Service Manual

ELECTRONIC TIME RECORDER

ES700

06-0297-000 Rev. B

ACROPRINT® Time for Business.™

5640 Departure Drive
Raleigh, NC 27616
www.acroprint.com

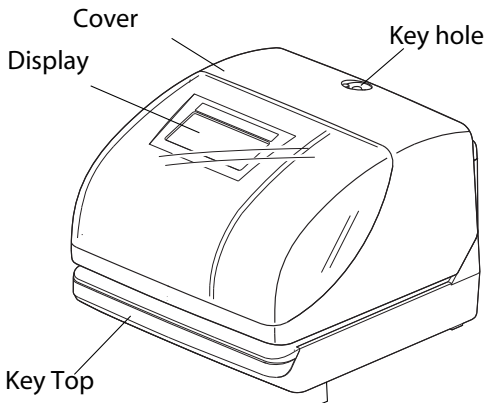
Service Manual

CONTENTS

1. OUTLINE

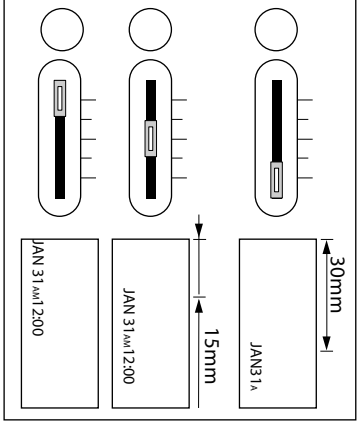
Be careful to avoid electric shock when repairing this unit.

<Front view>

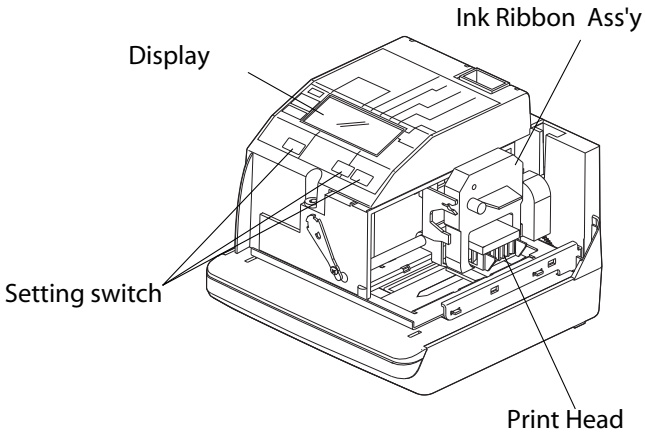


<Print position adjuster>

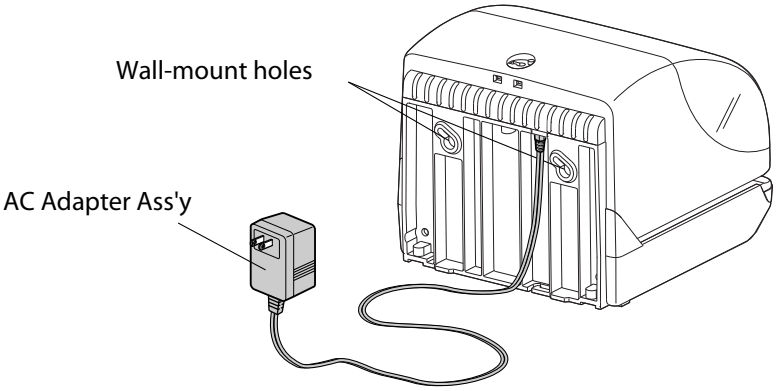
The print position from the card edge is adjustable by pressing and sliding the print position button located on the bottom .



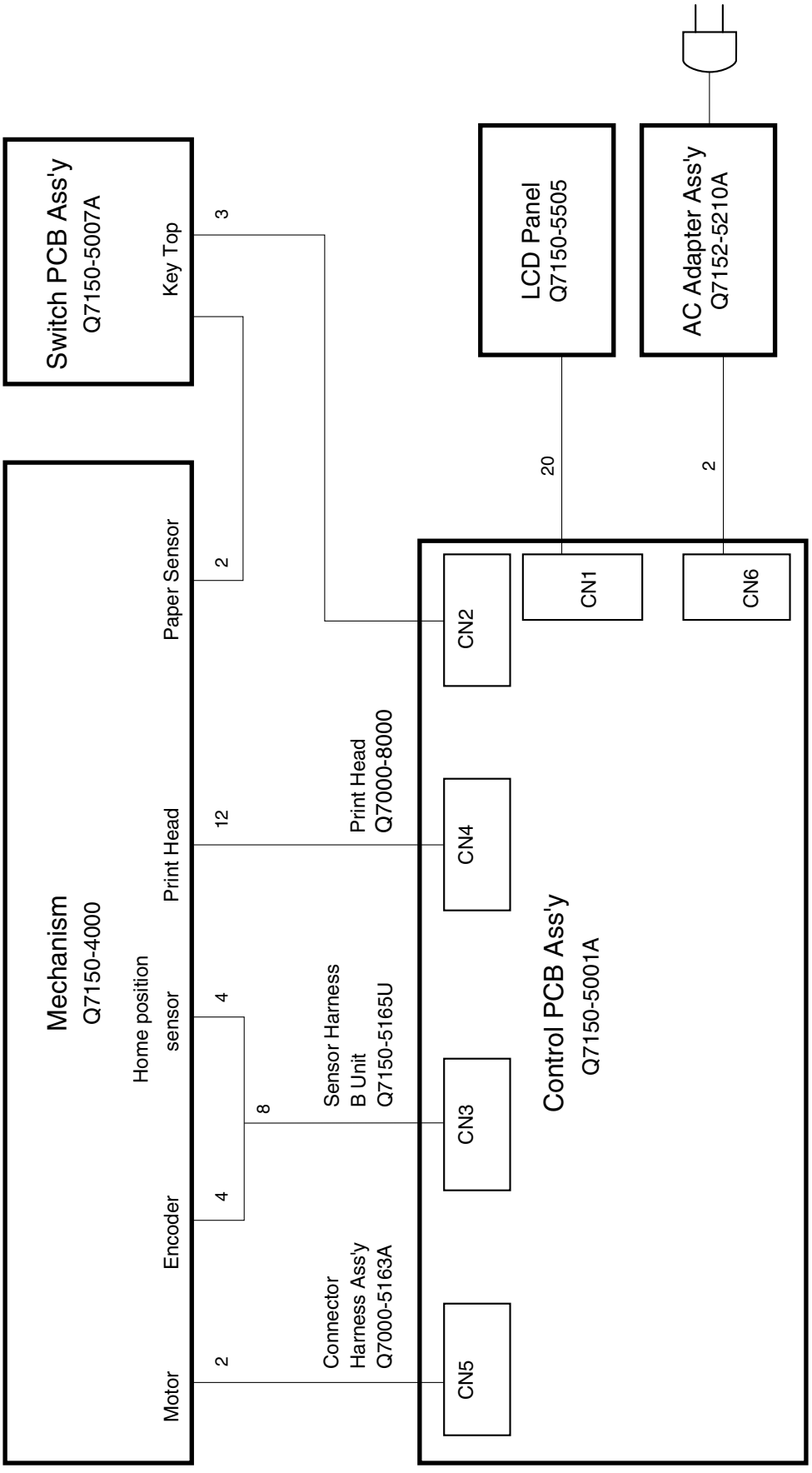
<Cover off>



<Back view>



2. BLOCK DIAGRAM



3. DISASSEMBLY AND REASSEMBLY OF BASIC PARTS

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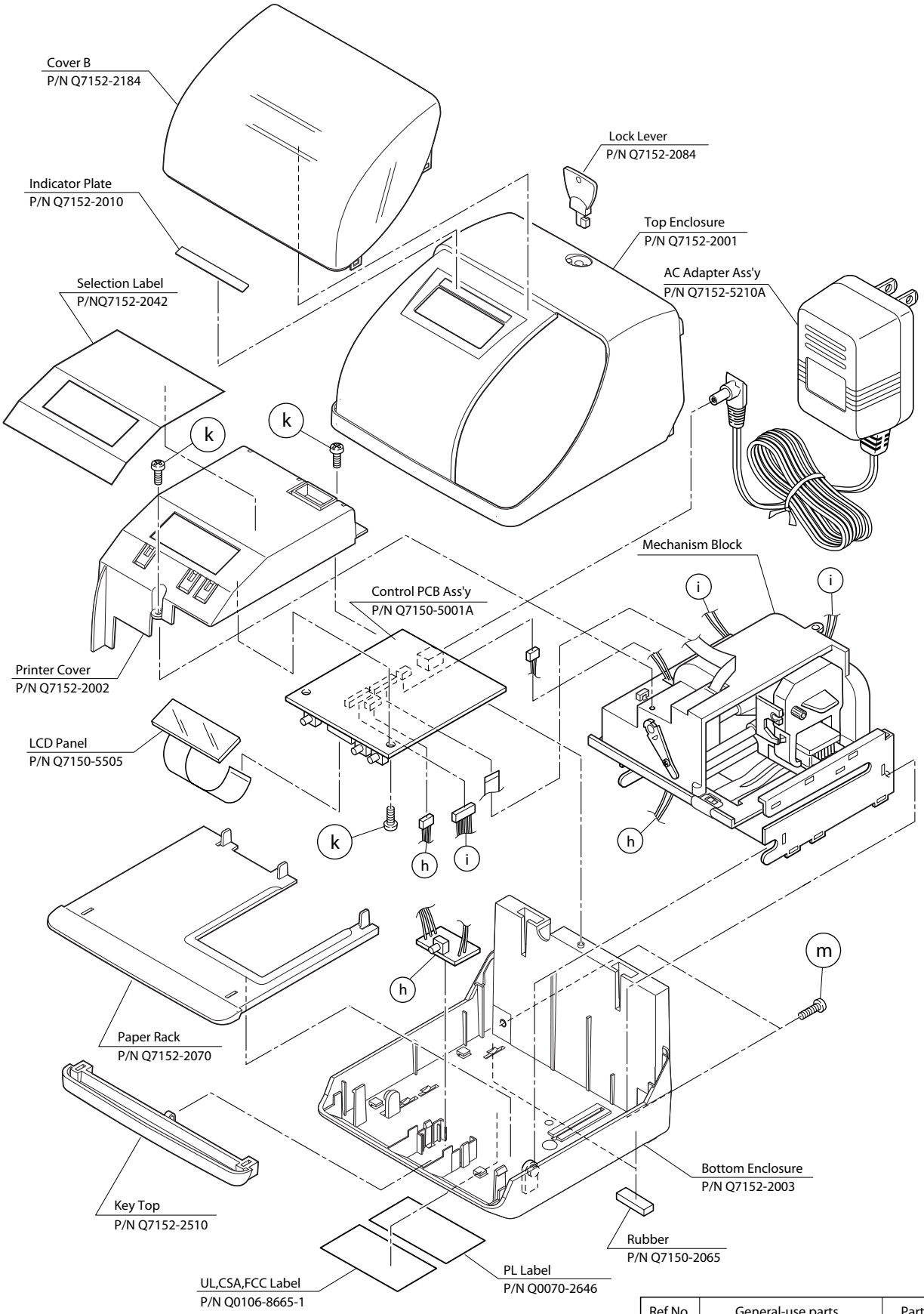
3-1. Exploded View



Ref No.	General-use parts	Part No.
(k)	P.H.T. Screw (BT) 3x8	84001-3026
(m)	P.H. Screw M4x10, SPW	84001-4019

3-2. Tools Required

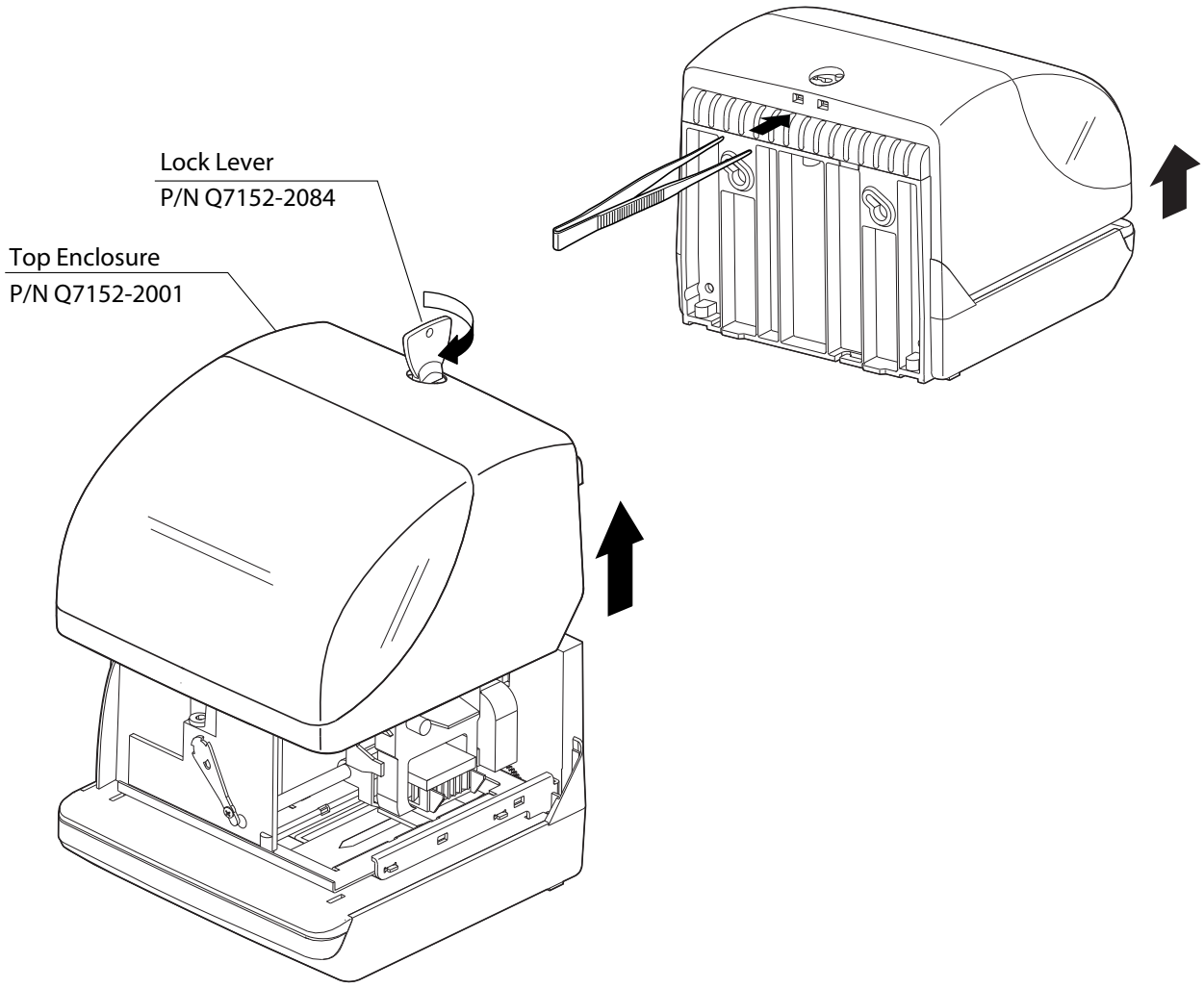
Tools required :
1. No. 2 or #2 Phillips screwdriver
2. Miniature screwdriver

3-3. Disassembly

Disassemble the parts in the following order :

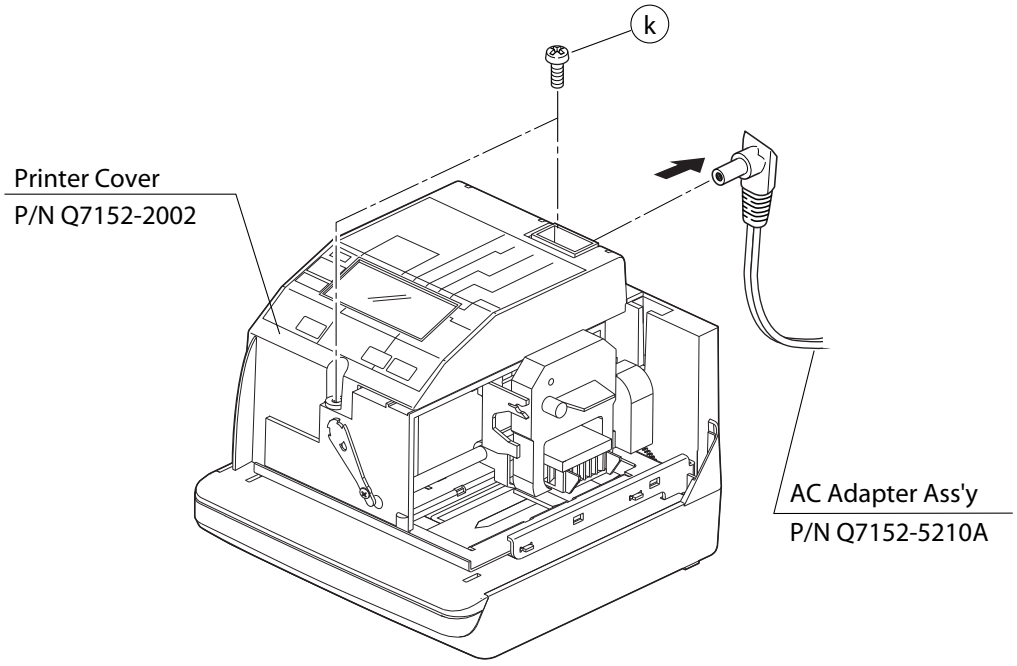
(1) Top Enclosure
(2) Printer Cover (1)
(3) Control PCB Ass'y (1)—(2)
(4) LCD Panel (1)—(2)—(3)
(5) Mechanism Block (1)—(2)—(3)—(4)
(1)—(2)————————-(5)

(1) Removing the Top Enclosure
1. Unlock the Lock Lever and remove the Top Enclosure.
*If the Lock Lever cannot be used, the unit may be unlocked by using tweezer with rounded points to push the two holes on the rear of the Top Enclosure.

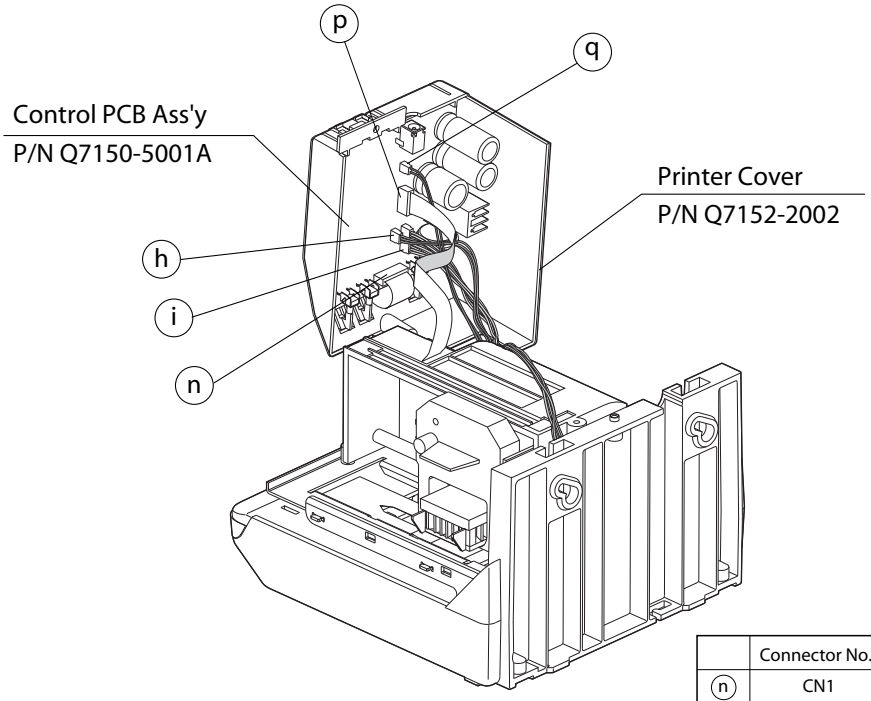


(2) Removing the Printer Cover

1. Remove the AC Adapter Ass'y cord.
2. Remove two screws ⓚ holding the Printer Cover.
   [Screw ⓚ : P.H.T. Screw (BT) 3x8 : 2 pieces]



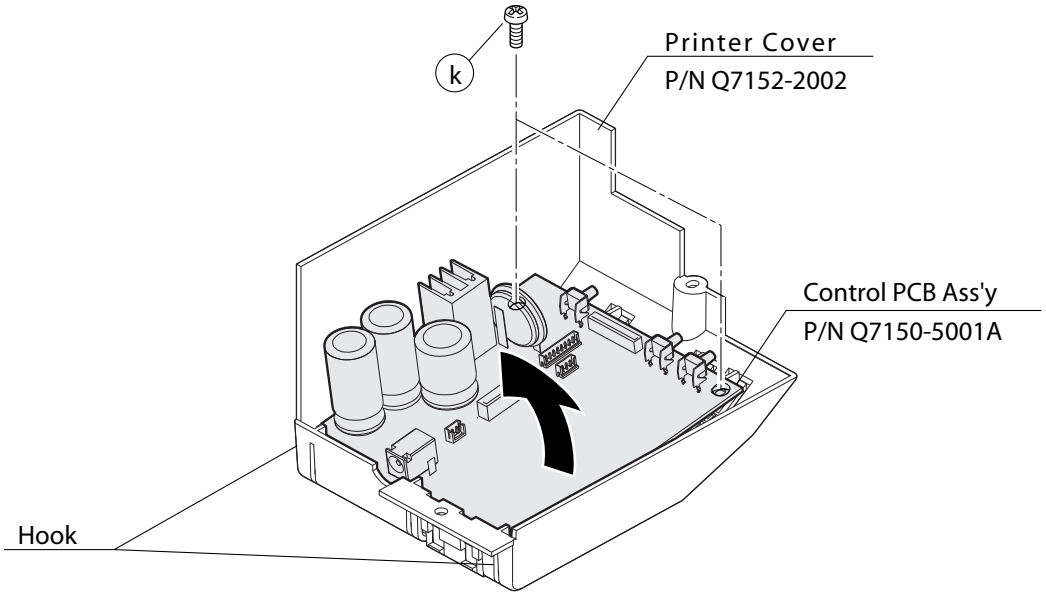
2. Lift the Printer Cover up and turn to the same direction as the illustration (about 90°).
3. Remove harness from the connector of Control PCB Ass'y.



	Connector No.	Numbers of Wire	Part No.
ⓝ	CN1	20	Q7150-5505
ⓗ	CN2	3	Q7150-5007A
ⓘ	CN3	8	Q7150-5165U
ⓟ	CN4	12	Q7000-8000
ⓠ	CN5	2	Q7000-5163A

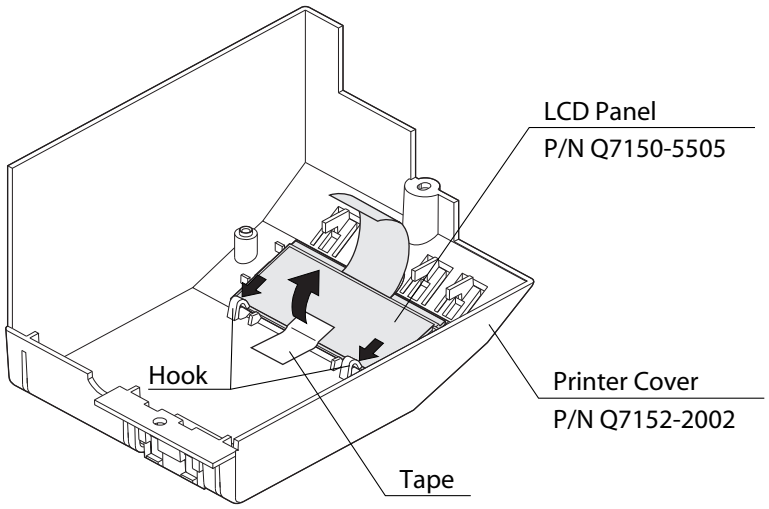
(3) Removing the Control PCB Ass'y

1. Remove two screws ⓚ holding the Control PCB Ass'y.
   [Screw ⓚ : P.H.T. Screw (BT) 3x8 : 2 pieces]
2. Remove the Control PCB Ass'y from the Printer Cover hooks by rotating it.



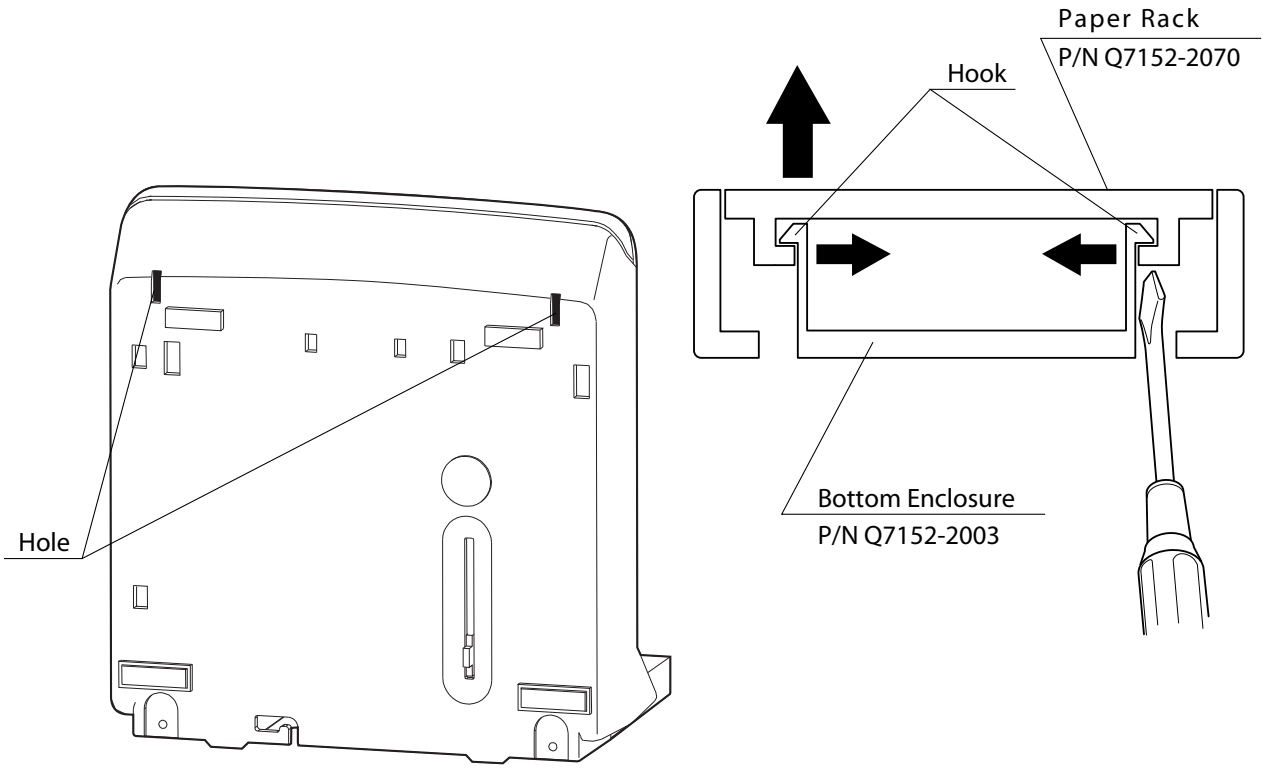
(4) Removing the LCD Panel

1. Remove a tape.
2. After releasing the two hooks holding the LCD Panel, push the LCD from the other side, and remove the LCD Panel.
   *Since the hooks that hold the LCD Panel break easily, please do not push any harder than necessary.

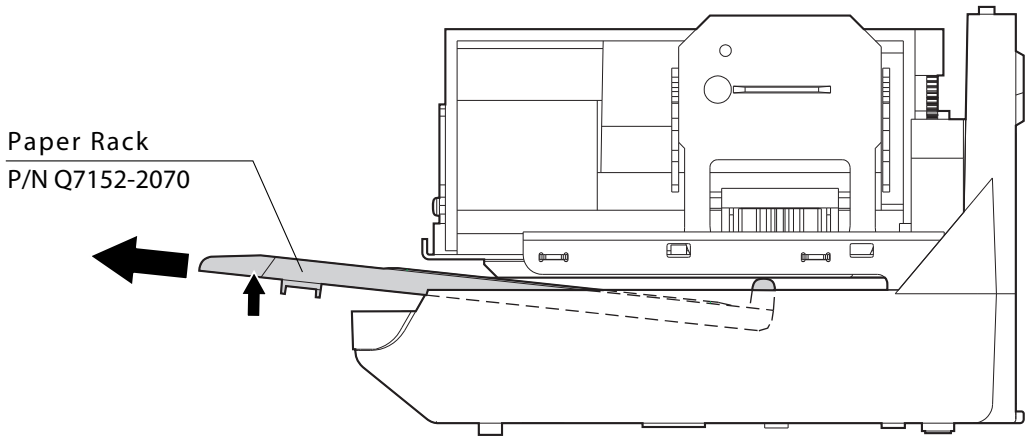


(5) Removing the Mechanism Block

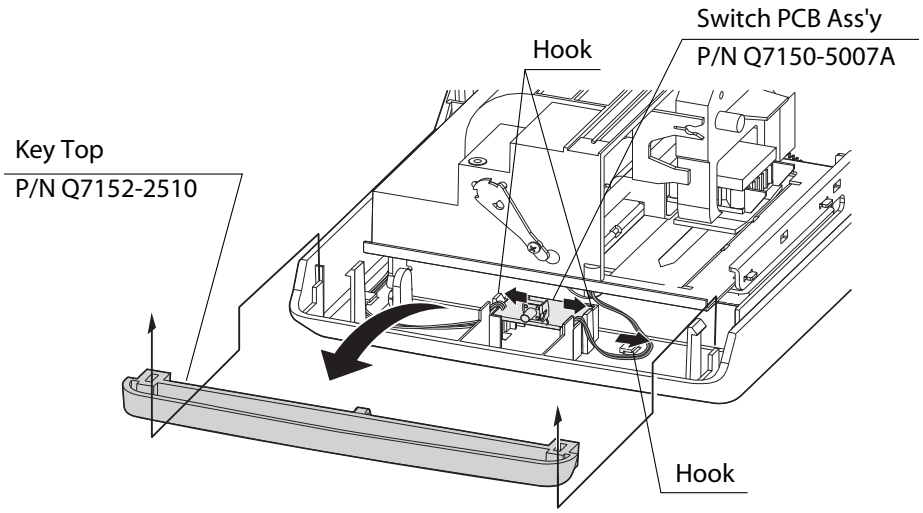
1. Insert the miniature screwdriver in the hole of the Bottom Enclosure back side, and release the two hooks holding the Paper Rack .



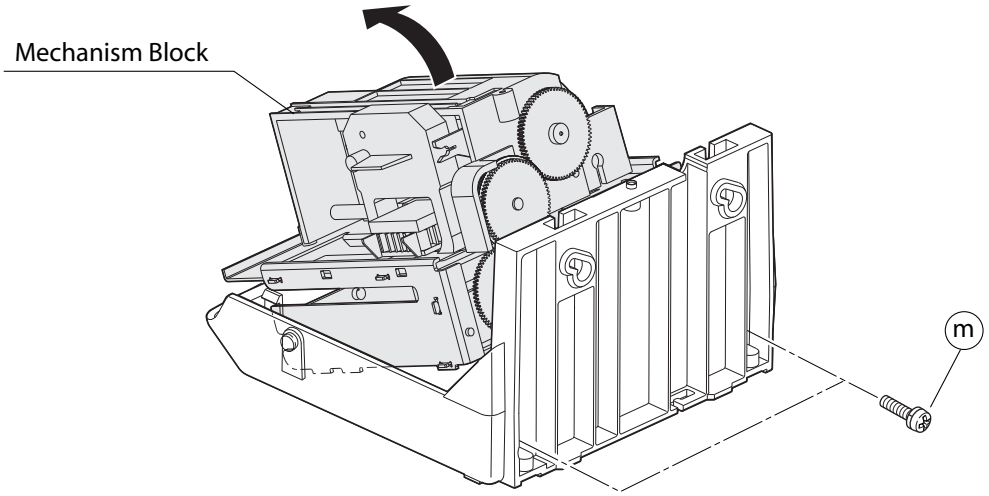
2. Lift the front edges of the Paper Rack, and pull it out.



3. Remove the Key Top.
4. Release harness connecting with Switch PCB Ass'y from the hook.
5. Open the hook and release fixing of Switch PCB Ass'y.



6. Remove two screws ⓜ holding the Mechanism Block.
   [Screw ⓜ : P.H. Screw M4x10 , SPW : 2 pieces]
7. Remove the Mechanism Block by rotating it in the same direction as the illustration.



3- 4. Reassembly

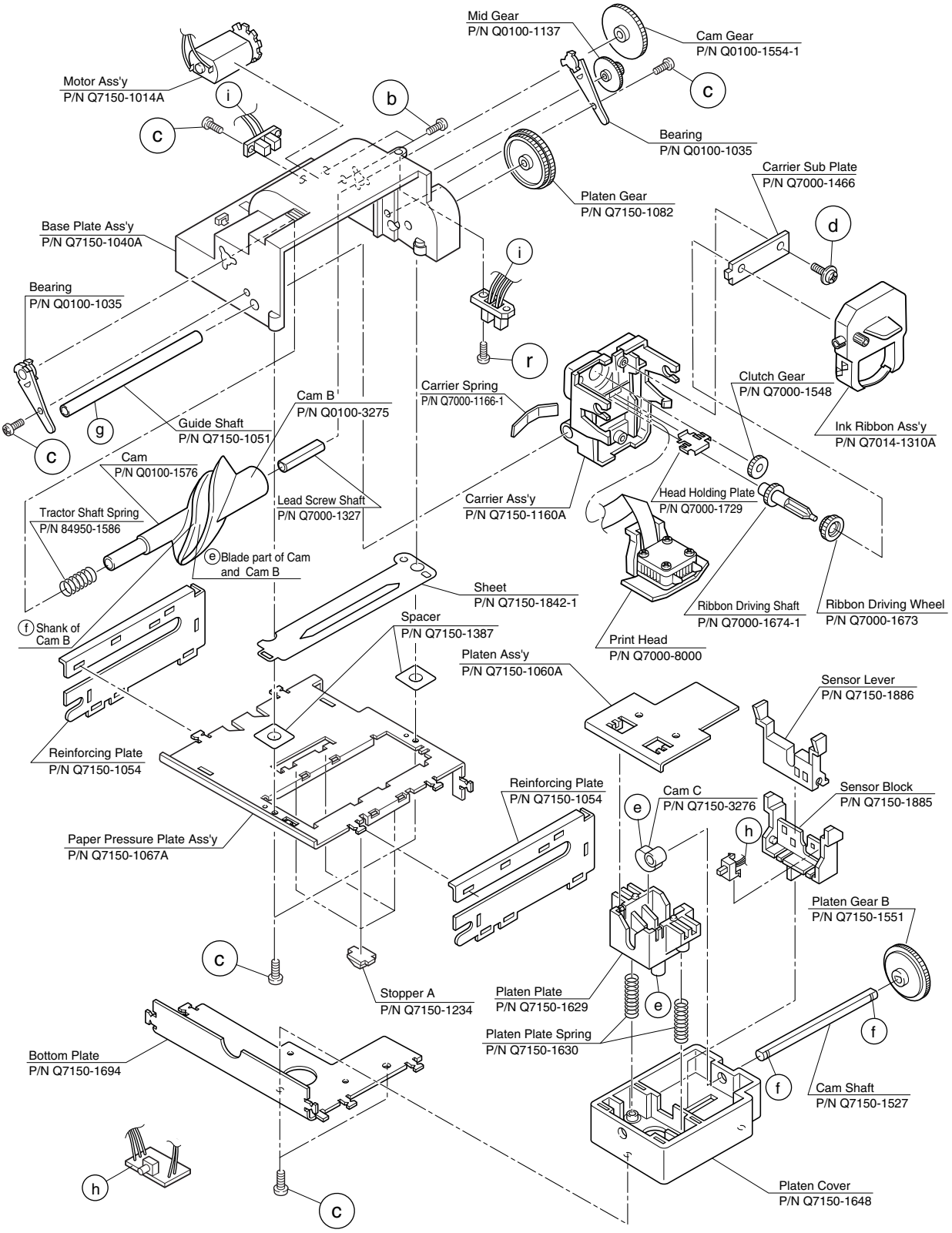
Reassembly of parts is performed by reversing the disassembly procedure.
Note the following points :

(1) Make sure that all connectors and screws are properly secured in place.
(2) Take care to avoid catching or cutting the harnesses or cables when mounting parts.
(3) Once reassembled, check all functions to ascertain that the reassembly procedure has been properly completed.

4. DISASSEMBLY AND REASSEMBLY OF MECHANISM

CONTENTS

4-1. Exploded View, Oiling Instruction Diagram



Ref No.	General-use parts	Part No.
ⓐ	Tielap TY-23M	84009-1060
ⓑ	P.H. Screw M2.6x5	84001-2641
ⓒ	P.H.T. Screw(BT) 3x6	84001-3025
ⓓ	P.H.T. Screw(BT) 3x6, PW	84001-3250
ⓡ	P.H.T. Screw(BT) 3x8	84001-3026

Lubricant	
ⓔ	YM-103
ⓕ	SFP-13
ⓖ	N-4K

ⓗ	Switch PCB Ass'y	P/N Q7150-5007A
ⓘ	Sensor Harness B Unit	P/N Q7150-5165U

4-2. Tools, Oils, and Detergent Required

Tools required :
1. No. 2 or #2 Phillips screwdriver
2. No. 1 or #1 Phillips screwdriver
3. Standard blade type screwdriver with a tip thickness of 1mm or less
4. Tweezers (for small parts)

Oils required :
1. YM-103 (The blade part of Cam and Cam B, Cam C, Shaft of Platen Plate)
2. SFP-13 (Shaft of Cam B, Cam Shaft)
3. N-4K (Guide Shaft)

Detergent required :
1. Alcohol (for cleaning the parts)
   *To clean the parts, moisten a soft cloth with alcohol and wipe. Do not dip the parts directly into alcohol.

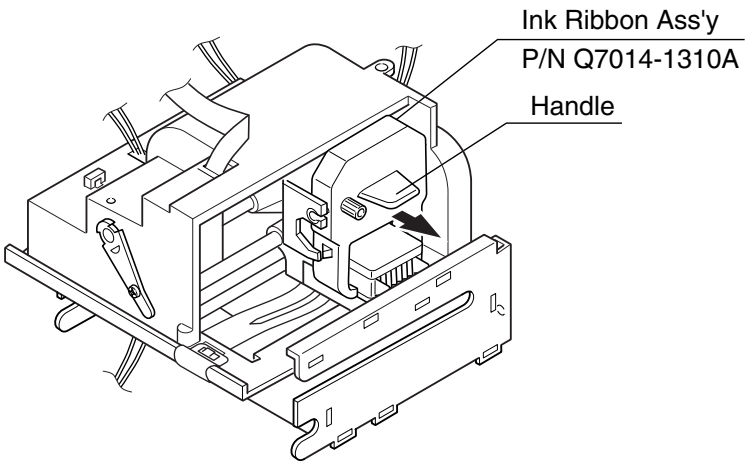
4-3. Disassembly

Disassemble the parts in the following order :

(1)	Ink Ribbon Ass'y	(1)
(2)	Head Holding Plate	(1) – (2)
	Print Head	
(3)	Platen Cover	(1) —— (3)
(4)	Platen Gear	(1) —— (3) – (4)
	Cam Gear	
	Mid Gear	
	Base Plate Ass'y	
	Spacer	
(5)	Bearing	(1) – (2) – (3) – (4) – (5)
	Guide Shaft	
	Carrier Ass'y	
	Carrier Spring	
	Carrier Sub Plate	
	Ribbon Driving Wheel	
	Clutch Gear	
	Ribbon Driving Shaft	
(6)	Lead Screw Shaft	(1) —— (3) – (4) – (5) – (6)
	Cam	
	Cam B	
	Tractor Shaft Spring	
	Bearing	
(7)	Sensor Harness B Unit	(1) —— (3) – (4) ———— (7)
(8)	Motor Ass'y	(1) —— (3) – (4) ———— (7) – (8)
(9)	Sheet	(1) —— (3) – (4) ———————— (9)
(10)	Platen Ass'y	(1) —— (3) ———————————— (10)
	Cam Shaft	
	Platen Gear B	
	Cam C	
	Platen Plate	
	Platen Plate Spring	
(11)	Sensor Block	(1) —— (3) ———————————— (10) – (11)
	Sensor Lever	
	Switch PCB Ass'y	
(12)	Stopper A	(1) —— (3) – (4) ———————— (9) – (10) ——— (12)
	Reinforcing Plate	
	Paper Pressure Plate Ass'y	
	Bottom Plate	

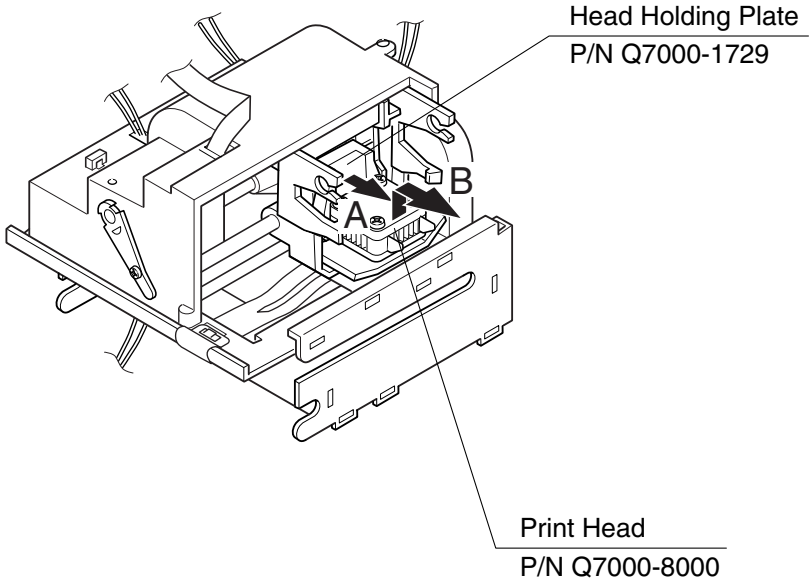
(1) Removing the Ink Ribbon Ass'y

1. Hold the handle of the Ink Ribbon Ass'y and remove it by pulling sideways.



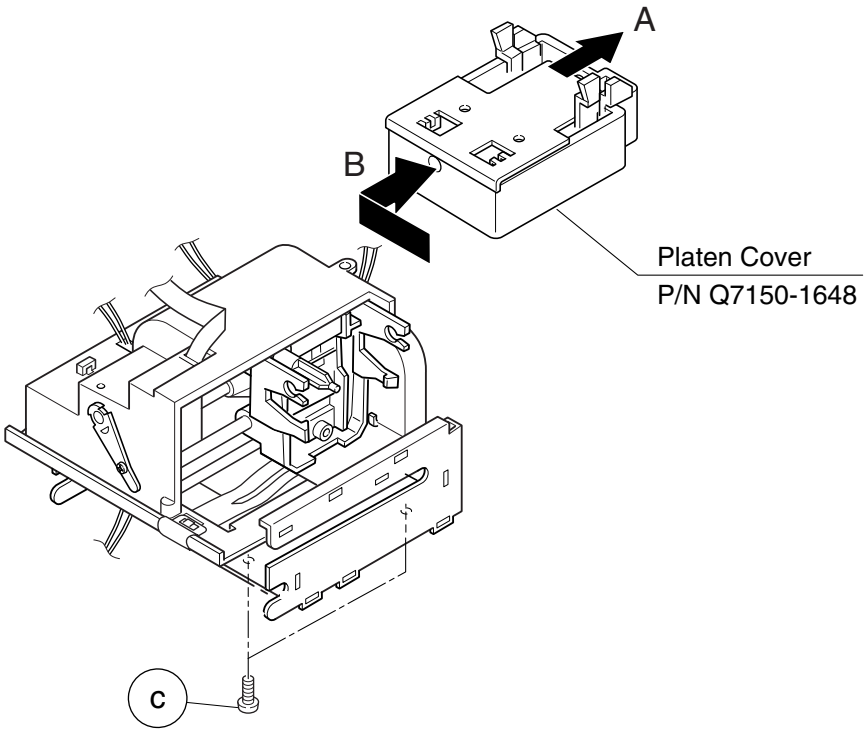
(2) Removing the Head Holding Plate and Print Head

1. Put the Head Holding Plate in the direction of arrow A with a screwdriver or tweezers and remove it.
2. Pull up the Print Head and remove it in the horizontal direction as shown by arrow B.



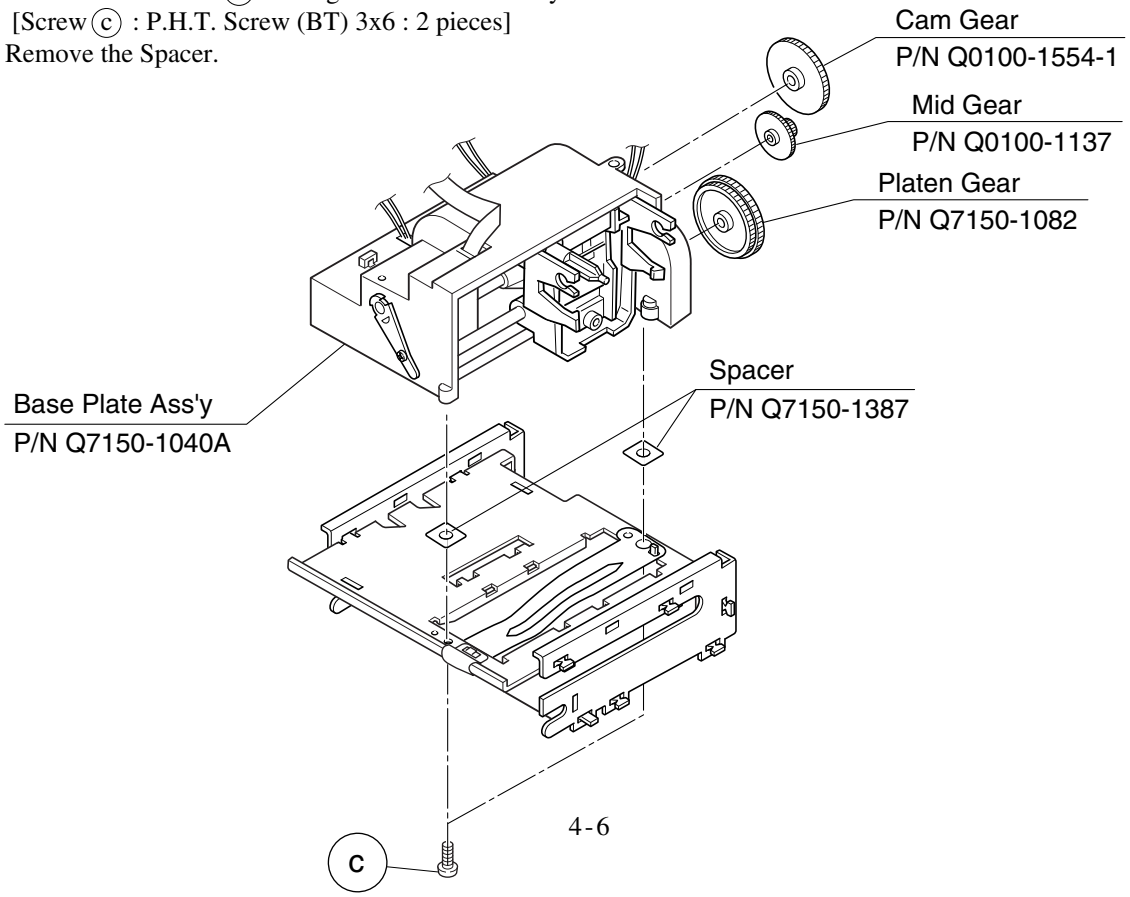
(3) Removing the Platen Cover

1. Remove two screws ⓒ holding the Platen Cover and move the Sensor Block in the direction shown by arrow A so as to slide the Platen Cover in the direction shown by arrow B for removal.
   [Screw ⓒ : P.H.T. Screw (BT) 3x6 : 2 pieces]
   *Carry out the procedure with the Platen Ass'y pressed downward. (Rotate the Cam Shaft to press down the Platen Ass'y. As the Platen Ass'y moves just underneath, it will emit a click sound.)



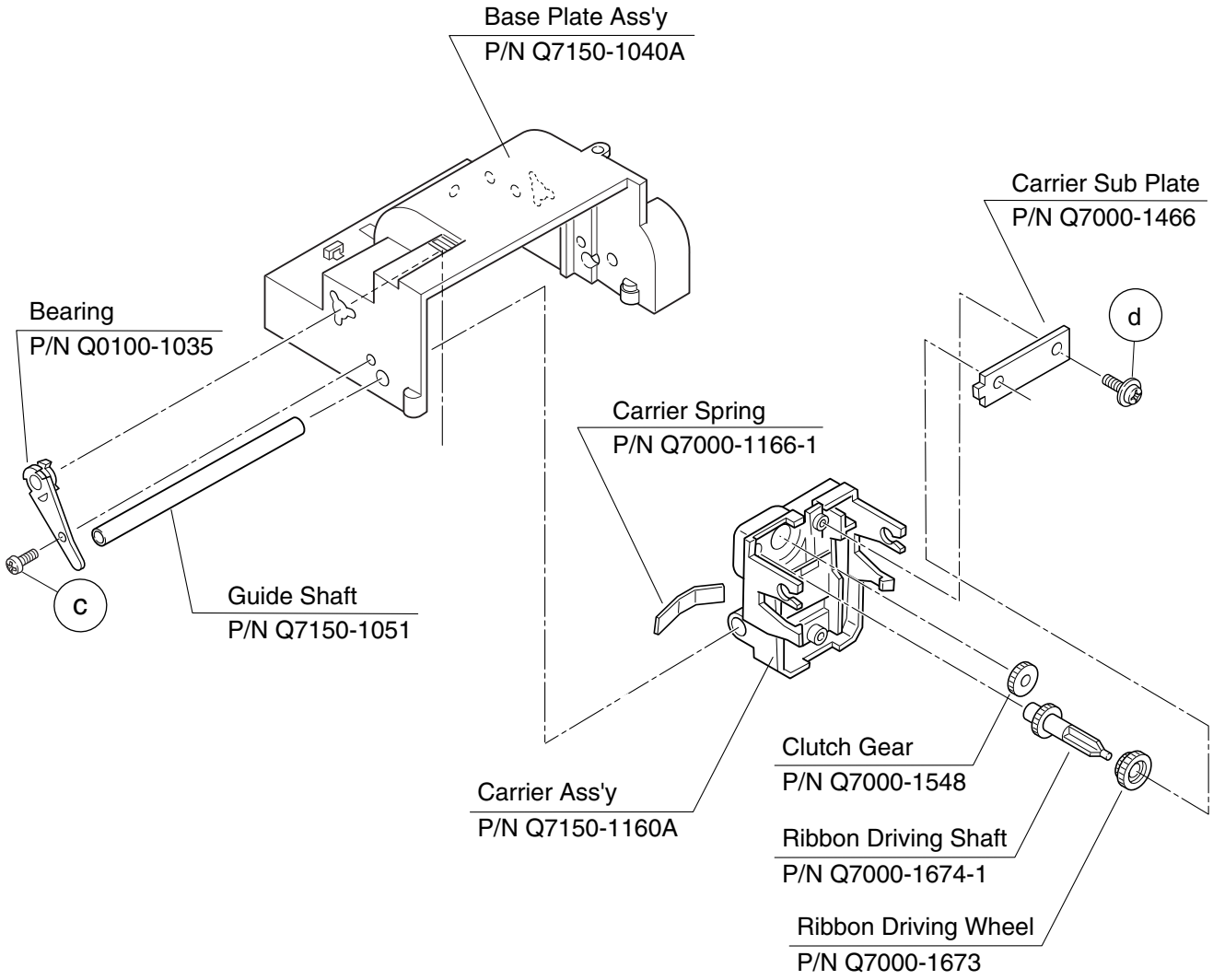
(4) Removing the Platen Gear, Cam Gear, Mid Gear, Base Plate Ass'y, and Spacer.

1. Remove the Platen Gear, Cam Gear, Mid Gear.
2. Remove two screws ⓒ holding the Base Plate Ass'y.
   [Screw ⓒ : P.H.T. Screw (BT) 3x6 : 2 pieces]
3. Remove the Spacer.



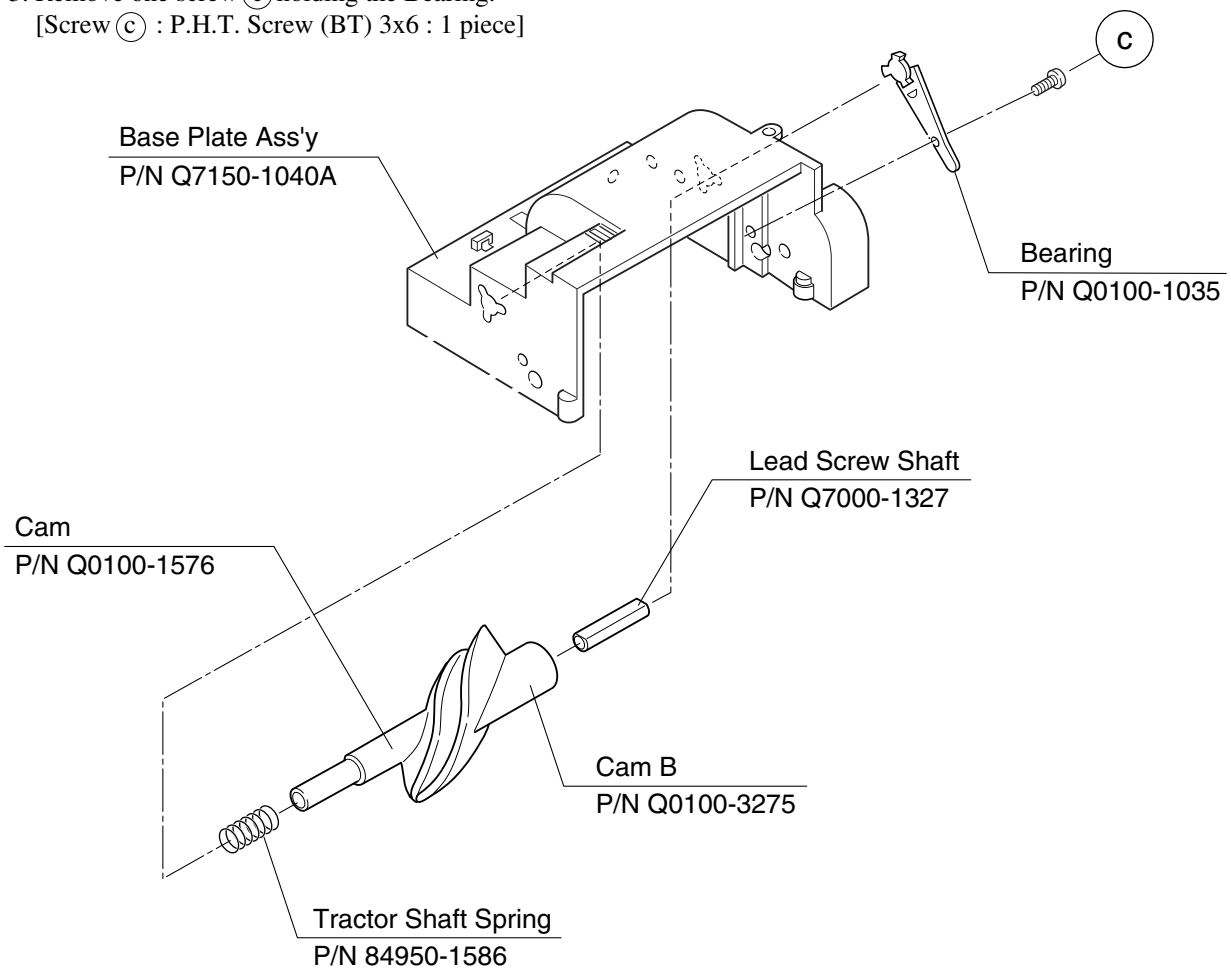
(5) Removing the Bearing (this side), Guide Shaft, Carrier Ass'y, Carrier Spring, Carrier Sub Plate, Ribbon Driving Wheel, Clutch Gear, and Ribbon Driving Shaft.

1. Remove one screw ⓒ holding the Bearing (this side).
   [Screw ⓒ : P.H.T. Screw (BT) 3x6 : 1 piece]
2. Remove the Guide Shaft from the Base Plate Ass'y.
3. Remove the Carrier Ass'y from the Base Plate Ass'y.
4. Remove the Carrier Spring from the Carrier Ass'y.
5. Remove one screw ⓓ holding the Carrier Sub Plate.
   [Screw ⓓ : P.H.T. Screw (BT) 3x6, PW : 1 piece]
6. Remove the Ribbon Driving Wheel, Clutch Gear, and Ribbon Driving Shaft.



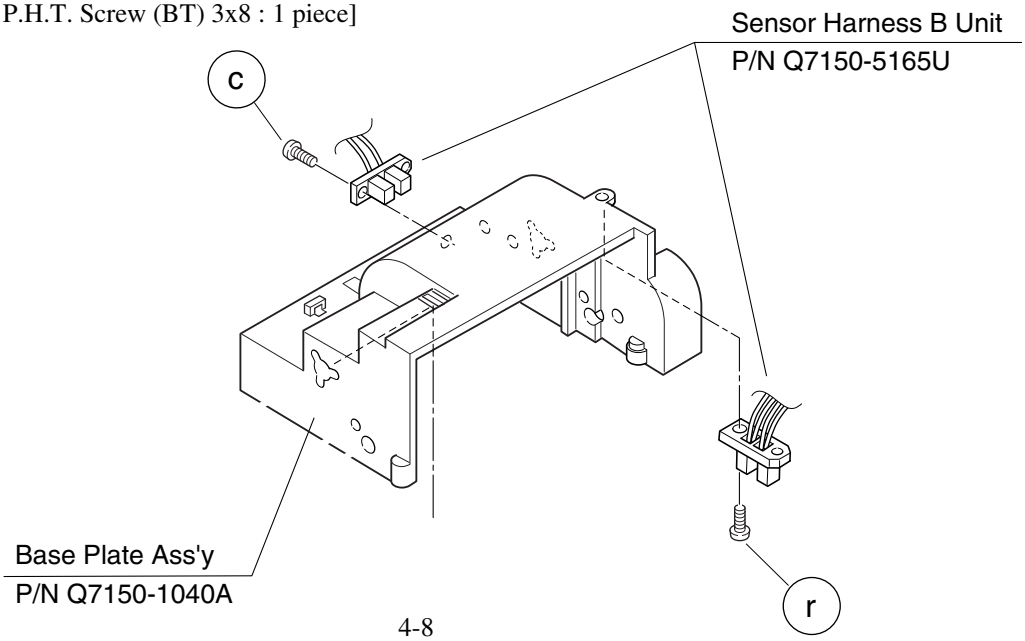
(6) Removing the Lead Screw Shaft, Cam, Cam B, Tractor Shaft Spring, and Bearing

1. Pull out the Lead Screw Shaft from the Cam B
2. Remove the Cam, Cam B, and Tractor Shaft Spring.
3. Remove one screw (c) holding the Bearing.
   [Screw (c) : P.H.T. Screw (BT) 3x6 : 1 piece]



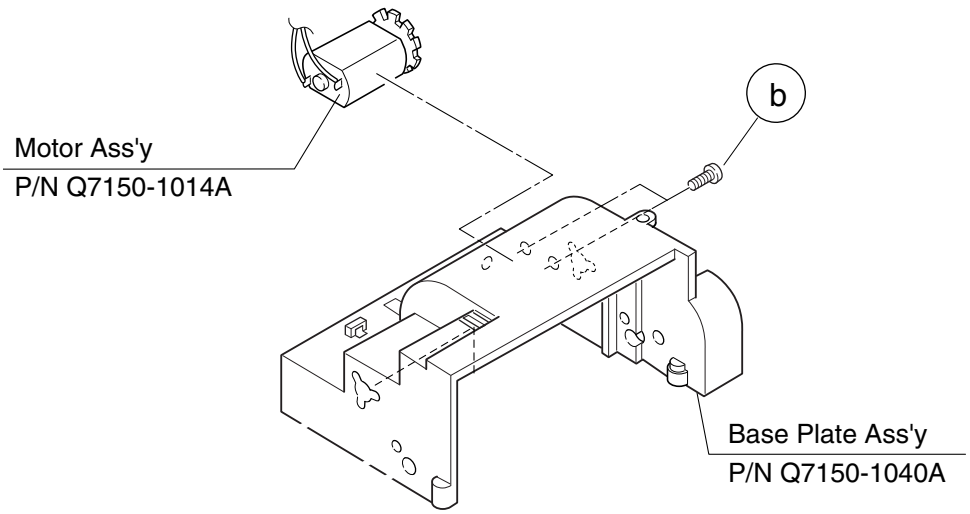
(7) Removing the Sensor Harness B Unit

1. Remove one screw (c) and one screw (r) holding the Sensor Harness B Unit
   [Screw (c) : P.H.T. Screw (BT) 3x6 : 1 piece]
   [Screw (r) : P.H.T. Screw (BT) 3x8 : 1 piece]



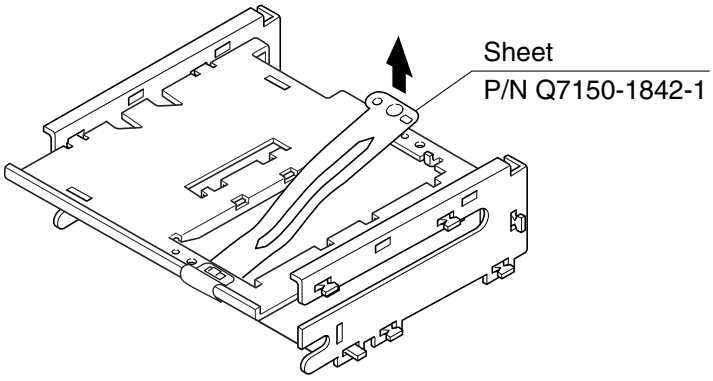
(8) Removing the Motor Ass'y

1. Remove two screws ⓑ holding the Motor Ass'y.
   [Screw ⓑ : P.H. Screw M2.6x5 : 2 pieces]



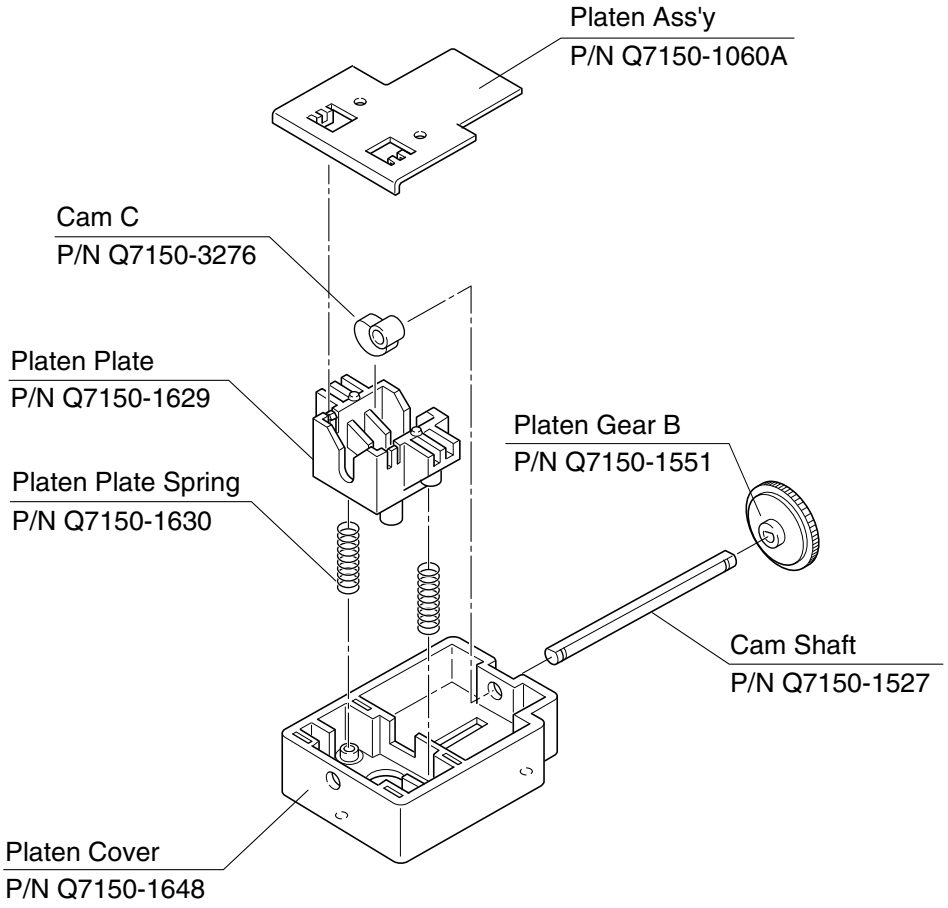
(9) Removing the Sheet

1. Remove the Sheet.



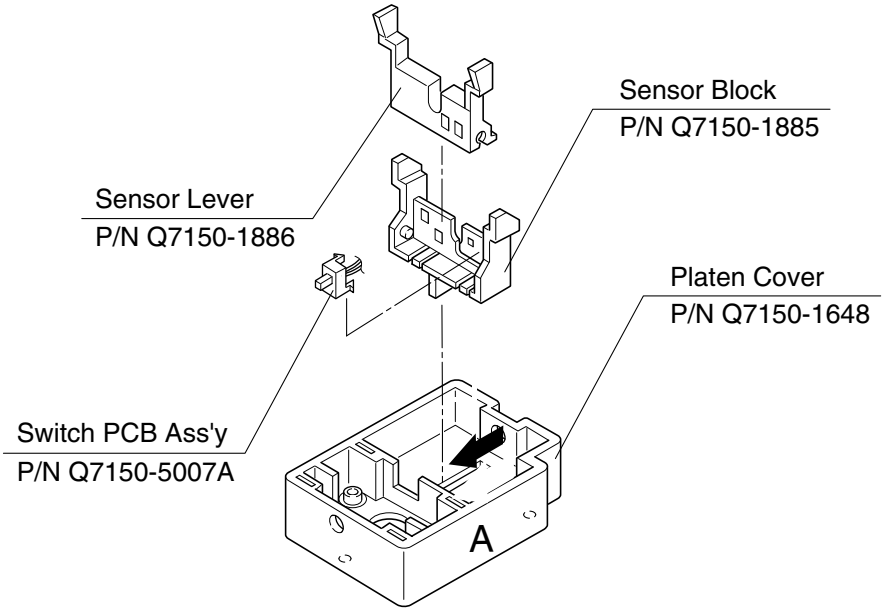
(10) Removing the Platen Ass'y, Cam Shaft, Platen Gear B, Cam C, Platen Plate, and Platen Plate Spring

1. Remove the Platen Ass'y by releasing the hook of the Platen Plate.
   *Do not peel off the tapes adhering the Platen Ass'y.
2. Pull out the Cam Shaft by pressing down the Platen Plate, and remove the Platen Gear B.
3. Remove the Cam C, Platen Plate, and Platen Plate Spring.



(11) Removing the Sensor Block, Sensor Lever, and Switch PCB Ass'y

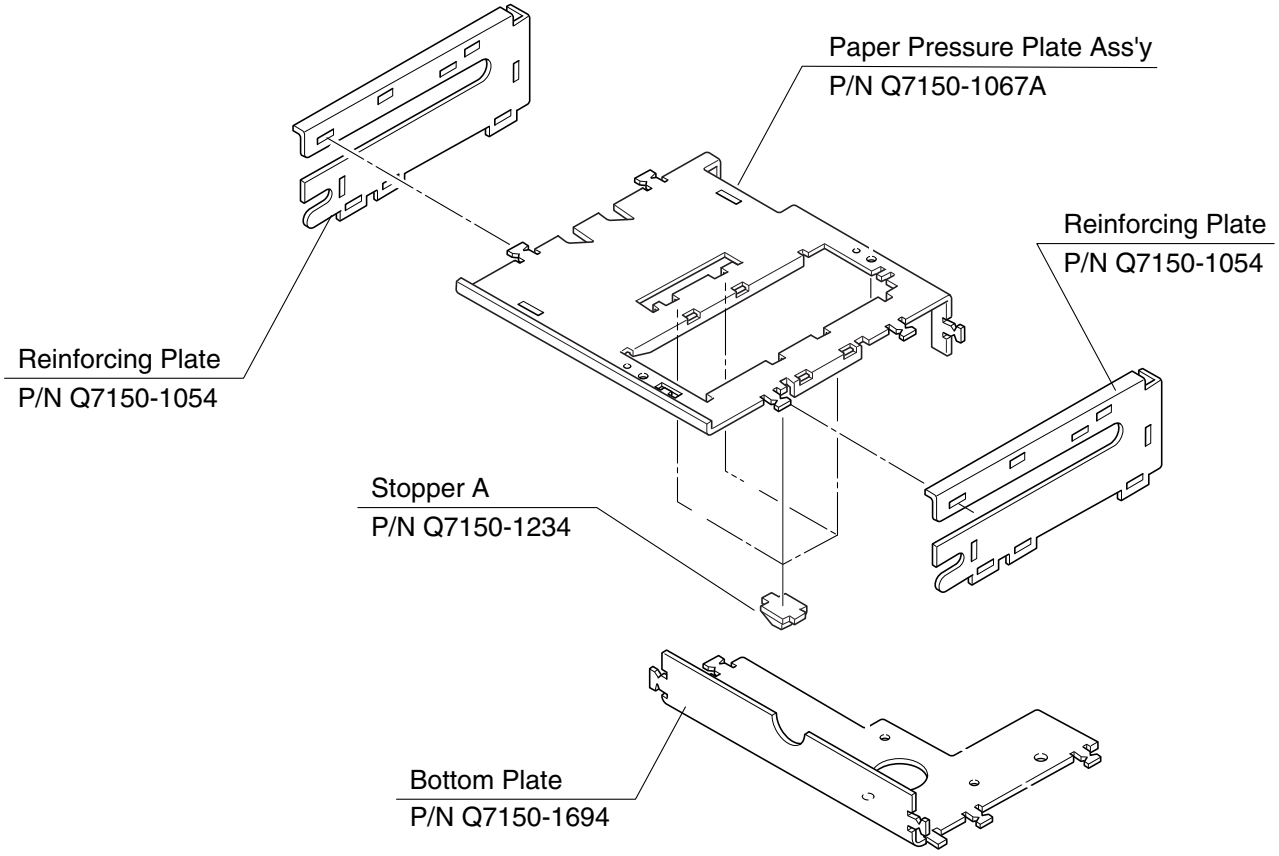
1. Move the Sensor Block in the direction shown by arrow A and remove it from the Platen Cover while pulling it upward.
2. Remove the Sensor Lever with tweezers
3. Release the hook part of the Sensor Block and remove the Switch PCB Ass'y.



(12) Removing the Stopper A, Reinforcing Plate, Paper Pressure Plate Ass'y, and Bottom Plate

1. Remove the Stopper A with tweezers.
2. Do not disassemble the Reinforcing Plate, Paper Pressure Plate Ass'y and Bottom Plate unless its removal is necessary.

*Do not peel off the tapes adhering the Paper Pressure Plate Ass'y.



4- 4. Reassembly

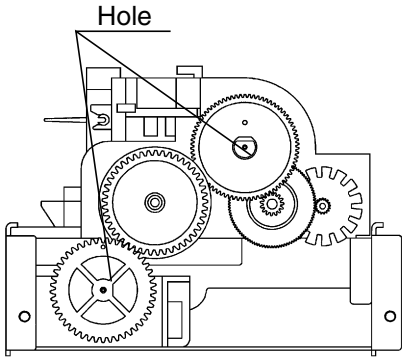
Reassembly of parts is performed by reversing the disassembly procedure.
Note the following points :

(1) Properly lubricate all parts that require lubrication.

(2) Bundle harnesses firmly and accurately enough to avoid interference with gears

(3) Lastly install the Platen Gear B as follows (See the drawing):
- Match the Cam Gear and the hole of the Base Plate Ass'y.
- Place the hole of the Platen Gear B facing straight upward. As it comes into the upright position, it will emit a clicking sound. At this time, the Platen Ass'y is at the lowered position.

(4) Check the following sliding parts :
1. Gears
2. Cam and Cam B
3. Carrier Ass'y
4. Platen Cover and Sensor Block
5. Sensor Block and Sensor Lever
6. Platen Block



(5) Check clearances in the following parts :
1. Cam and Cam B (right and left)
2. Carrier Ass'y (rack engagement)
3. Platen Plate

(6) Check for backlash between gears.

(7) Attach spring parts firmly at their right places to ensure the spring works properly.
*Attach the Carrier Spring so that their faces contact the Guide Shaft.

(8) Attach two sensors of the Sensor Harness B Unit firmly at their right places
*The one with a longer harness is the home position sensor, while the one with a shorter harness is the encoder sensor.

(9) When attaching hook-shaped parts, be sure that the hook parts are firmly attached.

(10) Direct the Cam C in the proper direction when installing it.

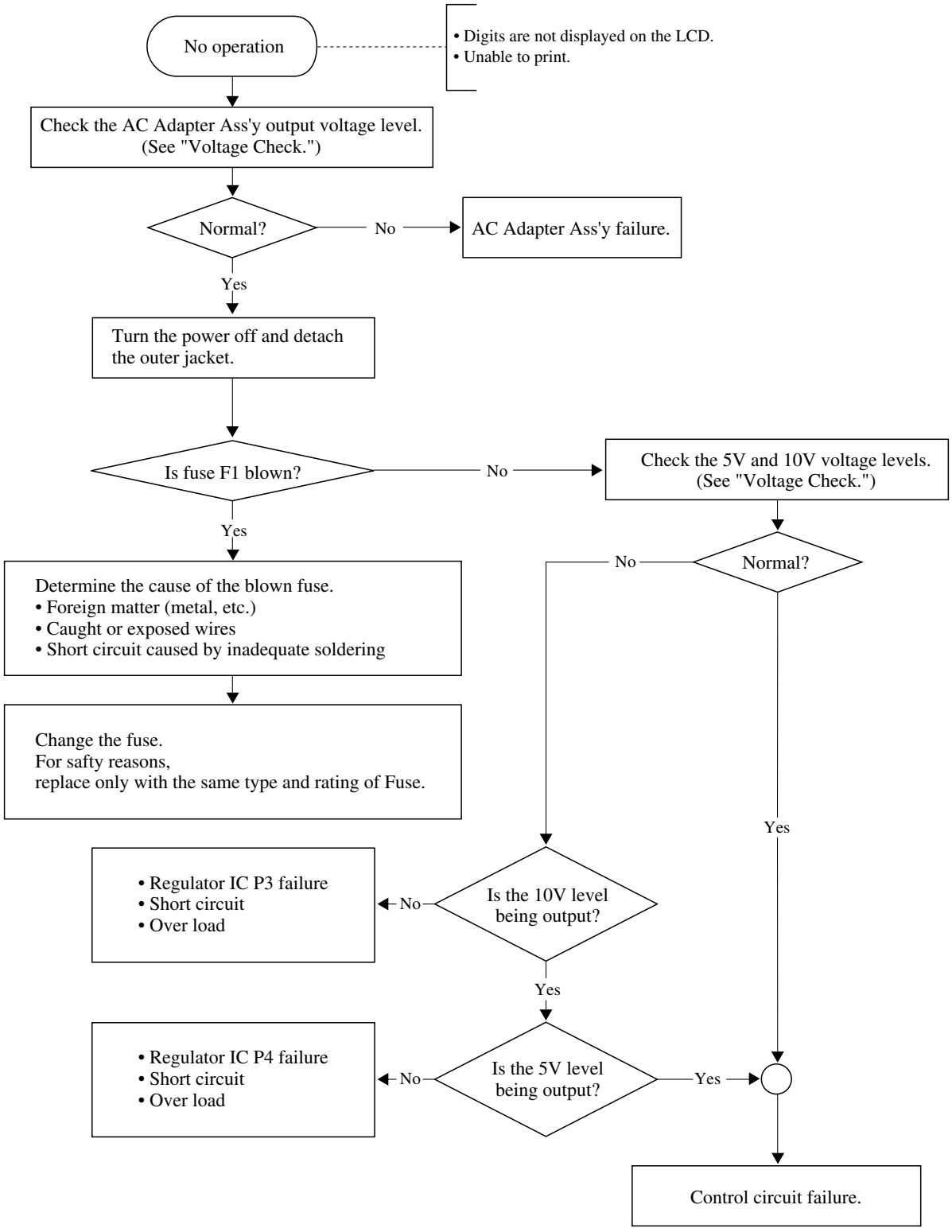
(11) When installing the FPC of the Print Head on the Base Plate Ass'y, check to see if the installation length of the FPC is appropriate or not by moving the Carrier laterally.

(12) When assembling the harness of Switch PCB Ass'y to the Platen Cover, be sure that the Sensor Block operates to the proper range.

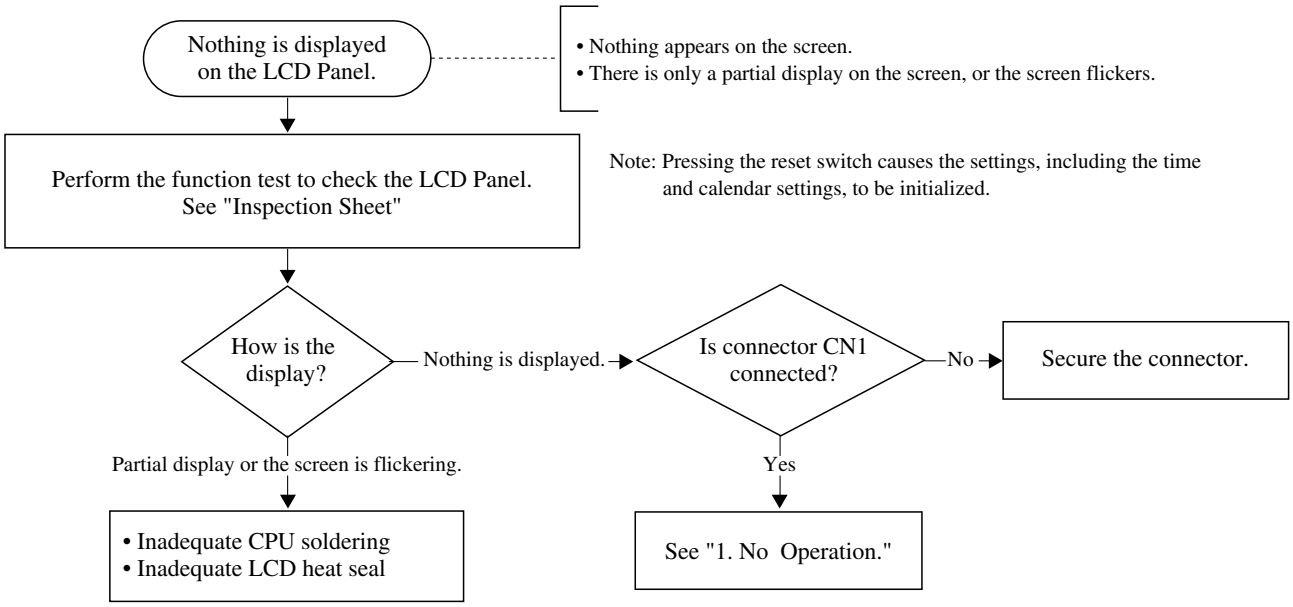
5. TROUBLESHOOTING

CONTENTS

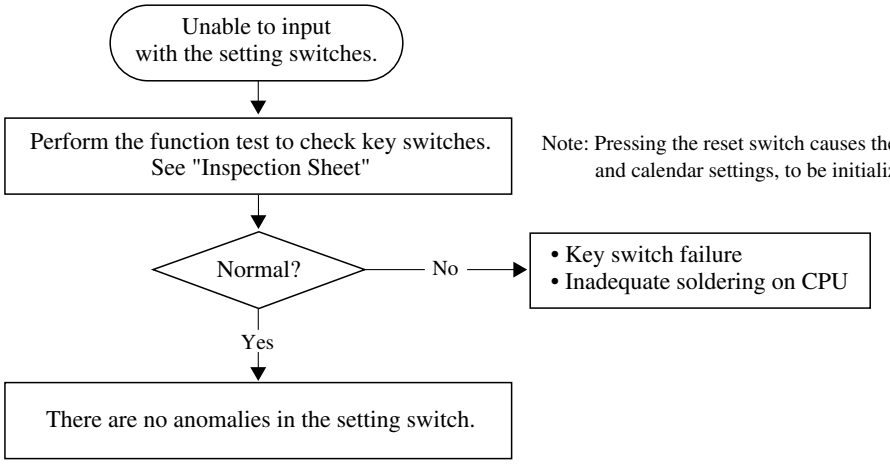
5-1. No Operation



5-2. No Display on the LCD Panel

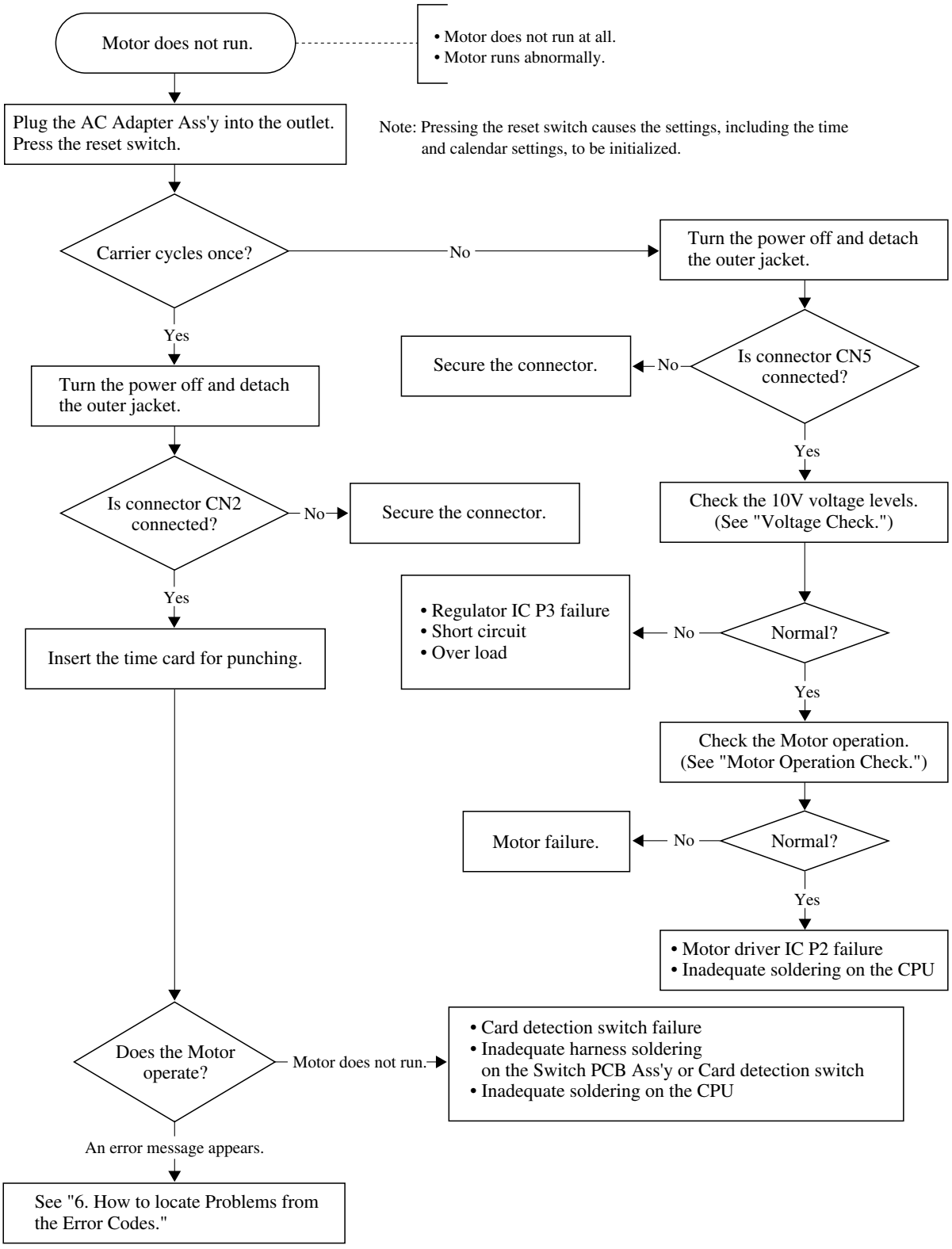


5-3. Setting Switch Malfunctioning

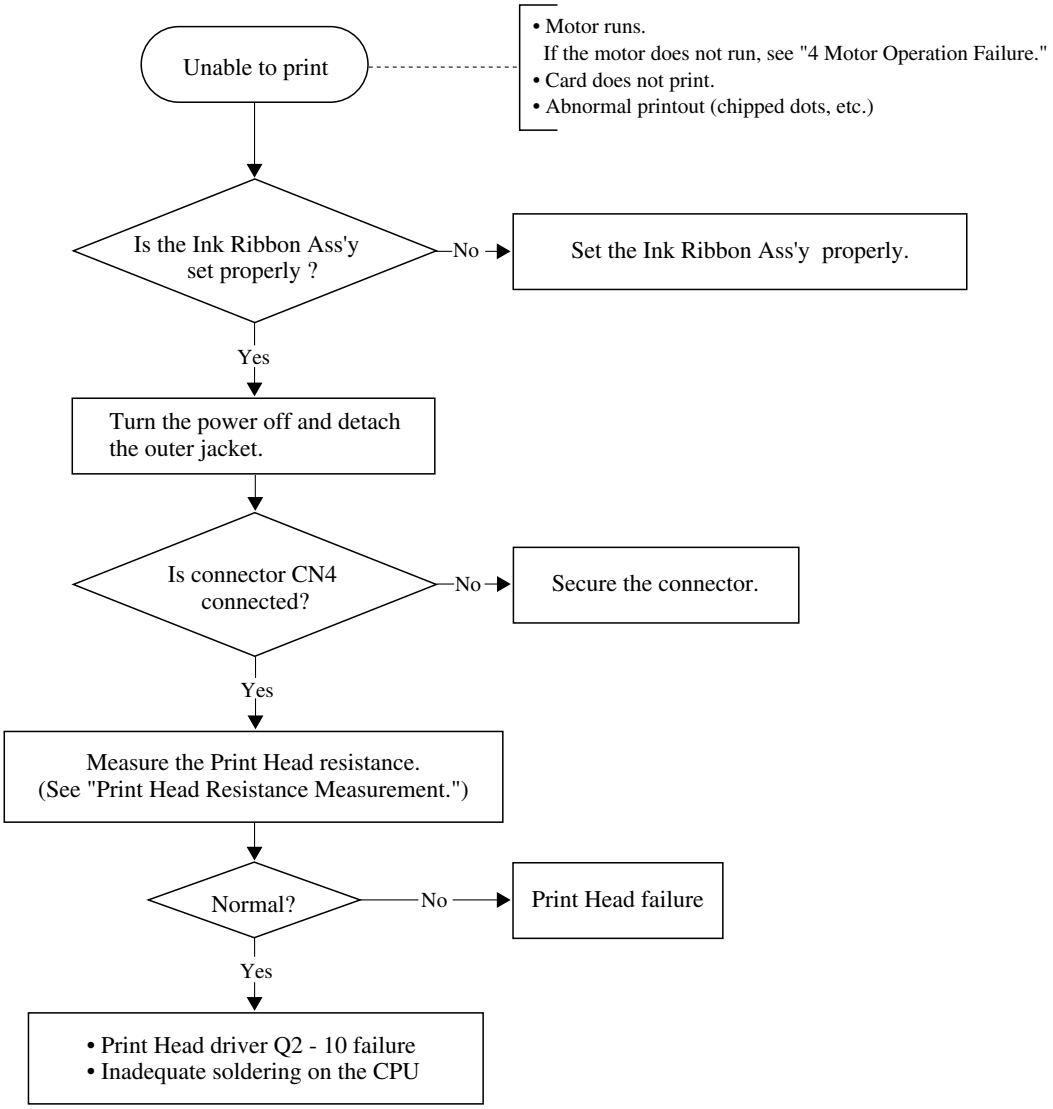


Note: Pressing the reset switch causes the settings, including the time and calendar settings, to be initialized.

5-4. Motor Operation Failure

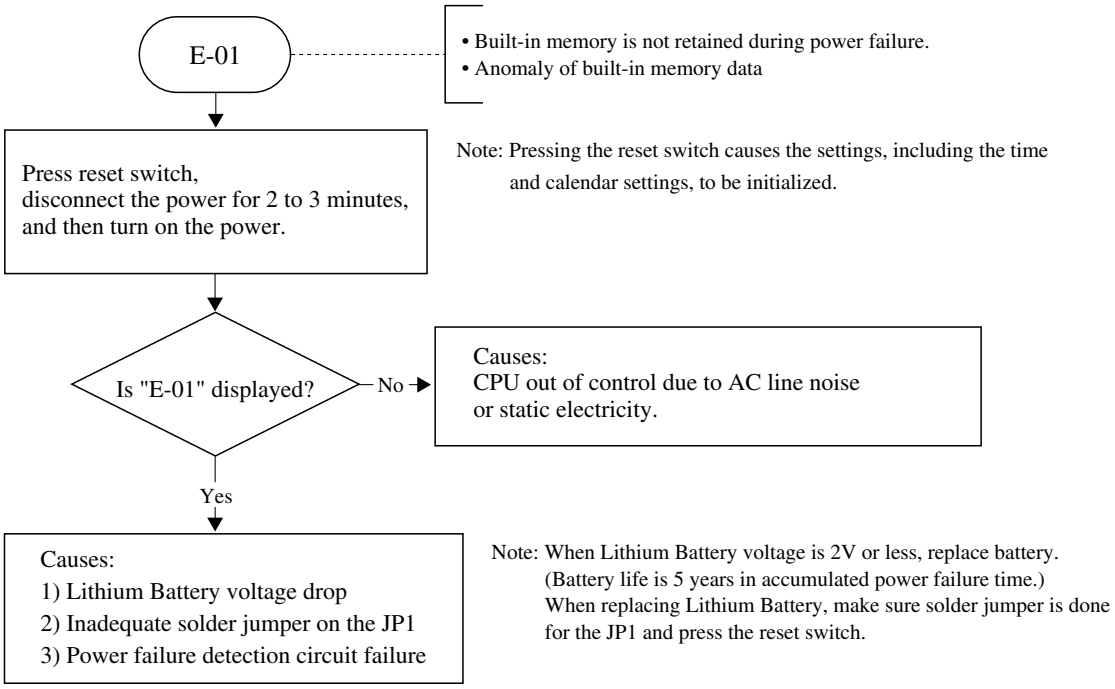


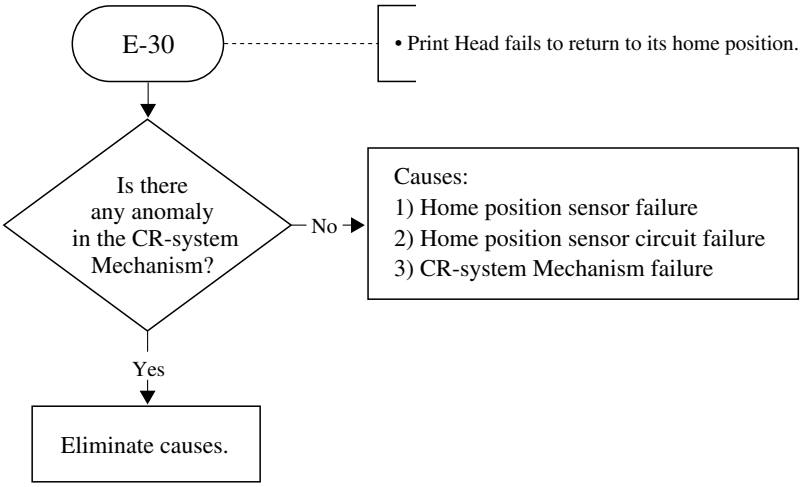
5-5. No Printing

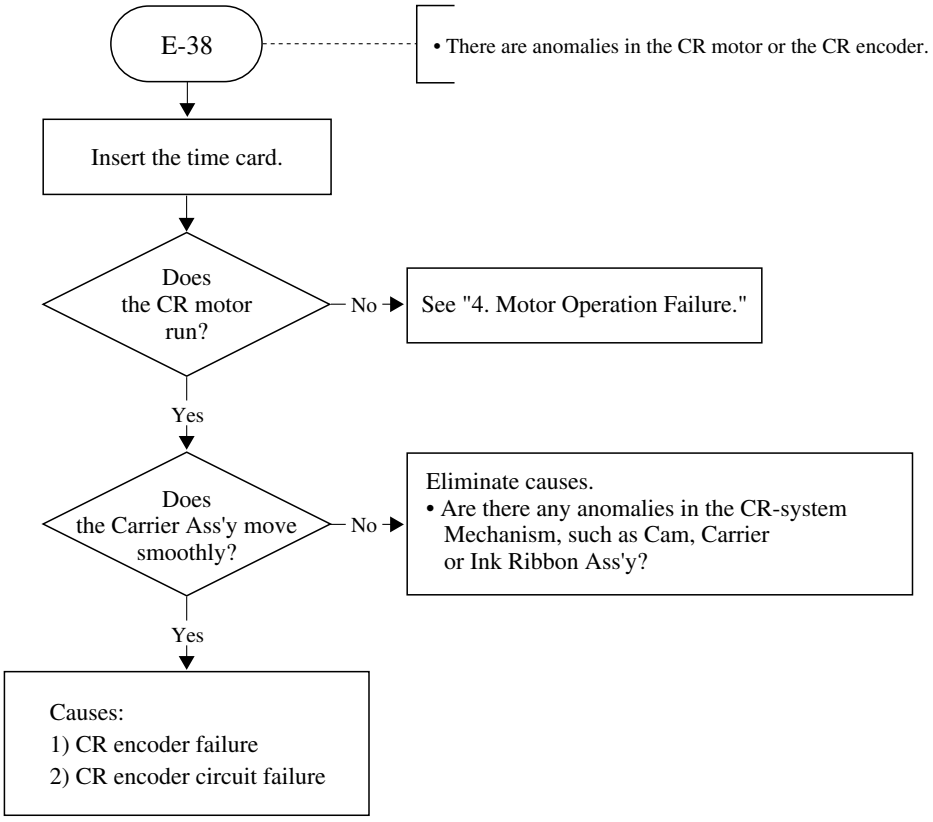


Note: If the Print Head resistance is less than the prescribed value, the Print Head driver is probably defective. You will also need to change the corresponding drivers (Q2 - 10).

5-6. How to locate Problems from the Error Codes






E-38
• There are anomalies in the CR motor or the CR encoder.
Insert the time card.
Does the CR motor run?
No
See "4. Motor Operation Failure."
Yes
Does the Carrier Ass'y move smoothly?
No
Eliminate causes.
• Are there any anomalies in the CR-system Mechanism, such as Cam, Carrier or Ink Ribbon Ass'y?
Yes
Causes:
1) CR encoder failure
2) CR encoder circuit failure

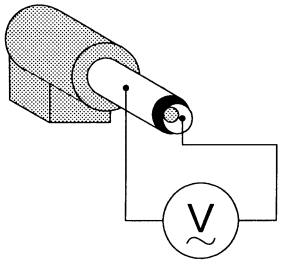
6. MEASUREMENT

CONTENTS

6-1. Voltage Check

• AC Adapter Ass'y
Measure the voltage at the AC Adapter Ass'y plug.

Measuring point	Target voltage	Measuring conditions
Outside metal ⟷ Inside metal	17.6VAC ± 15%	AC Adapter Ass'y plugged in.



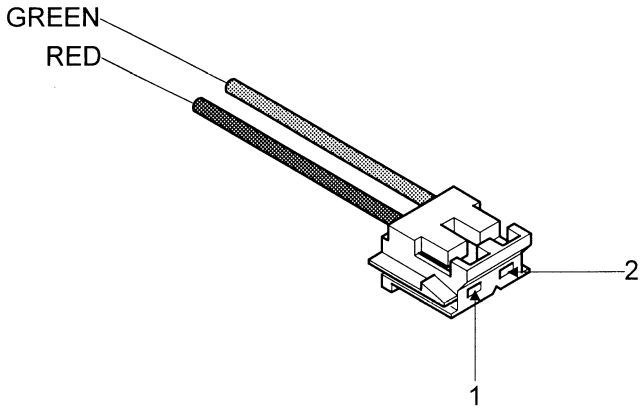
• Control PCB Ass'y
Use test pin land TP2, 3, and 5 to measure voltage.

Measuring point	Target voltage	Measuring conditions
10V (TP2) ⟷ GND (TP5)	10.85VDC ± 6%	AC Adapter Ass'y plugged in.
5V (TP3) ⟷ GND (TP5)	5VDC ± 5%	AC Adapter Ass'y plugged in.

6-2. Motor Operation Check

Apply voltage as follows to the harness inserted to the connector CN5 and check whether the Motor runs properly.

Motor	Movement	Voltage applied	
		Pin 1 (red)	Pin 2 (green)
CR motor	Print Head is fore-and-aft and Platen Ass'y is up-and-down.	GND	9VDC

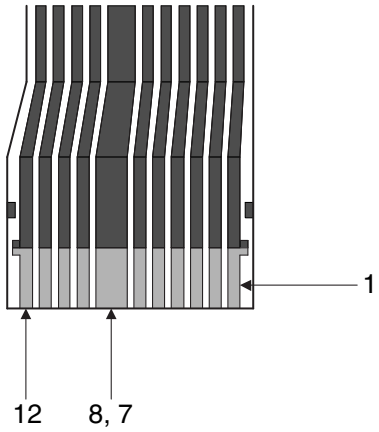


6-3. Print Head Resistance Measurement

Measure the Print Head resistance at the terminals with the FPC harness inserted to the CN4.

Measuring point	Target resistance
1 ⟷ 8	Open
2 ⟷ 8	2.35 ± 0.2
3 ⟷ 8	2.35 ± 0.2
4 ⟷ 8	2.35 ± 0.2
5 ⟷ 8	2.35 ± 0.2
6 ⟷ 8	2.35 ± 0.2
7 ⟷ 8	Short
9 ⟷ 8	2.35 ± 0.2
10 ⟷ 8	2.35 ± 0.2
11 ⟷ 8	2.35 ± 0.2
12 ⟷ 8	2.35 ± 0.2

Note: If the Print Head resistance is smaller than the value shown on the left, there is a possibility that the Print Head pin driver is broken. In that case, replace Print Head and check drivers Q2 - 10.



7. CONTROL CIRCUIT OPERATION

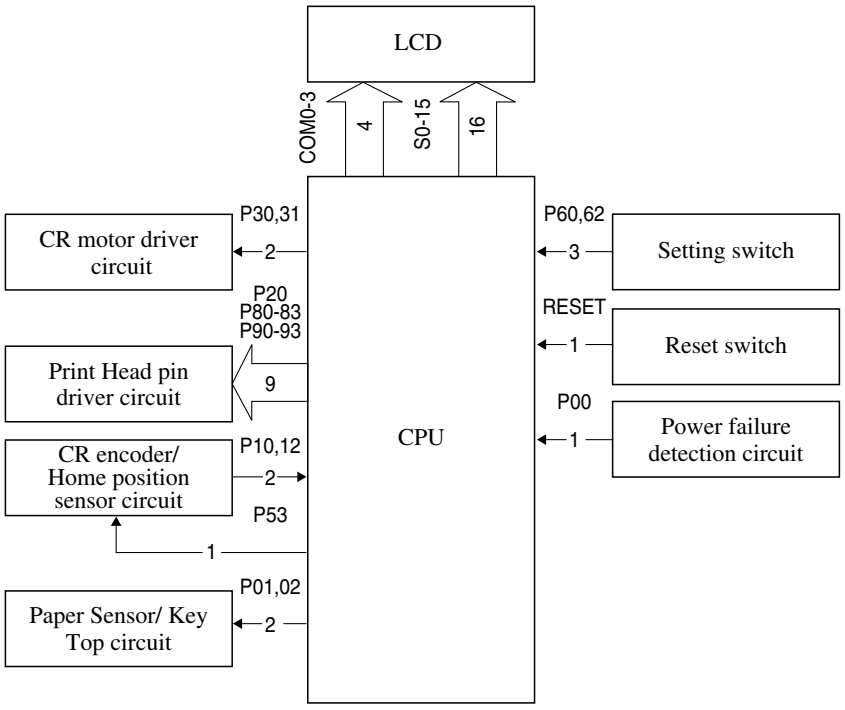
CONTENTS

7-1. Control Circuit

The control circuit consists of the following:

Control PCB Ass'y
- CPU
- LCD
- Setting switch
- Reset switch
- Sensor circuit
- Encoder circuit
- CR motor driver circuit
- Print Head pin driver circuit
- Power failure detector circuit

7-2. Block Diagram of Circuits



7-3. CPU

• 4-bit single-chip microcomputer μPD753108GC(NEC product)
• Equipped with 8,192 x 8 bit ROM and 512 x 4bit RAM
• Main system clock is a 4.19 MHz ceramic oscillator.
  Subsystem clock is a 32.768 kHz crystal oscillator.
  Equipped with LCD controller/driver.

7-4. Port List

Name	No. of Pins	I/O	Function	
P00/INT4	25	I	$\overline{\text{PWF}}$	Power failure detection
P01/$\overline{\text{SCK}}$	26	I	$\overline{\text{PS}}$	Paper Sensor
P02/SO/SB0	27	I	$\overline{\text{PB}}$	Key Top
P03/SI/SB1	28	I	-	Unused
P10/INT0	29	I	ENC	CR encoder
P11/INT1	30	I	-	Unused
P12/INT2/TI1/TI2	31	I	SH	Home position sensor
P13/TI0	32	I	-	Unused
P20/PT00	33	O	PIN9	Pin9
P21/PT01	34	O	-	Unused
P22/PCL/PT02	35	O	-	Unused
P23/BUZ	36	O	$\overline{\text{BUZ}}$	Clock trimming
P30/LCDCL	5	O	CR0	CR motor control 0
P31/SYNC	6	O	CR1	CR motor control 1
P32	7	O	-	Unused
P33	8	O	-	Unused
P50	10	O	-	Unused
P51	11	O	-	Unused
P52	12	O	-	Unused
P53	13	O	$\overline{\text{ESN}}$	Sensor enable
P60/KR0	14	I	$\overline{\text{SEL}}$	SELECT switch
P61/KR1	15	I	$\overline{\text{CHG}}$	CHANGE switch
P62/KR2	16	I	$\overline{\text{SET}}$	SET switch
P63/KR3	17	I	-	Unused
S23/P80	37	O	PIN8	Pin8
S22/P81	38	O	PIN7	Pin7
S21/P82	39	O	PIN6	Pin6
S20/P83	40	O	PIN5	Pin5
S19/P90	41	O	PIN4	Pin4
S18/P91	42	O	PIN3	Pin3
S17/P92	43	O	PIN2	Pin2
S16/P93	44	O	PIN1	Pin1

7-5. Operation Mode

Operation mode and functions are as follows:

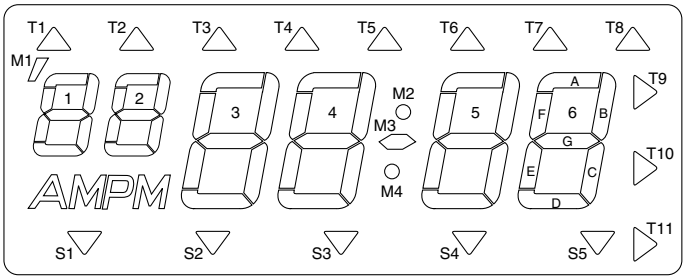
	A	B
Operation state	Normal operation All functions operation	Power failure operation Time update Memory retention only
AC power	ON	OFF
CPU state (clock)	Operation mode (4.19 MHz)	Halt mode (32.768 kHz)
$\overline{\text{PWF}}$ (P00)	H	L

When a power failure causes the output voltage of the 10V-regulator IC to drop below about 7V, $\overline{\text{PWF}}$(P00) is set to "L."
This allows the unit to enter into Mode B.

7-6. LCD

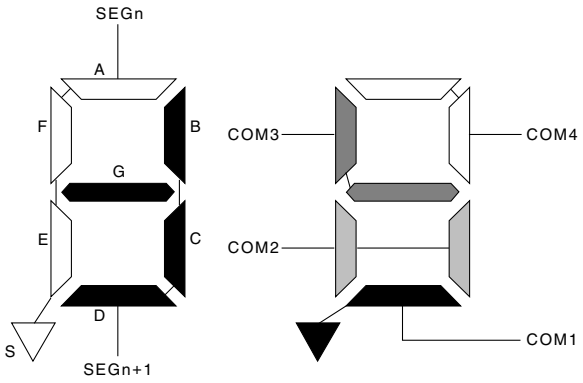
• LCD specifications

Operating voltage	5V
Lighting method	Reflective type
Viewing direction	6:00
Operating method	1/4 duty, 1/3 bias,128 Hz



• Pin table

Pin No.	COM1	COM2	COM3	COM4	
1	T7	T6	T5	T4	SEG1
2	M1	T1	T2	T3	SEG2
3	AM	1E	1F	1A	SEG3
4	1D	1C	1G	1B	SEG4
5	PM	2E	2F	2A	SEG5
6	2D	2C	2G	2B	SEG6
7	S1	3E	3F	3A	SEG7
8	3D	3C	3G	3B	SEG8
9	S2	4E	4F	4A	SEG9
10	4D	4C	4G	4B	SEG10
11	S3	M4	M3	M2	SEG11
12	S4	5E	5F	5A	SEG12
13	5D	5C	5G	5B	SEG13
14	S5	6E	6F	6A	SEG14
15	6D	6C	6G	6B	SEG15
16	T11	T10	T9	T8	SEG16
17	COM1	-	-	-	-
18	-	COM2	-	-	-
19	-	-	C0M3	-	-
20	-	-	-	COM4	-



7-7. Switch

The switch state is input the port below.
Switch state: L ..... ON, H ..... OFF

$\overline{PS}$(P01): Paper Sensor
Detects presence of a card.
Normally "off". When a card is put in, it pushed a sensor lever, it turn a sensor to "on".
$\overline{PB}$(P02): Key Top
For manual printing.
Normally "off". When the Key Top is pressed, it turn a switch to "on".
$\overline{SEL}$(P60/KR0): SELECT switch
Setting switch.
Normally "off". When a switch is pressed, it turn a switch to "on".
$\overline{CHG}$(P61/KR1): CHANGE switch
Setting switch.
Normally "off". When a switch is pressed, it turn a switch to "on".
$\overline{SET}$(P62/KR2): SET switch
Setting switch.
Normally "off". When a switch is pressed, it turn a switch to "on".

7-8. Sensor

Set $\overline{ESN}$(P53) to "L" to allow the sensor infrared LED to glow and make the sensor state readable.
Sensor state: L ..... light-passing, H ..... shading.

SH(P12/INT2) : Home position sensor
Detects the home position of the Print Head.

7-9. Encoder

Set $\overline{ESN}$(P53) to "L" to allow the sensor infrared LED to glow and make the encoder state readable.
Encoder state: L ..... light-passing, H ..... shading.

ENC(P10/INT0) : CR encoder
Detects the revolution of CR motor.

7-10. Motor

The CR motor CCW to cause the Cam to rotate, allowing the Print Head to move.
The motor operation mode is controlled by CR0 (P30) and CR 1 (P31).

Operation mode	CR0	CR1
Stand-by	L	L
CW	H	L
CCW	L	H
Brake	H	H

7-11. Print Head

A pin will impact when PIN1-9 (P20, P80-83, P90-93) is set to "H".
The record is printed when the Print Head is moving to the front.

Driving voltage: 9.5V±10%
Print Head pin impact time: 380μs, 400μs, 420μs (Variable)

Printing method	Impact serial dot matrix
Ribbon life	Violet, over 0.51 million characters or 1 year: provided the ribbon is used at normal temperature and humidity within 1 year from the date of manufacture.
Character dot composition	9 dots (H) x 7 dots (W)
Print Head life	Over 2.8 million characters

8. POWER SUPPLY CIRCUIT

(on Control PCB Ass'y)

1. 14-19Vac is provided from AC Adapter Ass'y to the connector CN6.

2. 14-19Vac is provided to DB1 after removing noise due to FB1 and FB2. And being rectified by DB1 and smoothed by C16 and C17 and is provided to regulator P3 that regulates into 10Vdc.

3. 10Vdc drives the pins and the motor.

4. And 10Vdc is regulated to 5Vdc by regulator P4. 5Vdc is supplied to the control circuit.

9. INSPECTION SHEET

Inspection Item	Inspection Method	Inspection Standard
Turn On	• Insert the AC Adapter Ass'y to the AC power outlet. • Press the reset switch.	 • Make sure initial operation was made and the display indicates the time at 12:00 a.m.
LCD Check	• Press the SELECT and reset switch simultaneously. • Press the SET switch. • Press the SET switch. • Each pressing of the SET switch causes the LC to glow in this following order. PASSWORD→none→D.S.T.END → D.S.T.START→PRINT DIRECTION → none→none→LANGUAGE→COMMENT →LEADING ZERO→HOUR MIN. → YEAR DIGIT→PRINT ORDER→HOUR →DATE→TIME '→AM→PM →: → → • Repeated pressing of the SET switch causes the display to change as follows. 00 0000→ 11 1111→ 22 2222→·····→ 88 8888 → 99 9999 • Press the SET switch.	• Display shows " 7 10-**". Make sure readouts other than ** are identical. • Make sure the entire LCD is lit up. • Make sure the entire LCD is put out. • "▲"(16 pieces), " ' ","AM","PM"," : ", "– " are lit up in sequence. • Make sure initial operation.
Printing Check	• Set the knob on the bottom to the center and print out three times. • Press the SET and reset switch simultaneously. • Print out three times. • Press the reset switch.	• Make sure the printed output is as follows. Example) JAN 1 AM 12:00 • Make sure initial operation, and display shows "00 0000". • Make sure twenty "E" characters are printed out. • Make sure initial operation was made and the display indicates the time at 12:00 a.m.

Inspection Item	Inspection Method	Inspection Standard
CHANGE Switch Check	• Press the SELECT switch and move ▲ position TIME. • Press the CHANGE switch when 6:00 is shown. • Press the SET switch twice. • Press the SELECT switch and move ▼position PRINT DIRECTION/PRINT ACTIVATION. • Pressing the SET switch makes CC (Print Activation) flicker. • Press the CHANGE switch when "3:Manual" is shown. • Press the SET switch twice.	• Make sure a readout on seconds advances. ** 6:00 - ** gives a readout on seconds. • Make sure the time displays and ":" flickers.
Manual Print Check	• Pull the knob on the bottom toward yourself and insert the card. • Press the Key Top and print out three times.	• No printed output is produced when the card is inserted. • Make sure the printed output is as follows. Example) JAN 1 AM 6:00 • Make sure the starting point of printed output is within 1 mm from the edge of a card.
Lithium Battery Check	• Check the time. • Pull out the AC Adapter Ass'y. • Make sure entire LCD is put out. • Leave one minutes. • Insert the AC Adapter Ass'y to the AC power outlet.	• Make sure the time display did not return to "AM12:00".
Completion of Check	• Press the reset switch. • Pull out the AC Adapter Ass'y.	

10. ERROR CODE LIST

No	Error Symptoms	Remedies
E-00	CPU does not function properly. Program is corrupted or CPU is broken.	1. Press the reset switch and check the CPU for proper operation.
E-01	Memory retention is not possible.	1. Make sure the Lithium Battery is properly installed. 2. Make sure JP2 of the Control PCB Ass'y is properly installed. 3. Make sure the voltage of the Lithium Battery is not lowered.
E-05	No-card detection occurs before printing in the automatic or semi-automatic printing modes.	1. Press the card on the Paper Sensor until time is printed.
E-30	Print Head does not return to the home position. Home position sensor is not shaded after the Print Head home position initial operation or after printing of the card.	1. Make sure the home position sensor is installed in the proper position. 2. Check the CR encoder sensor for proper function. 3. Make sure gears in the CR motor system are properly engaged and the Print Head properly moves.
E-38	There is an anomaly in the CR motor or CR encoder sensor. Encoder does not pulse within 1 sec. after the CR motor begins to operate or within 15.3 msec. during operation.	1. Check the CR encoder sensor for proper operation. 2. Make sure the CR motor can run. 3. Make sure the CR motor system gears meshed. 4. Check the CR encoder sensor for proper placement.
E-40	Wrong password is entered.	1. Enter the correct password that has been input in the password setting.
E-41	Daylight saving time setting is incorrect.	1. Change the setting being care not to input the same month and day for when daylight saving time starts and ends.
E-49	An impractical setting is made.	1. Make the setting within the practical range.

11. CONNECTOR PIN ASSIGNMENT

Control PCB Ass'y

(1) CN1 (LCD Panel (Q7150-5505))

Pin No.	Signal Name	Function	Pin No.	Signal Name	Function
1	COM 4	COMMON4	11	SEG10	SEGMENT10
2	COM 3	COMMON3	12	SEG9	SEGMENT9
3	COM 2	COMMON2	13	SEG8	SEGMENT8
4	COM 1	COMMON1	14	SEG7	SEGMENT7
5	SEG16	SEGMENT16	15	SEG6	SEGMENT6
6	SEG15	SEGMENT15	16	SEG5	SEGMENT5
7	SEG14	SEGMENT14	17	SEG4	SEGMENT4
8	SEG13	SEGMENT13	18	SEG3	SEGMENT3
9	SEG12	SEGMENT12	19	SEG2	SEGMENT2
10	SEG11	SEGMENT11	20	SEG1	SEGMENT1

(2) CN2 (Switch PCB Ass'y (Q7150-5007A))

Pin No.	Signal Name	Function
1	PB	Key Top
2	GND	
3	PS	Paper Sensor

(3) CN3 (Sensor Harness B Unit (Q7150-5165U))

Pin No.	Signal Name	Function
1	SHC	Home position sensor collector (SH)
2	SHE	Home position sensor emitter
3	SHA	Home position sensor anode
4	SHK	Home position sensor cathode
5	ENC	CR encoder collector (ENC)
6	ENE	CR encoder emitter
7	ENA	CR encoder anode
8	ENK	CR encoder cathode

(4) CN4 (Print Head (Q7000-8000))

Pin No.	Signal Name	Function
1	FG	Connection to head
2	PIN6	frame
3	PIN4	6th pin from top (PIN6)
4	PIN8	4th pin from top (PIN4)
5	PIN2	8th pin from top (PIN8)
6	PIN9	2nd pin from top (PIN2)
7	COM	Bottom pin (PIN9)
8	COM	Common (10V)
9	PIN7	Common (10V)
10	PIN1	7th pin from top (PIN7)
11	PIN5	Top pin (PIN1)
12	PIN3	5th pin from top (PIN5)

(5) CN5 (Connector Harness Ass'y (Q7000-5163A))

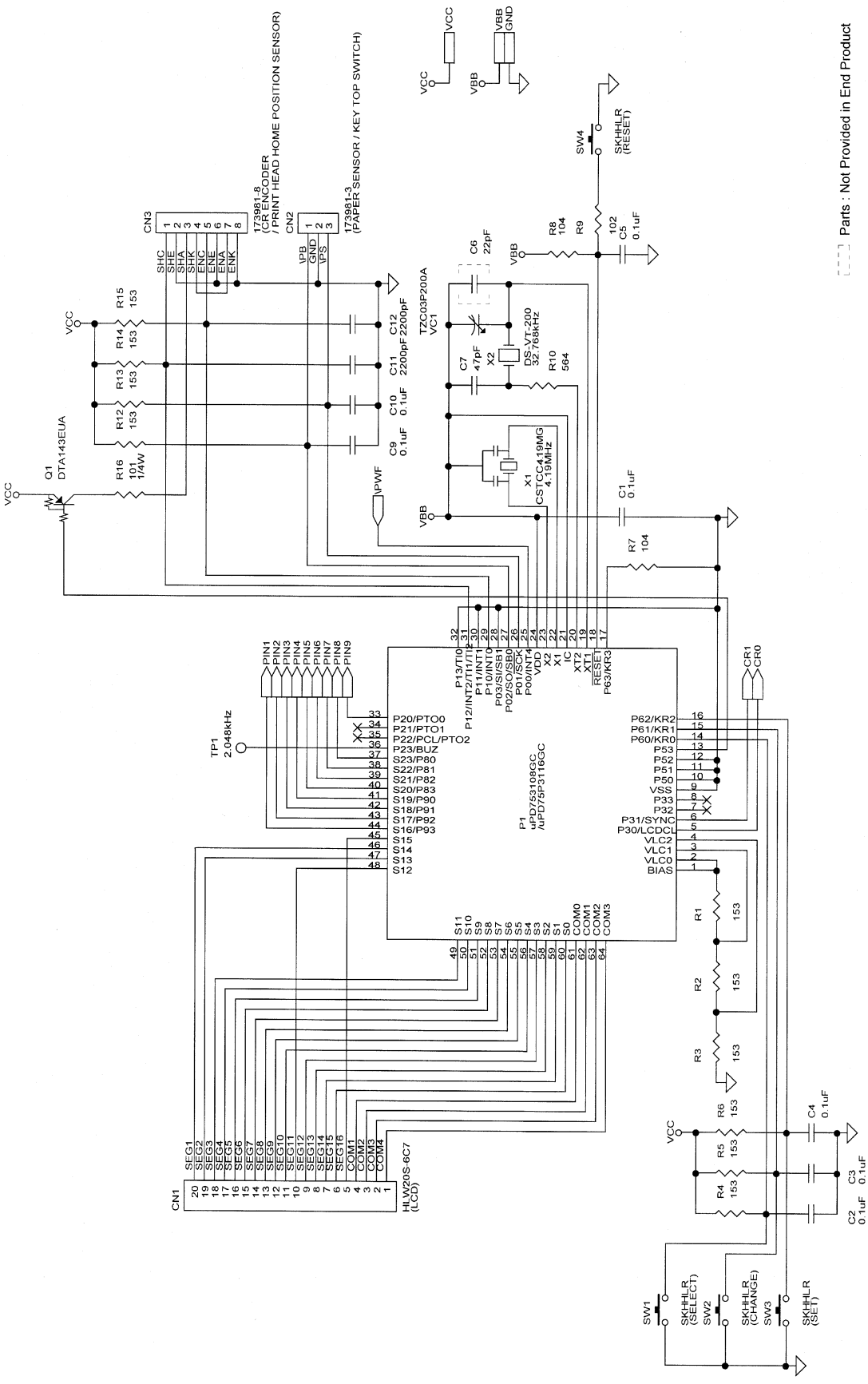
Pin No.	Signal Name	Function
1	CRA	CR motor (+)
2	CRB	CR motor (–)

(6) CN6 (AC Adapter Ass'y (Q7152-5210A))

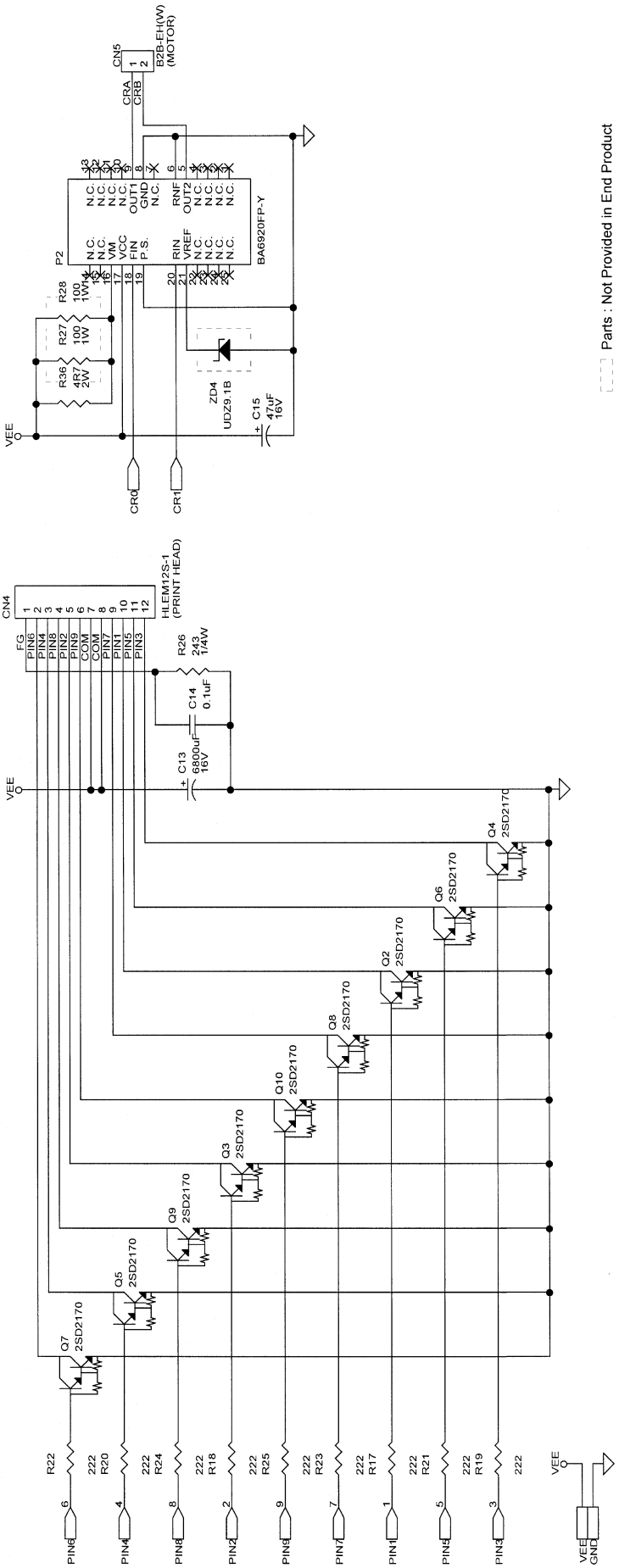
Pin No.	Signal Name	Function
1	AC	
2	AC	
3	-	

12. CIRCUIT DIAGRAM

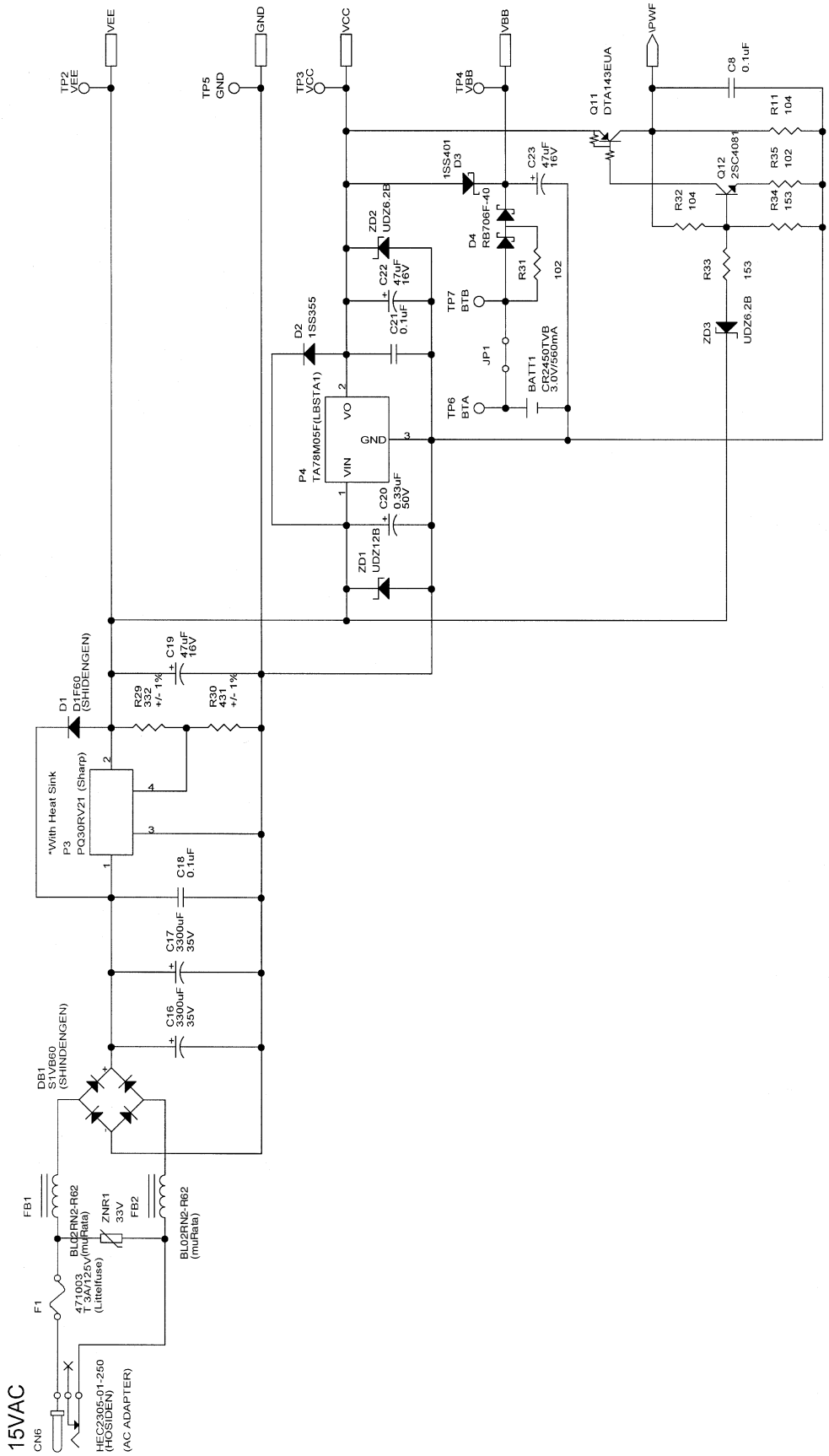
Control PCB Circuit Diagram (1/3)



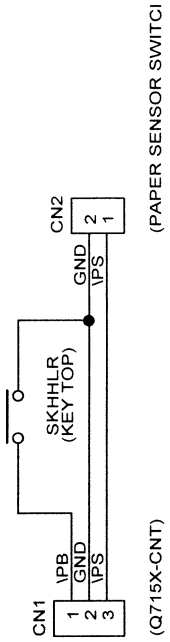
Control PCB Circuit Diagram (2/3)



Control PCB Circuit Diagram (3/3)



Switch PCB Circuit Diagram



13. PARTS LIST

CONTENTS

Note 1 : The ordering unit of part with the mark "#" is 10 pieces or sets.
(e.g. 10,20,30,---)
Note 2 : ( ) in Q' TY PER UNIT : Not available .
Note 3 : Service parts are shipped without lubrications even where it is required.
Refer to the exploded view to confirm lubrications and apply lubrication when necessary before replacing service parts.

PARTS LIST

1. Overall Exploded View

REF.NO.	DESCRIPTION	MANUFACTURER PART NUMBER	Q' TY PER UNIT	MODEL	
	Control PCB Ass'y	Q7150-5001A	1		
	Mechanism	Q7150-4000	1		
h	Switch PCB Ass'y	Q7150-5007A	1		
i	Sensor Harness B Unit	Q7150-5165U	1		
	LCD Panel	Q7150-5505	1		
	AC Adapter Ass'y	Q7152-5210A	1		
	Top Enclosure	Q7152-2001	1		
	Cover B	Q7152-2184	1		
	Indicator Plate	Q7152-2010	1		
	Printer Cover	Q7152-2002	1		
	Selection Label	Q7152-2042	1		
	PL Label	Q0070-2646	1		
	UL, CSA, FCC, Label	Q0106-8665-1	1		
	Bottom Enclosure	Q7152-2003	1		
	Rubber	Q7150-2065	2		
	Key Top	Q7152-2510	1		
	Paper Rack	Q7152-2070	1		
k	P.H.T. Screw (BT) 3x8 #	84001-3026	4		
m	P.H. Screw M4x10, SPW #	84001-4019	2		

2. Mechanism

REF.NO.	DESCRIPTION	MANUFACTURER PART NUMBER	Q' TY PER UNIT	MODEL	
	Base Plate Ass'y	Q7150-1040A	1		
	Base Plate	Q7150-1040	(1)		
	Reduction Shaft	Q7150-1002	(2)		
	Motor Ass'y	Q7150-1014A	1		
	Motor	Q0001-1014	(1)		
	Connector Harness Ass'y	Q7000-5163A	(1)		
	Motor Pinion	Q0100-1080	(1)		
	Carrier Ass'y	Q7150-1160A	1		
	Carrier	Q7000-1160-2	(1)		
	Carrier Roller	Q7150-1192	(1)		
	Carrier Spring	Q7000-1166-1	1		
	Cam	Q0100-1576	1		
	Cam B	Q0100-3275	1		
	Lead Screw Shaft	Q7000-1327	1		
	Tractor Shaft Spring	84950-1586	1		
	Ribbon Driving Wheel	Q7000-1673	1		
	Clutch Gear	Q7000-1548	1		
	Ribbon Driving Shaft	Q7000-1674-1	1		
	Carrier Sub Plate	Q7000-1466	1		
	Head Holding Plate	Q7000-1729	1		
	Bearing	Q0100-1035	2		
	Guide Shaft	Q7150-1051	1		
	Mid Gear	Q0100-1137	1		
	Cam Gear	Q0100-1554-1	1		
	Platen Gear	Q7150-1082	1		
	Platen Gear B	Q7150-1551	1		
	Cam Shaft	Q7150-1527	1		
	Cam C	Q7150-3276	1		
	Platen Ass'y	Q7150-1060A	1		
	Platen Plate	Q7150-1629	1		
	Platen Plate Spring	Q7150-1630	2		
	Platen Cover	Q7150-1648	1		
	Sensor Block	Q7150-1885	1		
	Sensor Lever	Q7150-1886	1		
	Sheet	Q7150-1842-1	1		
	Spacer	Q7150-1387	2		
	Stopper A	Q7150-1234	4		
	Reinforcing Plate	Q7150-1054	2		
	Paper Pressure Plate Ass'y	Q7150-1067A	1		
	Bottom Plate	Q7150-1694	1		
a	Tielap TY-23M #	84009-1060	1		
b	P.H. Screw M2.6x5 #	84001-2641	2		
c	P.H.T. Screw (BT) 3x6 #	84001-3025	7		
d	P.H.T. Screw (BT) 3x6, PW #	84001-3250	1		
r	P.H.T. Screw (BT) 3x8 #	84001-3026	1		
	Print Head	Q7000-8000	1		

3.Control PCB Ass'y

REF.NO.	DESCRIPTION	MANUFACTURER PART NUMBER	Q' TY PER UNIT	MODEL	
BATT1	Lithum Battery CR2450TVB	84093-4222	1		
C1-5, 8-10, 14,18,21	Chip Ceramic Cap. 0.1uF/50V #	84094-7150	11		
C7	Chip Ceramic Cap. 47pF/50V #	84094-7007	1		
C11,12	Chip Ceramic Cap. 2200pF/50V #	84094-7050	2		
C13	Al.Elec.Cap. 6800uF/16V	84093-2920	1		
C15,19 22,23	Chip Al.Cap. 47uF/16V	84094-4003	4		
C16,17	Al.Elec.Cap. 3300uF/35V	84093-2687	2		
C20	Chip Al.Cap. 0.33uF/50V	84094-4012	1		
CN1	Connector HLW20S-6C7	84093-7161	1		
CN2	Connector 173981-3	84092-1750	1		
CN3	Connector 173981-8	84092-1754	1		
CN4	Connector HLEM12S-1	84093-7105	1		
CN5	Connector B2B-EH(WHITE)	84092-2700	1		
CN6	Jack HEC2305-01-250	84093-0602	1		
D1	Chip Diode D1F60 #	84091-1472	1		
D2	Chip Diode 1SS355TE-17 #	84091-1478	1		
D3	Schottky Diode 1SS401-TE85L #	84091-1323	1		
D4	Schottky Diode RB706F-40T106 #	84091-1327	1		
DB1	Diode Bridge S1VB60	84091-1222	1		
F1	Fuse 471003 3A 125V	84091-8331	1		
FB1,2	Ferrite Beads BL02RN2-R62	84093-0427	2		
P1	Mask CPU	Q7150-5540	1		
P2	IC BA6920FP-Y	84094-3815	1		
P3	Linear IC PQ30RV21	84091-4017	1		
P3	Heat Sink A PUE16-30	94553-5413	1		
P3	P.H. Screw M3x8, SW #	84001-3009	1		
P4	Linear IC TA78M05F(TE16L)	84091-4050	1		
Q1,11	Transistor DTA143EUA-T106 #	84090-7961	2		
Q2-10	Transistor 2SD2170-T100	84090-7931	9		
Q12	Transistor 2SC4081-T106 #	84090-7922	1		
R1-6, 12-15,33,34	Chip Res. 1/10W +/-5% 15Kohm #	84094-6100	12		
R7,8,11,32	Chip Res. 1/10W +/-5% 100Kohm #	84094-6120	4		
R9,31,35	Chip Res. 1/10W +/-5% 1Kohm #	84094-6072	3		
R10	Chip Res. 1/10W +/-5% 560Kohm #	84094-6138	1		
R16	Chip Res. 1/4W +/-5% 100ohm #	84094-5004	1		
R17-25	Chip Res. 1/10W +/-5% 2.2Kohm #	84094-6080	9		
R26	Chip Res. 1/4W +/-5% 24Kohm #	84094-5010	1		
R29	Chip Res. 1/10W +/-1% 3.3Kohm #	84094-6284	1		
R30	Chip Res. 1/10W +/-1% 430ohm #	84094-6263	1		
R36	Metal Oxide Res. 2W +/-5% 4.7ohm	84090-4987	1		
SW1-4	Switch SKHHLRA010	84092-4620	4		
VC1	Variable Cap. TZC03P200A310T00	84090-2904	1		
X1	Ceramic Oscillator CSTCC4.19MG 4.19MHz	84091-3025	1		
X2	Quartz Crystal DS-VT-200 32.768KHz (CL=12.5pF)	84091-3120	1		
ZD1	Chip Zenner Diode UDZTE-1712B #	84091-2613	1		
ZD2,3	Chip Zenner Diode UDZTE-176.2B #	84091-2611	2		
ZNR1	Surge Absorber MNR33ZR07D	84091-1715	1		

4.Packing Material

REF.NO.	DESCRIPTION	MANUFACTURER PART NUMBER	Q' TY PER UNIT	MODEL	
	Packing Box	Q7152-6110	1		
	Pad A	Q7152-6105	1		
	Pad B	Q7152-6106	1		
	Manual	Q7152-6120	1		
	Ribbon Caution Sheet	Q7000-6154-1	1		
	Wall Folding Sheet	Q7000-6322-1	1		
	Oval Head Screw 3.5x25 #	84001-3371	2		
	Lock Lever	Q7152-2084	2		
	Subsidiary Pad	Q7150-6531	1		
	AC Adapter Pad	Q7150-6530	1		
	Paper Rack Pad	Q7150-6534	1		
	Polyethylene Bag 350x450	84008-1235	1		
	Polyethylene Bag 0.1x350x450	84008-1236	1		
	Polyethylene Bag 220x310	84008-1263	1		
	Polypropylene Bag 76x127	84008-1147	1		

e	YM-103	L95300-8002	50g		
f	SFP-13	LQ7150-8001	30cc		
g	N-4K	LQ7150-8002	30cc		

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