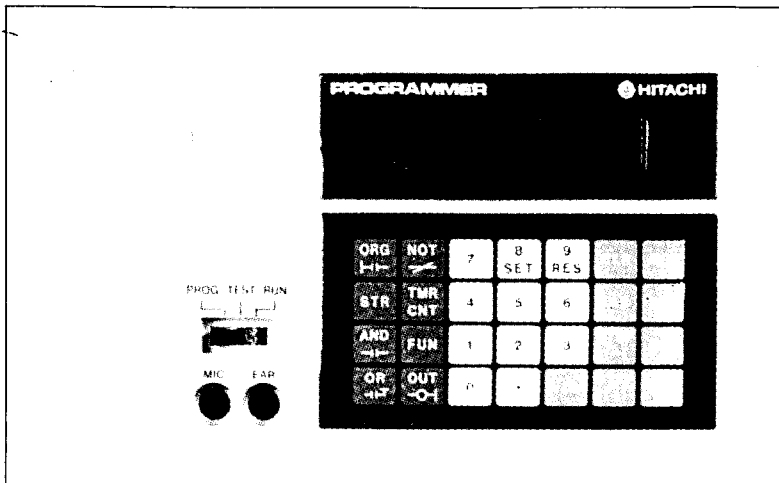# OPERATION
MANUAL
UNIVERSAL
PROGRAMMER
PGMJ-R

HITACHI
PROGRAMMABLE
CONTROL
SYSTEM

PREFACE

HITACHI UNIVERSAL PROGRAMMER type PGMJ-R is a versatyle programming and debugging tool which is developed for Hitachi Programmable Controllers E-series including EM type.

The programmer has somemore facilities comparing with a usual programmer as explained in the following.

1 . The integrated seial interface RS-232C permits the direct connection with the other device, such as a personal computer.

2 . Direct connection with the printer can output the content of the program as a ladder diagram, a code list and the cross reference list on the printer.

3 . The ROM programming function permits the easy copy of the user program for duplication of the function and program storage for maintenance.

4 . The LCD display help the operator with comprehensive word indication. Even in dark place, LCD can be read due to the back light in the display.

5 . Clearly coloured keyboard with a key touch reaction supplies the operator with comfortable programming.

Tables of Contents

1 . Specification of PGMJ-R

Table 1.1 shows specifications of PGMJ-R.

Table 1.1 Specifications of PGMJ-R

No.	Item			Specifications
1	Functions for Programmer		Programming function	All clear, Write-in, Read-out, Editing
			Editing	Change, Insertion, Deletion
			Monitoring	Monitoring of iuput/output status and current data of timer/counter.
			Check function	Syntax check, Key-in procedure check
			Test function	Forced output, Forced set, reset
2	CMT I/F function		Recording (DUMP)	Basic unit memory → Cassette tape
			Play-back (LOAD)	Basic unit memory ← Cassette tape
			Verification (VERIFY)	Basic unit memory ↔ Cassette tape
3	ROM writer function		Copy	Basic unit memory → Memory pack
			Load	Basic unit memory ← Memory pack
			Verify	Basic unit memory ↔ Memory pack
4	Printer Personal computer interface function		Interface	RS-232C
			Synchronization	Asynchronous method
			Transfer rate	300, 600, 1,200, 2,400, 4,800, 9,600, 19,200, 38,400 B.P.S (Changeable with incorporated DIP switch, set at 4,800 B. P. S when ex-factory.)
			Word length	Start bit : 1 bit, data bit : 8 bits, stop bit : 1 bit (When ex-factory, changeable with incorporated DIP switch.)
			Character code	ASCII(USA)
			Selection of function	Printer interface or personal computer interface is selected by DIP switch.
			Printer interface function	Code list, ladder diagram and cross reference are printed out.
			Personal computer interface function	(1) Correspondence of data with personal computer. (2) Following functions are possible with software at personal computer side. 1) Program write-in 2) Program read-out 3) On-line monitoring
		Recommendable peripheral equipment	Printer	Printer : EPSON RX-80, RX-80Ⅱ, FX-80 Interface board ; No. 8143, 8145, 8148
			Personal computer	IBM PC 5150/5160
5	Display			LCD (with back light) Both data and step No. are indicated.
6	General specification		Ambient temperature	5 ~ 40℃
			Ambient humidity	30~90% RH (non-condensing)
			Storage temperature	−10 ~ 60℃

2 . Name of PGMJ-R Parts

Fig. 2.1 shows the names of PGMJ-R parts and Fig. 2.2 shows its dimensions.

<table>
<tr><td>Connector for RS-232C
RS-232C cable is connected.</td><td>Connector for memory pack
Memory pack is inserted.</td><td>LCD indicator
Indicates command, data and step number.</td></tr>
</table>

Cable
Connected to the basic module. (270mm)

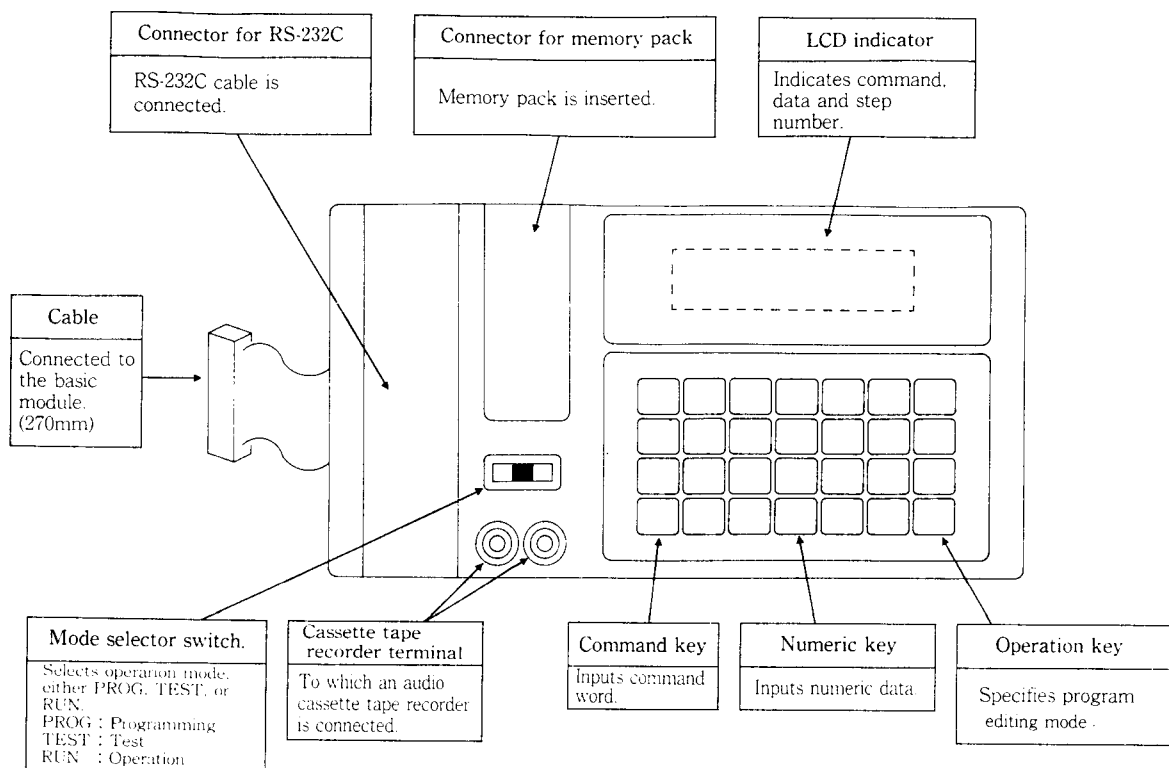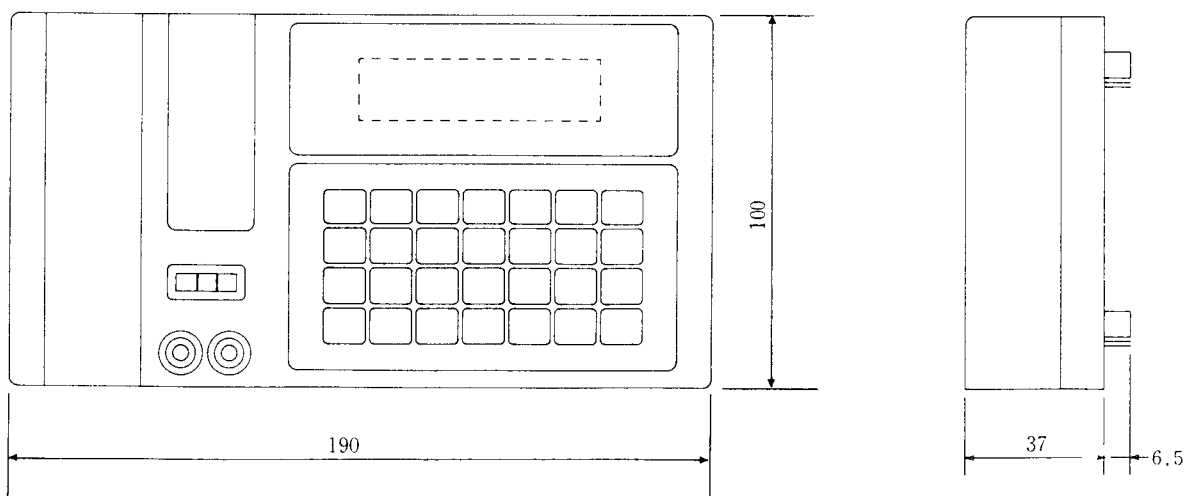| Mode selector switch.	Cassette tape recorder terminal	Command key	Numeric key	Operation key
Selects operation mode, either PROG, TEST, or RUN. PROG : Programming TEST : Test RUN : Operation	To which an audio cassette tape recorder is connected.	Inputs command word.	Inputs numeric data	Specifies program editing mode .

Fig. 2.1 Name of PGMJ-R parts

190

100

37

6.5

Fig. 2.2 Dimension of PGMJ-R

PGMJ-R can be mounted by pushing it to the holes on the basic unit.

3 . Programming Function

3.1 Display after turning on the power supply

Fig. 3.1 shows PGMJ-R display after turning on the power supply of the basic unit. (E, EM, J-16)

```
P R O G
P G M J — R      V : 1
```

Mode of mode selector switch   System ROM version
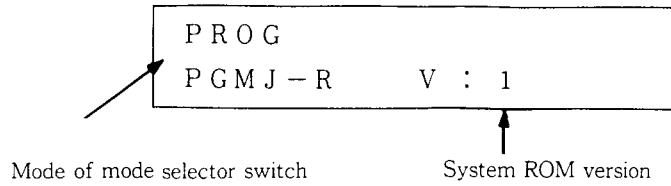
3.2 Programming function

Key-in procedure is compatible to the standard programmer (PGMJ) but the display is defferent. Table 3.1 shows the examples of the display.

Table 3.1 Display of PGMJ-R (2/1)

No.	Items		Key-in procedure	Display
1	All clear		[CLR]	PROG STEP ■■■■
			[ENT]	PROG STEP ■■■■ E
			[DEL]	PROG STEP 0 0 0 0 —
2	Command code display (example)		[ORG][NOT][TMR CNT][4]	PROG STEP 0 0 0 0 ORG NOT T / C 4 <u>Command code display</u> <u>Not display</u> <u>Timer, counter display</u> Number
			[OUT][TMR CNT][1][0] [9][5][0]	PROG STEP 0 0 0 1 OUT T / C 1 0 9 5 0 <u>Timer. counter number</u> <u>Preset value</u>
3	Syntax check	No error		PROG * STEP 0 3 5 6
		Dual coil error		PROG * STEP 0 1 2 3 d E OUT 5 0 <u>error display</u>
		Stack under error	[CLR] [SRC]	PROG * STEP 0 2 3 3 u E FUN 4 5 5 5 0 <u>error display</u>
		Stack over error		PROG * STEP 0 3 5 0 o E FUN 4 5 5 6 0 <u>error display</u>
		Framming error		PROG * STEP 0 1 2 0 f E <u>error display</u>

Table 3.1 Display of PGMJ-R (2/2)

No.	Items	Key-in procedure	Display

4	Monitoring	[O U T] [5] [0] [M O N]	R U N S T E P ■■■■
			O U T 5 0 ■
			                                ↑
			                               ON

5	Conduction	[C L R] [STEP +]	R U N S T E P 0 0 0 1
			A N D 2 0 0■
			                                ↑
			                          Conduction

6	Key-in error	[O R G] [9] [9] [9] [E N T]	P R O G S T E P 0 0 0 0 E O R G 9 9 9 ↑ error
7	Sum-check error	—	R U N S T E P ■■■■ 5 1 E
8	Undefined command error	—	R U N S T E P 4 — E

4 . Key-in procedure to ROM writer, CMT and Printer interface function

Table 4.1 shows key-in procedure to ROM, CMT and Printer interface function etc.

Table 4.1 Key-in procedure

Function		Key-in procedure	Display	Remarks
Shift to No.1~6 functions		`CLR` `SET` `SET` `ENT`	PROG R — — — 0 ROM MODE	PROG, TEST mode STOP status
1	ROM writer (1) function	`FUN` `0`	PROG R — — — 0 ROM MODE	ROM writer function when memory pack is set on the basic unit.
2	CMT interface function	`FUN` `1`	PROG C — — — 1 CMT MODE	Record and play-back to the cassette tape.
3	ROM writer (2) function	`FUN` `2`	PROG R — — — 2 ROM MODE	ROM writer function when memory pack is set on PGMJ-R.
4	Forced output function	`FUN` `3`	TEST 0 — — — 3 FORCED OUT	Forced output at Test mode.
5	Printer (1) interface function	`FUN` `4`	PROG P — — — 4 PRINT OUT	Programs of E and J-16 are printed out.
6	Printer (2) interface function	`FUN` `5`	PROG P — — — 5 PRINT OUT	Programs of EM are printed out.
Release of No. 1~6 functions.		`CLR` `RES` `RES` `ENT`		PROG, TEST mode, STOP status.

《Description》

1. ROM writer, CMT interface and printer interface functions are selected by FUN number (0~6), after key-in operation (`CLR` `SET` `SET` `ENT`).

2. `FUN` `0` Key-in operation is no necessary because ROM writer (1) mode is automatically selected after key-in operation (`CLR` `SET` `SET` `ENT`).
   `FUN` `0` Key-in operation is necessary when ROM writer (1) mode is selected after CMT interface mode.

3. Programming function returns after release key-in operation (`CLR` `RES` `RES` `ENT`)

5 . ROM Writer (1) Function (FUN 0)

Memory pack is copied and loaded with this function when memory pack is set on E series basic unit.

In case of J-16, this function means write-in to EEPROM.

Table 5.1 shows key-in procedure of copying and loading the memory pack which is set on E series basic unit.

Table 5.1 Key-in procedure of copying and loading the memory pack

| Item			Key-in procedure	Display	Remarks
Copy	1	CLR SET SET ENT		P R O G R — — — 0 R O M M O D E	ROM writer (1) function is specified.
	2	STR ENT		P R O G R — — P*_S T R 0 R O M M O D E	Basic unit ⟶ Basic unit EEPROM RAM
	3	Power OFF, memory pack is set. Then power ON.		P R O G P G M J — R V : 1	
	4	CLR SET SET ENT		P R O G R — — — 0 R O M M O D E	ROM writer (1) function is specified.
	5	OUT ENT		P R O G R — — P _ O U T 0 R O M M O D E	Basic unit ⟶ Memory pack RAM EEPROM
	6	AND ENT		P R O G R — — P*_A N D 0 R O M M O D E	Basic unit →←Memory pack RAM EEPROM
	7	CLR RES RES ENT			ROM writer (1) function is released.
Load	1	Power ON after memory pack is set.		P R O G P G M J — R V : 1	
	2	CLR SET SET ENT		P R O G R — — — 0 R O M M O D E	ROM writer (1) function is specified.
	3	STR ENT		P R O G R — — P*_S T R 0 R O M M O D E	Memory pack ⟶ Basic unit RAM
	4	Power OFF and memory pack is taken out. Then power ON.		P R O G P G M J — R V : 1	
	5	CLR SET SET ENT		P R O G R — — — 0 R O M M O D E	ROM writer (1) function is specified.
	6	OUT ENT		P R O G R — — P _ O U T 0 R O M M O D E	Basic unit ⟶ Basic unit RAM EEPROM
	7	CLR RES RES ENT			ROM writer (1) function is released.

*"P" is lit for the short time. (aprox. 0.1 sec)
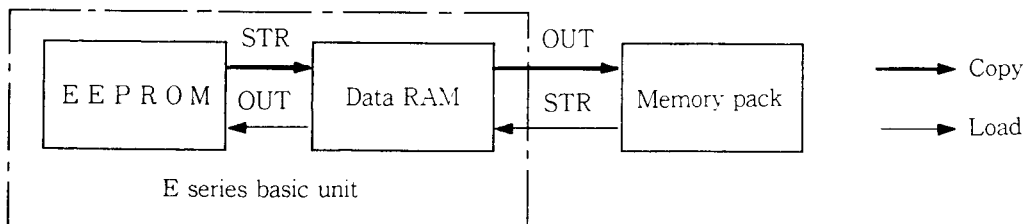
Fig. 5.1 Copying and loading memory pack

6 . CMT Interface Function(FUN 1)

Programs of the basic unit is recorded to the audio cassette tape with this function.
Three modes are selected by key-in operation shown in Fig. 6.1.
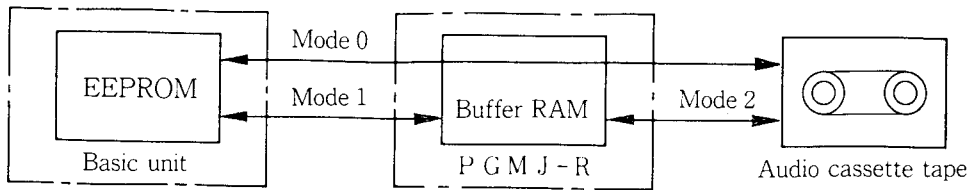
Mode 0 : Programs are transfered between the basic unit and the audio cassette tape through the buffer RAM in PGMJ-R.
Mode 1 : Programs are transfered between the basic unit and PGMJ-R.
Mode 2 : Programs are transfered between PGMJ-R and the audio cassette tape.

Fig. 6.1   Modes of CMT interface function

Mode 0 is normal key-in procedure, because programs are transferred between the basic unit and the audio cassette tape.
Mode 2 is selected, when the programs of A tape is recorded to B tape without changing the programs of the basic unit.

Table 6.1 shows key-in procedure of CMT interface function.

《Notice》

1. Monaural cassette tape recorder should be used. Set the tone and volume knob to maximum.

2. Be sure to wind up the tape beginning before recording, playing back or verification.

3. Connection cord without resistor is necessary.
   Don't use the code with resistor because of un-recording.

4. Execution time will be increased accoding to the number of program steps.
   Execution $\fallingdotseq$ 40 seconds + number of steps $\times$ 0.22 sec

5. The cassette tape recorded by PGMJ can be played back by PGMJ-R, but reverse operation is impossible
   (The cassette tape recorded by PGMJ-R can not be played back by PGMJ.)

Table 6.1 Key-in procedure of CMT interface function

| No.	Function		Key-in procedure		Display	Remarks
			Tape recorder	PGMJ-R		
1	CMT interface function is specified.			CLR SET SET ENT, FUN 1	PROG C --- 1 CMT MODE	
	Record (DUMP)	Mode 0	Recording	OUT ENT	PROG C--P-OUT 1 CMT MODE	Basic unit → EEPROM → Cassette tape
		Mode 1	MIC ⊙-□-⊙ MIC (PGMJ-R) (Tape recorder)	OUT 1 ENT	PROG C--P-OUT 1 1 CMT MODE	Basic unit → EEPROM, PGMJ-R → RAM
		Mode 2		OUT 2 ENT	PROG C--P-OUT 2 1 CMT MODE	PGMJ-R RAM → Cassette tape
2	Play back (LOAD)	Mode 0	Play back	STR ENT	PROG C--P-STR 1 CMT MODE	Basic unit ← EEPROM ← Cassette tape
		Mode 1	EAR ⊙-□-⊙ EAR (PGMJ-R) (Tape recorder)	STR 1 ENT	PROG C--P-STR 1 1 CMT MODE	Basic unit ← EEPROM, PGMJ-R ← RAM
		Mode 2		STR 2 ENT	PROG C--P-STR 2 1 CMT MODE	PGMJ-R RAM ← Cassette tape
	Verification (VERIFY)	Mode 0	Play back	AND ENT	PROG C--P-AND 1 CMT MODE	Basic unit -↛- Cassette tape
		Mode 1	EAR ⊙-□-⊙ EAR (PGMJ-R) (Tape recorder)	AND 1 ENT	PROG C--P-AND 1 1 CMT MODE	Basic unit -↛- EEPROM, PGMJ-R -↛- RAM
		Mode 2		AND 2 ENT	PROG C--P-AND 2 1 CMT MOD	PGMJ-R RAM -↛- Cassette tape
	Error display		Key-in operation error		C --- E	Depress CLR key to clear error, and retry.
			Play back error		C 6 2 E	
			Verification error		C 7 - E	
			Format error		C 8 - E	
3	Release CMT interface function			CLR RES RES ENT		

1) "P" is disappeared at completion of excution.
2) For data play back or verification, symbol "H" will apear for about 30 sec untill the tape is positioned at the start bit.

7 . ROM writer (2) Function (FUN 2)

Memory pack is copied and loaded with this function when the memory pack is set on PGMJ-R.

Three modes are selected by key-in operation shown in Fig. 7.1.
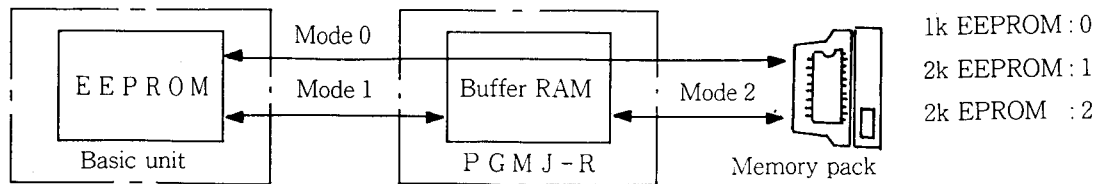
Mode 0 : Programs are transfered between the basic unit and the memory pack.
Mode 1 : Programs are transfered between the basic unit and PGMJ-R.
Mode 2 : Programs are transfered between PGMJ-R and the memory pack.

Fig. 7.1 Modes of ROM writer (2) function

Mode 0 is the normal key-in procedure, because programs are transfered between the basic unit and the memory pack.

Mode 2 is selected, when the programs of A memory pack is copied to B memory pack without changing the programs of the basic unit.

Table 7.1 shows key-in procedure of ROM writer (2) function.

⟨Notice⟩

1. If 2k EEPROM memory pack is operated as 2k EPROM
   ($\boxed{\text{OUT}}$ $\boxed{\text{x}}$ $\boxed{\text{2}}$ $\boxed{\text{ENT}}$). 2k EEPROM memory pack might be damaged.
      └── EPROM is specified

2. Programs are scrambled by loading operation without setting the memory pack on PGMJ-R.

Table 7.1 Key-in procedure of ROM writer (2) function

No.	Function		Key-in procedure	Display	Remarks
1	ROM writer (2) function is specified.		CLR SET SET ENT / FUN 2	PROG P - - - / 2 ROM MODE	
	COPY	Mode 0	OUT 0 ENT — 2k EEPROM:1, EPROM:2	PROG R - - P_OUT 0 0 / 2 ROM MODE	Basic unit ——→ EEPROM Memory pack
		Mode 1	OUT 1 0 ENT — Same meaning	PROG R - - P_OUT 1 0 / 2 ROM MODE	Basic unit ——→ EEPROM PGMJ-R RAM
		Mode 2	OUT 2 0 ENT — Same meaning	PROG R - - P_OUT 2 0 / 2 ROM MODE	PGMJ-R RAM ——→ EEPROM Memory pack
	LOAD	Mode 0	STR ENT	PROG R - - P_STR 0 0 / 2 ROM MODE	Basic unit ←—— EEPROM Memory pack
2		Mode 1	STR 1 ENT	PROG R - - P_STR 1 0 / 2 ROM MODE	Basic unit ←—— EEPROM PGMJ-R RAM
		Mode 2	STR 2 ENT	PROG R - - P_STR 2 0 / 2 ROM MODE	PGMJ-R RAM ←—— EEPROM Memory pack
	VERIFY	Mode 0	AND ENT	PROG R - - P_AND 0 0 / 2 ROM MODE	Basic unit →←→ EEPROM Memory pack
		Mode 1	AND 1 ENT	PROG R - - P_AND 1 0 / 2 ROM MODE	Basic unit →←→ EEPROM PGMJ-R RAM
		Mode 2	ANE 2 ENT	PROG R - - P_AND 2 0 / 2 ROM MODE	PGMJ-R RAM →←→ EEPROM Memory pack
	Blank check		NOT ENT	PROG R - - P_NOT / 2 ROM MODE	Erase check for EEPROM
	Error display		Key-in operation error	R - - - E	
			Copy error	R 6 2 E OUT	Exchange memory pack
			Verification error	R 7 - E AND	
			Blank check error	R 6 1 E NOT	EPROM is not erased.
3	Release ROM writer (2) function		CLR RES RES ENT		

"P" is disappeared at completion of excution.

8 . Forced Output Function (FUN 3)

This function enables turning ON/OFF external output while the system is in stop state under TEST mode in no connection with program, and thus the output wiring can be checked after installation.

Table 8.1 shows key-in procedure of forced output function.

Table 8.1　Key-in procedure of forced output

No.	Key-in procedure	Display	Remarks
1	CLR SET SET ENT FUN 3	P R P G 0 - - - 3 F O R C E D 　 O U T	Forced output is specified.
2	CLR OUT 5 0 SET	P R O G 0 - - - 　 O U T 3 F O R C E D 　 O U T 5 0 ■	Output 50 ON
	CLR OUT 5 5 SET	P R O G 0 - - - 　 O U T 3 F O R C E D 　 O U T 5 5 ■	Output 55 ON
	RES	P R O G 0 - - - 　 O U T 3 F O R C E D 　 O U T 5 5	Output 55 OFF
	CLR OUT 5 0 RES	P R O G 0 - - - 　 O U T 3 F O R C E D 　 O U T 5 0	Output 50 OFF
3	CLR RES RES ENT		Release forced output.

<Notice>

1. When the forced output mode is specified, then the RUN contact is turned ON.
   Perform the test with due consideration of safety.
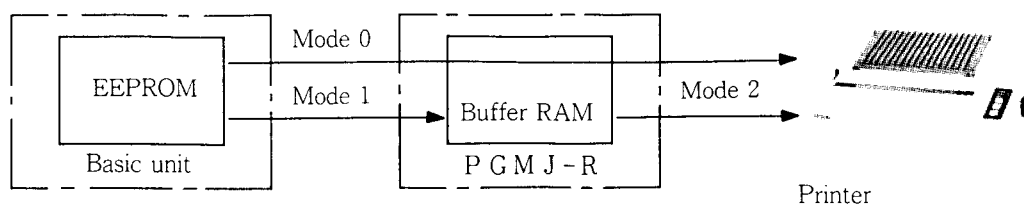
9 . Printer Interface Function (FUN 4, FUN 5)

9.1 Key-in procedure of PGMJ-R

Key-in procedure is different according to the type of the basic unit.

In case of E, J-16 series, FUN 4 is specified. The other operations are same to all types.

Three modes and print out formats are selected by the key-in operation.

Mode selection is shown in Fig. 9.1 and format selection in Table 9.1.

Mode 0 : Programs of the basic unit are printed out through the buffer RAM of PGMJ-R.

Mode 1 : Programs are transferred between the basic unit and PGMJ-R.

Mode 2 : Programs of PGMJ-R are printed out.

Fig. 9.1 Printer interface function

Table 9.1 Print out Format

Format is specified.	Title	Coding list	Ladder diagram	Cross reference
0	○	○	○	○
1		○	—	—
2	—	—	○	—
3	—	—	—	○

○ : Possible

Table 9.2 Key-in procedure as printer interface

No.	Function		Key-in procedure	Display	
1	Printer interface is specified.		[CLR][SET][SET][ENT] [FUN][4]	PROG P — — — 4 PRINT_OUT	In case of EM, FUN 5 is specified.
2	Print out	Mode 0	[OUT][0][2][ENT] └─ Ladder	PROG P — — P—OUT 0 2 4 PRINT_OUT	Basic unit → Printer EEPROM
		Mode 1	[OUT][1][ENT]	PROG P — — P—OUT 1 4 PRINT_OUT	Basic unit → PGMJ-R EEPROM RAM
		Mode 2	[OUT][2][1][ENT] └ Coding	PROG P — — P—OUT 2 1 4 PRINT_OUT	PGMJ-R → Printer RAM
3	Release printer interface		[CLR][RES][RES][ENT]		

[OUT][×][×][ENT]

Mode is specified ──┘   └──Format is specified

9.2 Setting DIP switch in PGMJ-R

Bit rate and word length are selected by DIP switch built in PGMJ-R.

Bit rate setting is shown in Table 9.3 and word length setting is shown in Table 9.4.

For word length | For Bit rate | No use. | Personal computer interface at on state.

```
 8  7  6  5  4  3  2  1
───────── O F F ─────────
```
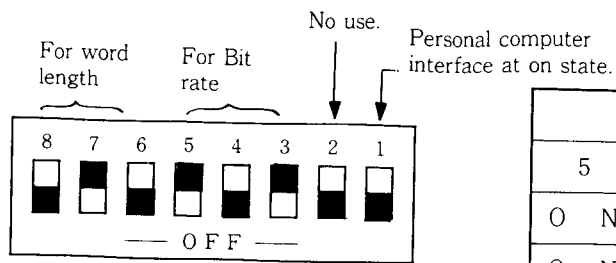
Table 9.3 Bit rate setting

Switch No.			Bit rate (kB. P. S)	Remarks
5	4	3		
O N	O N	O N	38.4	
O N	O N	O F F	19.2	
O N	O F F	O N	9.6	
O N	O F F	O F F	4.8	Factory-set
O F F	O N	O N	2.4	
O F F	O N	O F F	1.2	
O F F	O F F	O N	0.6	
O F F	O F F	O F F	0.3	

Table 9.4 Word length setting

Switch No.			Word length				Remarks
8	7	6	Start bit	Data bit	Parity bit	Stop bit	
O N	O N	O N	1	7	1 (even)	2	
O N	O N	O F F	1	7	1 (odd)	2	
O N	O F F	O N	1	7	1 (even)	1	
O N	O F F	O F F	1	7	1 (odd)	1	
O F F	O N	O N	1	8	—	2	
O F F	O N	O F F	1	8	—	1	Factory-set
O F F	O F F	O N	1	8	1 (even)	1	
O F F	O F F	O F F	1	8	1 (odd)	1	

9.3 Specification for printing

(1) The circuit which has within 8 serial contacts, within 26 lines and within 7 times STR command repeatedly is normally printed out.

(2) In case of the circuit excess limitation, the ladder diagram within limitation is printed out.

For example, when the circuit has 10 serial contacts, the ladder diagram up to 8 contacts is printed out, and 9 th and 10 th contacts are not printed Further "＊" is printed at the head of the circuit.

8 contacts MAX.

26 lines MAX.

Maximum scale of ladder diagram

＊
0520

Ladder diagram excess 8 contacts

Up to 8 contacts are printed out.

The contacts excess 8 contacts are not printed and the space is printed.
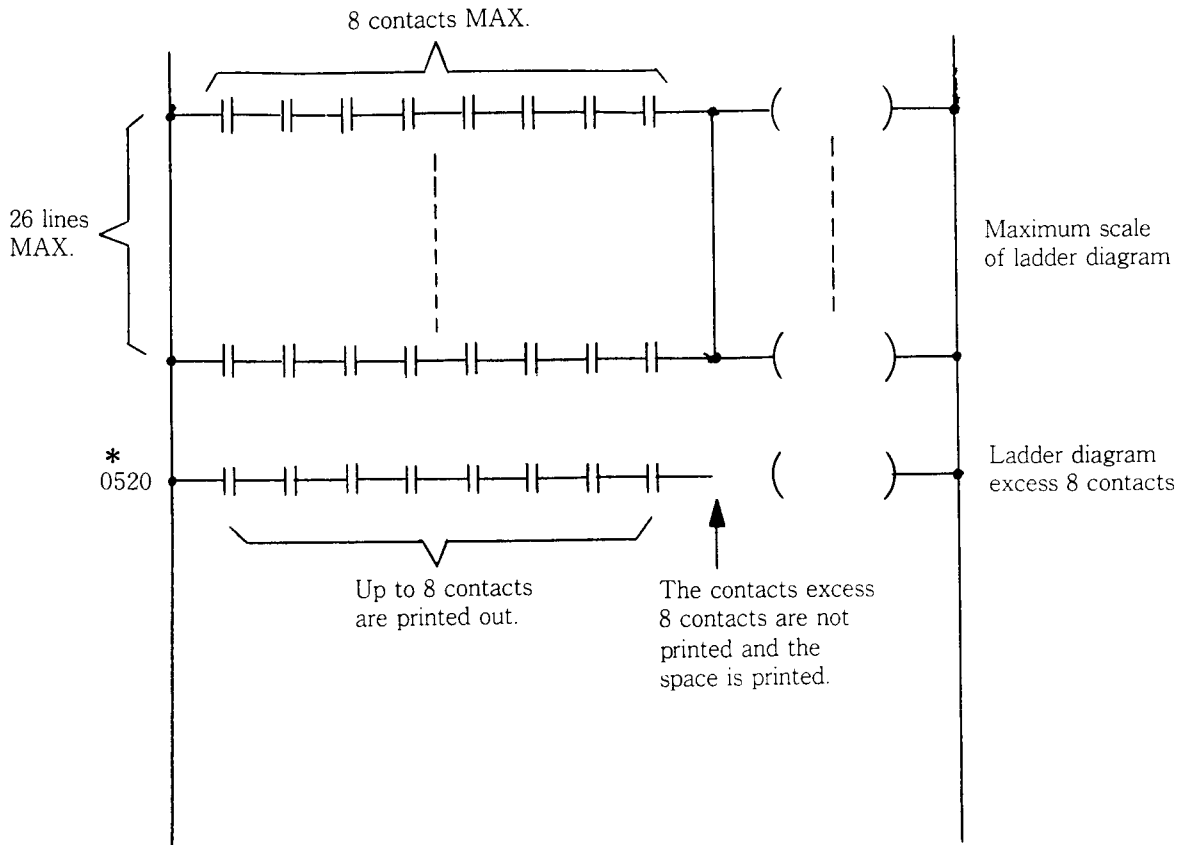
Note for using the printer

(1) To halt the printing in the course, push the start switch again.
The display lamp disappears and the printer stops.

(2) If the printer power is turned off or the printer paper becomes short during operation, perform the procedure all over again.

(3) When the printer paper is used up, the printer buzzer sounds eight times.

(4) It's convenient that the slits of the paper are set at the center of the printer's head using the knob for feeding the paper.

knob for feeding paper

head

slits
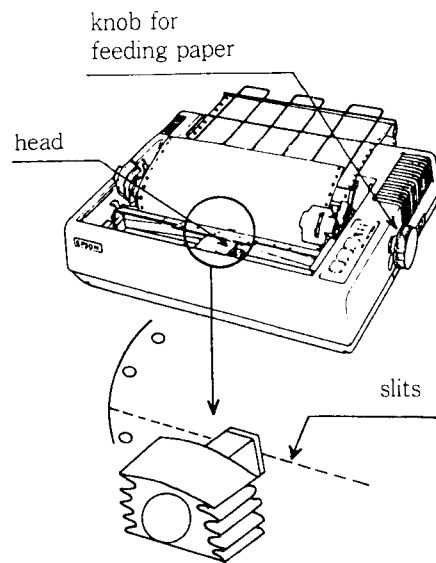
(3) Even if there is a syntax error in the program, the ladder diagram including a syntax error is printed out.

Examples are shown below.

(ex1) ORG command is missing.
ORG is mmissing. ——→
| AND   1
| OR   2
| OUT   10

space
|—001—(010)—|
002
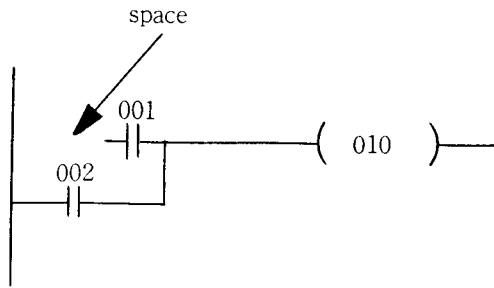
(ex2) OUT command is missing.
| ORG   0
| AND   1
| OR   2
OUT is missing. ——→
| ORG   3

000 001
002
003
space
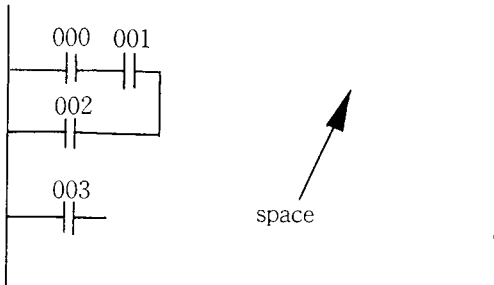
(ex3) OR·STR command is missing.
| ORG   0
| AND   1
| STR   3
OR·STR is missing. ——→
| OUT   10

000 001
002 003 —(010)—
space
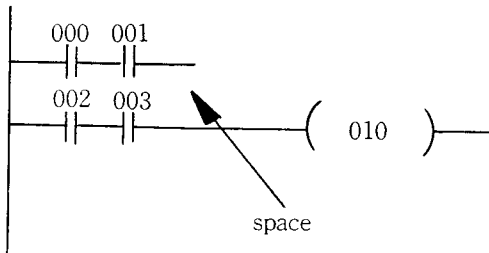
(ex4) AND·STR command is missing.
| ORG   0
| OR   1
| STR   2
| OR   3
AND·STR is missing. ——→
| OUT   10

000
001
002 —(010)—
003
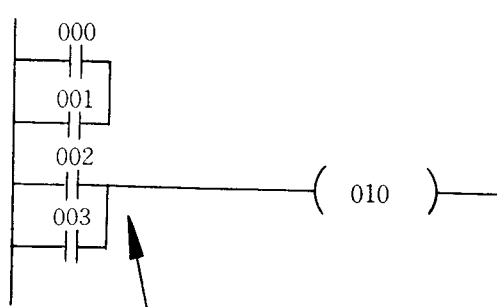
This circuit is printed out from the branch point because AND·STR is missing.

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9.4 Printed out example

```
********************************************************
*                                                      *
*            PROGRAMMABLE   CONTROLLER                  *
*                                                      *
*                   PROGRAM                            *
*                                                      *
*                                                      *
*                                                      *
*   SUBJECT :                                          *
*   -------------------------------------------------- *
*                                                      *
*   DRW NO.            VERSION                         *
*   -------------------------------------------------- *
*                                                      *
*   DATE              PROGRAMMER                       *
*   -------------------------------------------------- *
*                                                      *
********************************************************
```

PAGE 002   CODING LIST

STEP	CODE	DATA		STEP	CODE	DATA		STEP	CODE	DATA
0000	ORG	000	*	0008	OR	110	*	0016	AND	006
0001	AND NOT	001	*	0009	OUT	110	*	0017	AND NOT	007
0002	AND	002	*	0010	ORG	000	*	0018	AND	010
0003	AND NOT	003	*	0011	AND NOT	001	*	0019	AND NOT	011
0004	AND	004	*	0012	AND	002	*	0020	OUT	111
0005	AND NOT	005	*	0013	AND NOT	003	*	0021	END	
0006	AND	006	*	0014	AND	004	*			
0007	AND NOT	007	*	0015	AND NOT	005	*			

PAGE 003   LADDER DIAGRAM

STEP   LADDER

```
     !                                                          !
     ! 000   001   002   003   004   005   006   007            !
0000 +-! !---!/!---! !---!/!---! !---!/!---! !---!/!-+-(   110)-+
     ! 110                                           !          !
     +-! !-------------------------------------------+          !
     !                                                          !
*    ! 000   001   002   003   004   005   006   007            !
0010 +-! !---!/!---! !---!/!---! !---!/!---! !---!/!--- (   111)-+
     !                                                          !
     !                                                          !
0021 ! END                                                      !
```

PAGE 004   CROSS TABLE

DATA   STEP

```
000    0000   0010
001    0001   0011
002    0002   0012
003    0003   0013
004    0004   0014
005    0005   0015
006    0006   0016
007    0007   0017
010    0018
011    0019
110    0008 (0009)
111    (0020)
END
```

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9.5 Printer Specification

EPSON printer RX-80 or FX-80 is recommendable.

Printer specification is shown in Table 9.5.

Table 9.5 Printer specification

item	specification	remark
Printing methods	Impact-dot matrix	Bidirectional
Size of print character	2.1 W × 3.1 H	
Print paper	Fan-fold paper (with sproket holes)	Fold type
Printing speed	80 characters/sec.	
Number of print columns	80 columns	
Ribbon	Exclusive-use cartridge ribbon	
Interface	RS-232C	Cat. No. 8143 or 8145 interface pcb is required.
Ambient temperature	5 ~ 35°C	
Relative humidity	10 ~ 80% (without condensation)	
Power supply	220VAC + 10% 49.5 ~ 60.5Hz 100VA	
Cooling	Natural cooling	
Dimensions (mm)	374W × 107H × 305D	
Weight (kg)	Approx. 5.5kg	
Head useful life	100×10^6 characters (ladder diagram for 2000KW printable)	
Ribbon useful life	2×10^6 characters (ladder diagram for 40KW printable)	

9.6 Setting of DIP switch in the printer

Setting DIP switch in RX-80 is shown in Table 9.6.
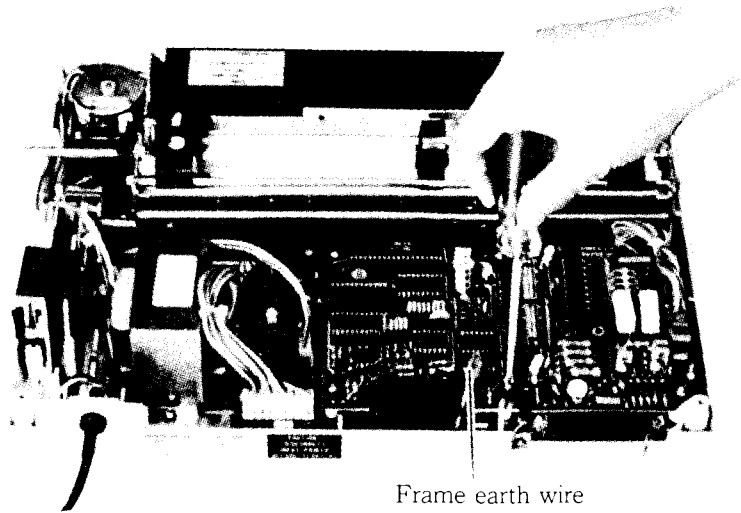
Table 9.6 Setting of DIP switch in RX-80

Switch No.		Setting	Function
SW1	1	OFF	Pica-sized, not condensed
	2	OFF	Control code, not Graphic symbol
	3	OFF	Sounds the buzzer.
	4	ON	Form length is 12-inch.
	5	OFF	Paper-end detector is valid.
	6	—	Don't care.
	7	—	
	8	—	
SW2	1	OFF	Zero font 0
	2	ON	SLCT IN signal is internally fixed.
	3	OFF	LF must be from host.
	4	OFF	1 inch skip-over perforation is invalid.

9.7 Setting of switch on the serial interface board

Installing the interface board is shown in Fig. 9.7.

Setting of DIP switch on the serial interface board is shown in Table 9.7.

Fig. 9.7 Installing the intorface board

Frame earth wire

(Note) The parallel interface isn't available after installing the serial interface board.

Table 9.7 Setting of DIP switch on the serial interface board

#8145

Switch No.		Setting
SW 1	1	OFF
	2	ON
	3	OFF
	4	OFF
	5	OFF
	6	OFF
	7	ON
	8	(don't care)
SW 2	1	OFF
	2	ON
	3	OFF
	4	ON

#8143

Switch No.	setting
1	ON
2	OFF
3	ON
4	OFF
5	(don't care)
6	OFF
7	OFF
8	ON

10. Personal Computer Interface Function

10.1 Setting DIP switch built in PGMJ-R

When DIP switch is set in Fig. 10.1, it is possible to communicate between PGMJ-R and the personal computer, and then display of PGMJ-R is shown in Fig. 10.2.

Key operation is ignored in this mode because the control command from the personal computer is prior to key operation of PGMJ-R.
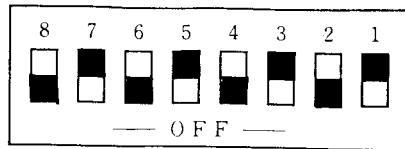
Switch No.	Setting	Contents
8	O F F	Start bit : 1 bit
7	O N	Data bit : 8 bits Parity : nothing
6	O F F	Stop bit : 1 bit
5	O N	
4	O F F	9,600 B P S
3	O N	
2	O F F	No use.
1	O N	Personal computer interface

(Switch No.1 and No.3 are different from factory-set.)

Fig. 10.1 Setting DIP switch
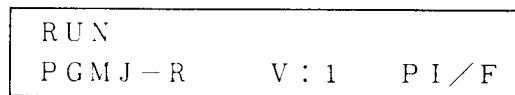
```
R U N
P G M J - R      V : 1     P I / F
```

Fig. 10.2 Display of PGMJ-R

10.2 Programming by the personal computer

It's possible to program by using the special software shown in Table 10.1.

Programming specification by the personal computer is shown in Table 10.2.

For details of programming operation, refer "J-LDR(IBM 5150/5160) operation manual."

Table 10.1 Software package

Package name	Personal computer
J-LDR (IBM)	IBM PC 5150/5160

Table 10.2 Programming specifications by personal computer

Specifications			Off-line	Online					
				PROG	TEST		RUN		
					Stop	Run	Stop	Run	
Function	Editing function (EDIT)	Program reading (read)	○	○*	○*	○*	○*	○*	
		Program writing (write)	○	○*	×	×	×	×	
		Program change (change)	○	○*	×	×	×	×	
		Program deletion (delete)	○	○*	×	×	×	×	
	Program all-clear (PROG. CLEAR)		○	○*	×	×	×	×	
	Label addition (LABEL)		○	○*	×	×	×	×	
	Forced output function (FORCE OUT)		×	×	○	×	×	×	
	Monitoring function (MONITOR)	Monitoring of ON/OFF of input/output Monitoring of elapsing values of timer and counter	×	×	×	×	×	○	
	Start/stop control function (START/STOP)		×	×	○	×	○	○	
	Mode switching function for E series (RUN/TEST/PROG)		×	○	○	×	○	×	
	Personal computer → E series program writing (WRITE)		×	○	×	×	×	×	
	Personal computer ← E series program reading (READ)		×	○	×	×	×	×	

*Processing in on line is in regard to data disk, not to E series.

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