LASER PRINTER

SERVICE MANUAL

MECHANICS & ELECTRONICS

CONTENTS

CHAPTER I GENERAL

1. SPECIFICATIONS

(1) Paper type
Cut sheet
Feedable paper weight : 60 ~ 105 g/ m^2

(2) Paper size
Max. : 216.0 x 356.0 mm
Min. : 182.0 x 257.0 mm

A4, Letter, Legal, Executive, ISO B5 (not available for the optional lower paper cassette)

(3) Input power supply
24V DC ± 10%, max. 0.6 A (supplied from the printer)

(4) Feeding system
Type :Reversal type
Paper feeding system :Alternate paper feeding system

(5) Paper feed
Paper feeding rate :70.6 mm/sec.
Feedable paper size :A4 210.0 x 297.0 mm
Letter 215.9 x 279.4 mm
Legal 215.9 x 355.6 mm
Executive 184.2 x 266.7 mm
B5 182.0 x 257.0 mm

(6) Dimensions
323.0 (W) x 105.0 (D) x 286.0 (H) mm

(7) Weight
4.5 kg

(8) Environmental conditions

1) Operating
Temperature : 10°C ~ 32.5°C
Humidity : 20% RH ~ 80% RH (No dew condensation allowed)

2) Idling
Temperature : 0°C ~ 35°C
Humidity : 10% RH ~ 80% RH (No dew condensation allowed)

3) Storage

Store the unit under the following conditions to ensure reliable performance.

Temperature	Normal (90% of entire storage period)		0°C ~ 35°C
	Severe (10% of entire storage period)	High	35°C ~ 60°C
		Low	-20°C ~ 0°C
Temperature variation (within 3 minutes)			60°C →15°C -20°C→25°C
Humidity*	Normal (90% of entire storage period)		35%RH ~ 85%RH
	Severe (10% of entire storage period)	High	85%RH ~ 95%RH
		Low	10%RH ~ 35%RH
Air pressure			613 ~ 1013hPa
Storage life			0.5 years

*No dew condensation allowed

4) Transportation conditions

Environment :

Temperature	-20°C ~ 60°C
Humidity	95%RH or below

5) Vibration

	Vibration acceleration	Vibration frequency	Measuring method
During operation	0.2 G	5 ~ 100 Hz	Refer to the evaluation test standard.
At standby	0.2 G	5 ~ 100 Hz	Same as above.
When packed	1.5 G	10 ~ 100 Hz	Same as above.

6) Inclination — The feeder must operate properly even at an inclination angle of 2.

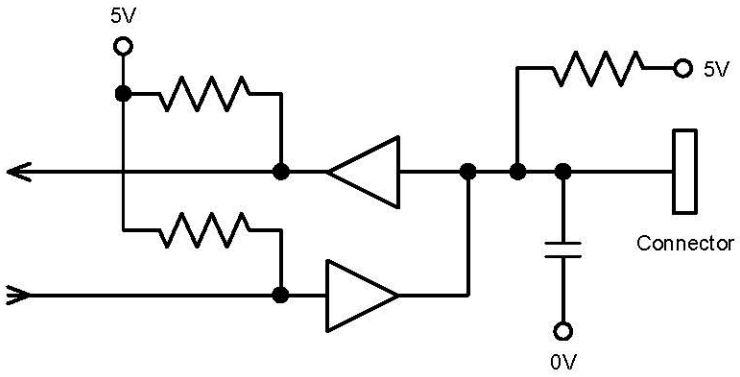
7) Mechanical noise — During printing : 49 dB (A) or below
At standby : 40 dB (A) or below

(9) Interface

1) Connector signal table (8 pin modular jack)

Pin	Signal name
1	24V
2	SIDATA
3	24V
4	SICLK
5	GND
6	/ATTN
7	/RESET
8	GND

2) Interface circuit



74LS07 or equivalent

CHAPTER II MECHANICAL SYSTEM

1. BLOCK DIAGRAM

The Duplex unit is composed of an outside frame, an inside frame and a Duplex tray, and operates according to signals sent from the printer in serial communication.

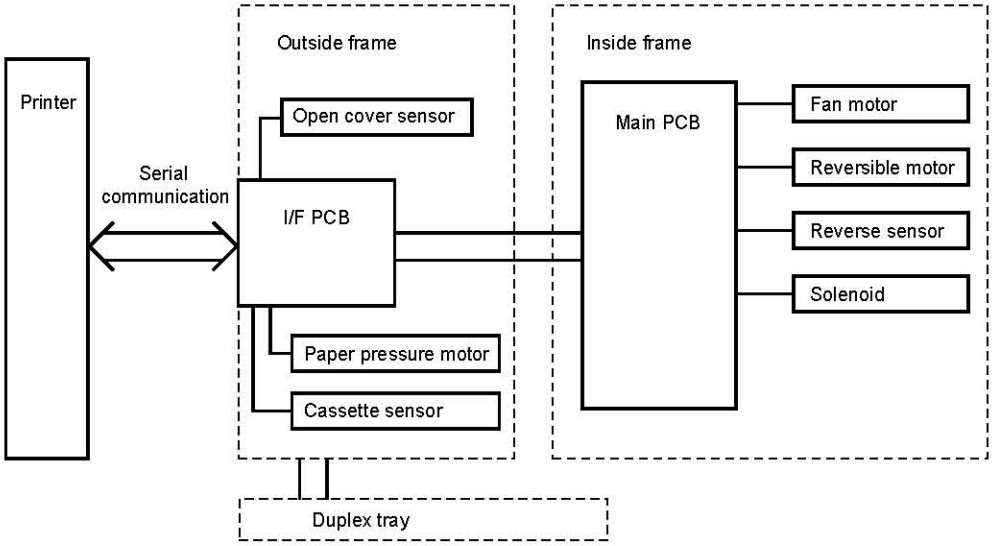


Figure 2.1

2. PAPER FEED MECHANISM

As soon as the printer requests for drive, a signal from the main PCB turns on the solenoid to run the reversible motor clockwise (when viewed from the motor output shaft). The Duplex unit will draw paper from the printer by turning on the solenoid.

The supplied paper is further transferred by the reversible motor driven reversible gears.

When the reverse sensor detects the rear end of the paper, the reversible motor comes to a momentary stop, and begins running counterclockwise.

Then the reversible motor enables the carriage rollers to feed the paper into the Duplex tray installed within the Duplex unit. With the printer's Duplex sensor on, the Duplex unit stops the reversible motor by a request from the printer.

One cycle of paper feeding operation is completed in this way.

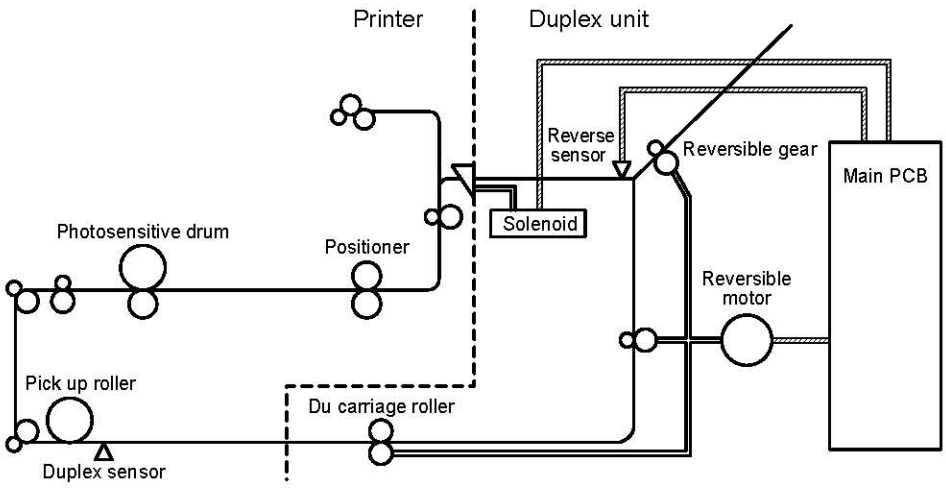
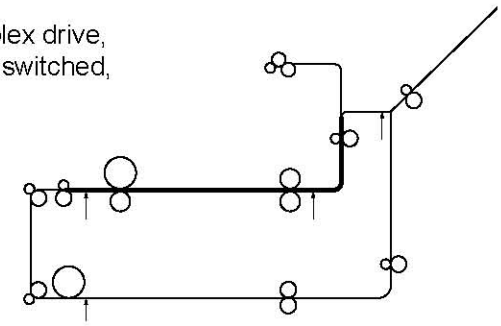


Figure 2.2

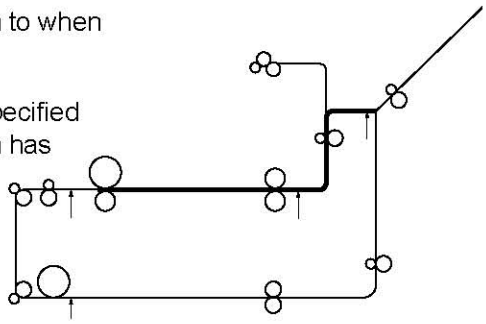
3. PAPER FEED SEQUENCE

(1) As soon as the printer requests for Duplex drive, the solenoid is turned on, the flapper is switched, and the motor runs forward.



(2) The reverse sensor is monitored to measure the time from when the solenoid is turned on to when the sensor is turned on.

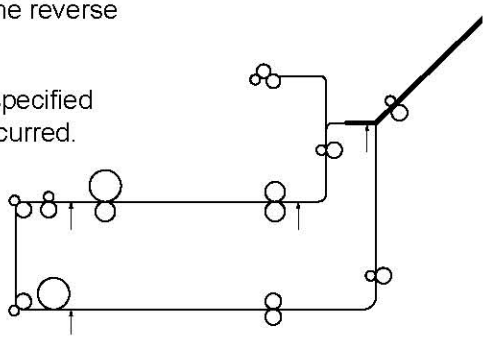
If the sensor has not turned on after a specified time passed, it is deemed that paper jam has occurred.



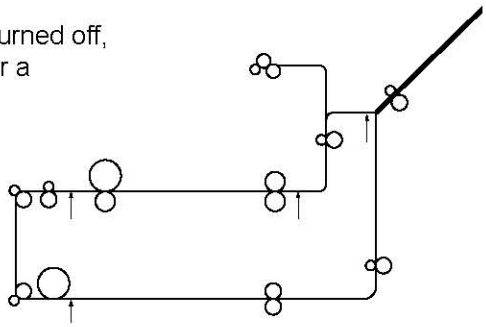
(3) The solenoid is turned off in response to instructions from the printer, and the flapper is returned as it was before.

After the reverse sensor is turned on, the time up to when the paper has passed through the reverse sensor is monitored.

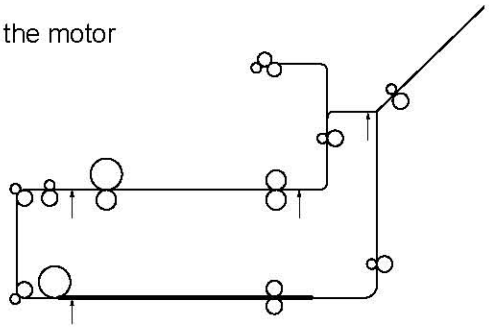
If the sensor has not turned off within a specified time, it is deemed that paper jam has occurred.



(4) Immediately after the reverse sensor is turned off, the motor begins through-down, stops for a specified time, and runs backward.



(5) As soon as the printer requests for stop, the motor stops and goes into a standby state.



• **Paper Feed Timing Chart (when only one piece of A4 paper is reversed)**

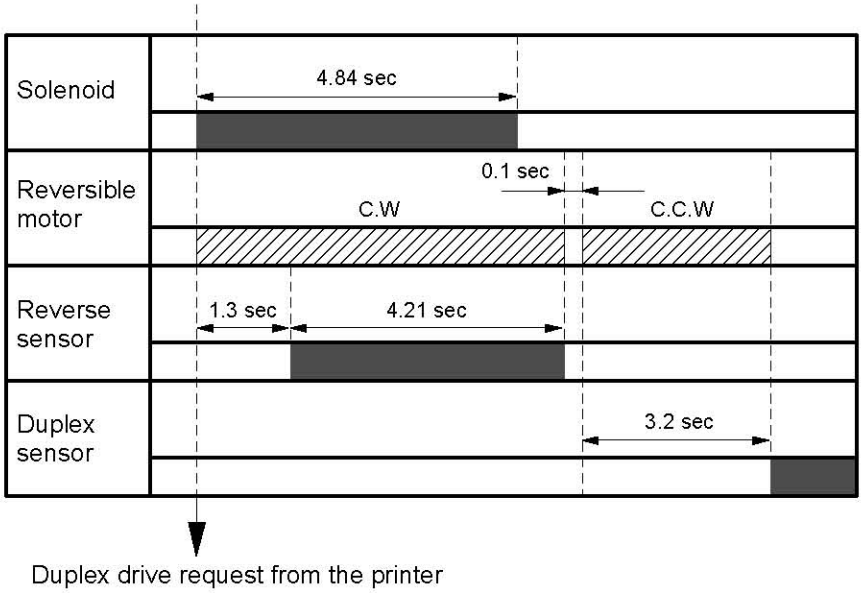


Figure 2.3

4. PAPER PRESSURE MECHANISM

Upon a request from the printer, the paper pressure unit built in the Duplex tray is moved up or down by the paper pressure motor connected to the I/F PCB.

The paper pressure unit is moved up only when the first tray is selected on the printer to supply paper, or down when paper is fed from another tray.

The cassette sensor detects the position of the paper pressure unit, and whether the Duplex tray is loaded into the Duplex unit.

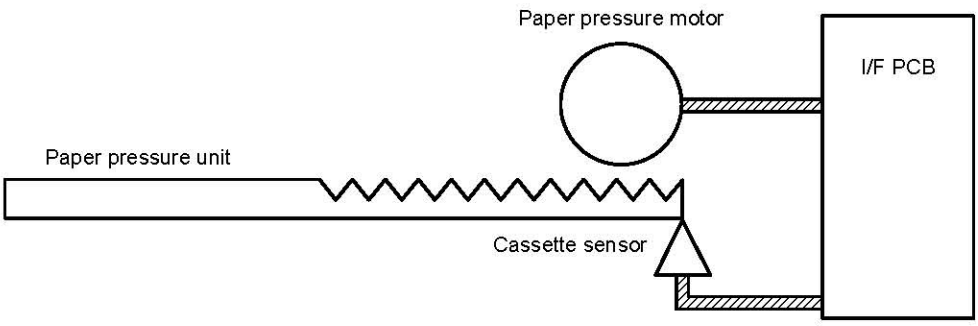


Figure 2.4

CHAPTER III ELECTRICAL SYSTEM

1. COMPOSITION

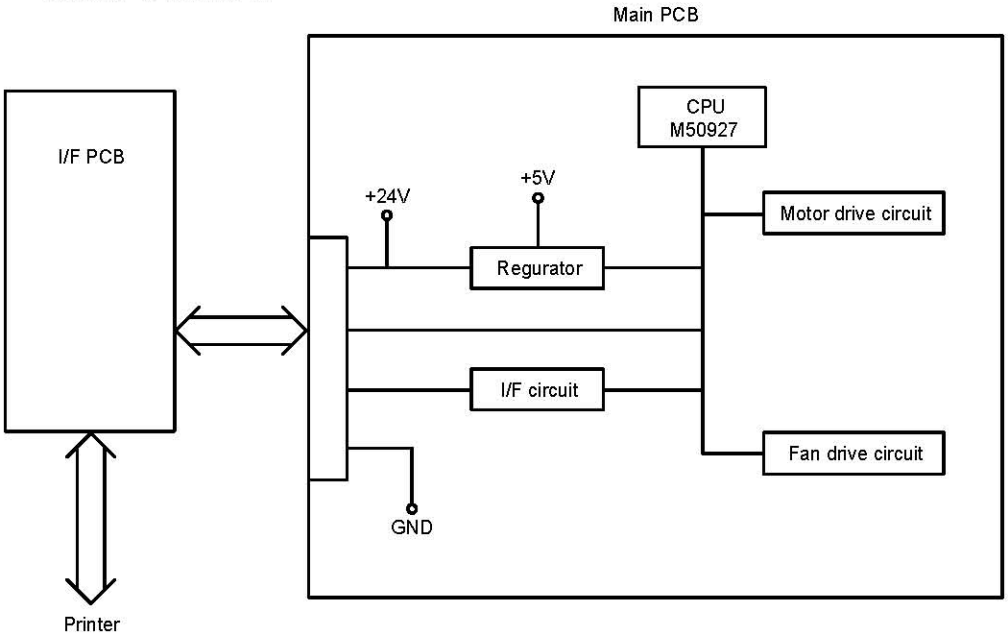


Figure 3.1

2. MAIN PCB FUNCTION

2.1 I/F Circuit

This interface circuit is used to transmit and receive data with the printer. Since the Duplex unit responds only to commands from the printer, the Duplex unit transmits its status upon request from the printer.

2.2 Regulator

The regulator produces +5V logic power supply from the +24V supplied by the printer.

2.3 Fan Drive Circuit

This circuit drives the cooling DC fan.

The fan rotation speed is switched between two different levels according to the signal from the CPU. It operates at high speed when the Duplex unit feeds paper, or it runs at low speed while the unit is not in operation.

When the DC fan functions properly, it sends a /FLOCK signal to the CPU to confirm that it is normal.

2.4 Motor Drive Circuit

According to the signal from the CPU, this circuit drives both the reversible motor and the paper pressure motor.

2.5 Solenoid Actuator

According to the signal from the CPU, this actuator turns the solenoid on or off.

2.6 Sensor Input

Signals to each of the reverse sensor, cassette sensor and open cover sensor are imported to the CPU port.

3. I/F PCB

The I/F PCB consists of two connectors (8-pin modular jack connectors) for connection of the printer to other optional devices, a paper pressure motor, a cassette sensor, an open cover sensor connector, and a connector for connection of the harness from the main PCB.

This board only relays signals among the paper pressure motor, cassette sensor, open cover sensor and printer and the main PCB.

4. COMMUNICATION WITH THE PRINTER

A 3-line clock synchronous serial interface is used for communication between the Duplex unit and the printer.

The following describe the timing of communication way.

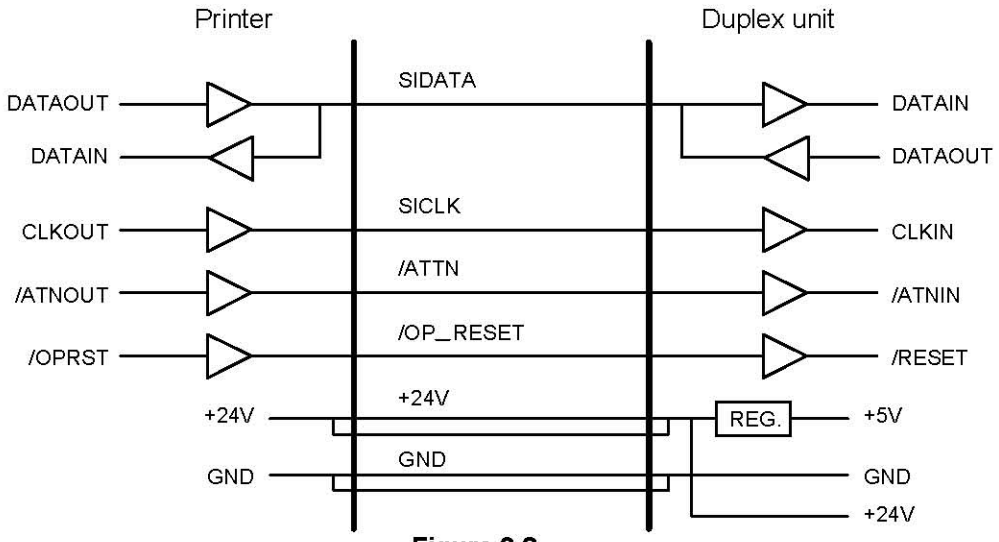
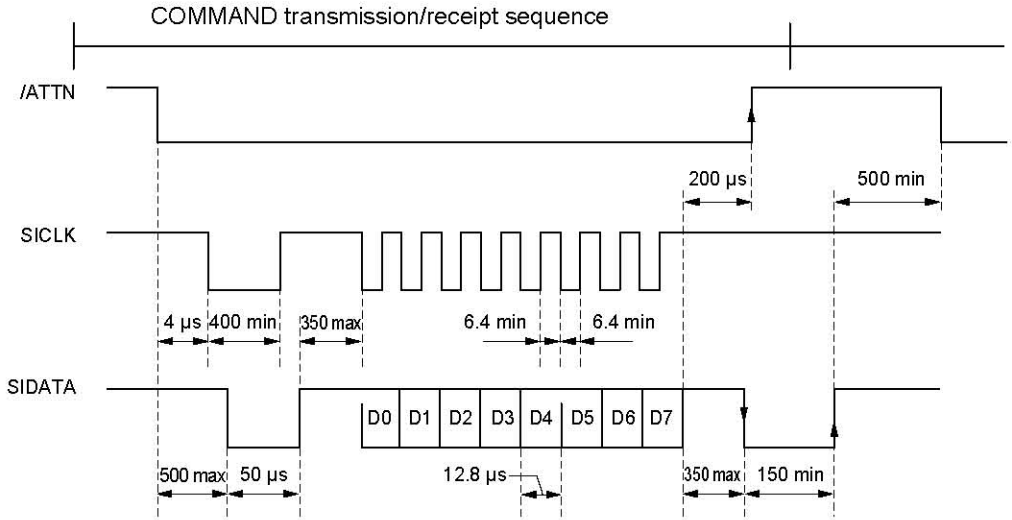
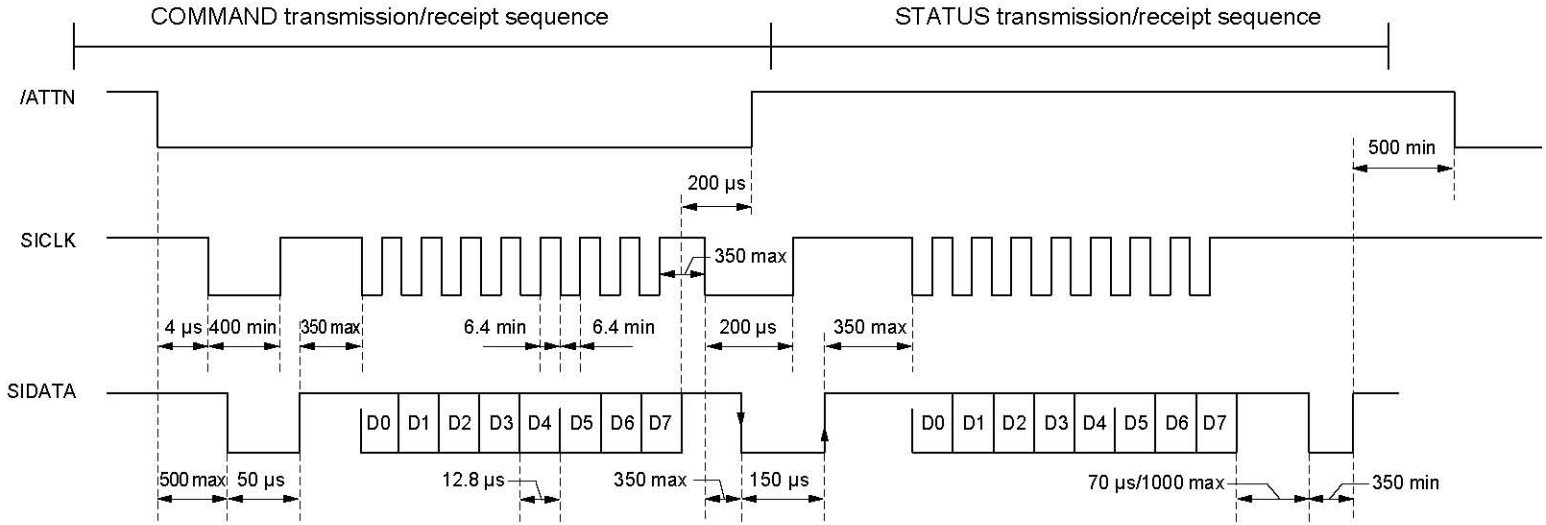


Figure 3.2

• **Without a STATUS request**



• **Within a STATUS request**



CHAPTER IV DISASSEMBLY

1. EXTERNAL COVERS

1.1 Composition

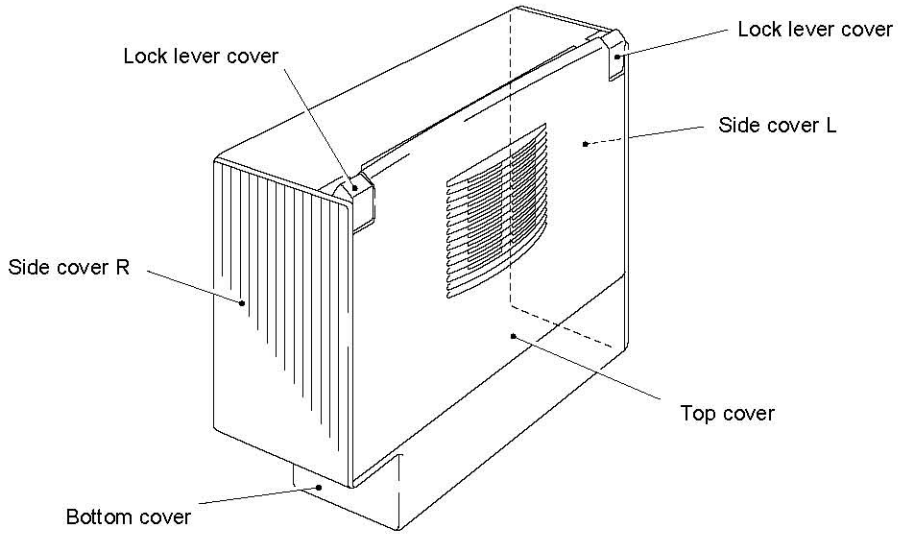


Figure 4.1

1.2 Side Cover R

(1) Push the lock lever cover, turn and open the inside frame unit.

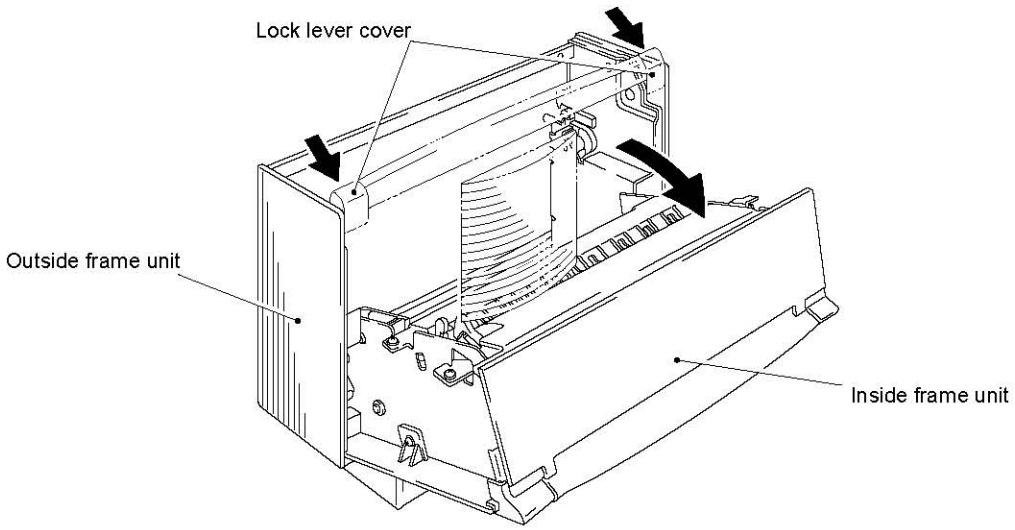


Figure 4.2

(2) Loosen the screw fastening the side cover R.

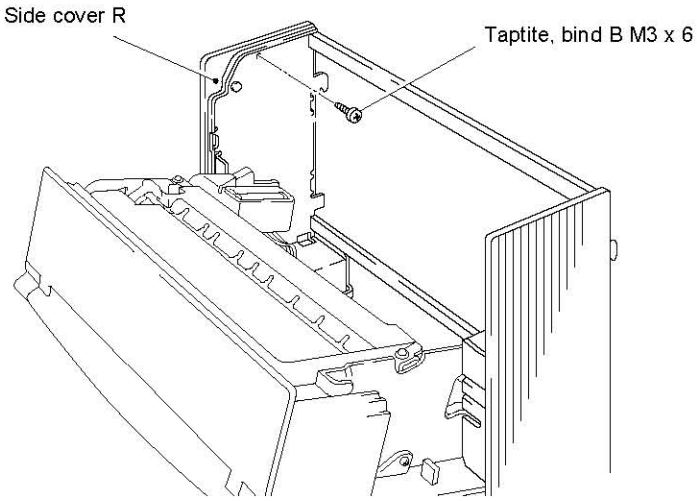


Figure 4.3

(3) Using a small minus screwdriver, disengage the six hooks to remove the side cover R from the outside frame R and the bottom cover.

(4) Separate the side cover R from the Duplex unit.

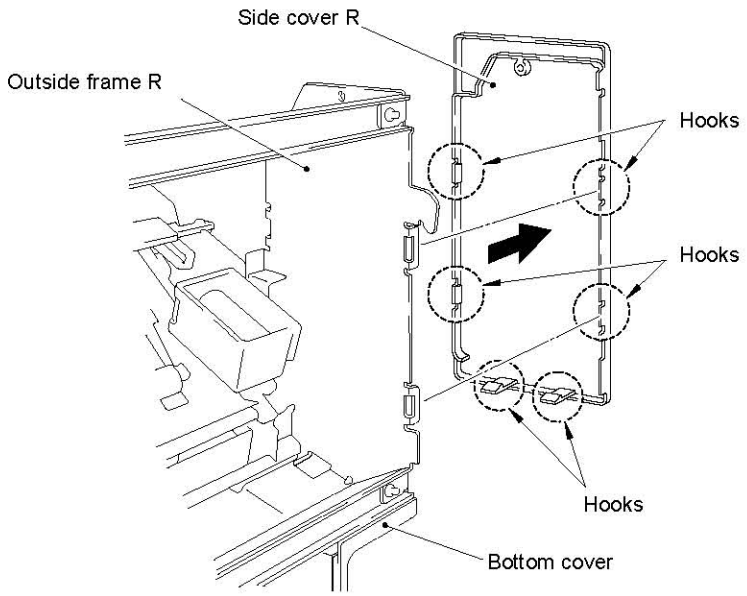


Figure 4.4

1.3 Side Cover L

(1) Unfasten the screw fastening the side cover L.

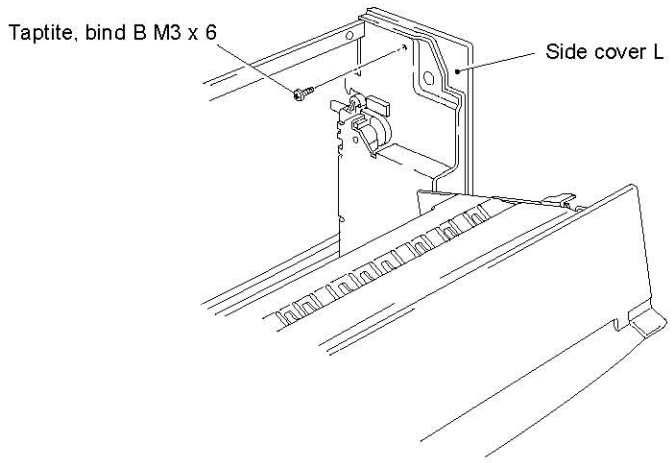


Figure 4.5

(2) Using a small minus screwdriver, disengage the five hooks to remove the side cover L from the outside frame L and the bottom cover.

(3) Separate the side cover L from the Duplex unit.

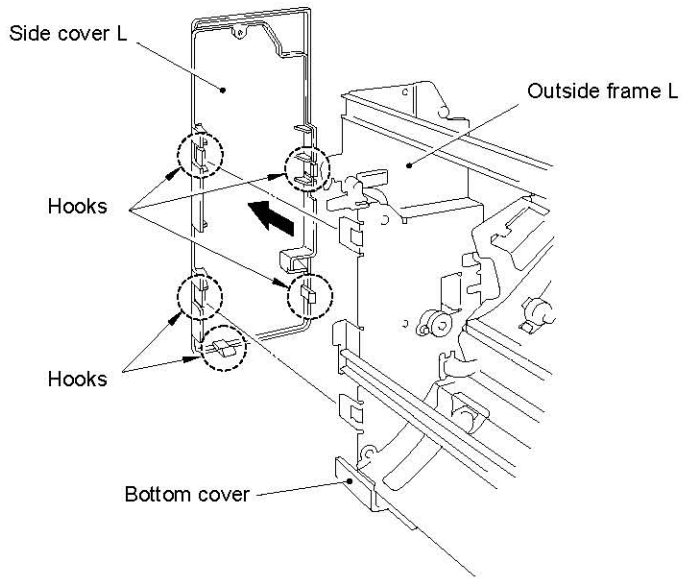


Figure 4.6

1.4 Bottom Cover

(1) Turn and close the inside frame unit.

(2) Lay down the Duplex unit on the side to face up the bottom cover.

(3) Loosen the two screws.

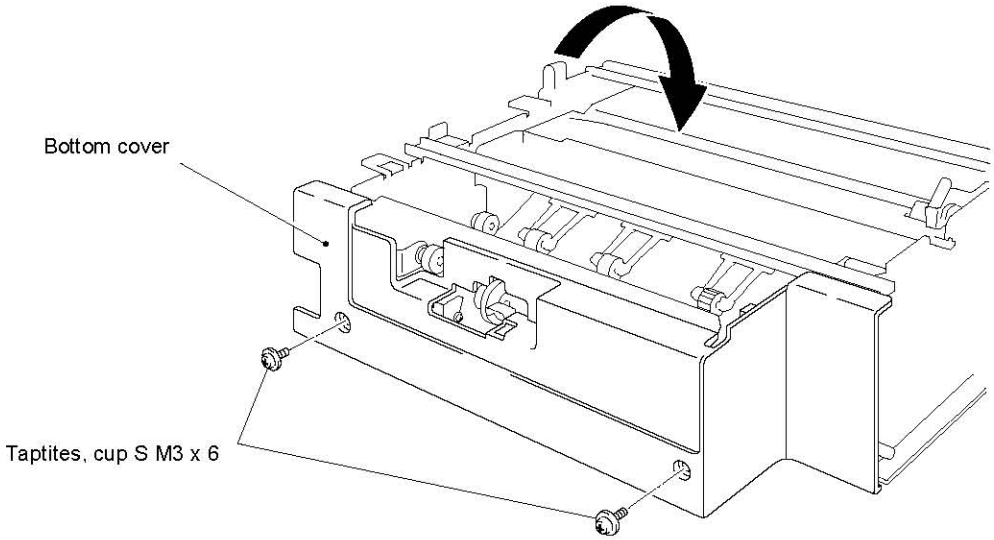


Figure 4.7

(4) Disengage the engaging locks of the bottom cover from the outside frame L, and separate the cover from the Duplex unit.

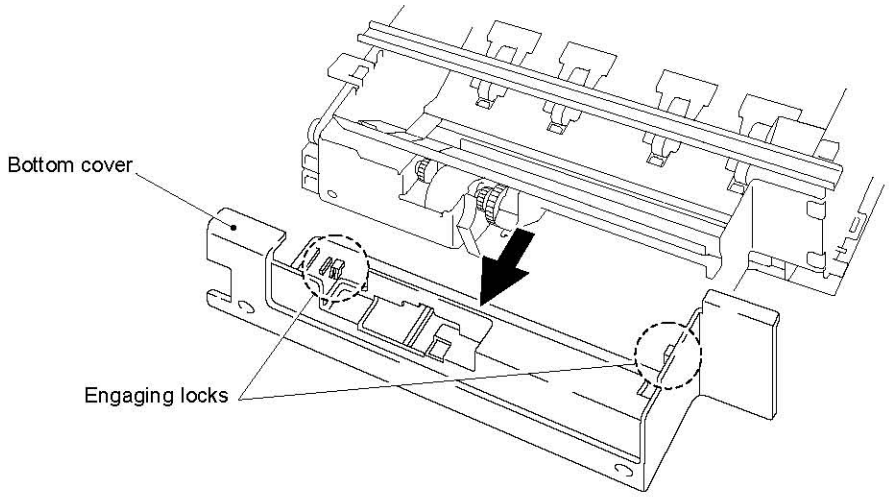


Figure 4.8

1.5 Top Cover

(1) Place the Duplex unit with the bottom down.

(2) Pushing the lock lever cover, turn and open the inside frame slightly. (approx. 30°)

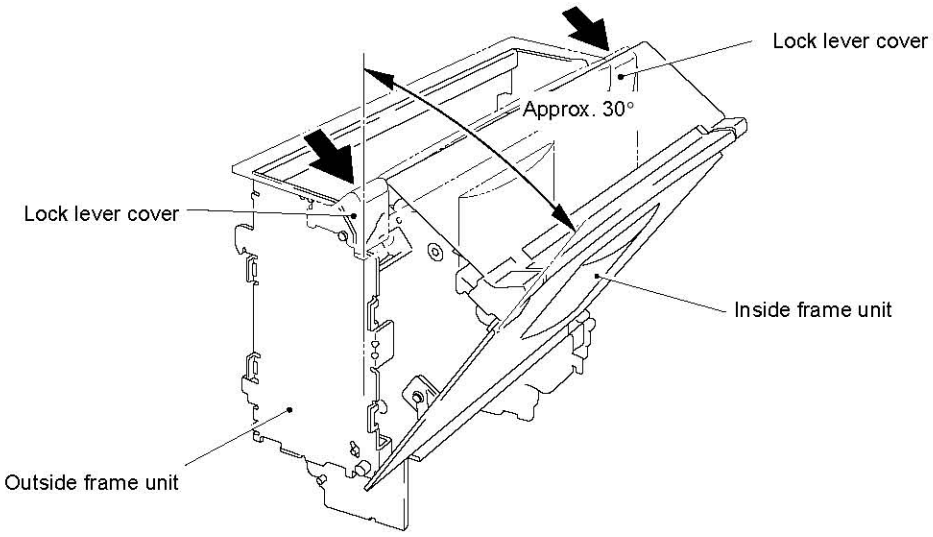


Figure 4.9

(3) Disengage the hook of the lock lever cover by using a minus screwdriver, and pull out the cover slantingly.

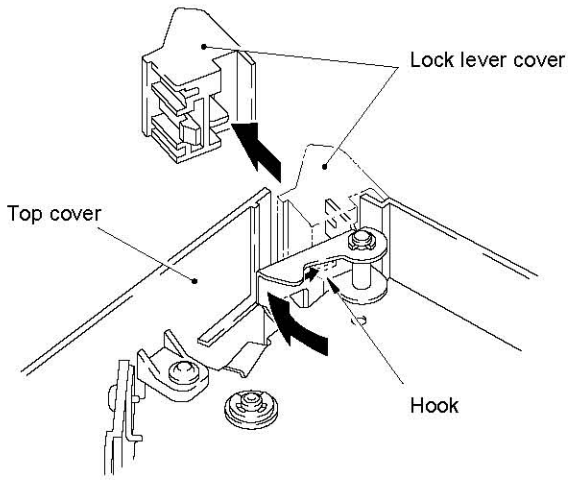


Figure 4.10

(4) Loosen the four screws (two on each side).

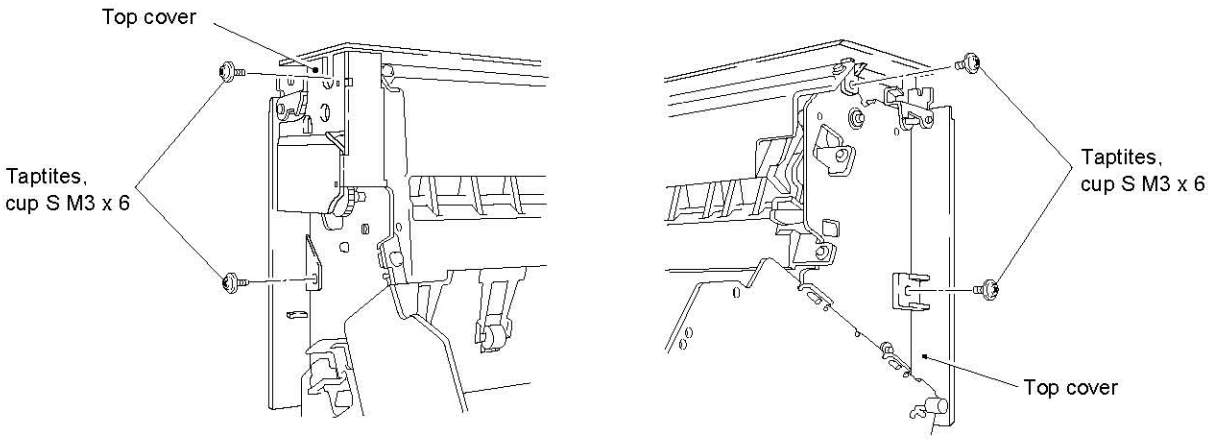


Figure 4.11

(5) Slide up the top cover to disengage the five engaging locks from the inside frame unit, and separate the top cover from the Duplex unit.

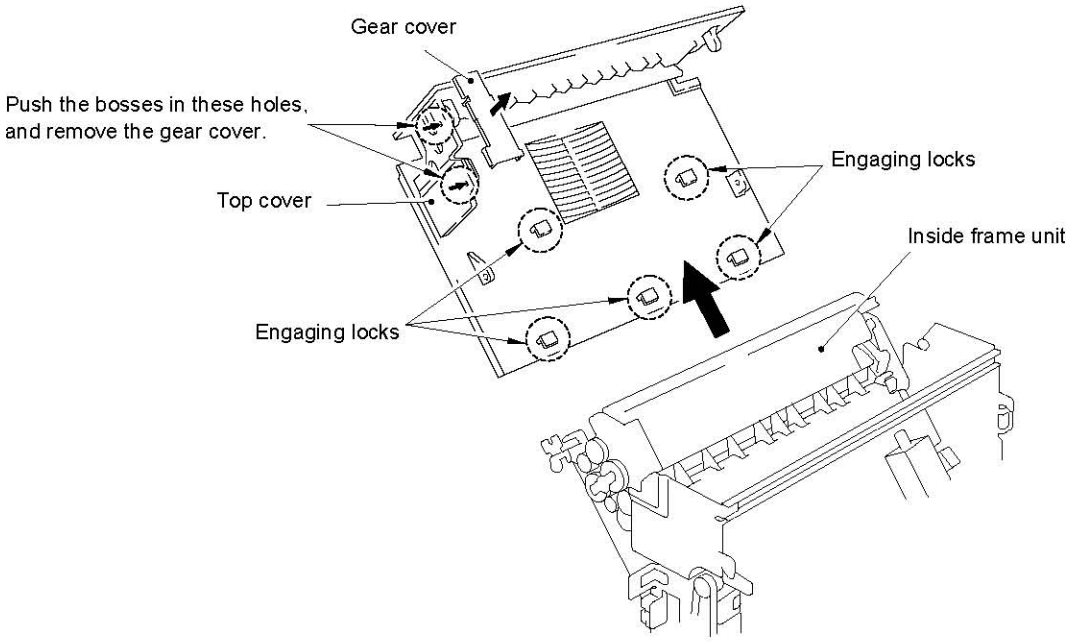


Figure 4.12

2. OUTSIDE FRAME UNIT

2.1 Composition

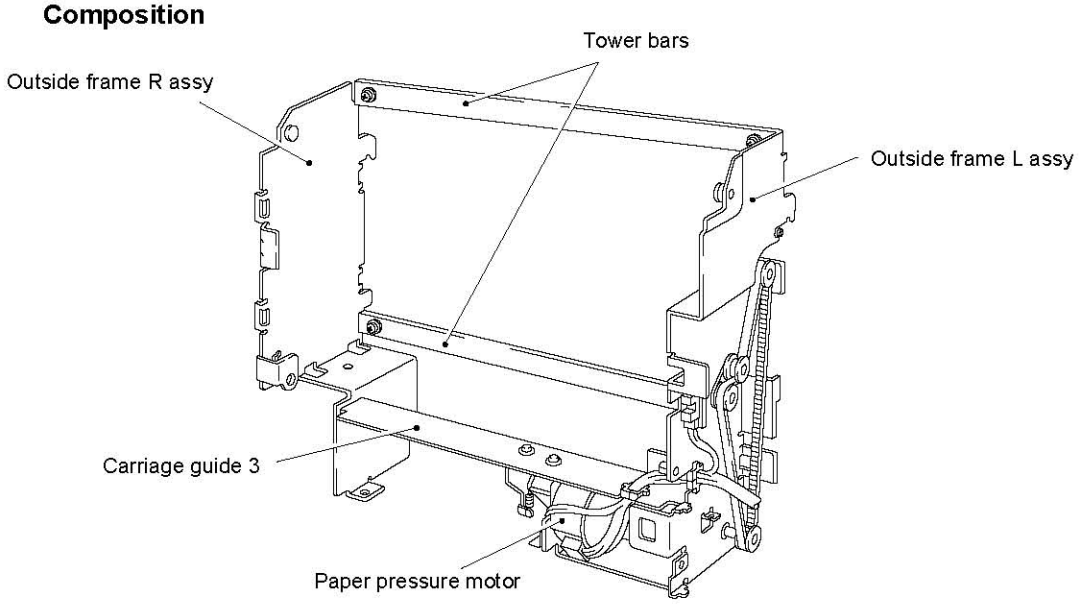


Figure 4.13

2.2.1 Removing the outside frame unit from the Duplex unit

(1) Turn and close the inside frame unit.

(2) Disconnect the relay harness assy from the Duplex I/F PCB assy and the edge saddle.

(3) Pull out the fulcrum shaft R by using pliers.

(4) Remove the fulcrum spring.

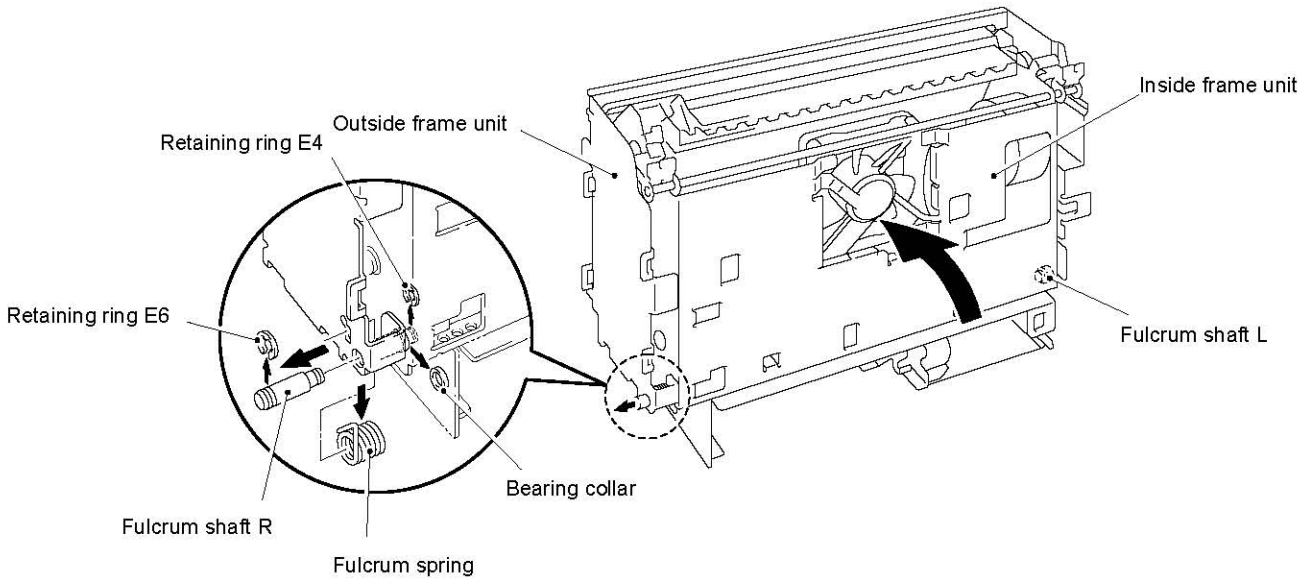


Figure 4.14

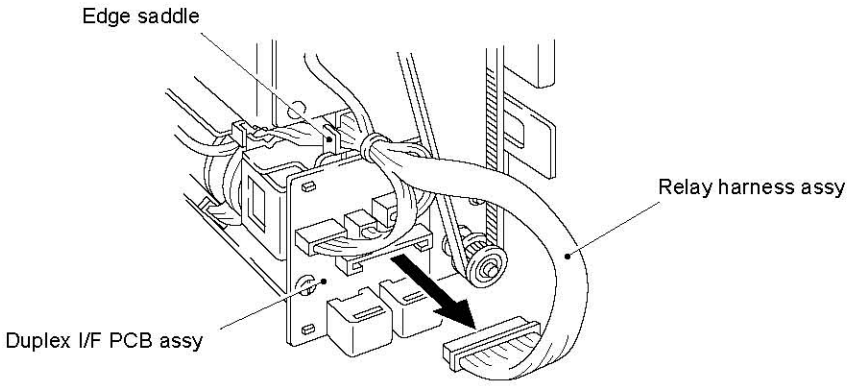


Figure 4.15

(5) Slide the R side of inside frame unit toward you to remove it from the fulcrum shaft L and the outside frame unit.

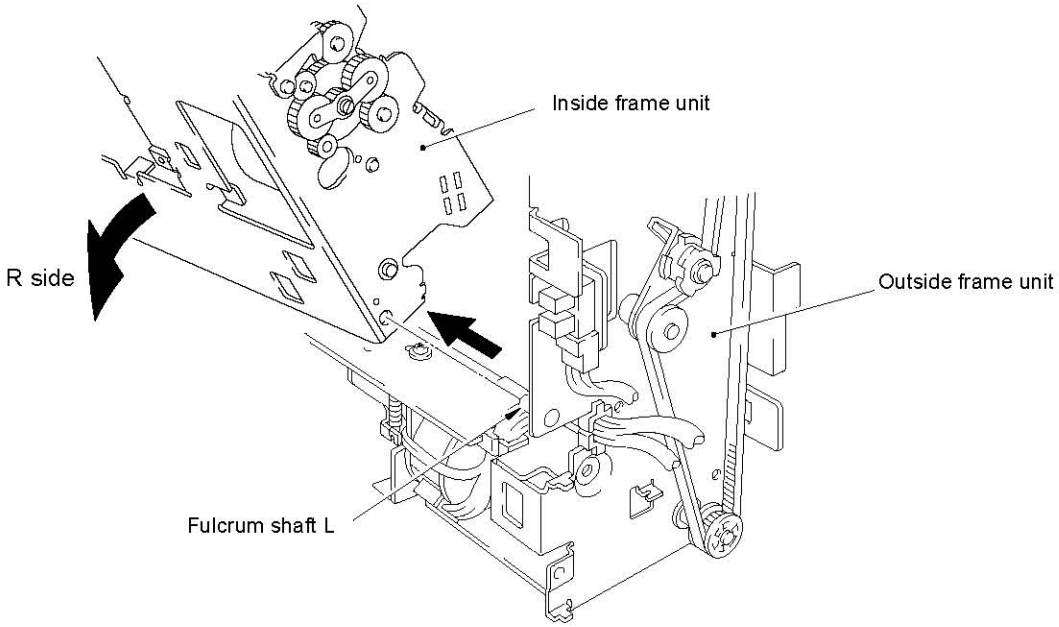


Figure 4.16

2.2.2 Mounting the outside frame unit in the Duplex unit

(1) Keeping the inside frame unit slantwise, mate the hole for the fulcrum shaft L of the inside frame unit with the fulcrum shaft L.

Note1 : Do not get the relay harness assy caught between the inside frame unit and the outside frame unit.

Note2 : If the solenoid assy harness is slack, stretch it.

(2) Turn the inside frame unit on the fulcrum shaft L to set it in the outside frame unit.

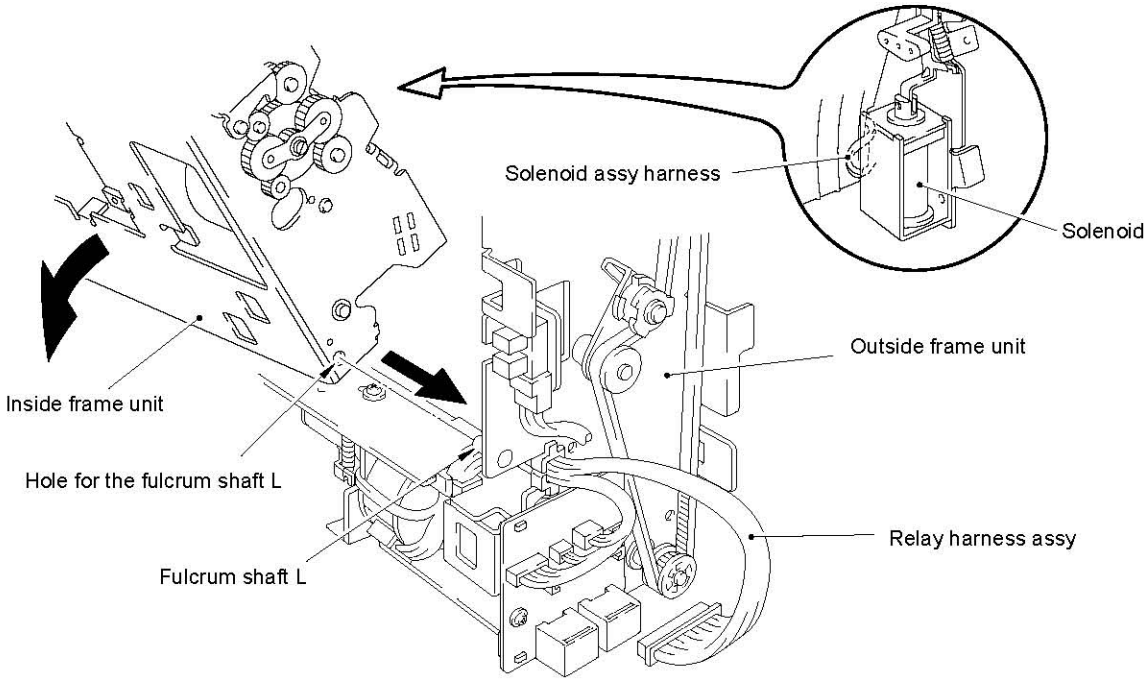


Figure 4.17

(3) Insert one end of the fulcrum spring in the hole in the outside frame unit.

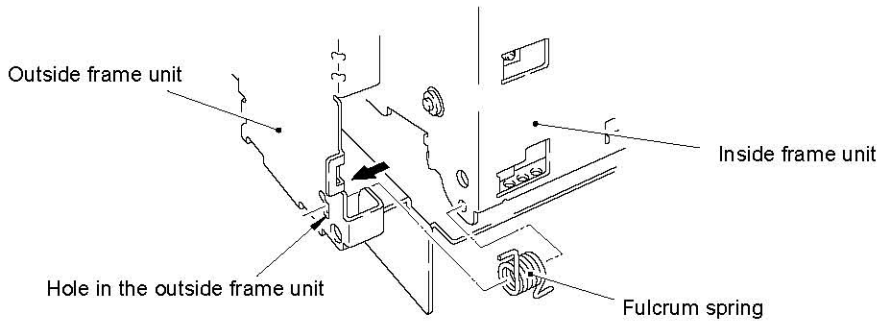


Figure 4.18

(4) Pass the fulcrum shaft R through the outside frame unit, the fulcrum spring and the inside frame unit.

(5) Using nippers, set the other end of the fulcrum spring (inside frame unit side) in the inside frame unit.

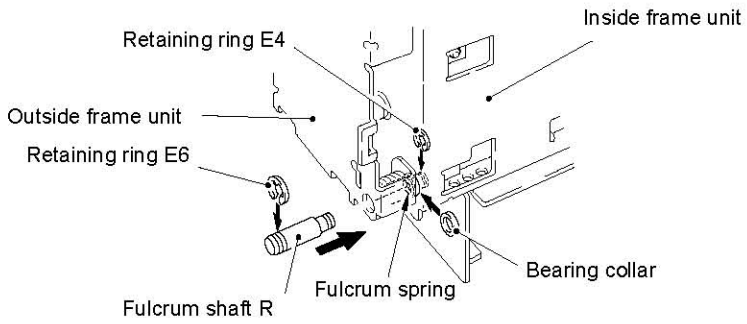


Figure 4.19

2.3 Duplex I/F PCB

(1) Disconnect the paper pressure motor harness, the cover sensor harness assy and the cassette sensor assy from the Duplex I/F PCB assy.

(2) Unfasten the screw.

(3) Remove the Duplex I/F PCB from the outside frame L.

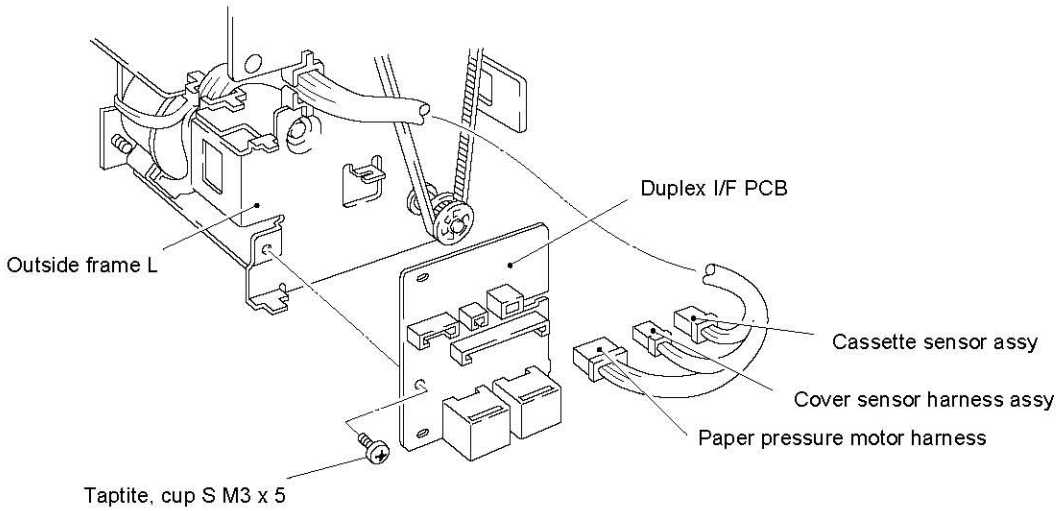


Figure 4.20

2.4 Outside Frame R Assy, L Assy

(1) Unfasten the four screws.

(2) Remove the two tower bars from the outside frame unit.

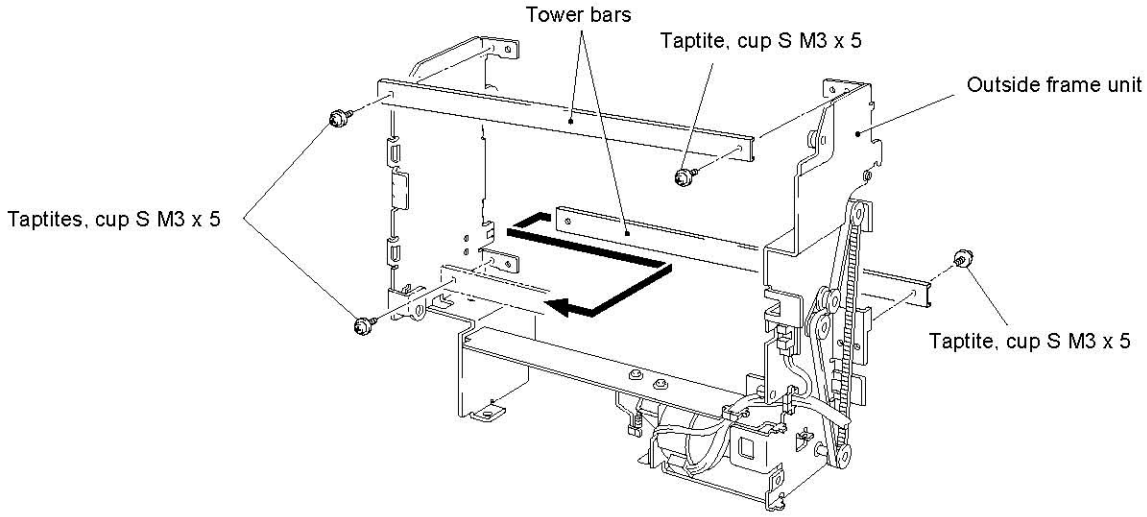


Figure 4.21

(3) Unfasten the two screws.

(4) Remove the outside frame R assy from the carriage guide 3.

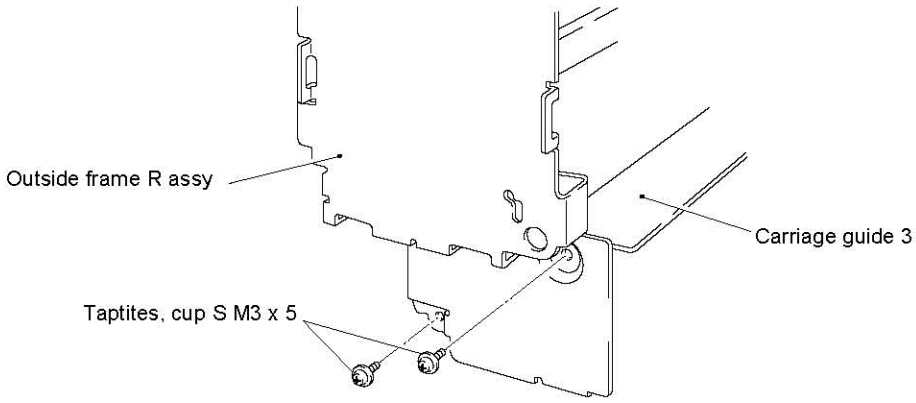


Figure 4.22

(5) Unfasten the four screws.

(6) Remove the outside frame L assy and the paper pressure frame assy from the carriage guide 3.

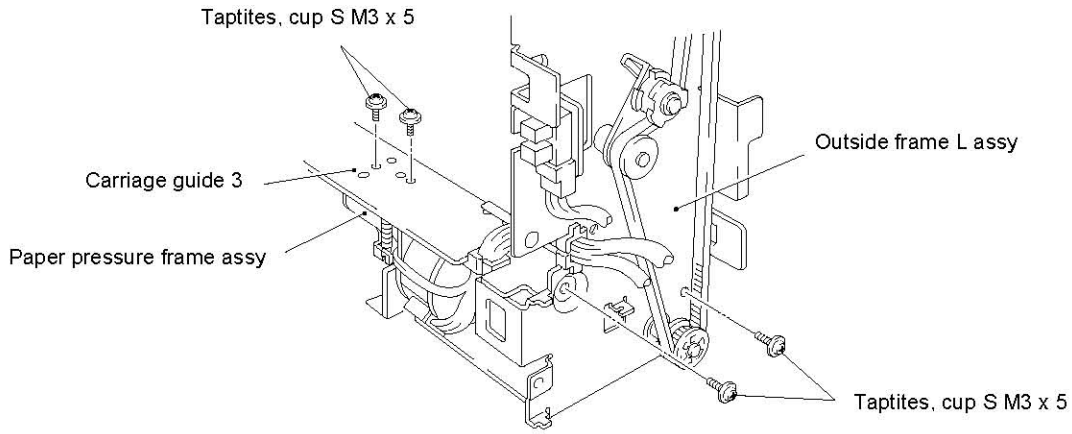


Figure 4.23

2.5 Paper Pressing Gear 1, 2

(1) Remove the gear release spring from the paper pressure frame assy and the gear release lever.

(2) Draw the paper pressure frame assy from the gear release lever in the direction of the arrow.

(3) Remove the paper pressing gear 2.

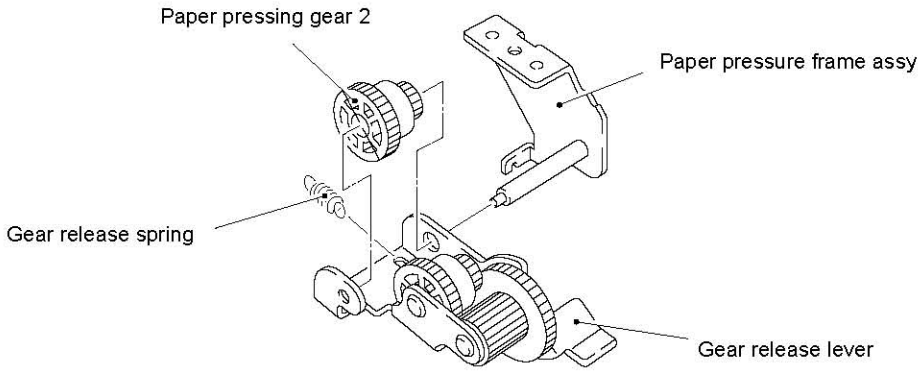


Figure 4.24

(4) Remove the two retaining rings E3.

(5) Pull out the two paper pressing gear shafts.

(6) Remove the paper pressing gears 1 and 2.

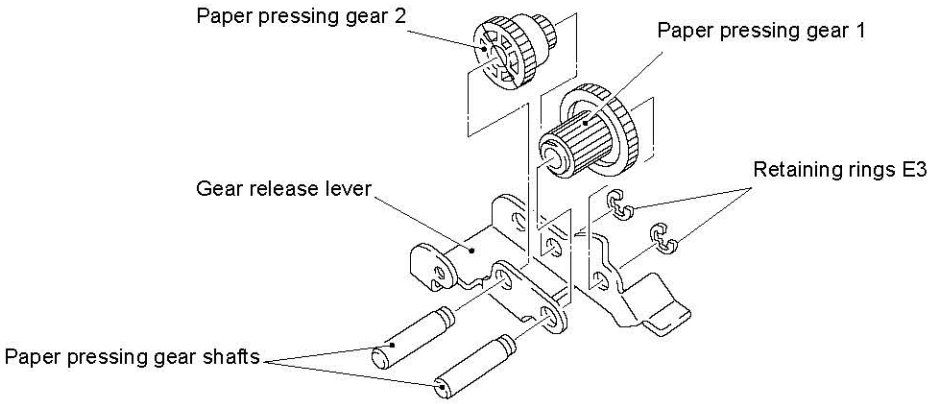


Figure 4.25

2.6 Paper Pressure Motor

(1) Unfasten the screw A.

(2) Remove the cassette sensor lever and the leaf switch from the outside frame L assy.

(3) Unfasten the two screws B.

(4) Remove the paper pressure motor from the outside frame L assy.

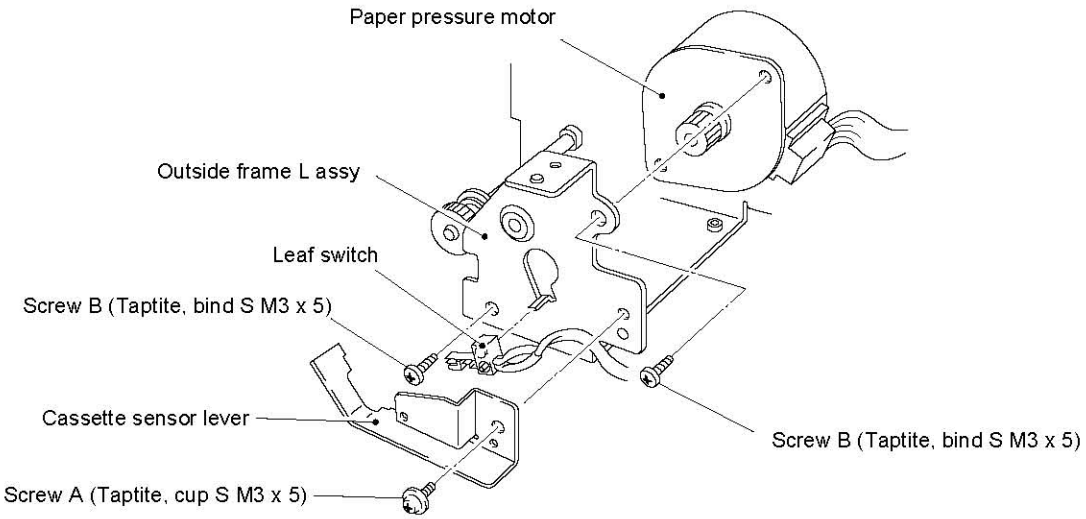


Figure 4.26

2.7 T Belt B40S2M396

(1) Remove the belt tension spring.

(2) Unfasten the screw.

(3) Remove the T belt B40S2M396.

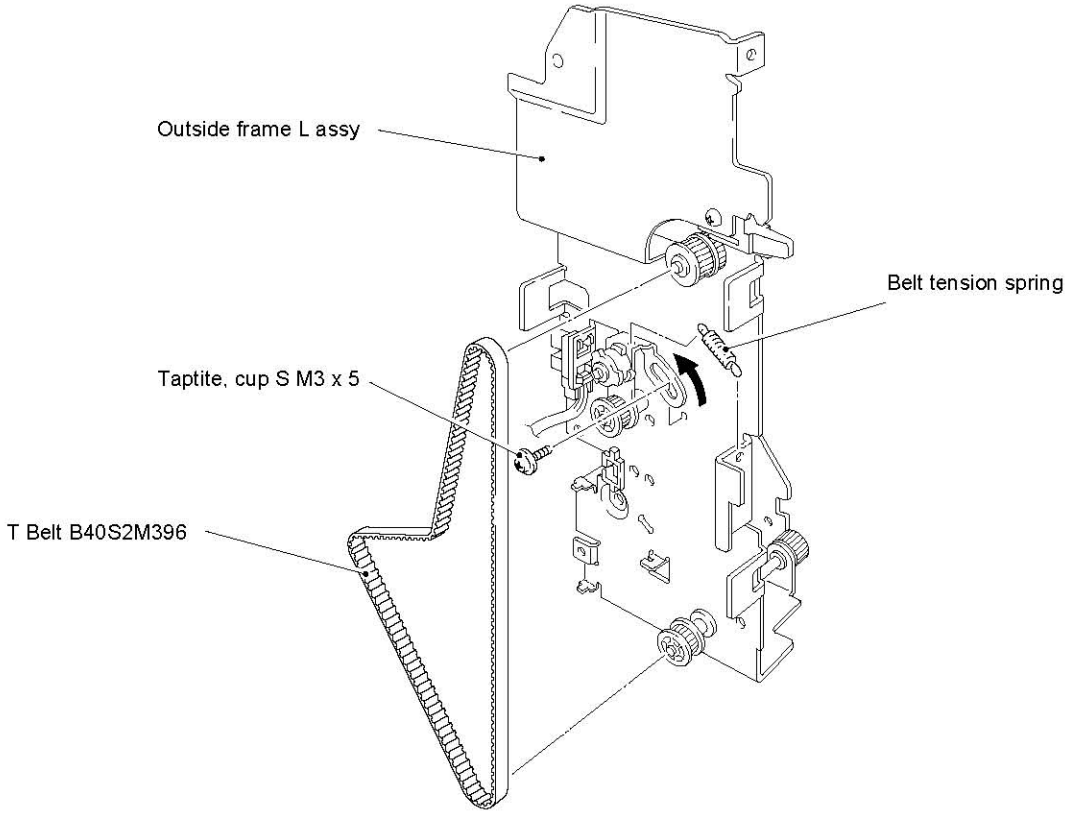


Figure 4.27

2.8 Photo Interrupter 1240

(1) Flexing the hook inward, turn the photo interrupter 1240 in the direction of the arrow and remove it.

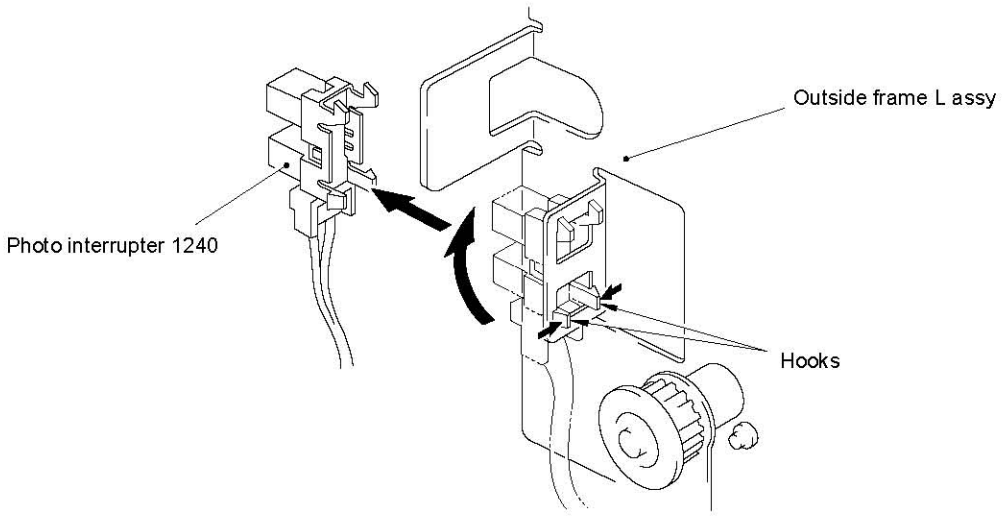


Figure 4.28

3. INSIDE FRAME UNIT

3.1 Reversible Frame

(1) Unfasten the six screws.

(2) Remove the reversible frame.

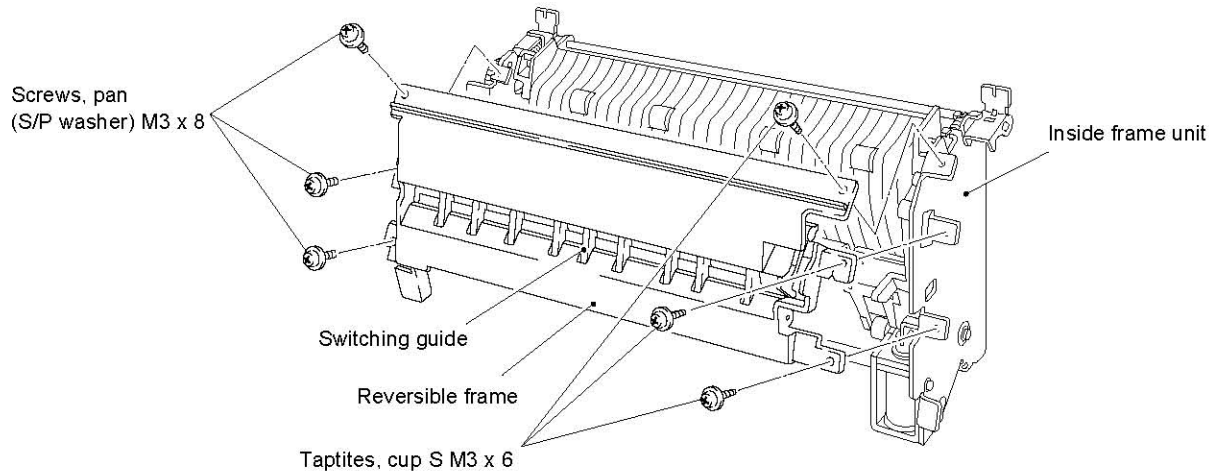


Figure 4.29

3.2 Photo interrupter 1240

(1) Disconnect the reverse sensor harness assy from the photo interrupter 1240.

(2) Flex the hooks of the photo interrupter 1240 to the inside to remove it.

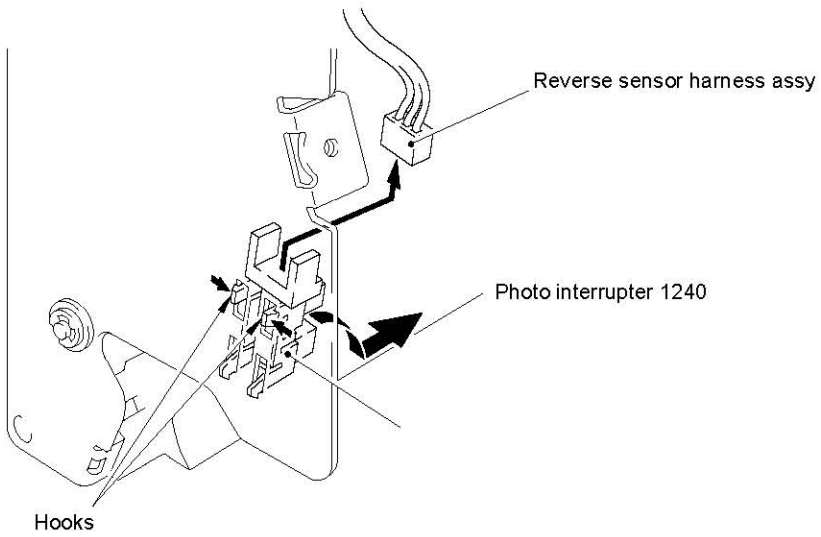


Figure 4.30

3.3 Solenoid

(1) Remove the solenoid spring.

(2) Unfasten the two screws.

(3) Remove the solenoid.

(4) Detach the retaining ring E3.

(5) Remove the switch arm and the solenoid link.

Note1 : Since the solenoid assy harness is connected to the conductor, handle it with care.

Note2 : Mount the solenoid without leaving the harness exposed excessively.

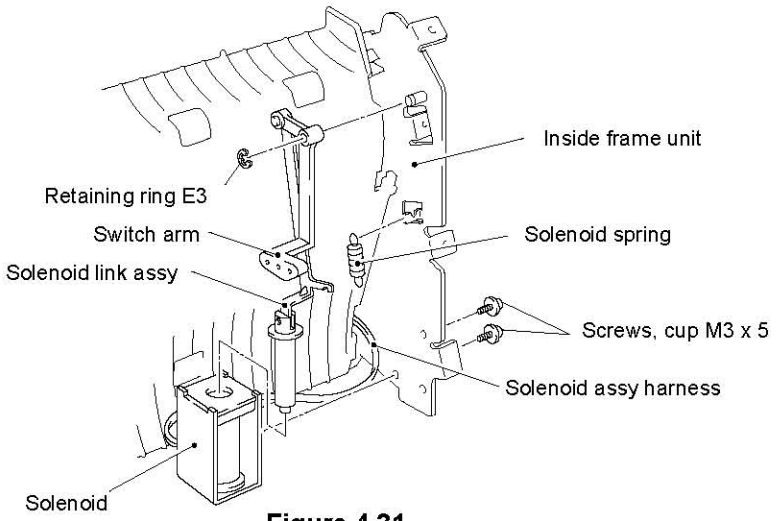


Figure 4.31

3.4 Carriage Guide 2 Assy

(1) Unfasten the screw A and the screw B.

(2) Slide the carriage guide 2 assy slightly in the direction of the arrow, and disengage the hooks.

(3) Remove the carriage guide 2 assy.

Note1 : When removing the carriage guide 2 assy, take care not to damage the solenoid assy harness.

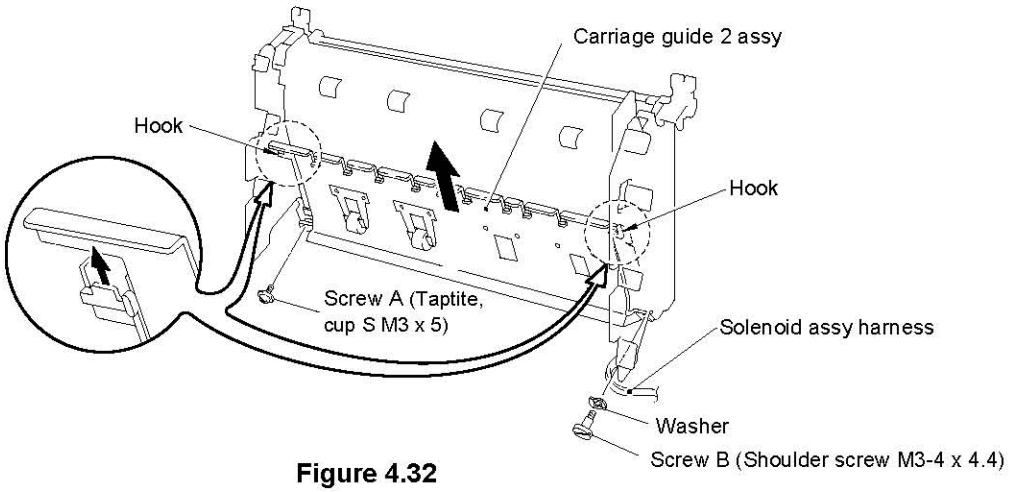


Figure 4.32

3.5 Carriage Guide 1

(1) Slid the carriage guide 1 slightly in the direction of the arrow.

(2) Disengage the carriage guide 1 from the engaging locks of the inside frame assy.

(3) Slide up and remove the carriage guide 1.

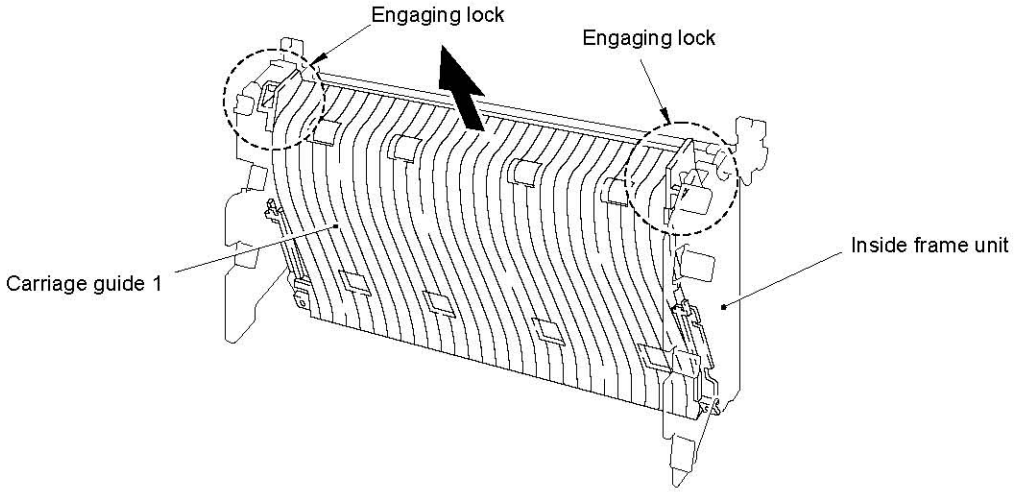


Figure 4.33

3.6 Duplex PCB Assy

(1) Disconnect the connectors of the solenoid, DC fan motor, reversible motor assy and reverse sensor harness assy from the Duplex PCB assy.

(2) Detach the two retaining rings E3.

(3) Remove the two PF bearings 05.

(4) Remove the carriage roller assy.

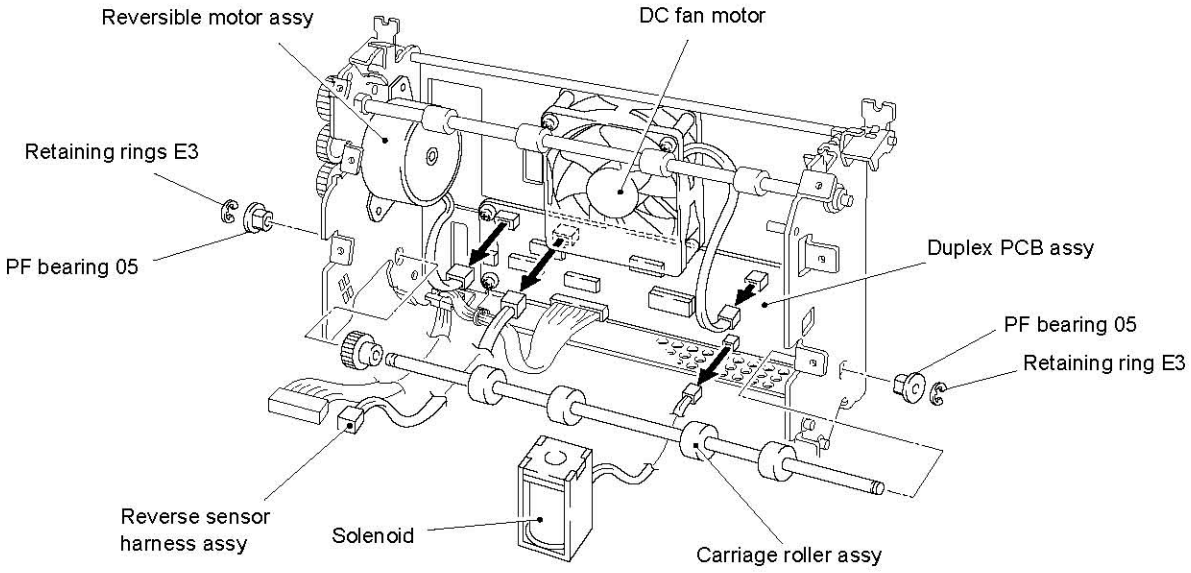


Figure 4.34

(5) Unfasten the four screws.

(6) Remove the Duplex PCB assy.

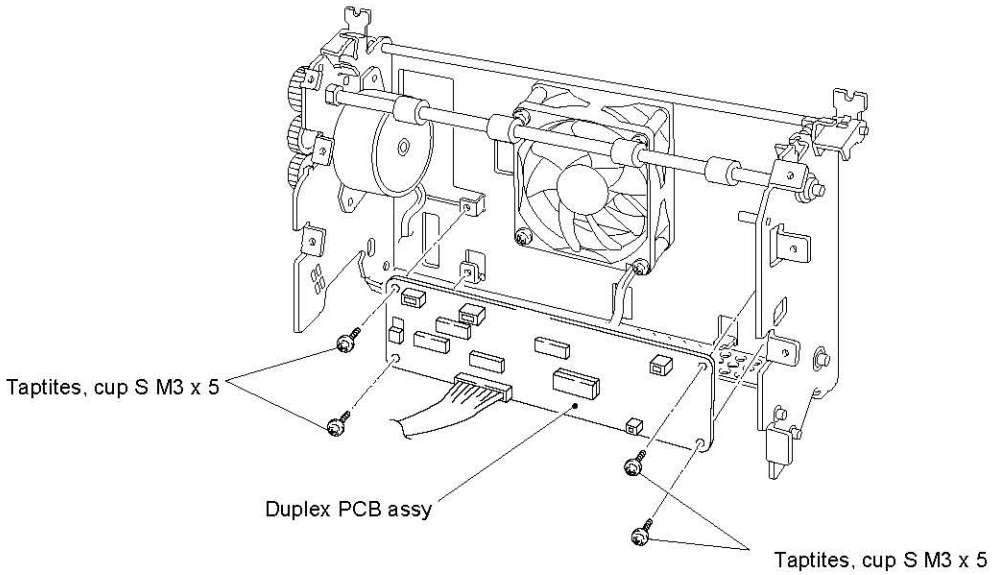


Figure 4.35

3.7 DC Fan Motor

(1) Use a minus screwdriver to disengage the hook of the reversible gear 15-30, and detach the gear.

(2) Detach the retaining ring E3.

(3) Remove the PF bearing 05.

(4) Remove the reversible gear assy.

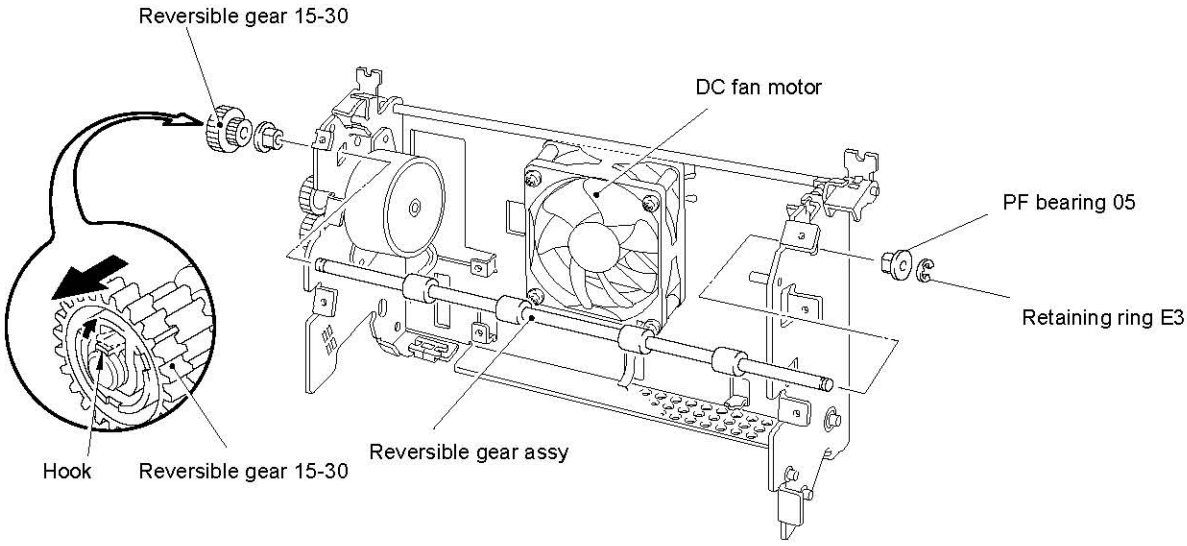


Figure 4.36

(5) Unfasten the three screws.

(6) Remove the DC fan motor.

Note1 : The DC fan motor should be so mounted that the label will not be exposed.

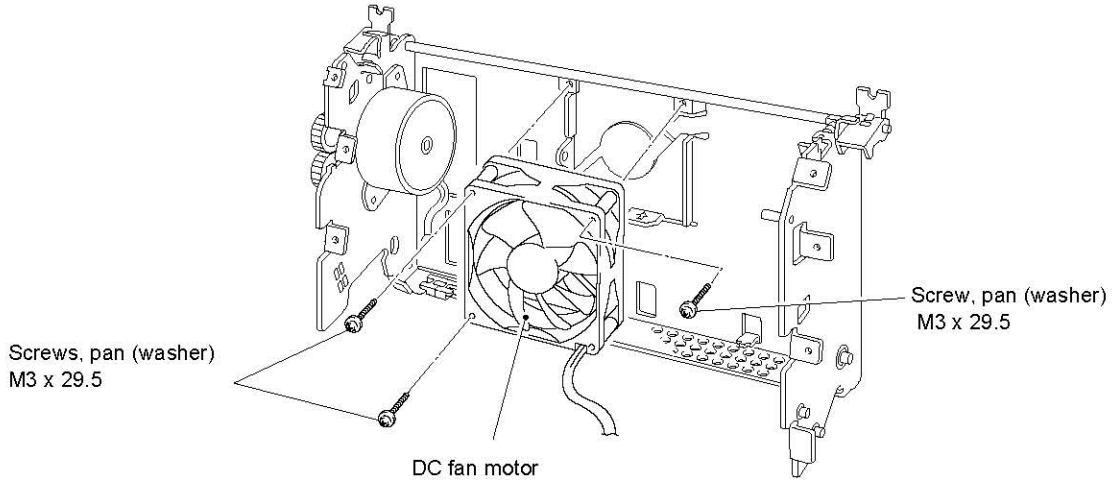


Figure 4.37

3.8 Reversible Motor Assy

(1) Unfasten the two screws.

(2) Remove the reversible motor assy.

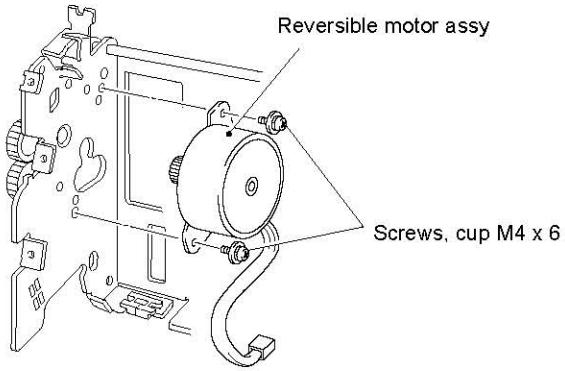


Figure 4.38

4. DU TRAY CARRYING WAY UNIT

(1) Unfasten the screw on the back of unit.

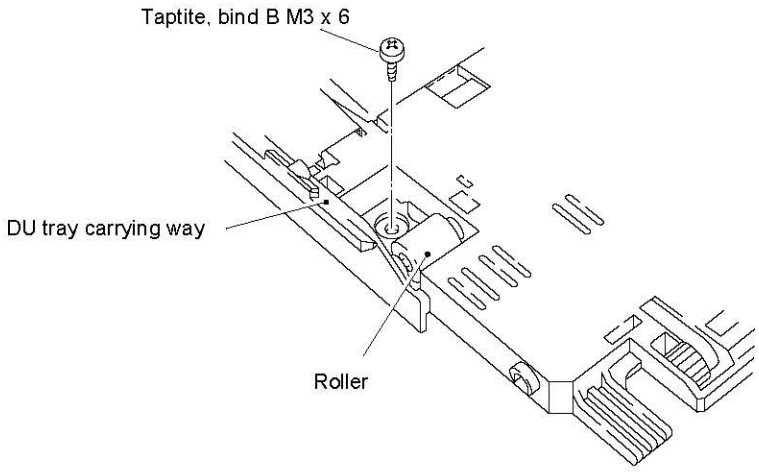


Figure 4.39

(2) Turn the unit to the face and remove the pressure roller.

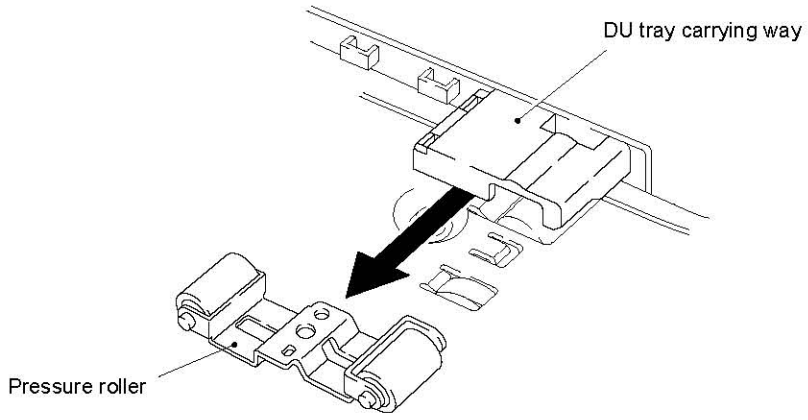


Figure 4.40

(3) Unfasten the three screws.

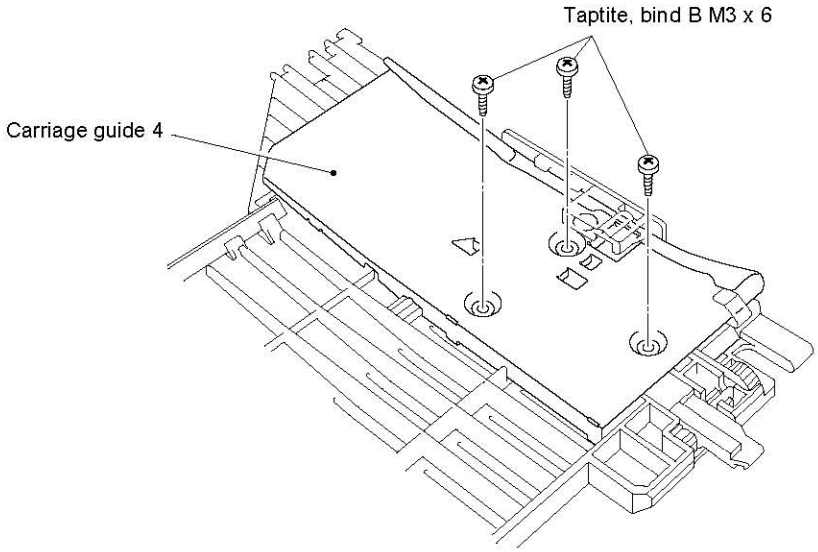


Figure 4.41

(4) Remove the four hooks on the back of unit and carriage guide 4.

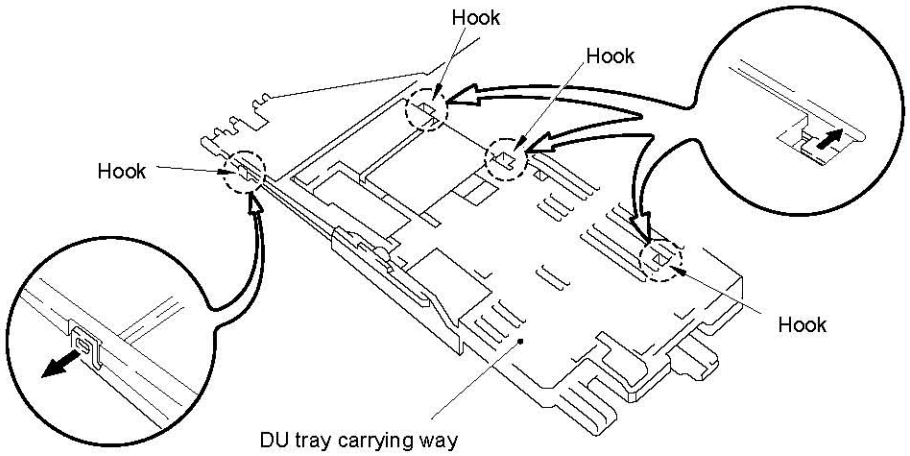


Figure 4.42

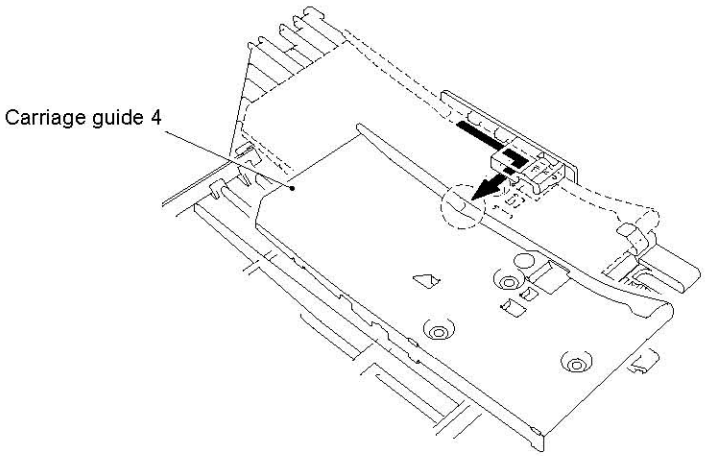


Figure 4.43

Note1 : Take care not to come off the rear ground spring.
When reassembling the rear ground spring, put it in the locating boss.

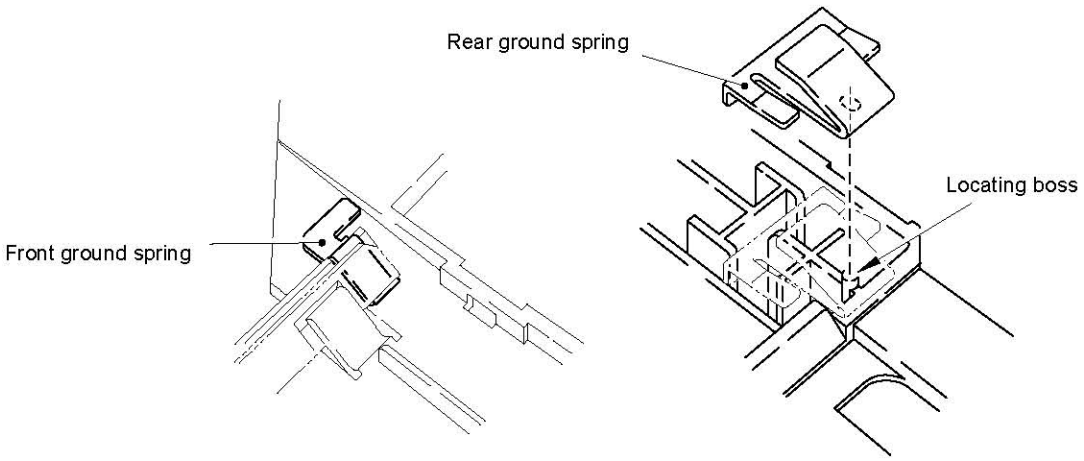


Figure 4.44

(5) Remove the tray pulley gear shaft from the clamp.

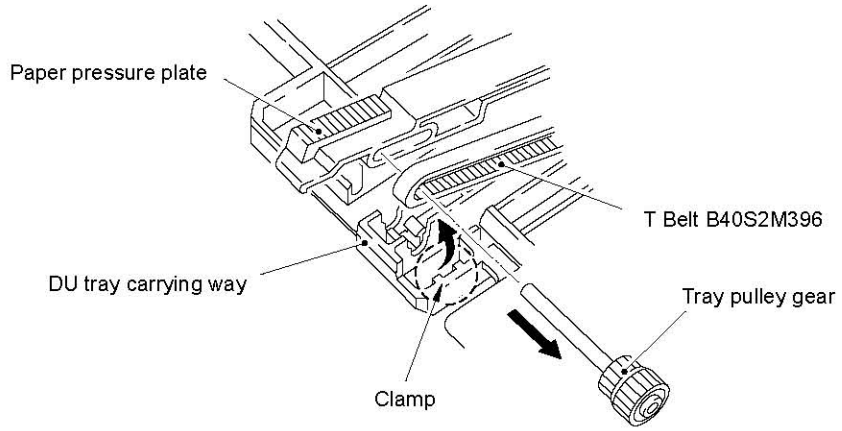


Figure 4.45

(6) Remove the paper pressure fulcrum shaft from the two clamps.

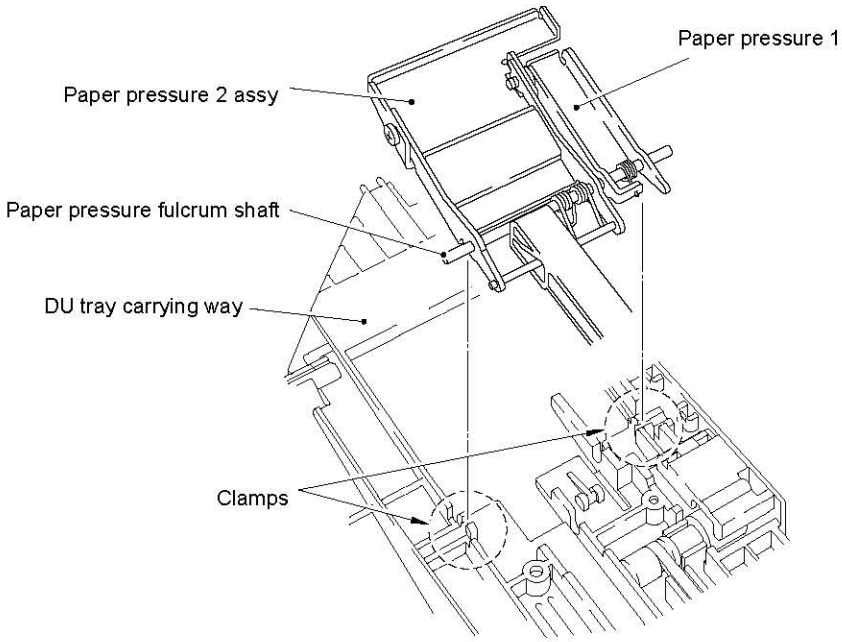


Figure 4.46

(7) Remove the roller assy from the clamp.

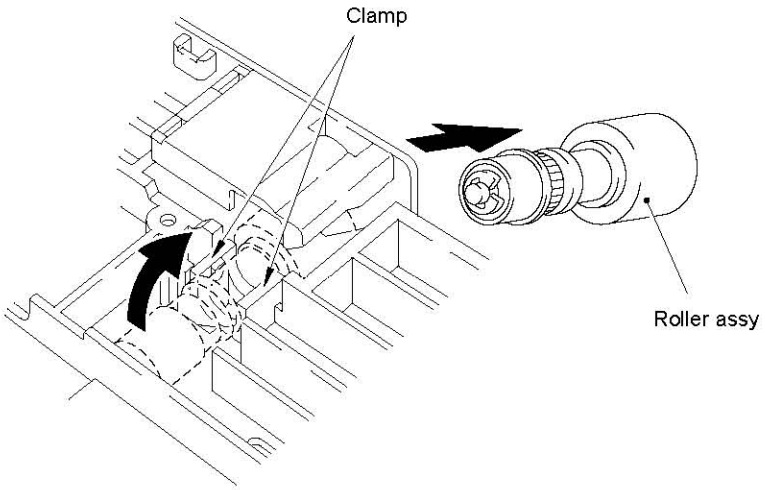


Figure 4.47

(8) Remove the discharge brush.

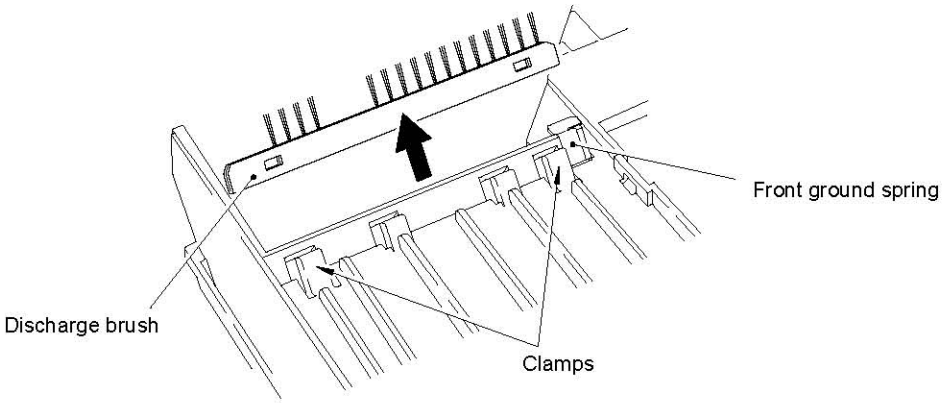


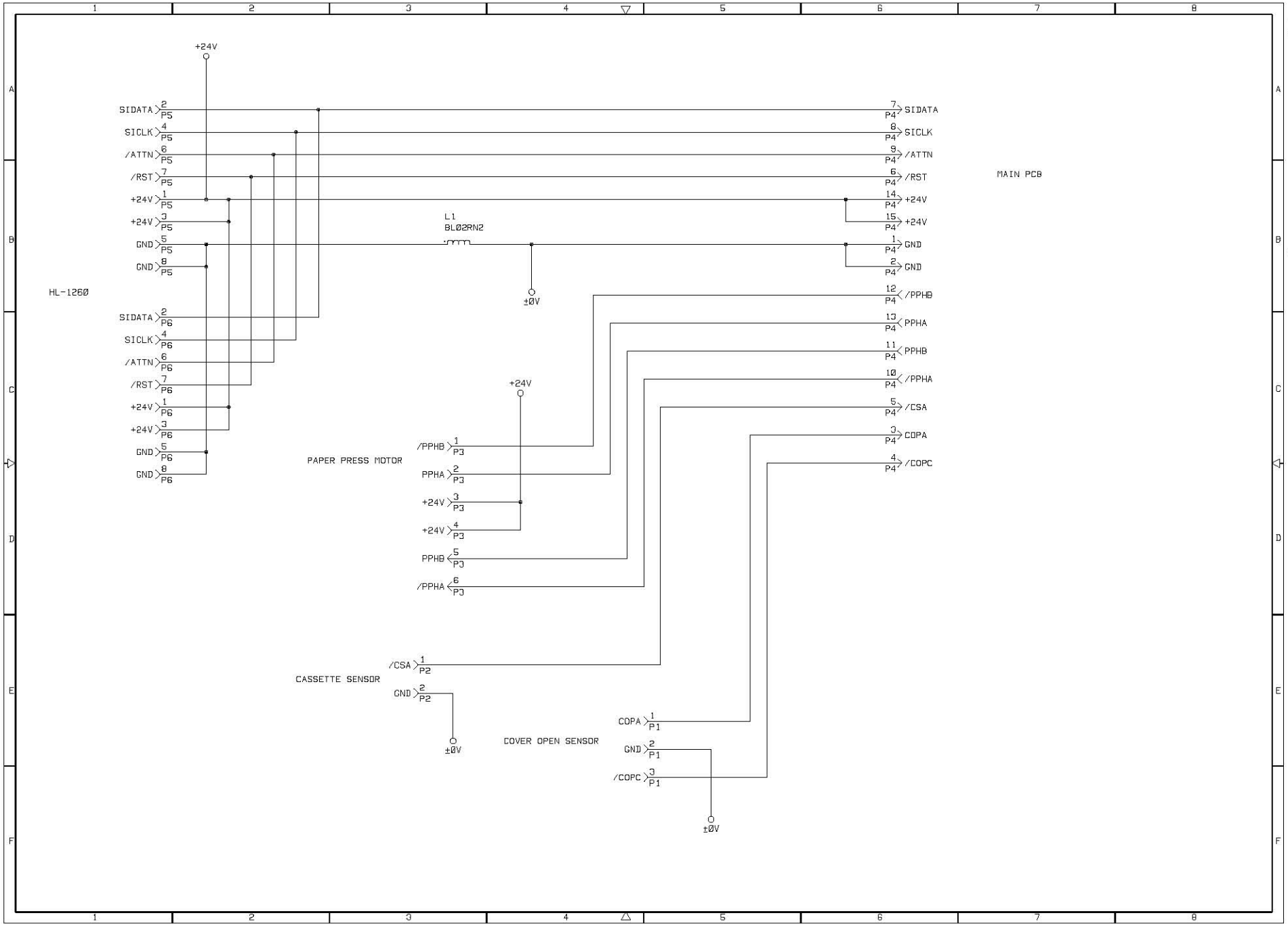
Figure 4.48

Troubleshooting (1)

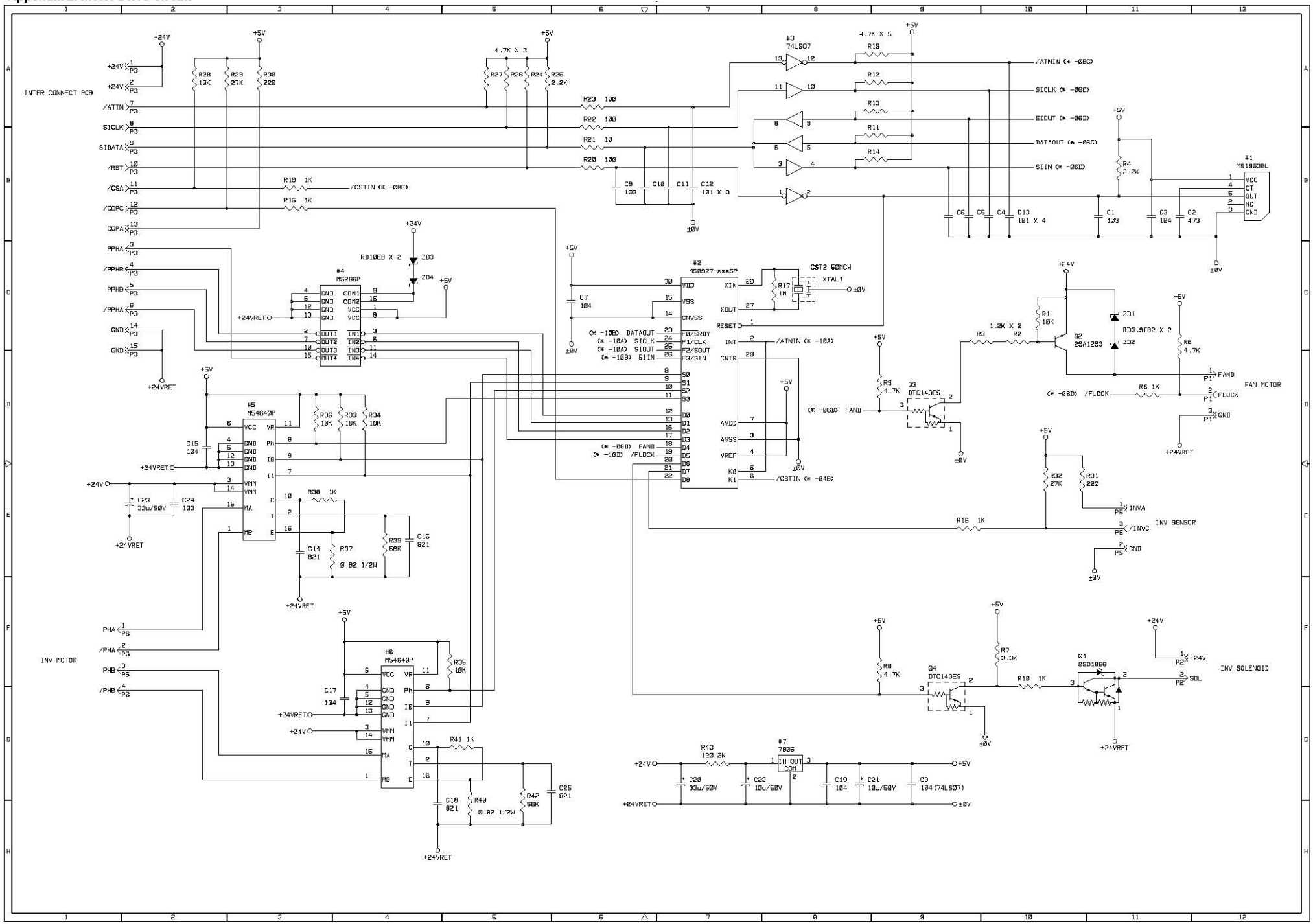
Problem	Cause	Check	Result	Remedy
The Duplex mode cannot be set on the panel.	Misoperation	Is the modular cable connected properly?	No	Turn off the power to the printer, and connect the modular cable properly. Then, turn on the power again.
	Modular cable Main PCB	Does a voltage of 24V appear at pin 14 or 15 of I/F PCB's connector P4?	Yes	Replace the main PCB.
			No	Replace the modular cable.
"NO DX TRAY" error message appears.	Misoperation	Is the Duplex tray loaded properly into the cassette according to the manual?	No	Load the Duplex tray into the cassette according to the manual.
	Main PCB	Does a voltage of 24V appear at pins 3 and 4 of I/F PCB's connector P3, and does the voltage vary from 0V to 24V at pins 1, 2, 5 and 6 when the paper cassette is set?	No	Replace the main PCB.
	Paper pressure motor	Does the paper pressure motor run when the paper cassette is set?	No	Replace the paper pressure motor.
			Yes	Replace the cassette sensor lever and leaf switch. Refer to Figure 4.26 (IV-9).
"DX OPEN" error message appears.	Misoperation	Is the hook of the Duplex unit's reversing mechanism engaged completely with the outside frame?	No	Close the reversing mechanism so as to engage the hook securely with the outside frame.
	Open cover sensor Main PCB	Does a voltage of 5V appear at pin 3 of I/F PCB's connector P1 when the cover is closed?	No	Replace the open cover sensor or cover sensor harness.
			Yes	Replace the main PCB.
"DX FAN MALF" error message apprears.	Main PCB	Does a voltage of more than15V appear at pin 1 of main PCB's connector P1?	No	Replace the main PCB.
	Fan Main PCB	Is the voltage 0V at pin 2 of main PCB's connector P1?	No	Replace the fan.
			Yes	Replace the main PCB.

Troubleshooting (2)

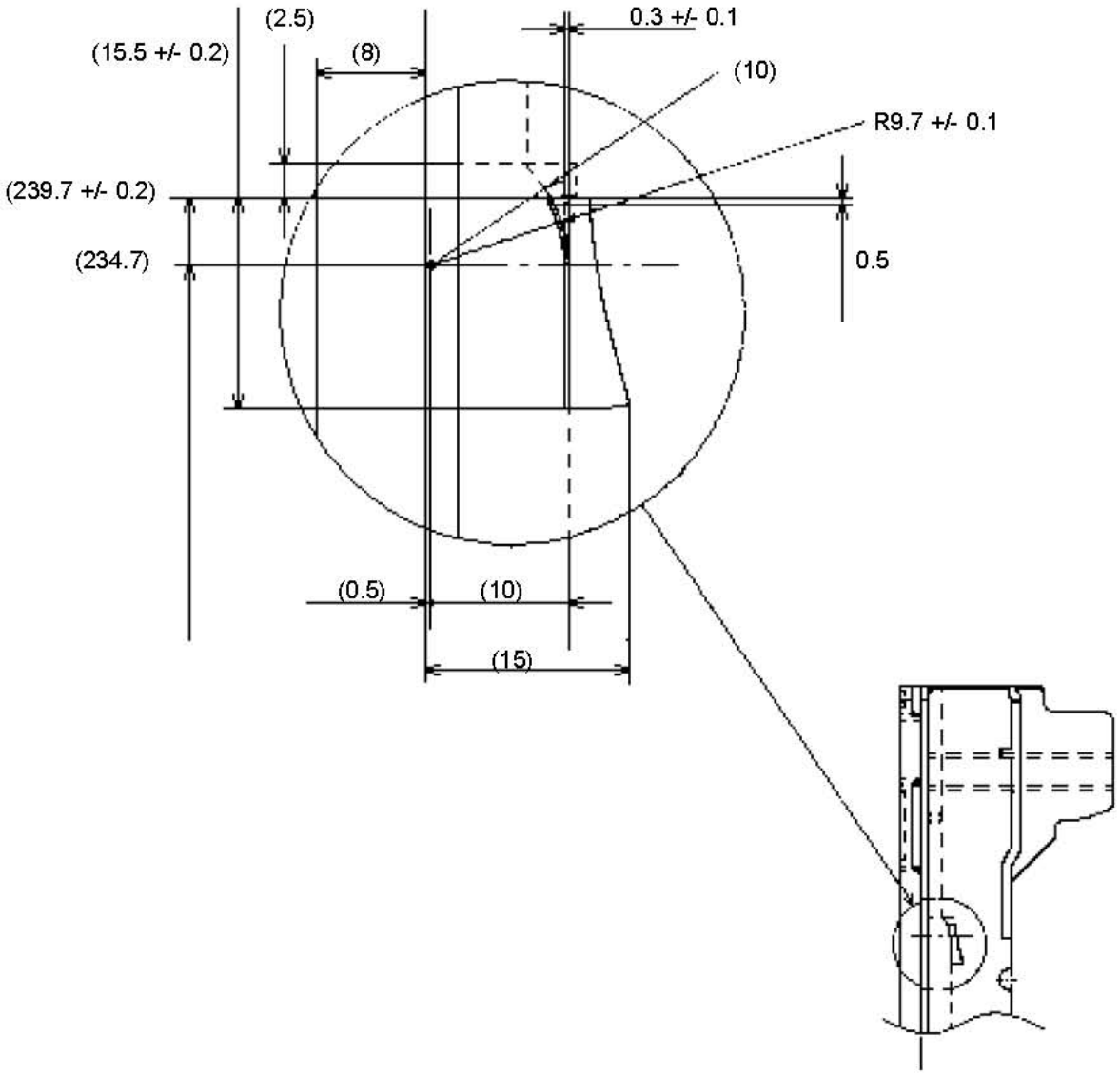
Problem	Cause	Check	Result	Remedy
Paper is not supplied in the Duplex unit.	Misoperation	Is the Duplex unit set properly in the printer?	No	Set the Duplex unit properly according to the manual.
	Main PCB	Does the voltage vary from 24V to 0V at pin 2 of main PCB's connector P2?	No	Replace the main PCB.
	Solenoid	Does the solenoid function?	No	Replace the solenoid.
	Main PCB	Does the voltage vary from 24V to 0V at pins 1, 2, 3 and 4 of main PCB's connector P6?	No	Replace the main PCB.
	Reversible motor	Does the reversible motor run?	No	Replace the reversible motor.
"JAM DUPLEX" error message appears though no paper is supplied in the Duplex unit. The paper supplied in the Duplex unit stops halfway.	Switching guide	Does the switching guide move smoothly? Refer to Figure 4.29 (IV-11).	No	Reset the switching guide, or replace its parts.
	Main PCB Reverse sensor	Does the voltage vary from 5V to 0V at pin 3 of main PCB's connector P5 while the switching guide is moving?	No	Replace the reverse sensor or reverse sensor harness.
			Yes	Replace the main PCB.
	DU detection (HL-1260)	Does the actuator (Parts reference list, 11-20) move smoothly?	No	Replace the HL-1260 actuator.
"JAM TRAY" error message appears. The first or second sheet of paper is not supplied to the HL-1260 resist sensor.	HL-1260 unit Pickup roller (HL-1260) Duplex tray	Supply paper in Simplex mode. Is paper correctly supplied?	No	Repair the HL-1260 unit. (Pickup mistake with the first sheet of paper)
			Yes	① Set the Duplex tray correctly. ② Set the HL-1260 pickup roller correctly. (Pickup mistake with the second sheet of paper)


+24V
SIDATA 2 P5
SICLK 4 P5
/ATTN 6 P5
/RST 7 P5
+24V 1 P5
+24V 3 P5
GND 5 P5
GND 8 P5
HL-1260
SIDATA 2 P6
SICLK 4 P6
/ATTN 6 P6
/RST 7 P6
+24V 1 P6
+24V 3 P6
GND 5 P6
GND 8 P6
L1
BL02RN2
±0V
7 P4 SIDATA
8 P4 SICLK
9 P4 /ATTN
6 P4 /RST
14 P4 +24V
15 P4 +24V
1 P4 GND
2 P4 GND
MAIN PCB
12 P4 /PPHB
13 P4 PPHA
11 P4 PPHB
10 P4 /PPHA
5 P4 /CSA
3 P4 COPA
4 P4 /COPC
+24V
/PPHB 1 P3
PPHA 2 P3
+24V 3 P3
+24V 4 P3
PPHB 5 P3
/PPHA 6 P3
PAPER PRESS MOTOR
/CSA 1 P2
GND 2 P2
CASSETTE SENSOR
±0V
COPA 1 P1
GND 2 P1
/COPC 3 P1
COVER OPEN SENSOR
±0V

Appendix 2. Motor Drive Circuit



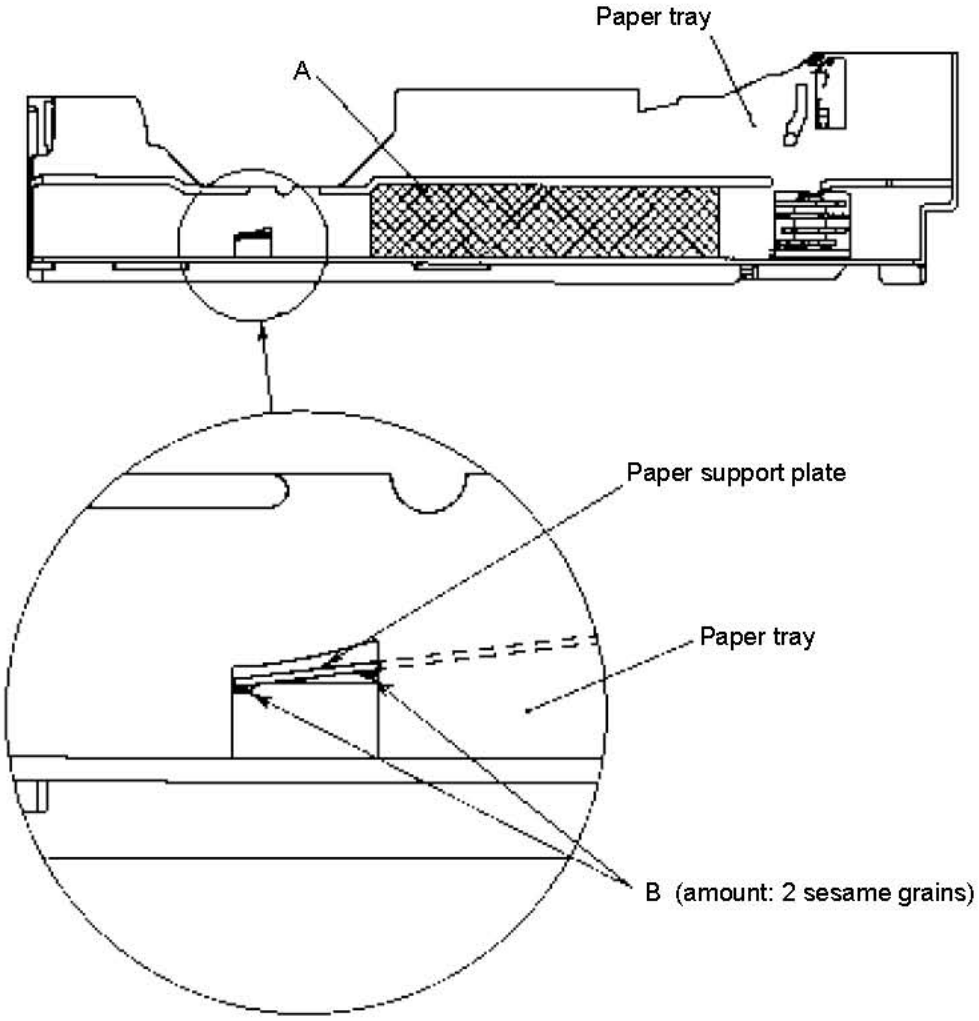
NEW PAPER TRAY



HOW TO APPLY THE SILICON GREASE

Paper tray & Paper support plate

		PRODUCTION						SPARE	
		Machine(HL) 54TU01 54TU02		Option(LT) 54XU01 54XU02		Option(DX) 54XU10 54XU20		Machine(HL) Option(LT) Option(DX)	
		OLD	NEW	OLD	NEW	OLD	NEW	OLD	NEW
A	UH2452000 PAPER TRAY	Y	N	Y	N	Y	Y	Y	Y
B	UH2457000 PAPER TRAY PLATE	Y	N	Y	N	N	N	N	N



Size switch spring

		PRODUCTION						SPARE	
		Machine(HL) 54TU01 54TU02		Option(LT) 54XU01 54XU02		Option(DX) 54XU10 54XU20		Paper feed chassis unit for Machine (HL)	
		OLD	NEW	OLD	NEW	OLD	NEW	OLD	NEW
C	UH2410000 SIZE SWITCH SPRING	Y	Y	Y	Y	-	-	N	Y