Digital Photo Printer

CHC-S1245-5

Maintenance Specifications

Date: March 8, 2005
Revised:
Revision: First Edition

Confirmation Signature			
（Shinko Electric Co., Ltd.）			（Customer： ）
Approved	Inspected	Drew	

Shinko Electric Co., Ltd.

YQE8-J0092E

Revision Record

Revised Date	Correction symbol	Descriptions	ECN No.
3/8/2005	—	First Edition	

Contents

1. Scope

This document is applicable to the following Shinko Digital Photo Printer.

Applicable Model Name : CHC-S1245-5

Related Documents

- Maintenance Parts Replacement Procedures YQE8-J0093E
- Operation Manual YTE8-J0124E

2．Periodic Inspection

2.1 Parts Required

No.	Description	Parts Number	Q'ty	Supplier	Remarks
1	Head Cleaning Kit	060-91-7146	1	Option	
2	Isopropyl Alcohol (IPA) or Ethyl Alcohol（more than 99% purity）		Some	Available on market	
3	Bleached Cloth		Some	Available on market	
4	Grease (equivalent to MOLYKOTE PG-671)		Some	Available on market	
5	Wire Tire (insulation lock)	060-64-8011	20		

2.2 Tools Required

Description	Model Type	Q'ty
＋Philips Screwdriver	＃0（Micro-driver）	1
＋Philips Screwdriver	＃1	1
＋Philips Screwdriver（small）	＃2 (less than 100mm in length）	1
＋Philips Screwdriver	＃2	1
＋Philips Screwdriver	＃2（more than 300mm in length）	1
＋Philips Screwdriver	＃2（Latch type）	1
－Flat-blade Screwdriver（small）	2.5×100	1
－Flat-blade Screwdriver（small）	4.5×50	1
Nipper		1
Pliers		1
Scissors		1
Clip for Digital Voltmeter	Refer to figure below for aspect	2

Clip for Digital Voltmeter

2.3 Tool Required

Description	Remarks
Digital Voltmeter	0.1V unit of measurement

2.4 Maintenance Schedule

Periodic inspection is performed according to the following schedule. If problem is detected during the inspection, adjustment or Replacement of parts may be necessary.

No.	Inspect Item	Schedule ○(circle) denotes to Perform, R denotes to Replace Number of Prints (K＝1,000 prints)										Remarks
		10K	20K	30K	40K	50K	60K	70K	80K	90K	100K	
1	Thermal Head	○	R	○	R	○	R	○	R	○	R	
2	Platen Roller	○	○	○	○	○	○	○	○	○	○	
3	Timing Belt	○	○	○	○	○	○	○	○	○	○	
4	DC Power Supply						○					
5	DC Motor ASSY （Ribbon winding）			R			R			R		
6	DC Motor ASSY ・Thermal Head Up/Down ・Pinch Roller UP/Down ・Paper Feed Pinch Up/Down ・Paper Ejection Pinch Up/Down						R					
7	Ribbon Brake 2 ASSY						R					
8	Pinch Roller ASSY	○	○	○	○	○	○	○	○	○	○	
9	Cleaning	○	○	○	○	○	○	○	○	○	○	
10	Lubricate		○		○		○		○		○	
	Lubricate (DC Motor ASSY)	○	○	○	○	○	○	○	○	○	○	

Remarks: Replace DC Power Supply and DC fan (Control box cooling) every 30,000 hours of total printer working time.

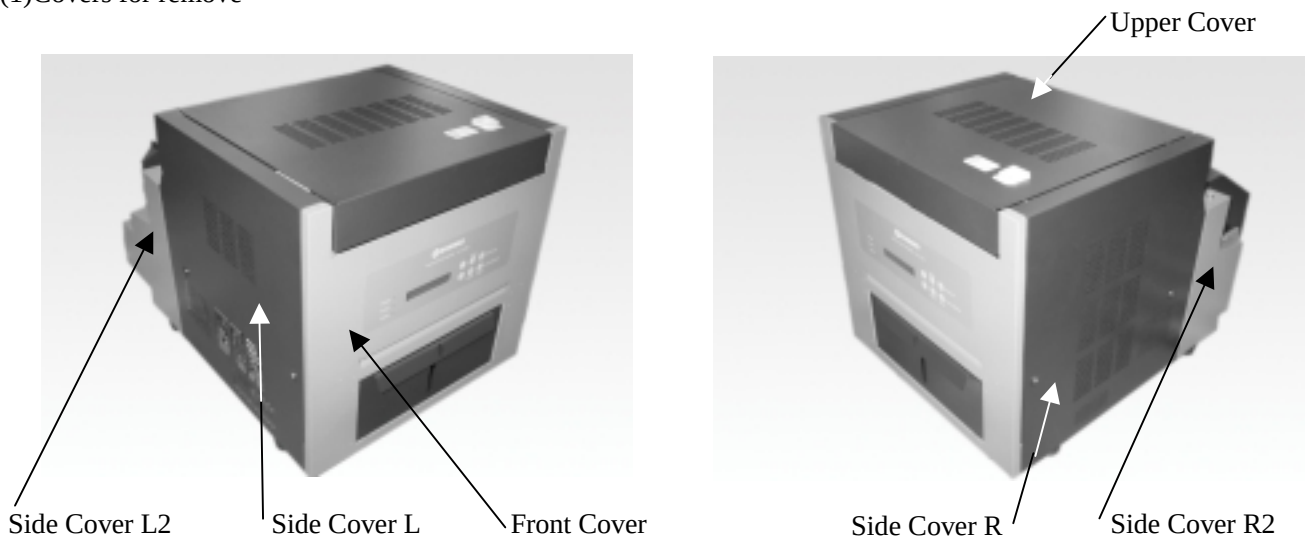
2.5 Inspection Contents

No.	Inspection Items	Inspection Contents
1	Thermal Head	Perform test printing, and replace the Thermal Head ASSY if the following problem occurs (Refer to Section 4 of this document for test printing procedures) - Visible white line on output surface (ink does not transfer to the paper even after cleaning the thermal print head. - Using pattern with fairly even density, there is extreme uneven density the output. (Refer to Maintenance Parts Replace Procedures for replacement procedures)
2	Platen Roller	Roll the Platen Roller to check for unevenness or scratches on the surface. Replace the platen if problem occurs with the output. (Refer to Maintenance Parts Replace Procedures for replacement procedures)
3	Timing Belt	Inspect the timing belt tension (Refer to Section 3.2 of this document). Turning the pulley to check for scratches and split on the timing belt. Replace the timing belt if the problem occurs (Refer to Maintenance Parts Replacement Procedures for replacement procedures).
4	DC Power Supply	Inspect the +5V, +24V, and THV output value. (Refer to Section 3.1 of this document for more details)
5	Pinch Roller	Roll the Pinch Roller to check for unevenness or scratches on the surface. Replace the pinch Roller if problem occurs with the output (Refer to Maintenance Parts Replace Procedures for replacement procedures).
6	Cleaning	(1) Clean the thermal head with Head Cleaning Kit (Refer to Section 2.6 for more details). (2) Clean the surface of rubber rollers with Isopropyl Alcohol (IPA) in bleached cloth (Refer to Section 2.6 for more details). ①Platen ②Cleaning Roller ③Paper Feed Roller (Paper feed) ④Paper Feed Roller (Paper transport) ⑤Ejection Roller (3) Clean the front of peeling plate and ribbon mark sensor reflector with Isopropyl Alcohol (IPA) in bleached cloth (Refer to Section 2.6 for more details). (4) Clean the paper sensor and ink ribbon sensor with Head Cleaning Kit. (5) Clean the surface of Pinch Roller with dry and bleached cloth. (6) Vacuum and/or clean the paper dust inside the printer. (7) Clean the covers with dry and bleached cloth (Refer to Operation Manual for more details). (8) Clean the fan filters at upper and side cover (Refer to Operation Manual for more details).

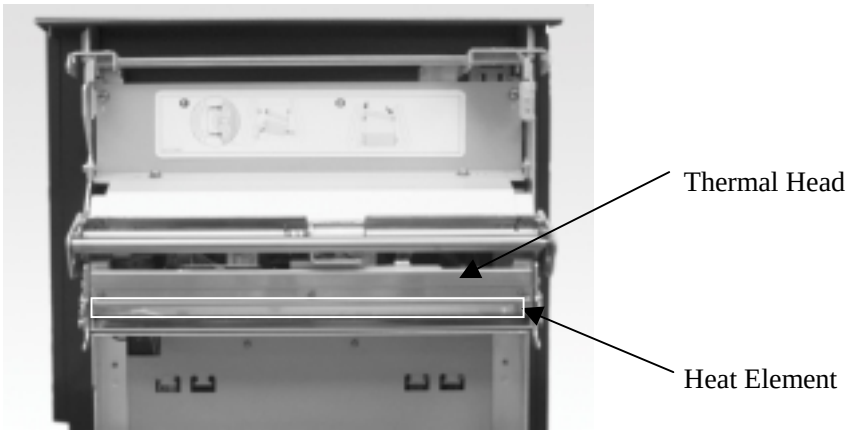
No.	Inspection Item	Inspection Contents
7	Lubricate	Apply some grease (Molykote PG-671) to each of the following sections. (1)DC Motor ASSY (Ribbon roll-up) ①Circumference of Worm Gear (2)DC Motor (Pinch Roller) ①Circumference of Worm Gear ②Circumference of the Pinch Cam (left and right) ③Circumference of Gear (3)DC Motor (Thermal Head) ①Circumference of Worm Gear ②Circumference of Head Cam (4)DC Motor (Paper Feeding Pinch Roller) ①Circumference of Worm Gear ②Circumference of Feed Pinch Roller Cam (5)DC Motor (Paper Ejection Pinch Roller) ①Circumference of Worm Gear (6)Sub-Motor ①Circumference of Pinion Gear

2.6 Description for point of cleaning

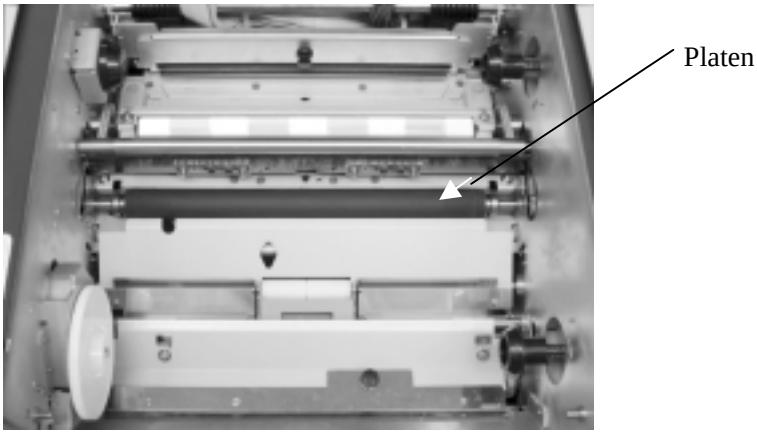
(1)Covers for remove



(2)Thermal Head Heat Element
Cleaning while opening Upper Unit

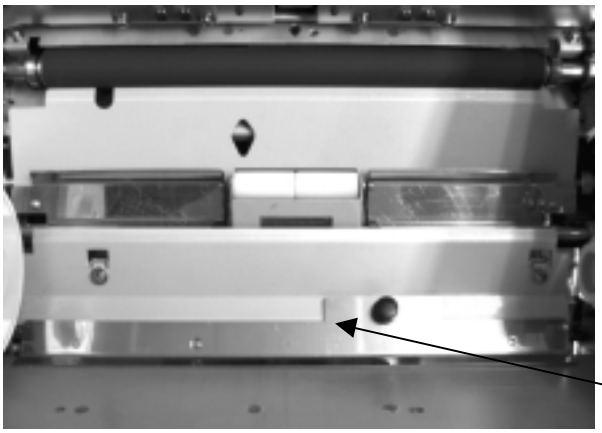


(3)Platen
Cleaning while opening Upper Unit



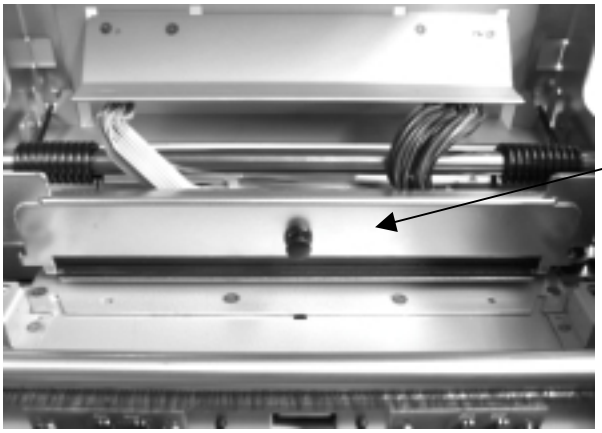
(4)Cleaning Roller（Paper Ejection side）

Remove the Cleaning Roller and clean while opening Upper Unit



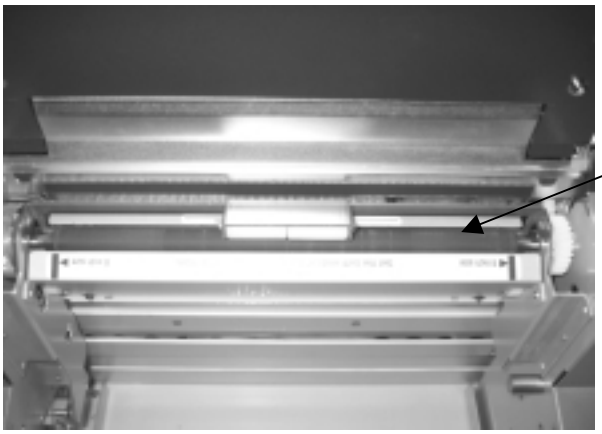
(5)Cleaning Roller（Paper Feed side）

Remove the Cleaning Roller and clean while opening Upper Unit



(6)Paper Feed Roller

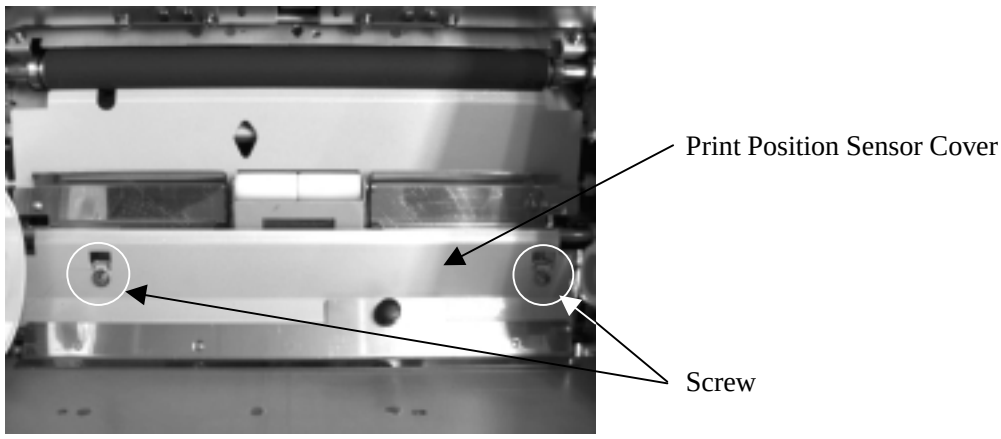
Clean the Paper Feed Roller while opening Paper Cover.



(7)Paper Feed Roller (For Paper Transport)

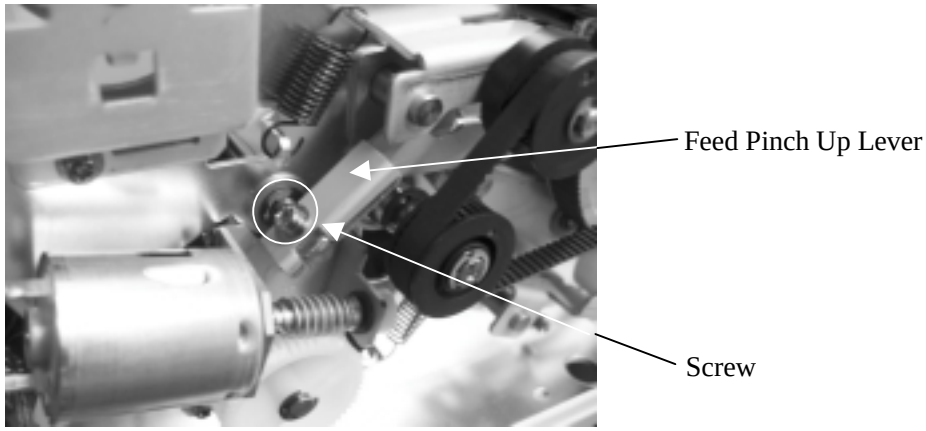
①Remove Cleaning Roller（Paper Feed side）

②Remove 2 screws (M3 x 6) which hold Print Position Sensor Cover, and remove Print Position Sensor Cover.

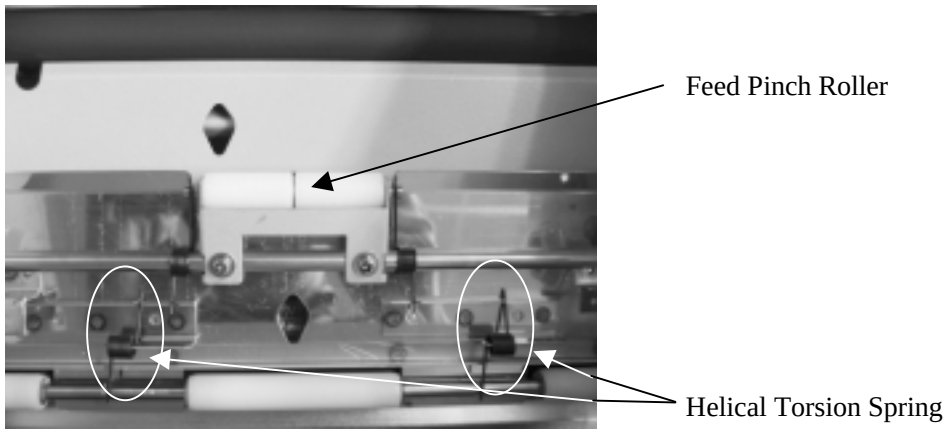


③Remove side cover R.

④Remove a screw (M3 x 6) which holds Feed Pinch Up Lever and remove Feed Pinch Up Lever.



⑤Remove the spring (roller side) which holds Feed Pinch Roller, move the Feed Pinch Roller upwards, and then clean the Pinch Roller.

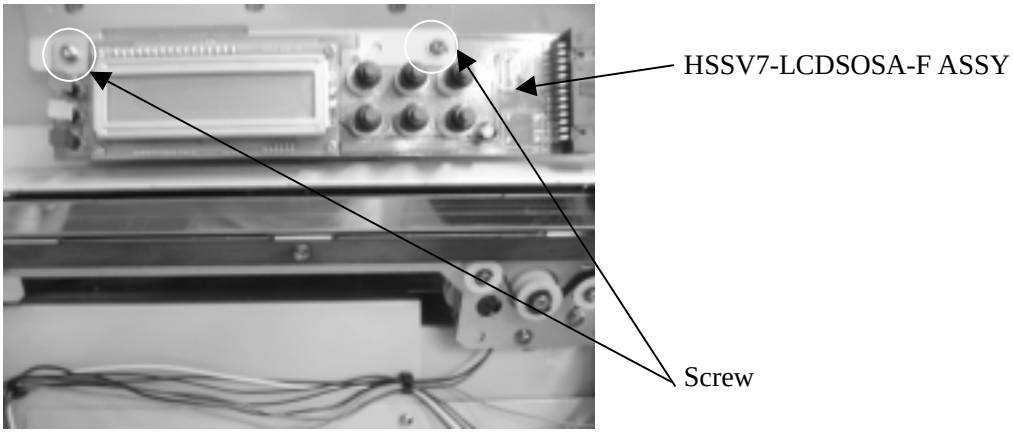


(8)Cleaning Ejection Roller

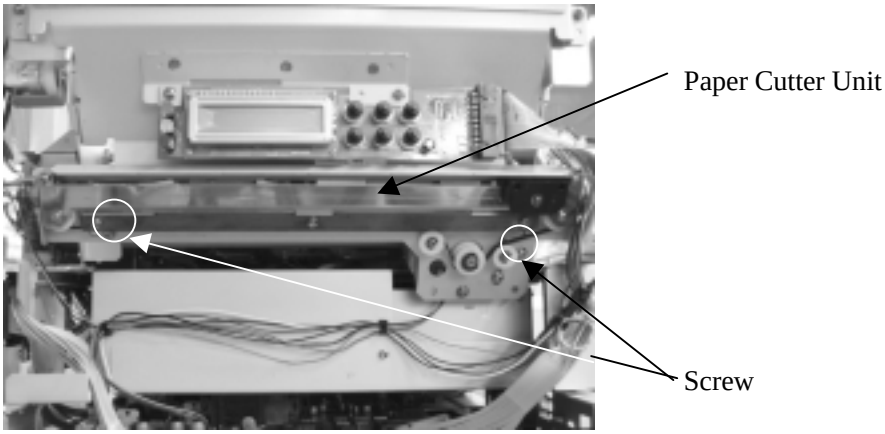
①Remove Side Cover L, Side Cover R, Front Cover, and cleaning roller (ejection side).

②Remove 2 screws (M3x6) which hold PCB HSSV7-LCDSOSA-F ASSY and remove the PCB (removing wire harness is not required).

Warning: Do not touch the blade of the cutter unit in order to avoid injury.

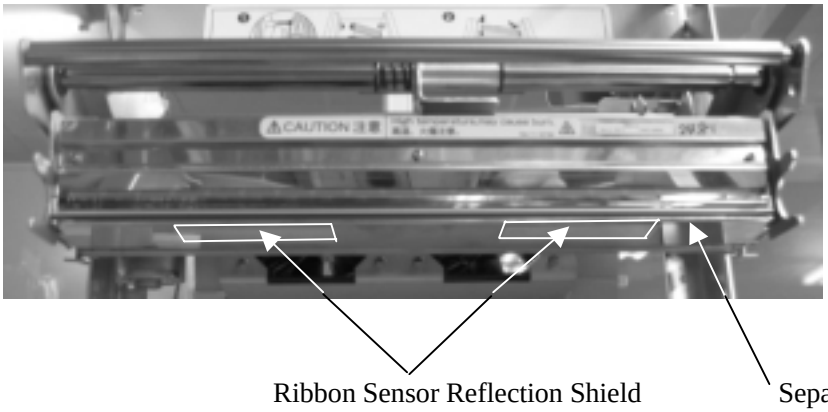


③Remove 2 screws (M3x6) which hold the Paper Cutter Unit, then remove the Paper Cutter Unit, and clean the Ejection Roller.



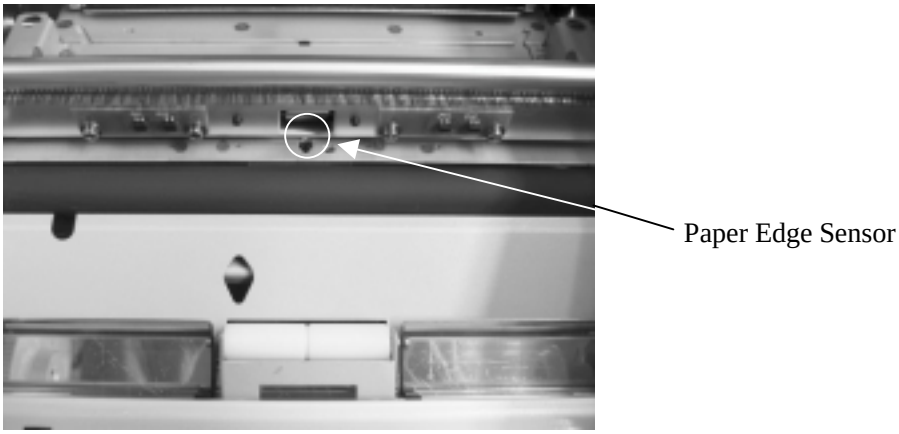
(9)Separation Plate and Ribbon Sensor Reflection Shield

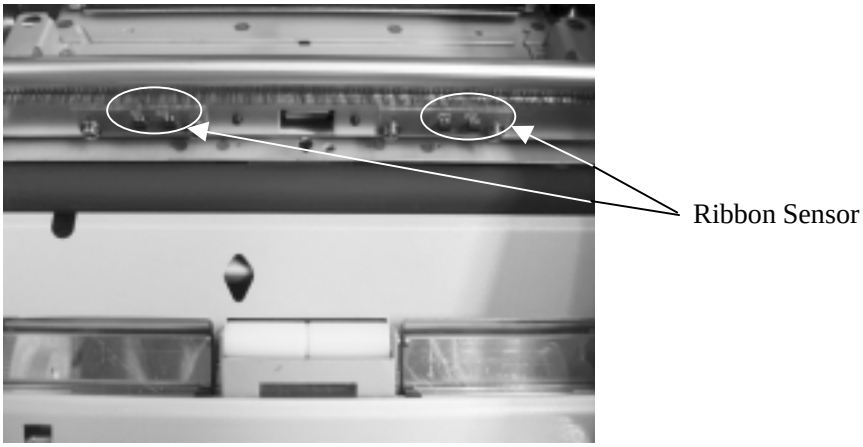
Clean the Separation Plate and Ribbon Sensor Reflection Shield with the upper unit opened.



(10)Paper Edge Sensor and Ribbon Sensor

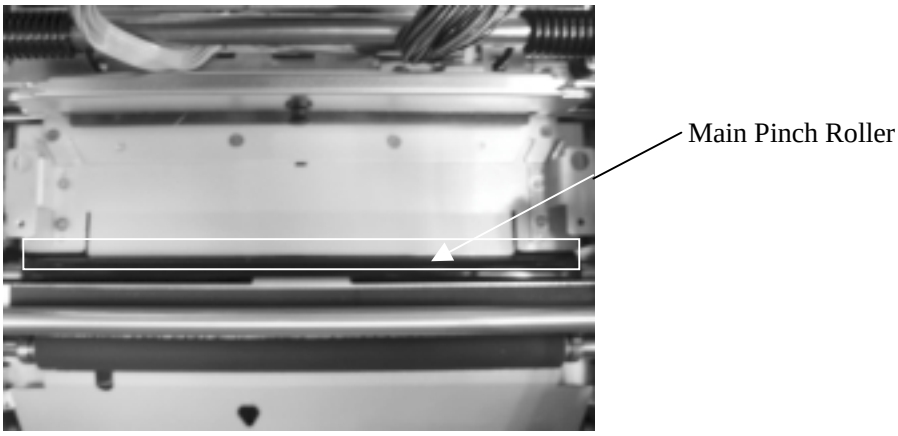
Clean the Paper Edge Sensor and Ribbon Sensor with the upper unit opened.





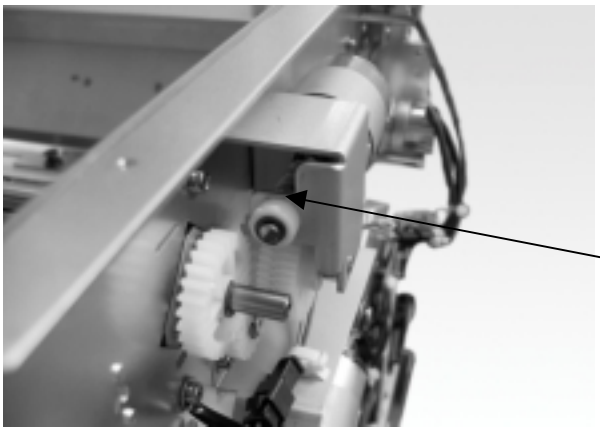
(11)Main Pinch Roller

Clean the Main Pinch Roller with the upper unit opened.

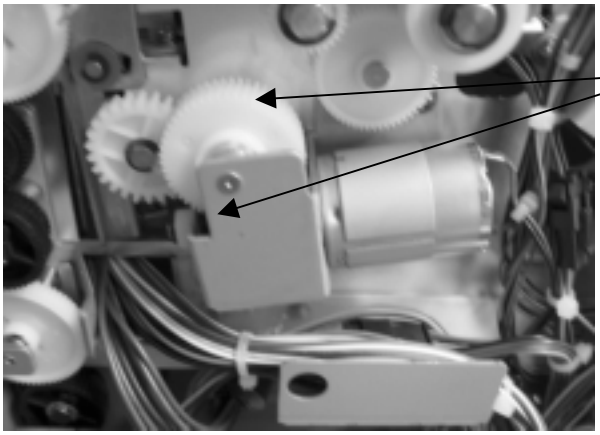


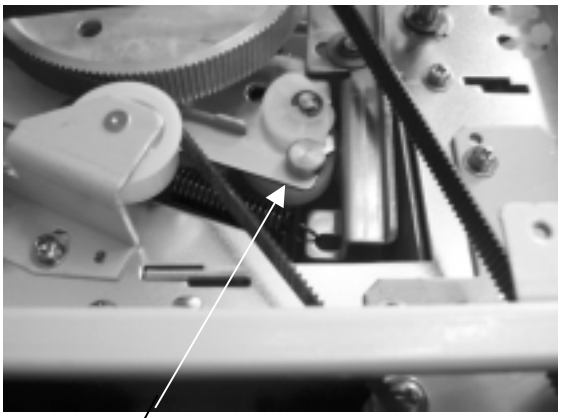
2.7 Description for point of lubrication

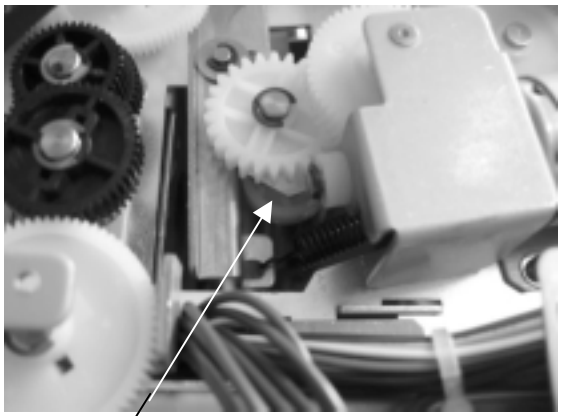
(1)Lubricating driving system of DC motor for ribbon winding
Lubricate the driving system of DC motor for ribbon winding with Side Cover L removed.



(2)Lubricating driving system of DC motor for pinch roller
Lubricate the driving system of DC motor for pinch roller with Side Cover L and Side Cover R removed.

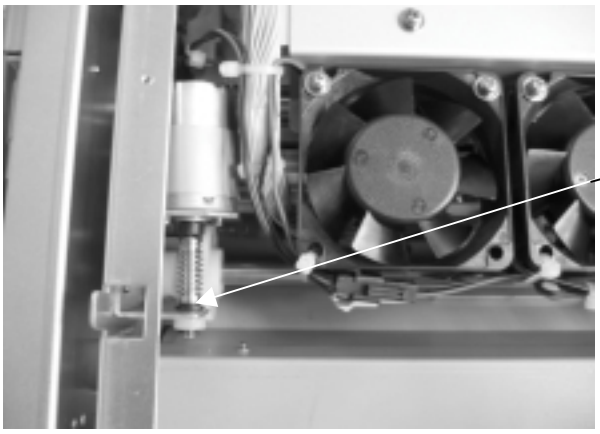


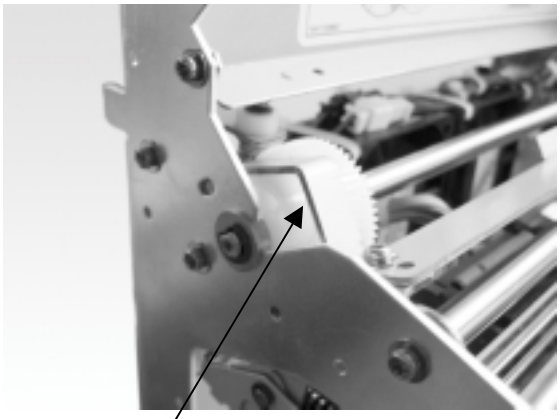


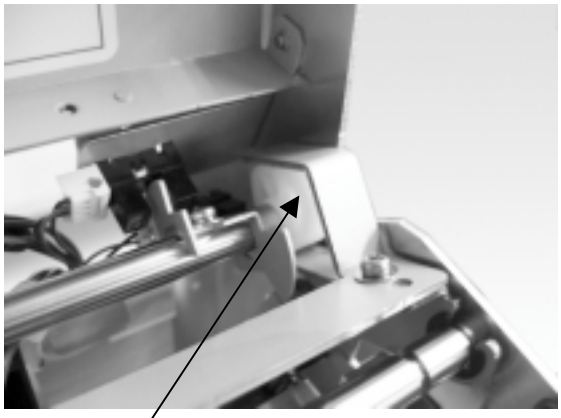


(3)Lubricating driving system of DC motor for thermal head

Lubricate the driving system of DC motor for thermal head with the Upper Cover and Head Gear Cover removed.





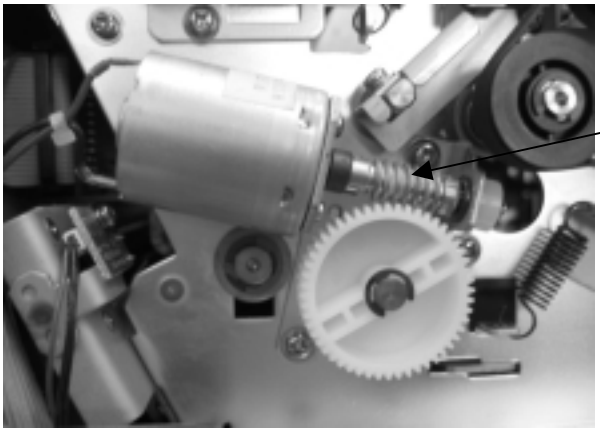


(4)Lubricating DC motor system for paper feed pinch roller

Lubricate the DC motor system for paper feed pinch roller with Side Cover L and Side Cover L2 removed.

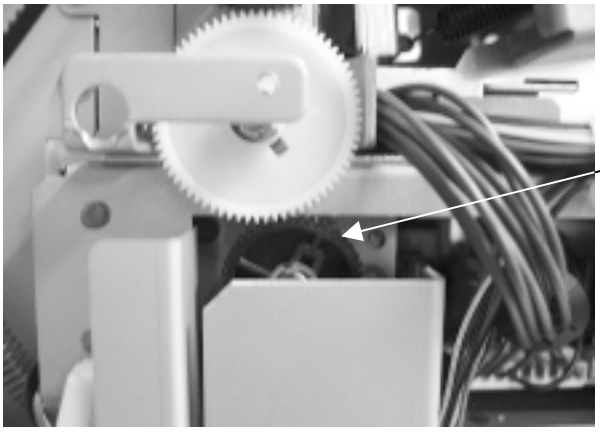
(5)Lubricating DC motor system for ejection pinch roller

Lubricate the DC motor system for ejection pinch roller with Side Cover R removed.



(6)Lubricating driving system of sub-motor

Lubricate the driving system of sub-motor with Side Cover L and Side Cover L2 removed.



3. Adjustment

3.1 Power Unit Voltage Setting

Remove the main cover and set the power unit voltage by the following procedures.

3.1.1 +5V Setting

(1)Measurement Conditions

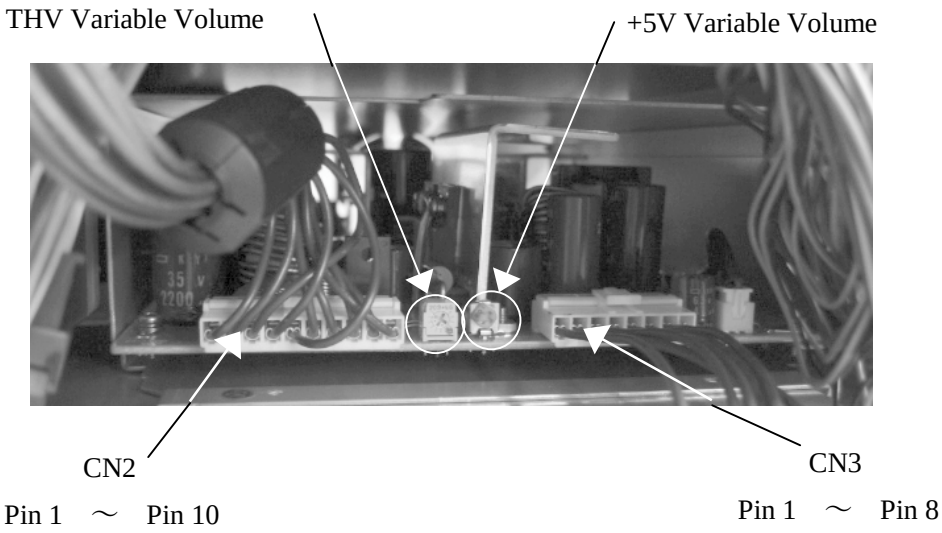
Turn the Power on, and measure under ready condition.
(Ink Ribbon and Paper are not required with control PC board connected)

(2)Setting Voltage

Connect the digital voltmeter directly to the +5V terminal (pin 1 or 2) and 0V terminal (pin 3 or 4) of CN3 connector on DC Power Supply and verify whether Power output is under the following figure.

+5V Voltage：5.15±0.1 [V]

If it is not set correctly, set the voltage by +5V adjustment volume of which shown at the following figure. (Turning the volume clockwise increases the voltage.)



View of DC Power Supply from the left side of the Printer

CN2 pin assignment (10 pins)

1	2	3	4	5	6	7	8	9	10
THV					GND				

CN3 pin assignment (8 pins)

1	2	3	4	5	6	7	8
+5V		0V		+24V		P0V	

0V, P0V, and GND are jumpered.

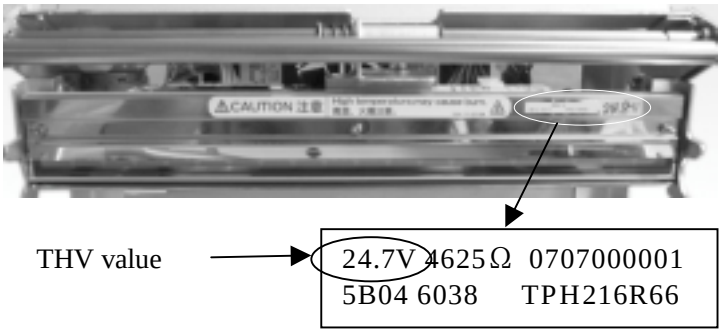
3.1.2 Thermal Head Power (THV) Setting

(1)Measurement Conditions

Turn the Power on, and measure under ready condition.
(Ink Ribbon and Paper are not required with control PC board connected)

(2)Setting Voltage

①Open the Upper Cover, and read the THV value that is stated in the nameplate on the Thermal Head cover (see below).



②Close the Upper Cover.

③Connect the digital voltmeter directly to the THV terminal (pin 1) and GND terminal (pin 10) of CN2 connector on DC Power Supply and set Power output under the following figure.

Set the voltage to +/- 0.1V limit to the THV value.

To set the THV value, use the THV variable volume described in Section 3.1.1.
(Turning the volume clockwise increases the voltage.)

3.1.3 +24V Verification

(1)Measurement Conditions

Be sure to perform the procedure for "+5V Setting" described in Section 3.1.1 first.
Turn the Power on, and measure under ready condition.
(Ink Ribbon and Paper are not required with control PC board connected)

(2)Setting Voltage

①Connect the digital voltmeter directly to the +24V terminal (pin 5 or 6) and P0V terminal (pin 7 or 8) of the CN3 connector on DC Power Supply and set Power output under the following figure.

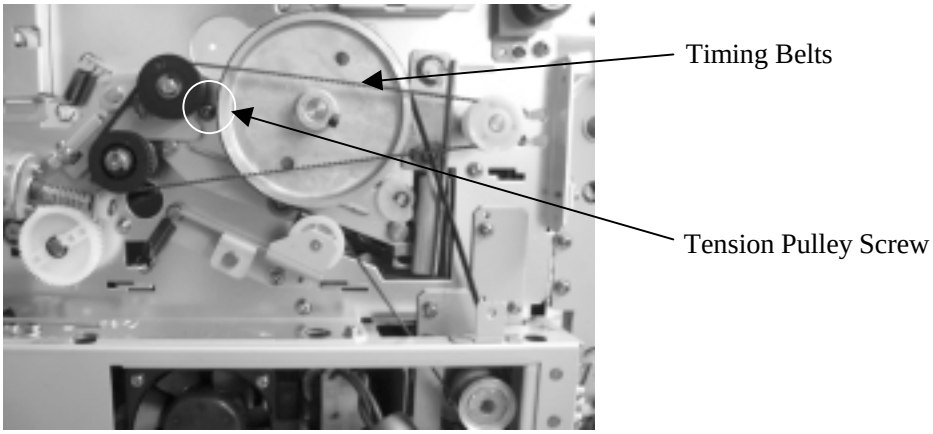
Verify whether the voltage is set at 24V +/- 1.44 V

If it is not set, replace DC Power Supply.

3.2 Timing Belts Adjustment

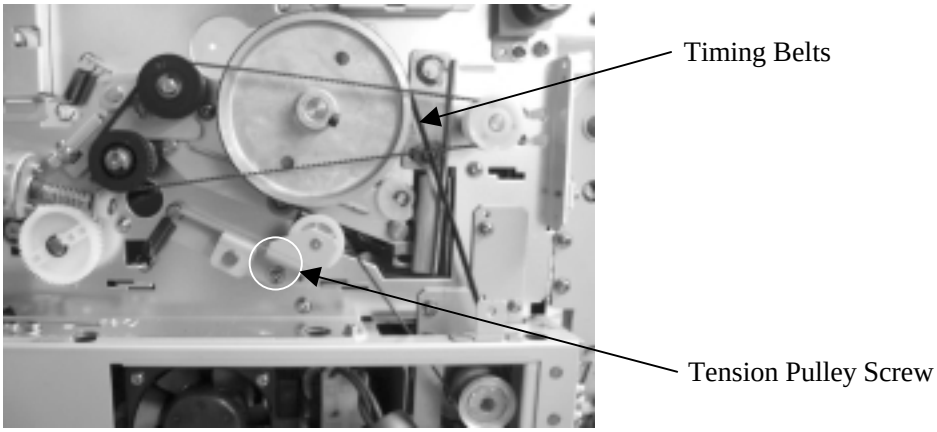
3.2.1 For Feed Roller Drive

①Loosen Tension Pulley Screw.
Tension pulley presses timing belt at appropriate strength by spring.
②Tighten Tension Pulley Screw.



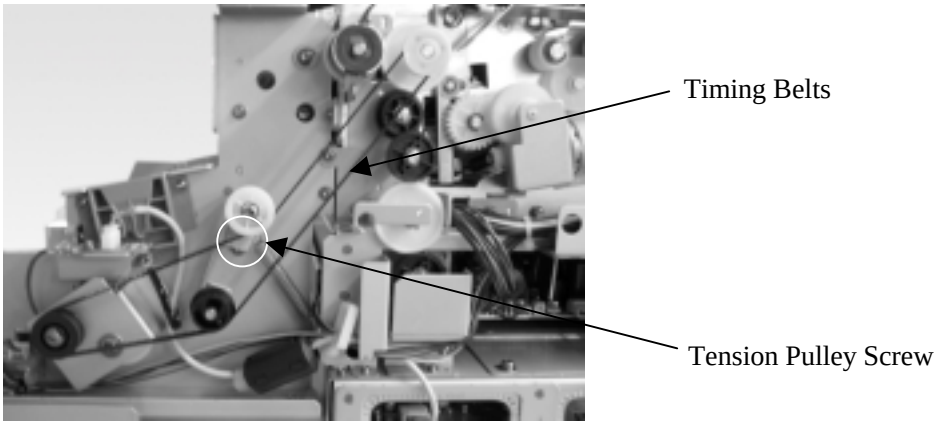
3.2.2 For Feed Roller Drive

①Loosen Tension Pulley Screw.
Tension pulley presses timing belt at appropriate strength by spring.
②Tighten Tension Pulley Screw.



3.2.3 For Roll Paper Drive

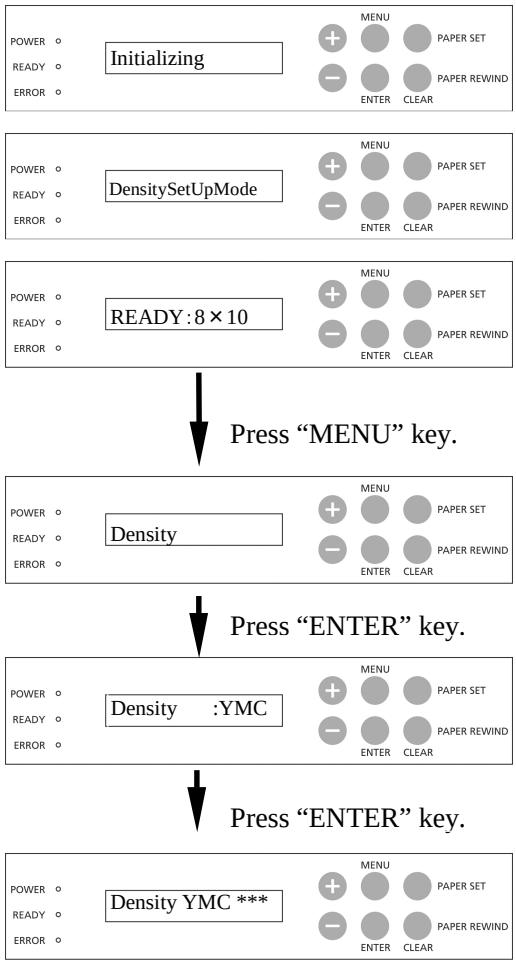
①Loosen Tension Pulley Screw.
Tension pulley presses timing belt at appropriate strength by spring.
②Tighten Tension Pulley Screw.



3.3 Print Density Adjustment

Print density setting is done for every Thermal Head. Therefore after replacing the thermal head, set the print density by the following procedures.

Turn the Power On by pressing “PAPER SET” and “CLEAR/PAPER REWIND” keys at the same time. LCD displays “Density Setup Mode” afterwards.



This shows the current setting.

By pressing “+” or “-“ keys, change this value to the density that is stated in Thermal Head (Spare Parts). Press “CLEAR” key until “Ready” appears on LCD.

Confirm the setting value by pressing the "ENTER" key, then press the "CLEAR" key until "Ready" appears on LCD.

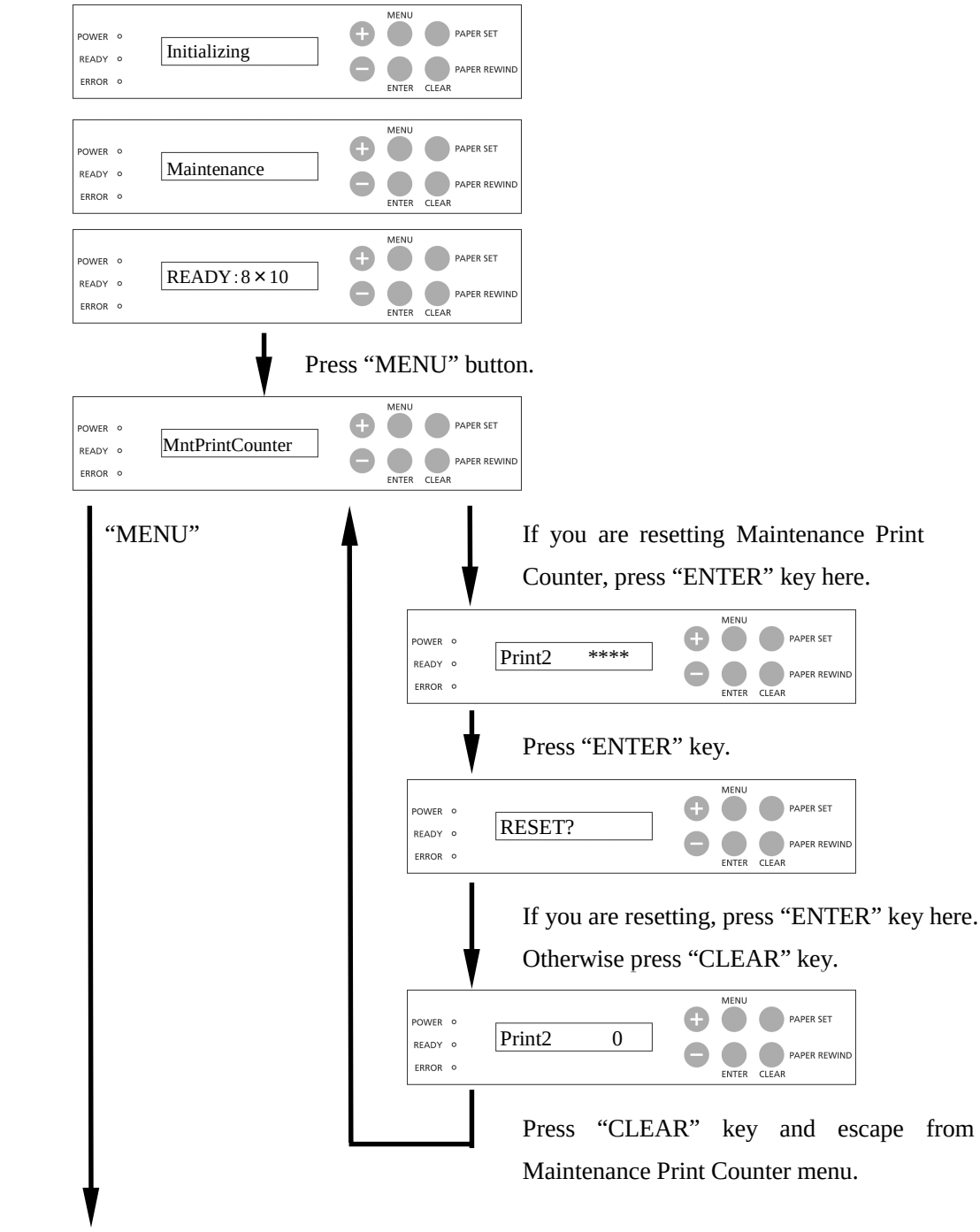
Remarks: Do not change the setting other procedures than explained above. If you have entered to other setting mode, press “CLEAR” key or turn off the power.

3.4 Resetting Maintenance Print Counter and Cutter Counter

Reset the Maintenance Print Counter after replacing Thermal Head, and reset the cutter counter after Paper Cutter Unit.

Turn the power on while pressing "-" and "MENU" keys.

LCD displays "Maintenance" and "Ready" afterwards.



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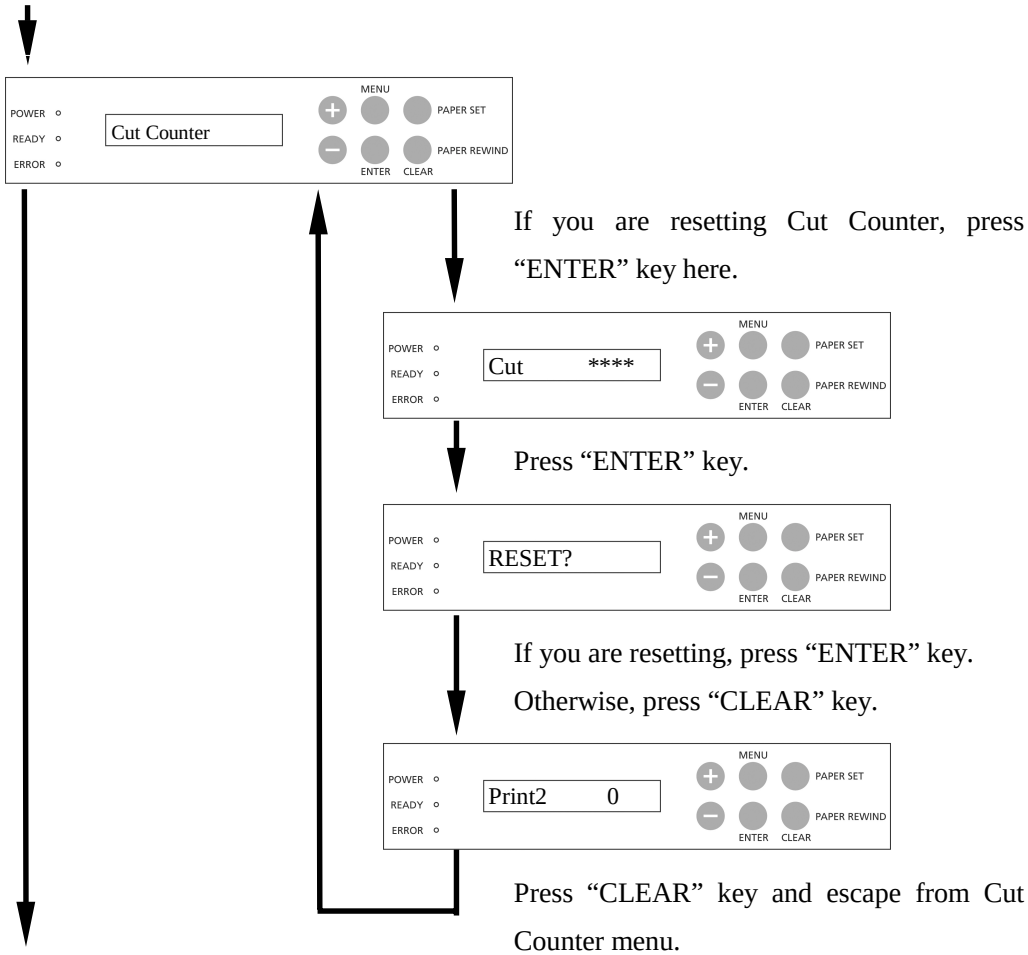


Press "CLEAR" key to Proceed Setup Mode.

Remarks: Pressing "MENU" key will move to the next menu, but do not use the menu other than Maintenance Print Counter and Cut Counter. If you have entered to other setting mode, press "CLEAR" key or turn off the power.

4. Test Printing

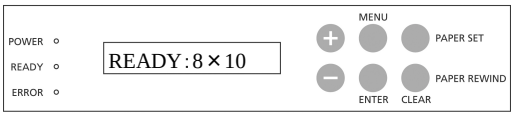
After adjustment and/or parts replacement, go to test print and verify the printer works properly.

The contents of self-diagnostic by test prints.

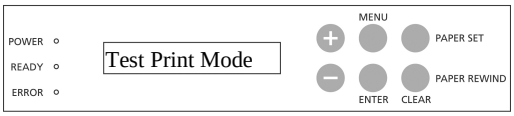
- Print mechanism
- Thermal Head
- Total test of DC Power Supply and Mechanic Control Boards.

If there are any troubles in test print, Re-confirm adjustment and/or replacement procedures.
If the problem still exists after re-confirmation, go to Troubleshooting to take corrective action.

Test Print Procedures



Press “MENU” key to proceed Setup Mode.



“Test Print Mode” menu appears. Press “ENTER” key to go to Test Print.

In order to escape from Test Print Mode, press “CLEAR” key.

5. Troubleshooting

5.1 How to Use This Specification

This document describes each of the trouble conditions that may occur.

The following is the explanation to the Symptom and Check Item.

Symptom	Check Item
No power when the power switch is turned to ON (I) position.	A-B-C-D・・・・・

Symptom list shows the possible causes of the problem.

"Check Item" shows list of alphabet as in A-B-C-D-…

In separate table (example shown below) lists the Check Item (A, B, C, D...), Probable cause and Corrective Action.

Check Item	Probable Cause	Corrective Action
A		

Sequences of the check item are listed in prior order of possible cause for the problem. Use the procedures that are best suited for the circumstances.

In the Corrective Action column, the number in the blank box refers to the sequence number listed in Maintenance Parts List. Furthermore, follow the Maintenance Parts Replacement Procedures.

5.2 Troubleshooting Table

5.2.1 Troubles during Power On and Off

Symptom	Check Item
No power when the power switch is turned on to (I) Position. (After verification that POWER LED at operation panel does not light and no LCD messages. And Power Supply does not work.)	A－C－B－E
When the power switch is turned to ON (I) position, DC fan in the DC Power supply does not work.	B
When the power switch is turned to ON (I) position, DC output fails down after a while.	B
When the power switch is turned to ON (I) position, Power Supply work, but Power LED does not work and LCD does not display at all.	D－H－F
When the power switch is turned to ON (I) position, POWER LED lights on but no LCD display at all.	D－F－G

Check Item	Probable Cause	Corrective Action
A	AC Power Cord connection	Verify that power cord is properly connected to the power plug. Also make sure that power cord is properly connected to the inlet plug on the device side.
B	DC Output from DC Power Supply is defective.	Use digital voltmeter or tester to verify that each DC Output value is correct. If the DC Output value is not correct, turn off the power and disconnect TB-2 and TB-3 connectors from DC Power Supply and verify the DC Output value again (refer to Section 3.1 of this document). Replace DC Power Supply [4] if the DC Output value is abnormal. If the DC output value is correct, turn the power off and connect output connector. Measure resistance value between each output terminal and GND. If resistance value is low, look for the reason. Reference : Resistance > Output voltage ÷ Rated Current
C	Power line connection is defective.	Verify that power line (AC inlet-TB1-Power Switch) inside the device is properly connected. If it is abnormal, repairing at manufacturer is required.
D	Operation Panel connector is defective or disconnected.	Verify that the cable between PCB HSS7-LCDSOSA-F ASSY and PCB HSSV7-CONT-F ASSY (CN21-CN13) is properly connected. If it is abnormal, repairing at manufacturer is required.
E	Power Switch is defective.	Verify that Power Switch can operate. If it is abnormal, repairing at manufacturer is required.
F	PCB HSS7-LCDSOSA-F ASSY is defective.	Replace PCB HSS7-LCDSOSA-F ASSY [2] and if it works, the original part is defective.
G	PCB HSSV7-CONT-F ASSY is defective.	Replace PCB HSSV7-CONT-F ASSY [1] and if it works, the original part is defective.
H	PCB HSSV7-CONT-F ASSY is defective. (Fuse in HSSV7-CONT-F ASSY is blown)	By using tester, verify that Fuse (F6) in PCB HSSV7-CONT-F ASSY is blown or not. If it was blown, then replace PCB HSSV7-CONT-F ASSY [1].

5.2.2 Error Messages on LCD Display when Power Is On

Symptom	Check Item
Control Error ＊＊	A
Mecha Error 01、Mecha Error 02	E－F－D－N－A
Mecha Error 03、Mecha Error 04、Mecha Error 05 Mecha Error 06	B－C－D－N－A
Mecha Error 07、Mecha Error 08	I－D－N－A
Mecha Error 09、Mecha Error 10	T－D－N－A
Mecha Error 11、Mecha Error 12	Q－D－N－A
Sensor Error 05	Q－D－N－A
Sensor Error 09、Sensor Error 10	F－D－N－A
Sensor Error 11、Sensor Error 12	C－D－N－A
Sensor Error 13、Sensor Error 14	I－D－N－A
Sensor Error 15、Sensor Error 16	T－D－N－A
Sensor Error 17、Sensor Error 18、Sensor Error 19	Q－D－N－A
Sensor Error 20	P－D－N－A
Sensor Error 21	U－D－N－A
TempSensErr 01、TempSensErr 02	W－A
TempSensErr 03、TempSensErr 04	X－D－N－A
Upper Cover Open	P－D－N－A
Paper Cover Open	U－D－N－A
Paper Jam01、Paper Jam23	V－S－Y－L－M－D－N－A
Paper Jam02、Paper Jam22	0－J－K－D－N－A
Paper Jam03、Paper Jam92	R－D－N－A
Paper Jam05、Paper Jam15、Paper Jam18、Paper Jam21 Paper Jam31、Paper Jam41、Paper Jam53、Paper Jam67 Paper Jam71	R－D－N－K－A－J
Paper Jam65、Paper Jam69、Paper Jam6C	R－D－N－G－K－A－J
Paper Jam6B、Paper Jam81、Paper Jam91	O－D－A－N
Paper Jam83	S－D－A－N
Paper Empty	Described in Section 5.2.4.
Ribbon Empty	Described in Section 5.2.5.
Inccorect Ribbon	H－D－A－N

Check Item	Probable Cause	Corrective Action
A	PCB HSSV7-CONT-F ASSY is defective.	Replace PCB HSSV7-CONT-F ASSY [1] and if replaced part works, the original part is defective.
B	Defective on DC Motor ASSY (Pinch Roller Up/Down), its connector or cable disconnection.	Verify that the cable between DC Motor ASSY（Pinch Roller Up/Down） and PCB HSSV7-CONT-F ASSY (CN12-CN62) is properly connected. If it is abnormal, repairing at manufacturer is required. Replace DC Motor ASSY（Pinch Roller Up/Down） [8] and if it works, the original part is defective.
C	Defective on Pinch Roller Sensor, its connector, or cable disconnection.	Verify that the cable between Pinch Roller Position Sensor and PCB HSS7-JUNCTION-F ASSY (CN41-CN71, CN41-CN72) is properly connected. If it is abnormal, repairing at manufacturer is required. If DC Motor (Pinch Roller Up/Down) rotates but error occurs, Replace Pinch Roller Sensor ASSY [23].
D	Connection failure on PCB HSSV7-JUNCTION-F ASSY.	Verify that the cable between PCB HSSV7-CONT-F ASSY and PCB HSSV7-JUNCTION-F ASSY (CN4-CN40) is properly connected. If it is abnormal, repairing at manufacturer is required.
E	Defective on DC Motor ASSY (Thermal Head Up/ Down), its connector, or cable disconnection.	Verify that the cable DC Motor ASSY (Thermal Head Up/Down) and PCB HSSV7-CONT-F ASSY (CN12-CN63-CN68) is properly connected. If it is abnormal, repairing at manufacturer is required. Replace DC Motor ASSY (Thermal Head Up/Down) [7] and if it works, the original part is defective.
F	Defective on Head Sensor ASSY, its connector, or cable disconnection.	Verify that the cable between Head Sensor ASSY and PCB HSSV7-JUNCTION-F ASSY (CN42-CN74, CN42-CN75) is properly connected. If it is abnormal, repairing at manufacturer is required. If DC Motor ASSY (Thermal Head Up/Down) rotates but error occur, replace Thermal Head Sensor ASSY [22].
G	Defective on Electromagnetic Clutch of Ribbon Brake 2 ASSY, its connector, or cable disconnection.	Verify that the cable between Electromagnetic Clutch of Ribbon Brake 2 ASSY and PCB HSSV7-CONT-F ASSY (CN12-CN66) is connected properly. Replace Ribbon Brake 2 ASSY[12] and if it works, the original part is defective.

H	Defective on Ribbon Sensor ASSY, its connector, or cable disconnection.	Verify that the cable between Ribbon Sensor ASSY and PCB HSSV7-JUNCTION-F ASSY (CN53-CN87, CN53-CN88) is properly connected. Replace Ribbon Sensor ASSY 27 and if it works, the original part is defective.
I	Defective Pinch Roller Position sensor, its connector, or cable disconnection. Defective DC Motor ASSY (Paper Feed Pinch Up/Down), its connector, or cable disconnection.	Verify that the cable between Pinch Roller Position sensor and PCB HSSV7-JUNCTION-F ASSY (CN48-CN80, CN48-CN81) is properly connected. If it is abnormal, repairing at manufacturer is required. Verify that the able between DC Motor ASSY (Paper Feed Pinch Up/Down) and PCB HSSV7-CONT-F ASSY (CN12-CN64-CN69) is properly connected. If it is abnormal, repairing at manufacturer is required. Replace DC Motor ASSY (Paper Feed Pinch Up/Down) 9 and if it works, the original part is defective.
J	Defective Main Motor (Paper Feed), its connector or cable disconnection.	Verify that the wire between Main Motor (Paper Feed) and PCB HSSV7-CONT-F ASSY (CN6) is properly connected. If it is abnormal, repairing at manufacturer is required. If the Main Motor does not work, Main Motor may be defective. Repairing at manufacturer is required.
K	Defective PCB HSSV7-CONT-F ASSY (Blown fuse of Main Motor (Paper Feeding)	Use the tester to verify that Fuse (F1) on PCB HSSV7-CONT-F ASSY is not blown. If it is blown, replace PCB HSSV7-CONT-F ASSY 1.
L	Defective Paper Feed Sub-Motor, its connection or cable disconnection.	Verify that the cable between Paper Feeding Sub-Motor and PCB HSSV7-CONT-F ASSY (CN7) is properly connected. If it is abnormal, repairing at manufacturer is required. If Paper Feeding Sub-Motor is not working, sub-motor may be defective. Repairing at manufacturer is required.
M	Defective PCB HSSV7-CONT-F ASSY (Blown Fuse on Paper Feed Sub-Motor)	Use the tester to verify that Fuse (F3) on PCB HSSV7-CONT-F ASSY is not blown. If it is blown, replace PCB HSSV7-CONT-F ASSY 1.
N	Defective PCB HSSV7-JUNCTION-F ASSY.	Replace PCB HSSV7-JUNCTION-F ASSY 3 and if it works, the original part is defective.

O	Defective Paper Edge Sensor, its connector or disconnection.	Verify that the cable between Paper Edge Sensor and PCB HSSV7-JUNCTION-F ASSY (CN45-CN82) is properly connected. If it is abnormal, repairing at manufacturer is required. Replace PCB HSSV7-SEN2-F ASSY [24] and if it works, the original part is defective.
P	Defective Upper Cover Open Switch, its connector or disconnection.	Verify that the Upper Cover Open Switch is operational. If it is abnormal, repairing at manufacturer is required. Verify that the cable between Upper Cover Open switch and PCB HSSV7-JUNCTION-F ASSY (CN49-CN96) is properly connected. If it is abnormal, repairing at manufacturer is required.
Q	Defective Paper Cutter Unit, its connector or disconnection	Verify that cable between the DC Motor at Paper Cutter Unit and PCB HSSV7-CONT-F ASSY (CN10) is properly connected. If it is abnormal, repairing at manufacturer is required. Verify that the cable between sensor at Paper Cutter Unit and PCB HSSV7-JUNCTION-F ASSY (CN50-CN91, CN50-CN92,CN50-CN93) is properly connected. If it is abnormal, repairing at manufacturer is required. Replace Paper Cutter Unit [10] and if it works, the original part is defective.
R	Defective Print Position Sensor, its connector or cable disconnection.	Verify that the cable between Print Position Sensor and PCB HSSV7-JUNCTION-F ASSY (CN46-CN83) is properly connected. If it is abnormal, repairing at manufacturer is required. Print Position Sensor is located inside Feed Roller Guide ASSY. Replace Feed Roller Guide ASSY [21] and if it works, the original part is defective.
S	Defective Paper Empty Sensor, its connector or cable disconnection.	Verify that cable connection between Paper Empty Sensor and PCB HSSV7-JUNCTION-F ASSY (CN43-CN78, CN43-CN79) is properly connected. If it is abnormal, repairing at manufacturer is required. Paper Empty Sensor may be defective. Repairing at manufacturer is required.

T	Defective Ejection Pinch Roller Position sensor, its connector, or cable disconnection. Defective DC Motor ASSY (Ejection Pinch Up/Down), its connector, or cable disconnection.	Verify that the cable between Ejection Pinch Roller Position sensor and PCB HSSV7-JUNCTION-F ASSY (CN39-CN84, CN39-CN85) is properly connected. If it is abnormal, repairing at manufacturer is required. Verify that the cable between DC Motor ASSY (Ejection Pinch Up/Down) and PCB HSSV7-CONT-F ASSY (CN12-CN59) is properly connected. If it is abnormal, repairing at manufacturer is required. Replace DC Motor ASSY (Ejection Pinch Up/Down) 29 and if it works, DC Motor ASSY (Paper Feed Pinch Up/Down) is defective.
U	Defective Paper Feed Cover Open Switch, its connector, or cable disconnection.	Verify that the Paper Feed Cover Open Switch is operational. If it is abnormal, repairing at manufacturer is required. Verify that the cable between the Paper Feed Cover Open Switch and PCB HSSV7-JUNCTION-F ASSY (CN48-CN89) is properly connected. If it is abnormal, repairing at manufacturer is required.
V	Dirty Paper Feed Roller of Paper Box.	Use a clear cloth soaked with isopropyl alcohol to clean the Paper Feed Roller of Paper Box. (Refer to Section 2.6 of this document)
W	Defective Thermal Head ASSY, its connector, or cable disconnection.	Verify that the cable between Thermal Head connector and PCB HSSV7-CONT-F ASSY (CN3-CN22) is properly connected. If it is abnormal, repairing at manufacturer is required. Replace the Thermal Head ASSY 5 and if it works, Thermal Head ASSY is defective.
X	Defective Ambient Temperature Sensor, its connector, or cable disconnection.	Verify that the Ambient Temperature Sensor is operational. If it is abnormal, repairing at manufacturer is required. Verify that the cable between the Ambient Temperature Sensor and PCB HSSV7-JUNCTION-F ASSY (CN52-CN90) is properly connected. If it is abnormal, repairing at manufacturer is required.
Y	Defective Electromagnetic Clutch , its connector, or cable disconnection.	Verify that the cable between Electromagnetic Clutch and PCB HSSV7-CONT-F ASSY (CN12-CN65) is connected properly. Replace Electromagnetic Clutch 11 and if it works, the original part is defective.

5.2.3 Troubles in Operation Buttons and Indicators

Symptom	Check Item
LED lights on Operation Panel do not display or are constantly displayed.	A－C－D－E
LCD does not display properly.	A－C－D－E
Operation Buttons do not operate.	A－B－D

Check Item	Probable Cause	Corrective Action
A	Operation Panel connector is defective or disconnected.	Verify that cable connection between Operation panel and PCB HSSV7-CONT-F ASSY (CN13-CN21) is properly connected. If it is abnormal, repairing at manufacturer is required.
B	Operation Switch is defective.	Replace HSSV7-LCDSOSA-F ASSY [2] and if the replaced PCB works, the original part is defective.
C	PCB HSSV7-LCDSOSA-F ASSY is defective.	Replace HSSV7-LCDSOSA-F ASSY [2] and if the replaced PCB works, the original part is defective.
D	PCB HSSV7-CONT-F ASSY is defective.	PCB HSSV7-CONT-F ASSY [1] and if the replaced PCB works, the original part is defective.
E	DC output from DC Power Supply is abnormal.	Verify that DC output value is normal. If it is not normal, then proceed to DC output voltage adjustment on DC Power Supply (Described Section 3.1 of this document) If the problem still exists, replace DC Power Supply [4].

5.2.4 Troubles in Paper Feed

Symptom	Check Item
Cannot initially load the paper. Paper Empty is displayed.	A—B—C—D—E—N
Paper does not properly eject after printing.	F—O—D—H
Scratches on the surface of the paper.	P—G
Front part of paper is bent.	G—A
Paper skews.	I—G—A
Paper is automatically rewound to the paper box.	L—K—J
Cannot detect paper empty.	J—M
Paper is not cut normally.	O

Check Item	Probable Cause	Corrective Action
A	Defective part inside Paper Box.	Verify that the part inside the Paper Box is properly working. If it is abnormal, repairing at manufacturer is required.
B	Defective DC Motor ASSY (Paper Feed Pinch Up/Down)	Replace DC Motor ASSY (Paper Feed Pinch Up/Down) 9 and if it works, the original part is defective.
C	Paper Feed Roller of Paper Box is dirty.	Use a clear cloth soaked with isopropyl alcohol to clean the Paper Feed Roller. (Refer to Section 2.6 of this document)
D	Defective Paper Feed Sub-Motor, its connector or cable disconnection.	Verify that the wire between Paper Feed Sub-Motor and PCB HSSV7-CONT-F ASSY (CN7) is properly connected. If it is abnormal, repairing at manufacturer is required. If properly connected but Sub-Motor does not work, the sub-motor may be defective. Repairing at the manufacturer is required.
E	Defective Electromagnetic Clutch (Paper Feed), its connector or cable disconnection.	Verify the cable between Electromagnetic Clutch (Paper Feed) and PCB HSSV7-CONT-F ASSY (CN12-CN65) is properly connected. If it is abnormal, repairing at manufacturer is required. Replace the Electromagnetic Clutch (Paper Feed) 11 and if it works, the original part is defective.
F	Defective Print Position Sensor, its connector or cable disconnection.	Verify the cable between Print Position sensor and PCB HSSV7-JUNCTION-F ASSY (CN46-CN83) is properly connected. If it is abnormal, repairing at manufacturer is required. Print Position sensor is inside Feed Roller Guide ASSY. Replace Feed Roller Guide ASSY 21 and if it works, the original part is defective.
G	Dirt or foreign object at the paper path.	Verify that if there is no dirt or foreign objects at paper path.
H	Defective Ejection Roller ASSY	Replace Ejection Roller ASSY 16 and if it works, the original part is defective.
I	Roll Failure of Paper	Verify whether the paper has no roll failure. If it has, replace with the new paper.

J	Defective Sensor, connector or cable disconnection.	Verify that the cable between Paper Empty Sensor and PCB HSSV7-JUNCTION-F ASSY (CN43-CN78, CN43-CN79) is properly connected. If it is abnormal, repairing at manufacturer is required. Paper Empty Sensor may be defective. Repairing at the manufacturer is required.
K	Defective Paper Edge Sensor, its connector, or cable disconnection.	Verify that the cable between Paper Edge Sensor and PCB HSSV7-JUNCTION-F ASSY (CN45-CN82) is properly connected. If it is abnormal, repairing at manufacturing is required. If there is no problem with connection, the Paper Edge Sensor may be defective. Replace PCB HSSV7-SEN2-F ASSY [24] and if it works, the original part is defective.
L	Dirt or foreign object on Paper Edge Sensor.	Clean the Paper Edge Sensor if there is dust or foreign object. (Refer to Section 2.6 of this document)
M	Defective PCB HSSV7-CONT-F ASSY	Replace PCB HSSV7-CONT-F ASSY [1] and if it works, the original part is defective.
N	Defective PCB HSSV7-CONT-F ASSY (blown fuse for Paper Feed Sub-Motor)	Use the tester to verify that Fuse (F3) on PCB HSSV7-CONT-F ASSY is not blown. If the fuse is blown, replace PCB HSSV7-CONT-F ASSY [1].
O	Paper Cutter Unit is defective.	Replace Paper Cutter Unit [10] and if the replaced part works, the original part is defective.
P	Dirt or foreign objects on Thermal Head and release plate.	Clean the heat element of Thermal Head and the edge of separation plate with Head Cleaning Kit.(Refer to Section 2.6 of this document)
Q	PCB HSSV7-JUNCTION-F ASSY is defective.	Replace PCB HSSV7-JUNCTION-F ASSY [3] and if it works, the original part is defective.

5.2.5 Troubles in Feeding Ink Ribbon

Symptom	Check Item
Cannot detect the beginning of the ribbon.	H－F－E－B－A－G－C－D
Cannot detect the ribbon out.	H－F－B－A－C－D
Ribbon empty error cannot cancel.	F－E－B－A－G－C－D
Cannot detect correct ribbon type.	H－F－E－B－A－C－D

Check Item	Probable Cause	Corrective Action
A	Defective Ribbon Mark Sensor ASSY, its connector, or cable disconnection.	Verify that the cable connection between Ribbon Sensor ASSY and PCB HSSV7-JUNCTION-F ASSY (CN87-CN53, CH88-CN53) is properly connected. If it is abnormal, repairing at manufacturer is required. Replace Ribbon Sensor ASSY 27 and if it works, the original part is defective.
B	Defective PCB HSSV7-JUNCTION-F ASSY, or cable disconnection.	Verify that cable connection between PCB HSSV7-CONT-F ASSY and PCB HSSV7-JUNCTION-F ASSY (CN4-CN40) is properly connected. If it is abnormal, repairing at manufacturer is required.
C	Defective PCB HSSV7-CONT-F ASSY.	Replace PCB HSSV7-CONT-F ASSY 1 and if it works, the original part is defective.
D	Defective PCB HSSV7-JUNCTION-F ASSY.	Replace PCB HSSV7-JUNCTION-F ASSY 3 and if it works, the original part is defective.
E	Ribbon Mark Reflection Shield is dirty.	Verify that Ribbon Mark Reflection Shield Slicked on the thermal head ASSY is not dirty. Clean if it is dirty （Refer to Section 2.6）
F	Dust and/or foreign object in the ribbon mark sensor ASSY.	Verify that there are no paper dusts, and foreign object on the Ribbon Mark Sensor ASSY. (Refer to Section 2.6)
G	Defective DC Motor ASSY (Ribbon Winding)	Use printer engine's self diagnostic to test the operation of DC Motor. If the diagnostic showed abnormality, replace the DC Motor ASSY (Ribbon Winding) 6.
H	Roll Failure of Ink Ribbon	Verify if there is no roll failure of Ink ribbon at winding or supply side. If there is roll failure, replace with the new ink ribbon.

5.2.6 Troubles in Printing and Contents of Printing

Symptom	Check Item
Thermal head cooling fan does not spin.	P－O－C
Thermal protect cannot be canceled.	P－O－B－C
Thermal protect occurs so often.	P－O－B－G－A－H
Stop in the middle of printing.	C
Printing function works, but only printing blank paper.	B－A－C
Printing result falls short.	L－D－C－R
Printing unwanted objects.	B－C－R
Certain block does cannot print or density is abnormal.	B－C
Blank line in the paper printing direction.	B－C
Section of the area is not printed.	E－F－N－K－J－B－C
Wrinkle printing occurs.	G－A－H－P－O－B－I
Printing has extreme bad registration.	L－D－C－M
Print density is too dark, or light.	B－G－A－H－C
Print color is completely different.	B－C
Streaks are printed in the longitudinal direction.	L－D－C－R
Printed image is distorted.	C－B
Paper cut cannot be done well.	Q

Check Item	Probable Cause	Corrective Action
A	Thermal head power output is defective.	Use digital voltmeter to verify the output value is correct. If it is abnormal, adjust the DC output on the DC Power Supply. (Refer to Section 3.1 of this document) If the value is incorrect even after this adjustment, replace the DC Power Supply [4].
B	Defective Thermal Head ASSY, its connector, or cable disconnection.	Verify the connection between thermal head connector and PCB HSSV7-CONT-F ASSY (CN3-CN22) is properly connected. If it is abnormal, repairing at manufacturer is required. Replace Thermal Head ASSY [5] and if it works, the original part is defective.
C	Defective HSSV7-CONT-F ASSY.	Replace PCB HSSV7-CONT-F ASSY [1] and if it works, the original part is defective.
D	Paper Feed Main Motor is defective.	If Paper Feed Main Motor does not work, the Main Motor may be defective. Repairing at manufacturer is required.
E	Platen is dirty.	Use a clear cloth soaked with isopropyl alcohol to clean the platen. (Refer to Section 2.6)
F	Pinch Roller is dirty.	Use a dry clear cloth soaked to clean the Pinch Roller.
G	Thermal head power setting is bad.	Each thermal head has different resistance value for the heating element. Therefore voltage setting for each device is different. Make sure that voltage setting matches the value on the nameplate. Otherwise set the voltage of the Power Supply Unit. (Refer to Section 3.1 of this document)
H	Incorrect Density Setting of Thermal Head.	Each thermal head has different density value. Therefore adjusting print density for each thermal head. Make sure that print density value is as same as designated. (Refer to Section 3.3 of this document)
I	Defective Electromagnetic Clutch (Ribbon Brake), its connector, or cable disconnection.	Verify that the cable between Electromagnetic Clutch (Ribbon Brake) and PCB HSSV7-CONT-F ASSY (CN12-CN66) is properly connected. Replace Ribbon Brake 2 ASSY [12] and if it works, the original part is defective.

J	Cleaning Roller is dirty. (Paper Feed, Paper Ejection)	If there is dust on the Cleaning Roller, use a clear cloth soaked with isopropyl alcohol to clean the Cleaning Roller.
K	Defective Pinch Roller	Verify that there is no unevenness and/or scratches on the Pinch Roller. Otherwise replace Pinch Roller ASSY 17.
L	Lack of tension on Timing Belt	Adjust the tension of timing belt, referring to Section 3.2 of this document. If there is defective, replace Timing Belt (Feed Roller Drive) 18, Timing Belt (Feed Roller Drive) 19 or Timing Belt (Roll Paper Drive) 20.
M	Defective DC Motor ASSY (Ribbon Winding)	Replace DC Motor ASSY (Ribbon Winding) 6 and if it works, the original part is defective.
N	Defective Platen ASSY.	If the printout has obvious streaking or density change for about every 57milimeters, replace Platen ASSY 14.
O	Defective DC Fan (Thermal Head Cooling).	Replace DC Fan (Thermal Head Cooling) 13 and if it works, the original part is defective.
P	Connector failure on DC Fan (Thermal Head Cooling), or cable disconnection.	Verify that connection between DC Fan connector and PCB HSSV7-CONT-F ASSY (CN12-CN63-CN70) is properly connected. If it is abnormal, repairing at manufacturer is required.
Q	Defective Paper Cutter Unit.	Replace Paper Cutter Unit 10 and if it works, the original part is defective.
R	Defective Paper Feed Sub-Motor.	If Paper Feed Sub-Motor does not work, the Sub-Motor may be defective. Repairing at the manufacturer is required.

5.2.7 Occurrence of Abnormal Noise

Symptom	Check Item
Abnormal noise occurs when turning the power on.	K
Abnormal noise occurs during Thermal Head up and down movement.	A－B
Abnormal noise occurs during printing.	G－C
Abnormal noise occurs during ribbon winding.	E－D
Abnormal noise occurs during paper feeding.	G－F－H－I
Abnormal noise occurs during paper cutting.	J

Check Item	Probable Cause	Corrective Action
A	Gear of DC Motor (Thermal Head Up/Down) does not have adequate grease.	If the DC Motor Gear does not have adequate grease, apply some grease to the gear. (Refer to Section 2.7 of this document)
B	Cam for Thermal Head contact does not have adequate grease.	If the cam for Thermal Head contact does not have adequate grease, apply some grease to the cam. (Refer to Section 2.7 of this document)
C	Sticking is occurring due to Thermal head voltage setting failure.	Use digital voltmeter to verify that each DC output value is correct. If it is not correct, adjust the DC output on the DC Power Supply. (Refer to Section 3.1 of this document) If the value is still incorrect, replace the DC Power Supply [4].
D	Defective DC Motor ASSY (Ribbon Winding)	Replace DC Motor ASSY (Ribbon Winding) [6] and if it works, the original part is defective.
E	Gear of DC Motor ASSY (Ribbon Winding) does not have adequate grease.	If the DC Motor Gear does not have adequate grease, apply some grease to the gear. (Refer to Section 2.7 of this document)
F	Defective Main Motor (Paper Feed)	If Main Motor (Paper Feed) works abnormally, the Main Motor may be defective. Repairing at manufacturer is required.
G	Lack of Tension on Timing Belt	Adjust the tension of timing belt, referring to Section 3.2 of this document. If there is defective, replace Timing Belt (Feed Roller Drive) [18], Timing Belt (Feed Roller Drive) [19] or Timing Belt (Roll Paper Drive) [20].
H	Defective PCB HSSV7-CONT-F ASSY.	Replace PCB HSSV7-CONT-F ASSY [1] and if it works, the original part is defective.
I	Foreign Object on Paper Path.	Verify that there are no foreign objects in the paper path.
J	Defective Paper Cutter Unit	Replace Paper Cutter Unit [10] and if it works, the original part is defective.
K	Cable contact to the rotating section of cooling fans.	Verify that there is no contact of the cable to thermal head cooling fan or DC Power Supply cooling fan. If there is contact, verify whether there is damage. If there is no damage, tie the cable in a bundle so as not to contact thermal head cooling fan or DC Power Supply cooling fan. If there is damage, repairing at manufacturer is required.

5.2.8 Troubles in Connection

Symptom	Check Item
Host cannot find the printer.	C－B－F－E
Data cannot be transferred to the printer.	C－B－F－E
Data transfer stops.	C－B－F－E－A－D

Check Item	Probable Cause	Corrective Action
A	Number of received data is different	Verify that data size to the printer and number of data that is sent from the driver software and format are correct.
B	Connection failure of USB cable, or cable disconnection.	Verify that the USB cable is not loose, and connector latch is properly locked. Replace the cable and if it works, the original cable is defective.
C	Defective USB cable connector.	Verify that USB cable connector's pin is normal. If it is abnormal, replace the USB cable.
D	Defective printer driver software.	Verify the driver software specifications to check whether the command and data transfer format are properly output.
E	Defective PCB HSSV7-CONT-F ASSY	Verify that the test print can operate properly. If not, PCB HSSV7-CONT-F ASSY 1 is defective. Replace the part with the new one.
F	Defective PCB HSSV7-USBCON-F ASSY, its connection, or cable disconnection.	Verify that the cable between PCB HSSV7-USBCON-F ASSY and PCB HSSV7-CONT-F-ASSY (CN18) is properly connected. Replace PCB HSSV7-USBCON-F ASSY 28 and if it works, the original part is defective.

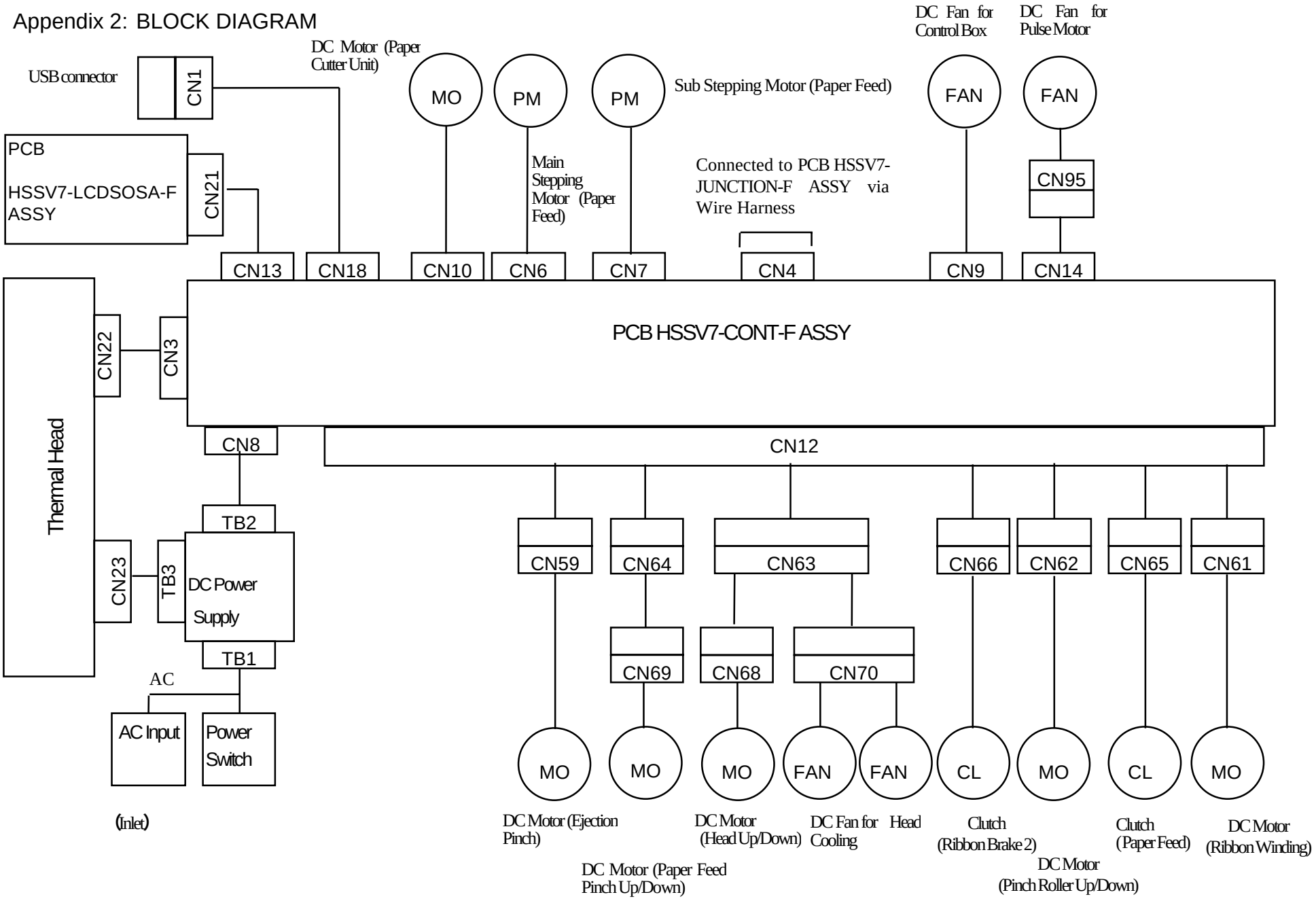
Appendix 1: Maintenance Parts List (including Periodic Replacement Parts)

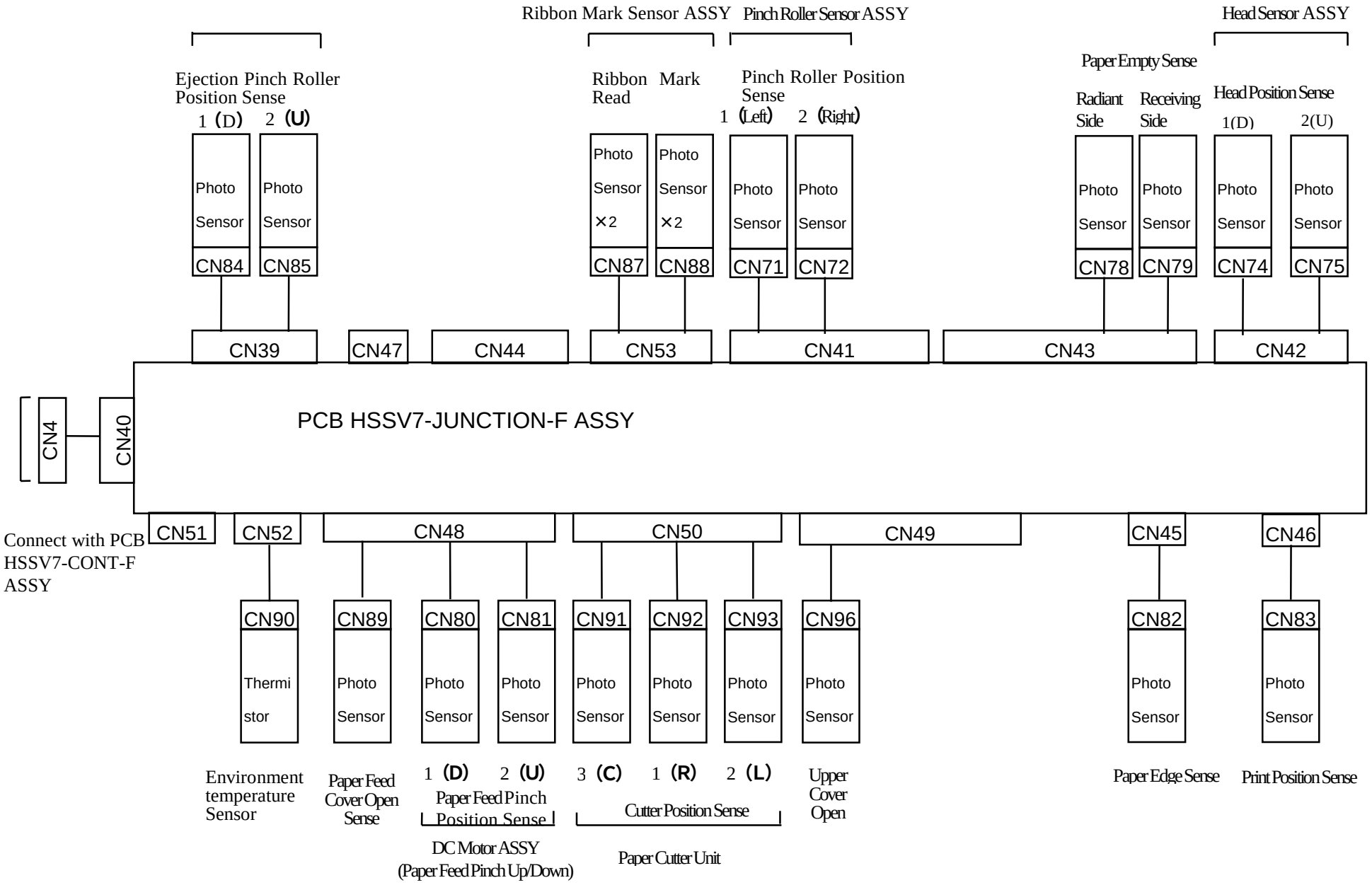
	№	Part Name	Part Number	Repair-ability	Storage (Year)	MTTR (Hour)	Life Cycle	Remarks
	1	PCB HSSV7-CONT-F ASSY	164-11-09756	Yes	2	0.2		
	2	PCB HSSV7-LCDSOSA-F ASSY	164-11-09757	Yes	2	0.2		
	3	PCB HSSV7-JUNCTION-F ASSY	164-11-09758	Yes	2	0.2		
	4	DC Power Supply	164-11-09625	No	2	0.4		
*	5	Thermal Head ASSY	164-11-09770	No	2	0.4	20,000 prints	
*	6	DC Motor ASSY (Ribbon Winding)	164-11-09627	No	2	0.2	30,000 prints	
*	7	DC Motor ASSY (Thermal Head Up/Down)	164-11-09628	No	2	0.2	60,000 prints	
*	8	DC Motor ASSY (Pinch Roller Up/Down)	164-11-09629	No	2	0.2	60,000 prints	
*	9	DC Motor ASSY (Paper Feed Pinch Up/Down)	164-11-09630	No	2	0.3	60,000 prints	
	10	Paper Cutter Unit	164-11-09760	No	2	0.2	300,000 cuts	
	11	Electromagnetic Clutch	164-11-09418	No	2	0.2	60,000 prints	
*	12	Ribbon Brake 2 ASSY	164-11-09634	No	2	0.2	60,000 prints	
	13	DC Fan (Thermal Head Cooling)	164-11-09765	No	2	0.3	30,000 hours	
	14	Platen ASSY	164-11-09766	No	1.5	0.3	More than 100,000 prints	
	15	Feed Roller ASSY	164-11-09767	No	1.5	0.3	More than 100,000 prints	
	16	Ejection Roller ASSY	164-11-09768	No	1.5	0.3	More than 100,000 prints	
	17	Pinch Roller ASSY	164-11-09769	No	1.5	0.3	More than 100,000 prints	
	18	Timing Belt (Feed Roller Drive)	060-91-1803-101	No	1.5	0.2	More than 100,000 prints	
	19	Timing Belt (Feed Roller Drive)	060-91-1782-126	No	1.5	0.2	More than 100,000 prints	
	20	Timing Belt (Roll Paper Drive)	060-91-1810-256	No	1.5	0.2	More than 100,000 prints	

	№	Part Name	Part Number	Repair-ability	Storage (Year)	MTTR (Hour)	Life Cycle	Remarks
	21	Feed Roller Guide ASSY	164-11-09761	Yes	2	0.4		
	22	Head Sensor ASSY	164-11-09415	No	2	0.2		
	23	Pinch Roller Sensor ASSY	164-11-09762	No	2	0.4		
	24	PCB HSSV7-SEN2-F ASSY	164-11-09764	No	2	0.2		
	25	Cleaning Roller (Paper Feed side)	164-11-09771	No	1.5	0.1	More than 100,000 prints	
	26	Cleaning Roller (Paper Ejection side)	164-11-09772	No	1.5	0.1	More than 100,000 prints	
	27	Ribbon Sensor ASSY	164-11-09763	No	2	0.2		
	28	PCB HSSV7-USBCON-F ASSY	164-11-09759	No	2	0.2		
*	29	DC Motor ASSY (Ejection Pinch Up/Down)	164-11-09823	No	2	0.2	60,000 prints	

Remarks 1: * denotes periodic replacement parts. Follow the maintenance schedule for periodic replacement.

Appendix 2: BLOCK DIAGRAM




Ribbon Mark Sensor ASSY
Pinch Roller Sensor ASSY
Head Sensor ASSY
Ejection Pinch Roller Position Sense
1 (D) 2 (U)
Ribbon Mark Read
Pinch Roller Position Sense
1 (Left) 2 (Right)
Paper Empty Sense
Radiant Side
Receiving Side
Head Position Sense
1(D) 2(U)
Photo Sensor
Photo Sensor ×2
CN84
CN85
CN87
CN88
CN71
CN72
CN78
CN79
CN74
CN75
CN39
CN47
CN44
CN53
CN41
CN43
CN42
CN4
CN40
PCB HSSV7-JUNCTION-F ASSY
CN51
CN52
CN48
CN50
CN49
CN45
CN46
Connect with PCB HSSV7-CONT-F ASSY
CN90
CN89
CN80
CN81
CN91
CN92
CN93
CN96
CN82
CN83
Thermistor
Photo Sensor
Environment temperature Sensor
Paper Feed Cover Open Sense
1 (D) 2 (U)
Paper Feed Pinch Position Sense
DC Motor ASSY (Paper Feed Pinch Up/Down)
3 (C) 1 (R) 2 (L)
Cutter Position Sense
Paper Cutter Unit
Upper Cover Open
Paper Edge Sense
Print Position Sense