

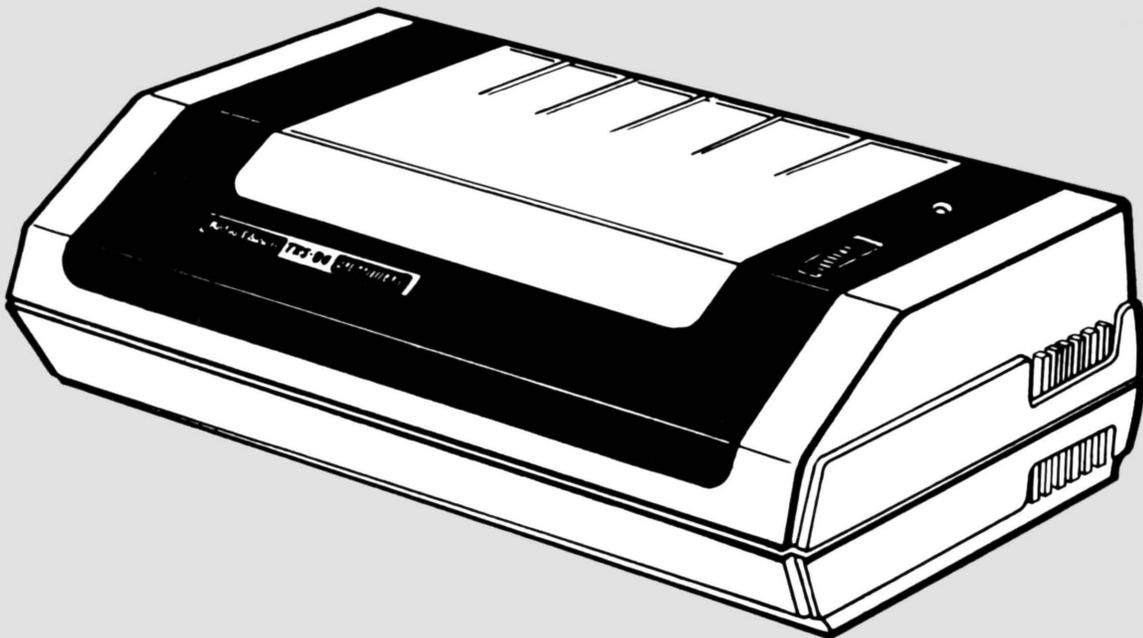
**Radio Shack<sup>®</sup>**

# **Service Manual**

**26-1167**

## **TRS-80 LINE PRINTER VII**

Catalog Number: 26-1167



CUSTOM MANUFACTURED FOR RADIO SHACK  A DIVISION OF TANDY CORPORATION

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# SPECIFICATIONS

Print method	Impact dot-matrix print
Print format	5 x 7 dot-matrix
Character set	96 characters conforming to ASCII STANDARD
Graphics	Able to print 7-dot column
Character codes	7- or 8-bit ASCII serial or 8-bit ASCII parallel
Character size	Height: 7 dots (2.82 mm) Width: 5 dots (2.11 mm)
Print speed	30 characters/sec at 10 CPI 80 columns
Max. columns	80 at 10 CPI
Characters/inch	a. 10 CPI at 80 columns b. 5 CPI at 40 columns
Lines/inch	a. 6 . . . Alphanumeric mode b. 9 . . . Graphic mode
Line feeds/second	a. 5 . . . Alphanumeric mode b. 7.5 . . . Graphic mode
Paper feed	Pin feed
Paper width	Up to 9.5" width paper can be used. Pin to pin 9"
Number of copies	Up to 3 copies including original
Inked ribbon	Inked roller built-in cassette type, single color (Cat. No. 26-1421)
Dimensions	8 · 1/4" x 16 · 1/16" x 5 · 6/16" 209.5d x 408w x 135h mm
Weight	Approx. 1.77 lbs (3.9 kg).
Power requirements	120 ± 15 VAC, 60 Hz for USA and Canada 100 (Japan), 220/240 (Europe), 240 (Australia) VAC 15 watts max. (character printing) 5 watts (idling)
Temperature	Operation 32° F to 109° F (0° C to + 43° C) Storage without damage -40° F to 160° F (-40° C to + 71° C)
Humidity	20% to 80% (no condensation)

## General functions

Double width characters can be printed by using a special command.  
Graphic pattern printing is possible. (Valid only in 8-bit code)  
In graphic mode, repetitive graphic data print is possible by a certain command.  
It is possible to select printing start-position by designating dot or character address.  
(Dot positioning is valid only when using 8-bit code)  
It is possible to print in the same line characters, double width characters, and graphics.  
Wrap-around function.

## Print modes

Character print mode  
Double width character print mode  
Graphic print mode

## Control codes

### Single-byte codes

1. LF (0,A) Print command with a linefeed
2. CR (0,D) Print command with a linefeed
3. SUB (1,A) Print command without a linefeed
4. DC2 (1,2) Indicates graphic print mode
5. RS (1,E) Indicates character mode
6. US (1,F) Indicates double width character print mode

### Multi-byte codes

1. POS (1,0) Designates printing start-position.
2. ESC (1,B) Designates a dot addressing along with a succeeding POS code.
3. FS (1,C) Designates repetitive graphics.

Code table

B8	B7	B6	B5	B4	B3	B2	B1		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
									0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
									0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
									0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
									0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
									0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
				0	0	0	0	0		POS	SP	0	@	P	·	p								
				0	0	0	1	1			!	1	A	Q	a	q								
				0	0	1	0	2		DC2	"	2	B	R	b	r								
				0	0	1	1	3			#	3	C	S	c	s								
				0	1	0	0	4			\$	4	D	T	d	t								
				0	1	0	1	5			%	5	E	U	e	u								
				0	1	1	0	6			&	6	F	V	f	v								
				0	1	1	1	7			'	7	G	W	g	w								
				1	0	0	0	8			(	8	H	X	h	x								
				1	0	0	1	9			)	9	I	Y	i	y								
				1	0	1	0	A	LF	SUB	*	:	J	Z	j	z								
				1	0	1	1	B		ESC	+	;	K	[	k	{								
				1	1	0	0	C		FS	,	<	L	\	l	;								
				1	1	0	1	D	CR		—	=	M	]	m	}								
				1	1	1	0	E		RS	.	>	N	^	n	~								
				1	1	1	1	F		US	/	?	O	_	o	SP								

} GRAPHIC DATA

Note: Regarding the code table for Japan, refer to the owner's manual in Japanese.

# CONSTRUCTION

## 1. SUMMARY—BLOCK DIAGRAM & FLOWCHART

Figure 1 shows the block diagram and Figure 2 is a flowchart showing the sequence of its motion.

### SIMPLIFIED BLOCK DIAGRAM

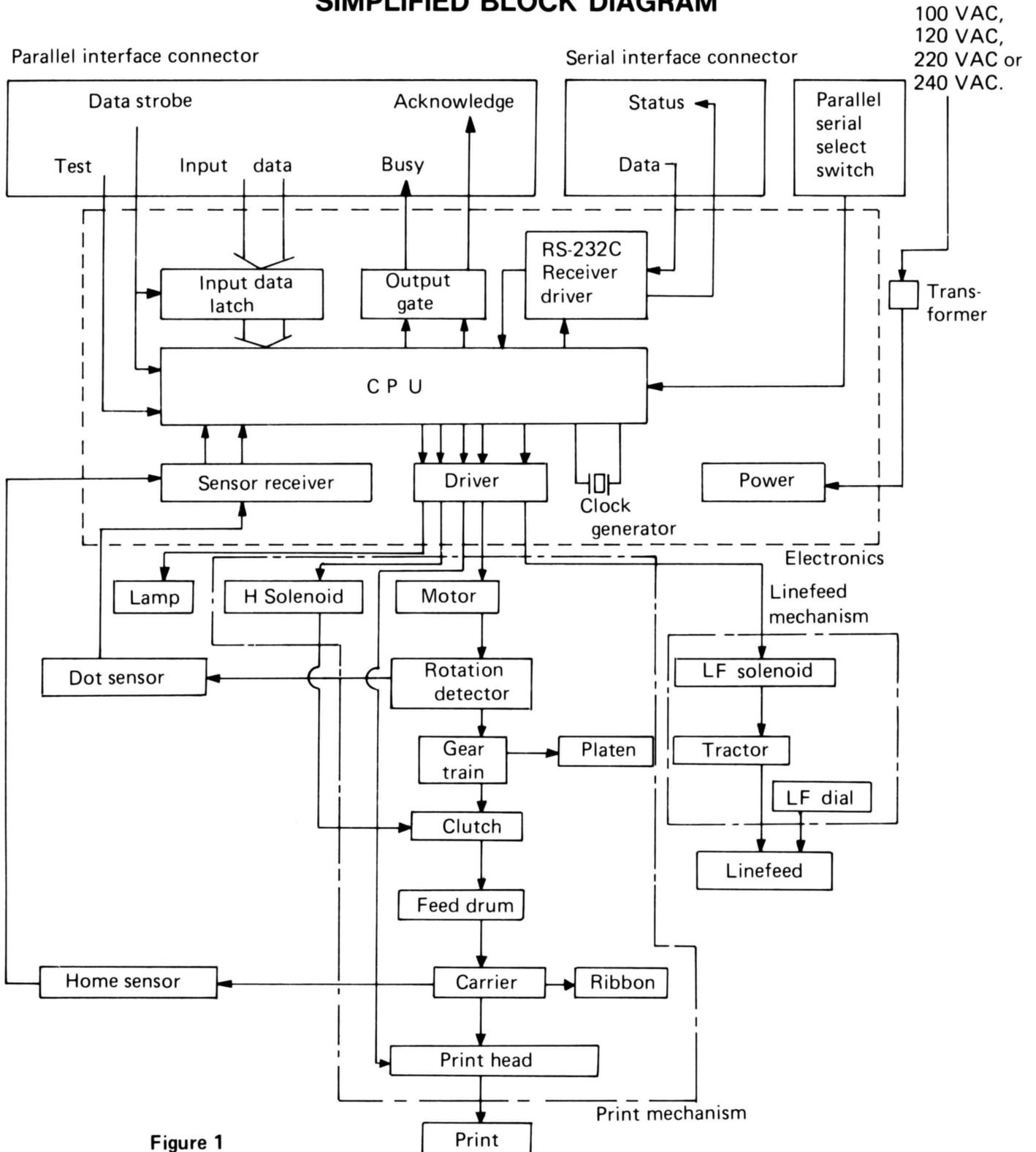


Figure 1

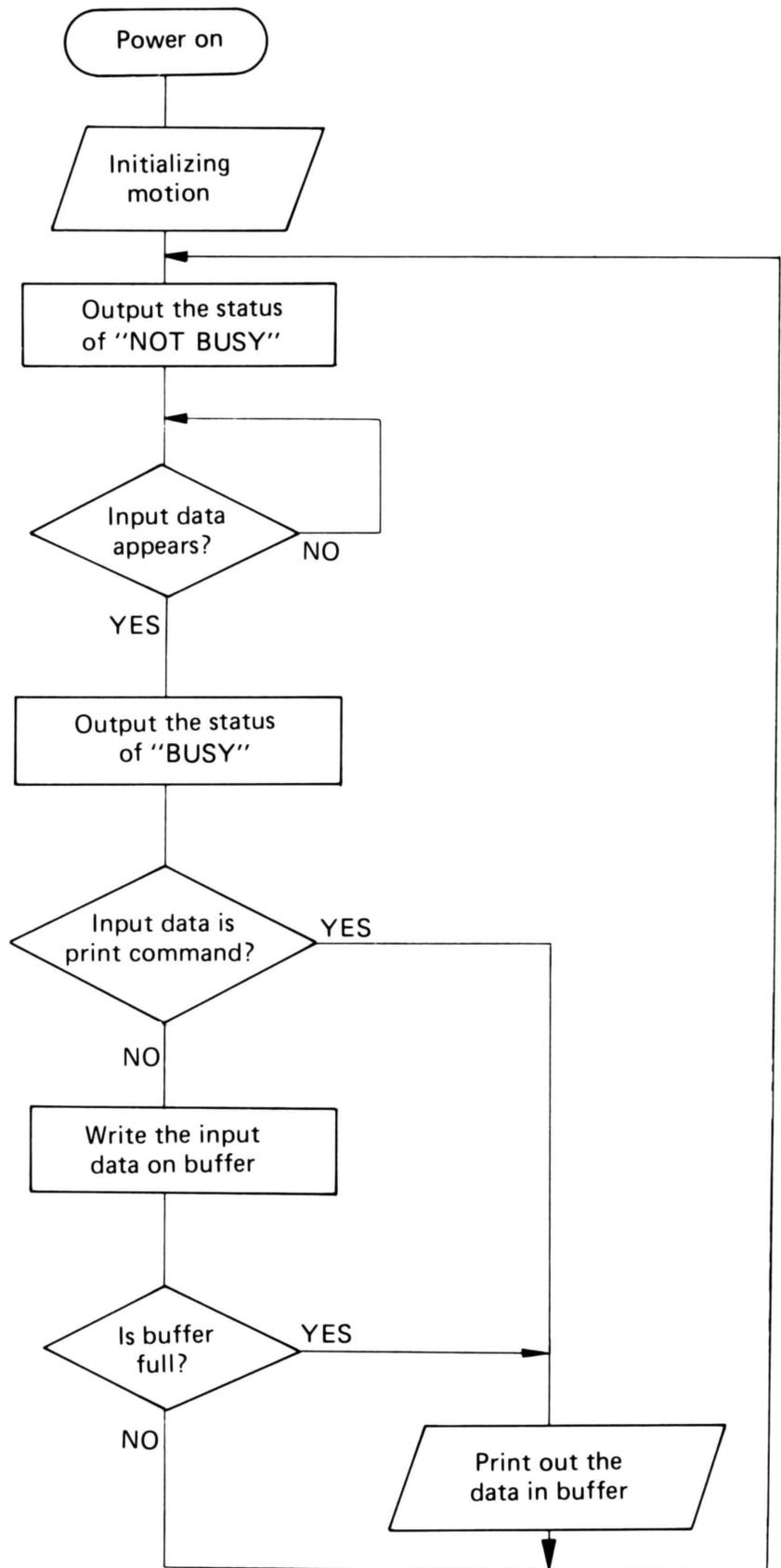
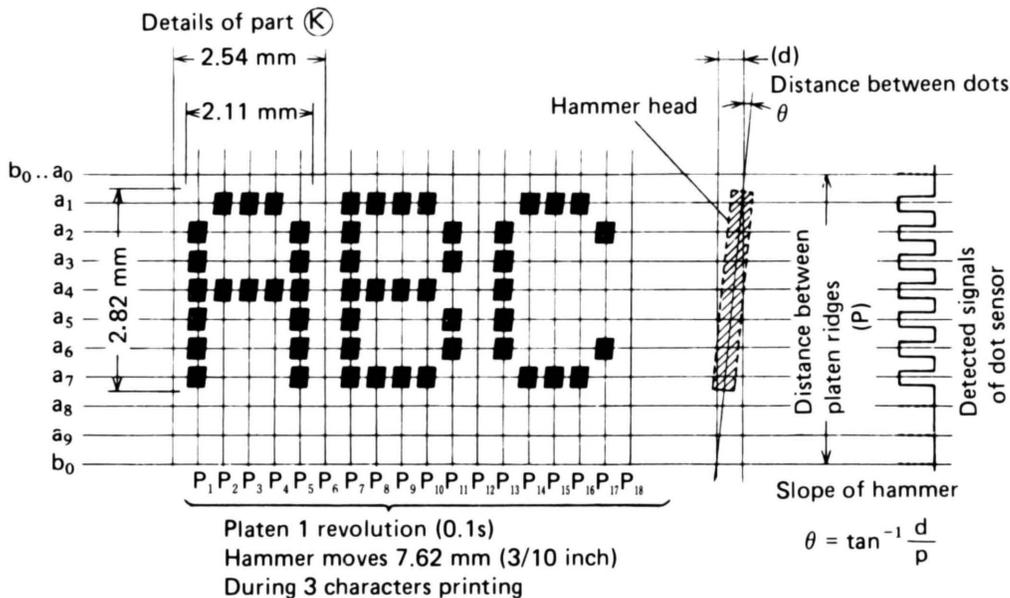
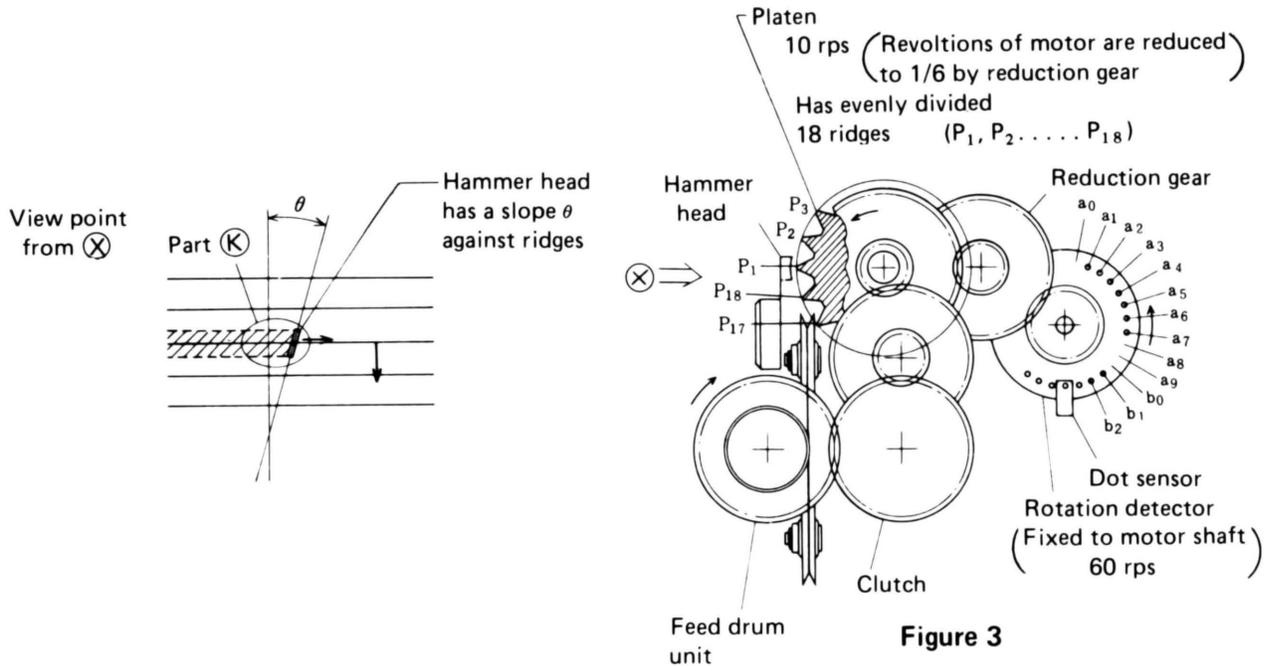


Figure 2

## 2. PRINTING

### (1) PRINTING MECHANISM

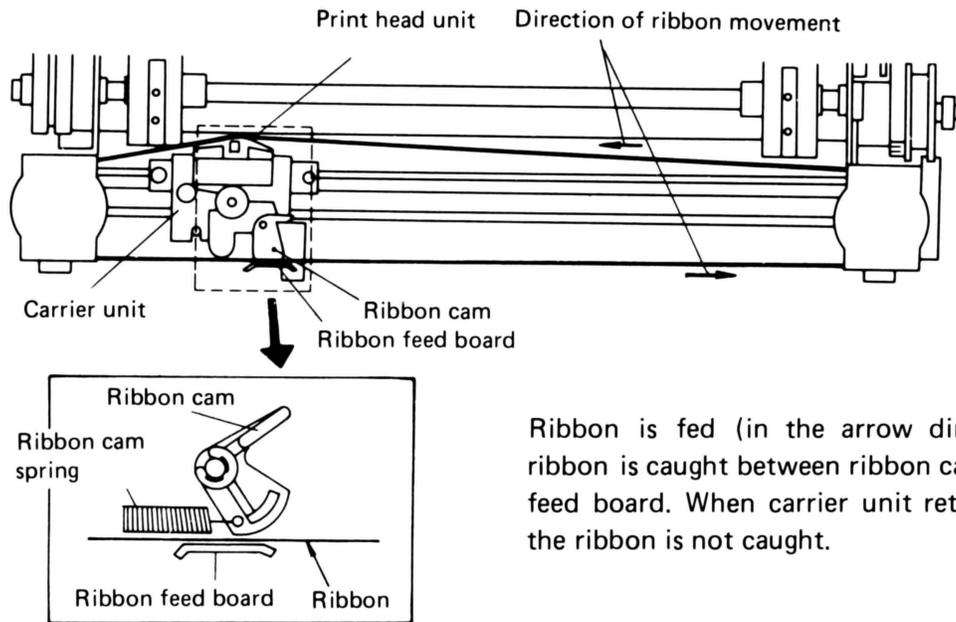
This Printer is based on a single printing hammer system which is quite unique and different from other impact dot printing systems. The timing of hammer printing depends upon revolution of the rotation detector. This revolution, rightward movement of the hammer and the revolution of the platen are synchronized. Character and graphics dots are printed when the relative positions of the hammer head and the platen are encountered. The relationship of the hammer, the platen and the dot sensor is shown in Figure 3; that of the hammer head, printed dot, and signals of the dot sensor in Figure 4.



**Figure 4**

## (2) CARRIER UNIT MOVEMENT AND RIBBON FEEDING

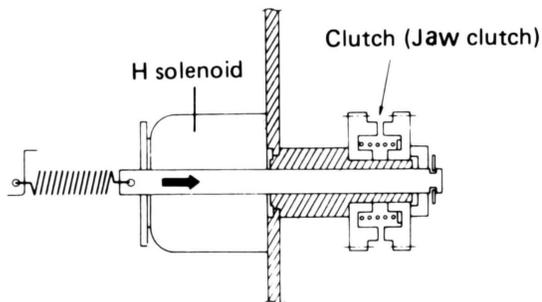
Figure 5 shows rightward movement of the carrier unit and ribbon feeding due to motor revolutions. Figure 6 describes the carrier unit's return to the home position, activated by the H solenoid.



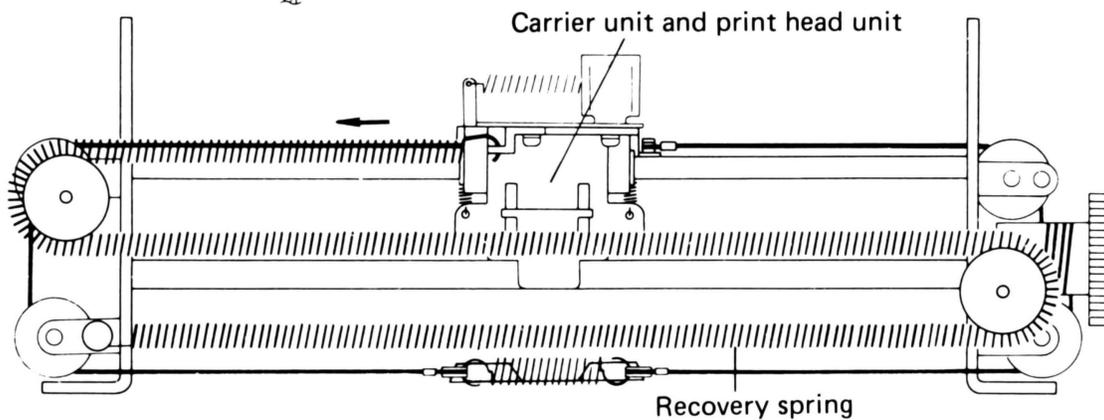
Ribbon is fed (in the arrow direction) when ribbon is caught between ribbon cam and ribbon feed board. When carrier unit returns leftward, the ribbon is not caught.

**Figure 5**

### Construction of H solenoid and clutch

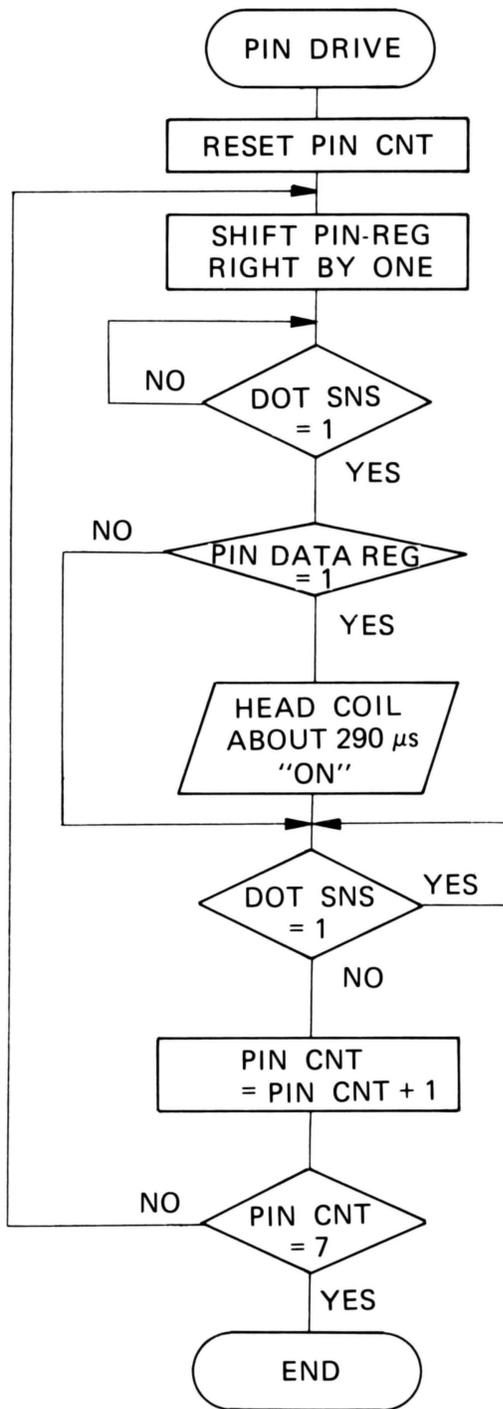


When H solenoid is pulled, the clutch is released and the carrier unit returns to the leftmost home position forced by the recovery spring.

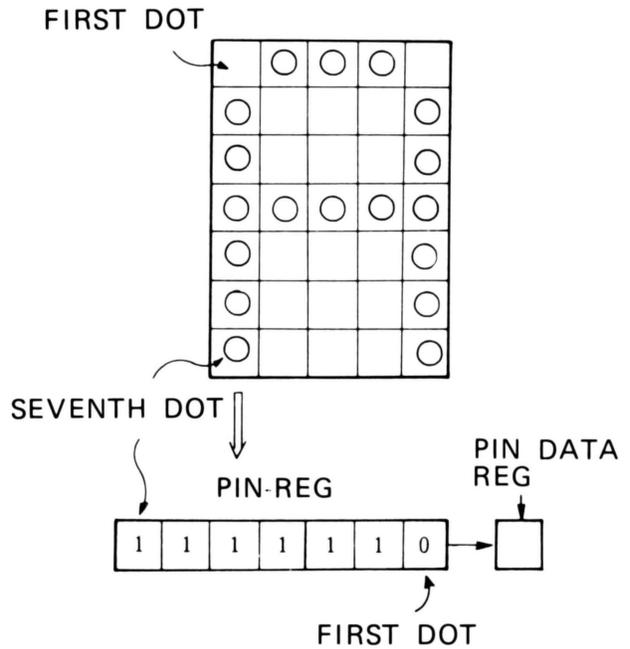


**Figure 6**

(3) HAMMER DRIVE (PIN DRIVE) FLOWCHART



CHARACTER PATTERN "A"



- PIN CNT: A counter for one column (7 dots) of a character pattern.
- PIN-REG: A register storing one column (7 dots) of a character pattern.
- DOT SNS: Timing signal for each dot.
- PIN DATA REG: One bit register for a dot to be printed.

Figure 7

### 3. LINEFEED

#### (1) LINEFEED MECHANISM

Figure 8 shows the linefeed (paper feed) controlled by the motion of the LF solenoid. The LF solenoid is activated three times for printing characters and two times for printing graphics.

The transmission sequence of the LF solenoid motion is:



The condition of the claw wheel unit when the LF solenoid is inactive is:

- i) The claw wheel unit is pulled by the LF rope spring.
- ii) The saw teeth of the LF claw wheel and the saw teeth pushed by the claw wheel spring are coupled.

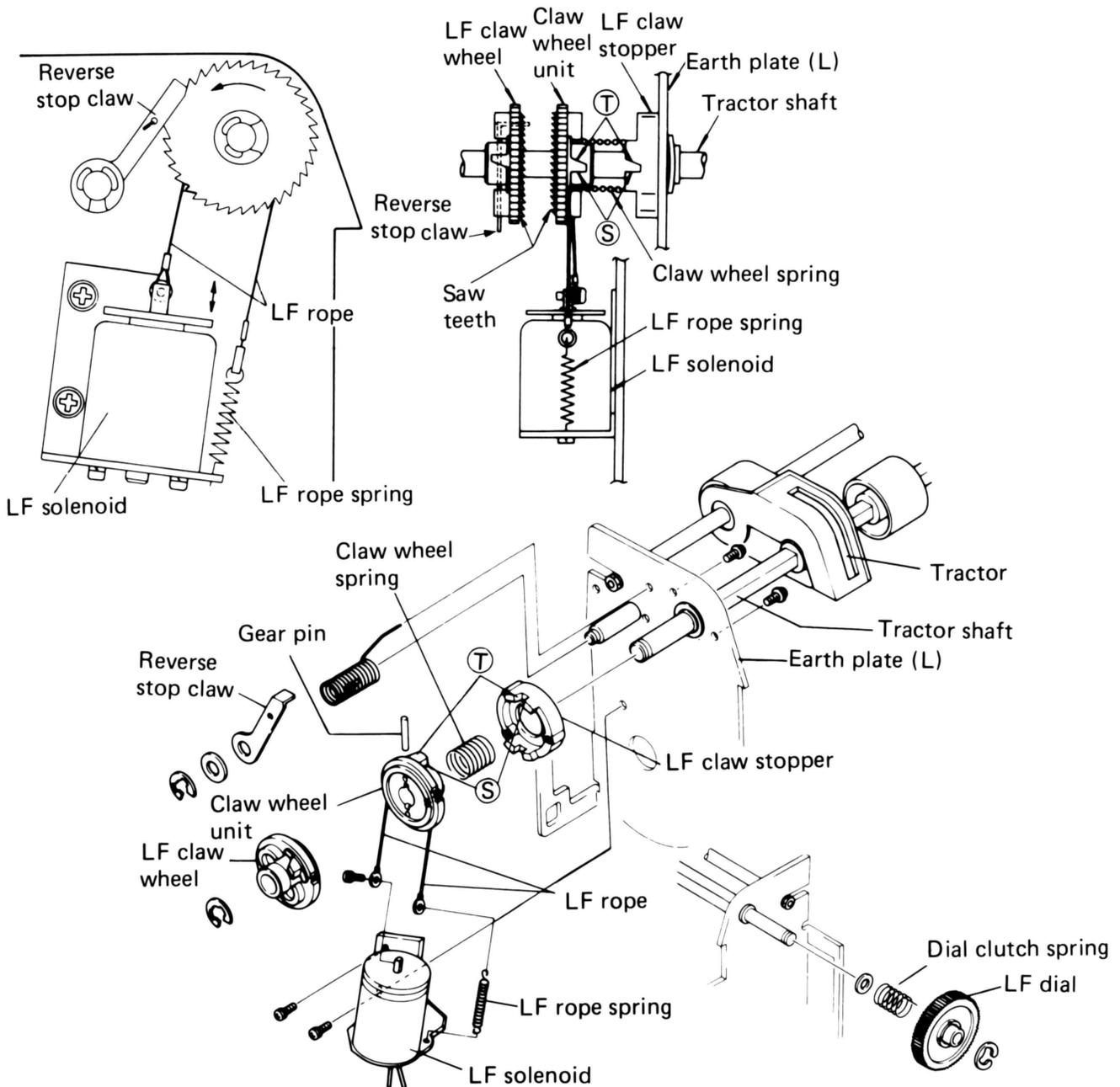


Figure 8

(2) LINEFEED FLOWCHART

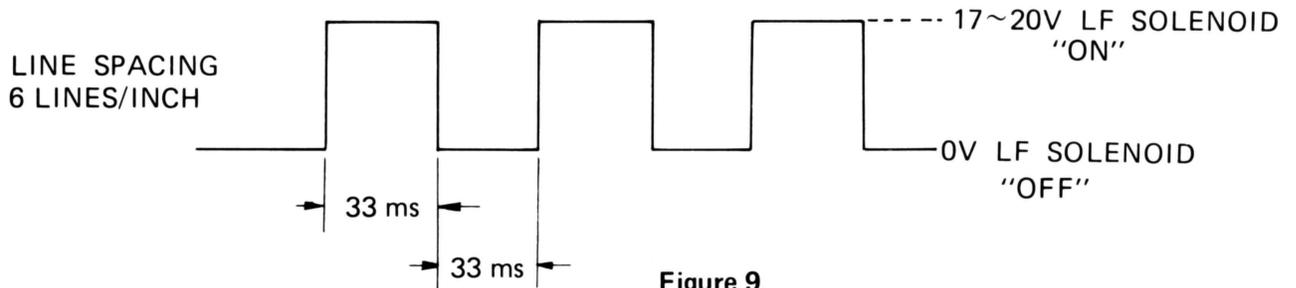
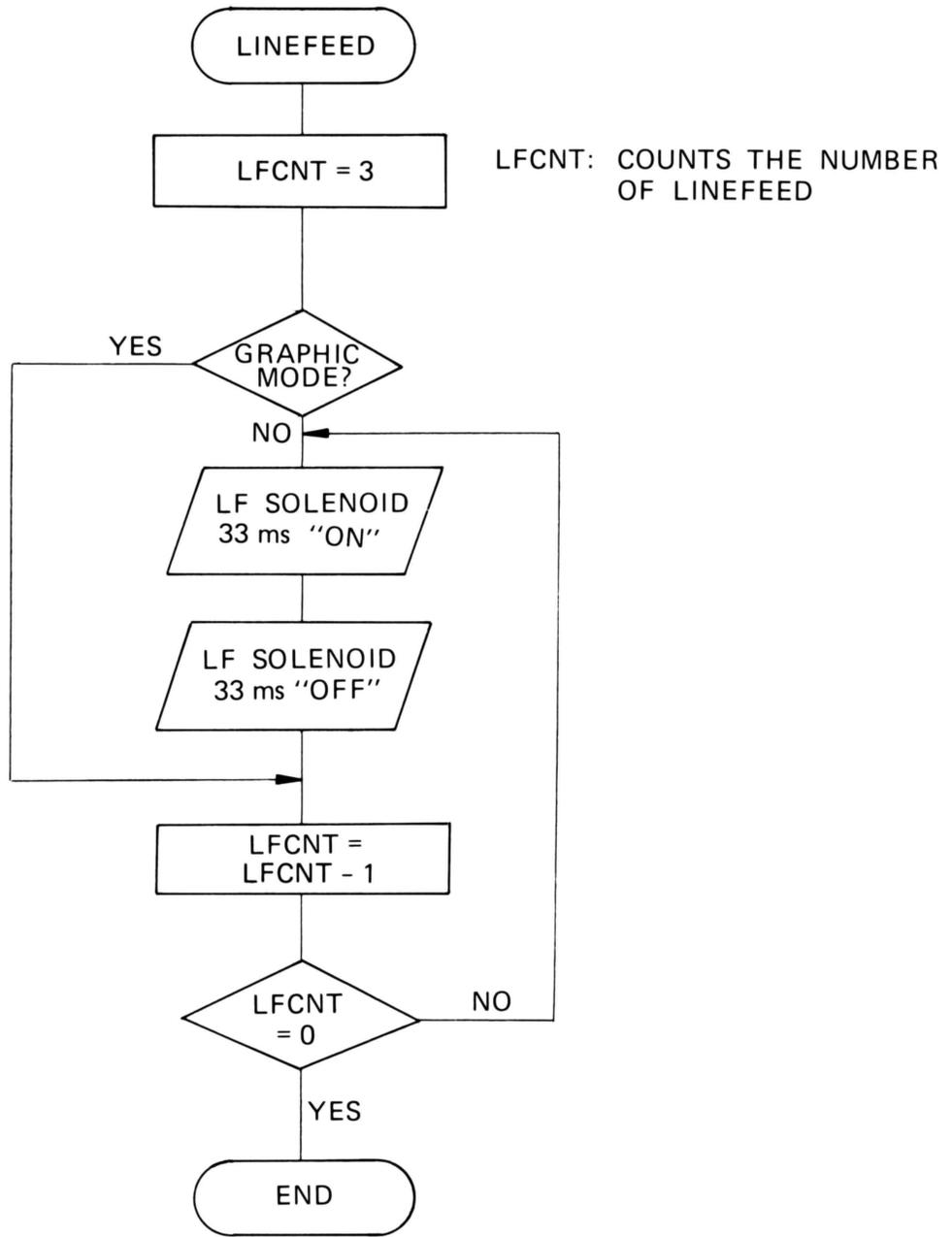


Figure 9



(2) PCB (PRINTED CIRCUIT BOARD) VIEW

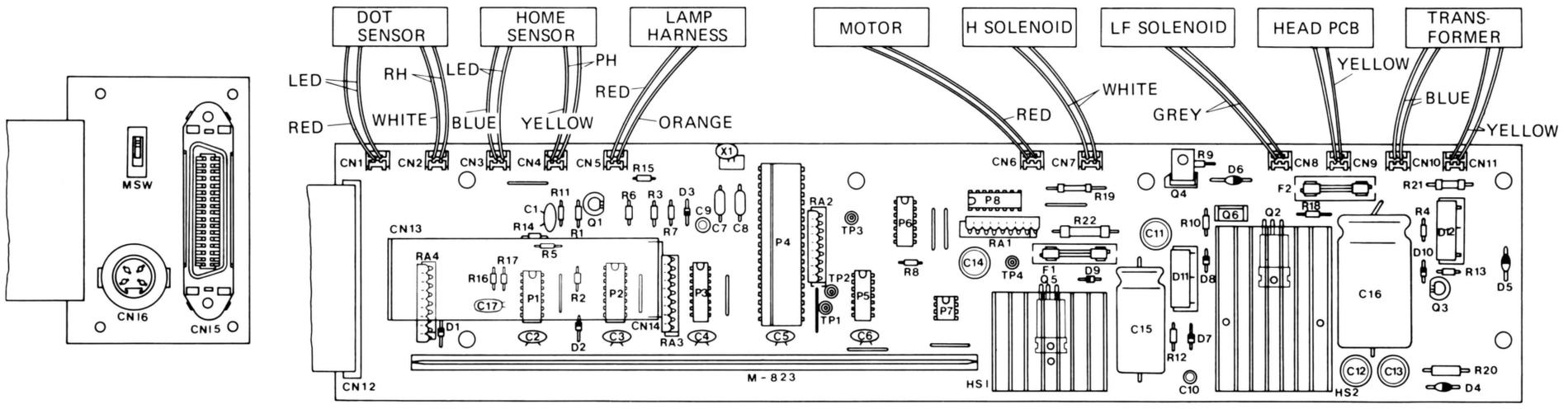
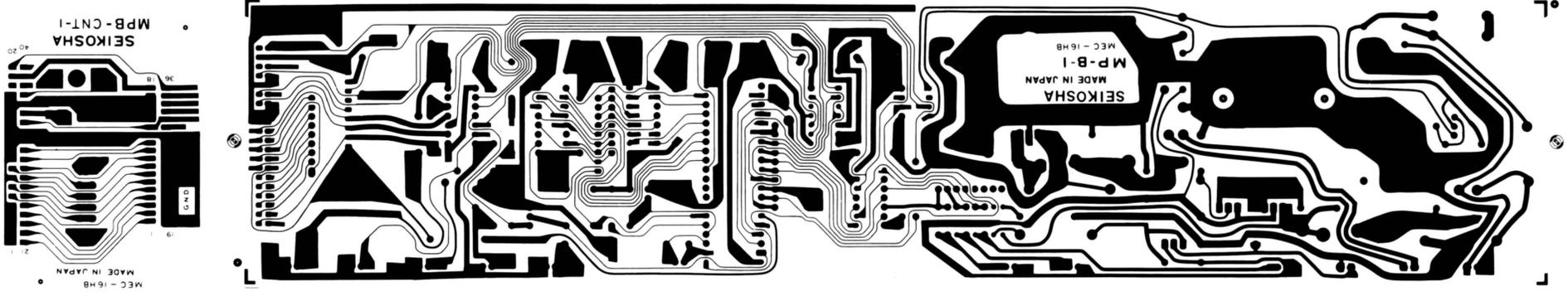


Figure 11  
14



## 5. TIMING DIAGRAM

### (1) Initializing motion

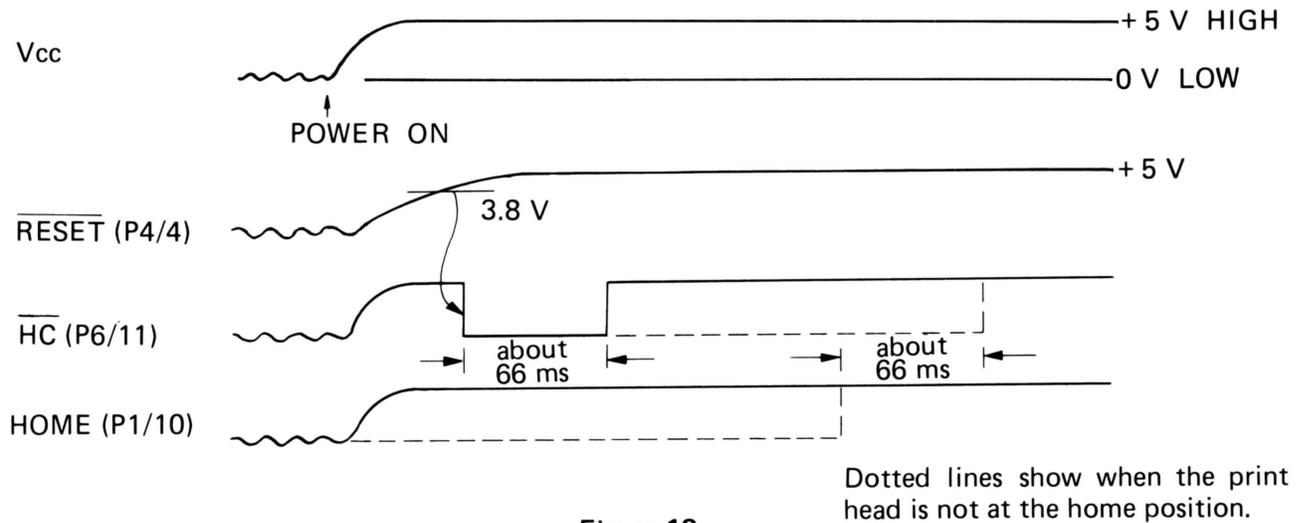


Figure 12

When power is applied, P4/4 [NO. 4 terminal of CPU chip (IC NO. P4)] accepts  $\overline{\text{RESET}}$  signal. CPU is reset by this signal. When the  $\overline{\text{RESET}}$  signal exceeds approximately 3.8V, CPU becomes active and makes  $\overline{\text{HC}}$  signal (P6/11) LOW. When this signal is LOW, the driver (P8/13 and 14 of 75468) becomes LOW and pulls the clutch by supplying current to the H solenoid. The head carrier (the carrier unit and the print head unit) then returns to the home position forced by the recovery spring. HOME signal (P1/10) is a shaped signal of the output from the home sensor unit. It is HIGH when the head carrier is at the home position and LOW when it is not at the home position. You can see this signal through a test pin (TP2). After CPU has made  $\overline{\text{HC}}$  signal LOW, it checks HOME signal to see whether it is HIGH or LOW. If it is HIGH, CPU will make  $\overline{\text{HC}}$  signal HIGH about 66 ms later; if it is LOW, CPU waits until it becomes HIGH and then makes  $\overline{\text{HC}}$  signal HIGH about 66 ms later. After  $\overline{\text{HC}}$  signal rises to HIGH, the driver (P8/13 and 14) becomes OFF, ending the motion, then the head carrier is set at the home position.

### (2) Start of the printing motions

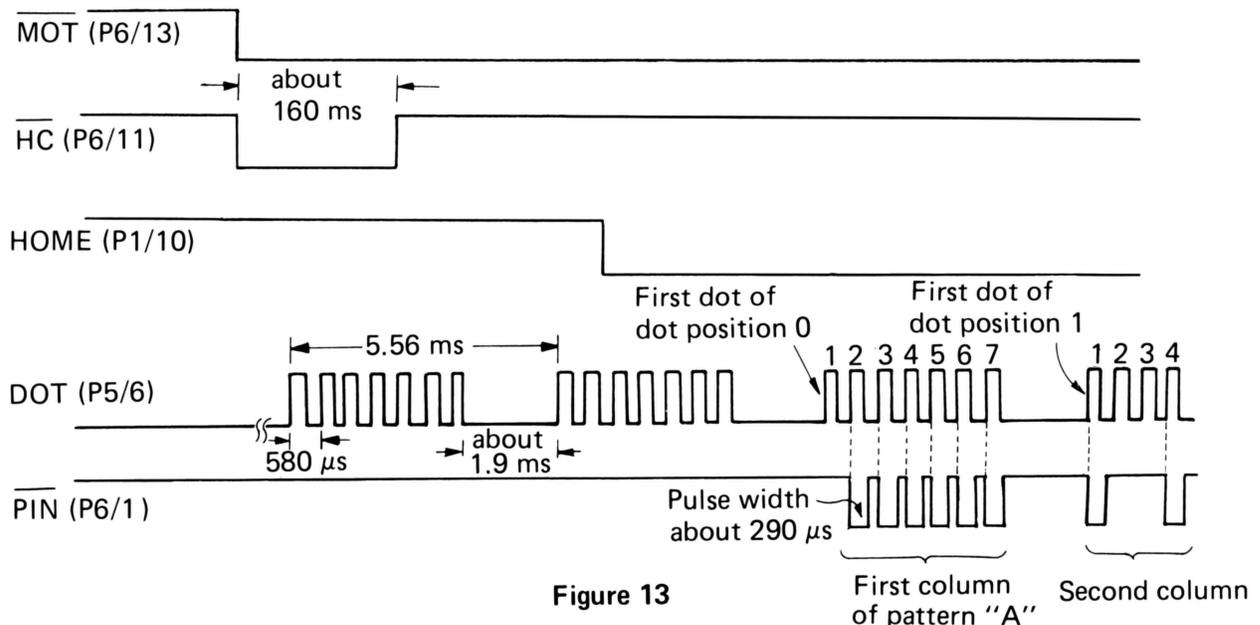


Figure 13

When the printing starts, CPU makes  $\overline{\text{MOT}}$  (P6/13) and  $\overline{\text{HC}}$  (P6/11) signals LOW. After  $\overline{\text{MOT}}$  signal becomes LOW, a driver (P8/15 and 16) is ON (LOW) to supply current to the motor to start it. Since  $\overline{\text{HC}}$  signal is also LOW, the clutch is activated to relieve the motor shaft from the head carrier so that the motor races. (The rotation detector revolves because it is attached to the shaft firmly.) After keeping this status for about 160 ms to get a stable revolution of the motor, CPU will raise  $\overline{\text{HC}}$  signal to HIGH if the output from the dot sensor is not abnormal. (In case there is no output or abnormal output from the dot sensor, CPU will halt after raising  $\overline{\text{HC}}$  and  $\overline{\text{MOT}}$  signals to HIGH because mechanic error must have occurred.) When  $\overline{\text{HC}}$  signal becomes HIGH, the motor shaft and the head carrier are coupled and move the print head rightward. Next, CPU will wait and see if the print head leaves the home position via HOME signal (P1/10). After confirming that HOME signal becomes LOW which means the head carrier gets out of the home position, CPU goes to check DOT signal (P5/6) and decides when to start printing. (A test pin (TP1) is also connected to DOT signal.)

DOT signal is a shaped output signal of the dot sensor and, as shown in Figure 13, sequential seven pulses are repeated at constant intervals. A printing start time for each column (seven dots) is indicated at the first rising-edge of DOT signal after it has been LOW (about 1.9 ms). Each rising-edge of the seven pulses indicates the time to print each dot. If LOW duration is over 1.3 ms, the succeeding rising-edge indicates the time to start printing. CPU then goes to the hammer drive routine shown in Figure 7. At this stage,  $\overline{\text{PIN}}$  signal (P6/1) of the hammer drive pulse which is synchronized with DOT signal remains LOW for about 290  $\mu\text{s}$ . While  $\overline{\text{PIN}}$  signal is LOW, a driver (P8/10) is LOW and turns ON a transistor, Q4 (2SA 636) driving the hammer and printing one dot.

### (3) Recovery motion

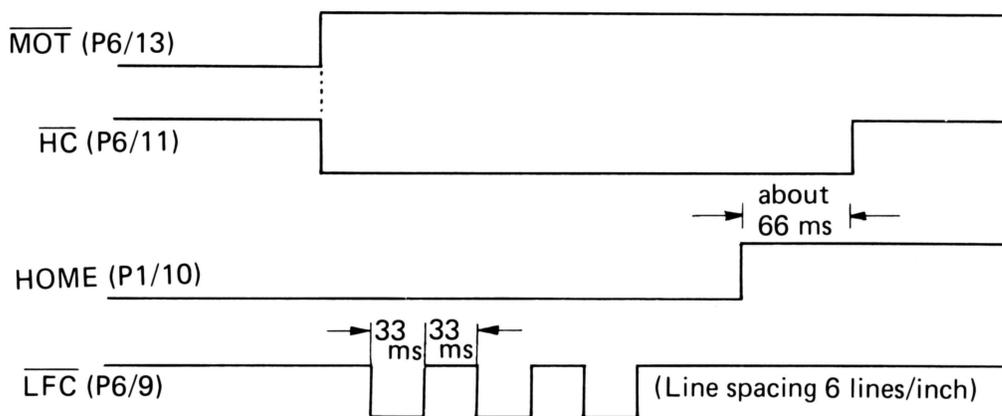


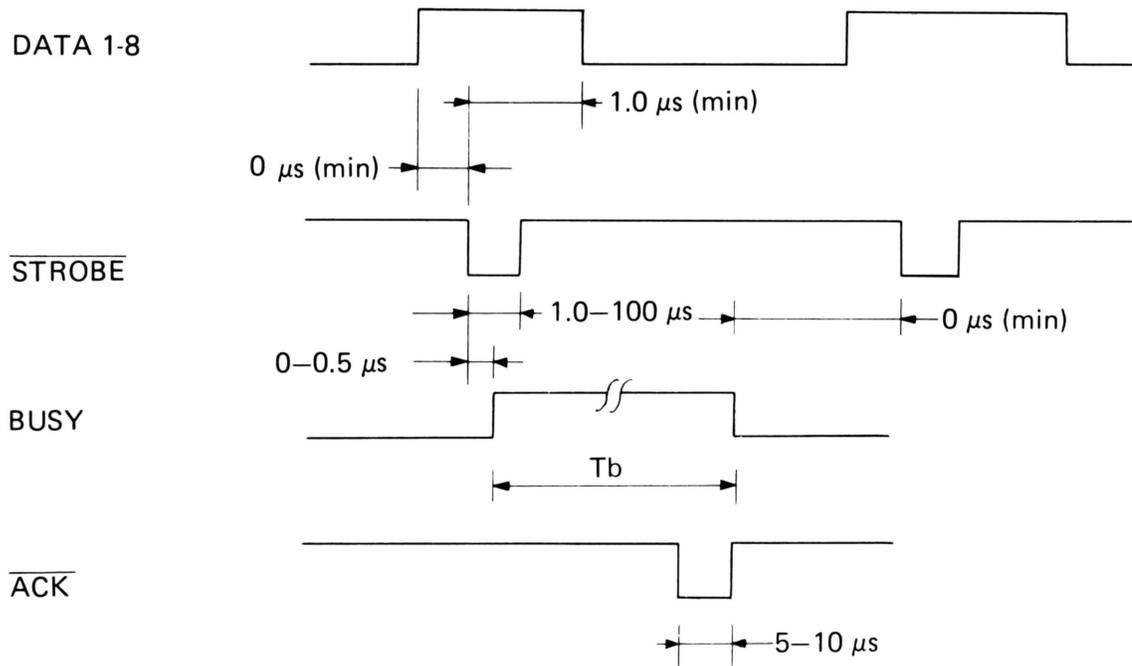
Figure 14

After printing, CPU makes  $\overline{\text{MOT}}$  signal HIGH and  $\overline{\text{HC}}$  signal LOW. With this, the motor stops revolving and the head carrier returns to the home position forced by the recovery spring. If a recovery motion includes a line feed, the output of  $\overline{\text{LFC}}$  signal (P6/9) follows. While this signal is LOW, a driver (P8/11 and 12) is LOW and activates the LF solenoid for linefeed by 1/18 inch. (Refer to Figure 9 of linefeed flowchart.)

After linefeed, CPU waits until HOME signal becomes HIGH. When the head carrier returns to the home position and HOME signal becomes HIGH, CPU raises  $\overline{\text{HC}}$  signal to HIGH about 66 ms later, ending the recovery motion of the head carrier.

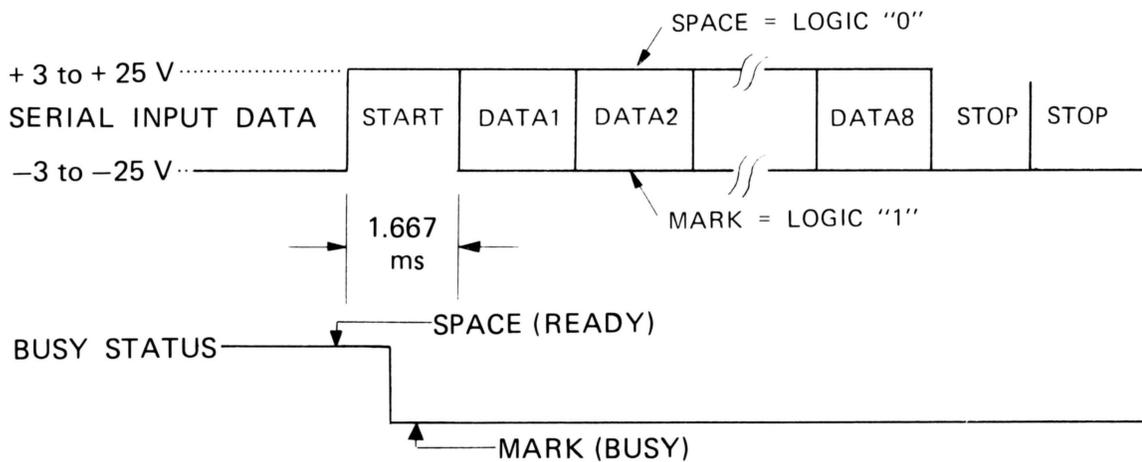
(4) Timing chart of input

A. Parallel input timing chart



$T_b$ ; CHARACTER CODE . . . . .  $100 \mu\text{s}$  to  $500 \mu\text{s}$   
 CR/LF/SUB CODE . . . . . PRINT + CARRIAGE RETURN  
 (about 3 seconds max.)  
 Reference: CR = (0,D), LF = (0,A), SUB = (1,A)

B. Serial input timing chart . . . . . Baud rate set to 600 bps.

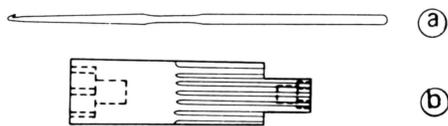


- 8-bit mode: 8-bit data, no parity, one or two stop bits
- 7-bit mode: 7-bit data, 8th bit = 0, one or two stop bits

# MEASURING INSTRUMENTS AND TOOLS

The following items are necessary to repair or adjust LINE PRINTER VII.

1. Oscilloscope  
This is used to adjust the position of the home sensor unit, or in other words, to adjust the alignment of the printing start position. It is also used to check the PCB unit.
2. Multimeter (VOM)
3. Print head adjusting tools (for LINE PRINTER VII only)



Ⓐ is used to hook a spring to the print head unit and Ⓑ is used to drive the head adjusting nut and the nut. If these tools are not available, use non-magnetic material tools.

4. Tools (screwdriver, tweezers, pliers and nippers)
5. Soldering iron (For electronic parts)
6. Desoldering tool

# MAINTENANCE

## 1. CLEANING

Due to its material, each part has its own proper cleaning liquid and method. It should be noted that if an improper cleaning liquid is used or cleaning method is poor, parts may be damaged or may not function properly. Follow the instructions in Table 1 to clean. It is helpful to use a hair drier to dry, but, if the cleaning liquid is flammable, take care to keep it away from hair drier.

Table 1

PARTS	CLEANING METHOD	CLEANING OIL	DRYING METHOD	REMARKS
Metal parts	Brush washing	Benzine or trichloroethylene	Warm air	
Plastic parts of the mechanisms	"	Benzine	Cool air	<ul style="list-style-type: none"> <li>• Do not use any oil other than designated one.</li> <li>• Wash quickly, wipe with a cloth and dry rapidly.</li> <li>• Use good, clean oil.</li> </ul>
Plastic parts of the enclosure	—	—	—	Wipe off dirt.
Rubber parts	—	—	—	"
Electrical parts { PCB u., Motor, H solenoid u., LF solenoid u., Dot sensor u., Home sensor u. etc., Print head u., Carrier u.	Do not wash	—	—	Wipe off dirt with a cloth with benzine or alcohol.
Rope parts { Feed drum u. Head rope(L) u. Claw wheel u.	"	—	—	<ul style="list-style-type: none"> <li>• Do not wipe or touch the rope.</li> <li>• Lubricate with oil only.</li> </ul>

## 2. LUBRICATING

Use the following lubricants to repair and adjust the LINE PRINTER VII. Portions needed to lubricate are described in the next chapter.

SF-100

J-5

Screwlock

# DISASSEMBLY AND REASSEMBLY

To disassemble, follow the sequences written in each figure, and follow the sequences in the reverse order to reassemble.

## 1. UPPER CASE

Ref.NO.	Description	Manufacturer Part Number
1-1	Cover (T)	84501-2002
S-36	Tapping Screw M3 x 16	84001-3006
1-2	Upper case unit (T)	84501-2001U
1-3	LED clip	84501-2025
1-4	Lamp harness	84095-3295

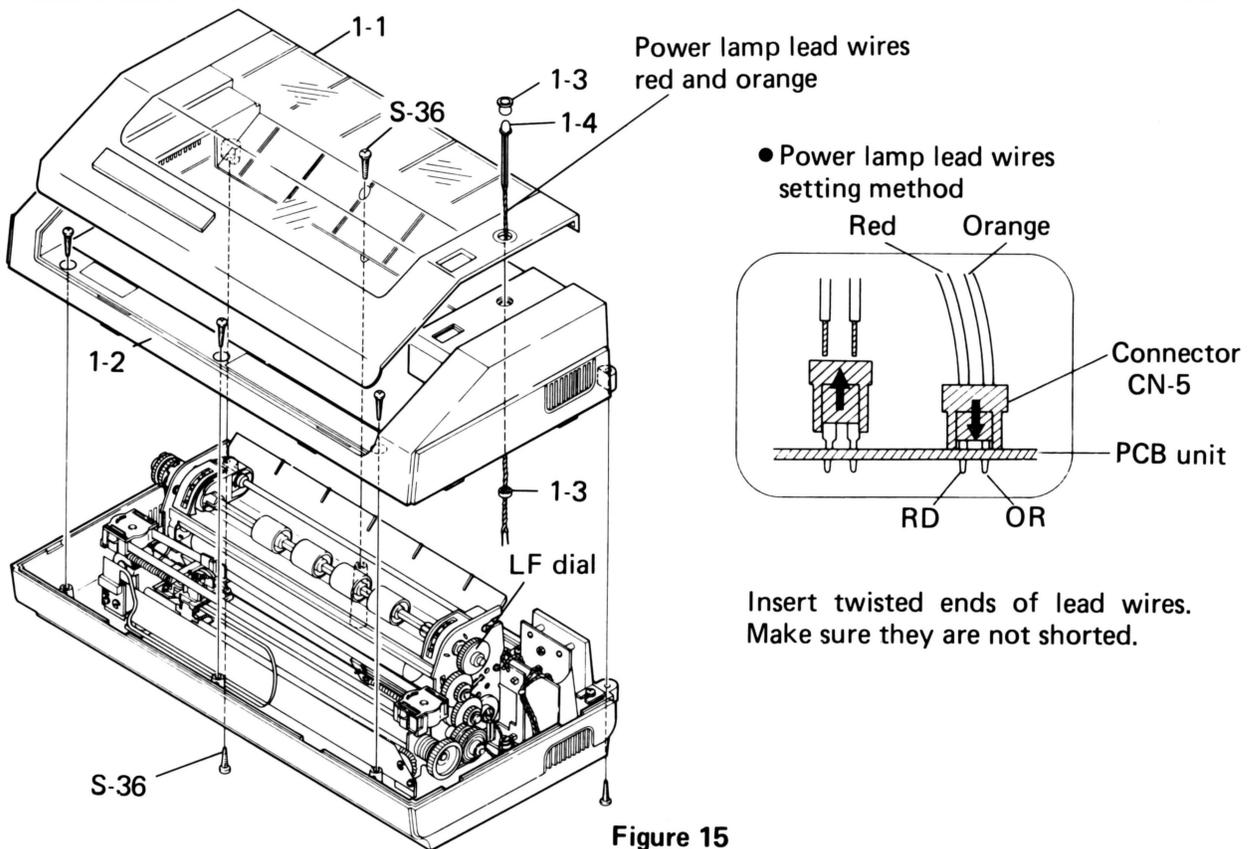


Figure 15

### ● Confirming the functions

Follow the procedures below to confirm the functions.

- (1) After applying power, check whether the power lamp is lit and the Printer is initialized.
- (2) Check whether paper advances properly with LF dial.
- (3) Is ribbon advancing?
- (4) Is it possible to set paper properly?
- (5) Check printed characters (wrong printing, character missing or smudging).
- (6) Is the aligning of the start position of printing properly achieved?
- (7) Is the last column printing possible?
- (8) Is there any abnormality in character width, height, or space between characters?
- (9) Is there any dot missing at upper or lower part of characters?
- (10) Are printed characters vivid? Is there any dirt caused by ribbon?
- (11) Is the spacing of linefeed proper?

## 2. LOWER CASE BLOCK AND MECHANISM

Ref.NO.	Description	Manufacturer Part Number
2-1	Ribbon cassette	84501-1300A
S-36	Tapping Screw M3 x 16	84001-3006
S-45	Screw M4 x 5	84001-4004
W-42	Spring Washer M4	84003-4002
W-43	Toothed Lock Washer M4	84003-4003
2-2	M. stop screw	84500-1350
2-3	Lower case block	
2-4	Mechanism	

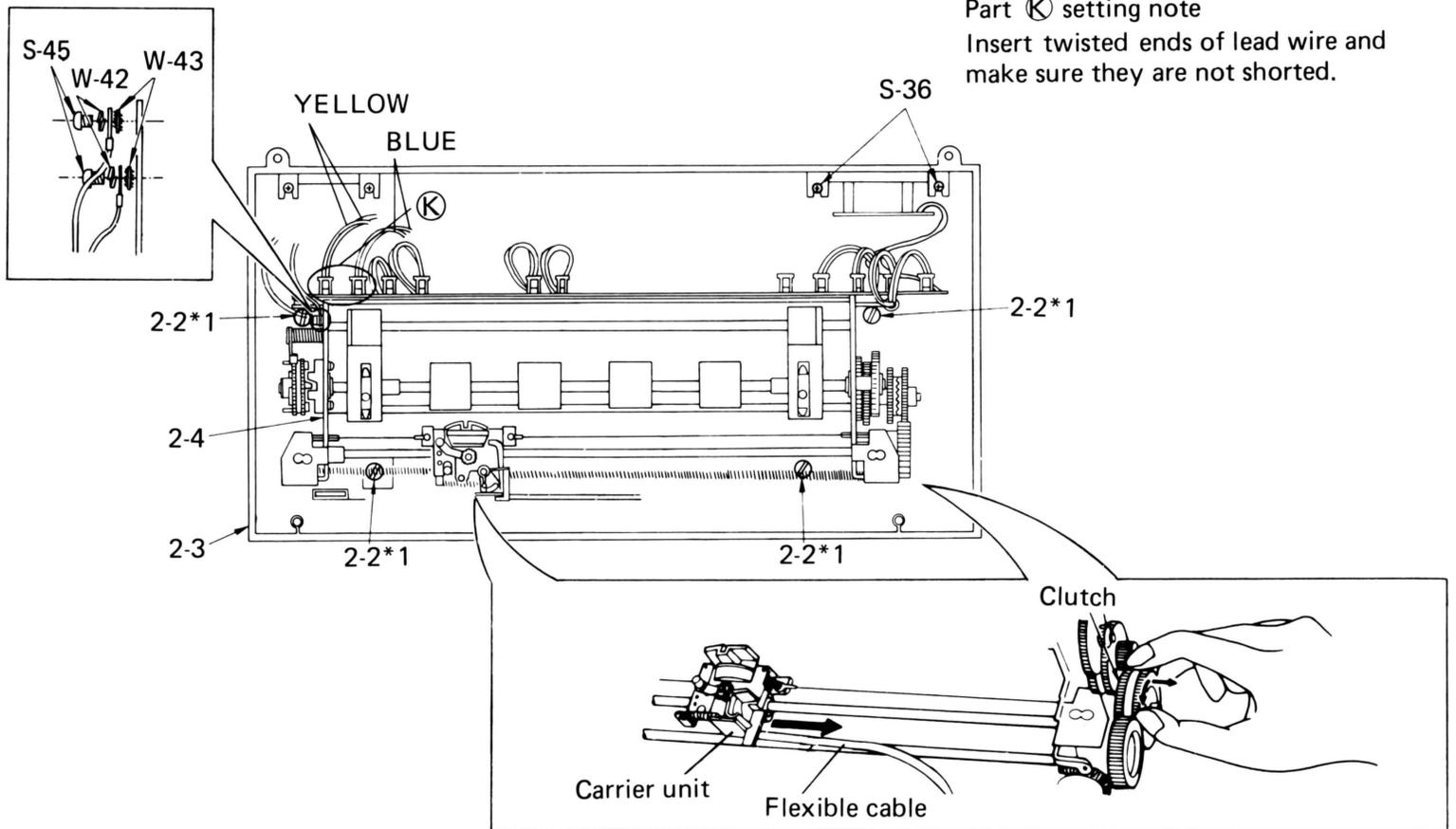


Figure 16

- \*1 Before replacing 2-3 and 2-4 with 2-2, the carrier unit must be moved to the center. When setting 2-3 and 2-4, be careful not to catch the lead wires or the recovery spring between 2-3 and 2-4, and to damage or to injure them.  
Do not move the carrier unit directly by hand. By pulling and revolving the clutch on the right side counterclockwise, the carrier unit can be moved to the center.
- \*2 Take care not to damage the flexible cable.

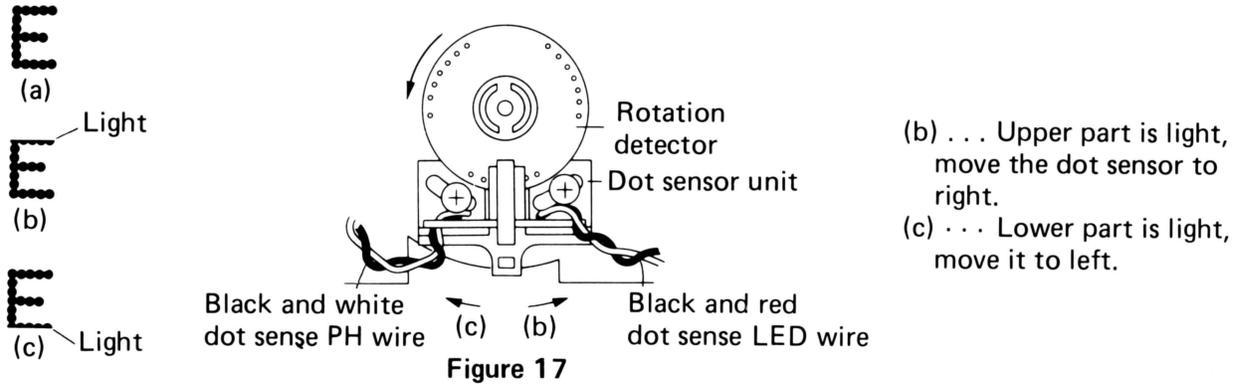
Note: The repair procedures for 2-3 and 2-4 are described in section 3 (p23) and on.

## Adjustments for printing

Make the following adjustments after setting the ribbon cassette and paper.

### (1) Adjusting the position of the dot sensor unit

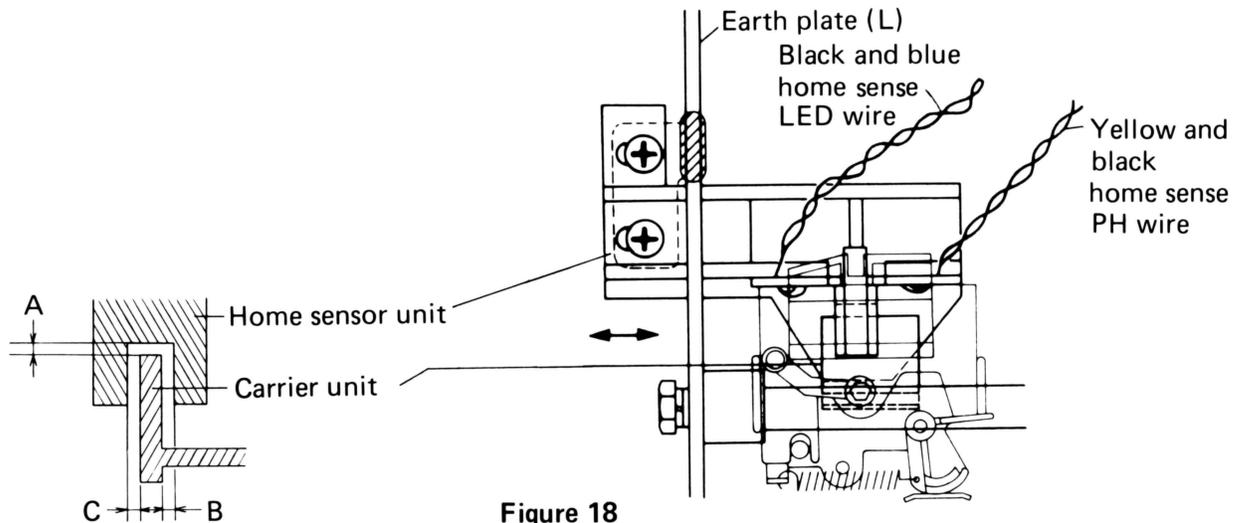
Print characters and check the darkness of the upper and the lower part of characters. If the darkness is not equal, adjust the position of the dot sensor unit.



### (2) Adjusting the printing start position with the carrier unit and the home sensor unit

#### i) The gaps between the carrier unit and the home sensor unit.

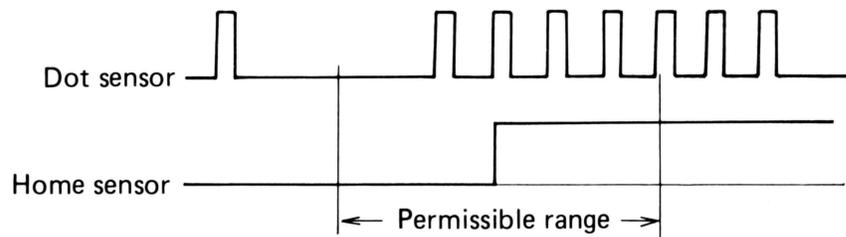
Gaps A and B should be about 0.5 mm, with B smaller than C. The gaps can be adjusted by twisting oblique line part of the earth plate (L).



#### ii) Adjustment for aligning the start position of printing

(Connect TP1 and TP2 of PCB unit to oscilloscope)

Adjust the position of the home sensor unit so that the rising-edge of the home sensor pulse can be within the permissible range of the dot sensor pulses.



If the rising edge of the home sensor pulse shifts to right . . . . . Shift the home sensor unit to right.

If the rising edge of the home sensor pulse shifts to left . . . . . Shift the home sensor unit to left.

- iii) Adjustment to prevent “JITTER” by changing the coupling between the feed drum unit and the clutch.

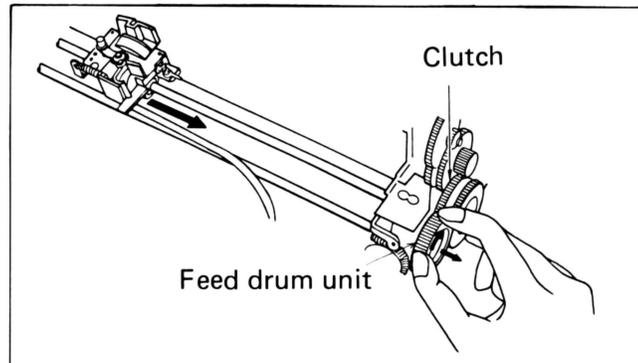
Push the feed drum unit to the right, disengaging the coupling. Then rotate the feed drum unit one pitch in either direction, reengage the coupling.

When rotating the feed drum unit one pitch, the rising edge of the home sensor moves approximately one pulse width of the dot sensor signal.

If the “JITTER” still exists, continue adjusting the coupling. The jitter can eventually be eliminated by continual adjustment – up to a maximum of three or four pitches.

Refer to the figure below.

**Note:** While this method of adjusting the print start position is easier than the method described in ii), it is not as accurate. For accuracy, be sure to use an oscilloscope.



(3) Adjusting the print head unit

- i) By using a print head adjusting tool to tighten the head adjust nut, proper darkness of the printed character can be obtained. If there appears to be smudging, loose it until smudging disappears.
- ii) Set the head adjust lever at the hole ①.
- iii) With a print head adjusting tool, tighten the hexagon nut so that the head adjust lever could be moved without too much force. Then lubricate screwlock on the hexagon nut.

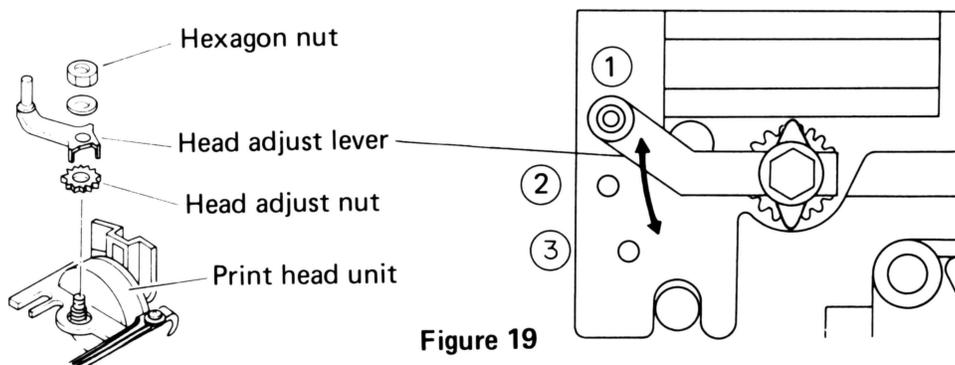
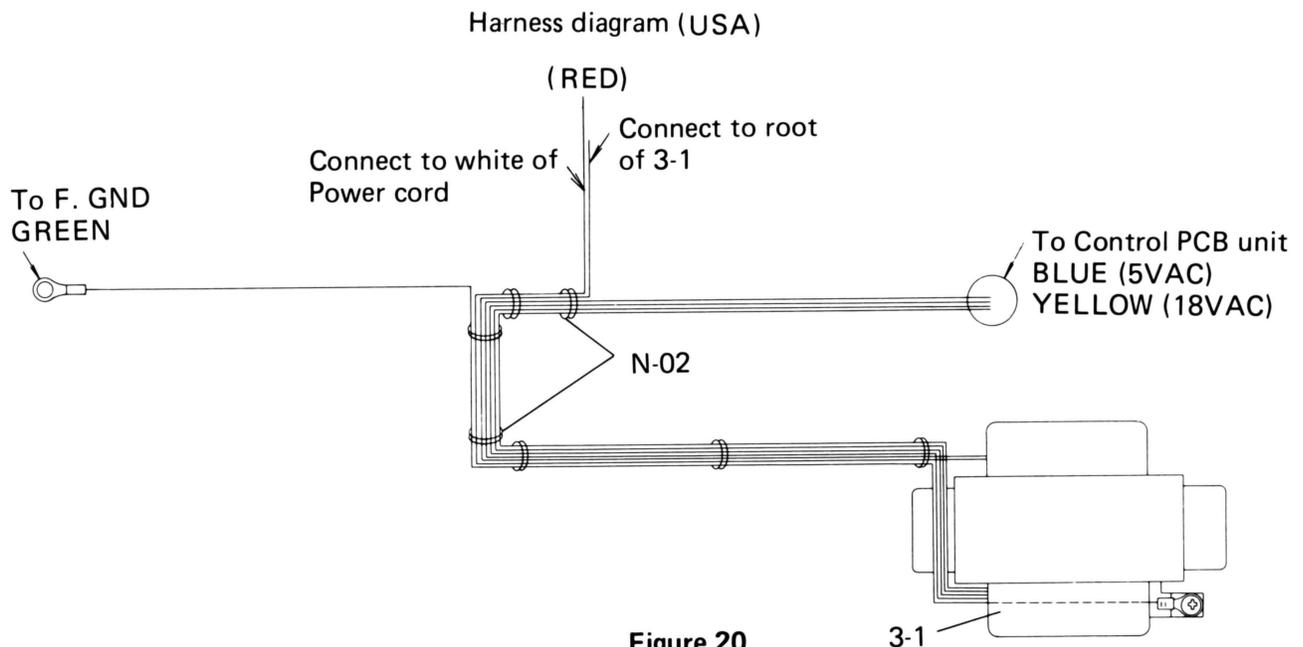


Figure 19

- Note:**
- Since the print head unit is made of magnetic metal, do not use magnetized tools to adjust.
  - If the smudging appears When you receive a printer, loose the head adjust nut as shown above.
  - Confirming the functions  
Confirm all the items described on page 20.

### 3. LOWER CASE BLOCK

Ref.NO.	Description	Manufacturer Part Number
S-36	Tapping screw M3 x 16	84001-3006
M-20	Splice 35115	84092-2063
M-01	Extruded tubing 5 x 0.25 x 12	84095-3457
F3	Fuse	84091-7183(USA)
3-1	Fuseholder S-11000	84091-6403(USA)
3-2	Cord bush	84500-2015(USA)
3-3	A.C. cord set KP-30 or 18 AWG. SVT	84092-3906(USA)
S-40	Tapping screw M3 x 5	84001-3012
M-02	Extruded tubing 3 x 0.25 x 12	84095-3465
M-32	Switch harness	84095-3317
S-37	Screw M3 x 0.5 x 4	84001-3007
3-4	Sw. stopper (T)	84501-2014(USA)
3-5	Power switch	84091-8597(USA)
3-6	Power panel	84501-2006
S-43	Tapping screw M3 x 16	84001-3006
N-02	Wire band B KM-85	84095-0164
S-47	Screw M4 x 6	84001-4007
N-41	Hexagon nut M4	84004-4001
W-43	Toothed lock washer M4	84003-4003
M-31	GND harness	84095-3325
M-21	Terminal 171512-5	84092-2039
3-7	Transformer	84093-0295(USA)
3-8	Lower case unit (T)	84520-2003U(USA)



EXPLODED VIEW (LOWER CASE BLOCK) (USA)

PART (K)

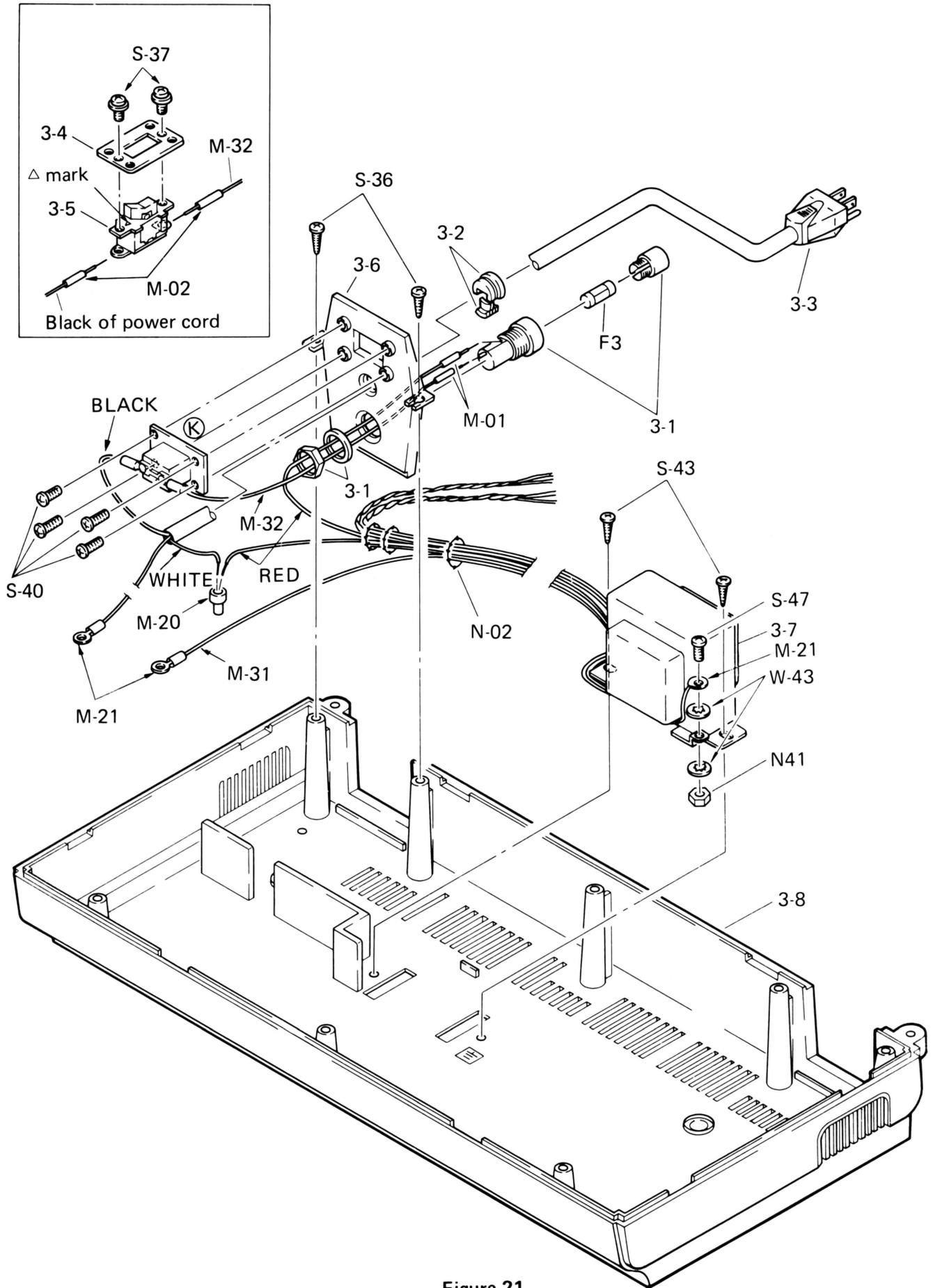
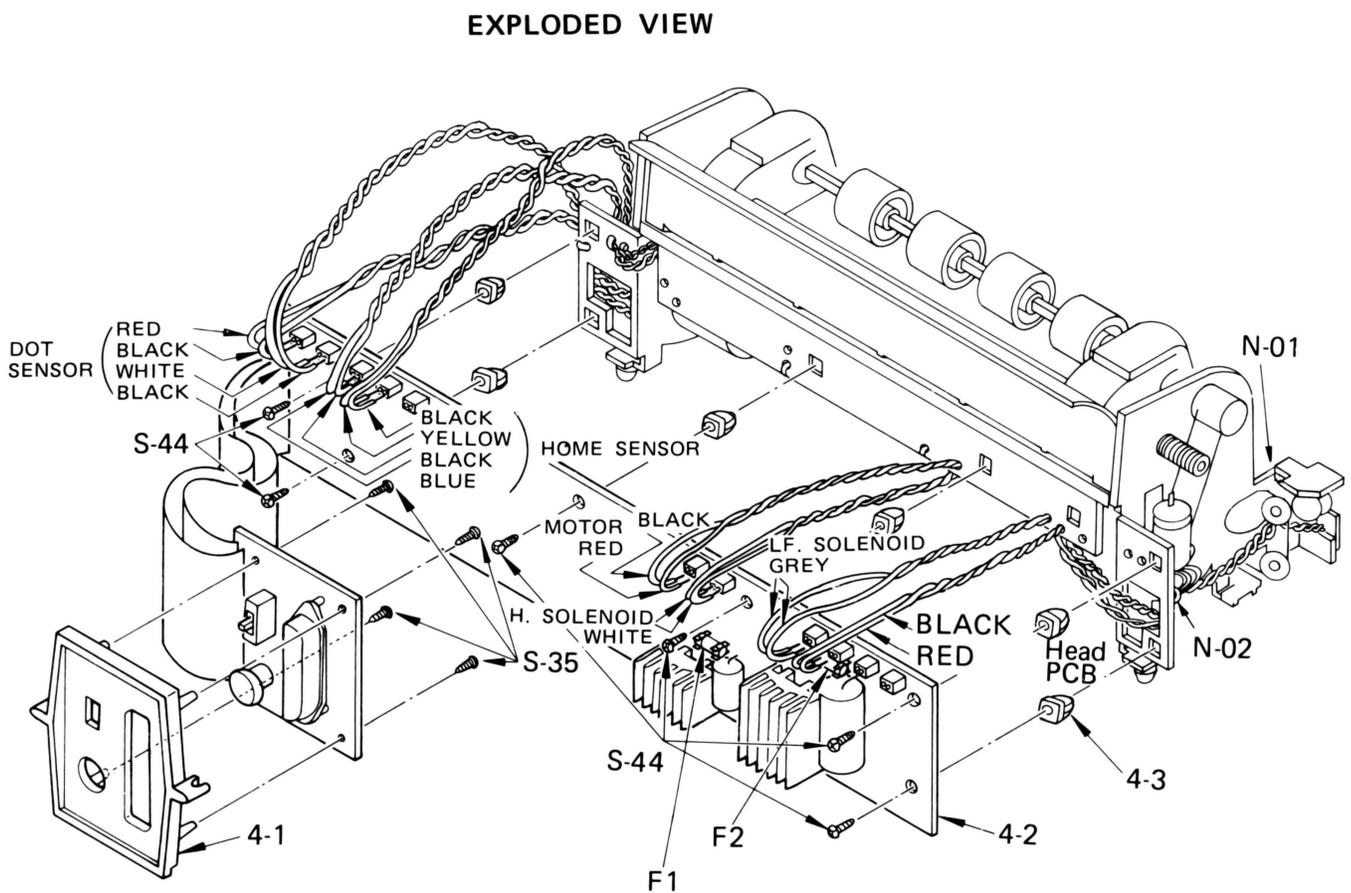


Figure 21

## 4. CONTROL PCB (PRINTED CIRCUIT BOARD) UNIT

When fixing PCB unit, refer to the circuit diagram (Figure 10), the PCB view (Figure 11) and the timing diagrams (Figures 12~14).

Ref.NO.	Description	Manufacturer Part Number
S-35	Tapping Screw M3 x 8	84001-3005
4-1	Input panel	84501-2007
S-44	Tapping Screw M4 x 15	84001-4006
4-2	Control PCB unit	84098-8456U(USA)
F2	Fuse (5.2 x 10 mm) 1.5A	84091-7256
F1	Fuse (5.2 x 20 mm) 1A	84091-7248
4-3	PCB receptacle	84500-1320
N-01	Wire band A SST 1M	84095-1365
N-02	Wire band B. KM-85	84095-0164



**Figure 22**

## 5. PRINT HEAD UNIT

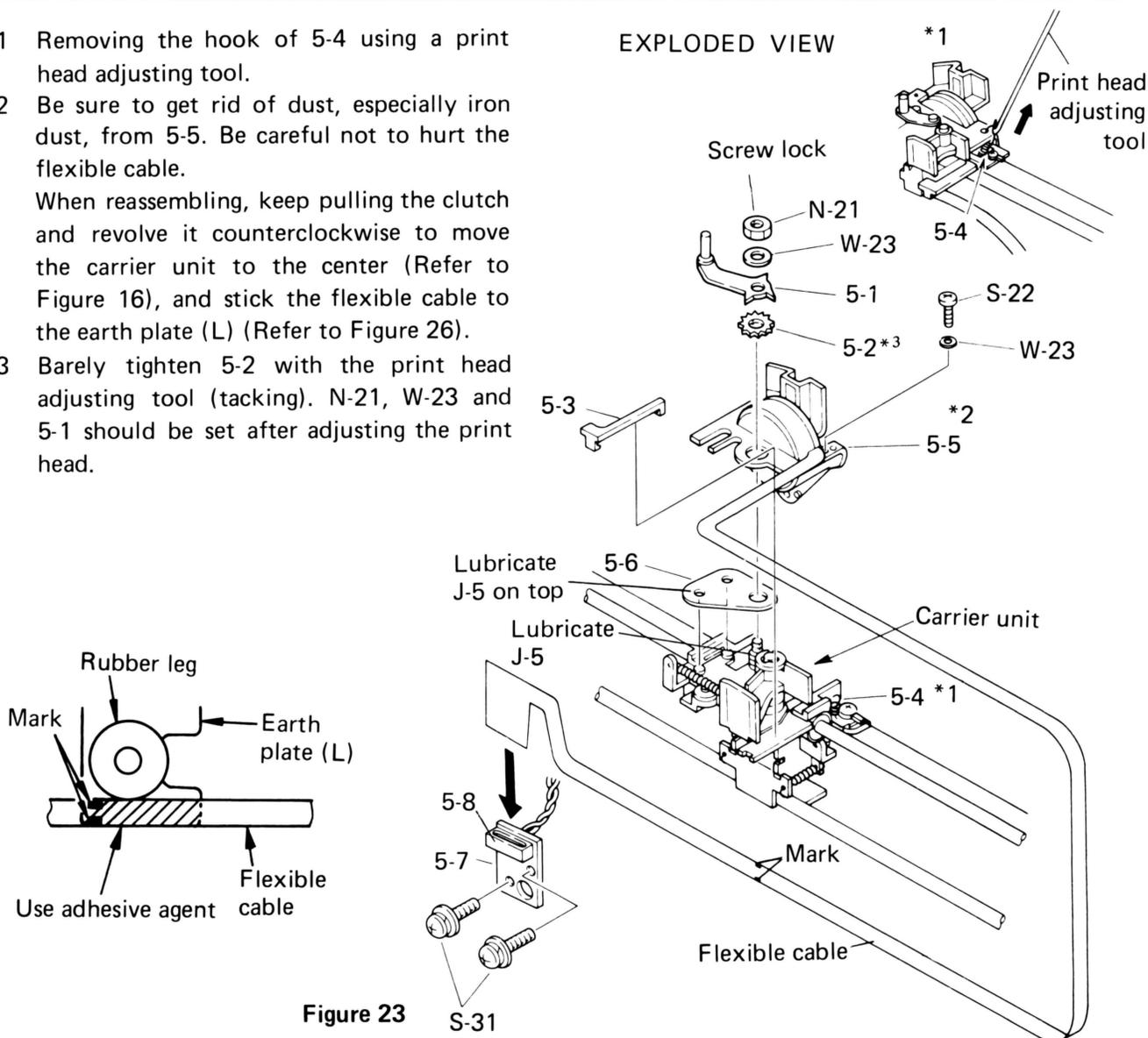
Ref.NO.	Description	Manufacturer Part Number
N-21	Hexagon Nut (Brass) M2 x 0.4	84004-2001
W-23	Plain Washer M2	84003-2003
5-1	Head adjust lever	84500-1242A
5-2	Head adjust nut	84500-1240
S-22	Screw (Brass) M2 x 0.4 x 3	84001-2002
W-23	Plain Washer M2	84003-2003
5-3	Cable guide	84500-1246
5-4	Head adjust spring	84500-1241
5-5	Print head unit	84501-1200U
5-6	Head spacer	84500-1178
S-31	Screw M3 x 0.5 x 6	84001-3001
5-7	Head board unit	84500-1107U
5-8	Head connector	84500-1108

\*1 Removing the hook of 5-4 using a print head adjusting tool.

\*2 Be sure to get rid of dust, especially iron dust, from 5-5. Be careful not to hurt the flexible cable.

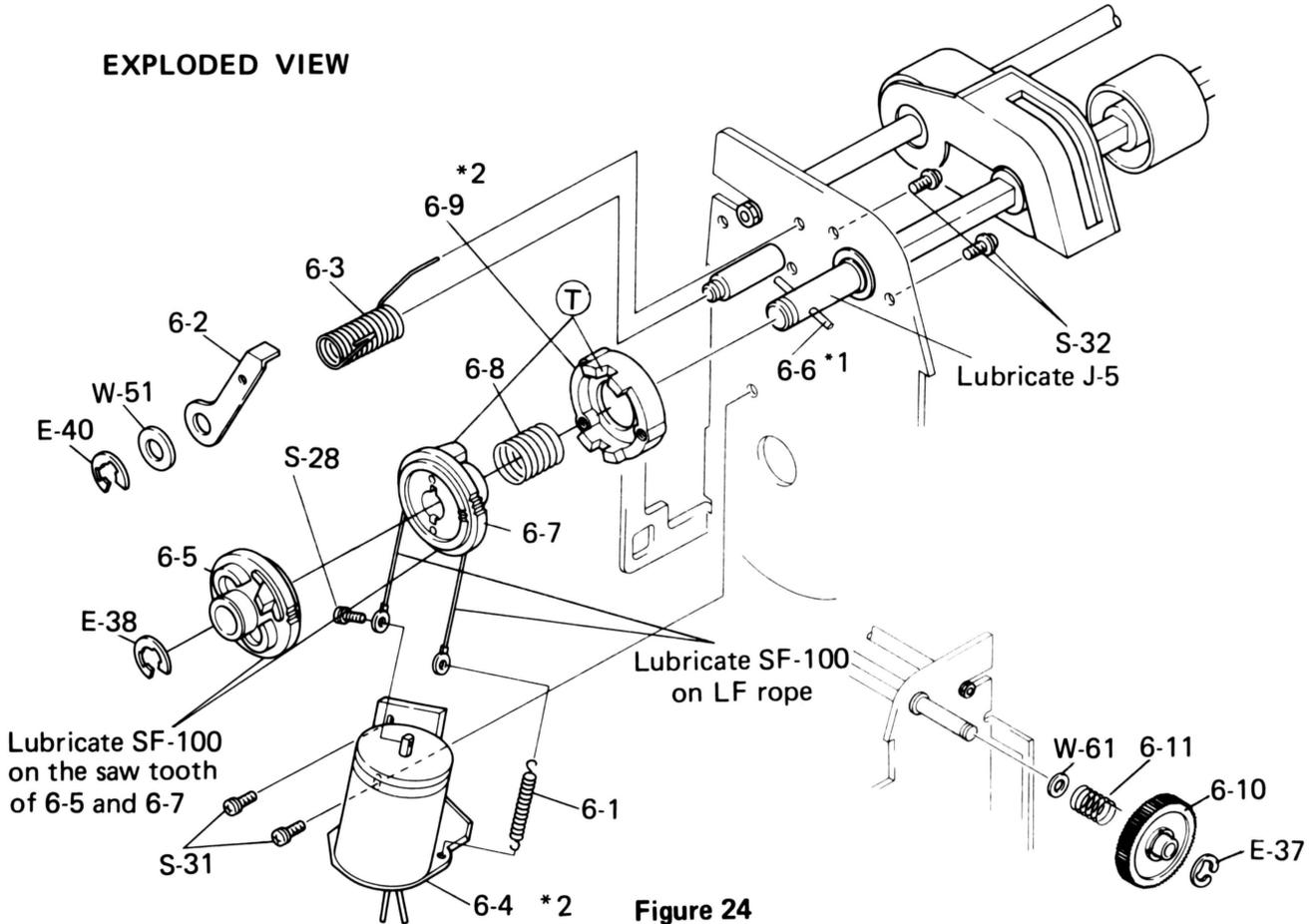
When reassembling, keep pulling the clutch and revolve it counterclockwise to move the carrier unit to the center (Refer to Figure 16), and stick the flexible cable to the earth plate (L) (Refer to Figure 26).

\*3 Barely tighten 5-2 with the print head adjusting tool (tacking). N-21, W-23 and 5-1 should be set after adjusting the print head.



# 6. LINEFEED MECHANISM

Ref.NO.	Description	Manufacturer Part Number
6-1	LF rope spring	84500-1144
E-40	E-40 Ring	84005-4001
W-51	Plain Washer Small M5	84003-5001
6-2	Reverse stop claw	84500-1141
6-3	Reverse stop spring	84500-1140
S-28	Screw M2.6 x 0.45 x 6	84001-2604
S-31	Screw M3 x 0.5 x 6	84001-3001
6-4	LF solenoid unit	84500-1030U
E-38	BE-37 Ring	84005-3702
6-5	LF claw wheel	84500-1130
6-6	Gear pin	84500-1083
6-7	Claw wheel unit	84500-1130U
6-8	Claw wheel spring	84500-1128
S-32	Screw M3 x 0.5 x 8	84001-3002
6-9	LF claw stopper	84500-1026
E-37	E-37 Ring	84005-3701
6-10	LF dial	84500-1125
6-11	Dial clutch spring	84500-1124
W-61	Plain Washer Small M6	84003-6001



**Figure 24**

- \*1 6-6 should be in the groove of 6-5, but not in that of 6-7
- \*2 6-4 and 6-9 adjusting method

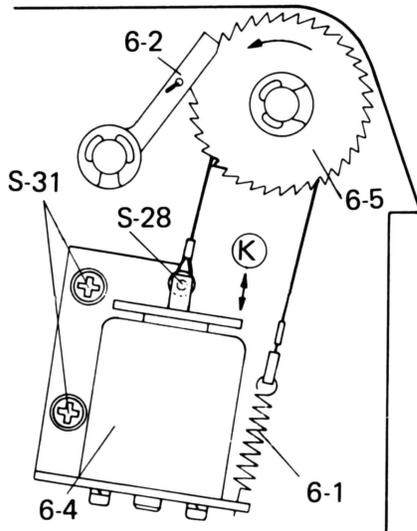


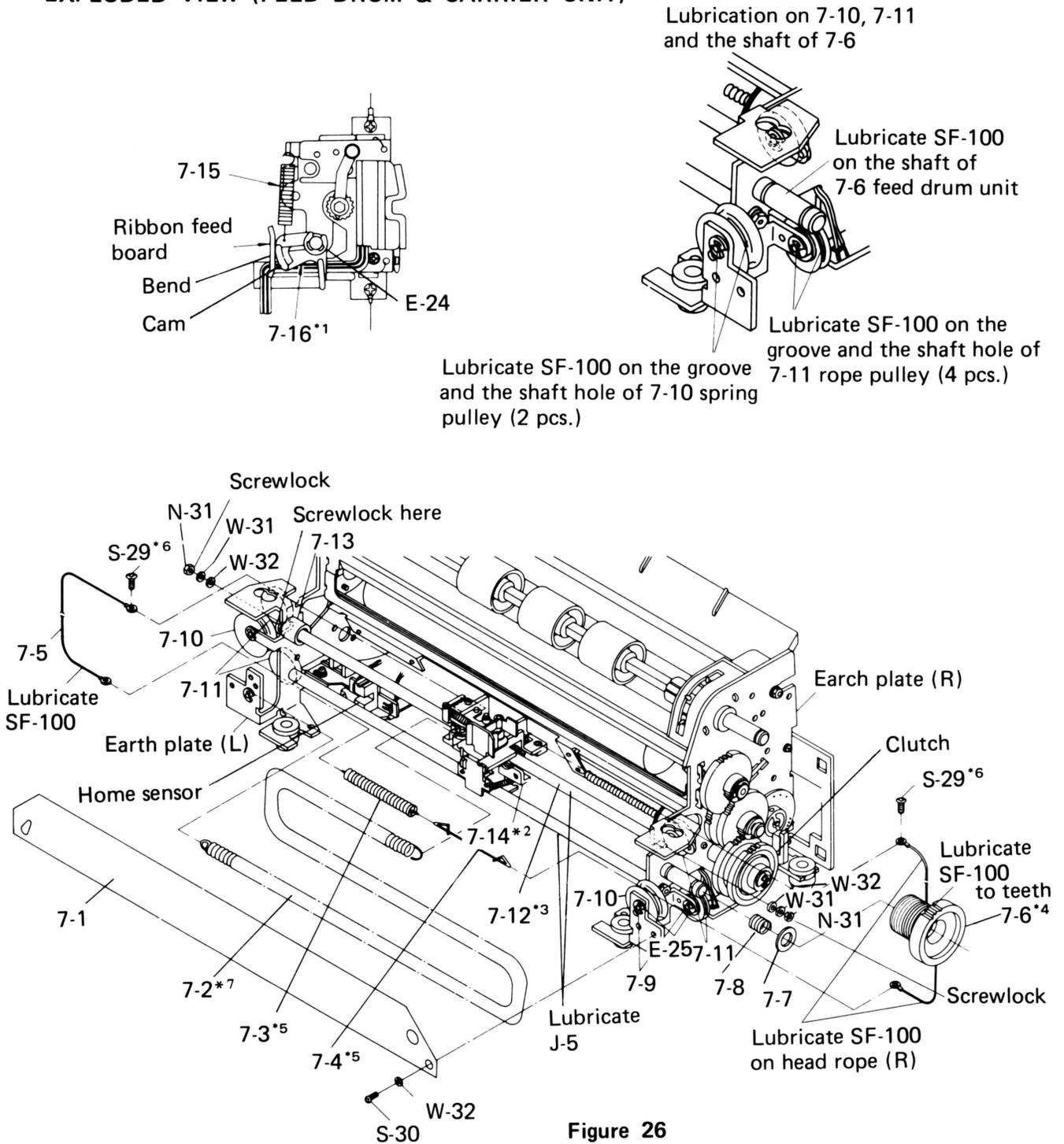
Figure 25

- i) While pushing down part (K) of 6-4, fix 6-4 with S-31 at the position where 6-2 falls from a tooth top of 6-5. The screw S-28 should be set to the direction as shown in Figure 25.
- ii) While pressing part (K) of 6-4, fix 6-9 with S-32 at the position where (T) part of 6-9 and (T) part of 6-7 are coupled to stop the revolution of 6-7.
- iii) Confirm linefeed functions by pressing part (K).

## 7. FEED DRUM AND CARRIER UNIT

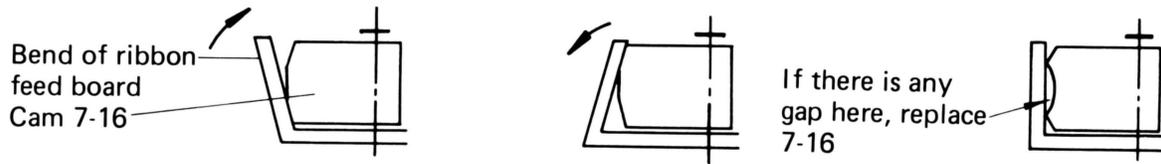
Ref.NO.	Description	Manufacturer Part Number
S-30	Screw M3 x 0.5 x 4	84001-3011
W-32	Plain Washer Small M3	84003-3002
7-1	FPC guide	84501-1196
7-2	Recovery spring	84501-1194
S-29	Screw M2.6 x 0.45 x 8	84001-2607
7-3	Rope spring	84500-1190
7-4	Rope stopper (1 set)	84500-1184 84500-1185 84500-1186
7-5	Head rope (L) unit	84501-1187U
7-6	Feed drum unit	84501-1183U
7-7	Drum spring step	84500-1182
7-8	Drum spring	84500-1181
E-25	BE-24 Ring	84005-2402
7-9	Pulley pin	84500-1004
7-10	Spring pulley	84500-1012
7-11	Rope pulley	84501-1010
N-31	Hexagon Nut M3 x 0.5	84004-3001
W-31	Spring Washer M3	84003-3001
W-32	Plain Washer Small M3	84003-3002
7-12	Guide pillar	84501-1051
7-13	Damper	84500-1179
7-14	Carrier unit	84500-1160U
7-15	Ribbon cam spring	84500-1177
E-24	E-24 Ring	84005-2401
7-16	Ribbon Cam	84500-1175

**EXPLODED VIEW (FEED DRUM & CARRIER UNIT)**



**Figure 26**

- \*1 The cam 7-16 and the bend of the ribbon feed board must be parallel. If not parallel, ribbon feeding may function abnormally. In this case, you can either change 7-16 or adjust the bend of the ribbon feed board by using pliers to fit the cam 7-16.



- \*2 When 7-14 is at the home position, there should be gaps between the home sensor (Refer to Figure 18).
- \*3 Firmly insert 7-12 into the earth plate (R) and (L), and tighten with N-31.
- \*4 Once you have removed the feed drum unit (7-6), you must install a new one. A new one, which has 7 winds of the head rope (R), is fixed by a fixing tool. The fixing tool should be taken off after you have finished assembling (with S-29 screws).

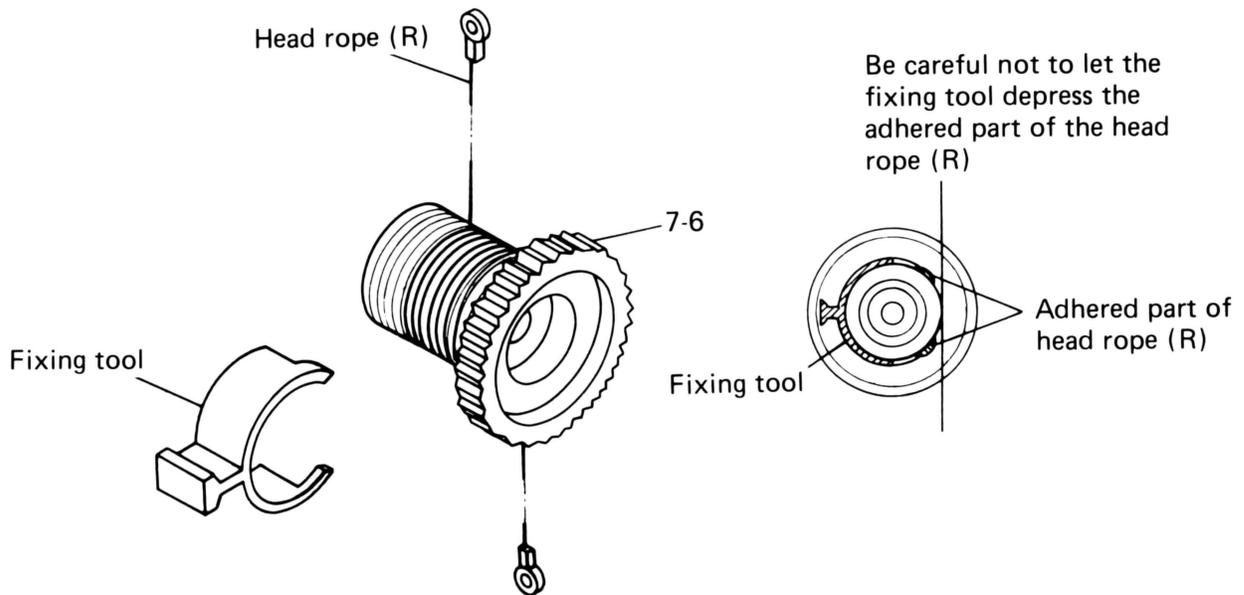


Figure 27

- \*5 Insert the rope stopper 7-4 into the rope spring 7-3.
- \*6 To fix the head rope (R) and (L) using screw S-29:
  - i) Inject screwlock into the screw hole of the carrier unit.
  - ii) Tighten the screw S-29 to the extent that the rings of the head rope (R) and (L) can be revolved.

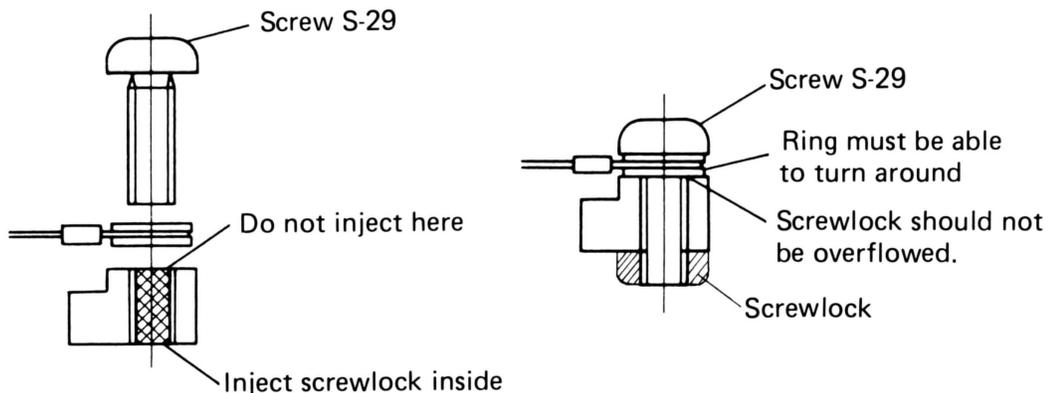
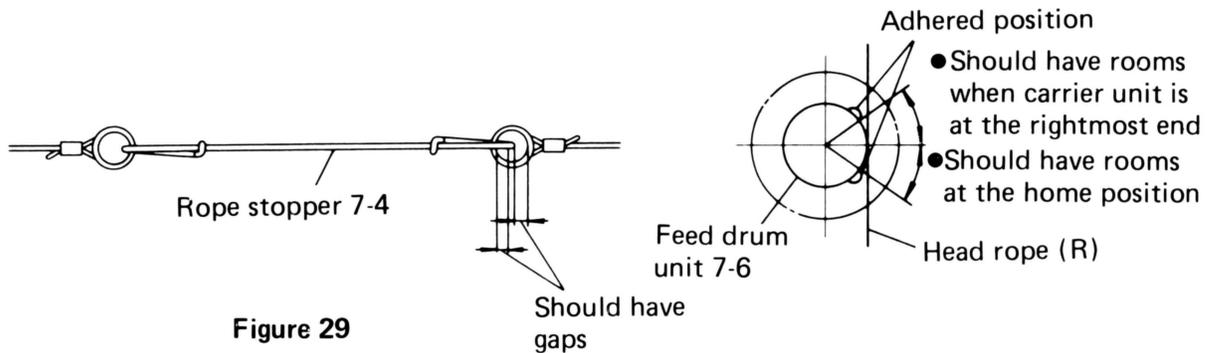


Figure 28

- \*7 Check the following after attaching the recovery spring 7-2.  
While manually pulling and revolving the clutch counterclockwise to move the carrier unit to the right end, check the rotation of the rope pulley 7-11, the gaps of the rope stopper 7-4 and the adhered position and status of the feed drum unit 7-6.



**Figure 29**

After pressing the H solenoid to release the clutch (Figure 6), check the smooth motion of the carrier unit while returning to the home position. Also check the adhered position and its status of the feed drum unit 7-6 at the home position.

## 8. GEAR TRAIN

Ref.NO.	Description	Manufacturer Part Number
8-1	Clutch moving spring	84500-1093
S-31	Screw M3 x 0.5 x 6	84001-3001
8-2	Dot sensor unit	84500-1100U
E-28	E-28 Ring	84005-2801
8-3	Clutch Step	84500-1091
8-4	Clutch	84501-1087
8-5	Spring pan	84500-1089
8-6	Clutch spring	84500-1088
8-7	Clutch	84501-1087
E-37	E-37 Ring	84005-3701
8-8	Reduction gear (B)	84501-1086
8-9	Gear pin	84500-1083
8-10	Rotation detector	84500-1085
E-38	BE-37 Ring	84005-3702
8-11	Platen gear	84501-1082
8-12	Gear pin	84500-1083
8-13	Reduction gear	84500-1081
S-26	Screw M2.6 x 0.45 x 4	84001-2602
8-14	H solenoid	84500-1016
S-33	Screw M3 x 0.5 x 5	84001-3003
8-15	Motor	84500-1014

## EXPLODED VIEW (GEAR TRAIN)

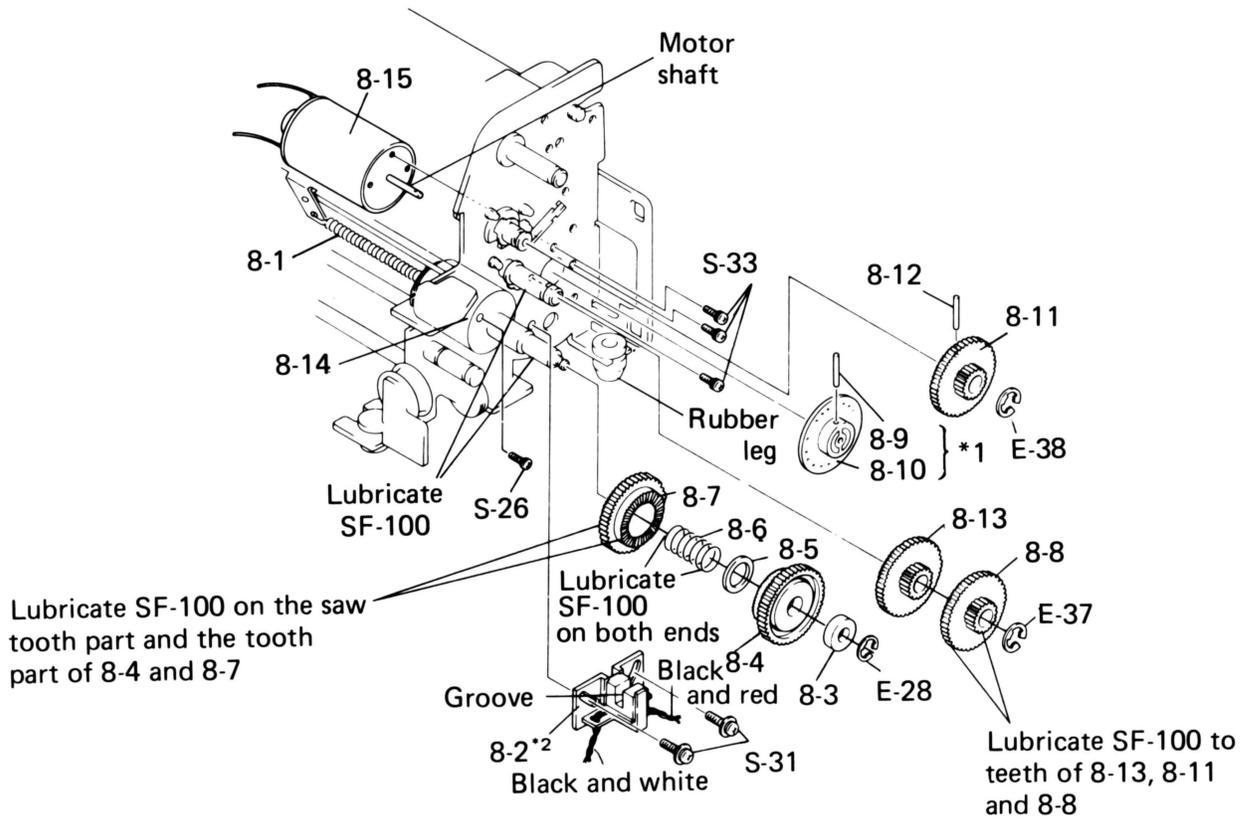


Figure 30

\*1 The way to set 8-10 and 8-9

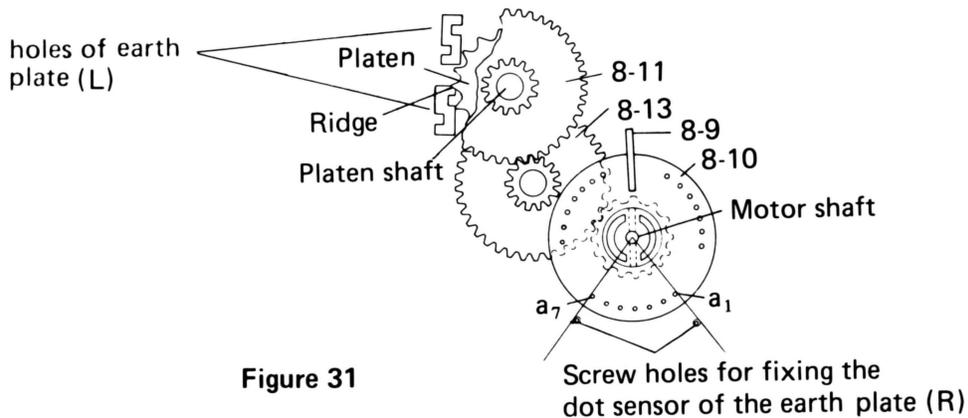


Figure 31

- Attaching method of 8-10  
When a platen ridge is at the horizontal position, couple 8-10 and 8-13 in the status of  $a_1$  and  $a_7$  of 8-10 facing the two screw holes of the earth plate (R) respectively.
- Attaching method of 8-9  
After rotating 8-10 to fit the holes of 8-10 and the motor shaft, insert 8-9 using pliers.

\*2 First, insert the M. stop screw (Figure 16) into the rubber leg, and then fix 8-2 by S-31. Make sure there are gaps between the grooves of 8-2 and 8-10.

# 9. TRACTOR

Ref.NO.	Description	Manufacturer Part Number
S-32	Screw M3 x 0.5 x 8	84001-3002
9-1	Soundproof	84501-1197
N-31	Hexagon Nut M3 x 0.5	84004-3001
W-31	Spring Washer M3	84003-3001
W-32	Plain Washer Small M3	84003-3002
9-2	Guide pillar	84501-1051
9-3	Paper holder (L) unit	84500-1149U
9-4	Paper holder (R) unit	84500-1147U
E-75	BE-74 Ring	84005-7401
9-5	Platen bearing (Tractor bearing)	84500-1008
9-6	Tractor shaft	84501-1068
9-7	Pin feed roller	84500-1070
9-8	Tractor rubber ring	84500-1071
E-60	CE-6 Ring	84005-6001
S-32	Screw M3 x 0.5 x 8	84001-3002
9-9	Home sensor unit	84500-1104U
9-10	Rubber leg	84500-1095

- \*1 Push 9-9 outside as far as it will go and fix with S-32.
- \*2 Assemble the two 9-7 so that the pins are facing each other.
- \*3 Check that the surface of 9-6 (L) part is smooth and has no scar.

## EXPLODED VIEW

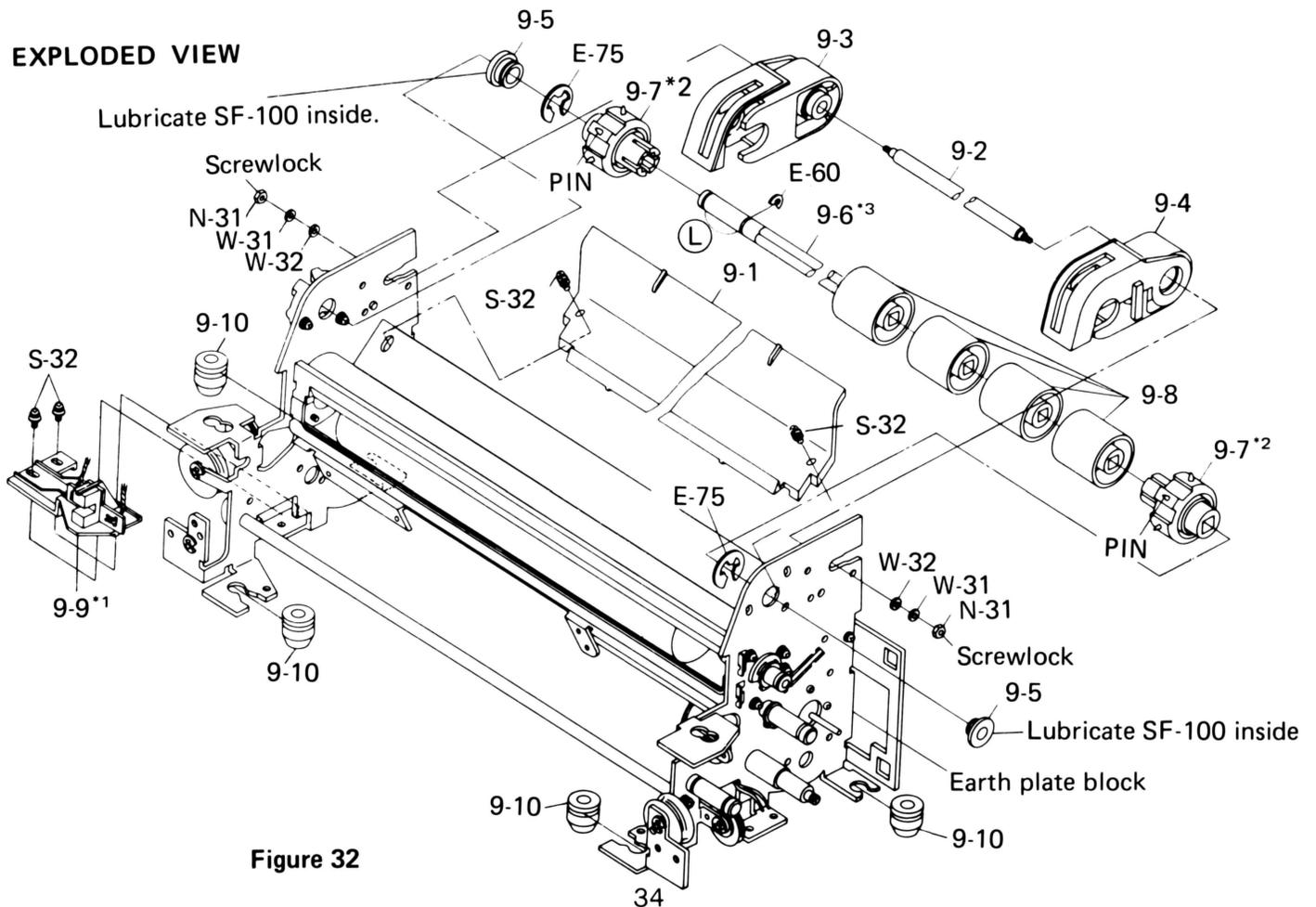


Figure 32

# TROUBLESHOOTING

## 1. The power lamp does not light.

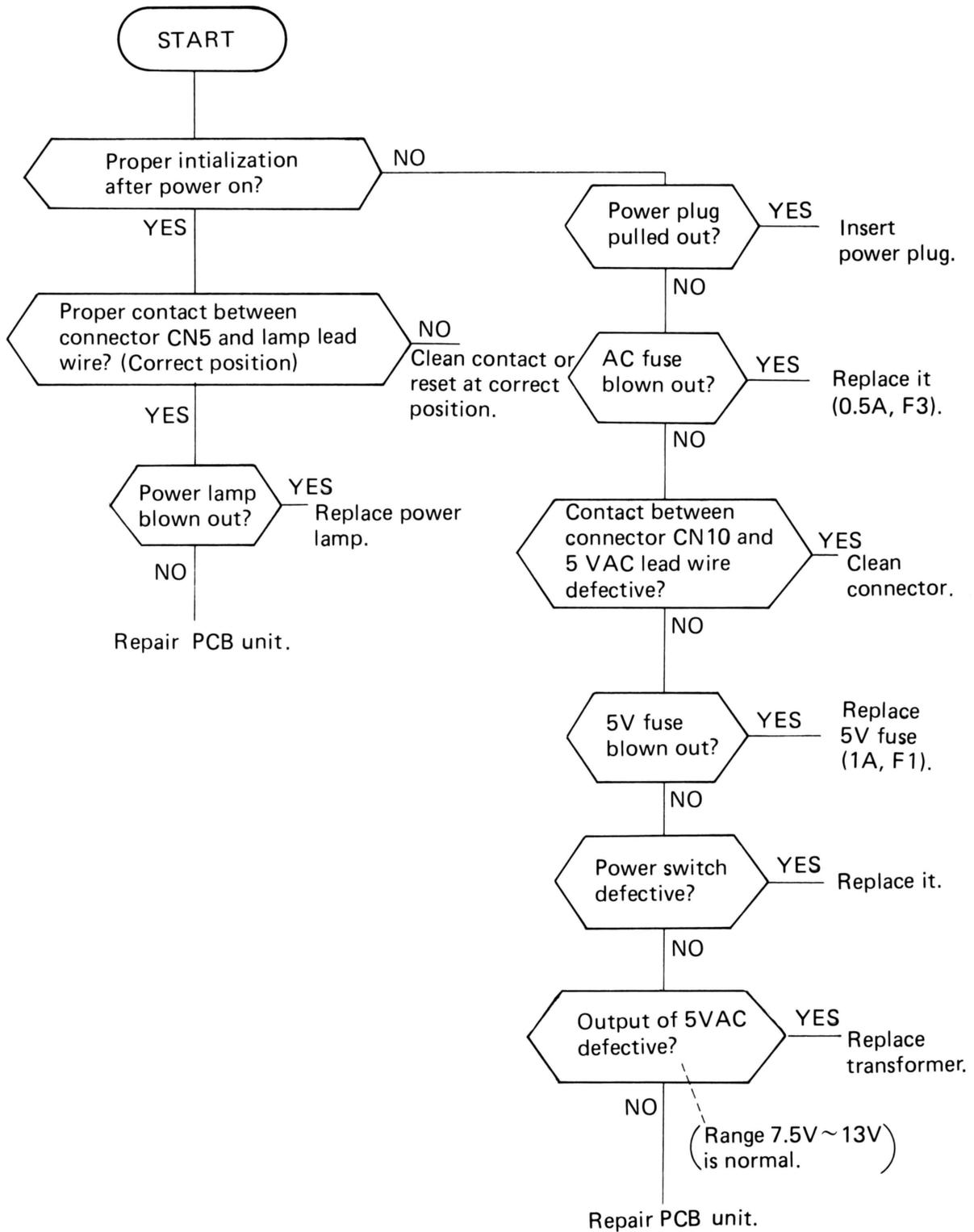
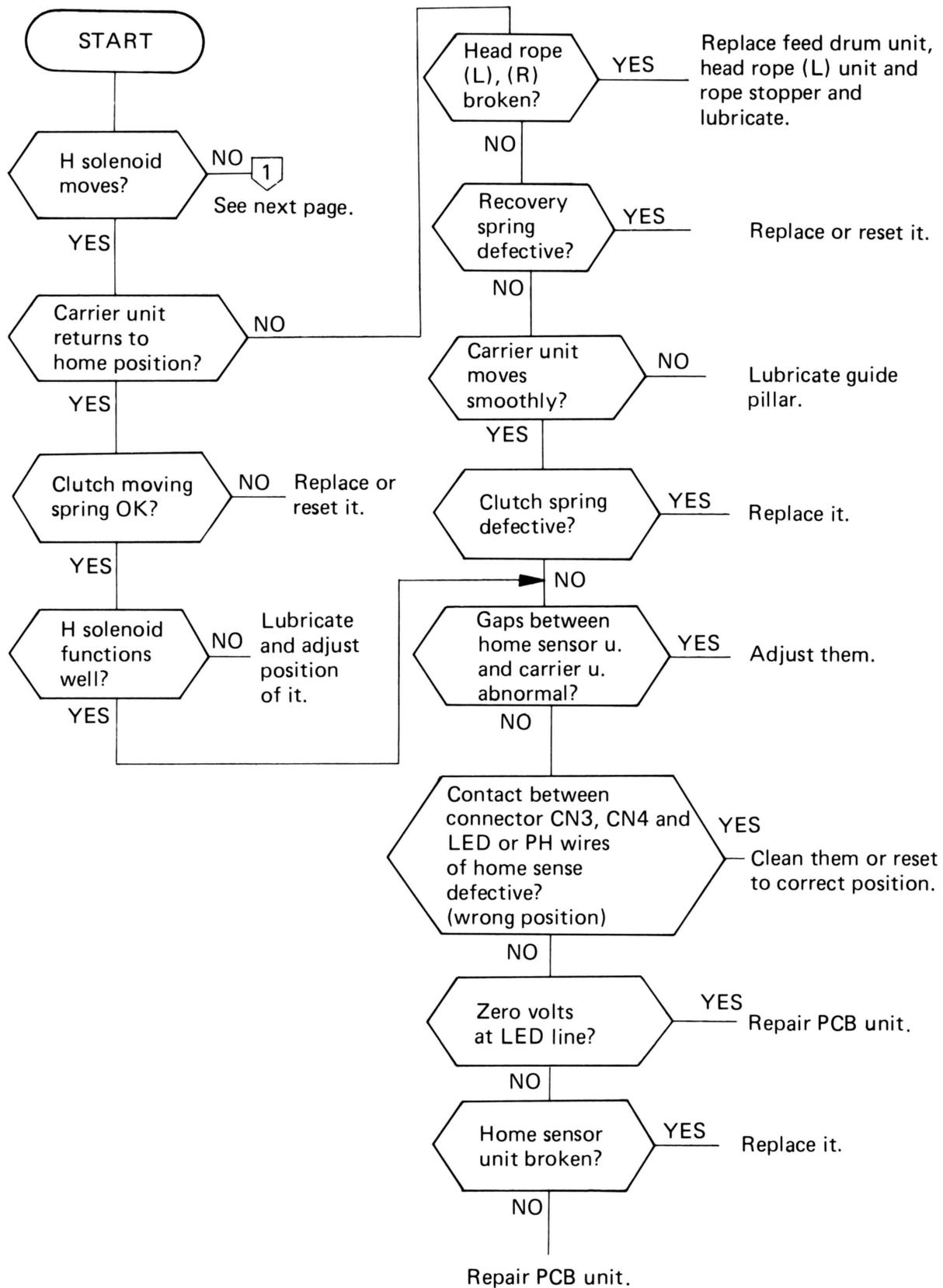
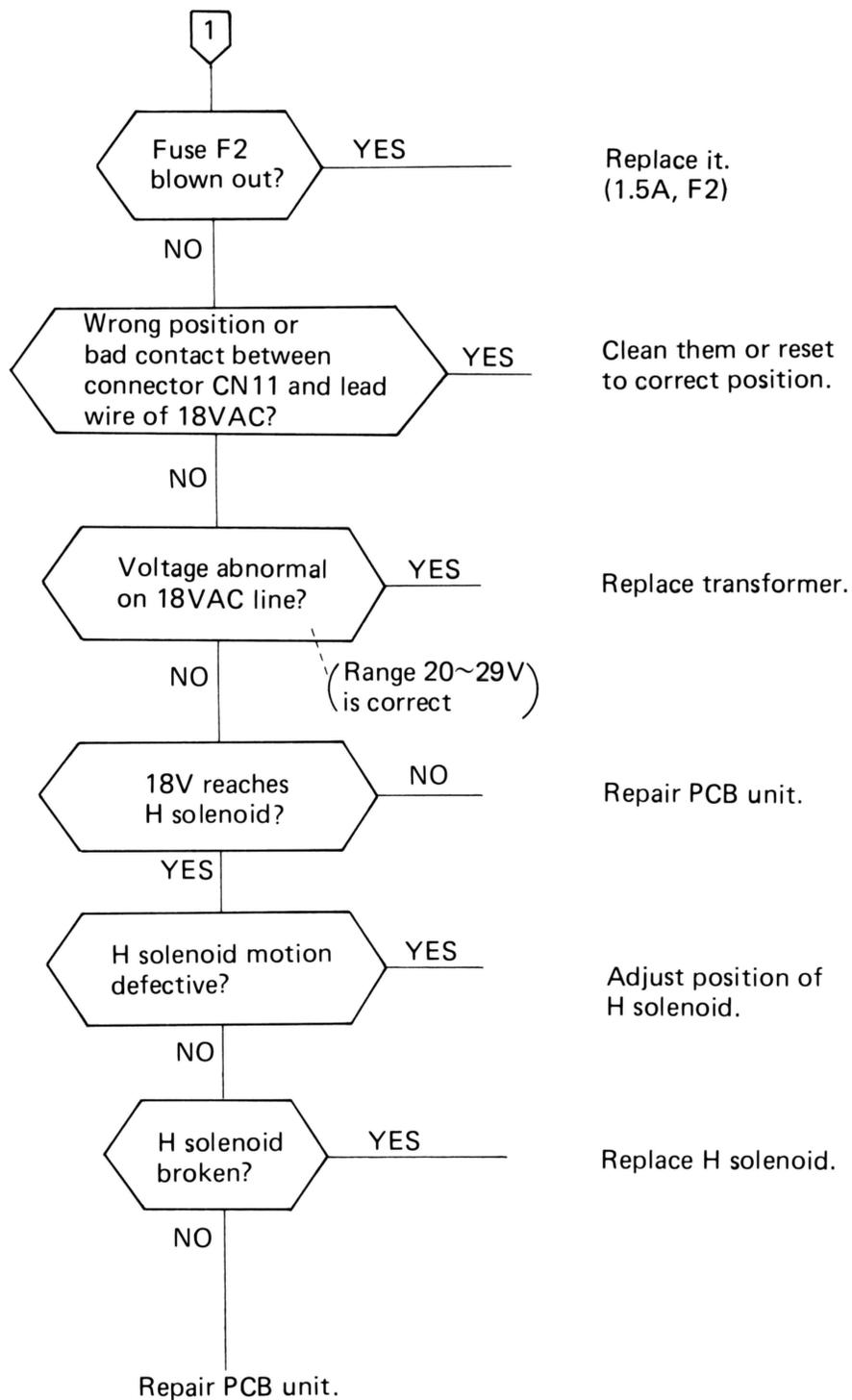


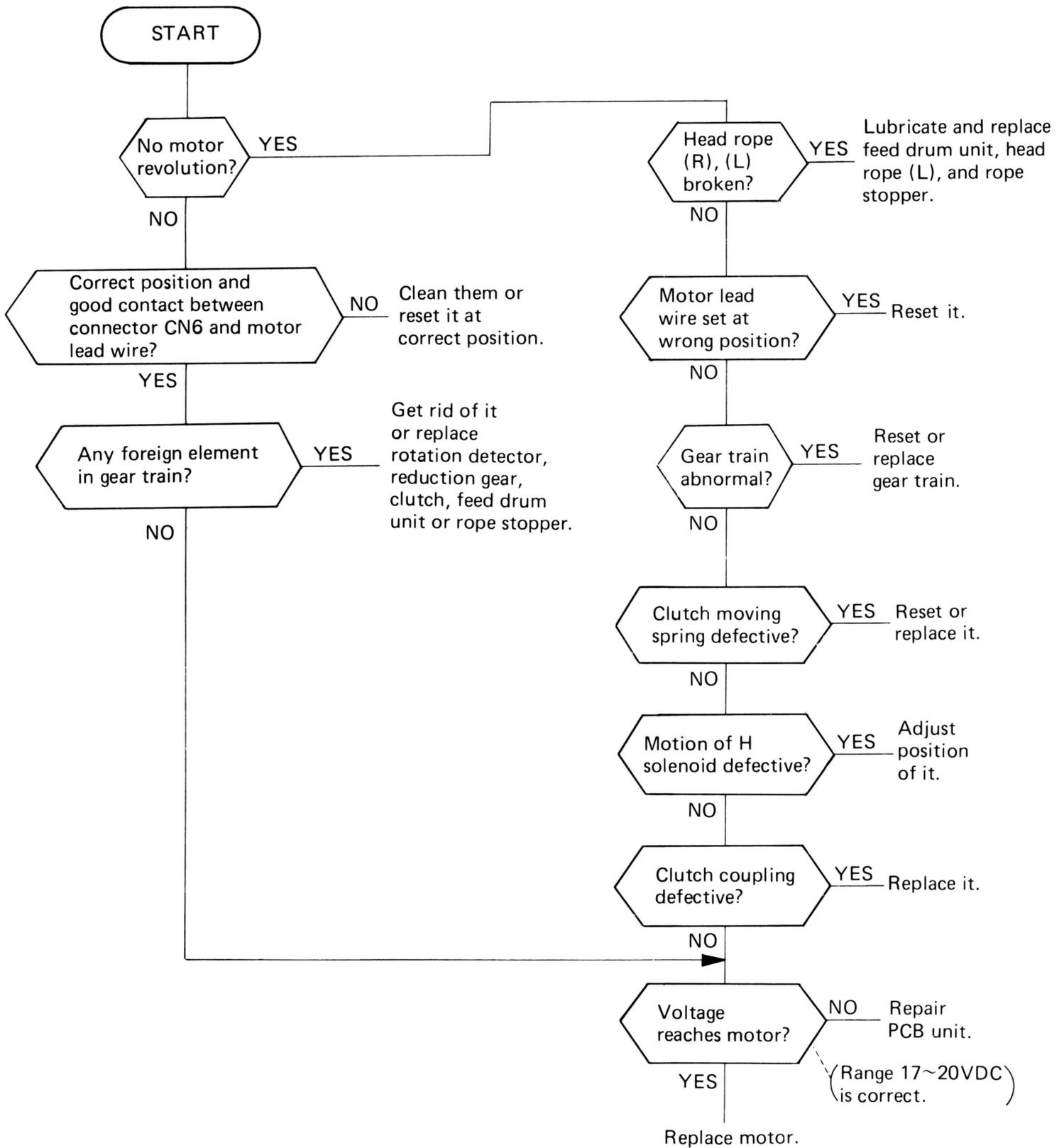
Figure 28

## 2. No initialization



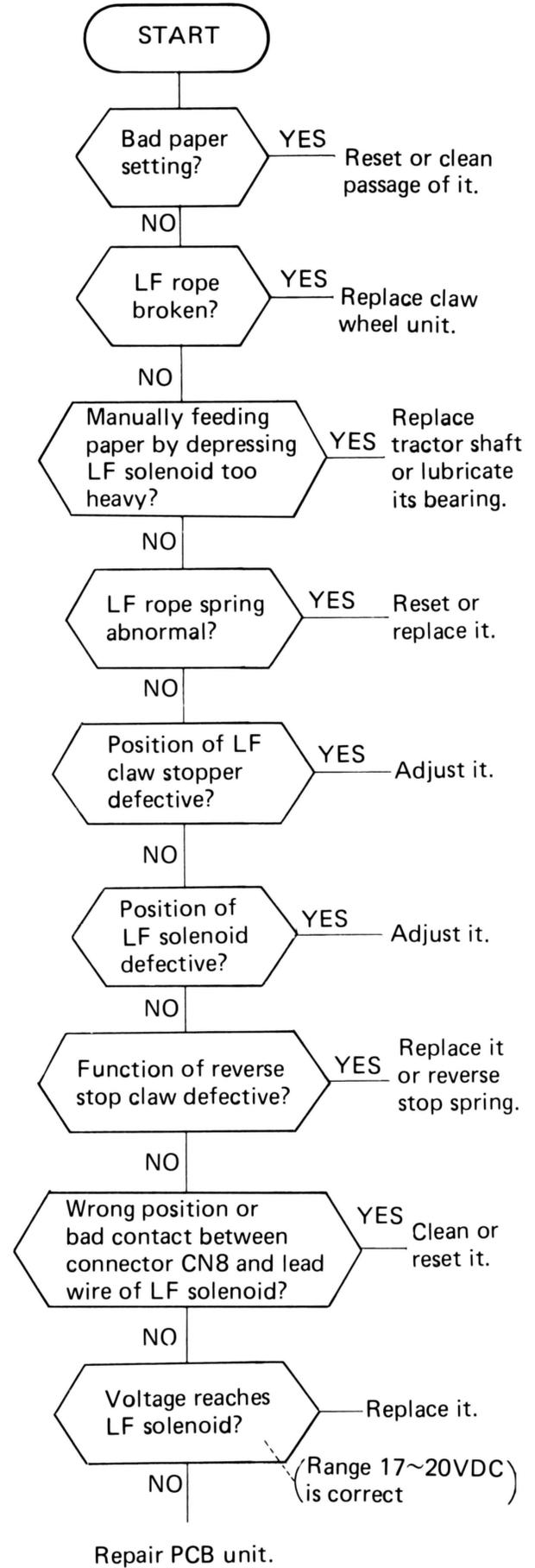
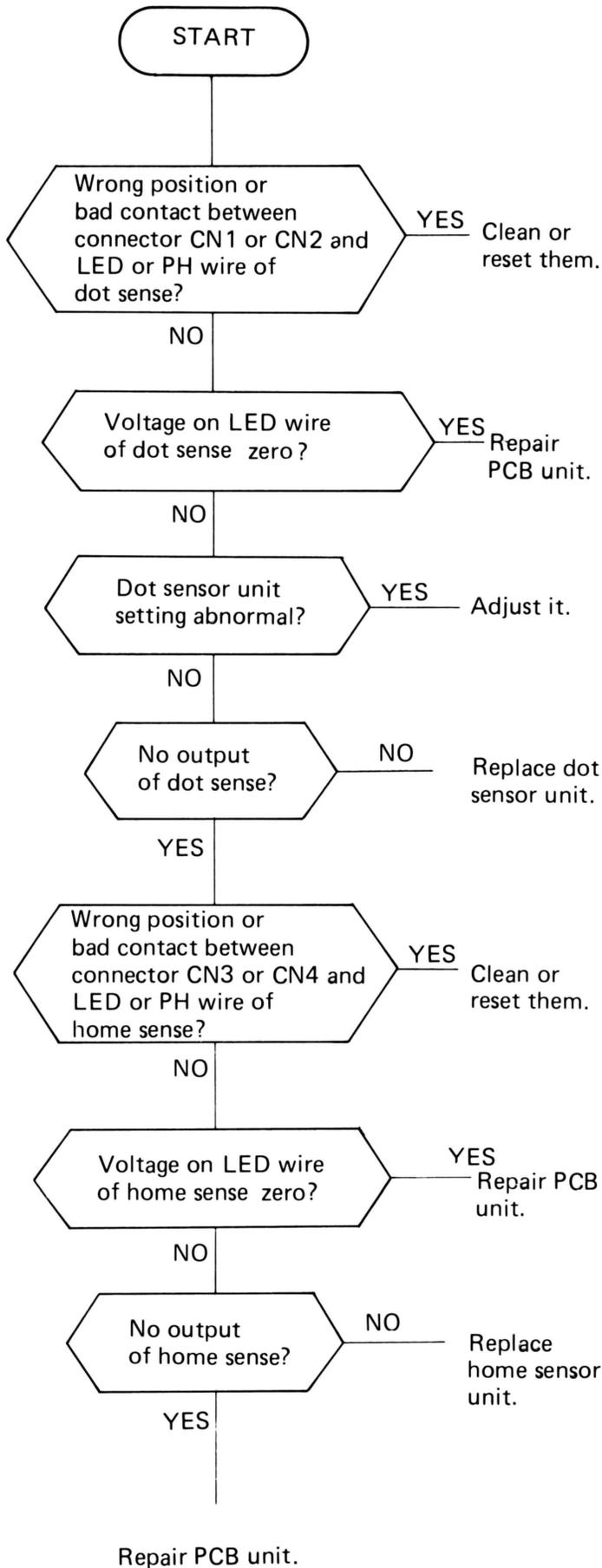


### 3. The carrier unit does not move with a print command.

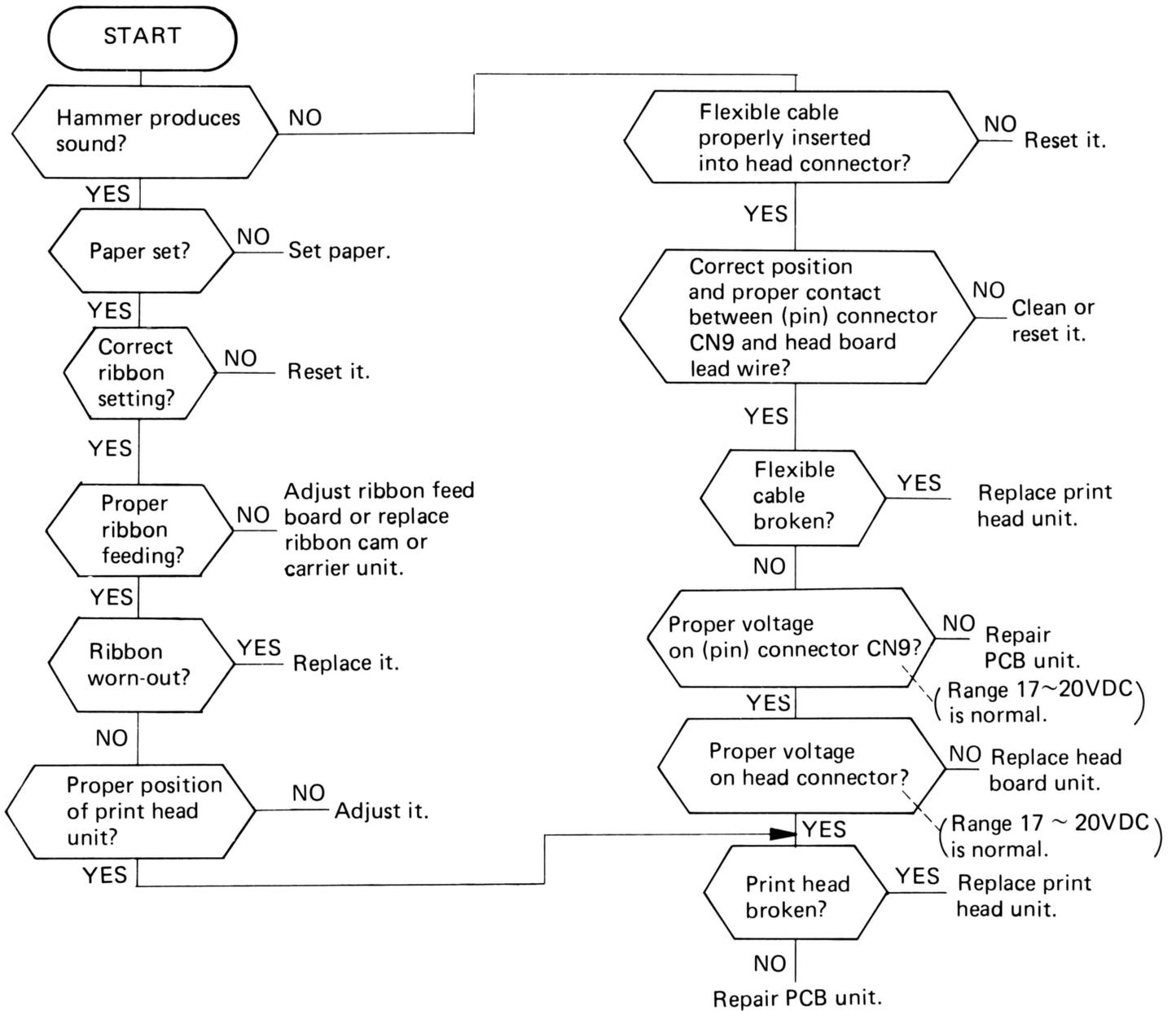


#### 4. The carrier unit overruns.

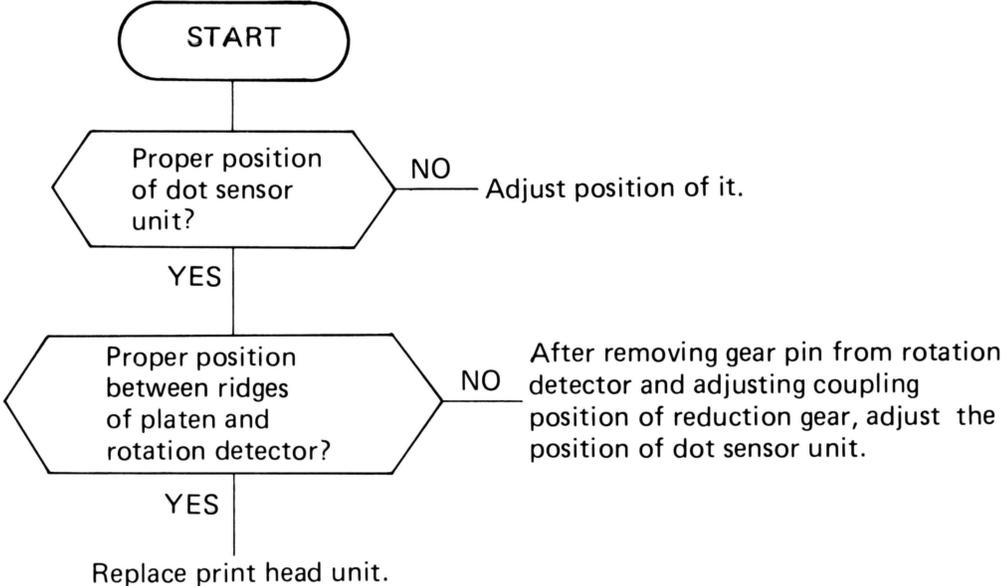
#### 5. Improper paper feed movement.



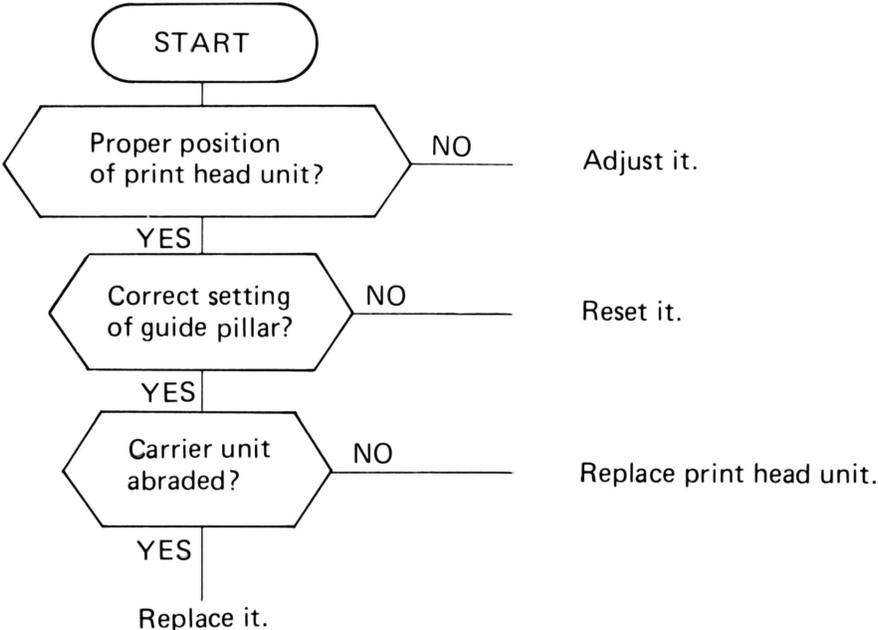
## 6. No printing or poor print quality



**7. The upper or lower dots of printed characters are missing.**



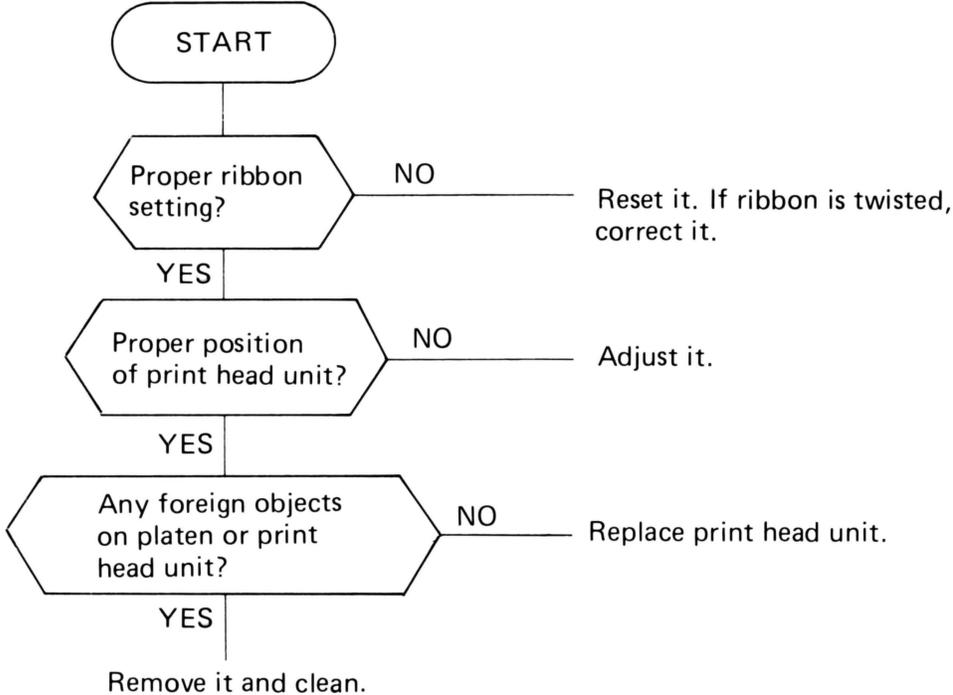
**8. The upper or lower dots of printed characters are too light.**



# 9. Printing is too light.

Refer to "6. No printing or poor print quality."

# 10. Smudging by ribbon.



# PARTS LIST

## 1. Mechanical Parts List

Ref.NO.	Description	Model	Radio Shack Part Number	Manufacturer Part Number
1-1	Cover (T)		AZ-5999	84501-2002
1-2	Upper case unit (T)		AZ-5998	84501-2001U
1-3	LED clip		AHC-0495	84501-2025
1-4	Lamp harness		AW-2644	84095-3295
2-1	Ribbon cassette			84501-1300A
2-2	M. stop screw		AHD-1652	84500-1350
3-1	Fuseholder	S-11000	AHF-1186	84091-6403
	Fuseholder	FEB-1401		B <sub>01</sub> ,B <sub>02</sub> ,B <sub>05</sub>
3-2	Cord bush	F-4	B <sub>03</sub> ,B <sub>04</sub>	84500-2033
	Cord bush	R-5	B <sub>01</sub>	84500-2033
	Cord bush	EA-5	B <sub>02</sub> ,B <sub>05</sub>	84500-2015
3-3	AC cord set	VFF 1.25 mm with KP-205	B <sub>03</sub> ,B <sub>04</sub>	84500-2032
	AC cord set	KP-30 AWG18 SVT	B <sub>01</sub>	84092-3949
	AC cord set	GTCE3 with KP-48190	B <sub>02</sub> ,B <sub>05</sub>	84092-3906
	AC cord set	GTSA3 with KP-550	B <sub>03</sub>	84092-3914
			B <sub>04</sub>	84092-3922
3-4	Sw. stopper (T)		B <sub>01</sub> ,B <sub>02</sub> ,B <sub>05</sub>	84501-2014
3-5	Power switch	DS-005	B <sub>01</sub>	84091-8571
	Power switch	DS-005 3B-2	B <sub>02</sub> ,B <sub>05</sub>	84091-8597
	Power switch	WK-2A44	B <sub>03</sub> ,B <sub>04</sub>	84091-8635
3-6	Power panel		B <sub>01</sub> ,B <sub>02</sub> ,B <sub>05</sub>	84501-2006
	Power panel (E)		B <sub>03</sub> ,B <sub>04</sub>	84501-2008
3-7	Transformer	ETP-57E153H	B <sub>01</sub>	84093-0287
	Transformer	ETP-57E159H	B <sub>02</sub> ,B <sub>05</sub>	84093-0295
	Transformer	ETP-59Q46E	B <sub>03</sub> ,B <sub>04</sub>	84093-0309
3-8	Lower case unit (T)		B <sub>01</sub>	84501-2003U
	Lower case unit (T)		B <sub>02</sub>	84520-2003U
	Lower case unit (T)		B <sub>03</sub>	84521-2003U
	Lower case unit (T)		B <sub>04</sub>	84522-2003U
	Lower case unit (T)		B <sub>05</sub>	84523-2003U
4-1	Input panel		ART-3377	84501-2007
4-2	Control PCB unit	MP-B-01	B <sub>01</sub>	84098-8460U
	Control PCB unit	MP-B-02	B <sub>02</sub> ,B <sub>05</sub>	84098-8456U
	Control PCB unit	MP-B-03	B <sub>03</sub> ,B <sub>04</sub>	84098-8461U
4-3	PCB receptacle		AHC-0634	84500-1320
5-1	Head adjust lever		AHC-0498	84500-1242A
5-2	Head adjust nut		AHD-7212	84500-1240
5-3	Cable guide		AHC-0499	84500-1246
5-4	Head adjust spring		ARB-7069	84500-1241
5-5	Print head unit		AH-4439	84501-1200U
5-6	Head spacer		AHC-0497	84500-1178
5-7	Head board unit		AX-8730	84500-1107U
5-8	Head connector	HBLB 6R-IJ/BURNDY	AJ-6973	84500-1108

Model: B<sub>01</sub> (Japan), B<sub>02</sub> (USA), B<sub>03</sub> (Europe), B<sub>04</sub> (Australia), B<sub>05</sub> (Canada)

Ref.NO.	Description	Model	Radio Shack Part Number	Manufacturer Part Number
6-1	LF rope spring		ARB-7118	84500-1144
6-2	Reverse stop claw		AHC-0501	84500-1141
6-3	Reverse stop spring		AHD-1653	84500-1140
6-4	LF solenoid unit		AS-9145	84500-1030U
6-5	LF claw wheel		ARA-2871	84500-1130
6-6	Gear pin		AHC-0502	84500-1083
6-7	Claw wheel unit		ARA-1870	84500-1130U
6-8	Claw wheel spring		ARB-7067	84500-1128
6-9	LF claw stopper		ART-3372	84500-1026
6-10	LF dial		AHC-0503	84501-1125
6-11	Dial clutch spring		ARB-7066	84500-1124
7-1	FPC guide		AHC-0500	84501-1196
7-2	Recovery spring		ARB-7063	84501-1194
7-3	Rope spring		ARB-7064	84500-1190
7-4	Rope stopper	1 set	ART-3367	84500-1184 84500-1185 84500-1186
7-5	Head rope (L) unit		ART-3366	84501-1187U
7-6	Feed drum unit		ART-3368	84501-1183U
7-7	Drum spring step		AHC-0487	84500-1182
7-8	Drum spring		ARB-7060	84500-1181
7-9	Pulley pin		AHC-0506	84500-1004
7-10	Spring pulley		ARA-2867	84500-1012
7-11	Rope pulley		ARA-2868	84501-1010
7-12	Guide pillar		ART-3373	84501-1051
7-13	Damper		AHC-0505	84500-1179
7-14	Carrier unit		ART-3369	84500-1160U
7-15	Ribbon cam spring		ARB-7065	84500-1177
7-16	Ribbon cam		ARA-2869	84500-1175
8-1	Clutch moving spring		ARB-7061	84500-1093
8-2	Dot sensor unit		AS-9147	84500-1100U
8-3	Clutch step		AHC-0507	84500-1091
8-4	Clutch		ARA-2866	84501-1087
8-5	Spring pan		AHC-0508	84500-1089
8-6	Clutch spring		ARB-7062	84500-1088
8-7	Clutch		ARA-2866	84501-1087
8-8	Reduction gear (B)		ARA-2865	84501-1086
8-9	Gear pin		AHC-0502	84500-1083
8-10	Rotation detector		AS-9148	84500-1085
8-11	Platen gear		ARA-2864	84501-1082
8-12	Gear pin		AHC-0502	84500-1083
8-13	Reduction gear		ARA-2863	84500-1081
8-14	H solenoid		AS-9144	84500-1016

Ref.NO.	Description	Model	Radio Shack Part Number	Manufacturer Part Number
8-15	Motor		AM-4605	84500-1014
9-1	Soundproof		ART-3453	84501-1197
9-2	Guide pillar		ART-3373	84501-1051
9-3	Paper holder (L) unit		ART-3375	84500-1149U
9-4	Paper holder (R) unit		ART-3374	84500-1147U
9-5	Platen bearing (Tractor bearing)		ART-3371	84500-1008
9-6	Tractor shaft		ART-3370	84501-1068
9-7	Pin feed roller		ARA-0324	84500-1070
9-8	Tractor rubber ring		AHC-0504	84500-1071
9-9	Home sensor unit		AS-9146	84500-1104U
9-10	Rubber leg		AF-0324	84500-1095

## 2. Common Parts List

Ref.NO.	Description	Model	Radio Shack Part Number	Manufacturer Part Number
S-22	⊕ pan head screw (brass) M2 x 0.4 x 3		AHD-2377	84001-2002
S-26	⊕ pan head screw with spring washer M2.6 x 0.45 x 4		AHD-2368	84001-2602
S-28	⊕ pan head screw with spring washer M2.6 x 0.45 x 6		AHD-2365	84001-2604
S-29	⊕ pan head screw M2.6 x 0.45 x 8			84001-2607
S-30	⊕ pan head screw M3 x 0.5 x 4		AHD-2363	84001-3011
S-31	⊕ pan head screw with spring & small plain washers M3 x 0.5 x 6		AHD-2366	84001-3001
S-32	⊕ pan head screw with spring & small plain washers M3 x 0.5 x 8		AHD-2367	84001-3002
S-33	⊕ pan head screw with spring washer M3 x 0.5 x 5		AHD-2364	84001-3003
S-35	⊕ pan head tapping screw (type B cutting) M3 x 8		AHD-2376	84001-3005
S-36	⊕ pan head tapping screw (type B cutting) M3 x 16		AHD-3281	84001-3006
S-37	⊕ pan head screw with spring washer M3 x 0.5 x 4	B <sub>01</sub> , B <sub>02</sub>		84001-3007
S-01	⊕ pan head tapping screw (type B cutting) M3 x 5		AHD-3280	84001-3012
S-43	⊕ pan head tapping screw (type B cutting) M4 x 8		AHD-2378	84001-4003
S-44	⊕ pan head tapping screw (type B cutting) M4 x 15		AHD-2379	84001-4006
S-45	⊕ pan head screw M4 x 5		AHD-2372	84001-4004
S-47	⊕ pan head screw M4 x 6		AHD-2373	84001-4007
W-23	Plain washer WS (brass) M2		AHD-8612	84003-2003
W-31	Spring washer M3		AHD-8610	84003-3001
W-32	Plain washer small M3		AHD-8611	84003-3002
W-42	Spring washer M4		AHD-8614	84003-4002
W-43	Toothed lock washer M4		AHD-8607	84003-4003
W-51	Plain washer small M5		AHD-8608	84003-5001
W-61	Plain washer small M6		AHD-8609	84003-6001
N-21	Hexagon nut (brass) M2 x 0.4		AHD-7211	84004-2001
N-31	Hexagon nut M3 x 0.5		AHD-7213	84004-3001
N-41	Hexagon nut M4			84004-4001
E-24	E-24 ring		AHE-0038	84005-2401
E-25	BE-24 ring		AHE-0039	84005-2402

Ref.NO.	Description	Model	Radio Shack Part Number	Manufacturer Part Number
E-28	E-28 ring		AHE-0040	84005-2801
E-37	E-37 ring		AHE-0042	84005-3701
E-38	BE-37 ring		AHE-0041	84005-3702
E-40	E-40 ring		AHE-0043	84005-4001
E-60	CE-6 ring		AHE-0044	84005-6001
E-75	BE-74 ring		AHE-0045	84005-7401
M-01	Extruded tubing	5 x 0.25 x 12	AHC-0631	84095-3457
M-02	Extruded tubing	3 x 0.25 x 12	AHC-0630	84095-3465
M-20	Splice	35115		84092-2063
M-21	Terminal	171512-5	AJ-6970	84092-2039
M-31	GND harness		AW-2643	84095-3325
M-32	Switch harness		AW-2642	84095-3317
C50	Ceramic capacitor	400VAC 4700pF		84091-7655
F1	Fuse	1A		84091-7078
	Fuse	GGSI (1A)	B03, B04 B01	84091-7248
	Fuse	ES-2 (1A)	B02, B05	84091-6977
F2	Fuse	MF-51 (A932) 1.5A	B03, B04 B01	84091-6969
	Fuse	GGI 1.5 (1.5A)	B02, B05	84091-7256
	Fuse	ES-2 1.6A	B03, B04	84091-6985
F3	Fuse	0.5A	B01	84091-7019
	Fuse	UL GDL 0.5A	B02, B05	84091-7264
	Fuse	ES-2 (0.25A)	B03, B04	84091-7124
N-01	Wire band A	SST 1M		84095-1365
N-02	Wire band B	KM-85		84095-0164

### 3. Control PCB unit Components Parts List

Ref.NO.	Description	Model	Radio Shack Part Number	Manufacturer Part Number
P1	IC	SN74LS14		84091-1568
P2,P3	IC	SN74LS175		84091-1673
P4	LSI	MB-8881-124		84090-9261
	LSI	MB-8881-122	B01 B02, B03, B04, B05	84090-9288
P5	IC	SN74LS74		84091-1045
P6	IC	SN74LS05		84091-1703
P7	IC	SN75150		84090-9610
P8	IC	SN75468		84091-1355
Q1	Transistor	2SC 1833		84091-2726
Q2	Transistor	2SA 1069C		84091-2254
Q3	Transistor	2SA 1153		84091-2289
Q4	Transistor	2SA 636L, L-M		84091-1908
Q5	Voltage regulator	$\mu$ A 7805UC		84093-5505
Q6	Voltage regulator	$\mu$ A 7812UC		84093-5513
C1~C6	Ceramic capacitor	25V 0.1 $\mu$ F Z		84091-5814
C7,C8	Polystyrene capacitor	150V 20pF K		84091-5971
C9,C10	Single ended type, A1. Electrolytic capacitor	50V 1 $\mu$ F (-10~+75%)		84091-7540
C11~ C13	Single ended type, A1. Electrolytic capacitor	50V 47 $\mu$ F (-10~+50%)		84091-7621

Ref.NO.	Description	Model	Radio Shack Part Number	Manufacturer Part Number
C14	Single ended type, A1. Electrolytic capacitor 6V 220 $\mu$ F (-10~+50%)		ACC227WBAP	84091-7558
C15	Axial lead type, A1. Electrolytic capacitor 16V 2200 $\mu$ F (-10~+30%)		ACC228RDAA	84091-5776
C16	Axial lead type, A1. Electrolytic capacitor 50V 2200 $\mu$ F (-10~+30%)		ACC228RJAA	84091-5784
C17	Film capacitor 50V 0.001 $\mu$ F K		ACC1020JMP	84091-5016
C18,C19	Ceramic capacitor 100V 0.022 $\mu$ F +80/-20%	B02		84091-7647
R1~R4	Solid resistor 1/4W 10k $\Omega$ J		AN0281EEB	84091-4231
R5	Solid resistor 1/4W 2.2k $\Omega$ J		AN0216EEB	84091-4176
R6~R10	Solid resistor 1/4W 1k $\Omega$ J		AN0196EEB	84091-4150
R11~R13	Solid resistor 1/4W 2.2k $\Omega$ J		AN0216EEB	84091-4176
R14,R15	Solid resistor 1/4W 300 $\Omega$ J		AN0158EEB	84091-4532
R16,R17	Solid resistor 1/4W 100 $\Omega$ J		AN0132EEB	84091-4079
R18	Solid resistor 1/4W 15 $\Omega$ J		AN0074EEB	84091-4028
R19	Metal oxide film resistor 1W 150 $\Omega$ J			84091-3684
R20	Solid resistor 1/2W 220 $\Omega$ J		AN0149EED	84091-4796
R21	Metal oxide film resistor 1W 1k $\Omega$ J		AN0196EGD	84093-5122
R22	Metal oxide film resistor 2W 75 $\Omega$ J		AN0116EHD	84091-3943
RA1	Resistor array 1/8W 1K K		ARX-0244	84091-3587
RA2~RA4	Resistor array 1/8W 10K K		ARX-0245	84091-3307
D1~D3	Diode IS1588		ADX-1304	84091-2424
D4~D6	Diode V06C		ADX-1514	84091-2581
D7~D8	Zener diode HZ9A-2			84091-2921
D9	Zener diode HZ6C-2		ADX-1515	84091-2939
D10	Zener diode RD13EB1		ADX-1516	84091-6951
D11,D12	Rectifier SIRBA10		ADX-1517	84093-5734
X1	Ceramic oscillator CSA6.00MB		ACA-8172	84093-5599
CN1~CN11	Connector MWP2P-1B		AJ-6971	84092-3868
CN12	Flat cable KMJ-C-20-B-3-FV-70		AW-2646	84095-3392
CN13	Flat cable KMJ-C-9-B-5-FV-100		AW-2647	84095-3350
TP1~TP4	P.C.B. disconnect Fuse socket AFP216		AJ-6972 AHF-1185	84092-3272 84091-6471
M-823	Mini bus NC7848-01		AJ-7000	84094-2668
HS1	Heat sink T-220K-30			84095-0806
HS2	Heat sink T-220K-50			84095-0814
	Bakelite plain washer 30 x 160		AHD-8615	84095-3449
	Jumper cable		AW-2661	84095-3341
S-38	⊕ pan head screw M3 x 0.5 x 15		AHD-2371	84001-3008
S-39	⊕ pan head screw with spring washer M3 x 0.5 x 8		AHD-2370	84001-3009
CN15	Connector 57-40360-12		AJ-6974	84092-2314
CN16	Connector D4-730N-10		AJ-6975	84092-2322
MSW	Switch (mode select switch) SS-222		AS-2681	84091-8627

Ref.NO.	Description	Model	Radio Shack Part Number	Manufacturer Part Number
S-02	Collar	3 x 5	AHC-0489	84009-0002
	⊕ pan head screw	M3 x 0.5 x 12		84001-3013
W-31	Spring washer	M3	AHD-8610	84003-3001
N-31	Hexagon nut	M3 x 0.5	AHD-7213	84004-3001

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**RADIO SHACK**  **A DIVISION OF TANDY CORPORATION**

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