called cassette adapter, and FANUC SYSTEM P-MODEL G is called P-G.

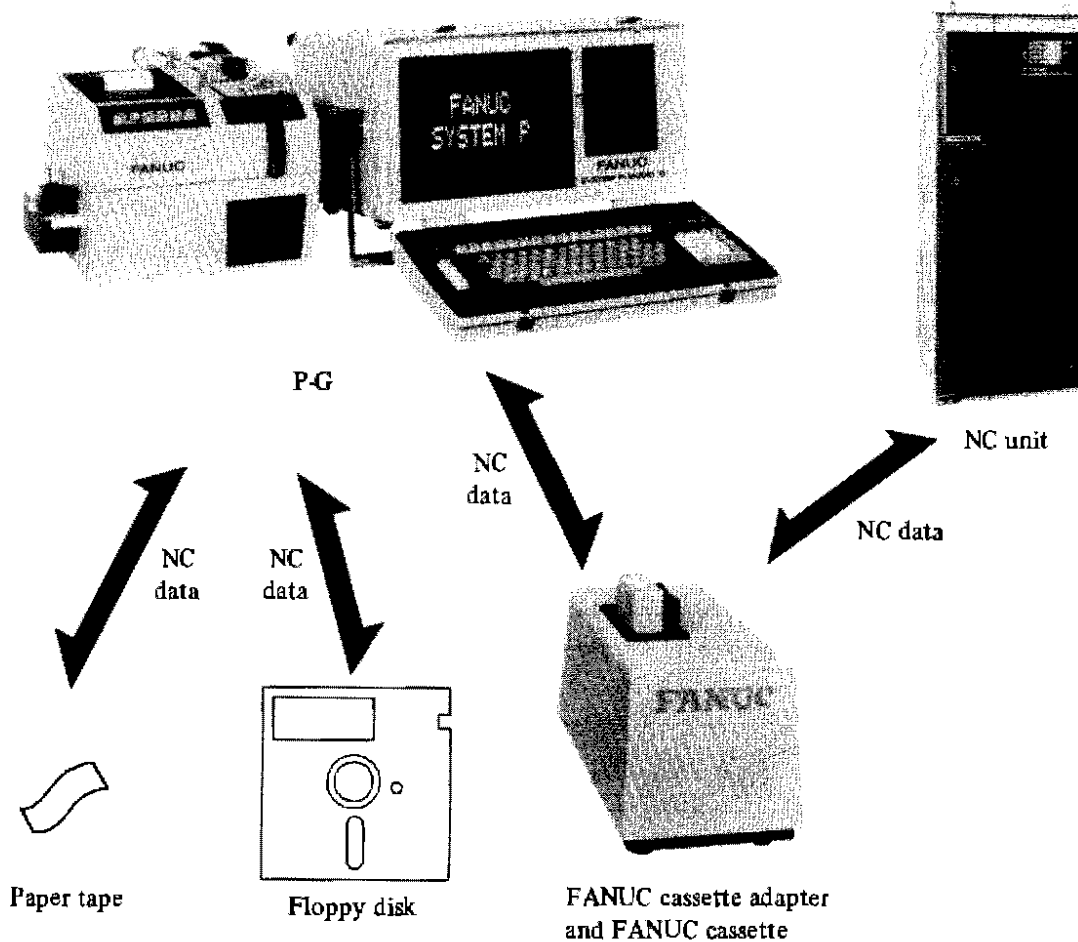
Refer to the operator's manual (B-53484E) for FANUC cassette and FANUC cassette adapter.

### 4.2 Purpose of Using FANUC Cassette

#### 4.2.1 Loading of NC data

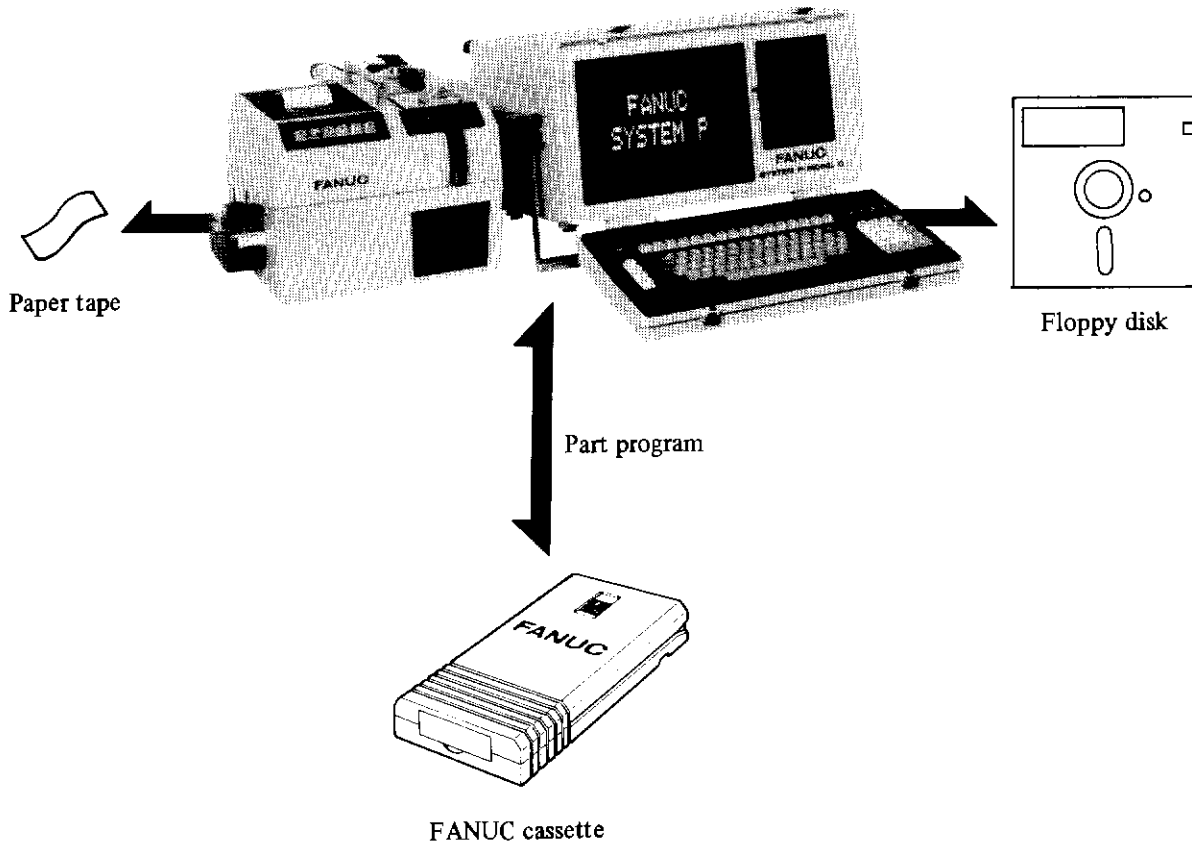
The FANUC cassette serves as a medium when NC data are transferred between P-G and NC machine tool in the same way as in paper tape. It is used for the following purposes.

- (1) The P-G produces NC data and outputs these data to FANUC cassette. This FANUC cassette is set to the NC unit to input FANUC cassette data (NC data) into the NC unit.
- (2) NC data in the NC memory are output to the FANUC cassette. The FANUC cassette is set to the FANUC cassette adapter connected to the P-G system to input NC data into P-G so as to modify, output, or store them (in paper tape or floppy disk).



### 4. 2. 2 Loading of FAPT part program

Various automatic programming software for producing an NC tape are prepared for P-G. These software input programs are called FAPT programs. The FANUC cassette can load these part programs.



### 4. 3 Handling of FANUC Cassette

The FANUC cassette is not directly connected to the P-G main unit. The cassette adapter is connected to the P-G main unit, and then, the FANUC cassette is mounted on the cassette adapter.

For details, refer to the operator's manual for FANUC cassette/FANUC cassette adapter (B-53484E). Connect the cassette adapter cable to the P-G system as shown in Fig. 4. 3.

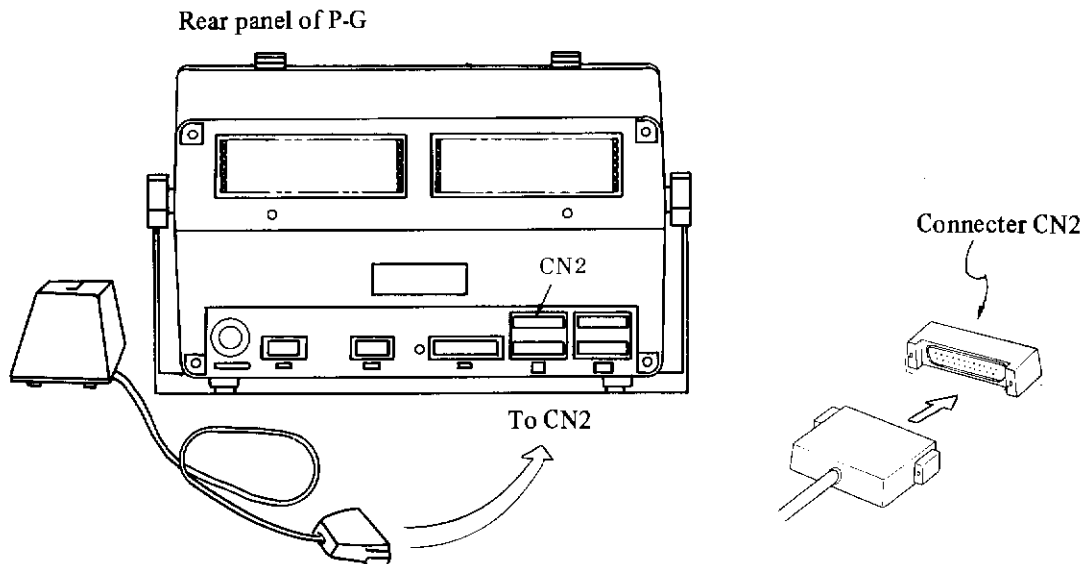


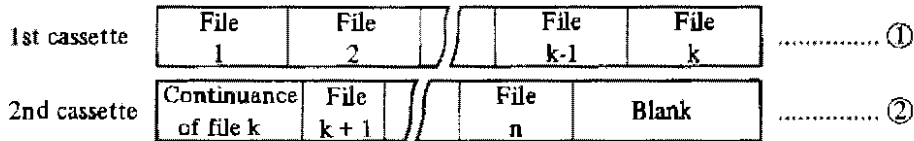
Fig. 4. 3 Connection of cassette adapter to P-G

### Write protect

If it is desired to use a cassette for read only, the cassette can be protected from being written with data. For details, refer to the operator's manual for FANUC cassette/FANUC cassette adapter.

## 4. 4 FANUC Cassette Data and Conditions

The unit to be inputted/outputted by a single operation from the P-G or NC to the FANUC cassette is called "file".



It is selectively applicable to write plural files into one roll of cassette or to write one file into 2 rolls (or 3 rolls or more) of cassettes extensively. This is called multivolume format.

### 4. 4.1 File number

Files being contained in FANUC cassette are numbered in the ascending order of 1, 2, 3 ... , starting with the head.

If the head of the cassette meets the head of a file as shown in cassette ① in the above figure, file numbers are judged in the loading sequence.

File number 3, for example, is judged as the 3rd file. If a file number of (k + 1) is specified after setting cassette ①, the file number is extended to cassette ②, and file (k + 1) in file ② is processed.

(If cassette ① does not contain any (k + 1) file and the last file is judged to be continued to another cassette, the cassette exchange instruction is informed to an operator by alternate flickering of red and green LED lamps of adapter for setting cassette ②.) However, if cassette ② in the above figure (The head of this cassette does not meet the head of a file) is set without instruction, the first part (part continued from another file) is neglected when judging the file number. If file number 1 is specified after setting cassette ② in the above figure, file (k + 1) corresponds to this file number 1. If cassette ② is set after cassette ① and it is specified as the i-th file afresh, the first part is neglected, and the i-th file as counted in the ascending order of 1, 2, 3 .... from the next file is processed.

### 4. 4. 2 FANUC cassette conditions

When FANUC cassette is ready for operation, its operating data and conditions can be known by the display LED of the FANUC cassette adapter. For details, refer to the operator's manual for FANUC cassette/FANUC cassette adapter.

## 4.5 FANUC Cassette Operation

In FAPT, the FANUC cassette can be handled by the same operation as in floppy disk. Accordingly, auxiliary instructions are not necessary usually.

### Operation

Input the following data from the keyboard.

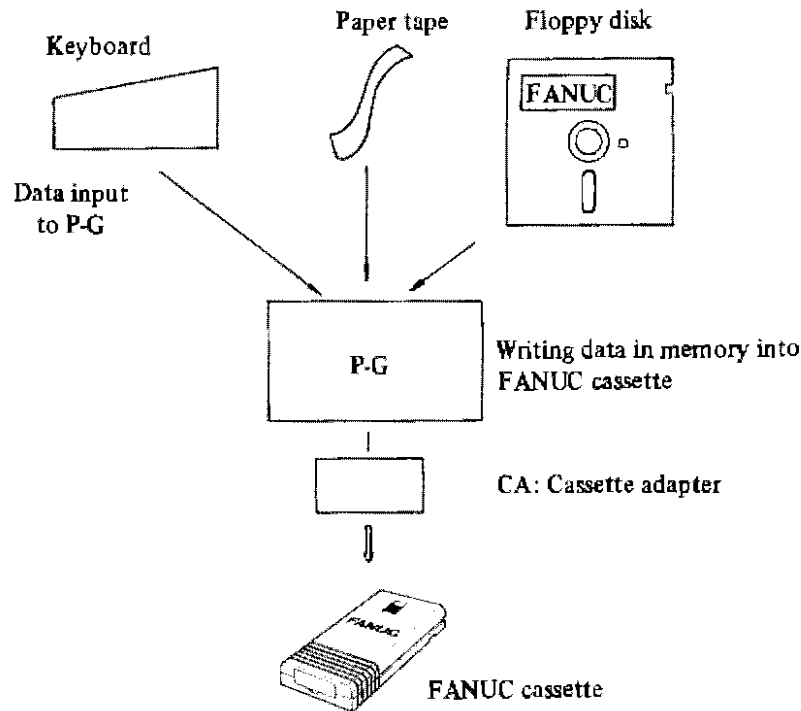
COMMAND = IO  $\square$  BCA, CN2, F<sub>i</sub>, F<sub>o</sub>  $\square$  NL  
 (i = 1, 8 ~ 14, o = 6, 8 ~ 14)

Data are written into the FANUC cassette when data output is specified, if F6 key is turned on after specifying F6. The F6 key primarily means the output of paper tape. However, the paper tape output cannot be done by this specification. (This condition is restored to the original condition by inputting IO  $\square$  BCA, OFF  $\square$  NL)

Data are input from the FANUC cassette when data input is specified, if F1 key is specified for F<sub>i</sub>. "CN2" means that the cassette adapter cable is connected to connector CN2 of P-G.

### Operation example

#### (1) Write to FANUC cassette



- ① Input the next data from the keyboard when writing data in P-G memory into FANUC cassette. (Data are output to FANUC cassette. Turn on F6 key.)

O U T NL

The following message is displayed at the lower part of the CRT.

SET BC & KEY IN 'OK' OR 'NO'.

BC = OK <, INT OR ADD OR A FILE NO. >

BC = -

- ② Specify where data are to be written in FANUC cassette from the keyboard.

. . . . Write data from the head of cassette.

. . . . . Write data from the position next to the last file of cassette.

. . . . . Write data from the n-th file of cassette. Files after the n-th file are replaced with written data. (n: 1, 2, 3 ..... numerals)

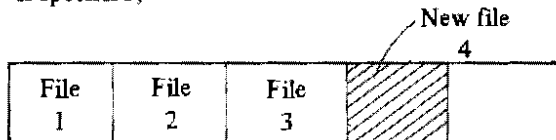
- (i) When OK  INT   is specified;

Head of cassette

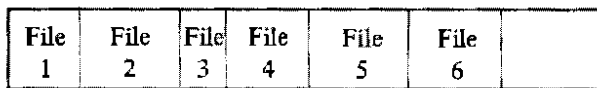


File 1

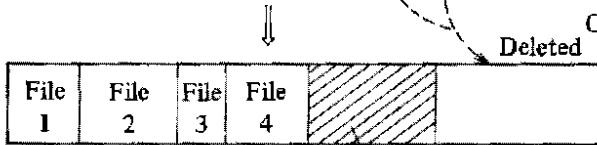
- (ii) When OK   is specified;



- (iii) When OK  n   is specified;



Before output



OK  5

After output

New file  
5

- (2) Input from FANUC cassette

- ① Input the next data from the keyboard when inputting FANUC cassette data into the P-G memory. (Data are input from FANUC cassette. Keep F1 key turned on)

The following messages are displayed at the lower part of CRT.

SET BC & KEY IN 'OK' OR 'NO'

BC = OK <, FILE NO. OR NXT >

BC = -

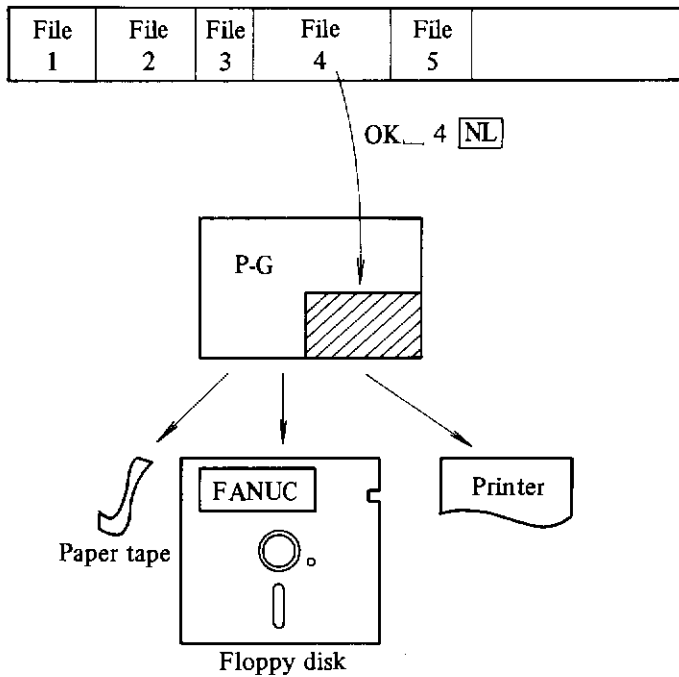
- ② Specify the file of FANUC cassette to be input from the keyboard.

. . . . . Input the start file.

. . . . . Input the n-th file. (n: 1, 2, 3, ..... numerals)

. . . . Input the file next to the file input last.

FANUC cassette



**Auxiliary instructions**

The following auxiliary instructions can be used for read/write operation of FANUC cassette. An operator specifies the file position from which data are written into FANUC cassette, or selects the files to be input according to these auxiliary instructions. For this purpose, the following BCA instructions are employed.

Depress **[R3]** key to input the following data from the keyboard.

REQUEST = **[B][C][A]** **[ ] [ ] [ ] [ ]** **[NL]**  
 BCA instruction

The following instructions are commandable.

Functions	BCA instructions	Meanings	Remarks
Heading of file	H <b>[XXXX]</b> :	Heading of the <b>[XXXX]</b> -th file (Max. 4 digits)	Commanded when reading and writing the n-th file.
	HO:	Heading of start	Commanded when writing data into new cassette.
	HN:	Heading of the next file	Commanded when reading or writing the next file after reading or writing a file.
	HE:	Search if data end of cassette	Commanded when adding a file after the last file in the cassette.
Deletion of file	D <b>[XXXX]</b> :	Deletion of the <b>[XXXX]</b> -th file (Max. 4 digits)	A file following the deleted file is carried.
Control	CL:	Reset of BCA	Places to the same condition as in turning on the power supply.

## 4.6 Error Display of Cassette Adapter

An error may be produced when writing or inputting data into FANUC cassette. The cassette adapter stores this error condition.

FAPT DOCTOR can display this error condition.

- ① Assume that an error was produced when FANUC cassette was operated by FAPT TRACER or FAPT MILL.  
Since the adapter stores this error condition, keep it as it is, and load FAPT DOCTOR. (This error condition is deleted, if the cassette is loaded or unloaded)
- ② Depress **R3** key, and menus appear. Select menu **9**.
- ③ Depress **R0** key, and an error condition is displayed in the format of BCA STATUS = ○○

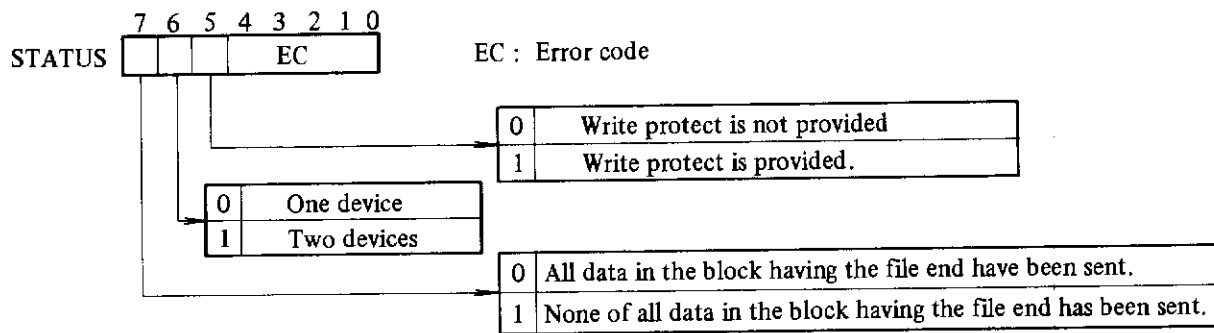
*(Note) Errors may be produced due to an operating mistake usually. (When an inexistent file number was specified, for example)*

*Check if operations have been done first.*

*Refer to the following error numbers table as references.*

*Since this table is used for maintenance, detailed description will be omitted.*

(Reference)



	EC					Description of error
	4	3	2	1	0	
0	0	0	0	0	0	NO ERROR
1	0	0	0	0	1	SEARCH ERROR (The specified file is missing)
2	0	0	0	1	0	NO ADDRESS MARK
3	0	0	0	1	1	MANY DEFECT LOOP
4	0	0	1	0	0	NO FILE HEAD MARK (Including such a case as the 2nd volume of multivolumes was read from the head)
5	0	0	1	0	1	
6	0	0	1	1	0	CRC ERROR
7	0	0	1	1	1	PAGE SIZE OVER
8	0	1	0	0	0	FREE MODE ENABLE ERROR
9	0	1	0	0	1	WRITE DATA OVER RUN ERROR (Data of 3 characters or over were sent after CS was turned off)
10	0	1	0	1	0	
11	0	1	0	1	1	NO MEMORY *
12	0	1	1	0	0	WRITE INHIBIT ERROR
13	0	1	1	0	1	READ ALL ERROR
14	0	1	1	1	0	"1" is not turned on at any control byte.
15	0	1	1	1	1	INTERFACE DATA ERROR (Overrun, framing error)
16	1	0	0	0	0	
17	1	0	0	0	1	
18	1	0	0	1	0	
19	1	0	0	1	1	
20	1	0	1	0	0	The 1st volume cassette was input instead of the specified 2nd volume when reading multivolumes.
21	1	0	1	0	1	
22	1	0	1	1	0	
23	1	0	1	1	1	DATA END (Data end mark was detected)
24	1	1	0	0	0	
25	1	1	0	0	1	
26	1	1	0	1	0	
27	1	1	0	1	1	
28	1	1	1	0	0	
29	1	1	1	0	1	
30	1	1	1	1	0	
31	1	1	1	1	1	

\* This status indicates that a cassette was once slipped out. This status disappears, if another error is produced.



## 5. INSTALLATION

### 5.1 Environmental Conditions at Installation Site

Table 5.1 shows the environmental conditions at the installation site of P-G system.

**Table 5.1 Environmental conditions at installation site**

Items		Conditions
Input power supply	P-G	AC85 ~ 125V, 50/60Hz $^{+1}_{-3}$ Hz, 0.2 KVA.
	PPR	100V type (A13B-0117-B001) AC85 ~ 125V, 50/60Hz $^{+1}_{-3}$ Hz, 0.2KVA.
Power transformer (option)		AC 100, 110, 115, 120, 200, 230, 240V $^{+10}_{-15}$ %, single phase 50/60 Hz $\pm$ 1 Hz Separate mount type
Ambient temperature		5 ~ 35°C (For PPR : 0 ~ 45°C)
Ambient humidity		30 ~ 80% RH, No dew formation is allowable.
Vibration		Less than 0.5G Vibrations should be avoided as much as possible.
Atmosphere		Shall be free of corrosive gases and oil mist.

The environmental conditions equivalent to those in a general air-conditioned office are applicable to the P-G system without any trouble when installing the P-G system.

Determine the installation site referring to the following items, and carefully handle the P-G system.

- (1) Don't put the P-G system at a place exposed to the sunlight directly or the draft from an air conditioner or at a place near a stove.
- (2) Don't use the P-G system at a dusty place or a place subjected to corrosive gases, injurious gases, or oil mist. Cigarette smoke unfavorably affects the P-G system to a large extent.
- (3) Don't use the P-G system in a strong electromagnetic field near a large motor or the like.
- (4) Avoid using a carpet or the like which may produce static electricity, or suppress the generation of static electricity by using a static electricity inhibitor.  
High-voltage static electricity may be generated by means of friction, and it causes an electric shock or an error of the P-G system due to its discharge in winter when moisture lowers in particular. If a tape reader unit is provided with an external paper tape receiving box, etc., connect a grounding wire to these external units.
- (5) Don't mount the P-G system at any vibrating place.
- (6) Don't use the P-G system at a place where ambient temperature changes abruptly (near a window, for example).  
The temperature gradient should be within 10°C/hour. No dew formation is allowable.
- (7) Don't share the power line (AC 100V) with a large motor, an air conditioner, etc.
- (8) Place the P-G system horizontally (within 10°).

- (9) Put the attached vinyl cover on the main unit, and FANUC PPR to prevent ingress of dust whenever these units are not used. Remove the cover from these units without fail when they are used.

## 5.2 Electrical Equipment

When installing the P-G system, supply stable power from the following electrical equipment. Connect an AC 100V single-phase power source and a ground wire to the P-G main unit and FANUC PPR.

### 5.2.1 AC 100V plug socket with a grounding terminal

Prepare two plug sockets with a ground terminal as shown in Fig. 5.2.1(a) within the reach of a 3m power cable (P-G) and 1.5m power cable (PPR). When an XY plotter, an external printer, and other I/O units are used, one plug socket is additionally required for each unit.

The power capacity of the P-G system is about 0.4 KVA (P-G main unit plus FANUC PPR) However, the power supply equipment should have the capacitance of about 10A.

When the XY plotter, external printer, and other I/O units are employed, increase the capacity proportionally. Connect a ground wire without fail.

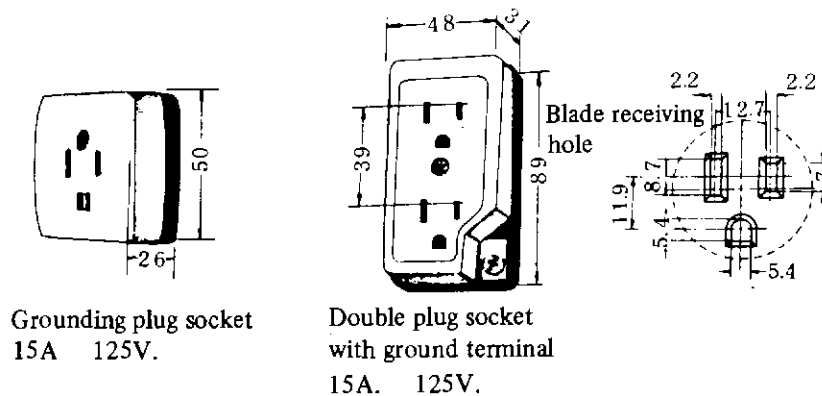


Fig. 5. 2. 1 (a) Example of power plug socket

A ground rubber plug shown in Fig. 5. 2. 1 (b) is attached to the tip of the P-G power cable.

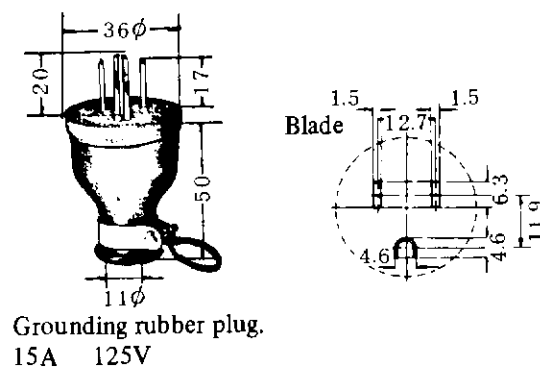


Fig. 5. 2. 1 (b) Tip connector of power cable

The power supplied from the power plug socket should satisfy the following specifications.

Power supply: AC85 ~ 125V  $\pm 10\%$ , 50/60 Hz  $\pm 1\%$  Hz, single phase

Grounding: Class 3 grounding or grounding with a grounding resistance of lower than 100 ohm.

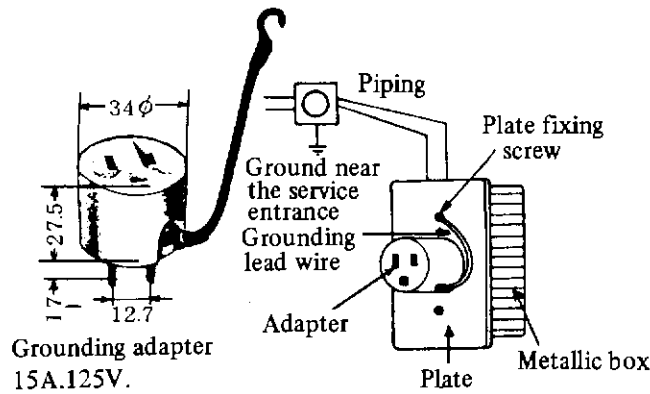
A noise filter is employed to eliminate power noises inside the P-G main unit and FANUC PPR, and the leak current is about 0.5 mA (50V during open) each.

**5. 2. 2 Connection using the grounding adapter**

Connect the P-G system by using the grounding adapter attached to the power cable as shown in Fig. 5.2.2, if the plug socket with a grounding terminal cannot be mounted.

Make sure that P-G system is securely grounded.

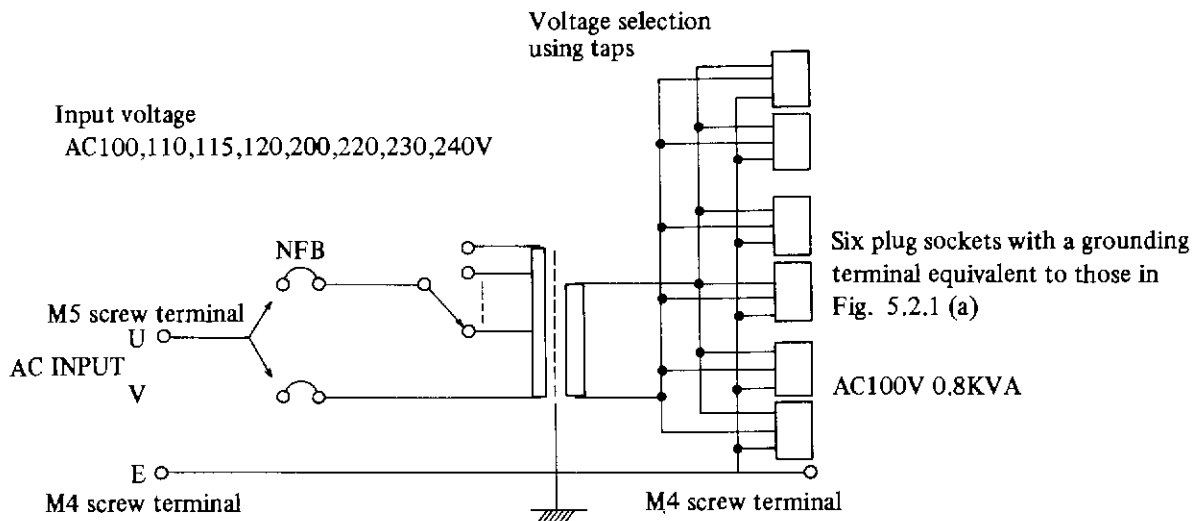
Be careful with poor contact due to a fixing failure of the cable at the grounding adapter.



**Fig. 5. 2. 2 Method of using the grounding adapter**

**5. 2. 3 When the P-G system is operated with a power supply other than AC 100V**

The P-G system voltage is AC 100V only. If the P-G system is operated with a power supply other than AC 100V, convert the power voltage into AC 100V by using the power transformer. The exclusive transformer has the following circuit configuration.



**Fig. 5. 2. 3 Power transformer for FANUC SYSTEM P-MODEL G**

Four plug sockets with a grounding terminal are mounted at the output of this power transformer, and power can be supplied to the P-G main unit, FANUC PPR and other two I/O devices.

### 5. 2. 4 Cautions to be observed when manufacturing the power cable

For manufacturing the power cable, refer to the signal arrangement of the power connector shown in Fig. 5. 2. 4.

Use a conductor having a sectional area of  $0.75 \text{ mm}^2$ , if the cable length is about 3m. The outer diameter of the cable should be about  $9\phi$ .

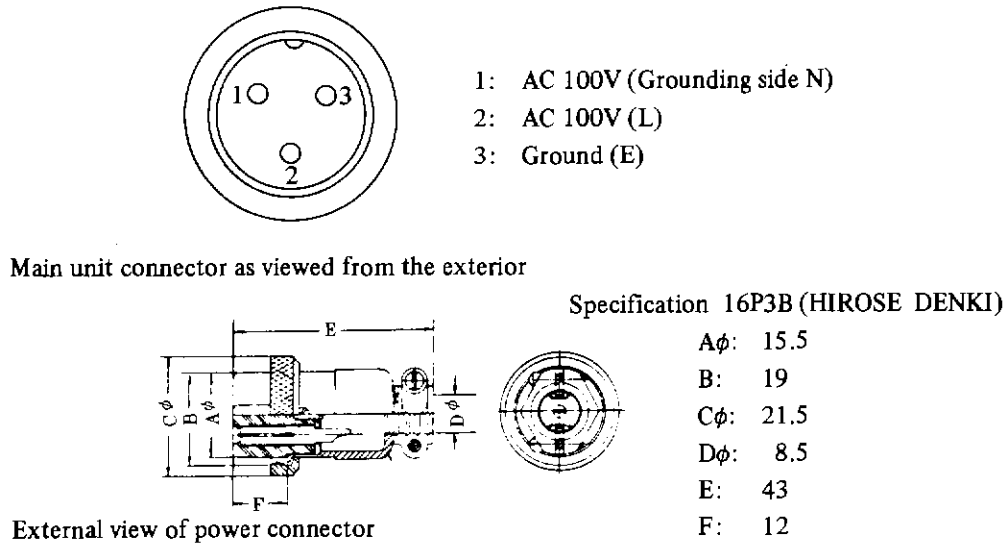


Fig. 5. 2. 4 External view of connector and signal arrangement of power connector

## 5. 3 Inspection of Accessories and Attachments

Accessories, attachments, system floppy disks, and documents are accommodated in the package. After unpacking, check their quantities.

### 5. 3. 1 Accessories and attachments for P-G main unit

(1) Standard attachments

(See Table 1. 4 (a) in item 1. 4) 1 set

(2) Power cable (3m) 1 pc.

(3) Documents

(a) The following manuals are attached as the standard equipment.

- Operator's manual for FANUC SYSTEM P-MODEL G (B-54111E) 1 vol.
- Operator's manual for FANUC SYSTEM P-MODEL G FAPT TRACER (B-54116E) 1 vol.
- Operator's manual for FANUC SYSTEM P-MODEL G FAPT TEACHER (B-54126E) 1 vol.
- Operator's handbook for FANUC SYSTEM P-MODEL G (B-54158E) 1 vol.
- Maintenance manual for FANUC SYSTEM P-MODEL G (B-54159E) 1 vol.

(b) Various descriptions, operator's manuals, and other manuals are attached according to the order specifications.

• Descriptions

- FAPT TURN/MILL Descriptions (B-54102E)
- FAPT CUT Descriptions (B-54103E)
- FAPT PUNCH-I Descriptions (B-54104E)
- FAPT PUNCH-II Descriptions (B-54105E)
- FAPT TRACER Descriptions (B-54106E)
- FAPT DIGITIZER Descriptions (B-54107E)
- FAPT DIE-II Descriptions (B-54121E)

• Symbolic FAPT TURN/MILL/CUT	Descriptions (B-54131E)
• Operator's Manual	
• FAPT TURN/MILL	Operator's Manual (B-54112E)
• FAPT CUT	Operator's Manual (B-54113E)
• FAPT PUNCH-I	Operator's Manual (B-54114E)
• FAPT PUNCH-II	Operator's Manual (B-54115E)
• FAPT DIGITIZER	Operator's Manual (B-54117E)
• 220S FAPT MILL	Operator's Manual (B-54127E)
• FAPT DIE-II	Operator's Manual (Volume 1) (B-54122E)
• FAPT DIE-II	Operator's Manual (Volume 2) (B-54122E-1)
• Symbolic FAPT TURN	Operator's Manual (B-54132E)
• Symbolic FAPT MILL	Operator's Manual (B-54134E)
• Symbolic FAPT CUT	Operator's Manual (B-54136E)
• Others	
• FAPT TURN/MILL/CUT	Part Program Illustration (B-54128E)
• FAPT DIE-II	Part Program Example (B-54123E)
• Symbolic FAPT TURN	Operator's Handbook (B-54133E)

(4) System floppy disks

The floppy disks loading software according to the order specifications are attached.

5.3.2 Accessories and attachments for FANUC PPR

(1) Standard attachments

(See Table 1.4 (b) in item 1.4)

1 set

5.4 Installation

After unpacking the P-G system, install it according to the following procedure.

Fig. 5.4 (a) and Fig. 5.4 (b) indicate the installation layout of the standard system.



Fig. 5.4 (a)

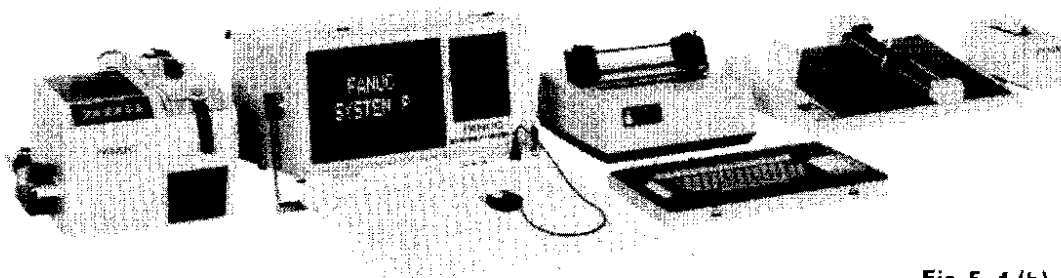


Fig. 5.4 (b)

### 5. 4. 1 Installation of P-G main unit

- (1) After unpacking, place the P-G main unit with its handle facing upward as shown in Fig. 5.4.1(a). Turn the handle in the arrow direction by 90° while depressing part (A) of the handle by both hands. Stop depressing part (A), and slightly move the handle vertically until it is fixed securely.
- (2) Place the P-G main unit as shown in Fig. 5.4.1 (b). Unlock the cover locks and open the keyboard unit as shown in Fig. 5.4.1 (c).

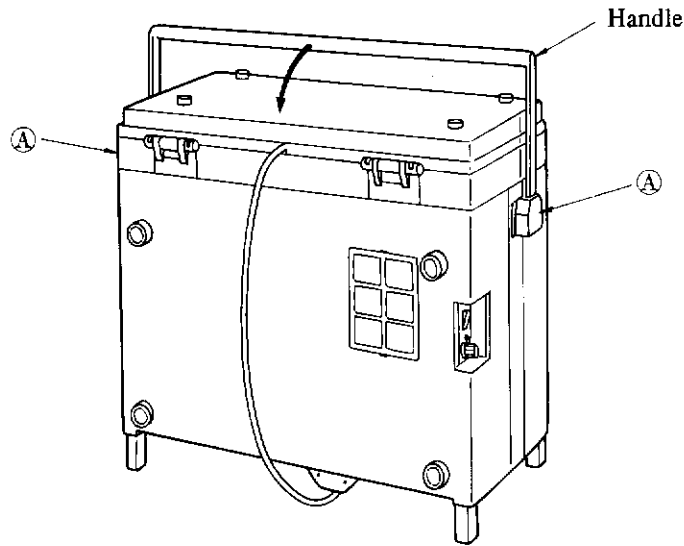


Fig. 5. 4. 1 (a) Installation of P-G main unit (a)

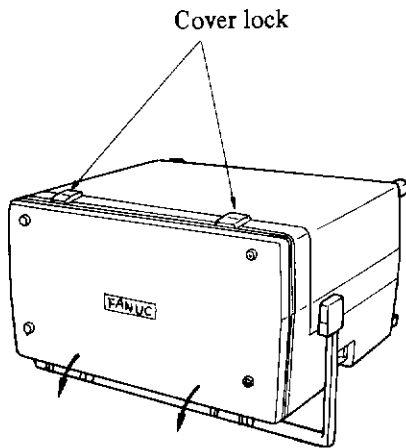


Fig. 5. 4. 1 (b) Installation of P-G main unit (c)

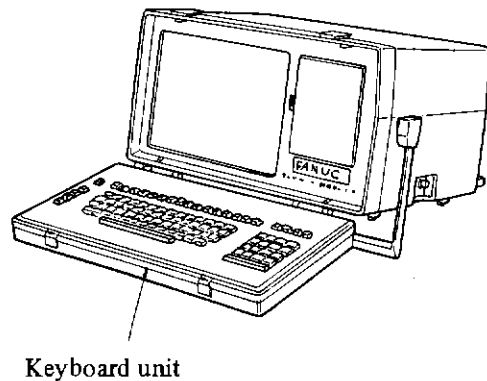
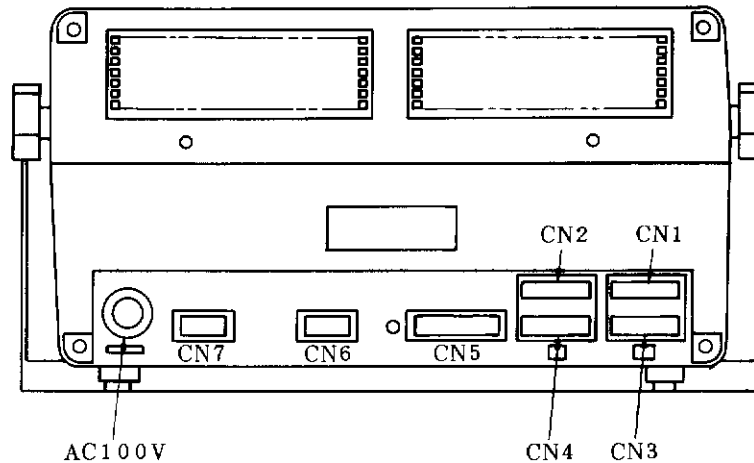


Fig. 5. 4. 1 (c) Installation of P-G main unit

### 5. 4. 2 Cable connection

Cable connectors are mounted on the rear panel of the P-G main unit for connecting the P-G main unit to each I/O unit.



**Fig. 5. 4. 2 (a) Mounting layout of connectors (Rear panel of P-G main unit)**

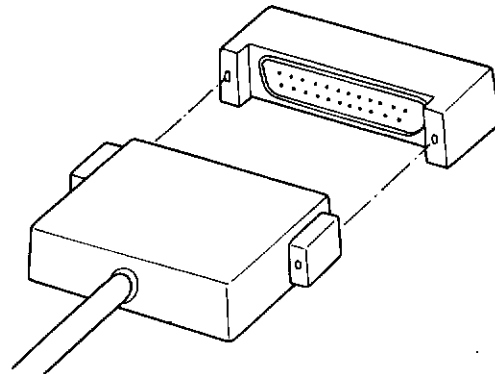
Connect the following cables to these connectors.

- |        |   |   |                          |
|--------|---|---|--------------------------|
| CN1    | FANUC PPR signal cable  | } | <i>(Note 1) (Note 2)</i> |
| CN2    | FANUC cassette adapter cable (option)                               |   |                          |
| CN3    | XY plotter signal cable (option)                                    |   |                          |
| CN4    | Tablet signal cable (option)  |   |                          |
| CN5    | Not used  |   |                          |
| CN6    | Keyboard unit signal cable (Connected before shipment from factory) |   |                          |
| CN7    | Not used  |   |                          |
| AC100V | Attached power cable  |   |                          |

*(Note 1) The standard connections of CN1 ~ CN4 are as shown above. In addition, a printer (external printer), an NC unit, FANUC selector, and other units are selectable to CN1 ~ CN4 connectors. The connectors to be employed are specified by FAPT instructions and others according to these units.*

*For details, refer to the operator's manual for individual software. (Connector CN1 ~ CN4 are an RS232C interface)*

*(Note 2) After connecting cables to connectors CN1 ~ CN4, clamp two fixing screws without fail.*



**Fig. 5. 4. 2 (b) Fixing of connectors CN1 ~ CN4**

### 5. 4. 3 Setting of FANUC PPR

Set the printer ink ribbon, printer form, and paper tape to FANUC PPR, referring to section 2. 6.

#### 5. 4. 4 Turning on the power supply

Check the power supply specifications referring to section 5.2, before applying power to the P-G system. If the input voltage is other than AC 100V, the power transformer is required.

Make sure that the power switches of the P-G main unit, FANUC PPR, and other units are turned off.

After applying power to the P-G system, turn on the power switch of each unit. After about 10 seconds, the FANUC SYSTEM P pattern will appear on the graphic display.

#### 5. 4. 5 Operation check using FAPT DOCTOR

After the FANUC SYSTEM P pattern has appeared, mount the FAPT DOCTOR system floppy disk to the floppy disk unit, and check the operation by loading the system.

For the system loading method, see section 2. 5.

For the use of FAPT DOCTOR, see chapter 3.

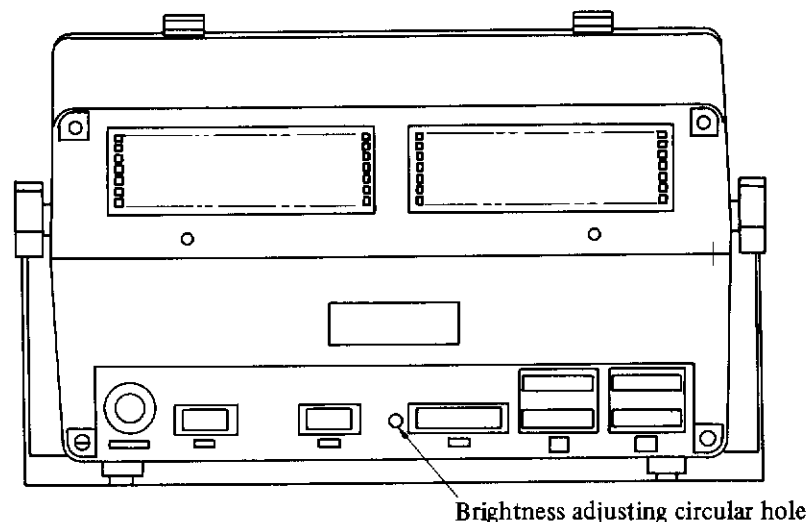
### 5. 5 Adjustments

Various adjustments have been made before shipment of the P-G system from factory, and no additional adjustments are required. However, if the brightness of the display unit is not suitable, it can be adjusted as follows.

#### 5. 5. 1 Brightness adjustment in graphic display

Adjust the brightness control knob for graphic display mounted on PCB of the P-G main unit by using a small conventional (-) screwdriver through the circular hole on the rear panel of the P-G main unit. When turning this control knob clockwise, the graphic display becomes brighter, and when turning it counterclockwise, the graphic display becomes darker.

Adjust the graphic display brightness according to the brightness in the room. Be careful not to bright the graphic display excessively, otherwise the CRT life may be shortened.



Rear view



Control knob

Insert a (-) screwdriver into this groove, and turn the screwdriver.

Fig. 5. 5. 1 Graphic display brightness adjustment



### Revision Record

FANUC SYSTEM P-MODEL G OPERATOR'S MANUAL (B-54111E)

02	Sep., '83	<ul style="list-style-type: none"> <li>· Addition of Sec. 2.7 "Connection of Input/Output Devices".</li> <li>· Change and addition of explanation on FANUC PPR.</li> <li>· Correction of errors.</li> </ul>			
01	Nov., '82	_____			
Edition	Date	Contents	Edition	Date	Contents

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