

ML6300FB-SC

Maintenance Manual

071312A

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Preface

This manual is for people involved in maintenance and describes on-site maintenance methods for ML6300FB-SC SKEW CORRECTION.

Among the configured parts, those that must be specified for ordering such as print circuit board are applied with a number.

E.g. ABCD-3 Print circuit board

The number is applied to specify the type of configuration part and is not the version number.

Parts are not described in numbers other than those listed in the configuration parts table unless otherwise required.

Regarding the methods for handling and operating the device, please refer to the Users Manual.

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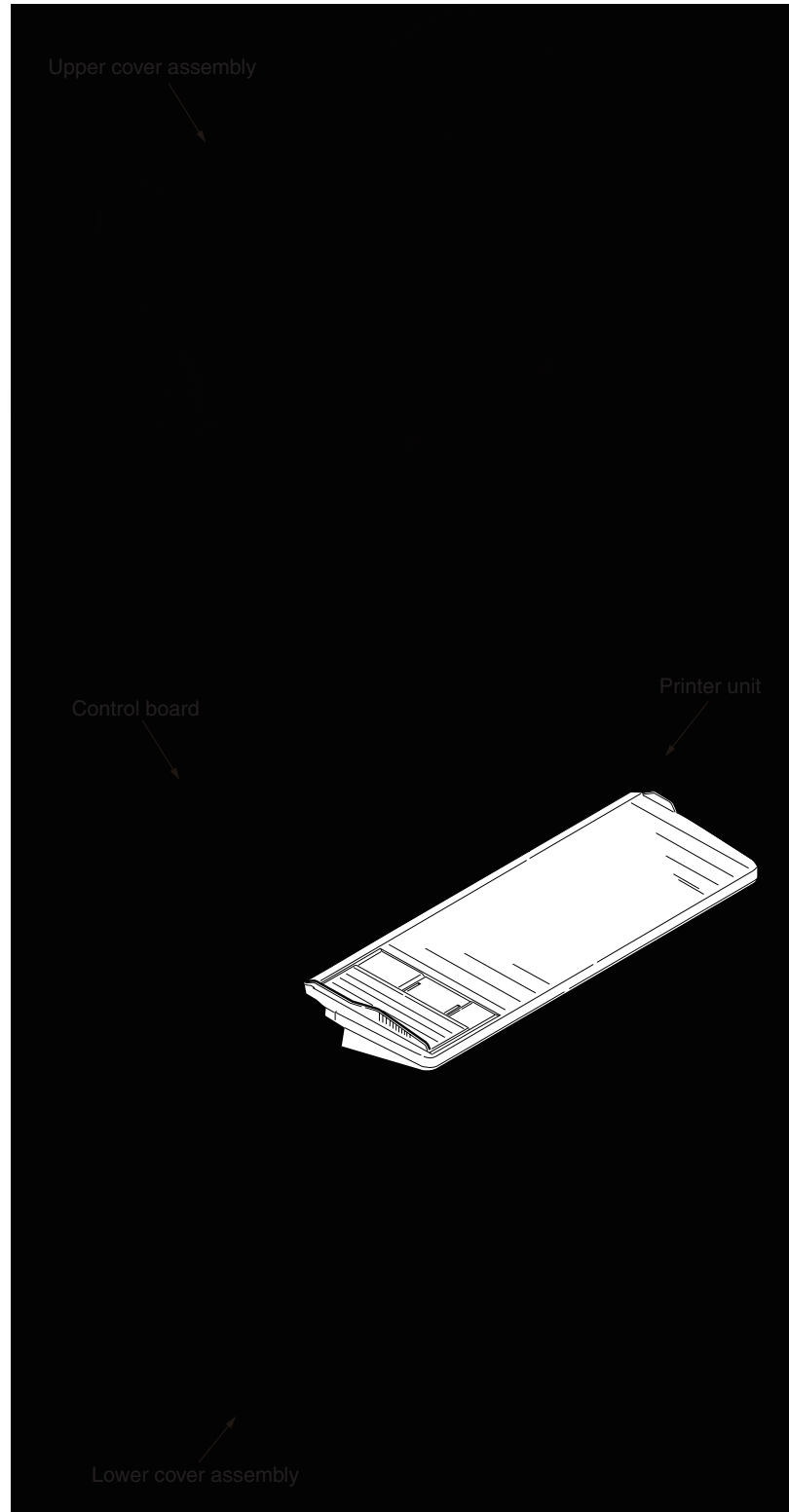
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1. Configuration

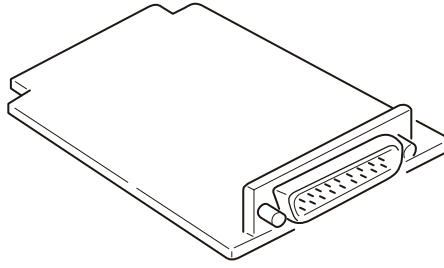
1.1 Standard Configuration

- (1) Upper cover assembly
- (2) Printer unit
- (3) Control board
- (4) Lower cover assembly

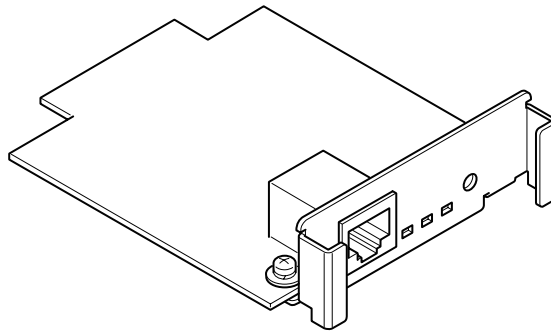


1.2 Option Configuration

(1) RS232C Board



(2) Network Board



2. Cleaning

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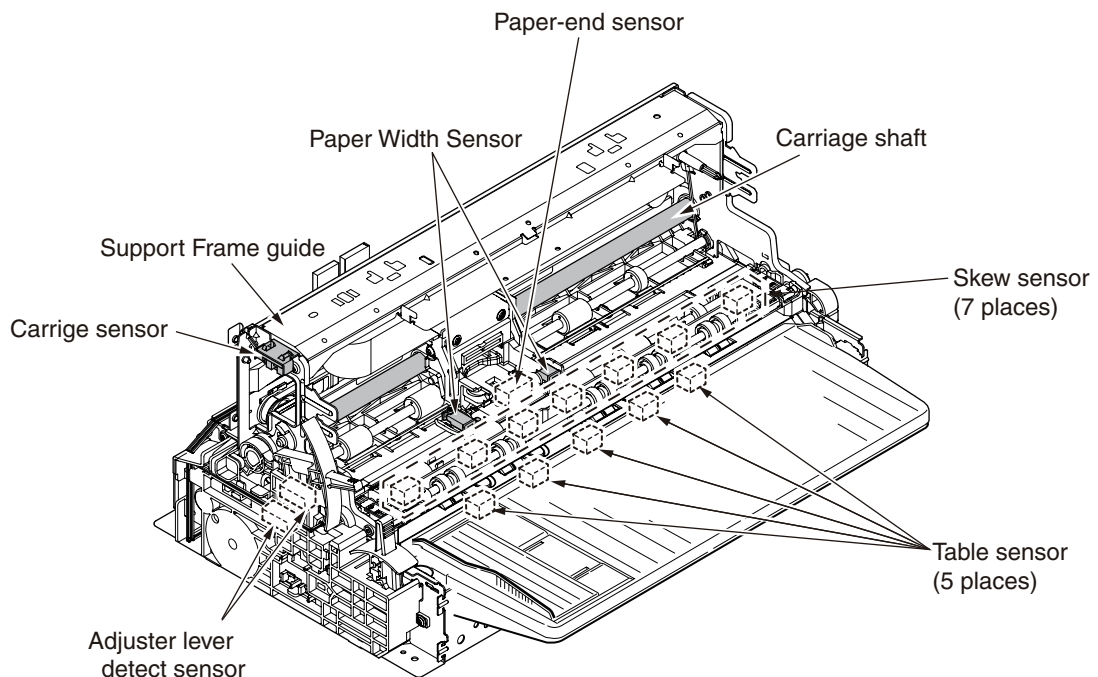
- Turn OFF the power source switch when cleaning.
- Be careful that chipped paper or dust does not go into the mechanism.
- After cleaning lubricated portions, be sure to lubricate again.

Clean the inner sections of the printer at a scheduled interval according to the following conditions.

Interval: After operating for six months or 300 hours.
 Required Time: Approx. 10 minutes
 Tools: Dry cloth (soft cloth such as a gauze), brush, cotton swabs, vacuum cleaner
 Sections to Clean: See Table 2-1.

Table 2-1 Section to Clean

Section to Clean	Contents
Carriage shaft and its periphery	Eliminate chipped paper and wipe away dust, ribbon chips, etc.
Both sides of the frame guide upper section	
Paper path surface	
Paper-end sensor Table sensor Skew sensor Paper width sensor Adjuster lever detect sensor	Wipe off dust attached to the sensor using a brush or cotton swag.



Note: After cleaning sensors, carry out the tests instructed in Section 7.1 (Table 7-2 *) and both TOF Adjust (cut sheet) and Print Position Adjust instructed in Section 7.2.

2.1 Cleaning the Sensors

2.1.1 Cleaning the paper-end sensor

- (1) Remove the upper cover assembly. (See 5.2.1)
- (2) Remove the printer unit. (See 5.2.10)
- (3) Remove the sensor frame. (See 5.2.14)
- (4) Wipe the sensor with a cotton swab.

2.1.2 Cleaning the adjust lever detect sensor

- (1) Remove the upper cover assembly. (See 5.2.1)
- (2) Wipe the sensor with a cotton swab.

2.1.3 Cleaning the skew sensor

- (1) Remove the upper cover assembly. (See 5.2.1)
- (2) Remove the printer unit. (See 5.2.10)
- (3) Remove the sensor board. (See 5.2.15)
- (4) Wipe the sensor with a cotton swab.

2.1.4 Cleaning the paper width sensor

- (1) Remove the LF unit assembly. (See 5.2.17)
- (2) Move the carriage Assy sideways and wipe the protector-ribbon bracket with a cotton swab.

2.1.5 Cleaning the table sensor

- (1) Remove the upper cover assembly. (See 5.2.1)
- (2) Remove the printer unit. (See 5.2.10)
- (3) Remove the sensor board. (See 5.2.15)
- (4) Wipe the sensor with a cotton swab.

3. Lubricating

Lubricate the required section according to the following items.

(1) Timing

This printer is a maintenance-free device, therefore, it does not require lubrication while in operation. However, it must be lubricated after disassembling/reassembling, cleaning lubricated sections, or replacing parts.

(2) Lubricant

- Pan Motor Oil 10W-30 (Nippon Mobile or an equivalent product) PM
- Albania Grease #2EP (Showa Shell Oil or an equivalent product) GEP

(3) Amount of lubricant

- Sufficient.....**Ⓐ**.....Apply the amount of lubricant needed.
- Normal**Ⓑ**.....Apply three or four drops of oil or approximately 0.2 mm thick grease.
- Small**Ⓒ**.....0.006 ± 0.002 g

(4) Parts that must not be lubricated

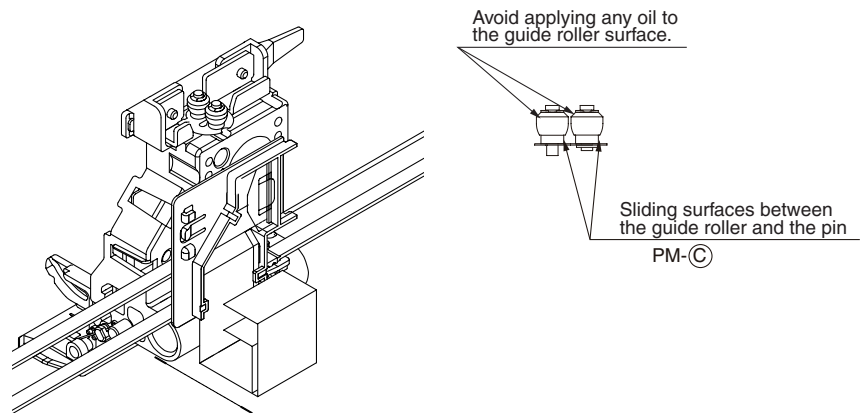
Table 3-1 Parts that must not be lubricated

No.	Prohibited Parts	Reason	Remarks
1	Ink ribbon	To prevent smeared print	
2	Sensors	To prevent dust from attaching	
3	Platen (resin surface)	To prevent smeared paper	
4	Feed roller (resin surface)	To prevent smeared paper	
5	Pin tractor	To prevent rubber from deteriorating	
6	Carriage shaft	To secure carriage run load	
7	Head cable	To prevent faulty contact and cracking	
8	Print head	To prevent faulty operation of print head	
9	Mini pitch belt B	To avoid rubber deterioration	
10	Carriage board	To avoid contact failure	
11	Terminal (e.g., connector)	To avoid contact failure	
12	Microswitch	To avoid contact failure	
13	Skew roller (resin surface)	To prevent smeared paper	

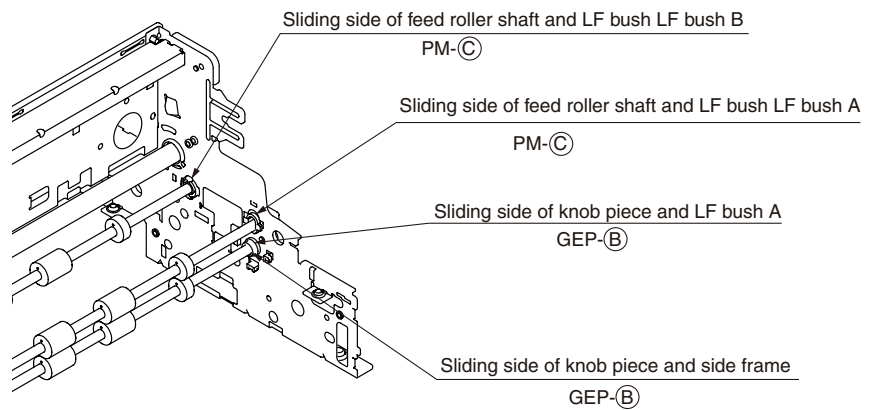
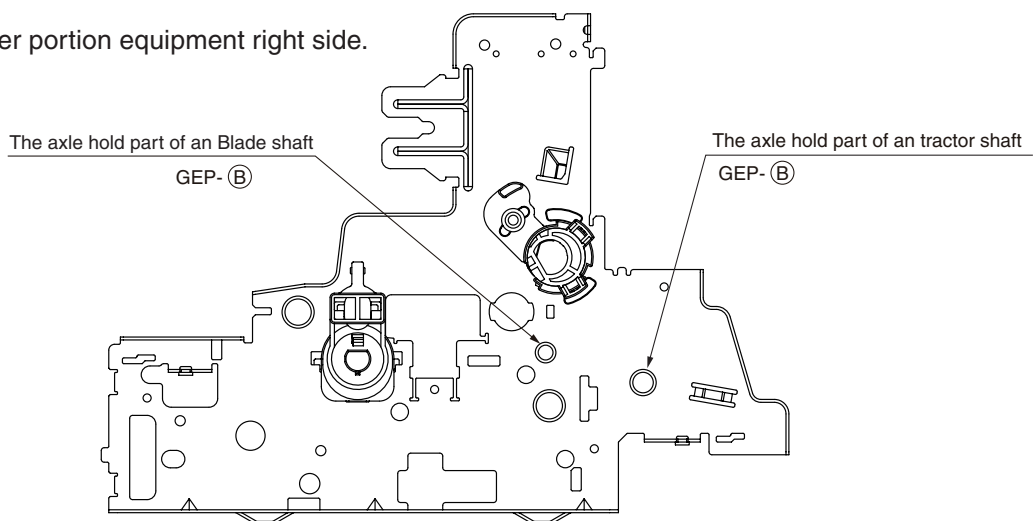
(5) Parts to lubricate

Lubricate the parts indicated in the following figure.

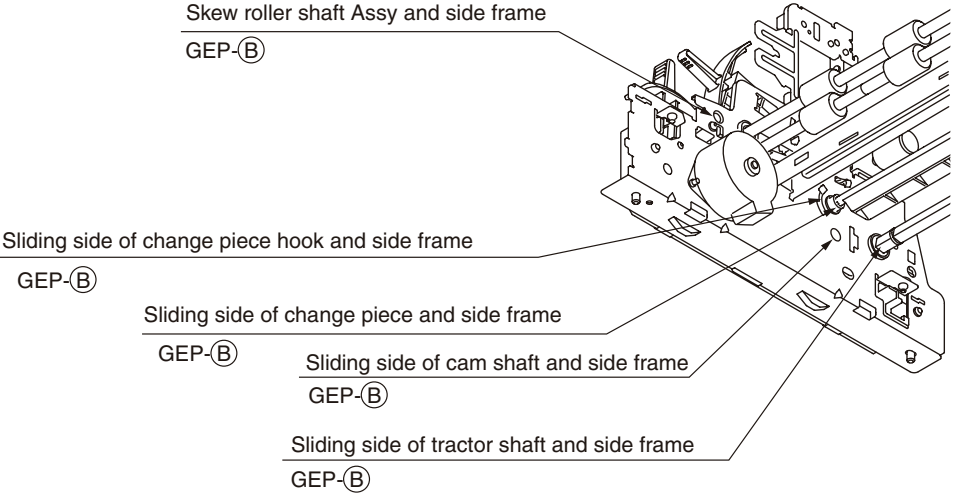
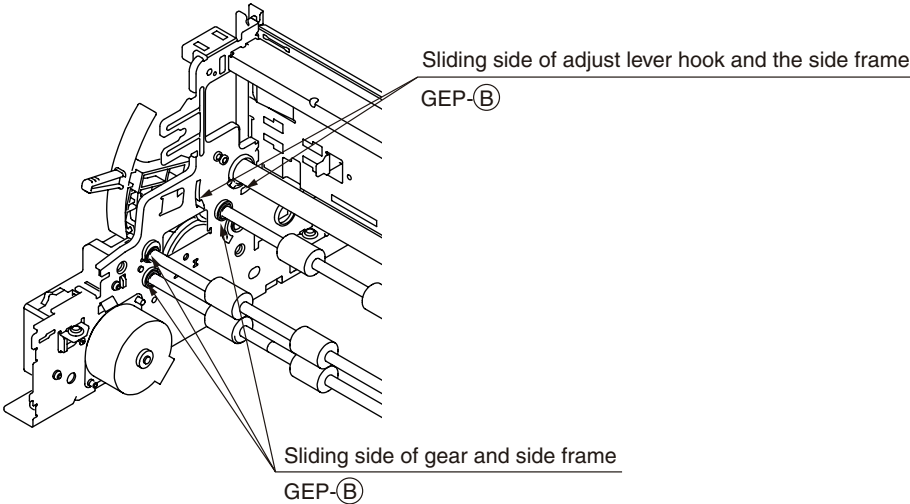
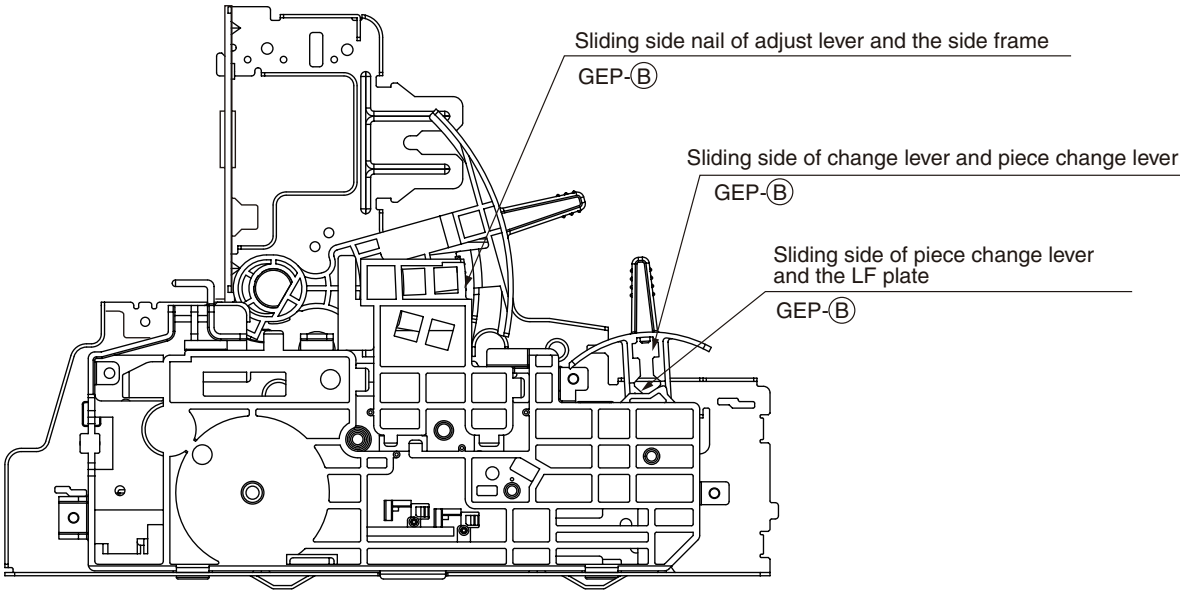
- Carriage guide roller



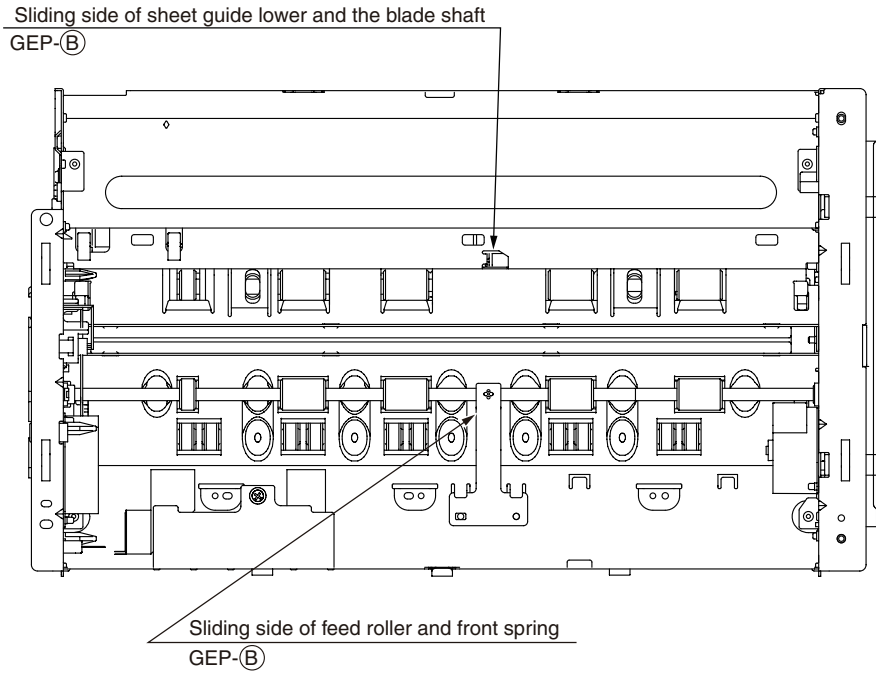
- Printer portion equipment right side.



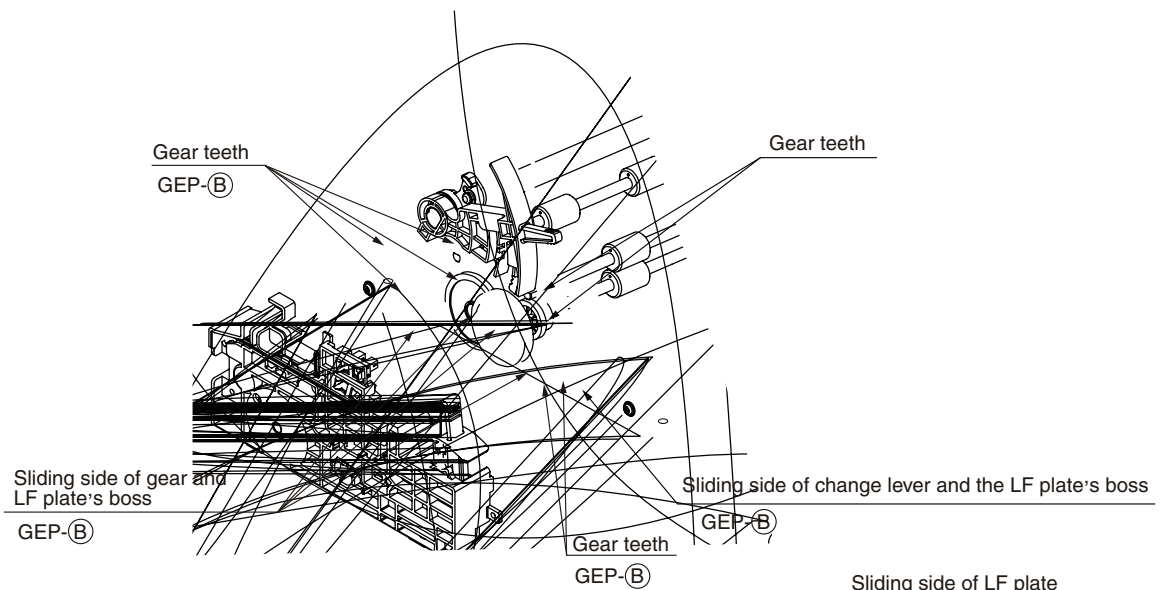
- Printer portion equipment left side.



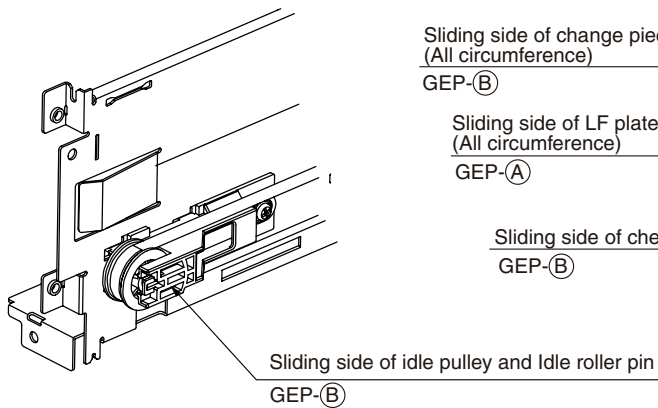
- Printer portion equipment back side.



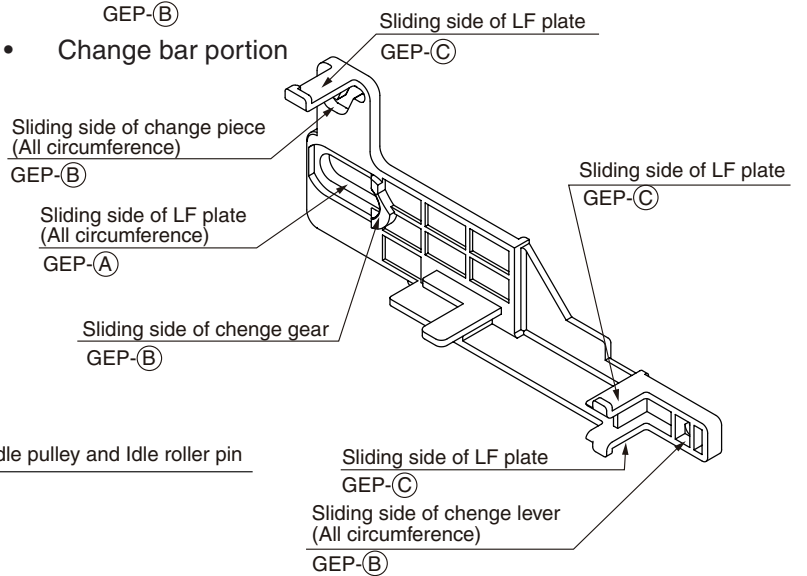
- LF plate Assy portion



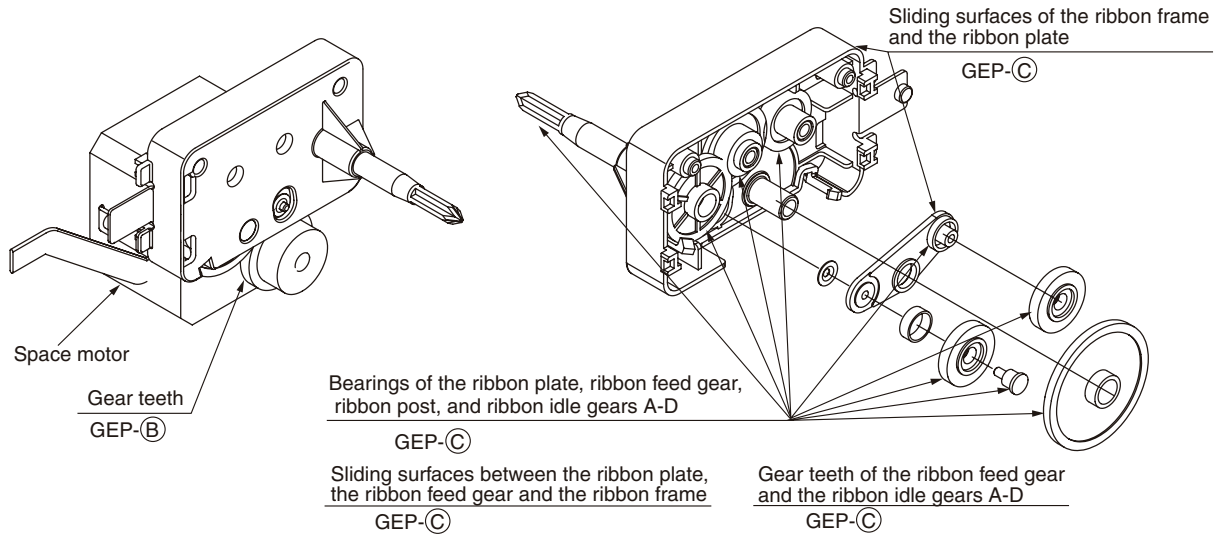
- Idle pulley portion



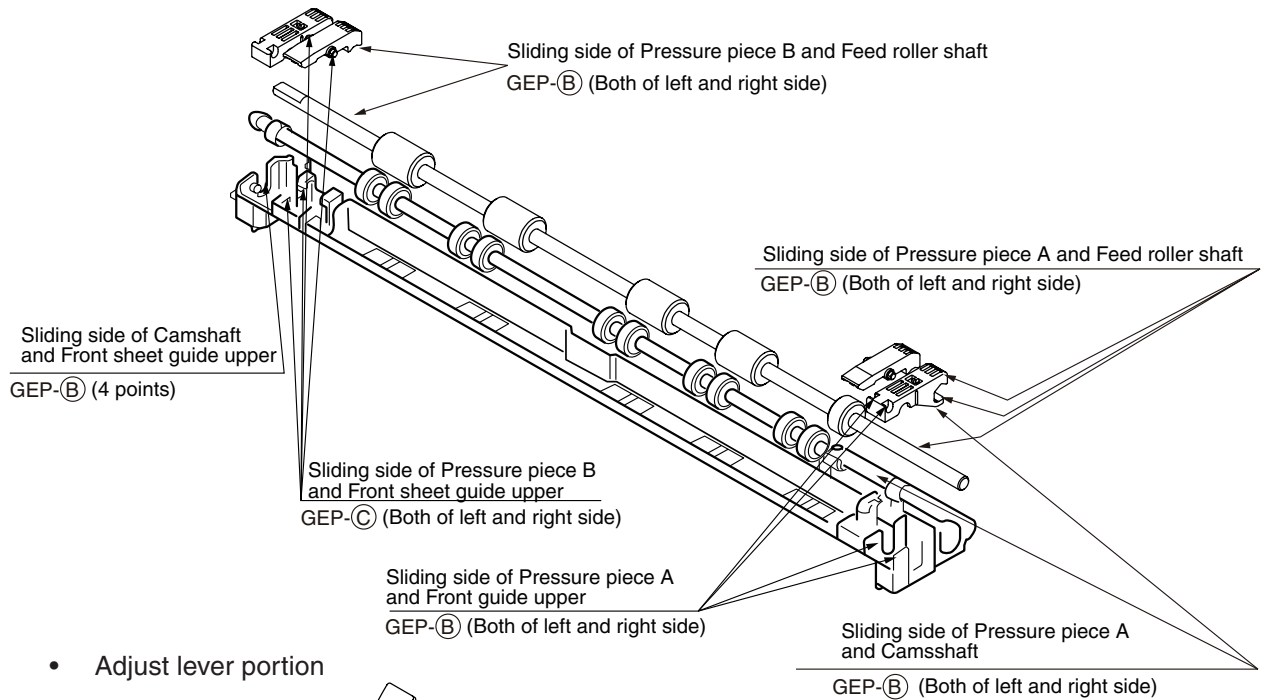
- Change bar portion



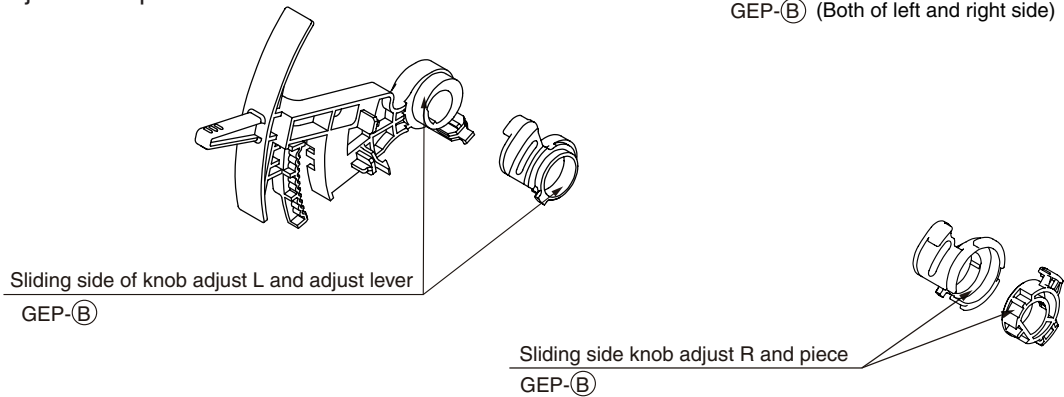
- Ribbon feed portion



- Front sheet guide upper portion

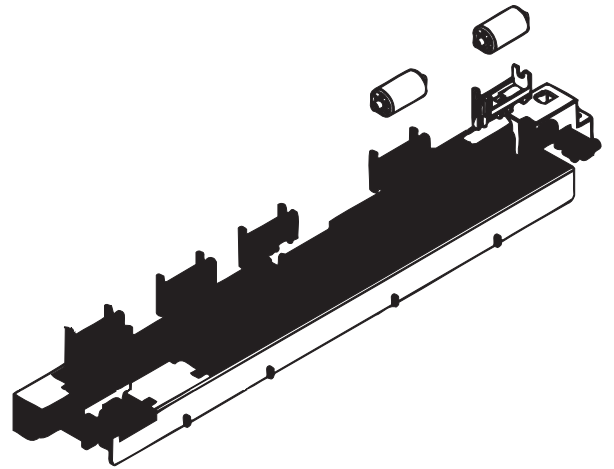


- Adjust lever portion



- Gear frame Assy portion

- Sensor holder Assy portion



4. Maintenance Tools

Tools required for replacing parts of the print board and unit on-site are listed in Table 4-1.

Table 4-1 Maintenance Tools

No.	Maintenance Tools	Quantity	Application	Remarks
1	No.1-100 Phillips screwdriver	1	2~2.6 mm screws	
2	No.2-200 Phillips screwdriver	1	3~5 mm screws	
3	5-200 screwdriver	1	3~5 mm screws	
4	Thickness gauge	1	0.38~0.44 thickness	J-43045001YA
5	No.3 pliers	1	NONE	
6	No.5 nippers	1	NONE	

5. Replacing Parts

5.1 Precautions Upon Replacing Parts

- (1) Turn OFF the printer power switch before disassembling, and first pull the AC plug out from the outlet, then disconnect the AC cord and interface cable from the printer.



There is a risk of electric shock during replacement of the low voltage power supply.

Use insulating gloves or avoid direct contact with any conducting part of the power supply, and caution should be exercised during replacement.

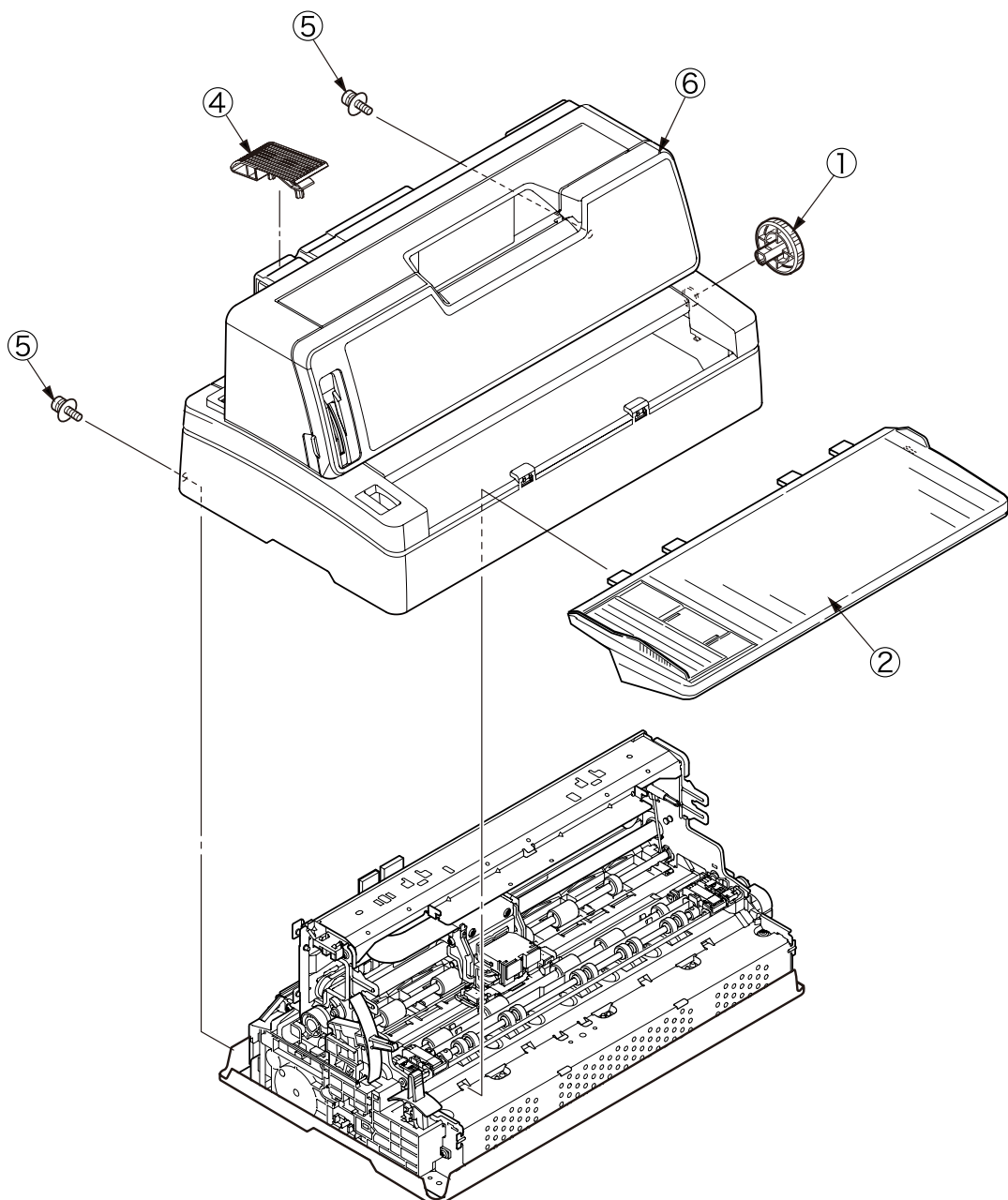
The capacitor may take one minute to complete discharge after the AC cord is unplugged. Also, there is a possibility that the capacitor doesn't discharge because of a breakage of the PCB, etc., so remember the possibility of electric shock to avoid electric shock.

- (2) The print head is extremely hot after a print job, therefore, start the disassembling task five minutes after turning OFF the power.
Furthermore, leave at least 20 seconds after turning OFF the power before disassembling the circuit parts (control board, print head, etc.) in order to prevent electronic parts from being damaged.
- (3) Remove paper and ribbon from the printer before disassembling.
- (4) After replacing or inspecting parts, be sure to check that connectors are properly connected and that there are no abnormalities.
- (5) Do not disassemble the printer when it is operating properly.
- (6) Determine the range of disassembling the printer according to the objective and do not disassemble beyond that range.
- (7) Use specified maintenance tools.
- (8) Disassemble the parts in the specified order. Parts may damage if they are not disassembled in proper order.
- (9) Small items such as screws and collars can be lost easily, therefore, set them in their original position temporarily.
- (10) IC such as microprocessors, ROM, and RAM can easily be damaged by electrostatic, therefore, do not wear gloves that build up electrostatic when handling the print board.
- (11) Do not place the print board directly on the floor or printer.

5.2 Removing and Reinstalling Parts

5.2.1 Upper cover assembly

- (1) Pull out the platen knob ①.
- (2) Remove the stage assembly ②.
- (3) Remove the sheet Guide(Tractor) ④.
- (4) Remove the screw ⑤. (2 locations)
- (5) Detach the three hitch portions from the lower cover in the front section of the upper cover assembly ⑥.
 - * The hitched portions can easily be detached by inserting a minus driver from the lower part of the upper cover.
- (6) Remove the upper cover assembly ⑥ by lifting it straight up.
- (7) Reinstall in the opposite sequence to removal.

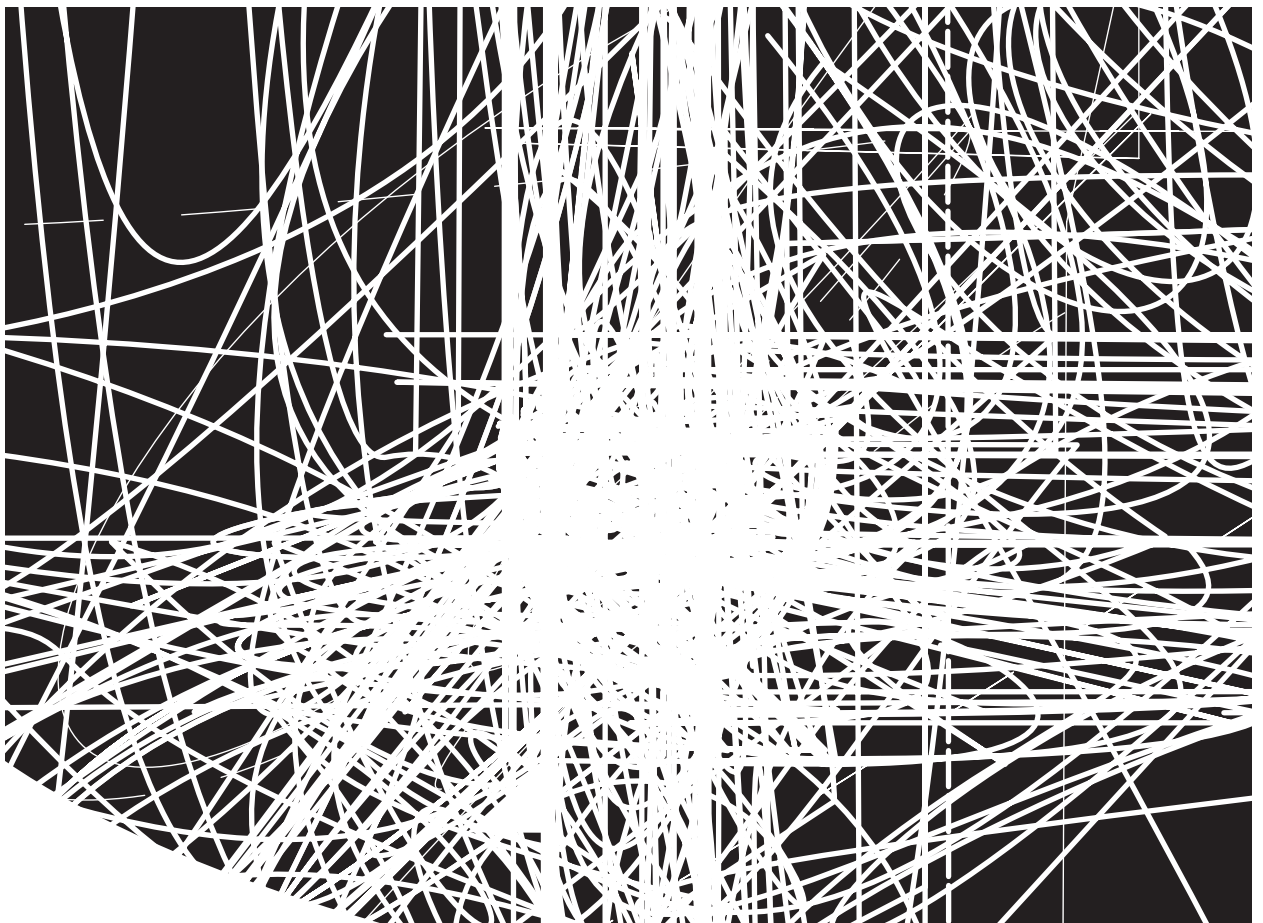


5.2.2 Print head

- (1) Open the access cover ①.
- (2) Move the adjust lever ② to the top.
- (3) Move the carriage unit ③ to the mid-section of the upper sheet guide ④ notch.
- (4) Pull the head clamp ⑤ toward the front and remove the print head ⑥ by pulling it out toward the front.
- (5) Reinstall in the opposite sequence to removal.

(Precautions upon reinstalling)

1. Press the print head ⑥ against the carriage unit ③ and insert it in the connector ⑦.
2. The head clamp ⑤ must be set securely in the print head ⑥ and carriage unit ③.

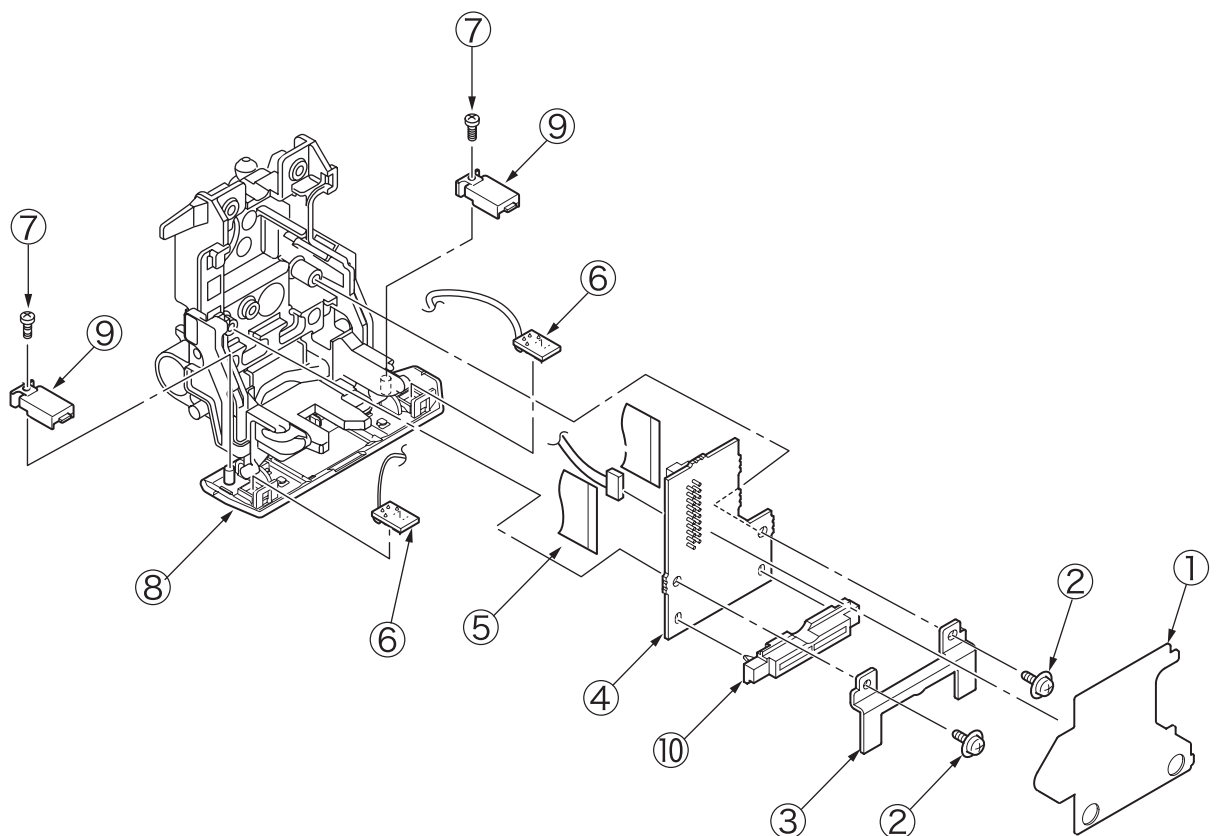


5.2.3 Carriage board, connector and paper width sensor

- (1) Remove the upper cover assembly. (See 5.2.1)
- (2) Remove the printhead. (See 5.2.2)
- (3) Remove the cover board ① .
- (4) Remove the two screws ② from the connector holder ③ .
- (5) Remove carriage board ④ .
- (6) Disconnect the two head cables ⑤ .
- (7) Disconnect the paper width sensor cable ⑥ .
- (8) Remove the two screws ⑦ from the protector-ribbon bracket ⑧ .
- (9) Remove the two sensor covers ⑨ .
- (10) Reinstall in the opposite sequence to removal.

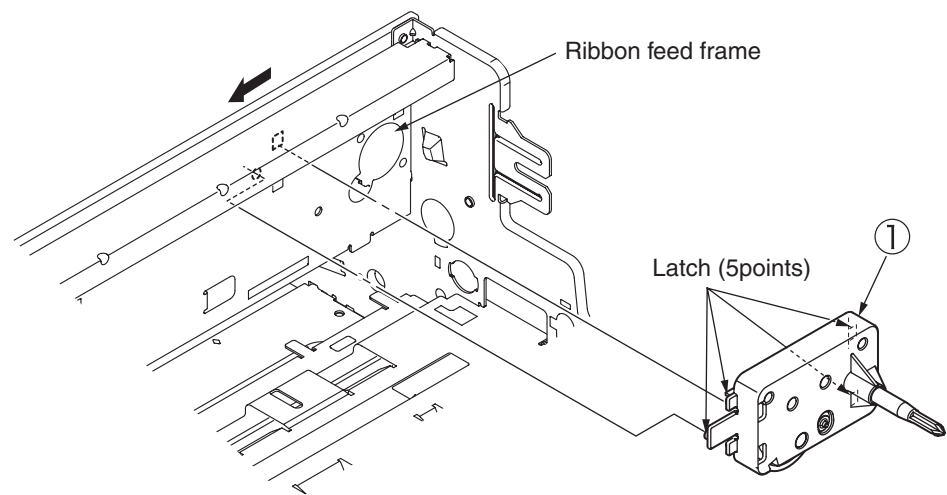
(Precautions upon reinstalling)

1. Be careful to avoid kinking the head cables ⑤ and paper width sensor cable ⑥ .
2. Make sure the connector ⑩ is correctly oriented.
3. Do not touch the exposed terminals on the connector ⑩ . To prevent faulty connections, keep the terminals free of dirt and dust.
4. After reinstallation, carry out the tests instructed in Section 7.1 (Table 7-2*) and implement both TOF Adjust (cut sheet) and Print Position Adjust instructed in Section 7.2.



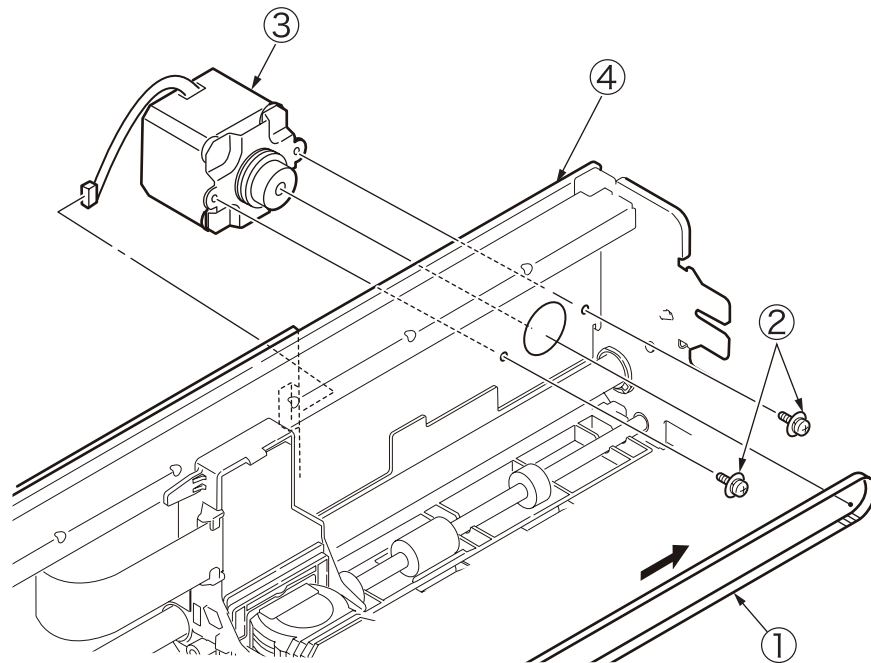
5.2.4 Ribbon feed assembly

- (1) Remove the upper cover assembly. (See 5.2.1)
- (2) Bend the latch on the ribbon feed frame forward and slide in the direction indicated by the arrow. This allows the ribbon feed assembly ① to be removed in the forward direction.
- (3) Reinstall in the opposite sequence to removal.



5.2.5 Space motor

- (1) Remove the upper cover assembly. (See 5.2.1)
- (2) Remove the ribbon feed assembly. (See 5.2.4)
- (3) Disconnect the space motor connector cable from the control board.
- (4) Push the mini pitch belt ① in the direction indicated by the arrow and remove the pulley belt from the motor pulley.
- (5) Remove the two screws ②, then remove the space motor ③ from the space frame ④.
- (6) Reinstall in the opposite sequence to removal.

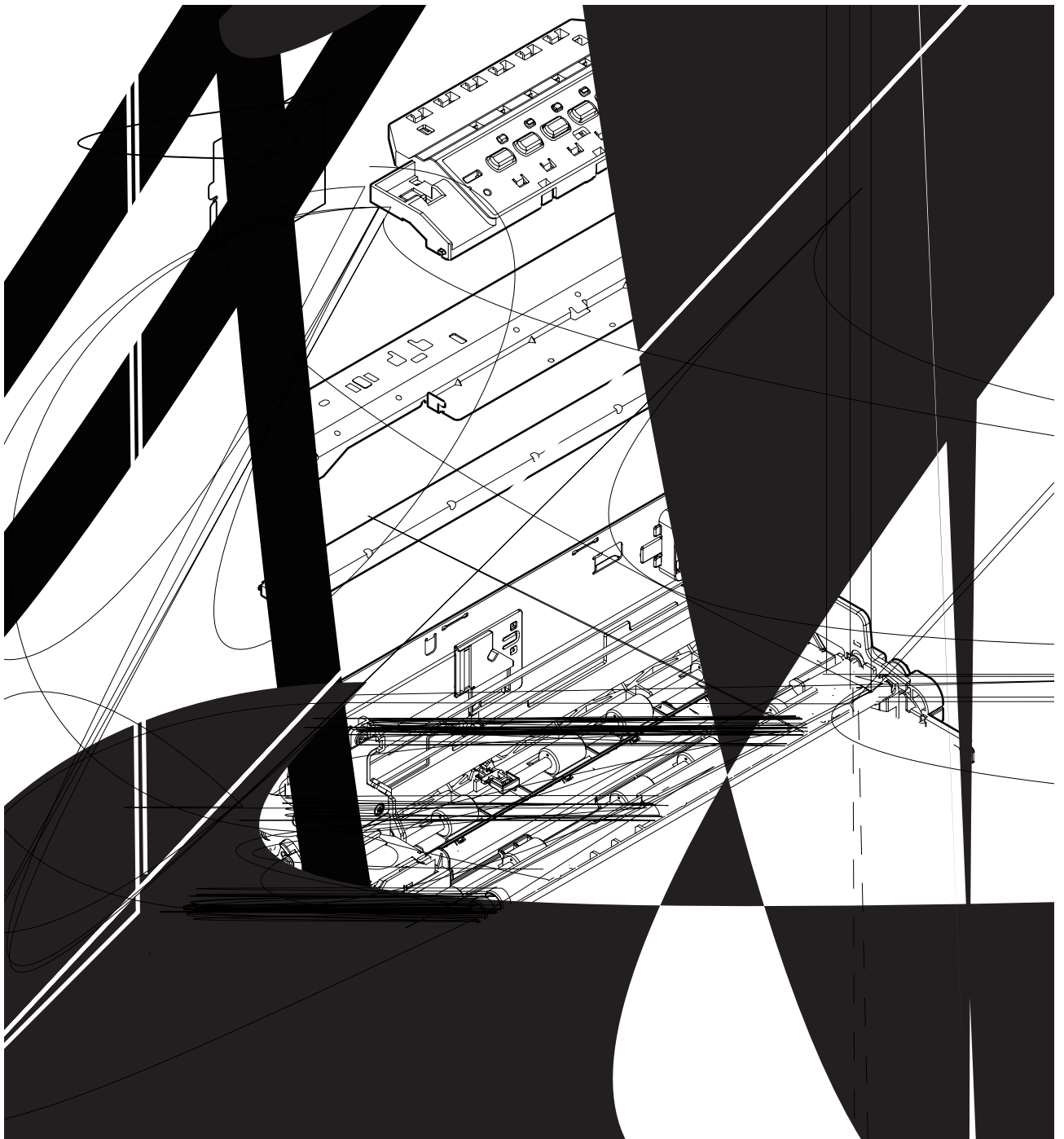


5.2.6 Frame guide

- (1) Remove the upper cover assembly. (See 5.2.1)
- (2) Remove the photo interrupter ⑤ .
- (3) Remove the five screws ① .
- (4) Remove the ope-panel assembly ② .
- (5) Remove the plate shield(B) ⑥ .
- (6) Remove the support frame ③ .
- (7) Remove the frame guide ④ .
- (8) Reinstall in the opposite sequence to removal.

(Precautions upon reinstalling)

1. Check and adjust the print head and platen after reinstalling the parts. (See 6.1)
2. Push in the frame guide ④ in the direction indicated by the arrow A until it stops, then secure in place.

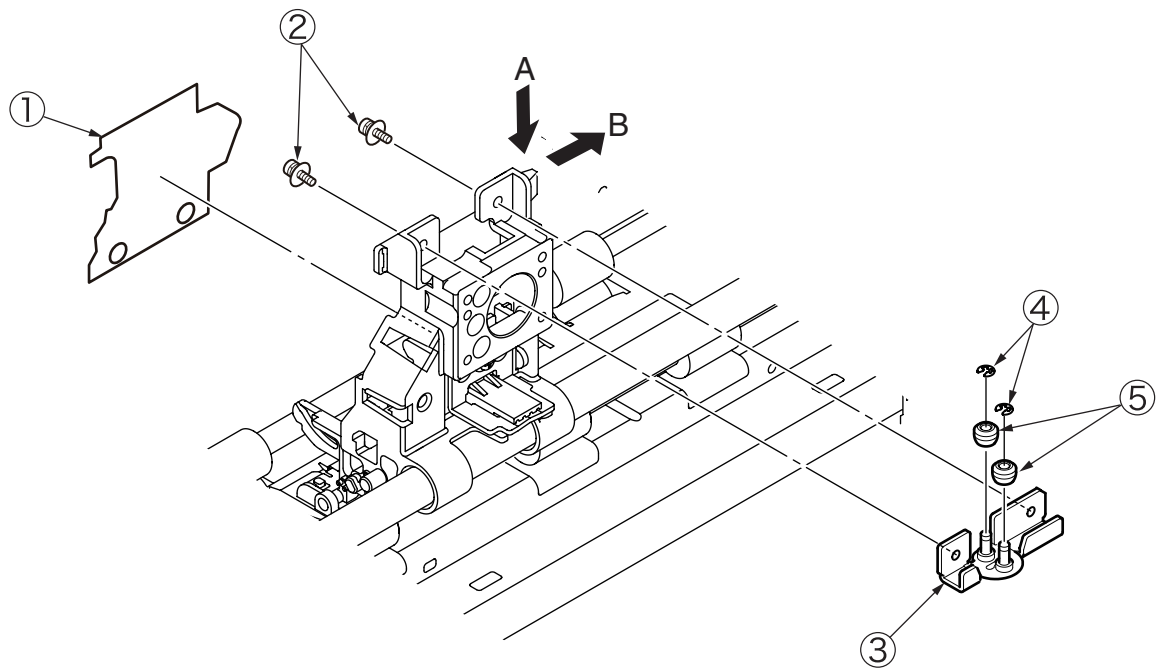


5.2.7 Guide roller

- (1) Remove the upper cover assembly. (See 5.2.1)
- (2) Remove the ope-panel assembly. (See 5.2.6)
- (3) Remove the support frame. (See 5.2.6)
- (4) Remove the frame guide. (See 5.2.6)
- (5) Remove the cover board ① .
- (6) Remove the two fixing screws ② and the guide roller bracket ③ .
- (7) Remove the two E-rings ④ and the two guide rollers ⑤ .
- (8) Reinstall in the opposite sequence to removal.

(Precautions upon reinstalling)

1. Check and adjust the print head and platen after reinstalling the parts (See 6.1).
2. Make sure the guide roller ⑤ is correctly oriented.
3. Push the guide roller bracket ③ in the direction of the arrows A and B to install.



5.2.8 Control board

- (1) Remove the upper cover assembly. (See 5.2.1)
- (2) Disconnect the SP motor, LF motor, Power supply, Printhead 1, Printhead 2, Paper sensor, Home sensor, and continuous/single sensor connectors from the control board ①.
- (3) Remove the three screws ② and screw ③. Remove the control board ① and shield plate ④, shield plate (B) ⑤.
- (4) Reinstall in the opposite sequence to removal.

(Precautions upon reinstalling)

1. When reassembling, make sure the control board ① firmly engages with the lower cover clip.
2. Clean with alcohol for screws ②, screw ③, shield plate ④ and screw-part in control board ①, and install the control board.
3. Push the control board ① in the direction of the arrow A for securing by screws to install.
4. Check the screws ② and screw ③ by visual.

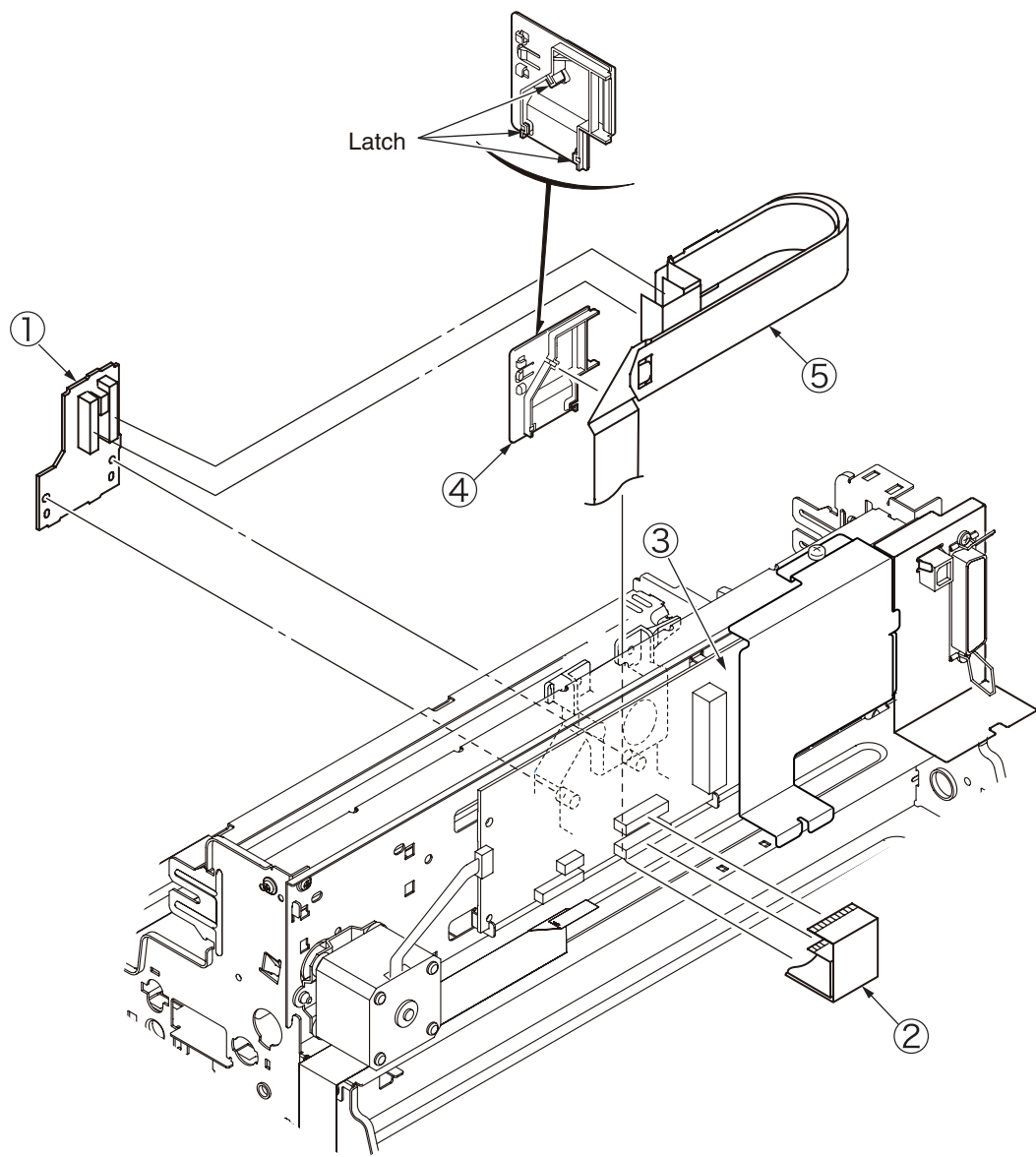


5.2.9 Head cables

- (1) Remove the upper cover assembly. (See 5.2.1)
- (2) Remove the printhead. (See 5.2.2)
- (3) Remove the ope-panel assembly. (See 5.2.6)
- (4) Remove the support frame. (See 5.2.6)
- (5) Remove the carriage board ①, then remove the two head cables ②. (See 5.2.3)
- (6) Disconnect the two head cables ② from the control board ③.
- (7) Remove the control board ③. (See 5.2.8)
- (8) Open the latch and remove the head cables ② together with guide cable ④ from the space frame.
- (9) Separate the head cables ② and film support ⑤ from the guide cable ④.
- (10) Reinstall in the opposite sequence to removal.

(Precautions upon reinstalling)

1. Be careful to avoid kinking the head cables ②.
2. Do not touch the exposed terminals on the head cables ②. To prevent faulty connections, keep the terminals free of dirt and dust.



5.2.10 Printer unit

- (1) Remove the upper cover assembly. (See 5.2.1)
- (2) Disconnect the connector (Power supply) from the control board ① .
- (3) Remove the four screws ② , then remove the printer unit ③ .
- (4) Reinstall in the opposite sequence to removal.



5.2.11 Power supply unit



There is a risk of electric shock during replacement of the low voltage power supply.

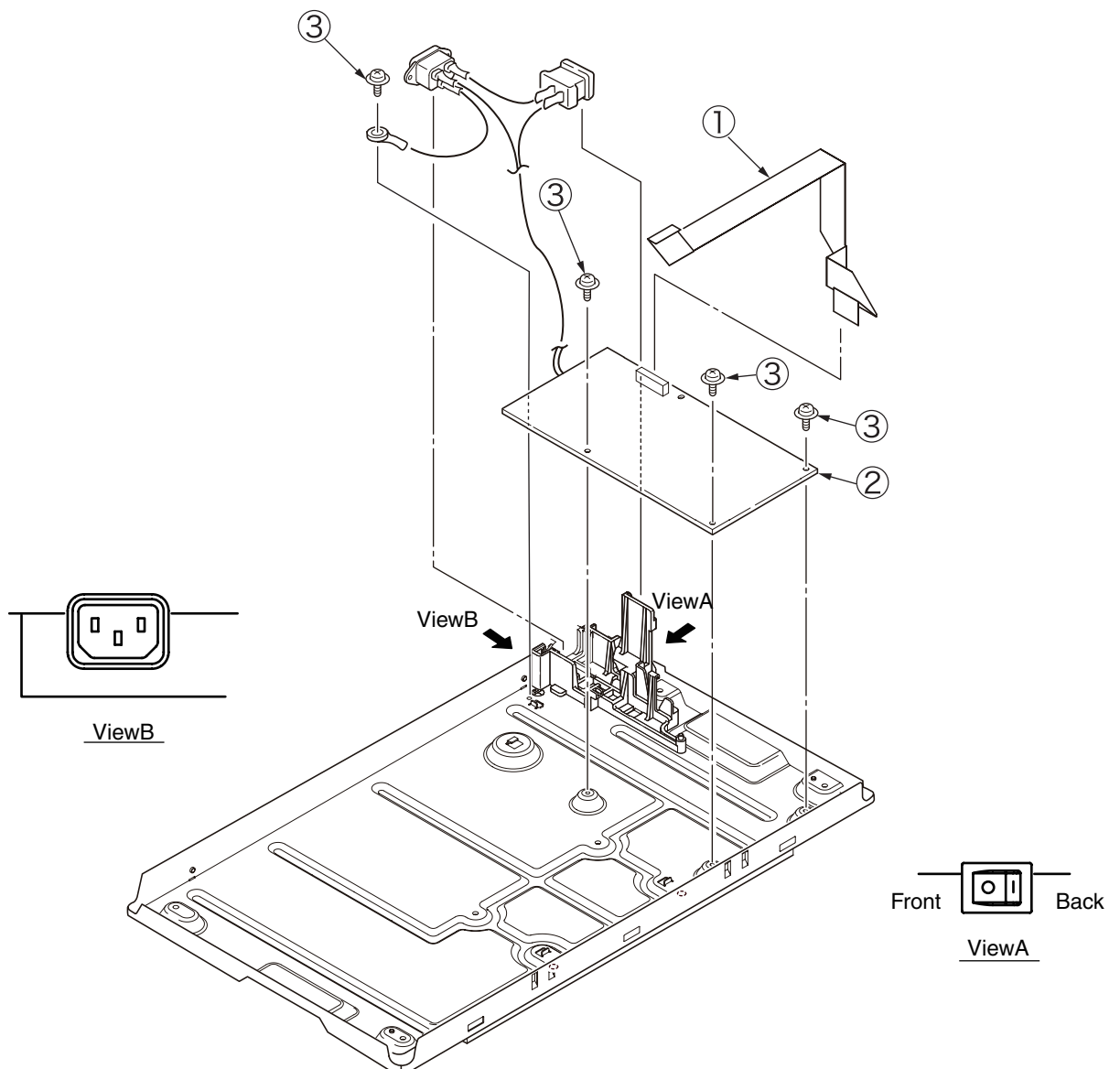
Use insulating gloves or avoid direct contact with any conducting part of the power supply, and caution should be exercised during replacement.

The capacitor may take one minute to complete discharge after the AC cord is unplugged. Also, there is a possibility that the capacitor doesn't discharge because of a breakage of the PCB, etc., so remember the possibility of electric shock to avoid electric shock.

- (1) Remove the upper cover assembly. (See 5.2.1)
- (2) Remove the printer unit. (See 5.2.10)
- (3) Disconnect the POW connector ① from the control board ② .
- (4) Remove the four screws ③ , then remove the power supply board ② .
- (5) Reinstall in the opposite sequence to removal.

(Precautions upon reinstalling)

Check the white connector (CN2) inserted Control board ② by visual.

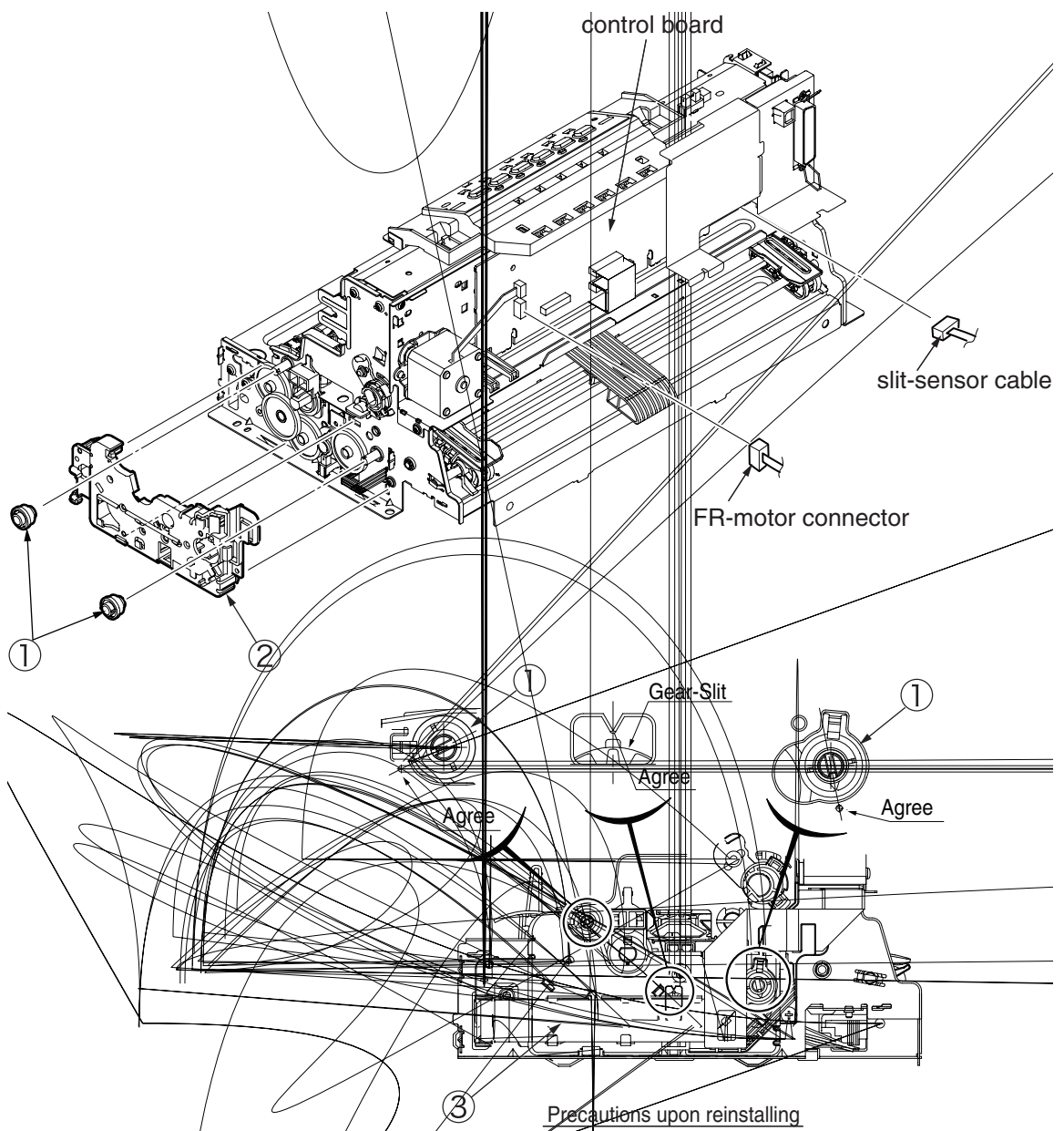


5.2.12 Gear-Frame Assembly

- (1) Remove the upper cover assembly. (See 5.2.1)
- (2) Remove the printer unit. (See 5.2.10)
- (3) Remove the sensor cables ③. (See 5.2.18)
- (4) Remove the two cam gears ①.
- (5) Disconnect the slit-sensor cable and the FR-motor connector from the control board.
- (6) Pull out the FR-motor cable to the inside of the side frame.
- (7) Remove the four latches from the side frame, and then remove the gear-frame assembly ②.
- (8) Reinstall in the opposite sequence to removal.

(Precautions upon reinstalling)

1. When fastening the cam gears ①, align the phases of the two cam gears ① and the slit gears.

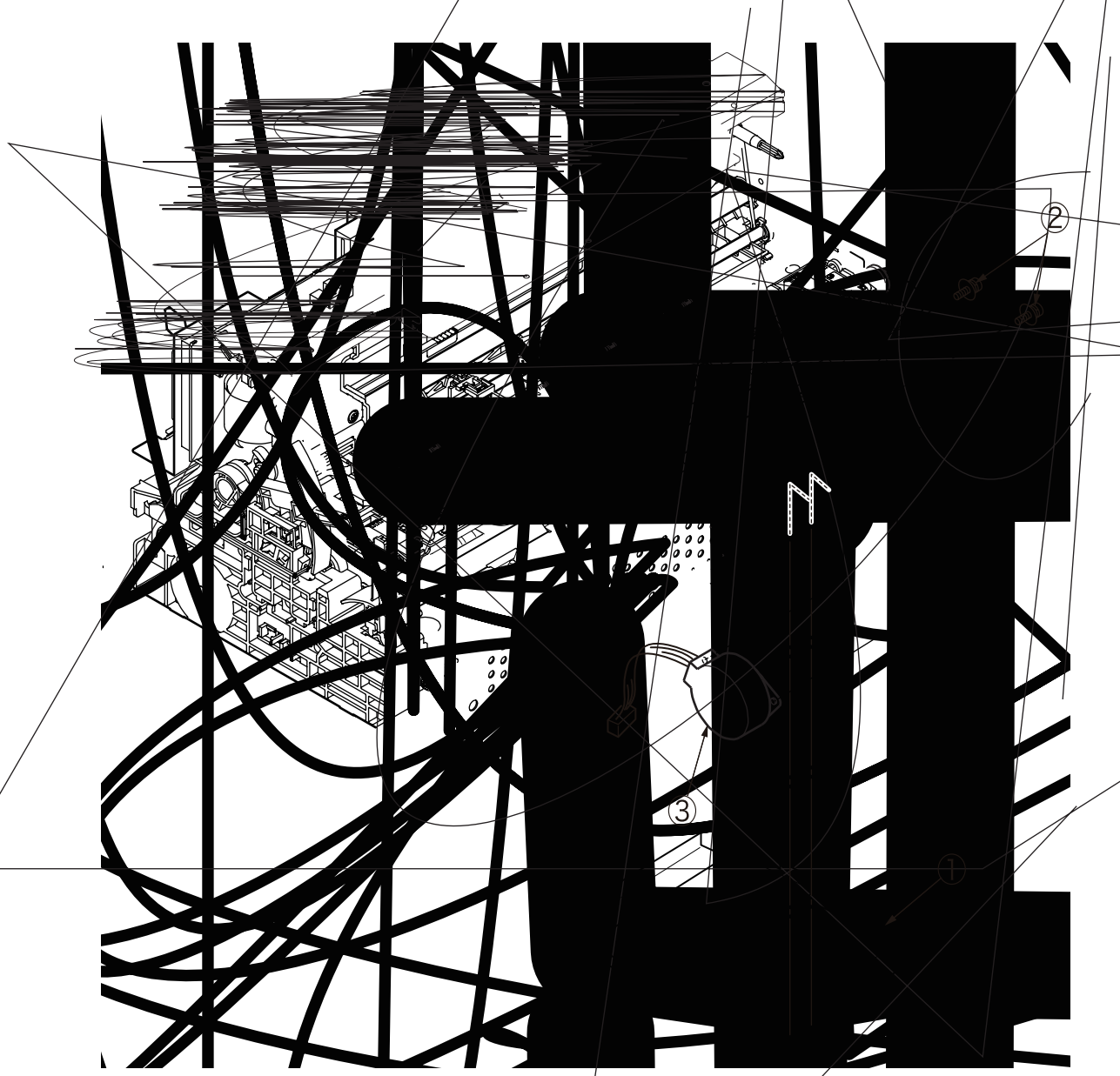


5.2.13 FR motor

- (1) Remove the upper cover assembly. (See 5.2.1)
- (2) Remove the printer unit. (See 5.2.10)
- (3) Remove the gear-frame assembly. (See 5.2.12)
- (4) Remove the Film-Guard(SC) ① .
- (5) Remove the two screws ② , then remove the FR motor ③ .
- (6) Reinstall in the opposite sequence to removal.

(Precautions upon reinstalling)

1. When fastening the cam gears , align the phases of the two cam gears and the slit gears.
(See 5.2.12)

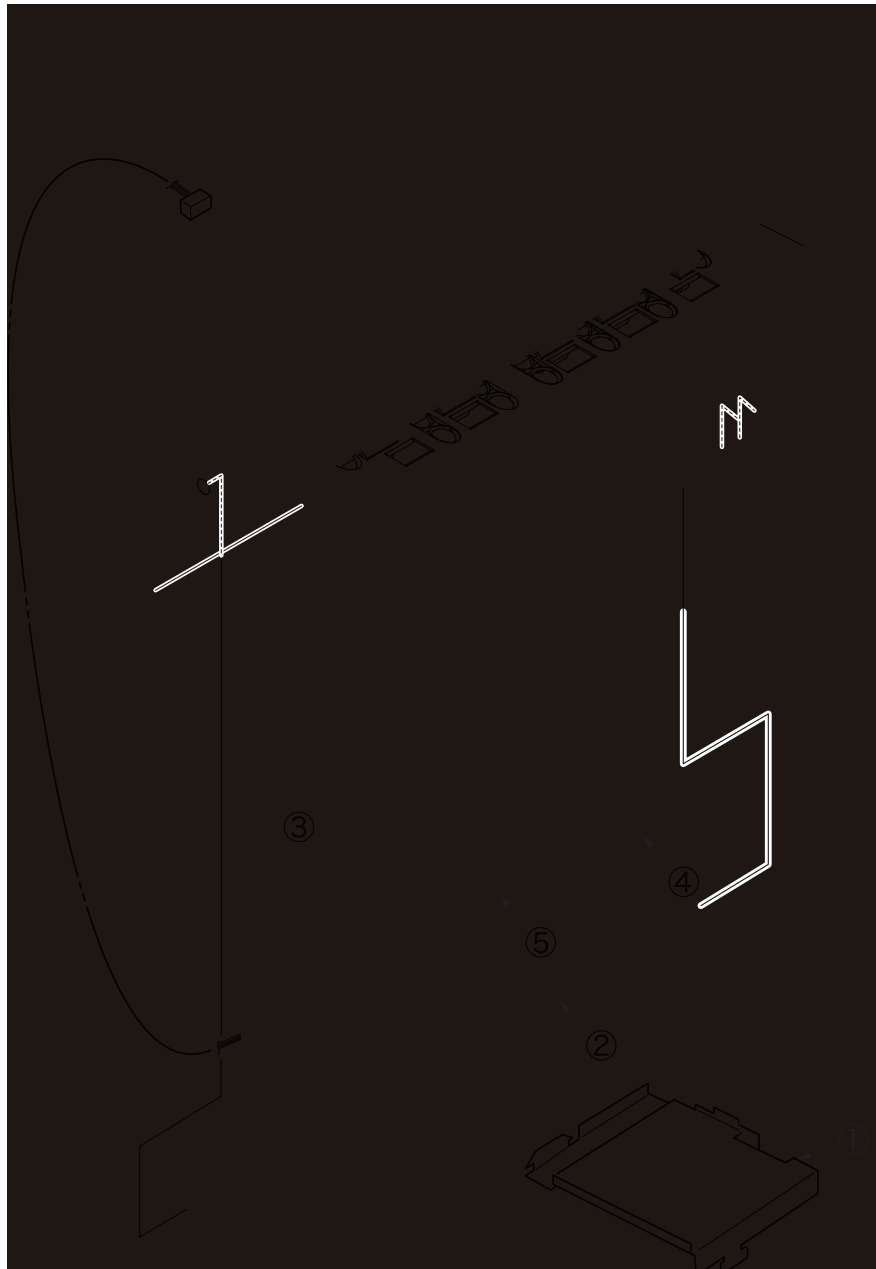


5.2.14 Sensor Assy

- (1) Remove the upper cover assembly. (See 5.2.1)
- (2) Remove the printer unit. (See 5.2.10)
- (3) Disconnect the LF motor and Paper sensor connectors from the control board.
- (4) Remove the LF unit assembly.(See 5.2.17)
- (5) Remove the gear frame assy. (See 5.2.12)
- (6) Remove the Film-Guard(SC) ① .
- (7) Remove the cam shaft ② .
- (8) Open the three clips ③ and slide the sensor frame toward the operator, then remove the sensor frame ④ . This allows the sensor arm B ⑤ to be released simultaneously.
- (9) Reinstall in the opposite sequence to removal.

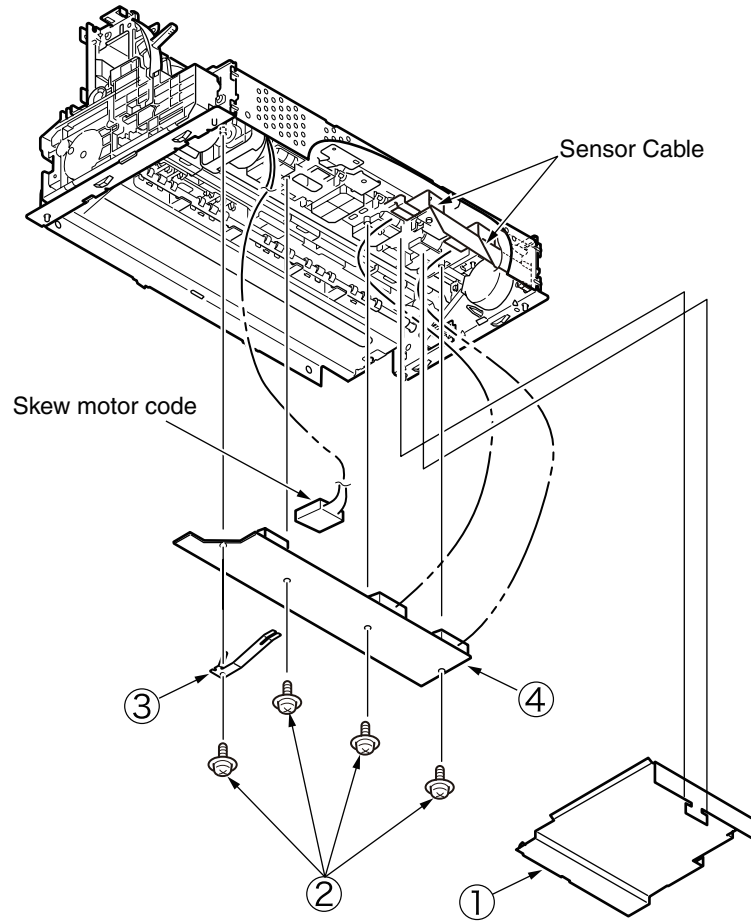
(Precautions upon reinstalling)

1. Reinstall the sensor assy after confirming that sensor arm B ⑤ move smoothly.
2. When fastening the cam shafts and cam gears, align the phases of the front and the rear (see 5.2.12).



5.2.15 Sensor board

- (1) Remove the upper cover assembly. (See 5.2.1)
- (2) Remove the printer unit. (See 5.2.10)
- (3) Remove the Film-Guard(SC) ① .
- (4) Remove the four screws ② , then remove the plate earth ③ and sensor board ④ .
- (5) Remove the two sensor cables and skew motor code.
- (6) Reinstall in opposite sequence to removal.

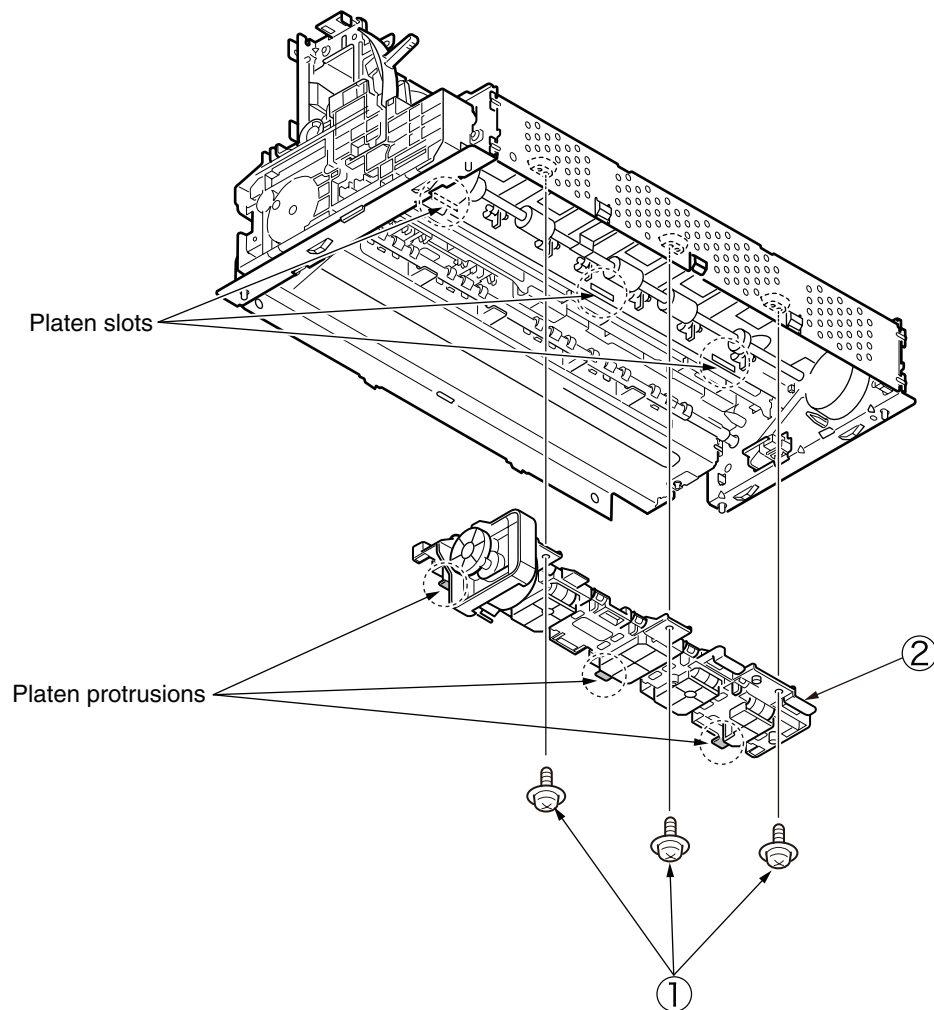


5.2.16 Sensor SC Assy

- (1) Remove the upper cover assembly. (See 5.2.1)
- (2) Remove the printer unit. (See 5.2.10)
- (3) Remove the sensor board. (See 5.2.15)
- (4) Remove the three screws ①, then remove the sensor SC Assy ②.
- (5) Reinstall in opposite sequence to removal.

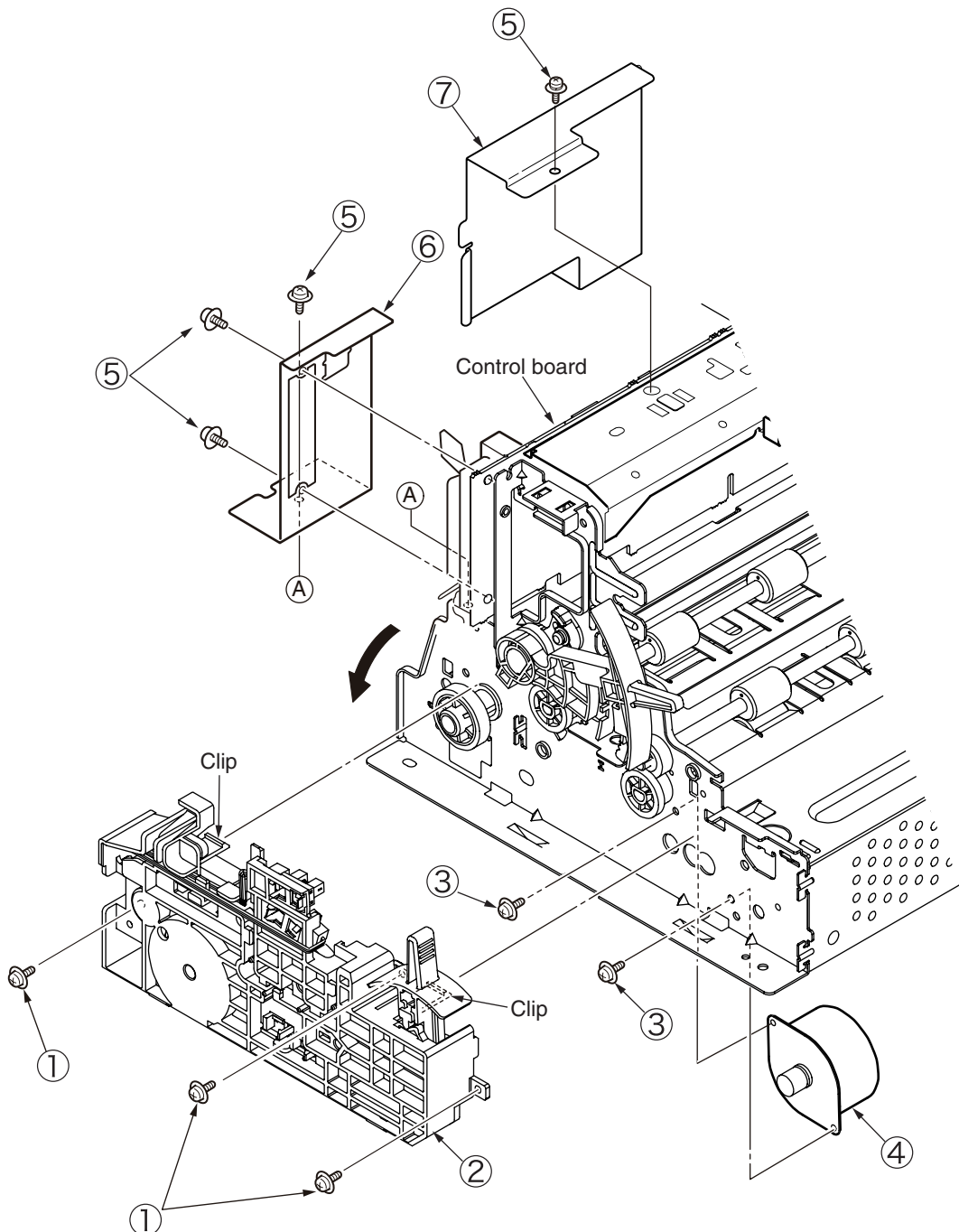
(Precautions upon reinstalling)

1. Insert the three protrusions of the sensor SC Assy ② into the three slots of the platen to reinstall the Assy.



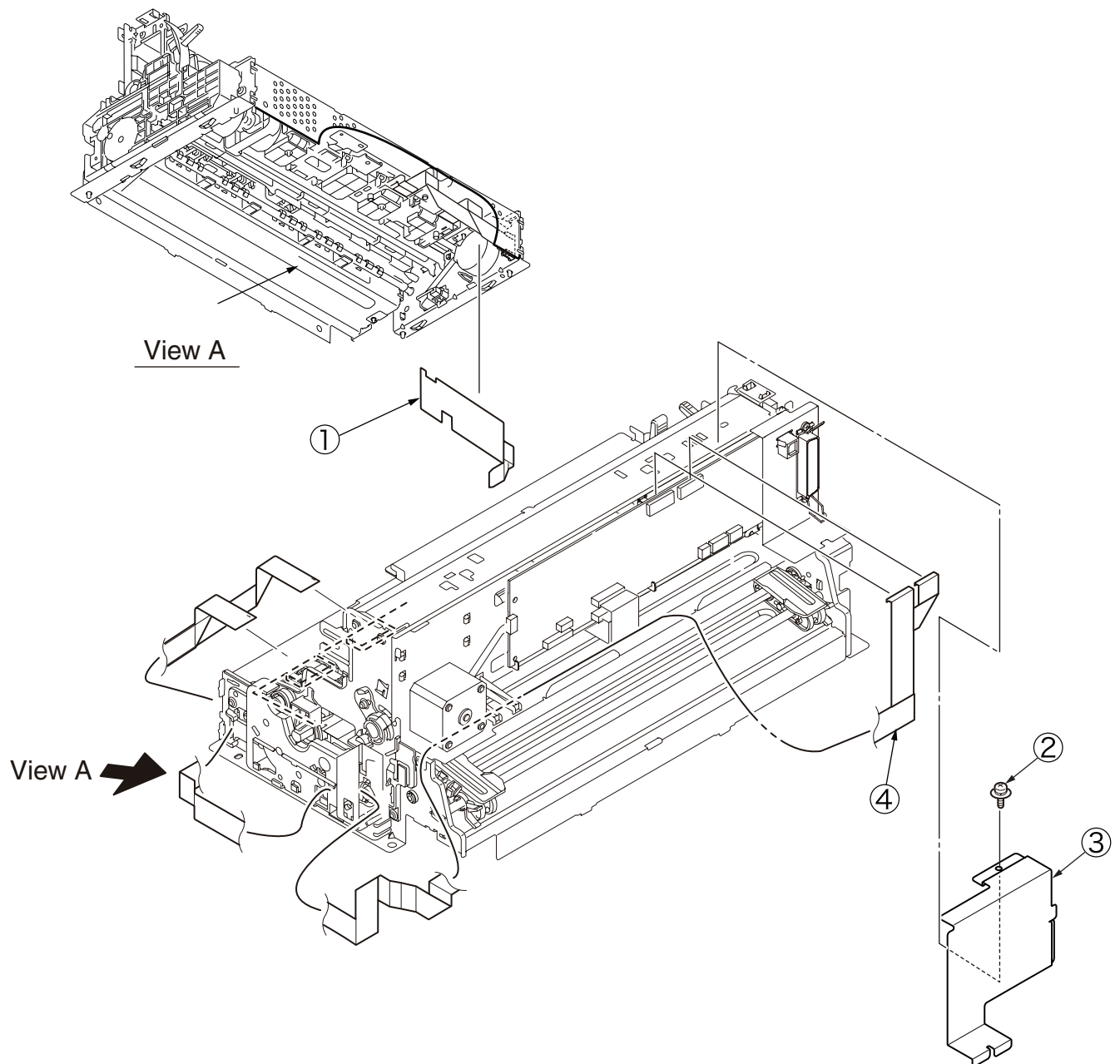
5.2.17 LF motor

- (1) Remove the upper cover assembly. (See 5.2.1)
- (2) Remove the printer unit. (See 5.2.10)
- (3) Remove the sensor SC Assy.(See 5.2.16)
- (4) Disconnect the LF motor, continuous/single changeover sensor, and Paper sensor connectors from the control board .
- (5) Remove the four screws ⑤ , shield plate ⑥ and plate shield (B) ⑦ .
- (6) Remove the three screws ① .
- (7) Press down on the two clips on the LF unit assembly ② and pull out in the direction indicated by the arrow. Release the two lower clips and remove the LF unit assembly ② .
- (8) Remove the two screws ③ , then remove the LF motor ④ .
- (9) Reinstall in the opposite sequence to removal.



5.2.18 Sensor cables

- (1) Remove the upper cover assembly. (See 5.2.1)
- (2) Remove the printer unit. (See 5.2.10)
- (3) Remove the sensor board. (See 5.2.15)
- (4) Remove the screw ②, and shield plate (B) ③.
- (5) Remove the film-cable ①.
- (6) Remove the sensor cable ④.
- (7) Reinstall in opposite sequence to removal.

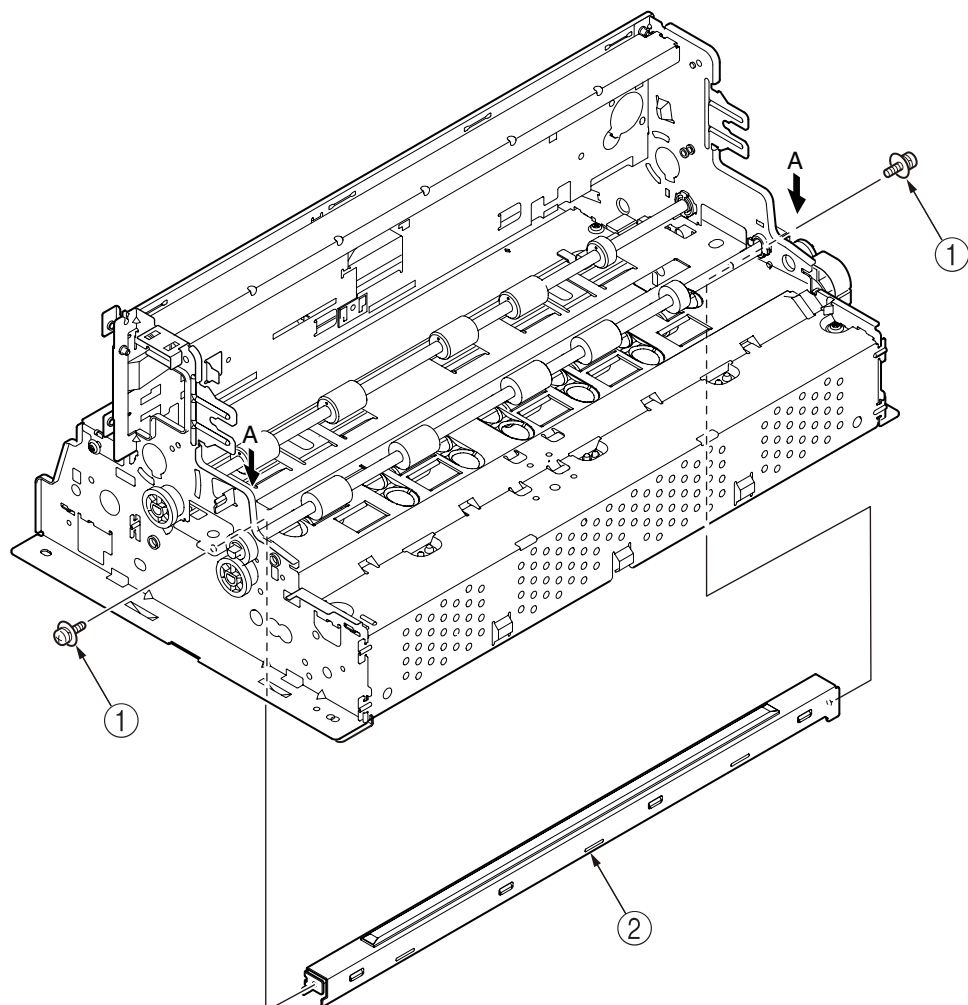


5.2.19 Platen

- (1) Remove the upper cover assembly. (See 5.2.1)
- (2) Remove the printer unit. (See 5.2.10)
- (3) Remove the LF unit assembly. (See 5.2.17)
- (4) Remove the gear frame assy. (See 5.2.12)
- (5) Remove the cam shaft. (See 5.2.14)
- (6) Remove the sensor assy. (See 5.2.14)
- (7) Remove the two screws ①.
- (8) Slide and pull out the platen ② in the direction indicated by the arrow.
- (9) Reinstall in the opposite sequence to removal.

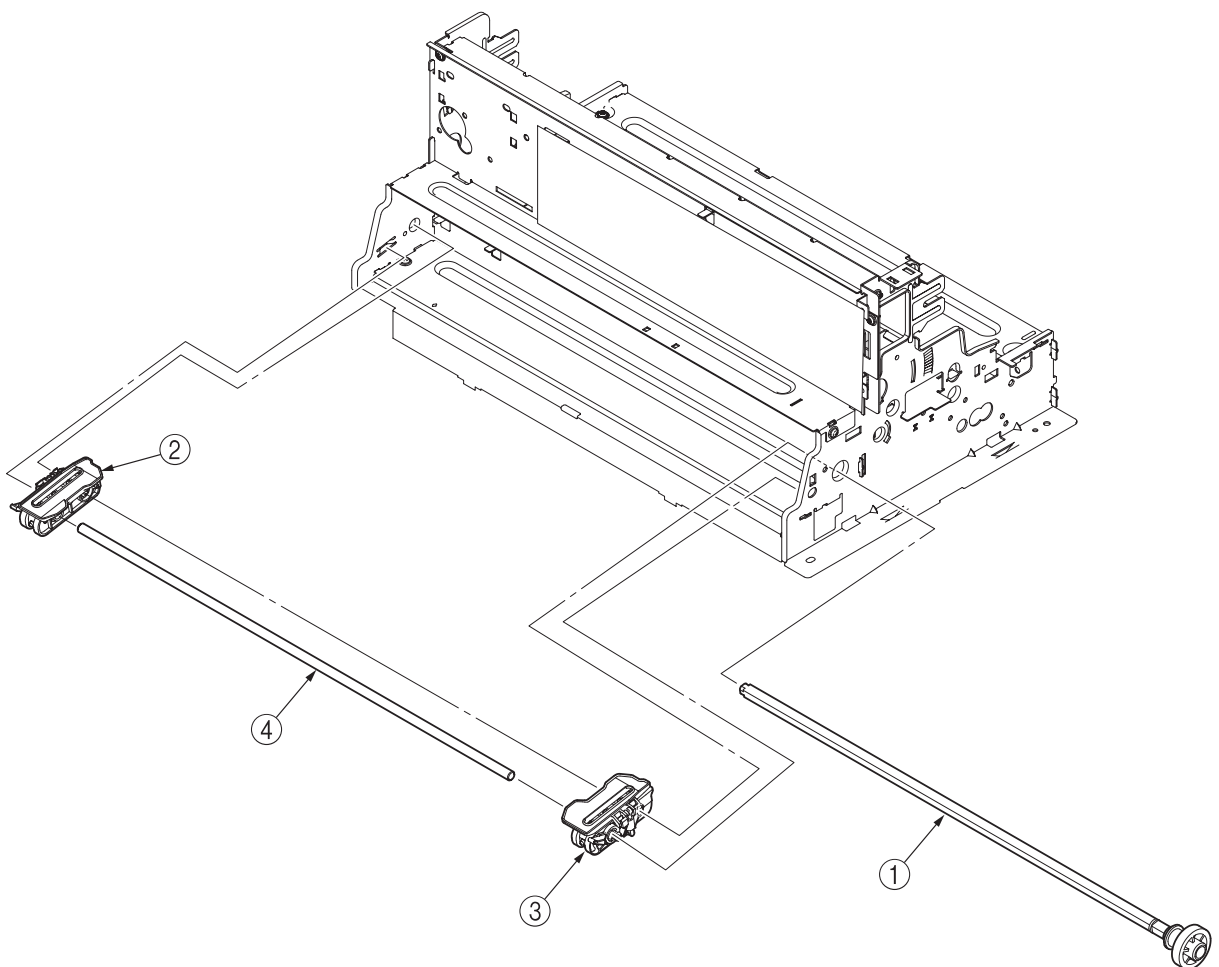
(Precautions upon reinstalling)

1. Adjust the gap between the platen ② and print head after reinstalling the platen ②.
2. Push in the platen ② in the direction indicated by the arrow A until it stops, then secure in place with screws.
3. When fastening the cam shafts and gears, align the phases of the front and the rear. (See 5.2.12)



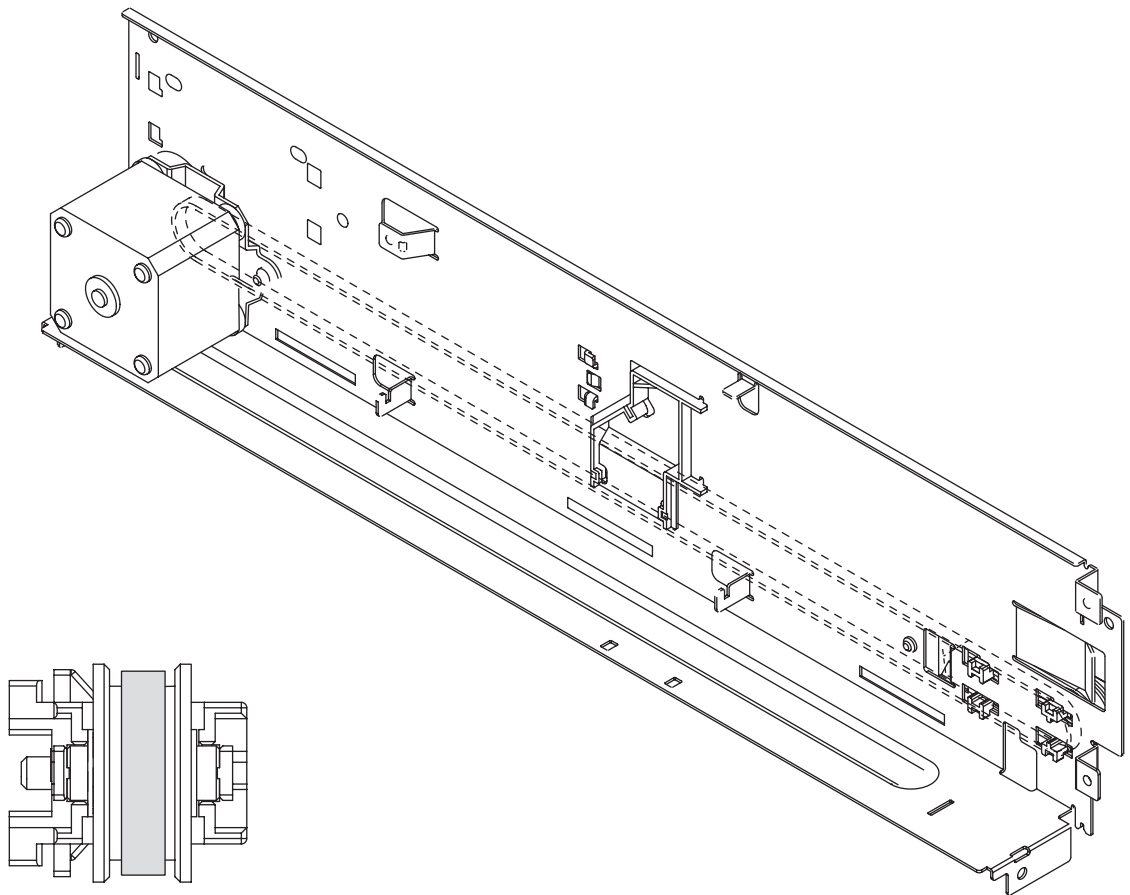
5.2.20 Pin Tractor Assembly

- (1) Remove the upper cover assembly. (See 5.2.1)
- (2) Remove the printer unit. (See 5.2.10)
- (3) Disconnect the LF motor, continuous/single changeover sensor and Paper sensor connectors from the control board.
- (4) Press down on the two clips and pull out the LF unit assembly in the direction indicated by the arrow. Release the two lower clips, then remove the LF unit assembly. (See 5.2.17)
- (5) Press down on the latch engaging the side frame and pull out the tractor shaft ①. Remove the two locating latches on the tractor assembly R, then pull out the shaft ①.
- (6) Remove the tractor assembly L ②, tractor assembly R ③, and lock shaft ④.
- (7) Reinstall in the opposite sequence to removal.



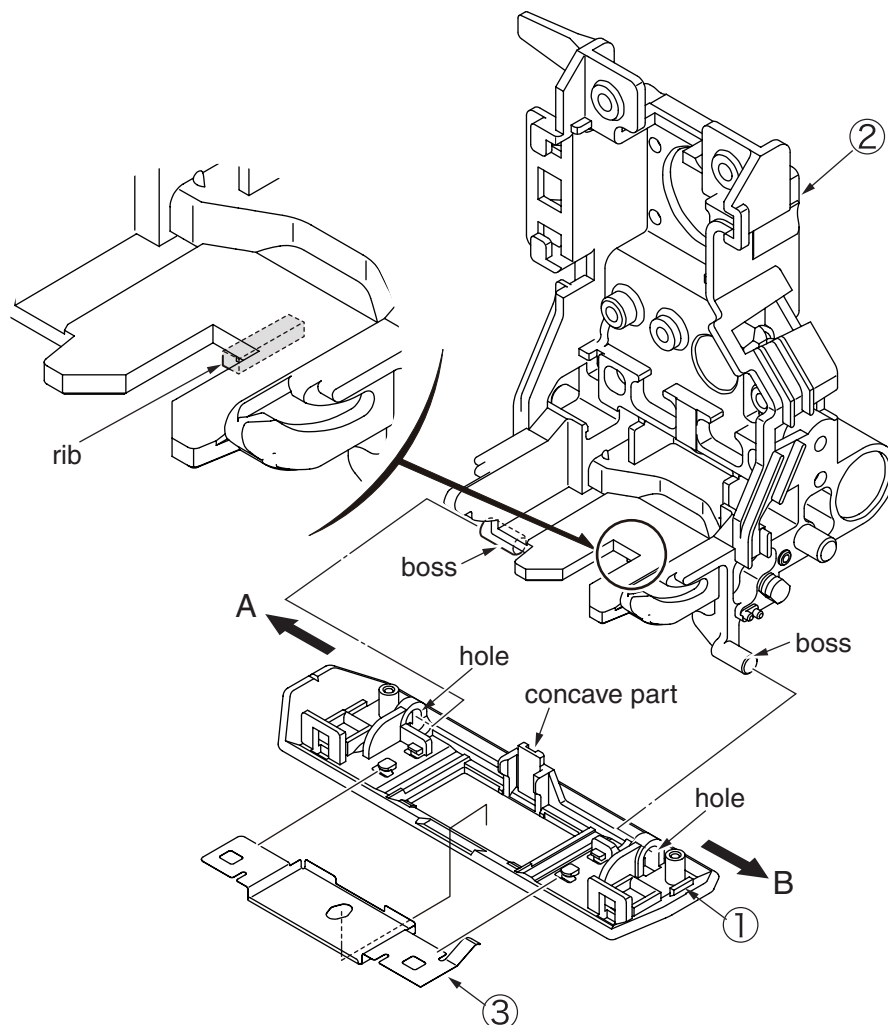
5.2.21 Mini pitch belt

- (1) Remove the upper cover assembly. (See 5.2.1)
- (2) Remove the control board. (See 5.2.8)
- (3) Insert a screwdriver between the space frame and idle pulley bracket, and lever the space idle bracket ① in the direction indicated by the arrow. When the mini pitch belt ② has sufficient slack, detach it from the space motor.
- (4) Use the slack in the belt to lift it past the projection on the belt guide at the rear of the carriage. Remove the belt.
- (5) Reinstall in the opposite sequence to removal.



5.2.22 Ribbon protector bracket and Ribbon protector

- (1) Remove the print head. (See 5.2.2)
- (2) Remove the sensor cover and paper width sensor. (See 5.2.3)
- (3) Bend the ribbon protector bracket ① and detach the concave part from the rib of the carriage frame ②.
- (4) Slide the ribbon protector bracket ① in the direction of the arrow A and pull the hole of the ribbon protector bracket ① out of the boss.
- (5) Slide the ribbon protector bracket ① in the direction of the arrow B and pull the hole of the ribbon protector bracket ① out of the boss.
- (6) Remove the ribbon protector ③ from the ribbon protector bracket ①.
- (7) Reinstall in the opposite sequence to removal.



(Precautions upon reinstalling)

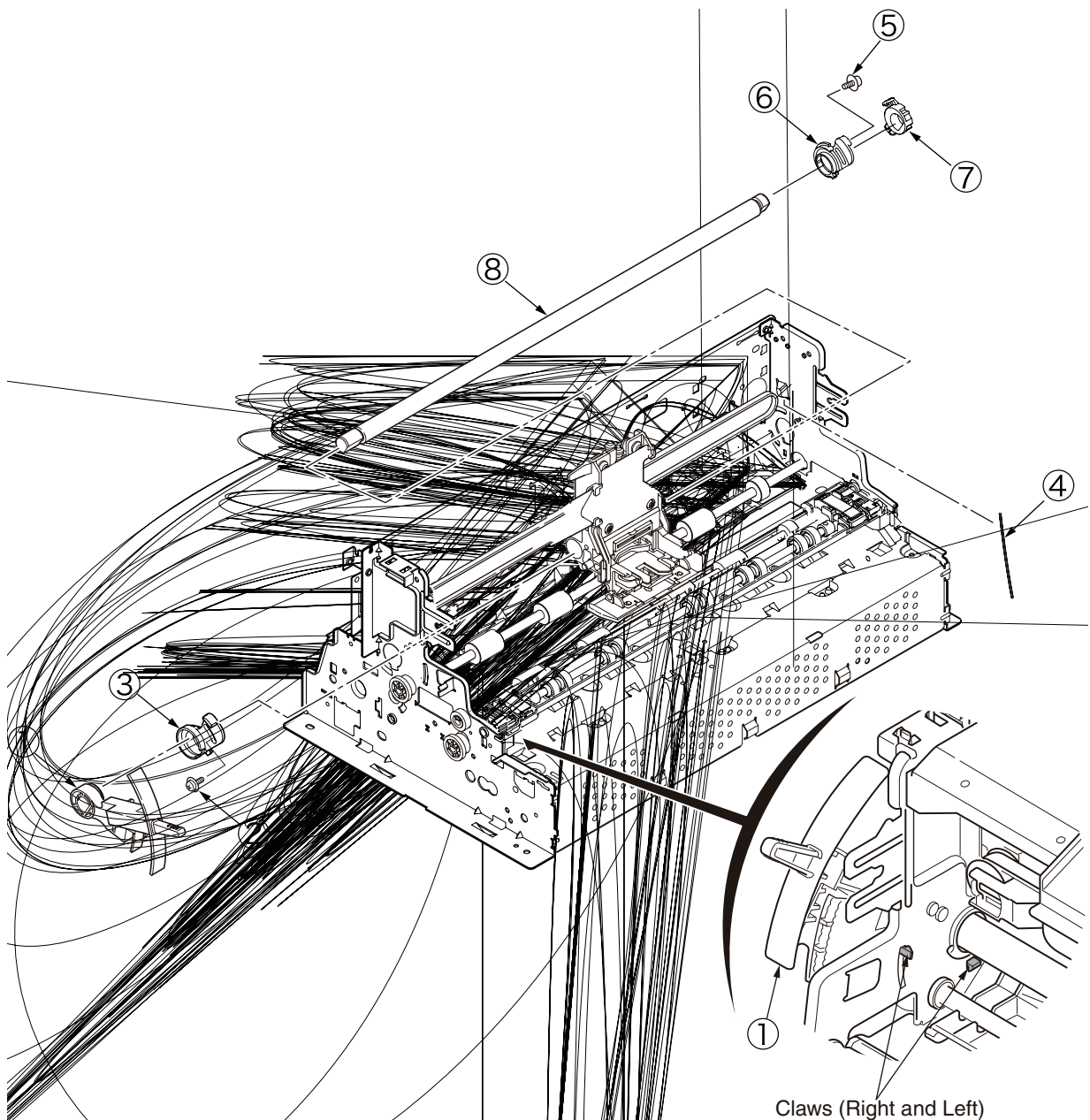
1. After reinstallation, carry out the tests instructed in Section 7.1 (Table 7-2*) and implement both TOF Adjust (cut sheet) and Print Position Adjust instructed in Section 7.2.

5.2.23 Carriage shaft

- (1) Remove the upper cover assembly. (See Subsection 5.2.1.)
- (2) Remove the print head. (See Subsection 5.2.2.)
- (3) Remove the printer unit. (See Subsection 5.2.10.)
- (4) Remove the LF unit assembly. (See Subsection 5.2.17.)
- (5) Remove the claws (at two locations) of adjust lever ①, and detach this adjust lever, screw ② and adjust knob (L) ③.
- (6) Remove spring ④.
- (7) Remove screw ⑤, and detach adjust knob (R) ⑥, adjust piece ⑦ and carriage shaft ⑧.
- (8) Remove adjust knob (R) ⑥ and adjust piece ⑦ from carriage shaft ⑧.
- (9) To reassemble the above parts, follow the same disassembling procedure in reverse order.

Precaution on the reassembling:

After the parts have been replaced, check the gap between the print head and the platen. (See Section 6.)

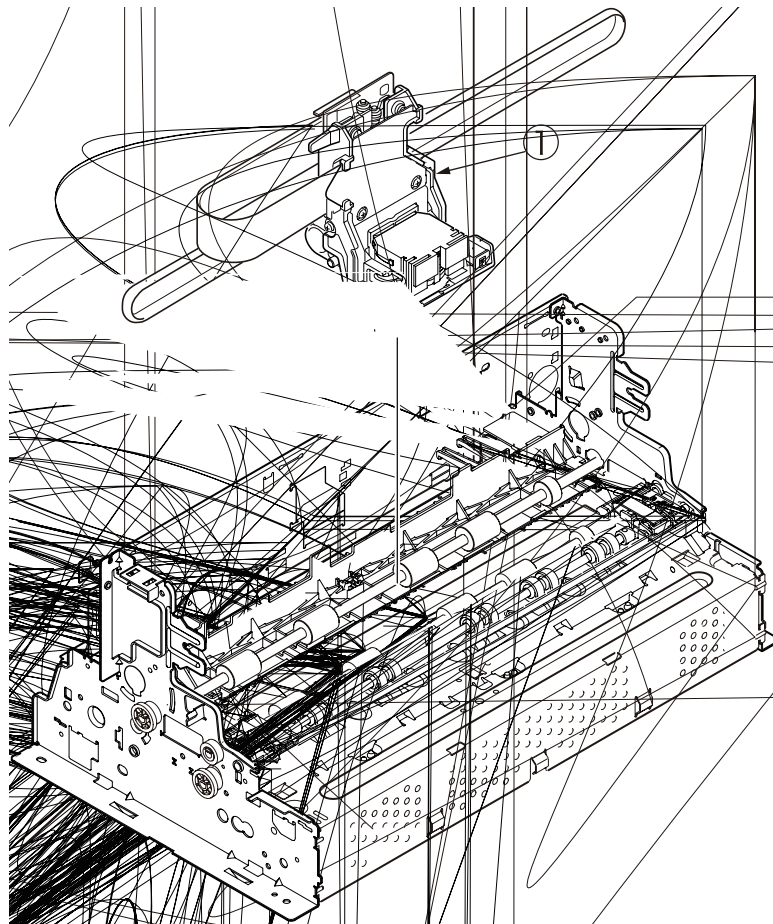


5.2.24 Carriage unit

- (1) Remove the upper cover assembly. (See Subsection 5.2.1.)
- (2) Remove the print head. (See Subsection 5.2.2.)
- (3) Remove the frame guide. (See Subsection 5.2.6.)
- (4) Remove the printer unit. (See Subsection 5.2.10.)
- (5) Remove the main PCB. (See Subsection 5.2.8.)
- (6) Remove head cable. (See Subsection 5.2.9.)
- (7) Remove the LF unit assembly. (See Subsection 5.2.17.)
- (8) Remove the carriage shaft. (See Subsection 5.2.23.)
- (9) Remove mini-pitch belt. (See Subsection 5.2.21.)
- (10) Remove carriage unit ①.
- (11) To reassemble the above parts, follow the same disassembling procedure in reverse order.

Precaution on the reassembling:

After the parts have been replaced, check the gap between the print head and the platen. (See Section 6.)

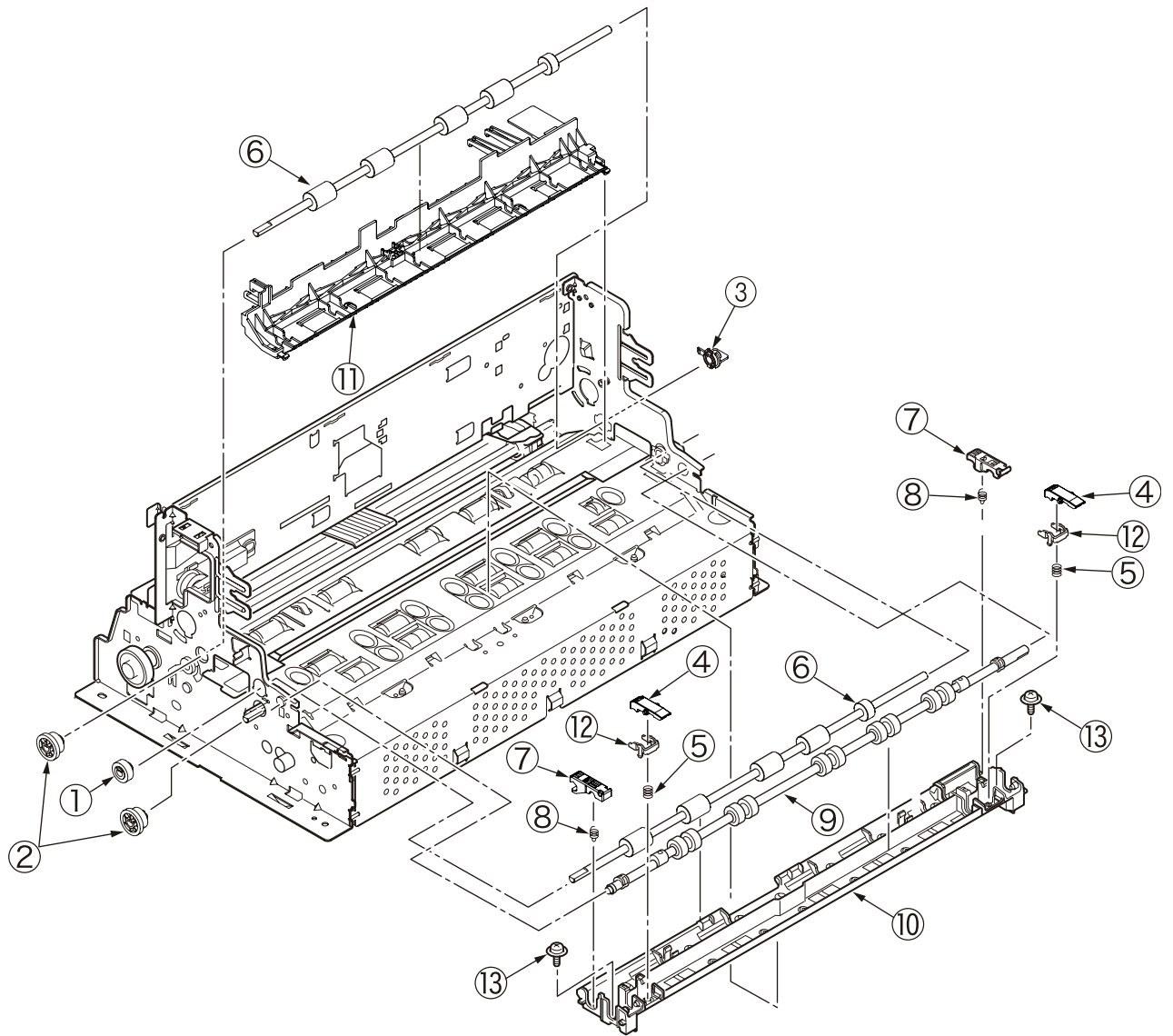


5.2.25 Sheet guide upper front/rear

- (1) Remove the upper cover assembly. (See Subsection 5.2.1.)
- (2) Remove the print head. (See Subsection 5.2.2.)
- (3) Remove the printer unit. (See Subsection 5.2.10.)
- (4) Remove the frame guide. (See Subsection 5.2.6.)
- (5) Remove the main PCB. (See Subsection 5.2.8.)
- (6) Remove the head cable. (See Subsection 5.2.9.)
- (7) Remove the LF unit assembly. (See Subsection 5.2.17.)
- (8) Remove the carriage shaft. (See Subsection 5.2.23.)
- (9) Remove the mini-pitch belt. (See Subsection 5.2.21.)
- (10) Remove the carriage unit. (See Subsection 5.2.24.)
- (11) Remove the ribbon feed assembly. (See Subsection 5.2.4.)
- (12) Remove the space motor. (See Subsection 5.2.5.)
- (13) Remove the gear frame assembly. (See Subsection 5.2.12.)
- (14) Remove LF gear A ① , LF gear B ② , LF bushing B ③ , right and left pressure pieces B ④ , spring B ⑤ , and right and left pieces cam shaft ⑫ .
- (15) Remove roller feed A ⑥ .
- (16) Remove the right and left pressure pieces A ⑦ and spring A ⑧ .
- (17) Remove skew roller assembly ⑨ .
- (18) Free the claws and two screws ⑬ of sheet guide upper front ⑩ , and detach the sheet guide upper front by sliding it toward the front side.
- (19) Free the claws of sheet guide upper rear ⑪ , and detach the sheet guide upper rear by sliding it toward the front side.
- (20) To reassemble the above parts, follow the same disassembling procedure in reverse order.

Precaution on the reassembling:

After the parts have been replaced, check the gap between the print head and the platen. (See Section 6.)



6. Adjusting

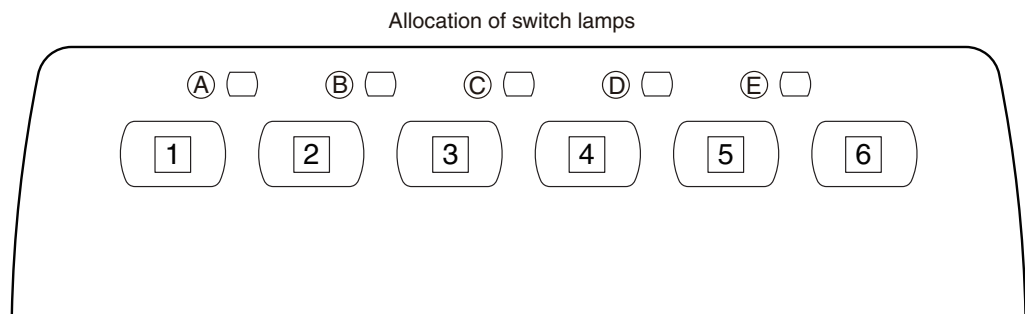
- Adjustments must be made with the printer unit installed in the lower cover.
- Adjustments must be made by setting the printer on a secure assembly platform (plane level: 1mm or less) in order to minimize skewed adjustments.

6.1 Adjusting the Gap Between the Platen and Print Head

Tools

- No. 2-200 Phillips screwdriver
- Thickness gauge

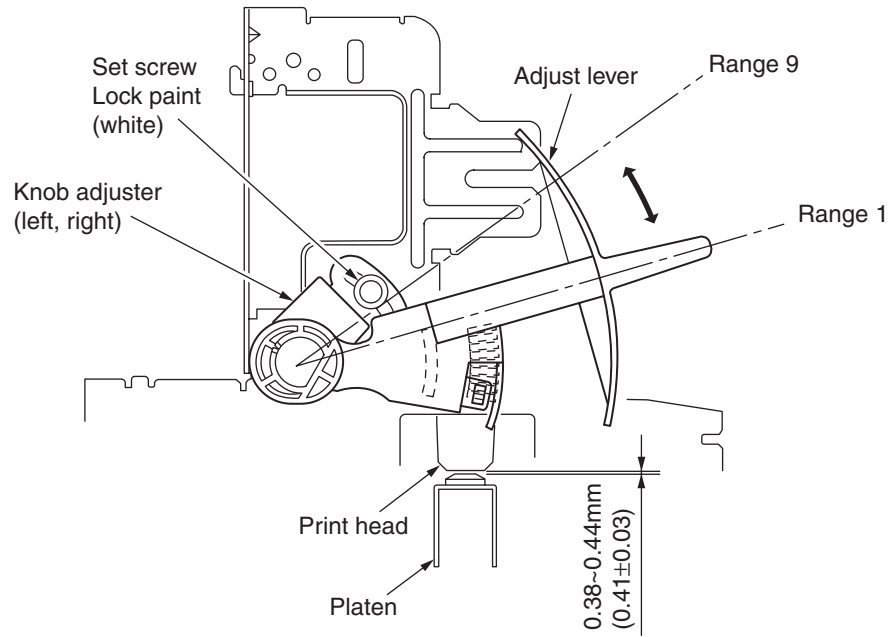
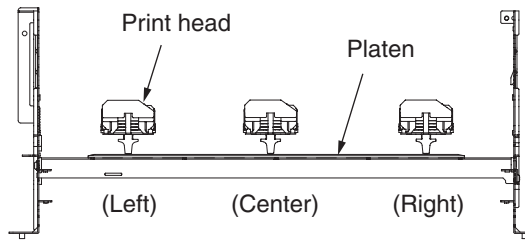
Adjusting Method



- (1) Turn OFF the power switch.
- (2) Remove the upper cover assembly. (See 5.2.1)
- (3) Remove the ribbon cartridge.
- (4) Remove the ribbon protector bracket. (See 5.2.22)
- (5) Set the adjust lever to [Range 1].
- (6) Loosen the screw on the right side of the device and turn the adjust knob (R). Set a thickness gauge of 0.41mm between the print head and platen on the right end of the carriage unit and secure the screw at a point where it goes in smoothly although the position may seem a bit skewed.
- (7) Loosen the screw on the left side of the device and turn the adjust knob (L). Adjust so that the space between the print head and platen in the center and left sides of the carriage unit becomes 0.38-0.44mm, then secure the screw.
- (8) After adjusting, set the ribbon cassette, then set a continuous form of 55kg ream weight to the tractor.
- (9) Turn ON the power while pressing the Switch [3] and confirm that a test print is performed properly.

CAUTION:

If the test print is not properly performed, check the gap adjustment values.



- Set the adjust lever to Range 1 for adjusting.
- Adjust the head gap by pressing the adjust lever lightly into the groove of the side frame so that there is no backlash between the adjust lever and groove.

7. Maintenance Test

7.1 Selecting the Test Mode

The switches on the operator panel have the functions indicated in Table 7-1 so that various tests can be conducted for maintenance.

To start the test in Table 7-1, turn power ON while pressing the switch marked with the ○.

In maintenance mode 1, maintenance mode 2, or print test selection mode test, start the test in Table 7-2 by pressing the switch marked with the ○ while at the same time holding down the switch marked with the ●.

Table 7-1

Operator Panel Switch						Menu Types
1	2	3	4	5	6	
		○				Activates Self Test mode.
		○	○			Performs skip/continuous pattern.
					○	Activates Rolling ASCII. (1 page)
○					○	Activates HexDump mode. (Note 1)
○						Activates Menu mode. (See 7.2)
○	○					Sets Menu factory default setting. (Note 2)
○		○				Activates maintenance mode1.
○		○		○		Activates maintenance mode2.

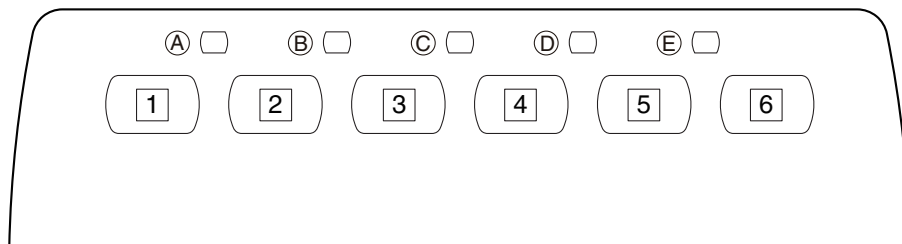
Table 7-2 (maintenance mode 1)

Operator Panel Switch						Menu Types
1	2	3	4	5	6	
●				○		Activates Menu mode. (See 7.2)
		○		●		Activates Registration Menu mode.(English)
		○			●	Adjust the vertical position of the paper width sensor
			○		●	Adjust the horizontal position of the paper width sensor
				○	●	Sets the slice level of the paper width sensor

Table 7-3 (maintenance mode 2)

Operator Panel Switch						Menu Types
1	2	3	4	5	6	
		●		○		Activates Flash loading mode.

Allocation of switch lamps



Caution:

- Hexadecimal dump is a mode in which all data sent from the host computer to the printer are printed in hexadecimal.
- With [function setup menu default setting] items excluding the mechanism correction value will return to default.

7.2 Setting the Menu

7.2.1 Items in the menu

(1) OKI mode (English indication)

Underlined values are by default.

Non-underlined values are in accordance to adjustment at the factory.

Item	Function	Remark
Emulation Mode	Select EPSON LQ mode, IBM PPR mode, or IBM X24 AGM mode.	IBM PPR IBM AGM <u>EPSON LQ</u>
Print Mode	Select quality of ANK characters. Only OEL:OCR-A and OCR-B.	<u>LQ Courier</u> LQ Roman LQ Swiss LQ Swisss Bold LQ Orator LQ Gothic LQ Prestige LQ OCR-A (OEL Only) LQ OCR-B (OEL Only) Utility HSD
Pitch	Select character pitch.	<u>10CPI</u> 12CPI 15CPI 17.1CPI 20CPI
Proportional Spacing	Select whether to use proportional spacing or not.	Yes <u>No</u>
Style	Select either font style.	<u>Normal</u> Italics
Size	Select the character scale size.	<u>Single</u> Double
Character Set	Select either ANK character code table.	Set I (ODA/AOS Default) Set II (OEL Default)
Language Set	Select a language character set.	< <u>ODA/AOS</u> > <u>American</u> French German British Danish I Swedish Italian Spanish I Japanese Norwegian Danish II Spanish II Latin American French Canadian Dutch Publisher

Underlined values are by default.

Non-underlined values are in accordance to adjustment at the factory.

Item	Function	Remark
Language Set	Select a language character set.	<OEL> <u>ASCII</u> French German British Danish I Swedish I Italian Spanish I Japanese Norwegian Danish II Spanish II Latin American French Canadian Dutch Swedish II Swedish III Swedish IV Turkish Swiss I Swiss II Publisher
Zero Character	The print font pattern when 30H ANK code is received.	Unslashed (OEL Default) Slashed (ODA/AOS Default)
Code Page	The code page is selected.	<ODA/AOS> <u>USA</u> Canada French Multilingual Portugal Norway BRASCII Abicomp Multilingual 858 ISO8859-15

Underlined values are by default.
 Non-underlined values are in accordance to adjustment at the factory.

Item	Function	Remark
Code Page	The code page is selected.	<OEL> <u>USA</u> Canada French Multilingual Portugal Norway Turkey Greek_437 Greek_869 Greek_928 Greek_437 CYPRUS Polska Mazovia Serbo Croatian I Serbo Croatian II ECMA-94 Hungarian CWI Windows Greek Windows East Europe Windows Cyrillic East Europe Latin II - 852 Cyrillic I - 855 Cyrillic II - 866 Kamenicky (MJK) ISO Latin 2 Hebrew NC (862) Hebrew OC Turkey_857 Latin 5 (Windows Turkey) Windows Hebrew Ukrainian Bulgarian ISO Latin 6 (8859/10) Windows Baltic Baltic_774 KBL-Lithuanian Cyrillic Latvian Roman-8 Icelandic-861 Multilingual 858 ISO 8859-15 Greek_737 Asmo 449+ Asmo 708 Arabic 864 Windows Arabic POL 1 Macedonian
Slashed Letter 0 *OEL only	Set whether to convert slashed 0 located at 9BH and 9DH in USA code page or not. This item is displayed only on printers specifically for OEL.	Yes <u>No</u>
Multi Pass	Select the printing direction when double-height print data exists in a line.	<u>Bi-directional</u> Uni-directional
Rcv Buffer	Select size of the received buffer.	0 2K 32K <u>64K</u>

Underlined values are by default.

Non-underlined values are in accordance to adjustment at the factory.

Item	Function	Remark
Print Suppress Effective	Set whether to enable or disable a print suppress setup command.	<u>Yes</u> No
Auto LF	Select whether to perform auto LF operation or not upon receiving a CR code.	Yes <u>No</u>
Auto CR *IBM PPR only	Select whether to perform auto CR operation upon receiving a carriage return command.	Yes <u>No</u>
SI Select Pitch (10CPI) *IBM PPR/AGM only	Set how to handle an SI command received in 10CPI mode.	15CPI <u>17.1CPI</u>
SI Select Pitch (12CPI) *IBM PPR/AGM only	Set how to handle an SI command received in 12CPI mode.	<u>12CPI</u> 20CPI
Reset Inhibit	Set whether to enable or disable an initial command.	<u>No</u> Yes
Select Language Set *OEL/EPSON only	Set whether to enable or disable a combination of the code page setting and the language setting by menu. This item is displayed only on printers specifically for OEL.	<u>Combined</u> Code Page Only
Impact Mode	Select print mode upon power on. (This item is referred to upon initialization only by I-PRIME or power on but not by an initialization command and such.)	<u>Normal</u> Quiet Hi Copy
Print Direction Command	Select the validity of a one-way print setup command.	<u>Valid</u> Invalid
Power Saving	Set whether to enable or disable power save mode.	<u>Enable</u> Disable
Power Save Time	Set idle time to enter power save mode while power save mode is enabled.	<u>5 min</u> 10 min 15 min 30 min 60 min
PE Detection	Select whether to detect paper end or not.	OFF <u>ON</u>
Table Print	Set whether to divide a path or not to print on occasions when printing by the same headpin continues for 3 inches or more in the same print block.	<u>Standard</u> Special
Line Spacing	Select line feed pitch.	<u>6LPI</u> 8LPI
Page Width	Set width of a line to determine the number of ANK (10CPI) characters to be printed. With this setting, the right margin is set. In the cases of reduced-size prints to 75 % or 50%, 136 characters are printed.	<u>10.6"</u> 8"
Form Tear-Off	Select manual or auto as the method to advance a continuous form to the form tear-off position.	<u>Off</u> 500ms 1sec 2sec
Skip Over Perforation	Select whether to skip over perforation or not. (When a skip over perforation setup command is received, the received command is given priority.)	Yes <u>No</u>

Underlined values are by default.
 Non-underlined values are in accordance to adjustment at the factory.

Item	Function	Remark
Page Length (Continuous)	Select the length of a continuous form.	3.5" 4" 5.5" 6" 7" 8" 8.5" 11" (ODA/AOS Default) 11 2/3" 12" (OEL Default) 14" 17" 5" 3" 3.25"
TOF (Continuous)	Select the reference position for the TOF position when auto loading continuous form paper from the rear end. (Up to the mid-section of characters in the first line.) 1Chr. Set Pos." is printed if the TOF position is set by using SHIFT + PARK switches.	2.12mm(1/12") 4.23mm(1/6") <u>6.35mm(1/4")</u> 8.47mm(1/3") 10.58mm(5/12") 12.7mm(1/2") 14.82mm(7/12") 16.93mm(2/3") 19.05mm(3/4") 21.17mm(5/6") 23.28mm(11/12") 25.4mm(1") 27.52mm(13/12") 1Chr. Set Pos.
Initial Position	This is the position of paper when paper is already loaded at power on. (For continuous form mode only.)	<u>Print</u> Tear OFF
Auto Eject Position	Select a printable area at the bottom of cut sheets of paper in cut-paper mode (the character center position).	<u>6.35mm(1/4")</u> 14.8mm

Underlined values are by default.
Non-underlined values are in accordance to adjustment at the factory.

Item	Function	Remark
Page Length (Cut Sheet)	Select the page length of cut sheet paper.	3.5" 4" 5.5" 6" 7" 8" 8.5" 11" (ODA Default) 11 2/3" (OEL/AOS Default) 12" 14" 16.57" (OEL only display) 17" (ODA/AOS only display) 5" 3" 3.25"
TOF (Cut Sheet)	Select the reference position for the TOF position when feeding cut-paper in manual mode. (Up to the mid-section of characters in the first line.) "1Chr. Set Pos." is printed if the TOF position is set by using SHIFT + PARK switches.	2.12mm(1/12") 4.23mm(1/6") <u>6.35mm(1/4")</u> 8.47mm(1/3") 10.58mm(5/12") 12.7mm(1/2") 14.82mm(7/12") 16.93mm(2/3") 19.05mm(3/4") 21.17mm(5/6") 23.28mm(11/12") 25.4mm(1") 27.52mm(13/12") 1Chr. Set Pos.
Wait Time	Select the waiting time between setting paper on the table and feeding it while the printer is waiting for paper to be fed in cut-paper manual feed mode.	<u>500ms</u> 1sec 2sec
FF Function	Set feeding operation upon receiving an FF code after cut-paper is fed.	<u>Eject</u> Form Feed
I-Prime	Select whether to print or clear buffer contents upon initialization by receiving I-PRIME.	Invalid Buffer Clear <u>Buffer Print</u>
Auto Feed XT *EPSON only	Set the validity of an Auto Feed XT signal.	Valid <u>Invalid</u>
Bi-Direction	Set whether to return a device ID or not in accordance with IEEE1284.	<u>Enable</u> Disable

Underlined values are by default.

Non-underlined values are in accordance to adjustment at the factory.

Item	Function	Remark
Parity *Displayed while only being connected to a serial interface	Select presence or absence of addition of parity bit and also select either even or odd parity bit. None: Absence of parity bit Odd: Odd parity Even: Even parity	<u>None</u> Odd Even
Serial Bits *Displayed while only being connected to a serial interface	Select the data bit length. 7: Data bit length is 7bit. 8: Data bit length is 8bit.	7 Blts <u>8 Blts</u>
Protocol *Displayed while only being connected to a serial interface	Select an I/F Busy control method. Ready/Busy: Busy control by a DTR signal X-ON/X-OFF: Busy control by a CD3/DC1 code	<u>Ready/Busy</u> X-ON/X-OFF
Diagnostic Test *Displayed while only being connected to a serial interface	Select whether to perform input/output diagnosis of RS-232C interface signals. No: Not execute the self diagnostic function Yes: Execute the self diagnostic function	<u>No</u> Yes
Busy Line *Displayed while only being connected to a serial interface	Set a Busy Line setting of a serial interface.	<u>SSD-</u> SSD+ DTR RTS
Baud Rate *Displayed while only being connected to a serial interface	Select the data baud rate from the options. 300 :Sets the data baud rate to 300 BPS 600 :Sets the data baud rate to 600 BPS 1200 :Sets the data baud rate to 1200 BPS 2400 :Sets the data baud rate to 2400 BPS 4800 :Sets the data baud rate to 4800 BPS 9600 :Sets the data baud rate to 9600 BPS 19200 :Sets the data baud rate to 19200 BPS	300 BPS 600 BPS 1200 BPS 2400 BPS 4800 BPS <u>9600 BPS</u> 19200 BPS
DSR Signal *Displayed while only being connected to a serial interface	Select the validity of the received data. Valid: Checks the status of a DSR signal, and the data received while the DSR signal is in the SPACE state is determined to be valid. If data is received while a DSR signal is in the MARK state, the data is determined to be invalid and discarded. Invalid: Regardless of the status of a DSR signal, all the received data is determined to be valid.	<u>Valid</u> Invalid
DTR Signal *Displayed while only being connected to a serial interface	Set a method to switch a DTR signal of a serial interface, by select/deselect or fix it to power on.	<u>Ready on Power UP</u> Ready on Select
Busy Time *Displayed while only being connected to a serial interface	Set the minimum time between BUSY to READY.	<u>200ms</u> 1 sec

Underlined values are by default.

Non-underlined values are in accordance to adjustment at the factory.

Item	Function	Remark
TOF Adjustment (Cut Sheet)	Select an adjustment value for the reference position in regard to the TOF position of cut-paper/passbooks. The position moves to the rear end of the form by [+] and to the top of the form by [-] in 1/60 inch increments.	-7 ~ -1 <u>0</u> +7 ~ +1
Rear Load Adjustment	Select an adjustment value for the reference position in regard to the TOF position of a continuous form. The position moves to the rear end of the form by [+] and to the top of the form by [-] in 1/60 inch increments.	-7 ~ -1 <u>0</u> +7 ~ +1
Cut Position Adjust	Select an adjustment value for the position to cut the end of a continuous form. (In 1/90 inch increments)	-7 ~ -1 <u>0</u> +7 ~ +1
Registration Low	Adjust the print starting position upon printing in the reverse direction. (The position moves to the right or left in 1/720 inch increments.)	-10 ~ -1 <u>0</u> +10 ~ +1
Registration Normal	Adjust the print starting position upon printing in the reverse direction. (The position moves to the right or left in 1/720 inch increments.)	-10 ~ -1 <u>0</u> +10 ~ +1
Registration High1	Adjust the print starting position upon printing in the reverse direction. (The position moves to the right or left in 1/720 inch increments.)	-10 ~ -1 <u>0</u> +10 ~ +1
Registration High2	Adjust the print starting position upon printing in the reverse direction. (The position moves to the right or left in 1/720-inch increments.)	-10 ~ -1 <u>0</u> +10 ~ +1
LF Revise (Cut Sheet)	Adjust a line feed amount in cut-paper mode.	-14 ~ -1 <u>0</u> +14 ~ +1
LF Revise (Continuous) *Displayed in Maintenance Menu only	Adjust a line feed amount when printing a continuous form from the rear end.	-2 -1 <u>0</u> +1 +2
PE Adjust (Cut Sheet)	Select the correction valve to "Auto Eject Position" in the cut sheet mode. It advances toward the direction of bottom by every 1/90 inches at "+" setting. It advances toward the direction of the top by every 1/90 inches at "-" setting.	-10 ~ -1 <u>0</u> +10 ~ +1
PE Adjust (Continuous)	The correction valve to "Auto Eject Position" in the continuous form mode is selected. It advances toward the direction of bottom by every 1/90 inches at "+" setting. It advances toward the direction of the top by every 1/90 inches at "-" setting.	-10 ~ -1 <u>0</u> +10 ~ +1

Underlined values are by default.

Non-underlined values are in accordance to adjustment at the factory.

Item	Function	Remark
Centering For Feed *Displayed in Maintenance Menu only	Specify the centering position for a line feed. Mode1: Centering to the 8th character s position to feed a continuous form from the rear end by 2 ranges or more and 2/3-inch and more Mode2: Centering to the 5th character s position to feed a continuous form from the rear end by 2 ranges or more and 2/3-inch and more Mode3: Centering to the 8th character s position to feed either continuous form from the rear end or cut-paper Mode4: No centering by a line feed	<u>Mode1</u> Mode2 Mode3 Mode4
Position Check *Displayed in Maintenance Menu only	Switch settings for position check of the print head. Check1: Homing when shifting from OFFLINE to ONLINE by pressing a switch with a standard setting and when exiting the power save mode Check2: Homing when printing is started by data reception after no operation of enhancement setting or printing for more than 3 minutes, and at the time of cut-paper feeding or a continuous form auto loading (before loading) Check 3: Adds the following actions to those performed by Check 1. (1) In cut-paper mode Performs homing upon completion of ejection. Performs homing if the head is at a different position from the homing sensor (assuming it was moved by hand) at the time of paper feed. (2) In continuous form mode Performs homing after completion of retraction. Performs homing when the form feed switch is pressed with no paper.Performs homing if the head is at a different position from the homing sensor (assuming it was moved by hand) at the time of paper feed.	Check1 Check2 <u>Check3</u>
SP Check *Displayed in Maintenance Menu only	Checking the starting point of the head for a continuous form.	<u>Valid</u> Invalid
Slack Adjust (Continuous) *Displayed in Maintenance Menu only	Set whether to execute slack adjustment for paper or not in use of a rear tractor.	<u>Valid</u> Invalid
Centering For Paper Top (Continuous) *Displayed in Maintenance Menu only	Select whether to apply centering or not to the 30th character before inserts line feeds until the top of form goes over the rear feed roller, in continuous form mode. Valid: Apply centering Invalid: Not apply centering	<u>Valid</u> Invalid

Underlined values are by default.

Non-underlined values are in accordance to adjustment at the factory.

Item	Function	Remark
Image Print Speed *Displayed in Maintenance Menu only	Select image print speed. ·Image print at the speed of DOWN (80%) for Normal ·Image print at the normal speed (100%) for Special.	<u>Normal</u> Special
CPU Compensation *Displayed in Maintenance Menu only	Set data latch timing and ACK-BUSY signal output timing in regard to Centronics interface signals. Standard: Busy signal output at the center of ACK Special: Busy signal output at the falling edge of ACK	<u>Standard</u> Special
I/F Timing Set *Displayed in Maintenance Menu only	Set data latch timing and STB-BUSY signal output timing in regard to Centronics interface signals. New: Busy signal output and data latch at the falling edge of STB Old: Busy signal output and data latch at the rising edge of STB Special: Busy signal output at the falling edge of STB and data latch at the rising edge of STB	New Old <u>Special</u>
Time Out Print *Displayed in Maintenance Menu only	This is to set or cancel the 150 ms timeout print mode.	<u>Valid</u> Invalid
Skew Correction	Enables/disables skew correction and paper width detection.	<u>Valid</u> Invalid
Left Margin (Skew correction) *Displayed in Maintenance Menu only	Selects left margin when skew correction mode is enabled.	3mm <u>5.08mm</u> 10mm 13mm 15mm 20mm 25mm
Print Position Adjust *Displayed in Maintenance Menu only	Selects a correction value for a print start position of the first character when Skew Correction mode is active.	Left30 ~ Left1 <u>0</u> Right1 ~ Right30
Paper Edge Detection *Displayed in Maintenance Menu only	Sets how to handle when the printer received data that goes beyond the printable area in skew correction valid mode.	Valid <u>Invalid</u>
Slice level adjust (left) *Displayed in Maintenance Menu only	Adjusts the slice level of the paper width detection sensor (left).	x1.2 x1.3 x1.4 x1.5 x1.6 <u>x1.7</u> x1.8 x1.9

Underlined values are by default.
 Non-underlined values are in accordance to adjustment at the factory.

Item	Function	Remark
Slice level adjust (right) *Displayed in Maintenance Menu only	Adjusts the slice level of the paper width detection sensor (right).	x1.2 x1.3 x1.4 x1.5 x1.6 <u>x1.7</u> x1.8 x1.9
Slice level adjust (left) for pow on *Displayed in Maintenance Menu only	(Reserve)	x1.2 x1.3 x1.4 x1.5 x1.6 <u>x1.7</u> x1.8 x1.9
Slice level adjust (right) for pow on *Displayed in Maintenance Menu only	(Reserve)	x1.2 x1.3 x1.4 x1.5 x1.6 <u>x1.7</u> x1.8 x1.9

Note1 :Cut sheet LF accuracy adjustment, following the table below with TOF position as a standard.

Set value	Contents
-14	Add 1 pitch[0.035mm(1/720")] every -3.88mm(55/360")
-13	Add 1 pitch[0.035mm(1/720")] every -7.83mm(111/360")
-12	Add 1 pitch[0.035mm(1/720")] every -8.46mm(120/360")
-11	Add 1 pitch[0.035mm(1/720")] every -9.10mm(129/360")
-10	Add 1 pitch[0.035mm(1/720")] every -10.01mm(142/360")
-9	Add 1 pitch[0.035mm(1/720")] every -11.00mm(156/360")
-8	Add 1 pitch[0.035mm(1/720")] every -12.48mm(177/360")
-7	Add 1 pitch[0.035mm(1/720")] every -13.97mm(198/360")
-6	Add 1 pitch[0.035mm(1/720")] every -16.29mm(231/360")
-5	Add 1 pitch[0.035mm(1/720")] every -18.62mm(264/360")
-4	Add 1 pitch[0.035mm(1/720")] every -23.28mm(330/360")
-3	Add 1 pitch[0.035mm(1/720")] every -27.94mm(396/360")
-2	Add 1 pitch[0.035mm(1/720")] every -41.91mm(594/360")
-1	Add 1 pitch[0.035mm(1/720")] every -55.88mm(792/360")
0	No LF pitch adjustment
1	Take 1 pitch[0.035mm(1/720")] every +55.88mm(792/360")
2	Take 1 pitch[0.035mm(1/720")] every +41.91mm(594/360")
3	Take 1 pitch[0.035mm(1/720")] every +27.94mm(396/360")
4	Take 1 pitch[0.035mm(1/720")] every +23.28mm(330/360")
5	Take 1 pitch[0.035mm(1/720")] every +18.62mm(264/360")
6	Take 1 pitch[0.035mm(1/720")] every +16.29mm(231/360")
7	Take 1 pitch[0.035mm(1/720")] every +13.97mm(198/360")
8	Take 1 pitch[0.035mm(1/720")] every +12.48mm(177/360")
9	Take 1 pitch[0.035mm(1/720")] every +11.00mm(156/360")
10	Take 1 pitch[0.035mm(1/720")] every +10.01mm(142/360")
11	Take 1 pitch[0.035mm(1/720")] every +9.10mm(129/360")
12	Take 1 pitch[0.035mm(1/720")] every +8.46mm(120/360")
13	Take 1 pitch[0.035mm(1/720")] every +7.83mm(111/360")
14	Take 1 pitch[0.035mm(1/720")] every +3.88mm(55/360")

Note2:Ruled lines print pattern at level print position adjustment is as follows.



7.2.2 Registration Menu

1) Overview

This is a factory shipped configuration to adjust the horizontal print position correction and capable of setting for the horizontal print position correction described in 4.4 menu selection.

2) Operation Description

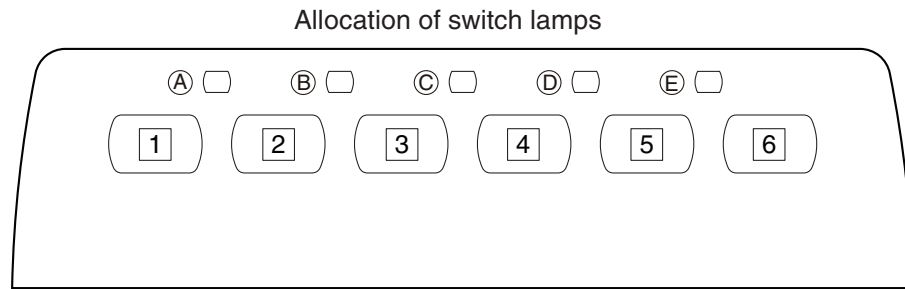
To enter registration menu mode:

- a. Hold down the SEL + LF switches and turn on the power to activate the maintenance mode.
- b. After the maintenance mode is enabled, hold down the TEAR switch and press the LF switch.

3) Table of Registration

No	ITEM	SET	Remark
1	Registration Low	+10	Factory Shipped Configuration: In increments of 1/720" ± 10/720.
		+9	
		+8	
		+7	
		+6	
		+5	
		+4	
		+3	
		+2	
		+1	
		0	
		-1	
		-2	
		-3	
		-4	
		-5	
		-6	
		-7	
		-8	
-9			
-10			
2	Registration Normal	+10	Factory Shipped Configuration: In increments of 1/720" ± 10/720.
		+9	
		+8	
		+7	
		+6	
		+5	
		+4	
		+3	
		+2	
		+1	
		0	
		-1	
		-2	
		-3	
		-4	
		-5	
		-6	
		-7	
		-8	
-9			
-10			

7.2.3 Setting the menu



- (1) Turn OFF power.
- (2) Load paper (ream weight of 55kg; cut-sheet) and the ribbon cartridge into the printer to prepare the printer.
- (3) Turning power ON by pressing the SEL switch activates Menu mode.
Take the following steps to activate the Maintenance Menu mode.
 - a. Hold down the SEL + LF switches and turn on the power to activate the maintenance mode.
 - b. After the maintenance mode is enabled, hold down the SEL switch and press the TEAR switch.
- (4) Upon entering the Menu mode, "Menu Print?" is printed.
- (5) See Key functions above for description of operation.
- (6) To exit the Menu mode, hold down the SHIFT switch and press the SEL switch.
- (7) The TOF position is not affected by Menu mode. (However, TOF setting is executed if page length changes.)

Caution:

- If paper runs out during menu setting, reload paper and press switch **1** to proceed with setting.
- To save settings, then press switch **1** while switch **2**. If the power is turned off before this is done, the settings will not be saved.
- Do not change these menu settings unless you need to use the printer under unusual circumstances. Normally, use the printer with its factory default configuration.

8. Procedures for Repairing

(1) Before repairing

When repair is requested from a customer, confirm whether the problem can be recovered by the methods described in "Measures for Problems" in the Instruction Manual in advance.

If possible, obtain information of how the problem occurred and write it down.

Before applying measures, operate the printer in the same condition as when the problem was generated and check if the problem still occurs. If the problem does not occur, start searching for the problem by performing test prints.

(2) Searching for what caused the problem

As for the method in searching for the cause of a problem, first confirm the alarm display in Table 8-1, check how the problem generated using Table 8-2, and confirm the specific contents of the problem. Next, search for the problem according to the detailed procedures.

Before repairing the problem, please acknowledge the precautions described in Section 5.1.

(3) Lamp display during a problem

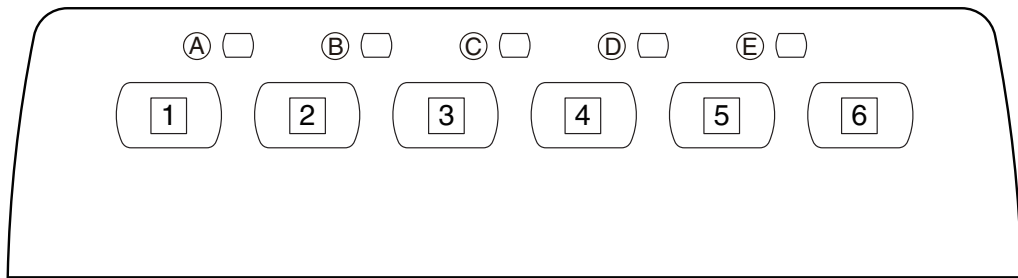
When a problem is generated in this printer, the content of the problem is notified by the lamps in the operation unit. The problem is notified by the blinking of Lamp **Ⓐ** and Lamp **Ⓑ**.

- Display content

Table 8-1

Main Blink	Sub Blink	Alarm Content	Remedy
1	1	Homing error	See section ⑥
	2	Spacing error	
	3	Roller error	
2	1	Program ROM error	Replace the LMC print circuit board.
	2	CG ROM error	
	3	Flash ROM error	
3	1	DRAM error	
4	1~9	CPU error	
5	1	F/W alarm	
	2~5	Flash loading error	
9	1	Head A/D error	Replace the LMC print circuit board or print head.

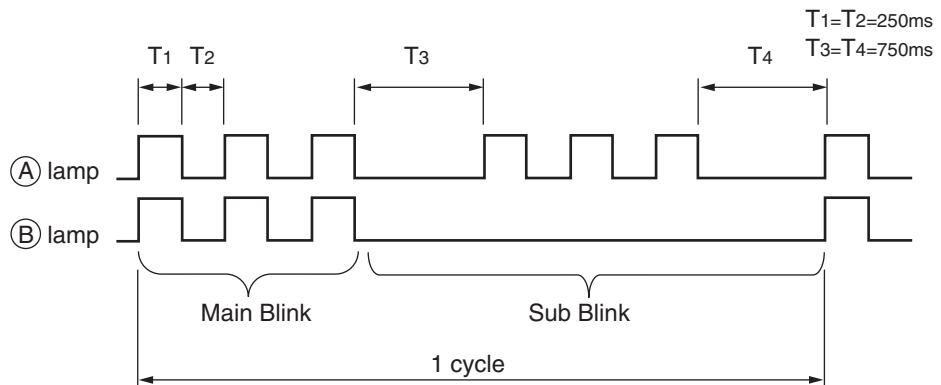
Allocation of switch lamps



Main Blink: (A) and (B) lamps blinking simultaneously.

Sub Blink: Only (A) lamp blinking.

The following describes Main Blink and Sub Blink. (EEP ROM error)



(4) Items to search

Table 8-2

Fault	Specific Content	Section to Refer
Power source abnormality	There is no response when turning on the power switch. (No lamps illuminate.)	①
Reset circuit abnormality	The carriage does not move at power ON and only lamp ⑤ illuminates faintly.	②
Operator panel abnormality	Some lamps do not illuminate (although the carriage moves.)	③
	Some lamps illuminate and stay ON (excluding lamp ⑤.)	④
	Some switches do not function or functions continuously.	⑤
Carriage operation abnormality	The carriage does not move at power ON or an alarm generates while printing thus the print job is stopped and an alarm is indicated.	⑥
	The movement of the carriage is abnormal (runs out of control, vibrates, stops during homing, etc.) and an alarm is indicated.	⑦
Paper feed abnormality	Paper-end is generated even when paper is set. (Lamp ⑤ goes on.) Paper-end does not generate even in paper-end condition. (Lamp ⑤ goes off.)	⑧
	Line is not fed upon receiving/printing data.	⑨
Ink ribbon feed abnormality	Print result is faint. The ink ribbon is not fed properly or is not sent at all.	⑩
Print condition abnormality	Print dots are missing.	⑪
	Space movement is normal but print is not performed.	⑫
Interface abnormality	Upon receiving/printing data: Spacing or printing is not performed and Lamp ④ is illuminating and ⑤ goes on.	⑬
	Upon receiving/printing data: Wrong characters are printed. Some characters are missing. Lamp ④ is illuminating.	⑭

① There is no response when turning On the power switch. (No lamps illuminate.)

└ Is the AC cord conduction normal?

└ N: Replace the AC cord.

└ Y: Is the AC fuse (F1) in the Pow Unit burned out?

└ Y: Replace the Pow Unit.

└ N: Is the voltage in the table below being output to the connector (CN1) for the Pow Unit?

Connector	Pin No.	Voltage
CN1	1, 2, 13~16	+42V
	5~6, 12	0V (logic-type)
	7, 11	+5V
	8~10	0V (drive-type)

└ Y: Is the power cord connected properly?

└ N: Reconnect the cord properly.

└ Y: Replace the Pow Unit.

└ N: Is the fuse (F2) in the Pow Unit burned out?

└ Y: Replace the Pow Unit.

└ N: Replace the Control board or replace the Pow Unit.

② The carriage does not move at power ON and only lamp ⑤ illuminates faintly.

└ Replace the Control board.

③ Some lamps do not illuminate (although the carriage moves.)

└ Replace the Control board.

④ Some lamps illuminate and stay ON (excluding lamp ⑤.)

└ Replace the Control board.

⑤ Some switches do not function or functions continuously.

└─ Replace the Control board.

⑥ The carriage does not move at power ON or an alarm generates while printing thus the print job is stopped and an alarm is indicated.

└─ Does the carriage move smoothly by hand when the power is turn OFF?

└─ N: Does the carriage move smoothly with the ribbon cartridge removed?

└─ N: Readjust the carriage unit.

└─ Y: Replace the ribbon cartridge.

└─ Y: Is +42V being output properly? (See Section ①)

└─ N: Replace the Pow Unit.

└─ Y: Is the fuse (F3) burned out?

└─ Y: Replace the Control board.

└─ N: Is the SP motor cord connected properly?

└─ N: Connect the cord properly.

└─ Y: Turn OFF the power, remove the SP motor connection, and confirm that the resistance between pins 1-2 and 3-4 of the SP motor connector (SPMOT) is approximately 2.0Ω.

└─ N: Replace the space motor.

└─ Y: Replace the Control board.

⑦

The movement of the carriage is abnormal (runs out of control, vibrates, stops during homing, etc.) and an alarm is indicated.

└ Is the HPOSI cord connected, and the attachment of a home position sensor properly?

└ N: Connect the cord or attachment the home position sensor properly.

└ Y: Is the output of HPOSI-P (HPOSI connector - 2 pin) signals proper?

└ N: Replace the home position sensor.

└ Y: Does the carriage move smoothly when the power is turned OFF?

└ N: Does the carriage move smoothly with the ribbon cartridge removed?

└ N: Readjust the carriage unit.

└ Y: Replace the ribbon cartridge.

└ Y: Turn OFF the power and confirm that the resistance between pins 1-2 and 3-4 of SPMOT connection on the Control board is approximately 2.0Ω.

└ N: Replace the space motor.

└ Y: Replace the Control board.

⑧

Paper-end is generated even when paper is set. (Lamp $\text{\textcircled{E}}$ goes on.) Paper-end does not generate even in paper-end condition. (Lamp $\text{\textcircled{E}}$ goes off.)

1) When using cut-sheets:

Set to menu mode and perform menu print.

If PE detect is set to OFF, reset to ON, and after confirming that paper-end is indicated, set to menu mode OFF.

Perform the following procedure if paper-end is not indicated.

2) Is the paper end cord connected and the attachment of the paper end sensor properly?

└ N: Connect the cord or attach the paper end sensor properly.

Is the output of FPESNS-P (FRONT connector-4 pin) signals proper?

└ N: Replace the paper end sensor.

└ Y: Replace the Control board.

└ Y: Set paper and feed the paper by turning the platen knob.

⑨ Line is not fed upon receiving/printing data.

└─ Is the LF motor cord connected properly?

└─ N: Connect the cord properly.

└─ Y: Turn OFF the power, remove the LF motor connector, and confirm that the resistance between pins 1-2 and 3-4 of the LF motor connector (LFMOT) is approximately 7.3Ω.

└─ N: Replace the LF motor.

└─ Y: Is the skew motor cord properly?

└─ N: Connect the cord properly

└─ Y: Turn OFF the power, remove the skew motor connector and confirm the resistance between pins 1-2 and 3-4 of the Skew motor connector (CN3) is approximately 10.3Ω.

└─ N: Replace the Skew motor.

└─ Y: Replace the Control board or Sensor board.

⑩

- Print result is faint.
- The ink ribbon is not fed properly or is not sent at all.

└─ Is the ribbon being fed properly during a print job?

└─ N: Remove the ribbon cartridge and check if the ribbon feed mechanism is operating properly.

└─ N: Replace the ribbon feed gear assembly.

└─ Y: Replace the ribbon cartridge.

└─ Y: Has the ink ribbon reached its life?

└─ Y: Replace the ribbon cartridge.

└─ N: Is the head gap set at the regulated value?

└─ N: Readjust the head gap.

└─ Y: Replace the print head.

⑪ Print dots are missing.

Is the head gap set at the regulated value?

N: Readjust the head gap properly.

Y: Are dots still missing after replacing the print head?

N: End the procedure.

Y: Are dots still missing after replacing the space motor assembly?

N: End the procedure.

Y: Are the sections between the Control board HD1, HD2 ↔ head cable ↔ carriage ↔ print head connected properly?

N: Reinstall properly.

Y: Replace the Control board.

⑫ Space movement is normal but print is not performed.

Is print disabled even after replacing the print head?

N: End the procedure.

Y: Are the sections between the Control board HD1, HD2 ↔ head cable ↔ carriage ↔ print head connected properly?

N: Reinstall properly.

Y: Replace the Control board.

- ⑬ Upon receiving/printing data:
Spacing or printing is not performed and Lamp Ⓐ is illuminating and Ⓔ goes on.

- └ Is the interface cable connected properly?
 - └ N: Connect the cable properly.
 - └ Y: Can a self-test print be performed?
 - └ N: Replace the Control board.
 - └ Y: Does Lamp Ⓐ go ON/OFF each time Switch 1 is pressed in a receive-standby mode after completing homing?
 - └ N: Replace the Control board.
 - └ Y: Are parallel data (CENT-2 pin ~ 9 pin) and STB-N (CENT-1 pin) sent from the Host?
 - └ N: Replace the interface cable.
 - └ Y: Replace the Control board.

- ⑭ Upon receiving/printing data:
Wrong characters are printed. Some characters are missing. Lamp Ⓐ is illuminating.

- └ Is the interface cable connected properly?
 - └ N: Connect the cable properly.
 - └ Y: Is a self-test print performed properly?
 - └ N: Replace the Control board.
 - └ Y: Is parallel data 1 to 8 sent properly to the pins 2 to 9 of the connector CENT from the Host?
 - └ N: Replace the interface cable.
 - └ Y: Replace the Control board.

9. Periodically Replaced Parts

The following parts shall be replaced in the designated period.

Table 9-1 Periodically Replaced Parts

No.	Name	Part No.	Replacement cycle [time (H) is POWER ON TIME]
1	Print head	42124207	200million dots/pin
2	Ribbon protector	43024301	Estimated 2000H (actual operation)

* Platen assembly 42643401

The replacement of the platen assembly is required with too much printing, which increases wear on it.

10. Operation

10.1 Summary

The main configuration of this printer is the print mechanism unit and print control unit.

The print mechanism unit can be divided broadly into the print head, space system, paper-feed system, and ribbon-feed system. The operation of each item is listed below.

- | | |
|------------------------|--|
| (1) Print head | Prints with the 24 wire-dot magnet. The dot patterns are configured in the print control unit. |
| (2) Space system | The stepping motor moves the carriage and performs spacing, tab, and carriage return. |
| (3) Paper-feed system | Paper is fed by the stepping motor. |
| (4) Ribbon-feed system | Ribbon is fed by obtaining drive force from the stepping motor just as in the space system. |
| (5) Print control unit | Controls the interface and mechanism with one SH7034B microprocessor (μ CPU). |

10.2 Circuit Operation (See Fig. 10-1)

The circuit of this printer consists of the control board and carriage board.

Circuits such as μ CPU and its peripheral circuits, drive circuits, and the external interface circuit are set on the control board.

The switches and LED are set on the control board.

With the control board being the main board, the boards are connected by cables.

10.2.1 μ CPU and peripheral circuits

(1) μ CPU (CPU: SH7034B)

The μ CPU is a 16-bit one-chip CPU which operates the peripheral circuits. Each I/O port is set as ADDRESS - BUS, DATA - BUS, and various control lines. It is capable of 8-channel A/D converter input and has five timers.

(2) Program ROM (PRG: Flash ROM)

The control program of the printer is stored. μ CPU operates according to the contents and various controls are performed.

(3) DRAM (DR1)

This is used to store various data for data received in 4Mbit RAM or print buffer, etc.

(4) LSI (LSI: 30R0120-036)

This is an LSI exclusively for the print head controller, external interface, and motor control. It has the following functions.

(a) Print head data control

Print data is unarchived to the print timing of a disperse allocation head and controls 24-pin worth of impact data drive time.

(b) Dot timing generating function

Dot timing (IPT) in sync with the print speed is generated and notifies the information to μ CPU.

(c) Speed control function of the space motor

The speed of the space motor is controlled and input command from μ CPU. Furthermore, the space motor speed in various print modes are also controlled.

(d) Parallel interface function

IFD 1-8 are used as input/output data of parallel data. Parallel data sent from the interface connector is latched by strobe signal STB-N and is read into μ CPU by a RD signal. Furthermore, control signals such as BSY-N, ACK, PE-N, and SEL-N are output to the interface connector by WR signals.

(e) I/O port

The I/O port has 14-bit input/output ports and controls various signals by input command from μ CPU.

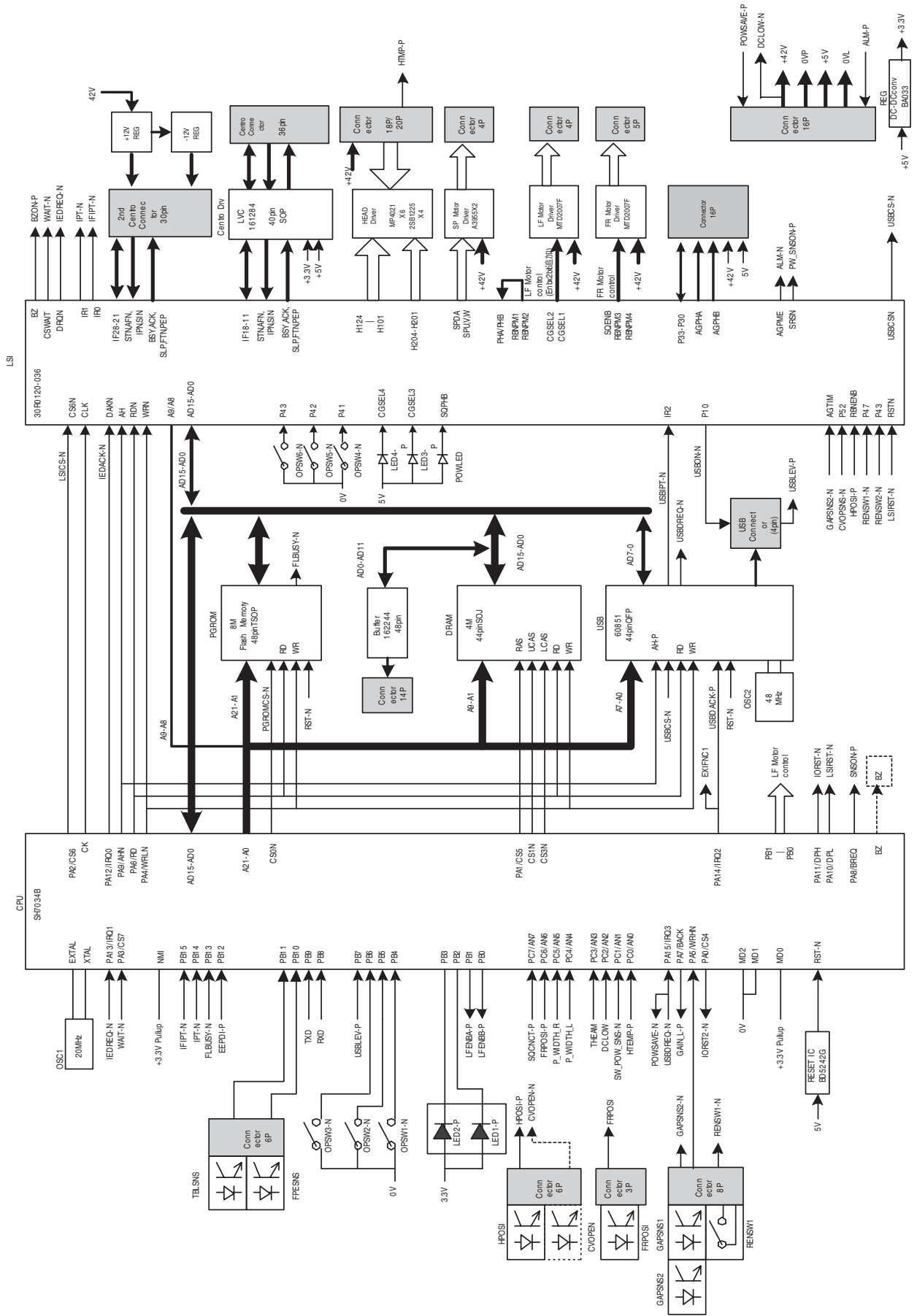


Fig. 10-1

10.2.2 Initializing operation

The initializing operation is performed for this printer when the power is turned ON and when I-PRIME for the parallel interface is input from the Host.

In the initializing operation, the RST-N signal is first output from the reset IC (RST-1 pin) to reset CPU (μ CPU). The program start after CPU is reset.

The program sets the LSI mode including μ CPU (CPU), checks the memory (ROM/RAM), and initializes the RAM. Then it determines the phase of the LF motor and performs homing for the carriage. Finally, it determines the interface signal (outputs ACK signal and BUSY signal), illuminates the [SEL] lamp, notifies the Host that it is in a mode that can receive data (data standby mode), and completes initialization. (Paper-end mode when using continuous form is excluded.)

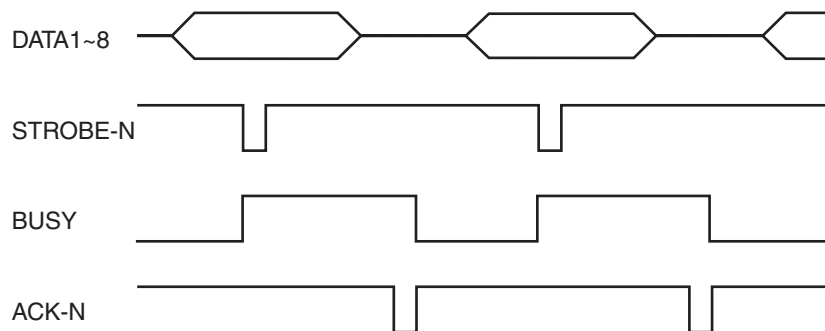
10.2.3 Controlling the interface

1) Parallel interface

Data from the interface is input from the connector (CENT) and is read in the timing of the STROBE-N signal by the interface, print head, and LSI for motor control (LSI: 30R0120-036).

When this signal is being process, the BUSY signal goes ON. When the process is completed, the BUSY signal goes OFF, sends an ACK-N signal, and waits to receive the next data.

(E.g.) When [I/F timing] is set to [A-B] in an English menu.



10.2.4 Print head control drive circuit

This circuit produces the print timing and drive time from LSI, drives the head magnet that corresponds to HEAD 1~24 with HD01-24-P signal and HDCOM1~4 - P signal and prints.

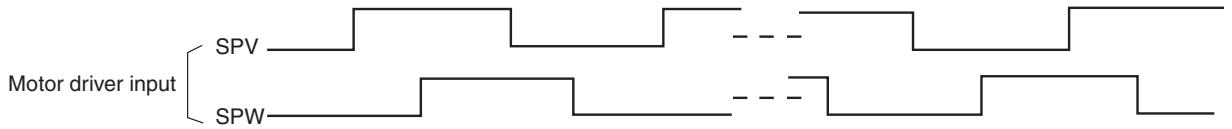
As the print head is dispersed and allocated in each group, the four groups are controlled individually.

10.2.5 Spacing

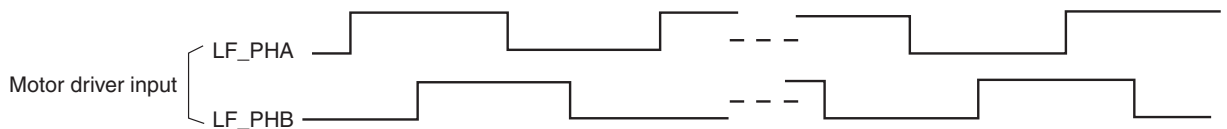
The LSI (LSI: 30R0120-036) outputs space motor phase signals (SPV, SPW) when it receives a spacing command from μ CPU. It outputs IPT signals as the dot timing and carriage position detection timing in sync with these phase signals.

The space motor phase signals (SPV, SPW) are input to the motor driver, which drives the space motor.

10.2.6 Line feed



The LF motor phase signals (LF_PHA, LF_PHB) from LSI (LSI:30R0120-036) are input to the motor driver, which drives the LF motor.



10.2.7 Alarm circuit

(1) High-temperature head alarm

The temperature of the head is monitored by a thermistor embedded in the head to protect the head coil.

The head temperature will rise after continuous heavy-duty print jobs. Therefore, when the head rises beyond a specified temperature, a thermal alarm mode will be entered, and after the current line is printed, the speed for printing the following lines will be decreased. Furthermore, if the head temperature does not fall, the following lines will be divided into two depending on the temperature, and printed by single-direction print.

The alarm is detected when the resistance of the thermistor decreases from the rise in the head temperature and μ CPU is input in the A/D converter.

10.2.8 Paper-end detect circuit

When paper runs out, the photosensor (PE) goes High level and the paper-end signal becomes [1]. This signal is input in μ CPU (CPU: SH1) which goes on the [ALARM] lamp.

10.2.9 Power source unit

The power source unit supplies DC+42V and +5V to each section by switching power.

10.3 Mechanism and Operation

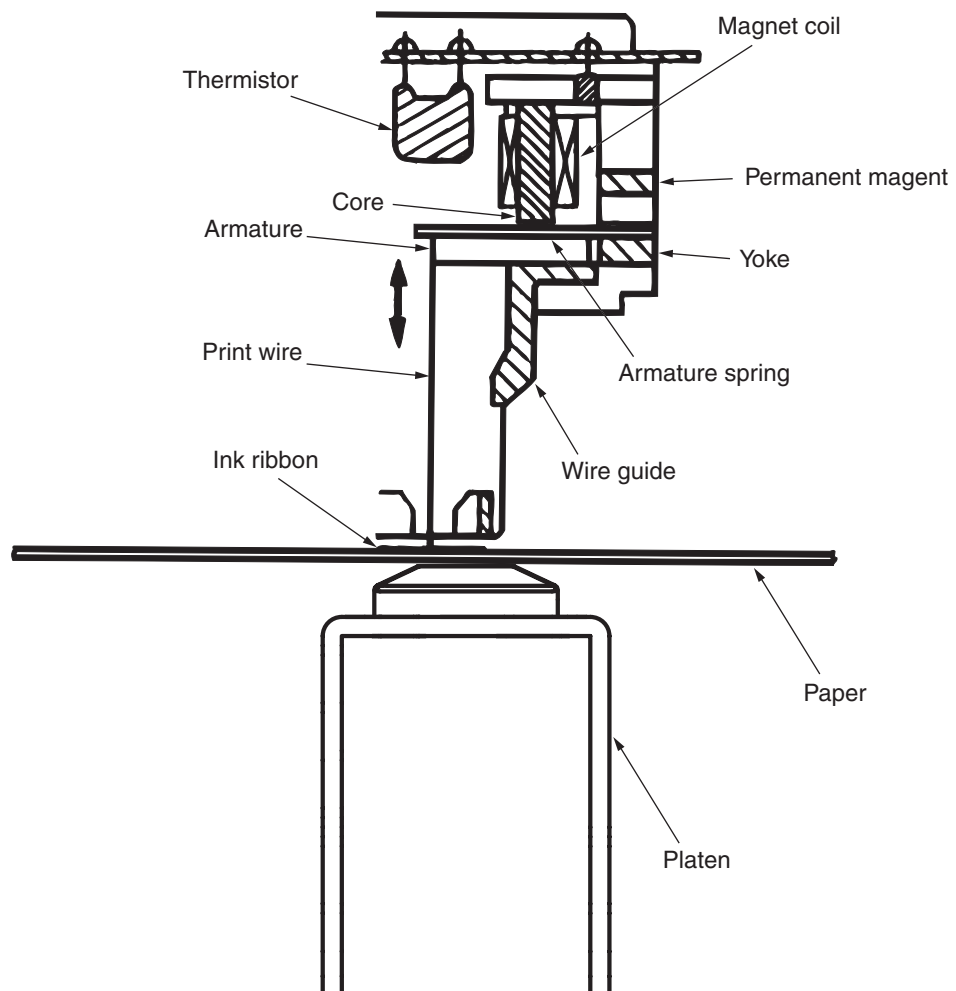
10.3.1 Mechanism and operation of the print head

The print head is a spring charge type head using a permanent magnet and is installed on a carriage that moves in parallel with the platen.

(1) Operation of the print head

An armature is normally absorbed to the core by warping an armature spring with a permanent magnet. The status of the print wire, which is integrated with the armature, will also be reset at this time.

When the magnet coil is energized by the print command from the device control unit, a magnetic flux opposite to that of the permanent magnet is generated. Then, the armature moves in the opposite direction of the core from the force of the armature spring and the print wire collides with the platen. Paper and ink ribbon are set between the the platen and print wire, and due to this collision, the ink on the ink ribbon is transferred on to the paper.

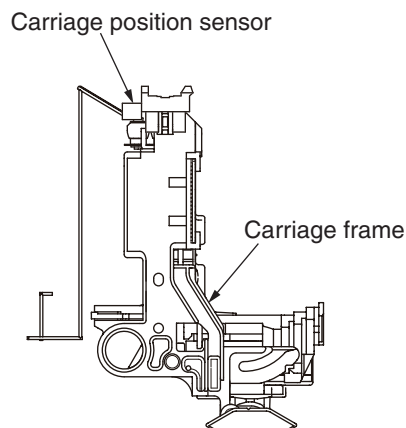
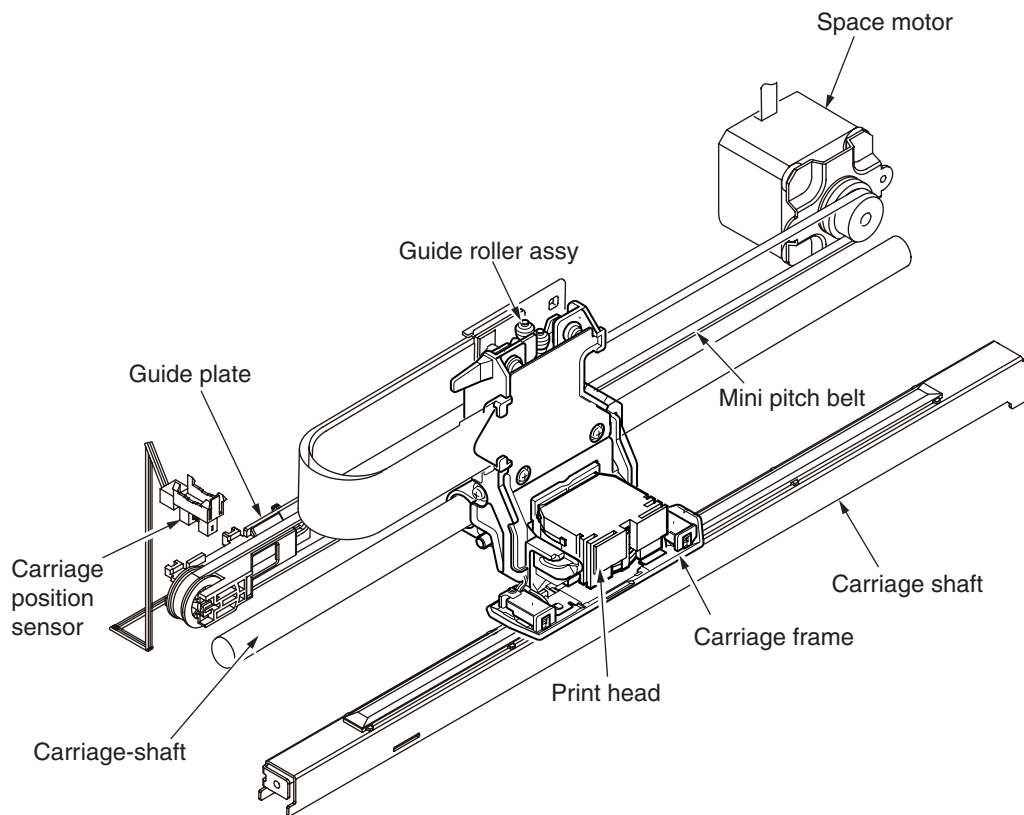


10.3.2 Mechanism and operation of space

The space mechanism of printers consists of several parts, including a carriage shaft placed parallel to a platen and a carriage frame that moves along the carriage shaft. The space mechanism is driven by a space motor located behind the carriage frame.

(1) Spacing operation

A carriage carrying a print head moves on its shaft parallel to a platen. As a space motor revolves, the power of the space motor is transferred to a mini pitch belt. This completely moves the carriage. The position of the frame of the carriage is identified by the numbers of pulses from right and left carriage position sensors.

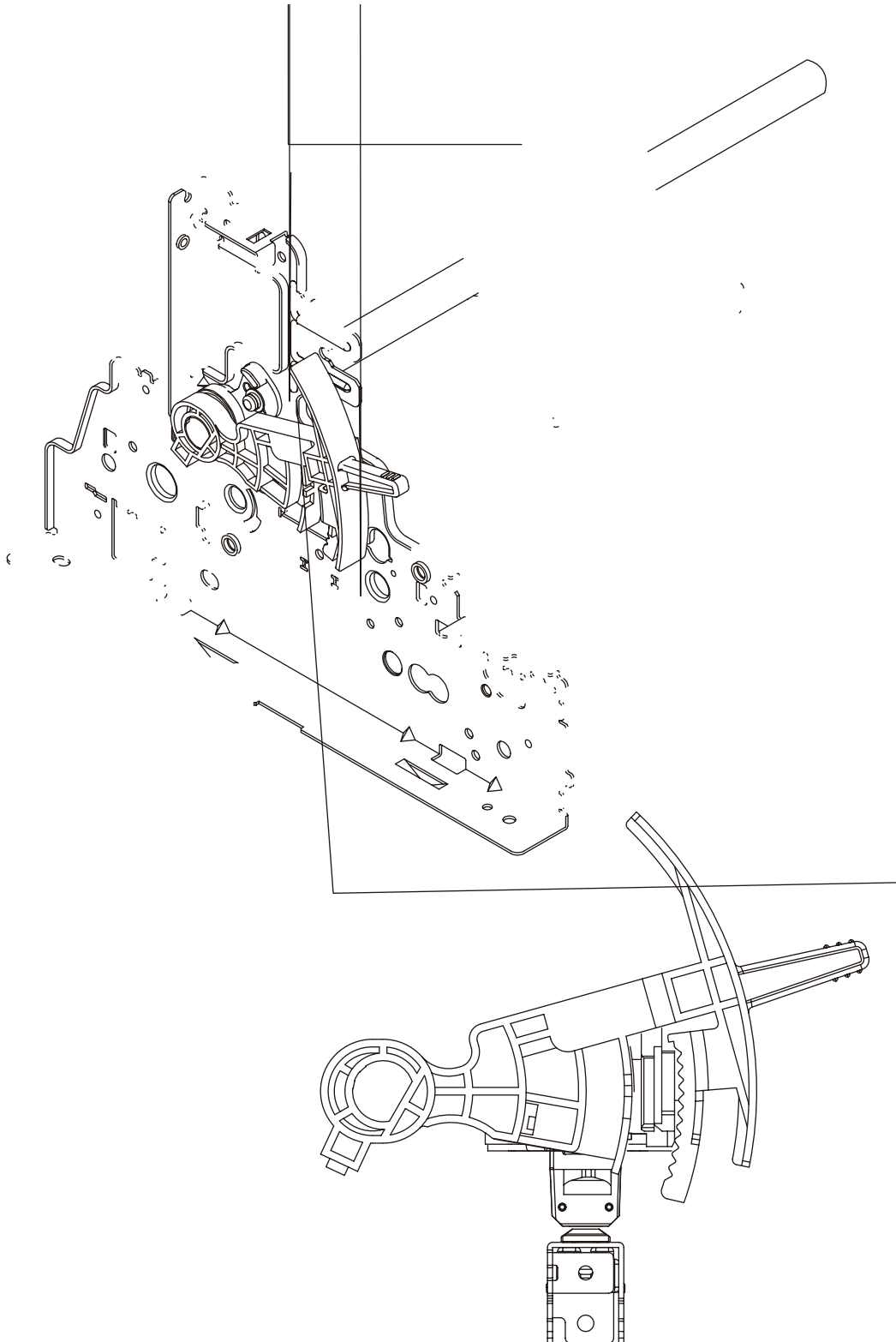


10.3.3 Mechanism for adjusting the head gap

The head gap adjustment is a mechanism to correct the gap between the print head and platen by moving the adjust lever vertically and rotating and moving the carriage shaft up and down.

The movement of the adjust lever rotates the carriage shaft that is connected directly to the adjust lever.

The carriage shaft is decentered against the fulcrum of the adjust lever (section fit with the carriage shaft), therefore, the carriage shaft moves up and down when the adjust lever rotates. The print head then moves to-and-fro the platen.



10.3.4 Mechanism and operation of ribbon feed

Ribbon feed is a mechanism to feed the ribbon which is driven by the stepping motor.

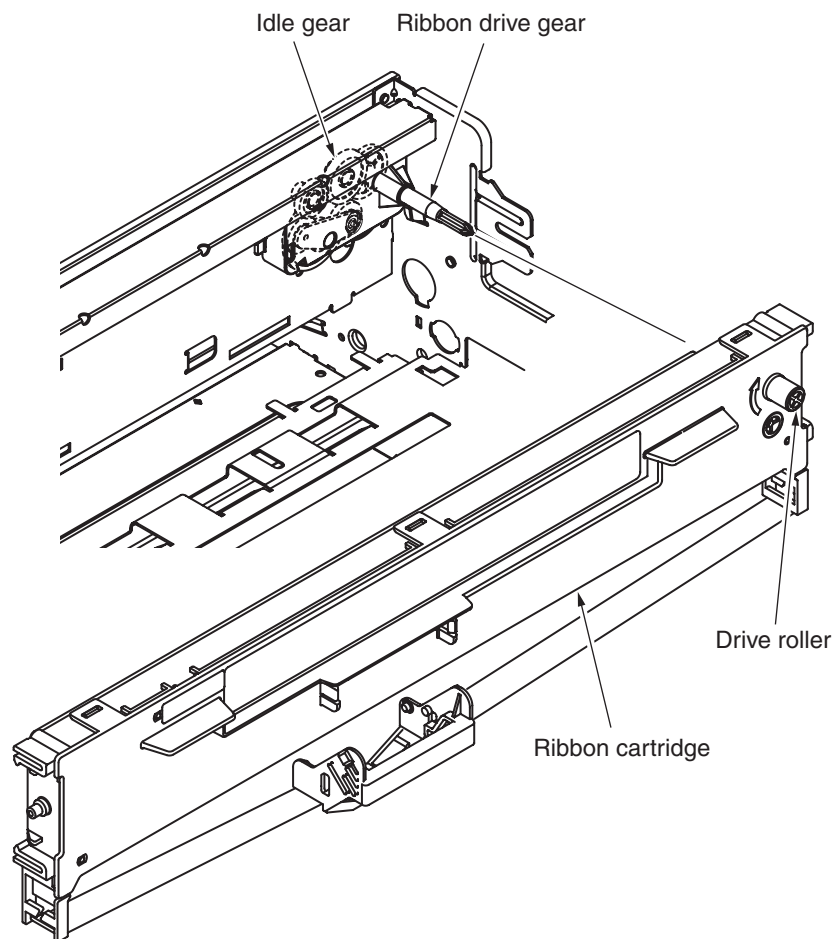
(1) Ribbon cartridge

The use of a one-way feed endless ribbon provides clear print results.

(2) Feed operation

Ribbon feed is initiated at the same time the spacing operation is initiated regardless of the mode, and stops when the spacing operation is ceased.

The rotation of a driven stepping motor is transferred to the drive roller in the ribbon cartridge via the ribbon gear which feeds the ink ribbon.



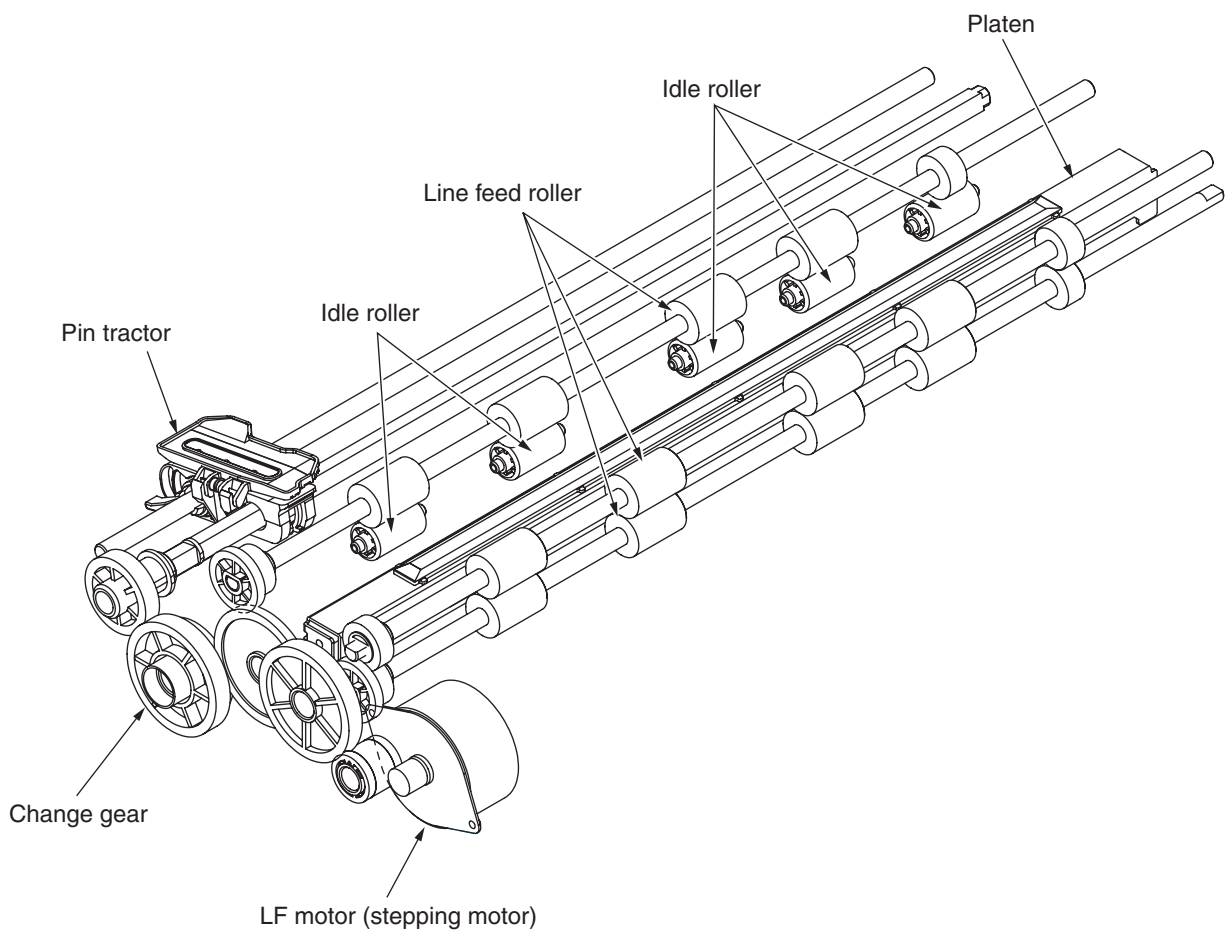
10.3.5 Mechanism and operation of paper feed

The line feed operation is driven by the LF motor that feeds the line feed roller and pin tractor.

(1) Paper feed operation

The LF motor (stepping motor) for feeding paper is installed on the left frame and the rotation of the motor is transferred to the platen gear via the deceleration gear.

The rotation of the line feed roller is also transferred to the pin tractor by switching the change gear. It is mechanically designed so that paper is fed by 0.27 inch (6.78mm) when the LF motor rotates 48 steps (360 degrees).



10.3.6 Mechanism for feed shaft UP/DOWN

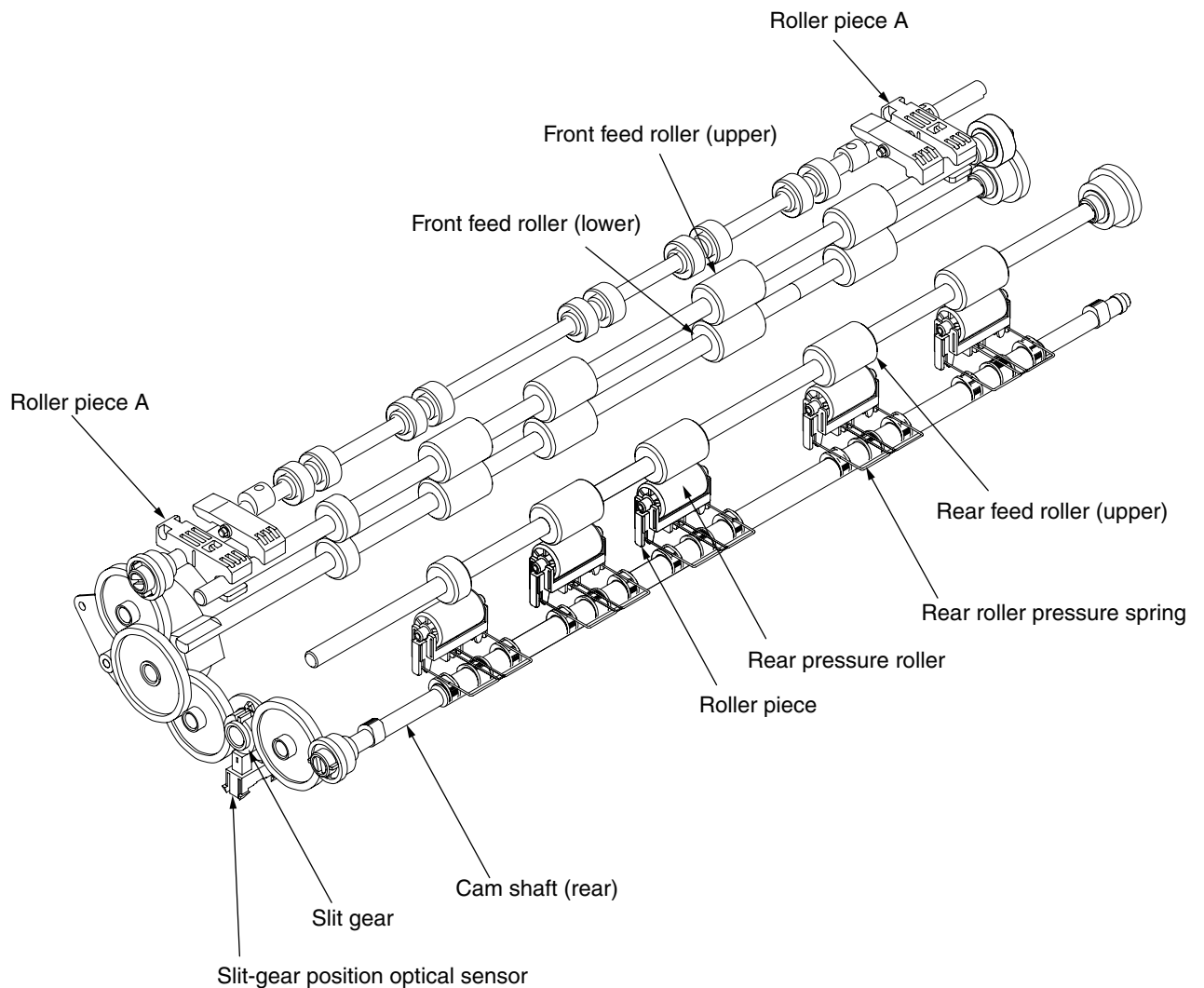
Operate the cut-sheet/continuous-form selector lever; the position sensor of the selector lever will detect the current position and control the feed rollers according to that position.

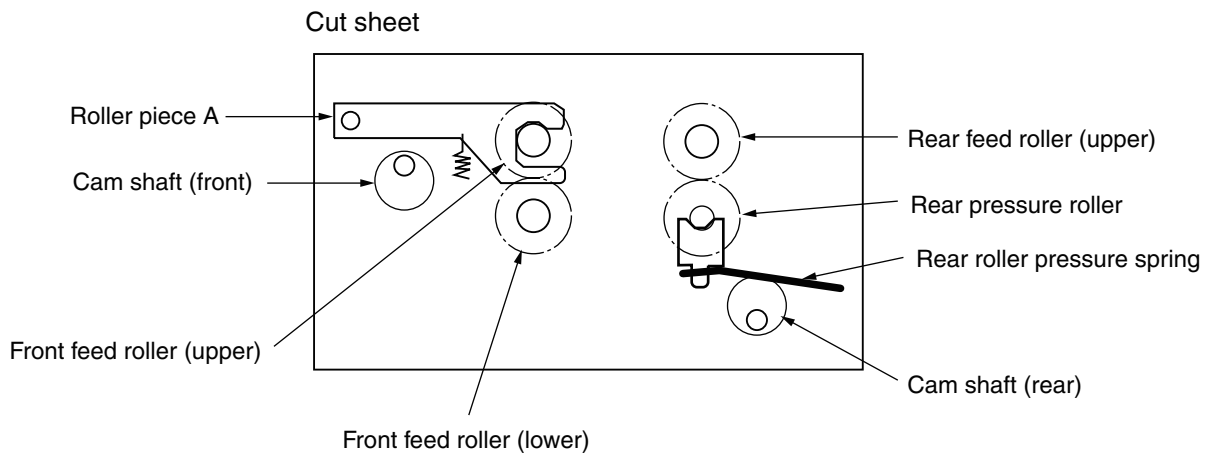
When the lever is turned to the cut-sheet position, the FR motor operates to rotate the front and rear cam shafts via the gears. This moves the roller piece of the front feed shaft into the cut-sheet position, and also moves into the cut-sheet position the spring that applies tension to the roller piece retaining the rear pressure roller. This increases the pressing force of the feed roller.

When the lever is turned to the continuous-form position, the FR motor operates to rotate the front and rear cam shafts via the gears. This moves the roller piece of the front feed shaft into the continuous-form position, and also moves into the continuous-form position the spring that applies tension to the roller piece retaining the rear pressure roller. This decreases the pressing force of the feed roller.

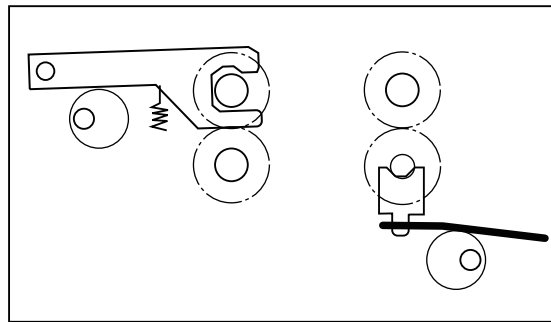
If the continuous-form retract button is pressed on the operating panel, the front feed roller is moved to the release position by the rotation of the cam shaft. The spring that applies tension to the roller piece retaining the rear pressure roller is also moved to the release position, releasing the paper from the feed roller.

The cam position is controlled by the optical sensor's detection of the slit position in the slit gear of the gear train.

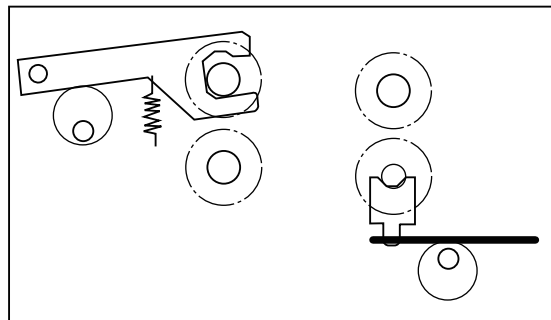




Continuous form

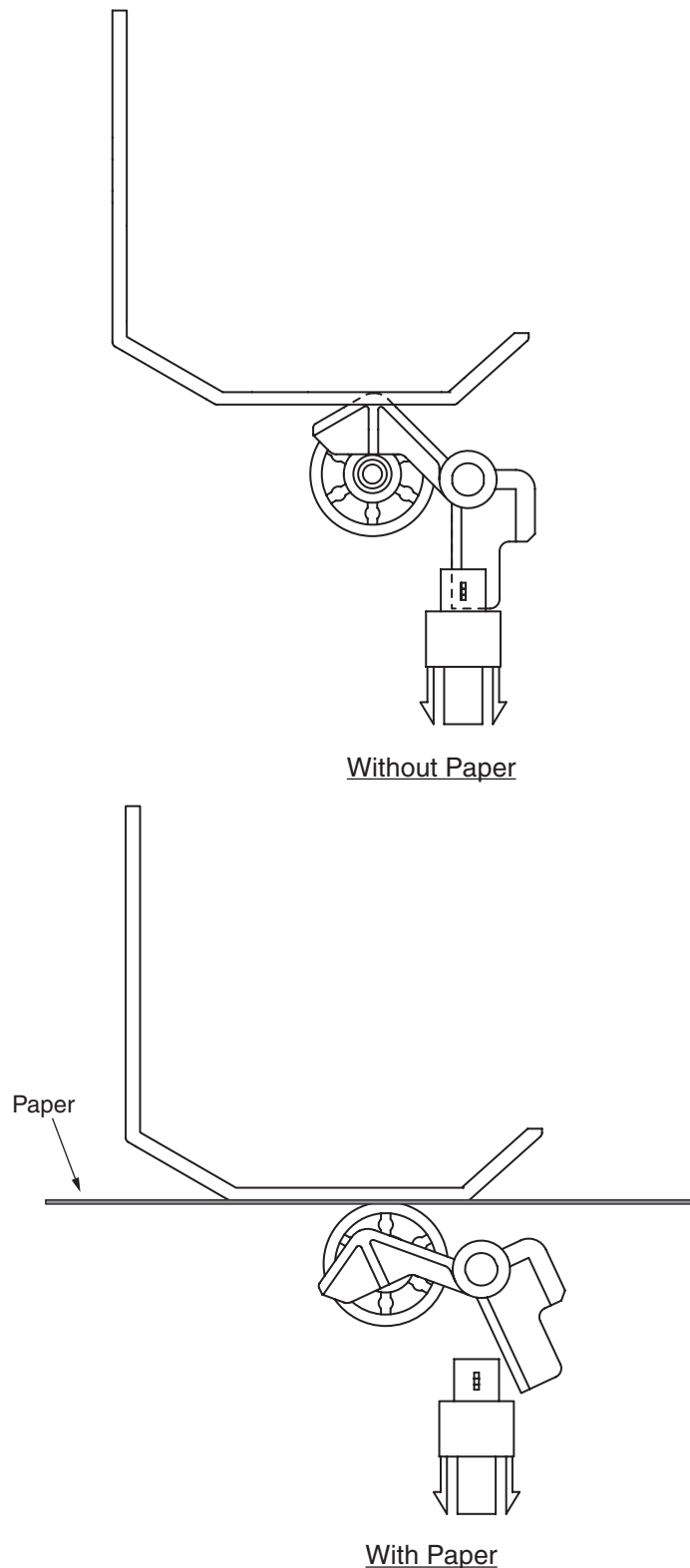


Continuous-form retract



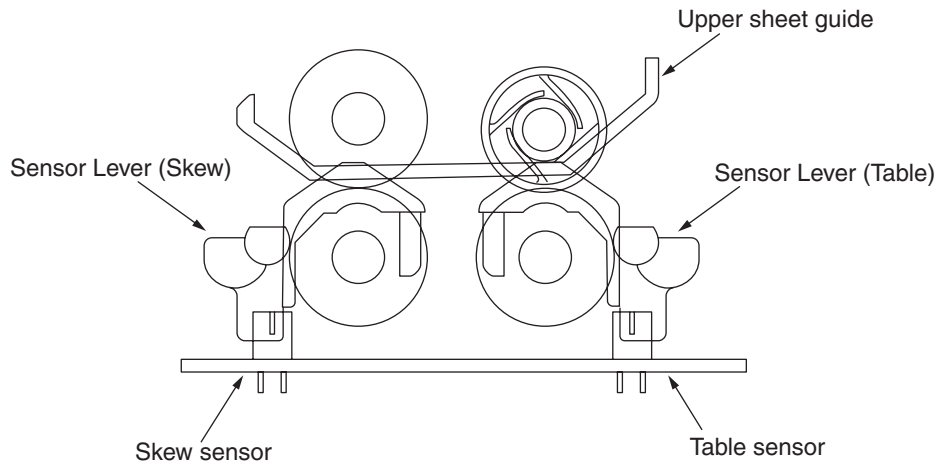
10.3.7 Mechanism for detecting the paper-end

When paper is inserted, the paper blocks the leading end of sensor arm (A) from entering the groove on the upper sheet guide, thus, the status of the paper-end sensor is ON. However, when paper is present, sensor arm (A) enters the groove of the upper sheet guide and the sensor is cut off by rear portion of sensor arm (A). With this operation, the status of the paper-end sensor becomes OFF and paper-end is detected. Paper-end is detected at approximately 22mm of the remaining paper length from the print position. When using cut-sheet, however, paper-end may not be detected upon operational control even when the paper-end sensor is OFF. (The following figures describes the front paper-end sensor.)

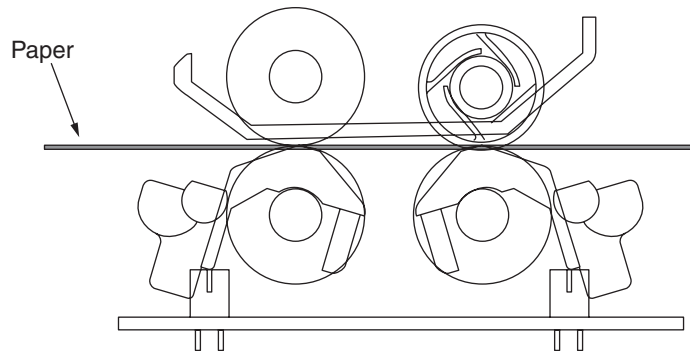


10.3.8 Mechanism for detecting the table sensor and Skew sensor

When paper is inserted in the stage, the paper blocks the leading end of sensor Lever(table) from entering the groove on the upper sheet guide, thus, the status of the stage sensor is ON. When the skew of the paper is corrected, the paper blocks the leading end of sensor Lever (skew) from entering the groove on the upper sheet guide, thus, the status of the skew sensor is ON. However, when paper is present, sensor Lever (table) and sensor Lever (skew) enters the groove of the upper sheet guide and the sensor is cut off by rear portion of sensor Lever (table). With this operation, the status of the stage sensor and skew sensor becomes OFF.



Without Paper



With Paper