# SERVICE MANUAL

## LARGE CAPACITY TRAY

# GENERAL PRECAUTIONS FOR INSTALLATION/ SERVICING/MAINTENANCE

1. When installing the Large Capacity Feeder RT47 to the equipment, be sure to follow the instructions described in the “Unpacking/Set-Up Procedure for the RT47” booklet which comes with each unit of the RT47.
2. The RT47 should be installed by an authorized/qualified person.
3. When transporting/installing the RT47, employ one person. The RT47 is fairly heavy and weights approximately 8.5 kg (18.7 lb.), therefore pay full attention when handing it.
4. Before starting installation, servicing or maintenance work, be sure to turn OFF and unplug the equipment first.
5. The RT47 is supplied with power from the equipment, requiring no additional power source.
6. The RT47 should be grounded to the specified positions on the machine frame.
7. When servicing or maintaining the RT47, be careful about the rotating or operating sections such as gears, pulleys, sprockets, cams, belts, etc.
8. When servicing the machines with the power turned ON, be sure not to touch live sections and rotating / operating sections.
9. When parts are disassembled, reassembly is basically the reverse of disassembly unless otherwise noted in this manual or other related documents. Be careful not to reassemble small parts such as screws, washers, pins, E-rings, toothed washers to the wrong places.
10. Basically, the machine should not be operated with any parts removed or disassembled.
11. Delicate parts for preventing safety hazard problems (such as thermofuses, door switches sensors, etc. if any) should be handled/installed/adjusted correctly.
12. During servicing or maintenance work, be sure to check the nameplate and other cautionary labels (if any) to see if they are clean and firmly stuck. If not, take appropriate actions.
13. Use suitable measuring instruments and tools.
14. The PC board must be stored in an anti-electrostatic bag and handled carefully using a wristband, because the ICs on it may be damaged due to static electricity.

    **Caution**: Before using the wrist band, pull out the power cord plug of the equipment and make sure that there is no uninsulated objects in the vicinity.
15. For the recovery and disposal of used the large capacity feeder, consumable parts, packing materials, it is recommended that the relevant local regulations rules.

# Service Data

## ELECTRICAL

# ELECTRICAL SECTION

## CONTENTS

# 1. SYMBOLS AND FUNCTIONS OF ELECTRICAL PARTS

## (1) Motor

| Symbol | Name | Function |
|---|---|---|
| (M1) | Paper-feed motor | Rotates the paper feed roller and pick-up roller to send sheets of paper to the copier. |
| (M2) | Tray motor | Moves the elevator tray up and down. |

## (2) Switch and Sensor

| Symbol | Name | Function |
|---|---|---|
| (S1) | Tray-up sensor | Detects when the paper supply on the elevator tray decreases below the specified level and the tray motor to raise the elevator tray. |
| (S2) | Paper empty sensor | Detects when the paper supply on the elevator tray has run out. |
| (S3) | Lower limit sensor | Detects when the elevator tray has arrived at the lower limit position and the tray motor to stop rotating. |
| (S4) | Door switch 1 | Detects whether the paper supply door is opened or closed. |
| (S5) | Door switch 2 | Detects whether the paper supply door is opened or closed.<br>When the door is opened it cut off the DC circuit. |

# 2. GENERAL OPERATION

## 2.1 Operation Immediately after Set-Up

(1) After loading the elevator tray with sheets of paper and closing the paper supply door to turn ON door switches (S4) and (S5), the tray motor (M2) is energized to raise the elevator tray.

(2) When the sheets of paper on the elevator tray pushes up the actuator of the paper empty sensor (S2) to turn it ON, the copier detects that there is a sheet of paper and the ADD PAPER message on the copier display panel disappears.

(3) When the elevator tray rises further to turn the tray-up sensor (S1) ON, the tray motor (M2) is stopped.

(4) When there is no paper on the tray, even if the tray rises, the paper empty sensor (S2) is not turned ON, the tray rises further to turn the tray-up sensor (S1) ON, and then the tray motor (M2) rotates in reverse to lower the tray. When the lower limit sensor (S3) is turned ON, the tray motor (M2) is stopped.

## 2.2 Operation During Copying

(1) When the START key is pressed, the paper-feed motor (M1) is turned ON and the sheet of paper is sent to the copier transport roller by the pick-up and paper-feed rollers of this large capacity feeder.

(2) When the copier transport switch is turned ON by the leading edge of the sent paper, the paper-feed motor (M1) will be stopped and the paper-feed roller will stop rotating.

(3) When fixed time goes by after the trailing edge of the paper passes the transport switch, the paper-feed motor (M1) is turned ON, and the next sheet of paper is sent to the copier transport roller.

(4) As the operation in steps (2) and (3) above is repeated, the level of the paper supply on the elevator tray gradually decreases. After 3 – 10 sheets have been sent, the level of the paper will have decreased by 0.2 – 1.0 mm, turning the tray-up sensor (S1) OFF. As a result, the tray motor (M2) is energized to raise the elevator tray. When the tray-up sensor (S1) is turned ON, the tray motor (M2) stops.

(5) The operation in step (4) above is repeated until the paper supply on the elevator tray is depleted.

## 2.3 Operation When Paper Supply is Depleted

After the final sheet of paper on the elevator tray has been sent to the copier, when the actuator of the paper empty sensor (S2) drops into the hole, the paper empty sensor (S2) is turned ON, causing the ADD PAPER message to appear on the copier's display panel and the tray motor (M2) is rotated to go down, when the elevator lower limit sensor (S3) is turned ON, the tray motor (M2) will stop to rotate.

## 2.4 Operation When There is a Paper Misfeed

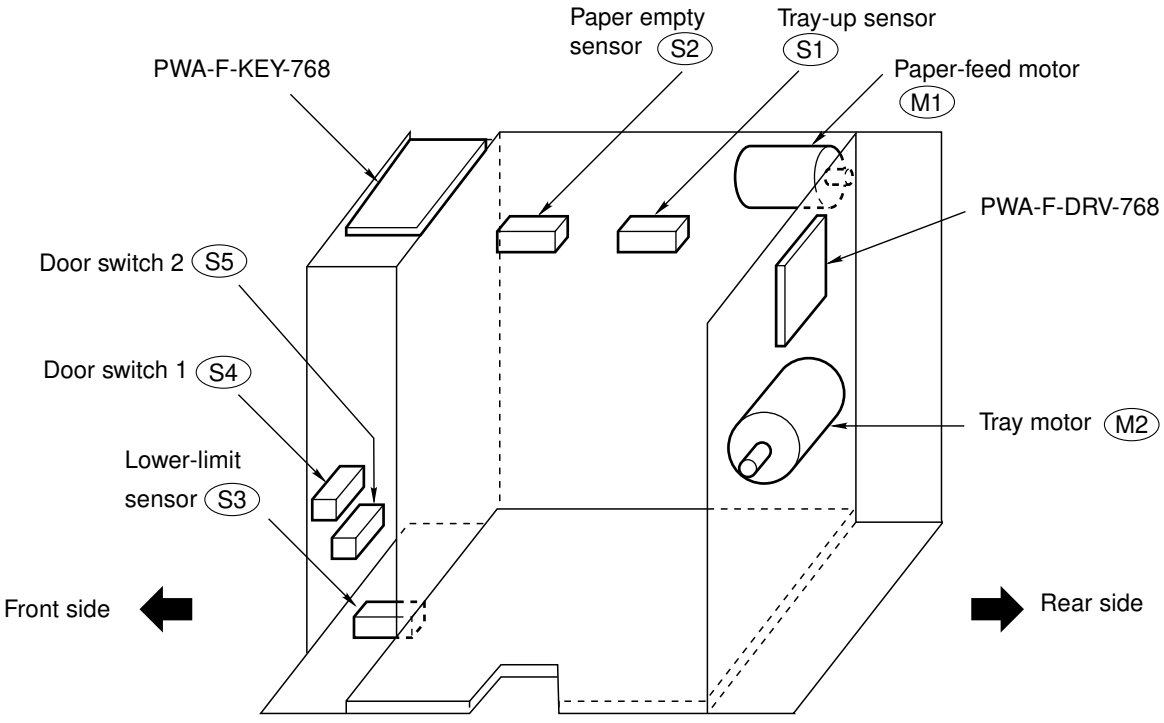
(1) If the copier transport switch remains OFF even when fixed time passes after the paper-feed motor (M1) has been energized to send a sheet of paper from the elevator tray to the copier transport roller, this large capacity feeder will determine that a paper misfeed has occurred, and the PAPER JAM will display on the display panel of the copier.

(2) When the paper supply door is opened to clear the misfed paper and then closed, the tray motor will rotate to raise the elevator tray to the feeding position.
When the tray-up sensor (S1) is turned ON, the tray motor (M2) will stop rotating and the copier will become ready.

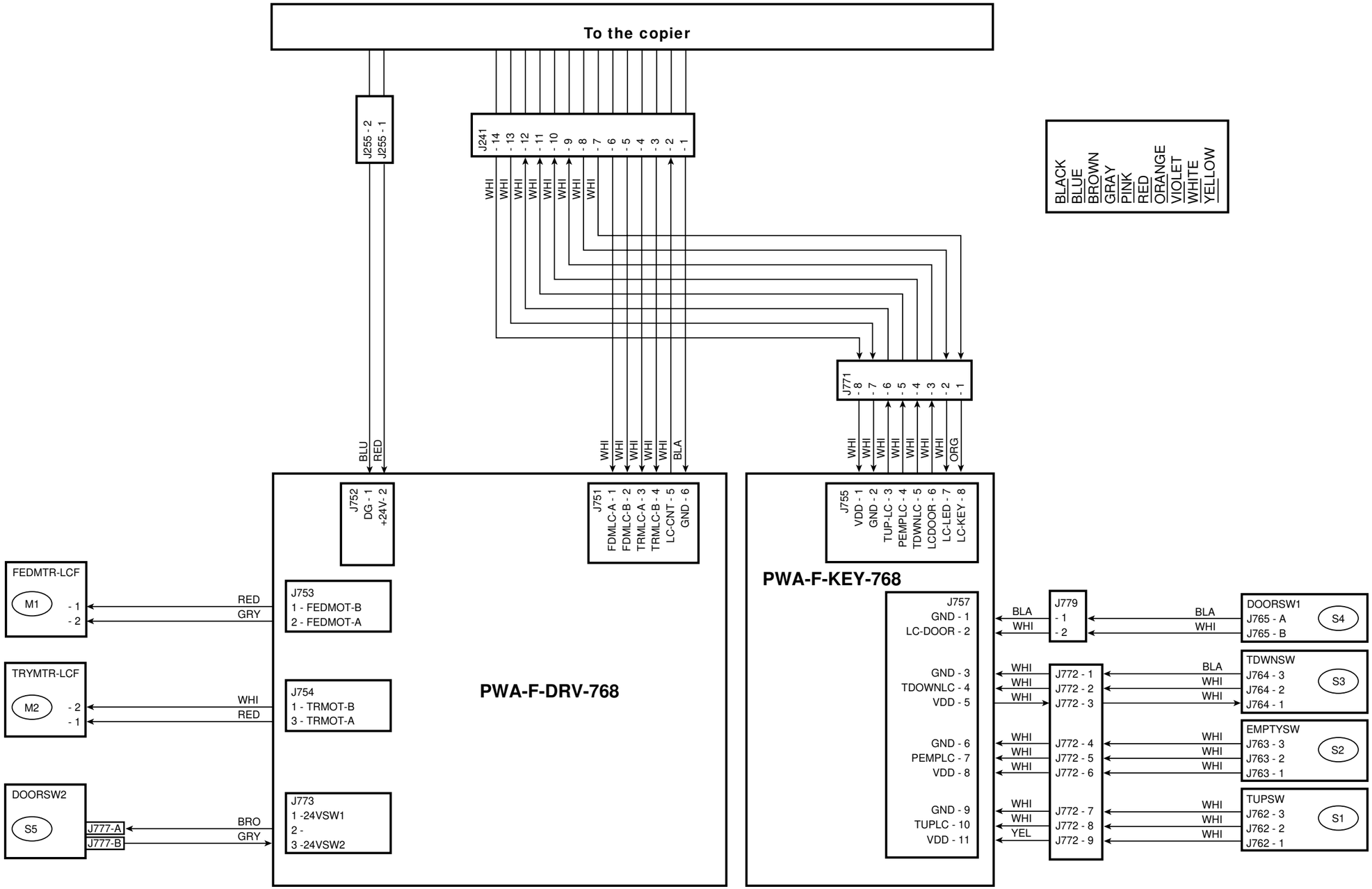
## 2.5 Other Operation

(1) While the tray motor (M2) is rotating, if the paper supply door is opened, the motor will stop rotating and when it is closed, the motor will resume rotating.
While the tray motor (M2) is rotating, if the copier's front cover is opened, the motor will stop rotating and the ADD PAPER message will appear on the copierís display panel. When the front cover is closed, the ADD PAPER message will disappear and the tray motor (M2) will resume rotating.

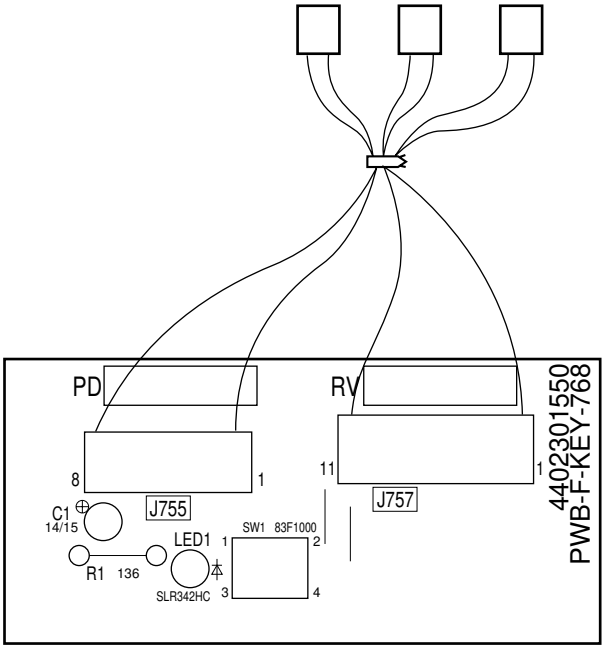
# 3. ELECTRICAL PARTS LOCATION

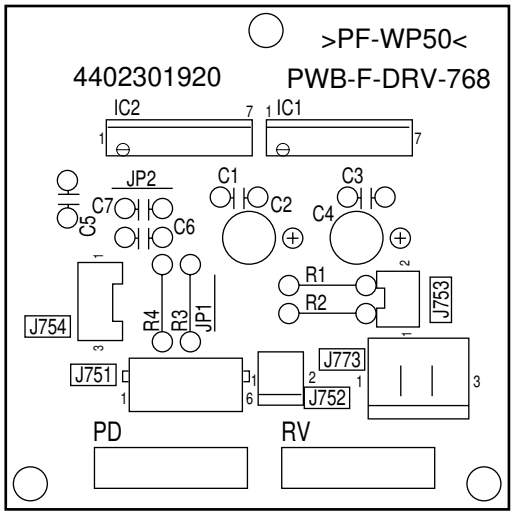


# 4. HARNESS CONNECTION DIAGRAM



# 5. PC BOARD ASSEMBLY




Key Board

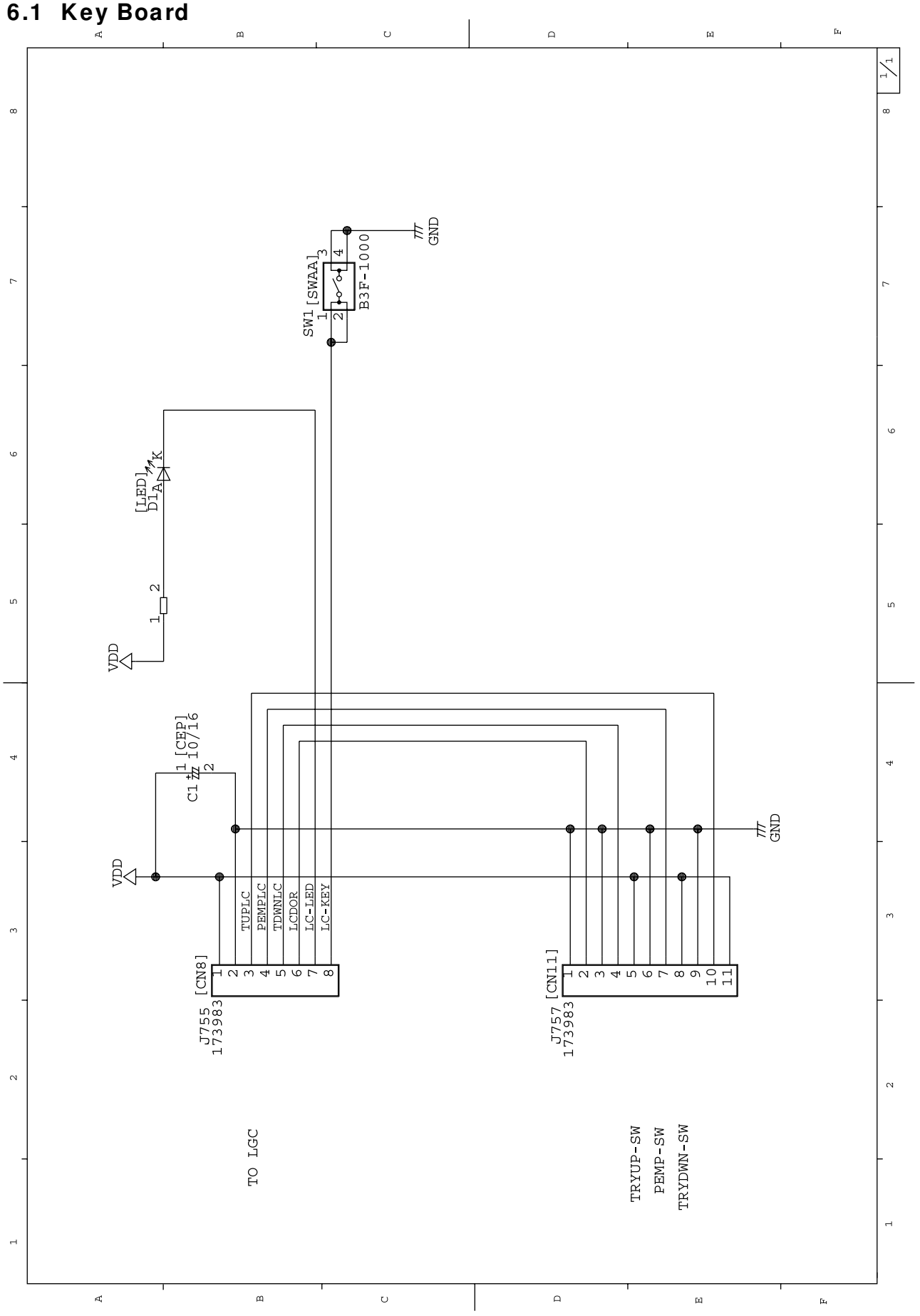
| SYMBOL | REMARKS |
|---|---|
| SW1 | Switch |
| | |
| C1 | 10 µ/16 V |
| | |
| J1, 2 | Jumper wire 10 mm |
| | |
| J755, J757 | Including wire harness |

Drive Board

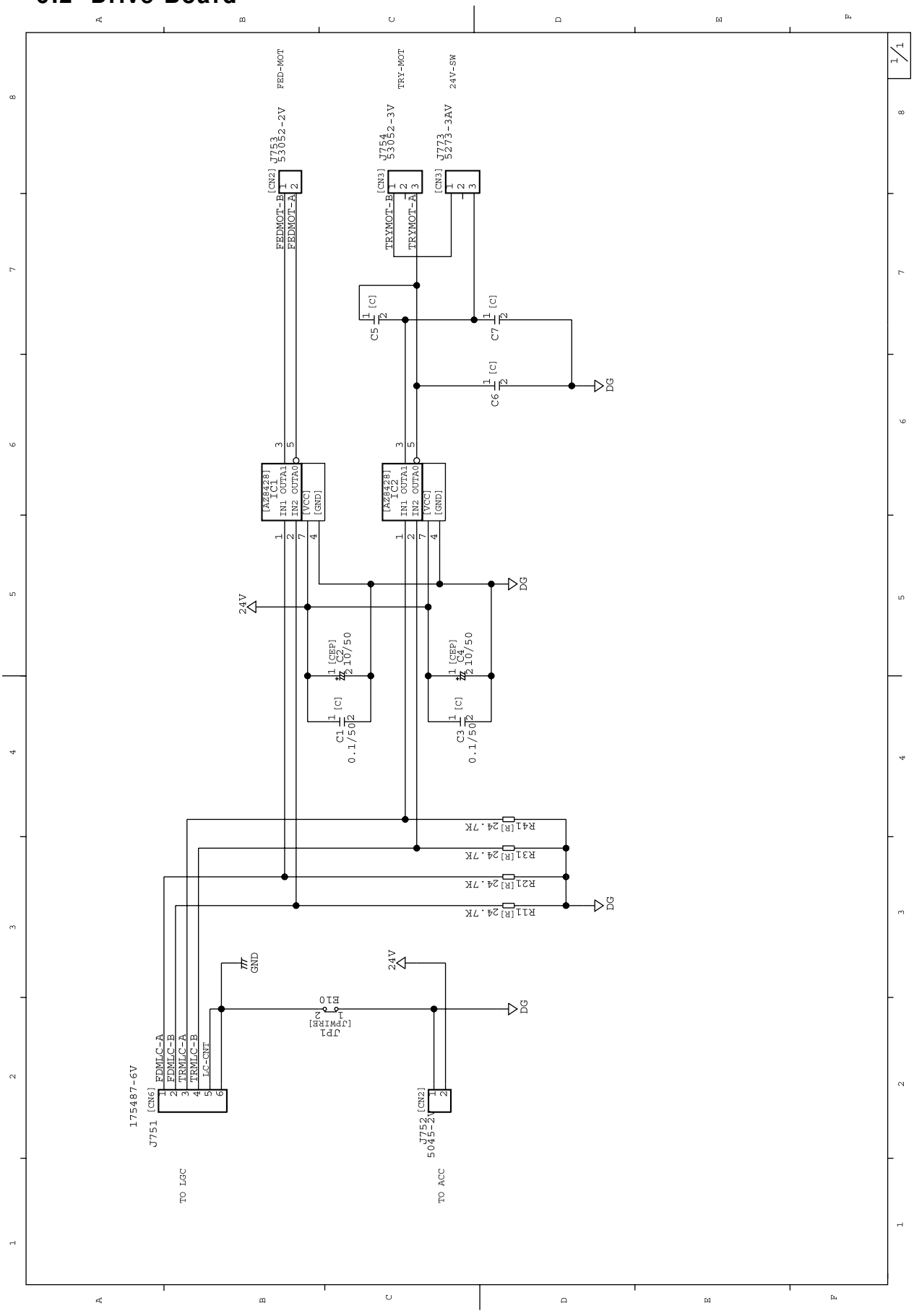
| SYMBOL | REMARKS |
|---|---|
| IC1, 2 | TA-8428 (S) |
| | |
| C1, 3 | 0.1 µ/50 V |
| C2, 4 | 10 µ/50 V |
| | |
| R1 – 4 | 1/4 W 4.7 kΩ |
| | |
| JP1, 2 | Jumper wire 10 mm |
| | |
| J751 | 6 PIN CONNECTOR |
| J752 | 2 PIN CONNECTOR |
| J753 | 2 PIN CONNECTOR |
| J754 | 3 PIN CONNECTOR |
| J773 | 3 PIN CONNECTOR |

# 6. CIRCUIT DIAGRAM

## 6.1 Key Board



## 6.2 Drive Board



# Service Data

## MECHANI-CAL

# MECHANICAL SECTION

## CONTENTS

# 1. SPECIFICATIONS AND FEATURES

## 1.1 Specifications

| | | |
|---|---|---|
| Type | ..... | Add-on Attachment |
| Acceptable Type of Paper | ..... | Size : Letter (8-1/2" x 11") – For North America |
| | | : A4 (210 mm x 297 mm) – For Europe and other areas |
| | | Weight : 64 g/m$^2$ (17 lbs Bond) – 163 g/m$^2$ (60 lbs Cover) |
| Maximum Number of Sheets Accommodated | ..... | Approx. 1,500 |
| Dimensions | ..... | W317 (including the portion which enters the copier) x D460 x H288 mm (Approx. 12.5" x 18.1" x 11.3") |
| Weight | ..... | Approx. 8.5 kg (18.7 lbs) with no paper loaded |
| Power Supply | ..... | DC 24 V and DC 5 V (Power is supplied from the copier) |

Specifications are subject to change without notice.

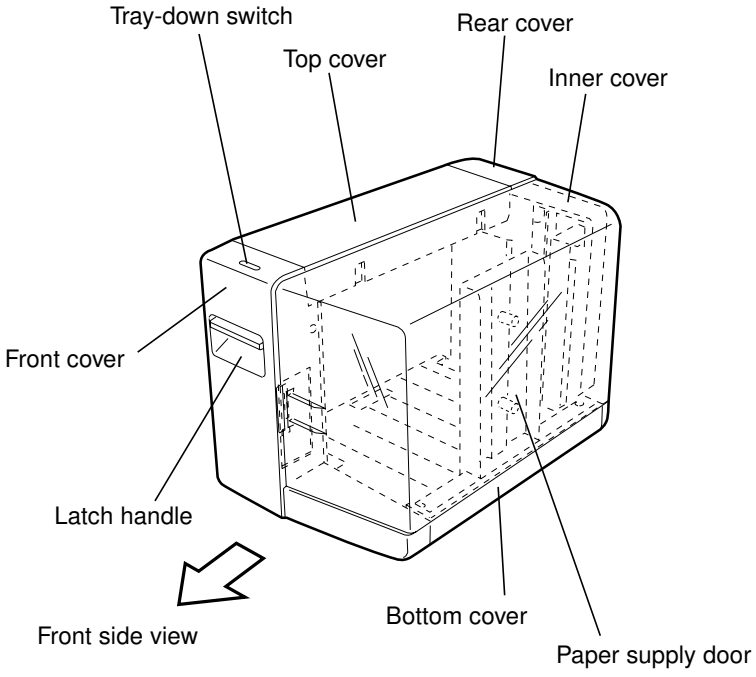
## 1.2 Features

This large capacity feeder offers the following features.

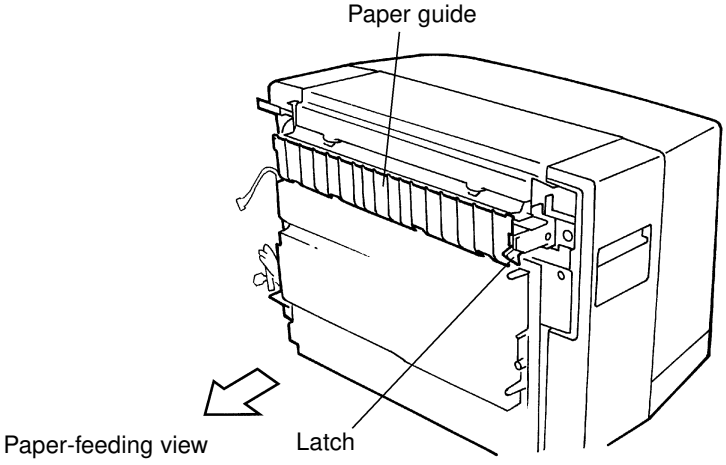
1. Paper supply of up to 1,500 sheets (A4 or Letter size), which allows you to make a large number of copies continuously without reloading copy paper.
2. Simple reloading of copy paper.
3. Easy of paper jam removal.

# 2. NAMES OF MAIN COMPONENTS

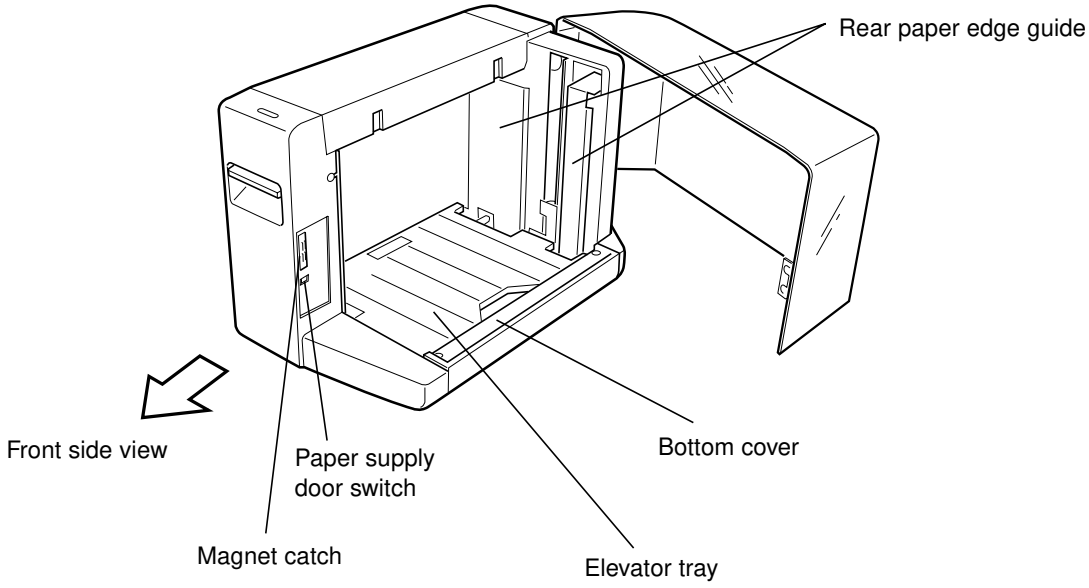
## 2.1 Names of Covers

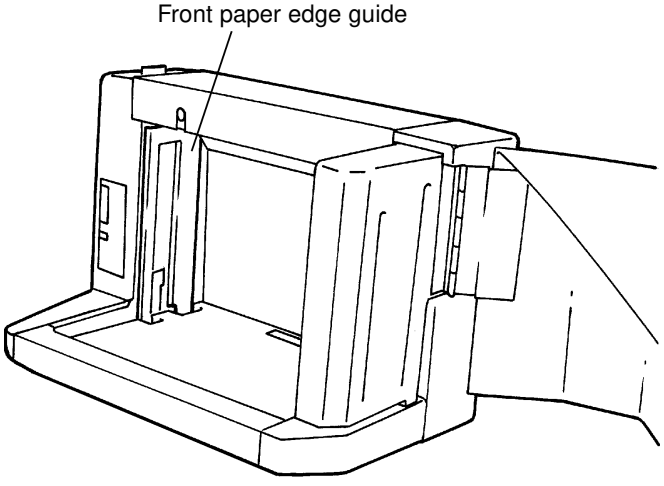



## 2.2 Names of Main Mechanical Parts

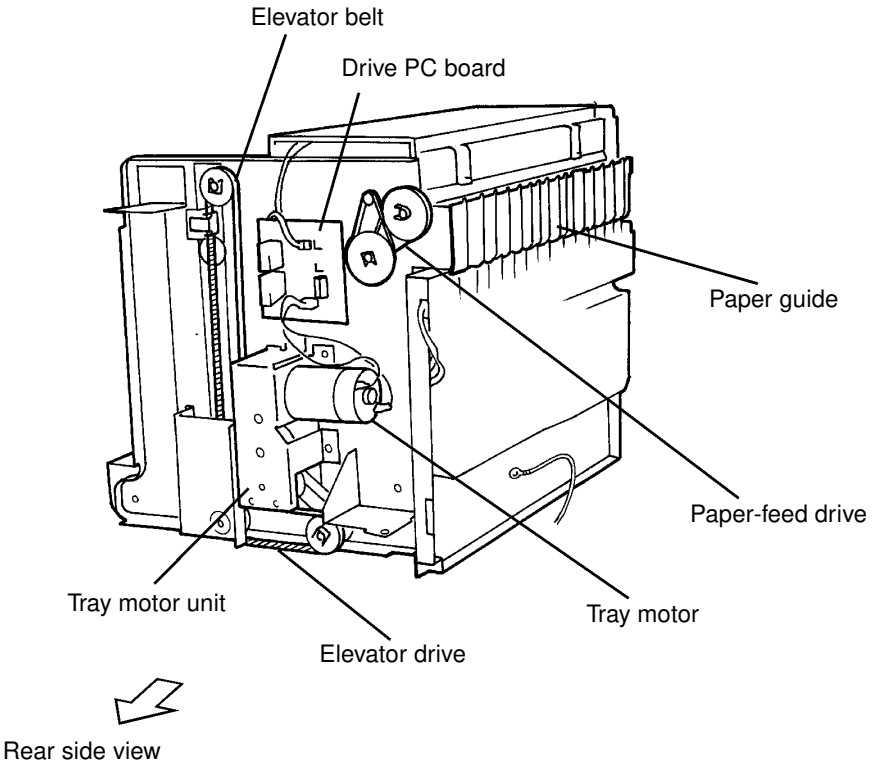


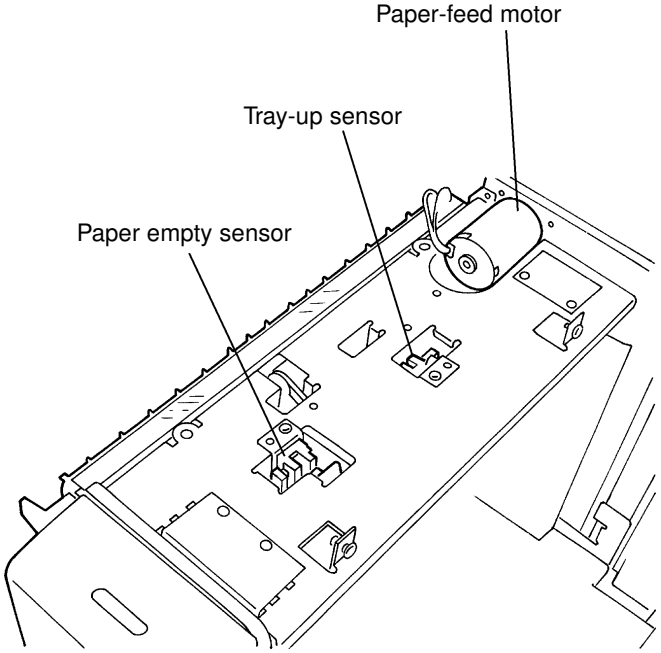
## Names of Main Mechanical Parts



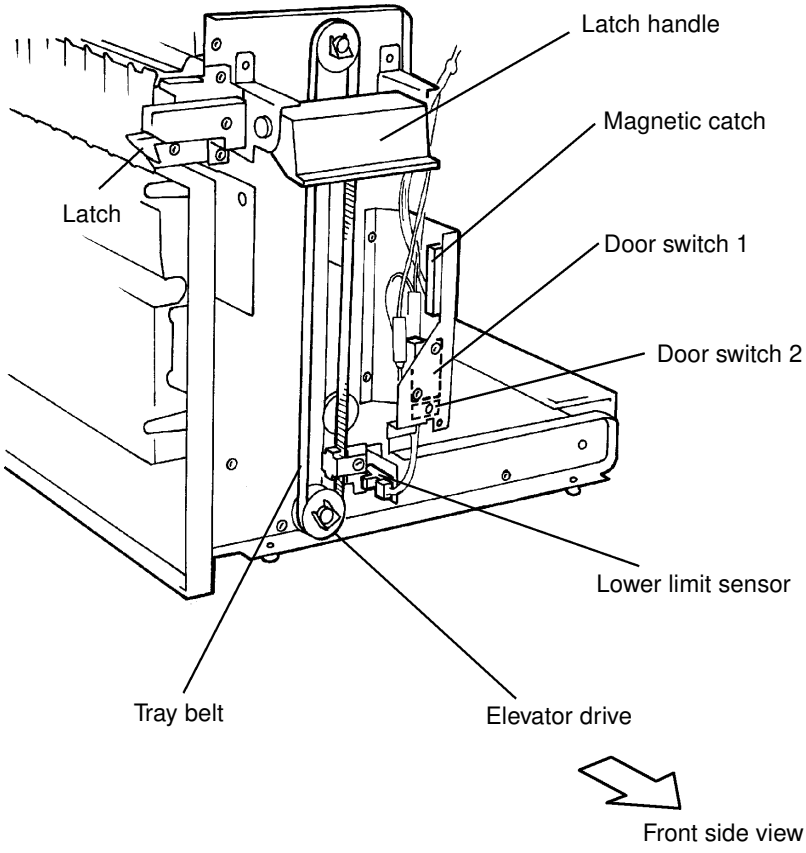



## Names of Main Mechanical Parts

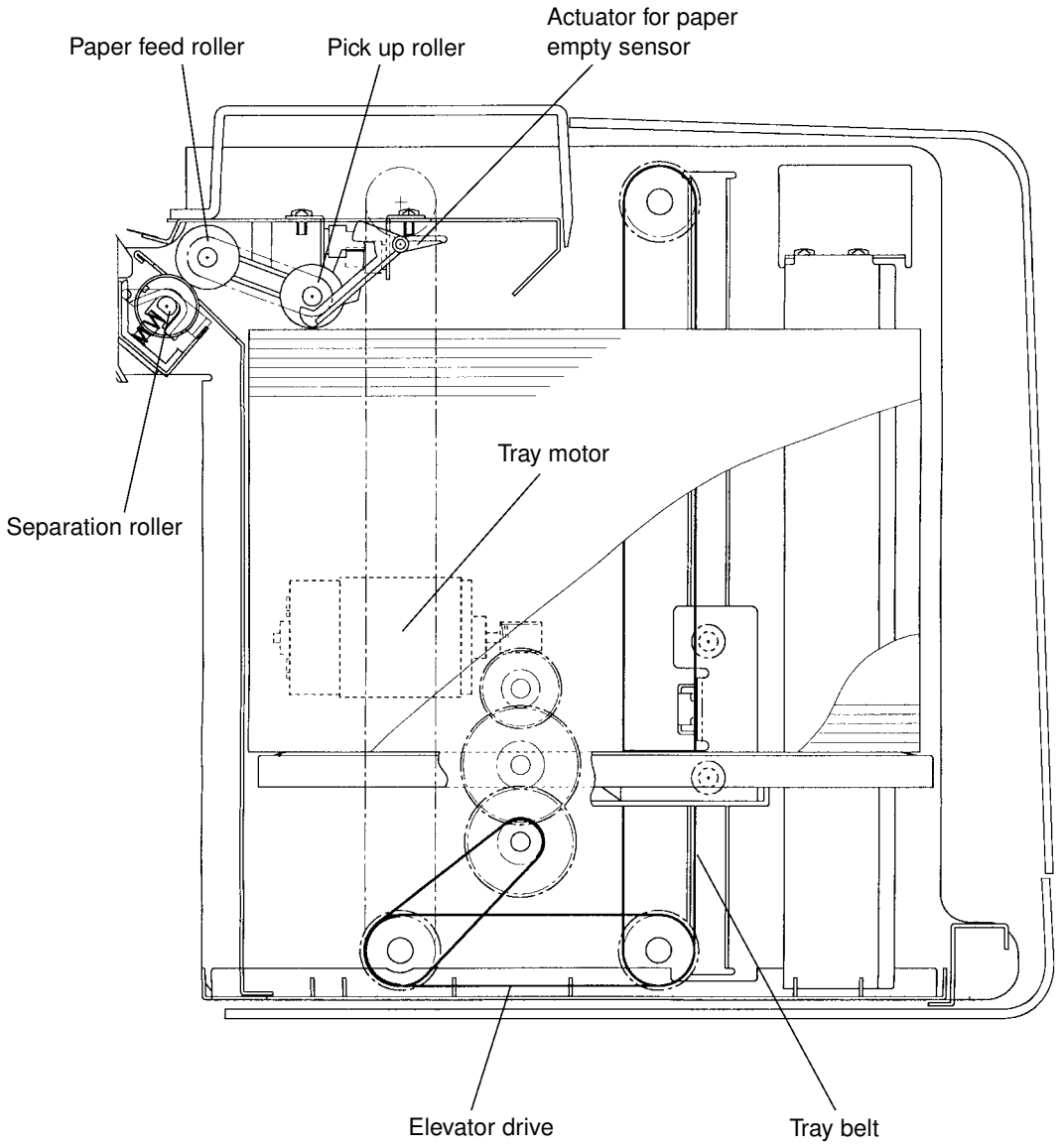


## Names of Main Mechanical Parts



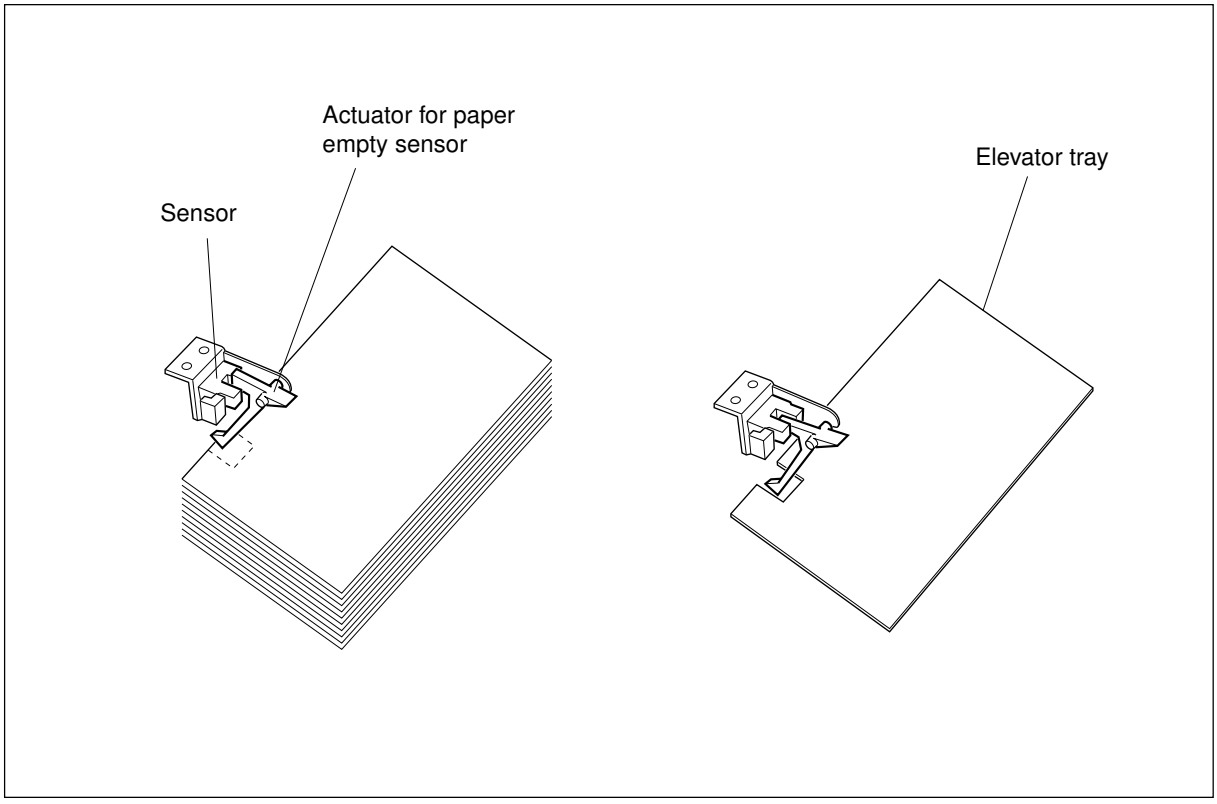
# 3. FRONT SECTIONAL VIEW



# 4. DESCRIPTION OF OPERATION

## 4.1 Paper-Empty Detection

If the paper on the elevator tray is exhausted, the actuator for the paper empty sensor will drop into the hole of the tray and the paper empty sensor will be turned ON.
And then, the ADD PAPER message will appears.



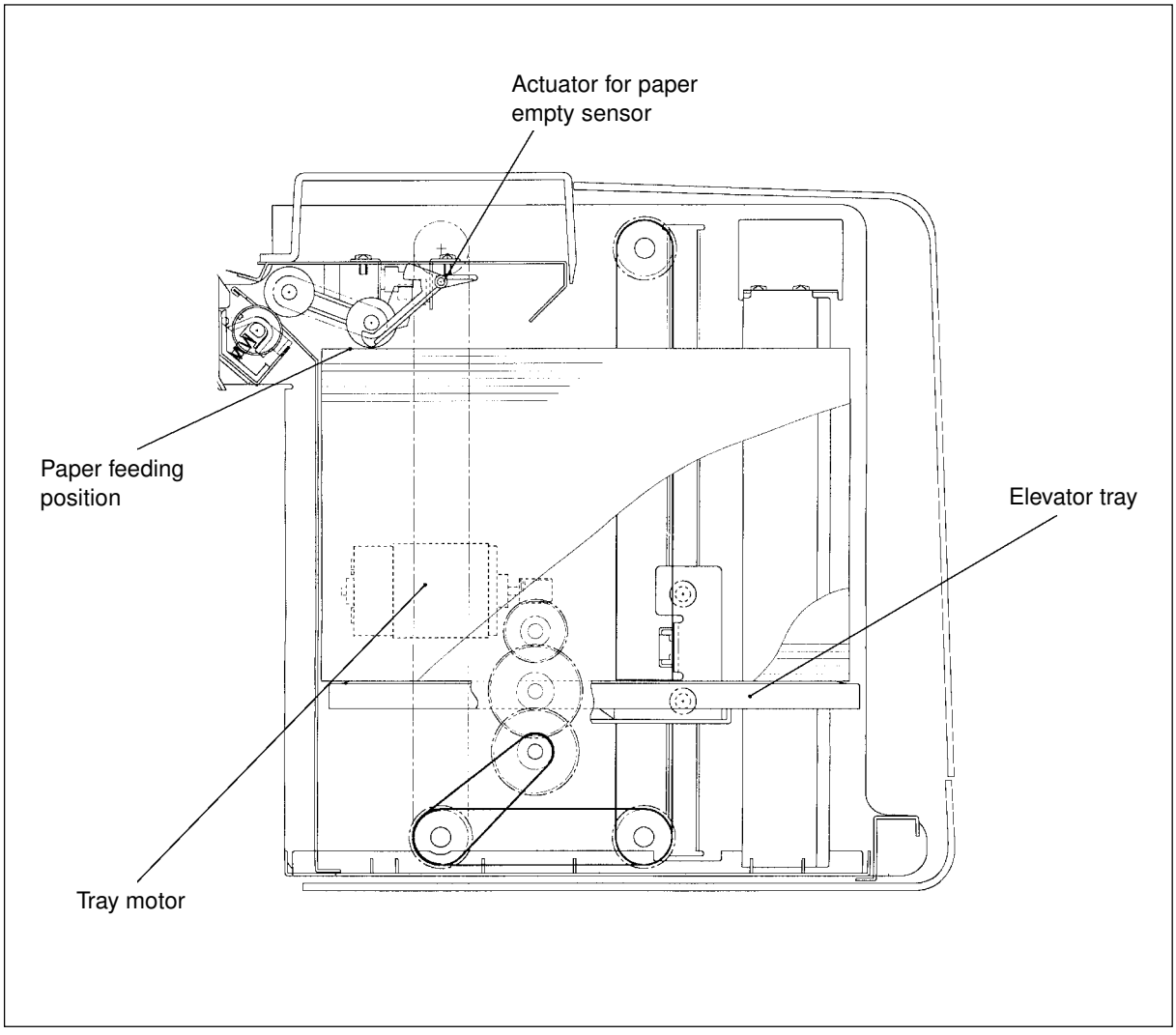

The ADD PAPER message of the copier also flashes when this large capacity feeder is in one of the following conditions:

- When the paper supply door is opened while the copier is in the ready condition.
- When the elevator tray is moving up.
- When a paper misfeed has occurred in the this large capacity feeder. (In this case, the elevator tray moves down.)

After opening the paper supply door, paper should be added and the paper supply door closed, then the elevator tray is automatically moved up. When the paper on the elevator tray pushes up the actuator of the paper empty sensor, the "paper empty" condition is cleared.

## 4.2 Paper Feeding Operation

After having added paper on the elevator tray, when the paper-supply door is closed, the tray motor rotates in such a direction as to raise the elevator tray. When it reaches the paper feeding position, the tray motor stops rotating.

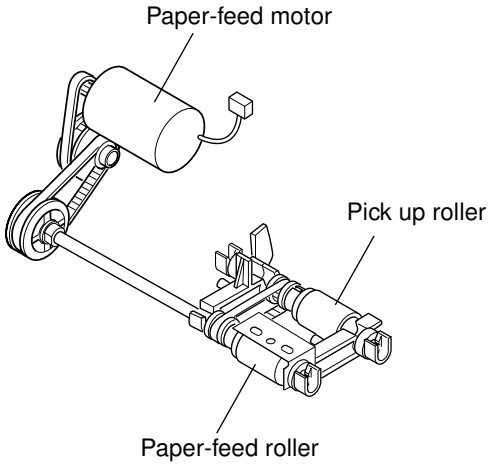



Under this condition, if the START key of the copier is pressed, the paper-feed motor rotates, causing the pick-up roller sends the paper to the transport roller, and then stops rotating. The transport roller sends the paper to the aligning roller. A fixed period of time after the trailing edge of the paper passes the copier's transport switch, the paper feed motor will rotate, causing the same procedure to be repeated for the number of copies specified.

## 4.3 Paper Feed Drive System

As shown in Fig. 4.3, when the paper-feed motor rotates in the paper feeding direction, its rotation is transmitted through pulleys and timing belts to the pulley drive shaft. The rotation is further transmitted through a pulley and timing belt to the feed roller shaft and the feed roller is rotated.

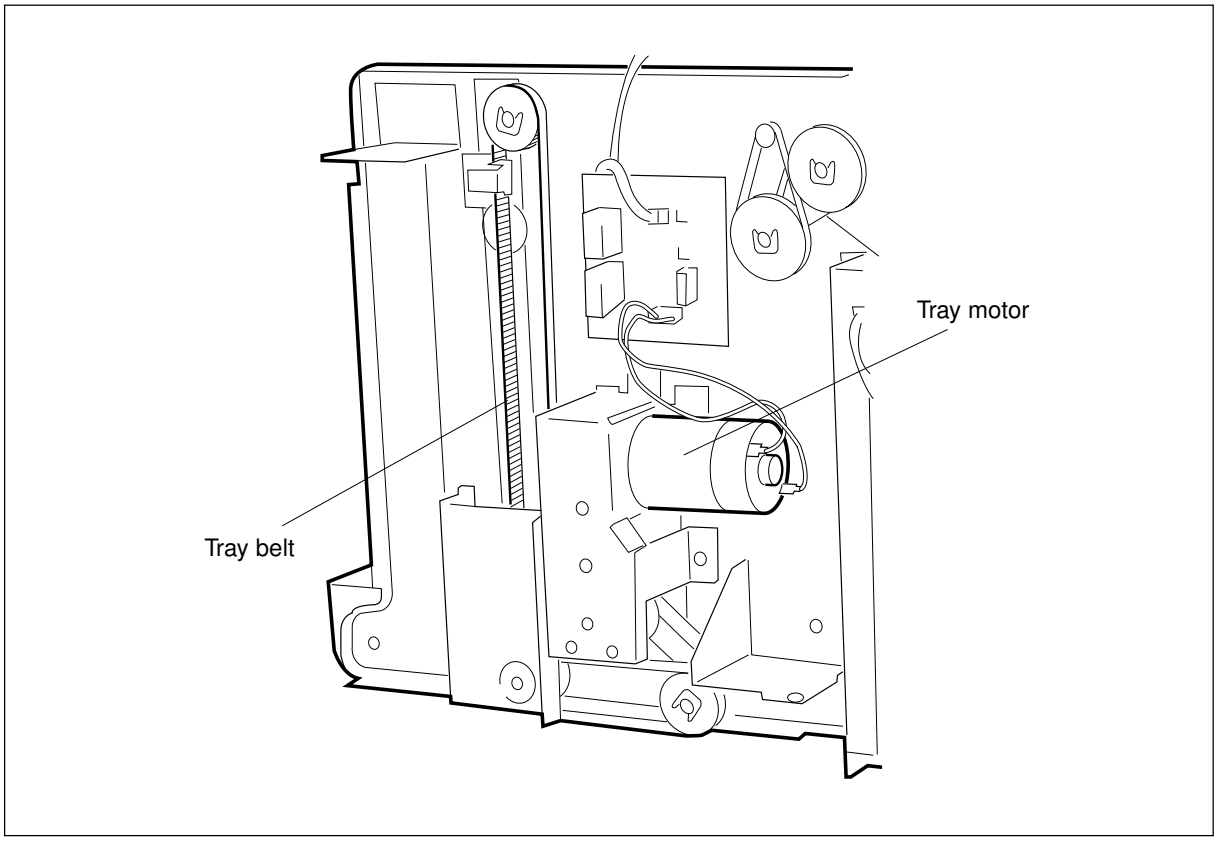
When the paper-feed roller is rotated, a sheet of paper activates paper sensor as described in the preceding section. The paper-feed motor is then turned off to stop the rotation of the feed roller.



## 4.4 Elevator Tray Operation

With the copier's power turned on, when the paper-supply door is closed, the tray motor rotates clockwise as seen at its shaft side, causing the elevator tray to rise by means of timing belts and pulleys.
When the paper on the tray pushes up the actuator of the tray-up sensor, causing the sensor to be turned on, which in turn off the tray motor.

Copying is started, and after 10 – 20 sheets of paper have been fed in, the pick-up roller lowers along with the actuator of the tray-up sensor. When the tray-up sensor detects this, it causes the tray motor to rotate, making the tray to rise 2 – 3 mm.




This incremental rising of 2 – 3 mm is repeated many times, and when the paper supply on the tray finally runs out, the actuator of the empty sensor drops in the opening in the tray. The empty sensor then detects this and the copier displays ADD PAPER. Also, the tray motor is rotated counterclockwise as seen at its shaft side, causing the elevator tray to move down, and when the tray pushes on the lower limit sensor, the tray motor stops rotating.

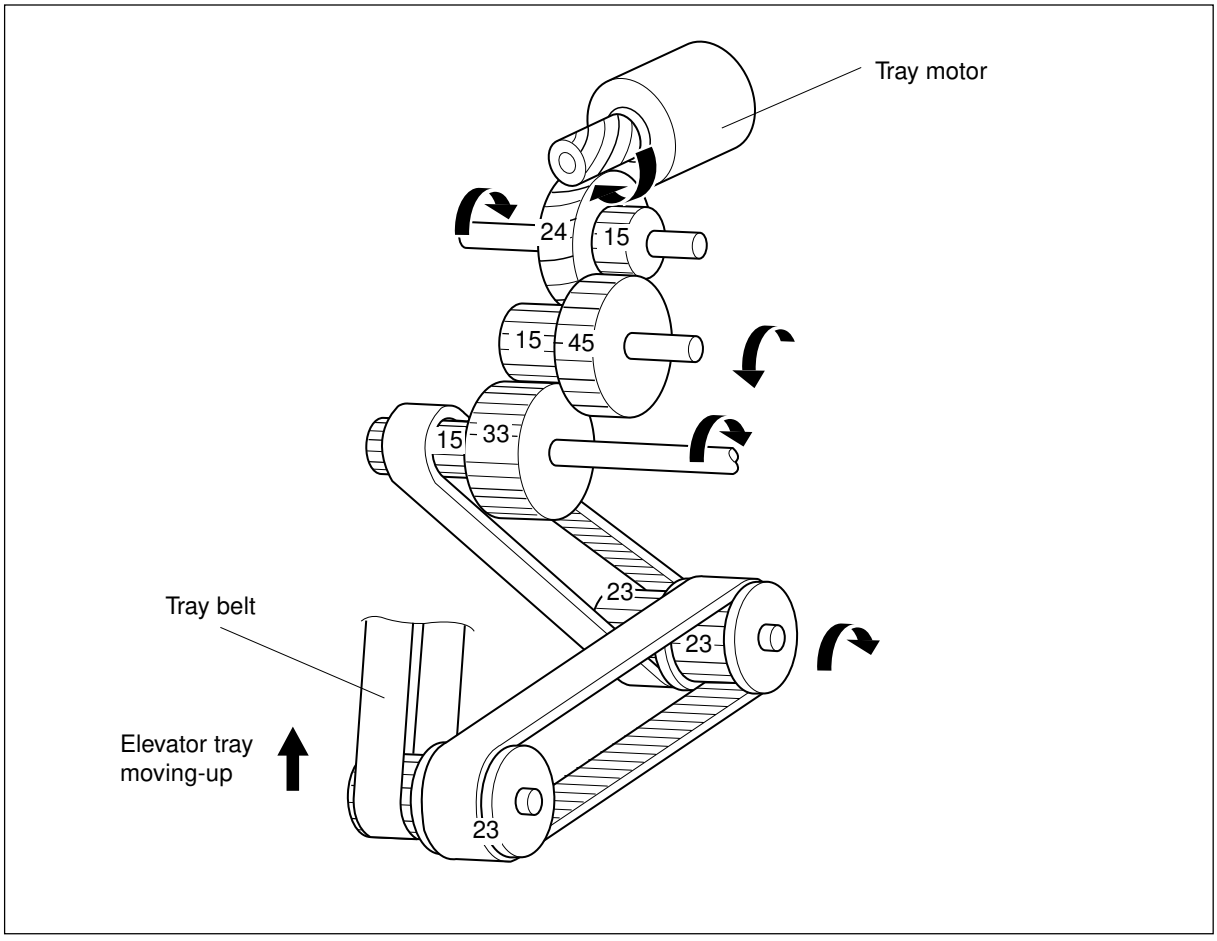
While the elevator tray is moving down, opening the paper-supply door will cause the tray motor to stop immediately. After paper is added and the paper-supply door is closed, the tray motor rotates in reverse, causing the elevator tray to move up to the paper feeding position.

## 4.5 Elevator Tray Drive System

The rotation of the tray motor is transmitted through pulleys and timing belts to move up and down the elevator tray.

### 4.5.1 Elevator tray rising operation

When the tray motor rotates clockwise as seen from the motor shaft, each gear of the tray motor unit rotates in the direction of the arrow as shown in the drawing below to raise the elevator tray through the tray belt.




### 4.5.2 Elevator tray lowering operation

The tray motor rotates in a direction reverse to that described in Section 4.5.1, causing the elevator tray to move down in a similar procedure.

# 5. REPLACEMENT AND ADJUSTMENT OF VARIOUS PARTS

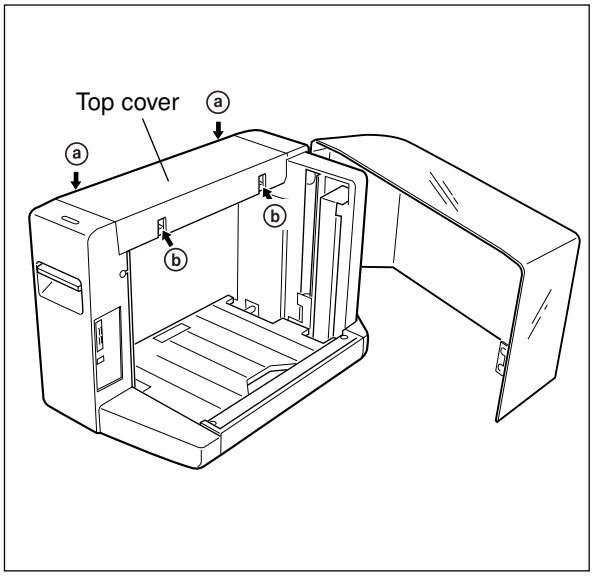
## 5.1 Removing Covers

### [A] Top cover

(1) Open the paper-supply door.

(2) Remove the two M4 screws (arrows ⓐ) from the top side, and loosen the two M4 screws (arrows ⓑ) from the paper-supply door side.

(3) Remove the top cover.



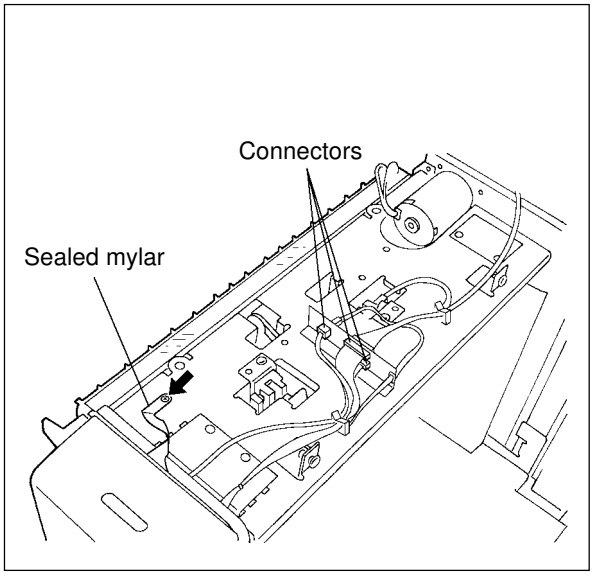

### [B] Front cover

(1) Open the paper-supply door.

(2) Remove the top cover. (▶ Ch. 5.1 [A])

(3) Remove the sealed mylar with one screw.

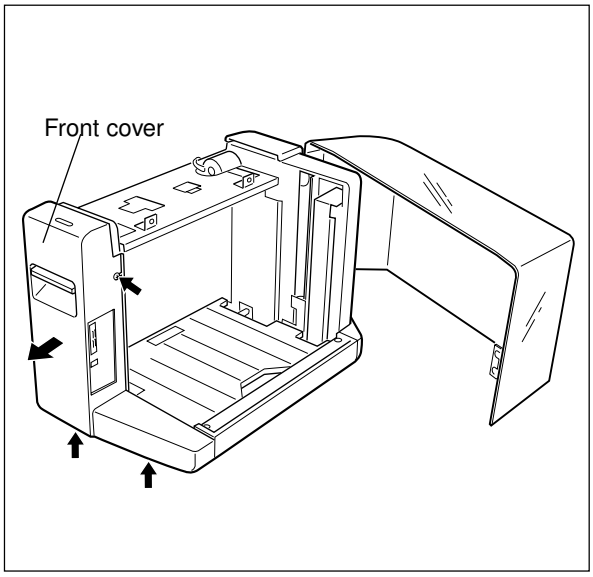
(4) Remove the three relay connectors.




(5) Loosen two screws from the lower side, and loosen one screw from the paper-supply door side.

(6) Slide out the front cover toward you.

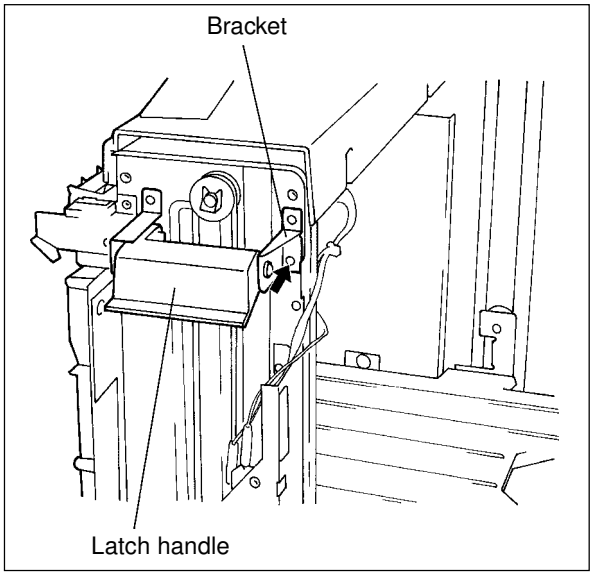
**Note:** Be careful as the front cover has electrical parts attached on its inside surface.



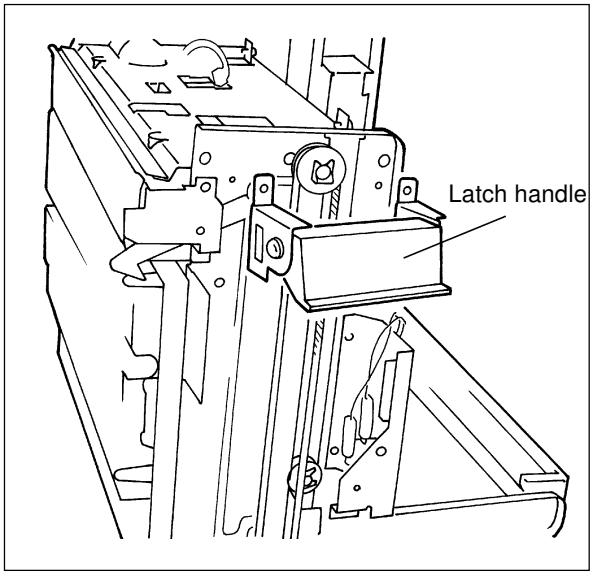
### [C] Latch handle

(1) Remove the front cover. (▶ Ch. 5.1 [B])

(2) Remove one screw to remove the bracket holding one side of the latch handle.



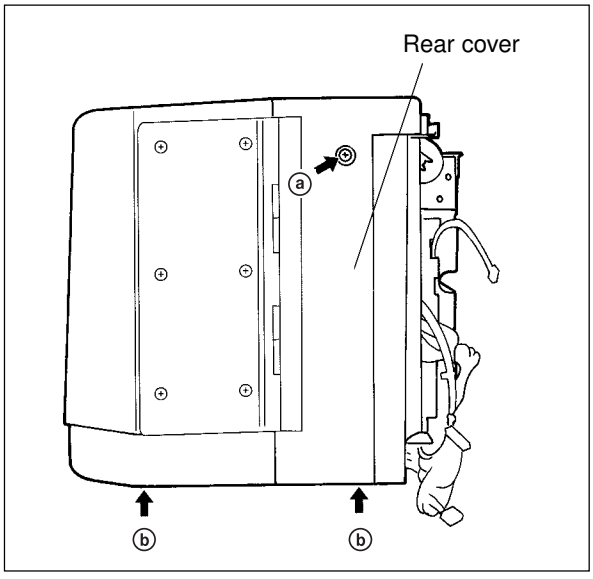

(3) Remove the latch handle.




### [D] Rear cover

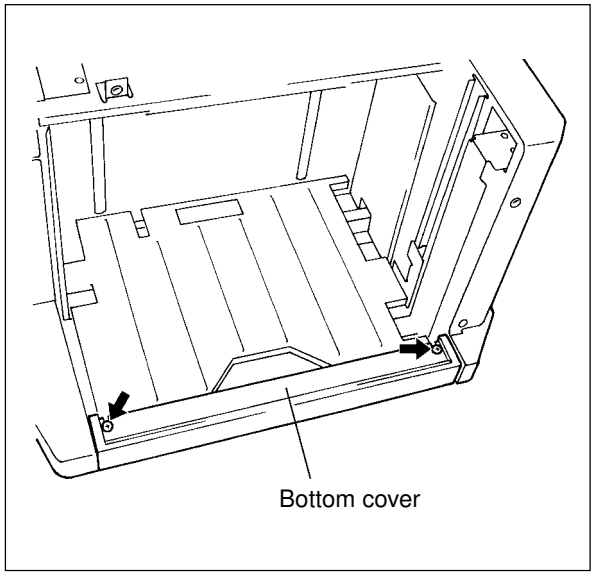
(1) Remove the M4 screw (arrow ⓐ), and loosen the two M4 screws (arrows ⓑ).

(2) Slide out the rear cover toward you.

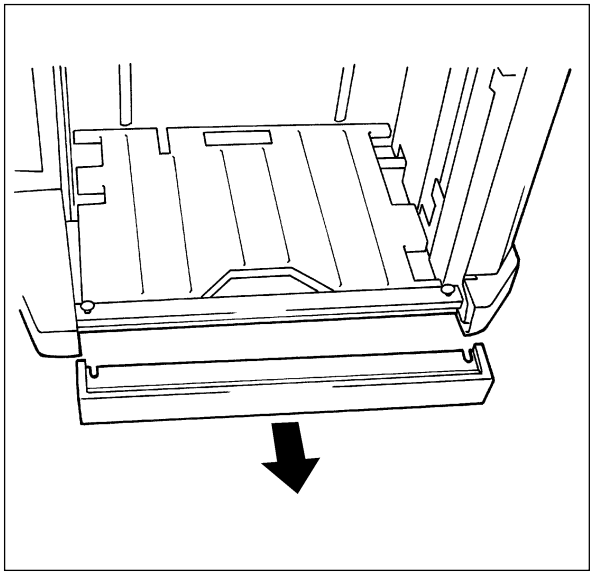


### [E] Bottom cover

(1) Open the paper-supply door.
(2) Loosen the two screws.

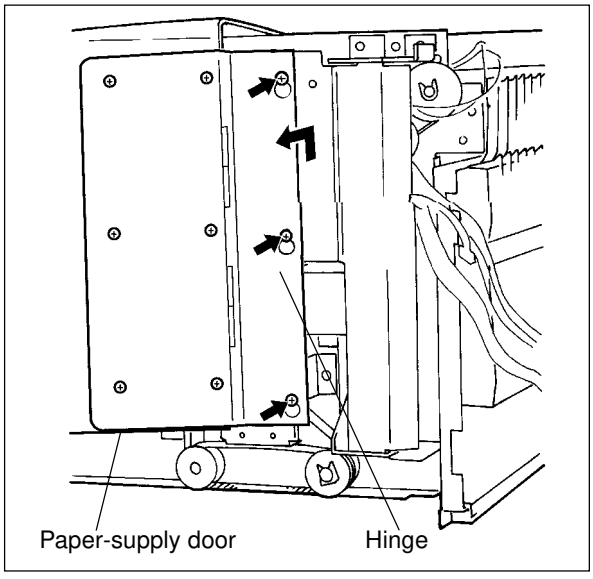



(3) Slide out the bottom cover toward you.

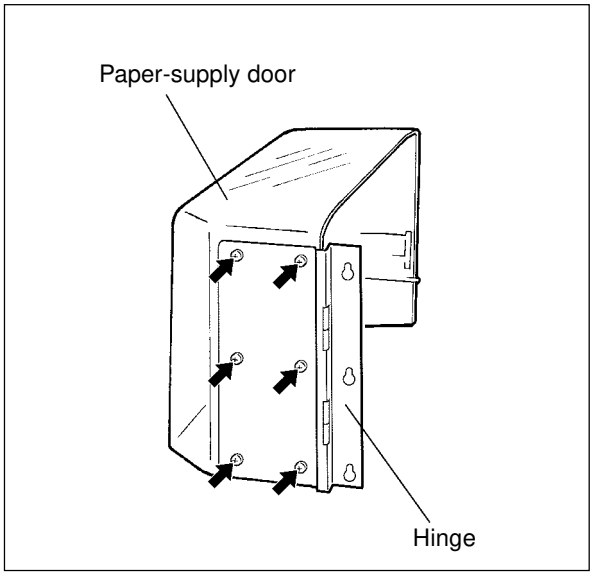


### [F] Paper-supply door

(1) Remove the rear cover. (▶ Ch. 5.1 [D])
(2) Open the paper-supply door.
(3) Loosen the three M3 screws fastening the hinge.
(4) Slide the paper-supply door (together with the hinge) upward to detach the hinge from its screws.

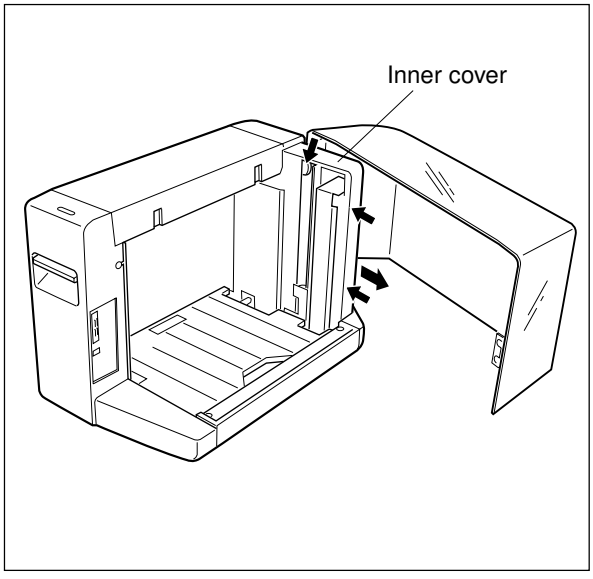


(5) Unscrew the six M4 screws fastening the paper-supply door to remove the hinge from the paper-supply door.




**[G]Inner cover**

(1) Open the paper-supply door.
(2) Remove three M4 screws.
(3) Slide out the inner cover toward you.



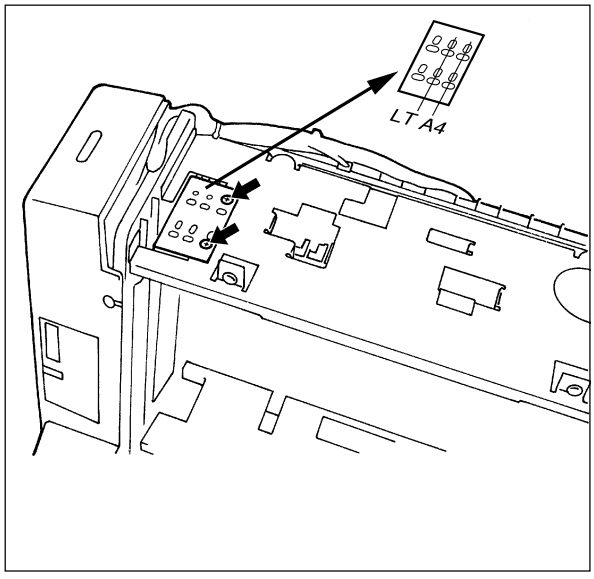
## 5.2 Paper-Edge Guides

**Note:** Both front and rear paper-edge guides are installed at different positions depending upon the size of the paper selected. The base cover, elevator tray and support brackets are each provided with mounting slots at the front and rear sides in positions corresponding to the various sizes of paper. The screws are also mounted at different positions correspondingly.

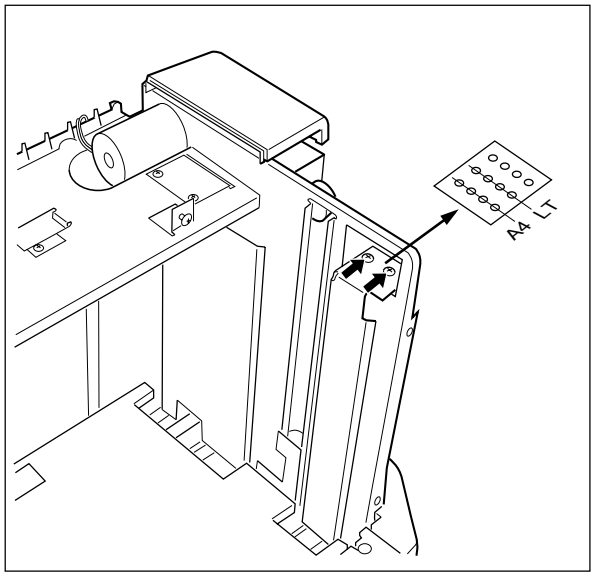
- A4 size .....Outer slots in the frame (front and rear)
- LT size .....Middle slots (front and rear)

**Note:** The front and rear paper-edge guides must be set parallel to each other, and the distance between their inner surfaces must be the paper width plus 0.5 – 1.0 mm.

(1) Remove the top cover. (▶ Ch. 5.1 [A])
(2) Remove the inner cover. (▶ Ch. 5.1 [G])
(3) Remove the two M3 screws fastening the front paper-edge guide.
(4) Lifting the paper-edge guide up slightly, insert it into the A4 or Letter size positioning groove, and after confirming the screw hole positions, tighten the screws.

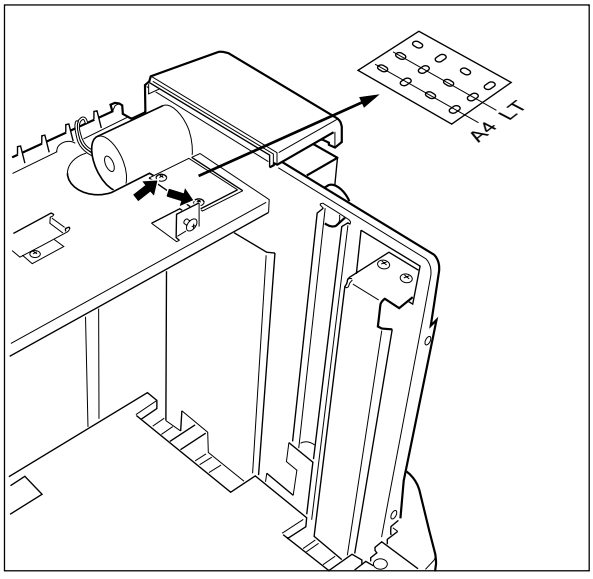


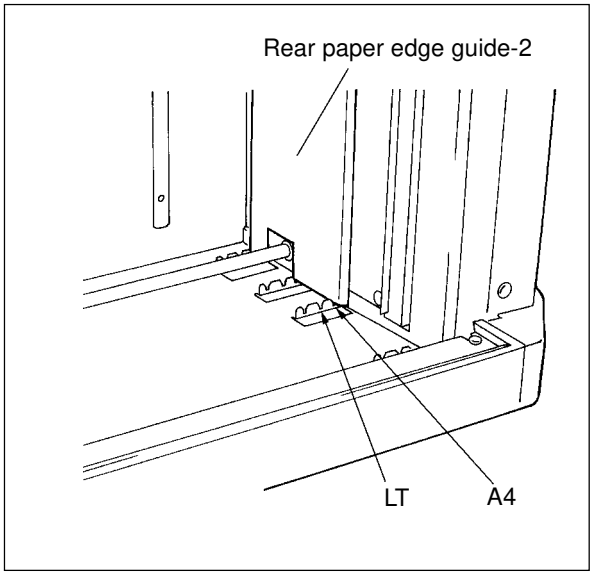

(5) Remove the two M3 screws fastening the rear paper-edge guide-1 located near the paper-supply door.
(6) Insert the rear paper-edge guide-1 into the A4 or Letter size positioning groove, and after confirming the screw hole positions, tighten the screws.



(7) Remove the two M3 screws fastening the rear paper-edge guide-2.
(8) Insert the rear paper-edge guide-2 into the A4 or Letter size positioning groove, and after confirming the screw hole positions, tighten the screws.

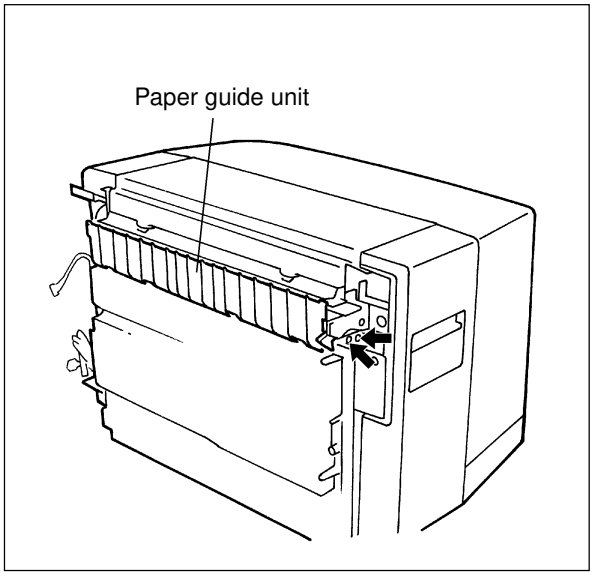
**Note:** If the paper size is not consistent, adjust the position of the guides by using the elongated holes. Normally, the screws are tightened in the round part of the screw holes.



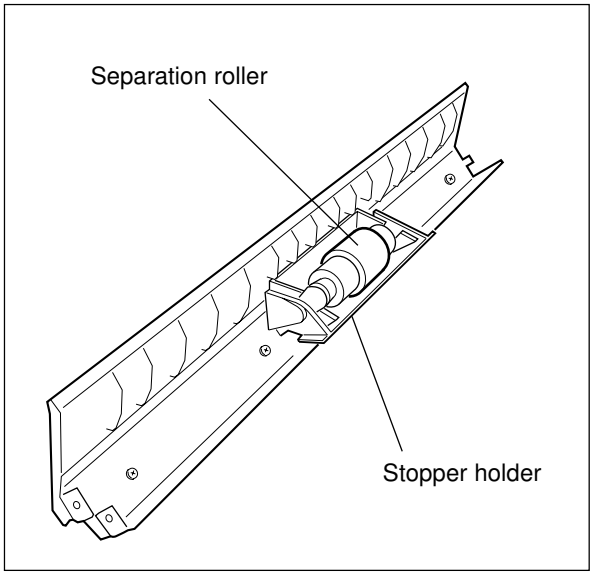



## 5.3 Separation Roller

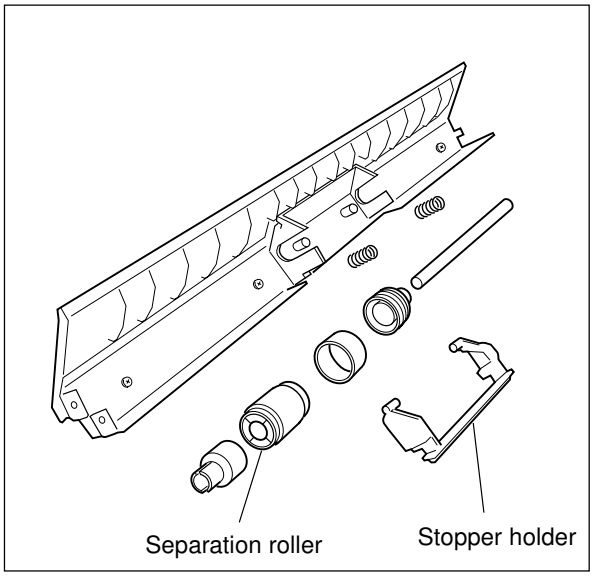
(1) Remove the two M3 screws to remove the paper guide unit.




(2) Remove the stopper holder.

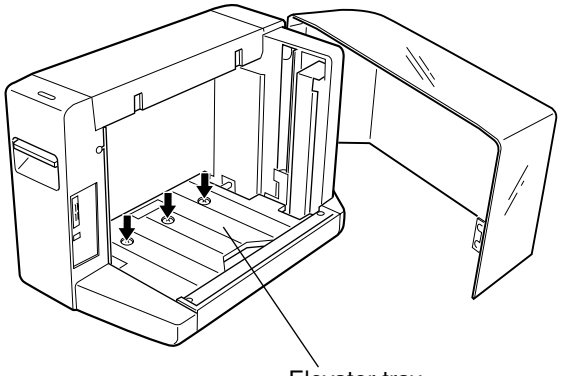



(3) Remove the separation roller.



## 5.4 Removing the Elevator Tray

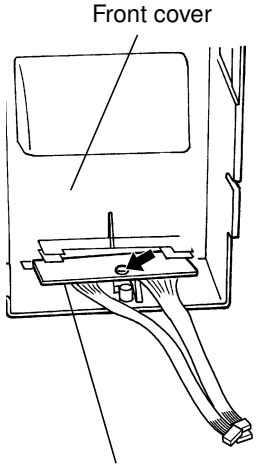
(1) Open the paper-supply door.
(2) Remove the three M4 screws from the top.
(3) Lift the elevator tray to take it off.




## 5.5 Replacing Electrical Parts

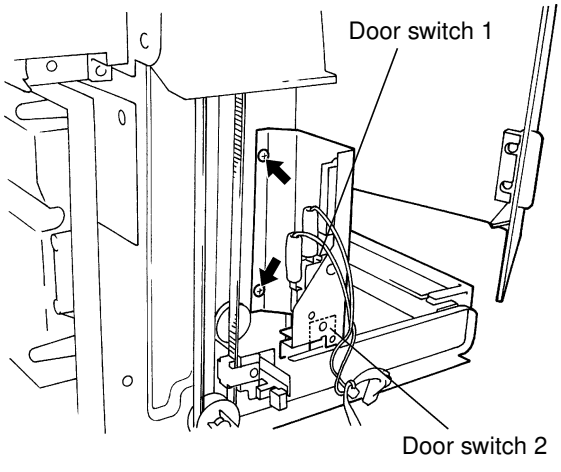
### [A] Lower limit sensor PC board

(1) Remove the top cover. (▶ Ch. 5.1 [A])
(2) Remove the front cover. (▶ Ch. 5.1 [B])
(3) Remove the M3 (PTBR) screw fastening the lower limit sensor PC board, and pull out the PC board from where it is held in the cover to take it off.

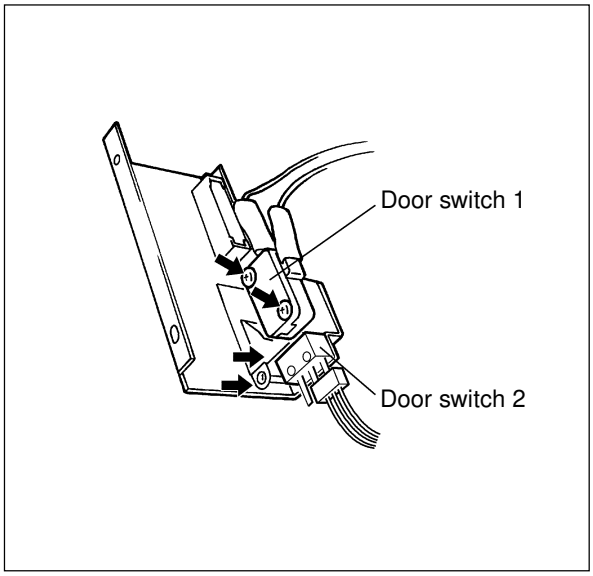



### [B] Door switch 1, switch 2

(1) Remove the top cover. (▶ Ch. 5.1 [A])
(2) Remove the front cover. (▶ Ch. 5.1 [B])
(3) Disconnect the two connectors of the door switch 1 and 2.
(4) Remove two M3 screws, and remove the bracket on which the door switch 1, door switch 2 are mounted.

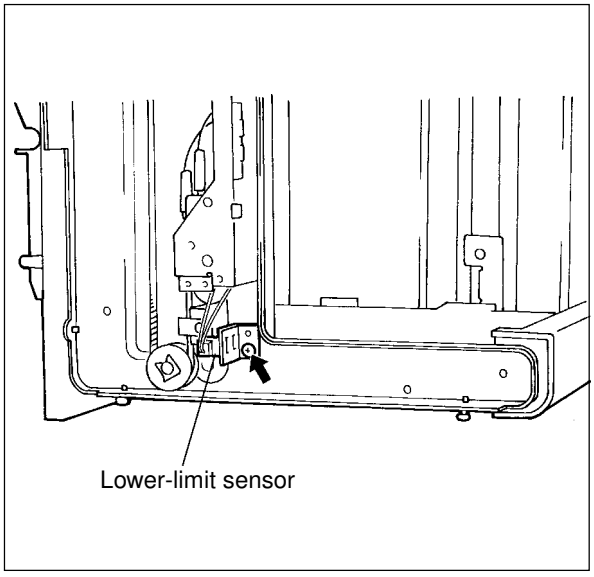


(5) Remove two M3 screws to remove the door switch 1.
(6) Remove two M2 screws to remove the door switch 2.

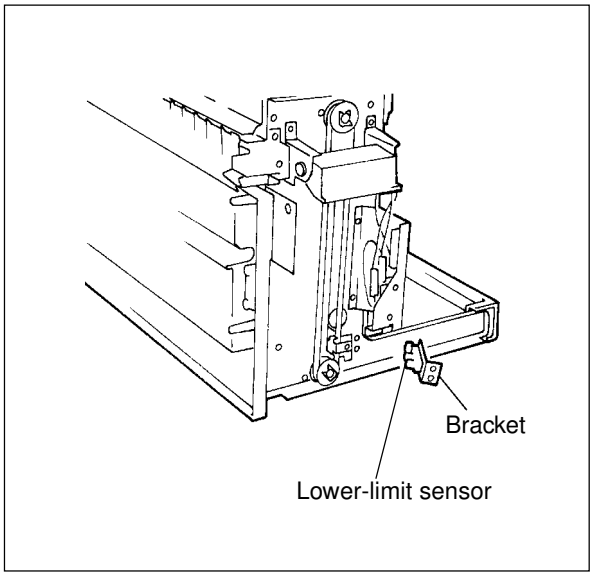



**[C] Lower-limit sensor**

(1) Remove the top cover. (▶ Ch. 5.1 [A])
(2) Remove the front cover. (▶ Ch. 5.1 [B])
(3) Remove the M3 screw to remove the bracket on which the lower-limit sensor is installed.
(4) Disconnect the connector of the lower-limit sensor.



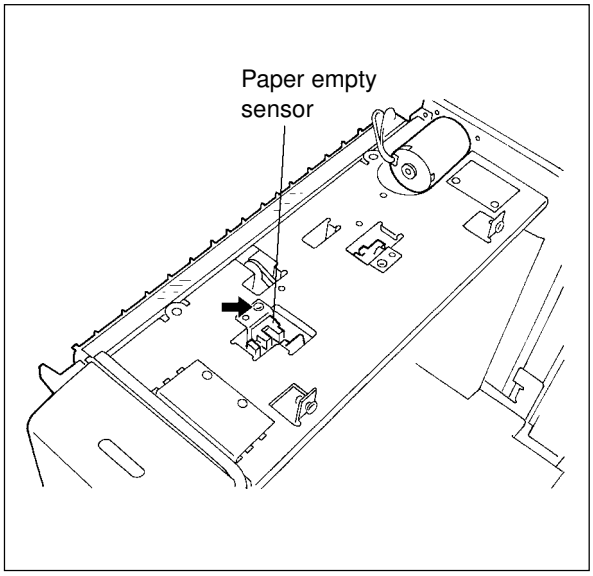

(5) Remove the lower-limit sensor from the bracket.



### [D] Paper empty sensor

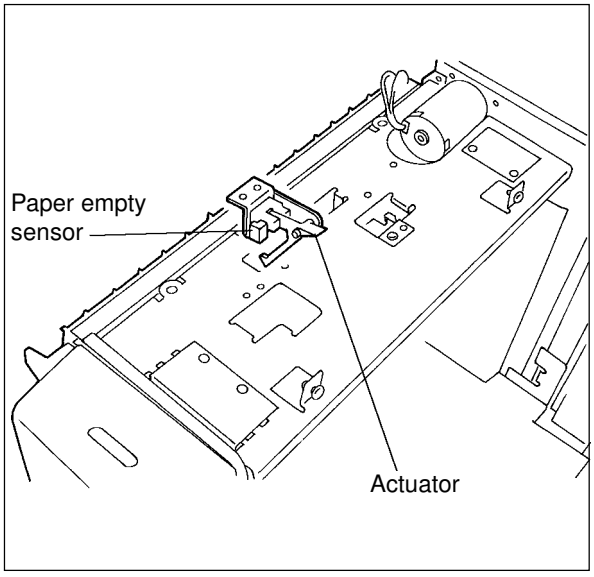
(1) Remove the top cover. (▶ Ch. 5.1 [A])

(2) Remove one M3 screw to remove the bracket on which the paper empty sensor is installed. Be careful as its actuator is also held by the bracket.

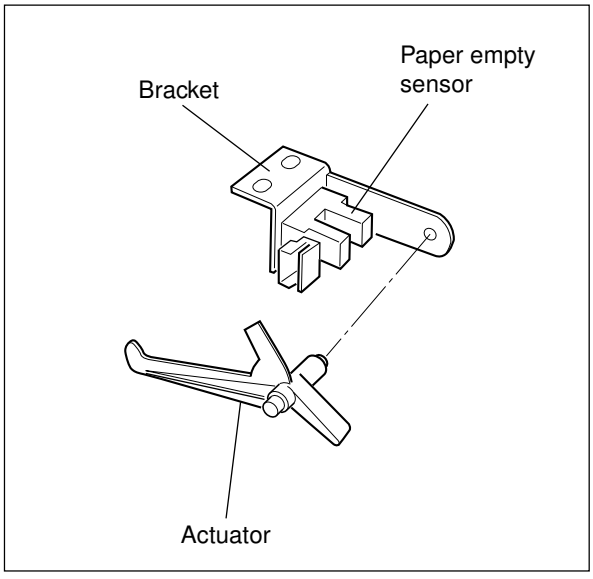



(3) Remove the actuator from its bracket.

(4) Disconnect the connector from the sensor.

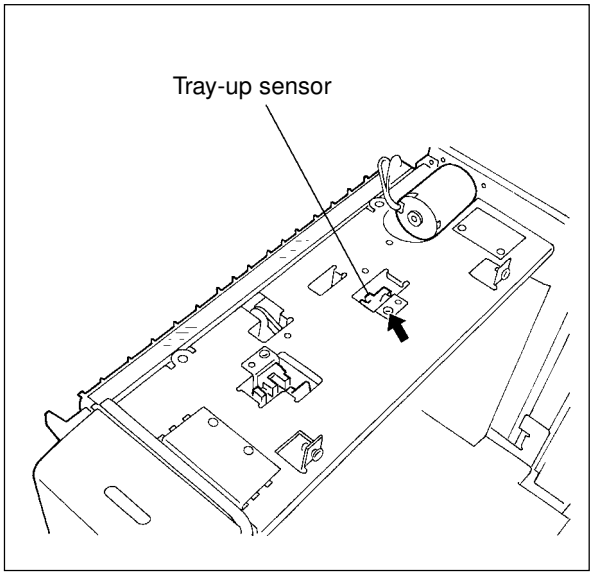



(5) Remove the paper empty sensor from its bracket.

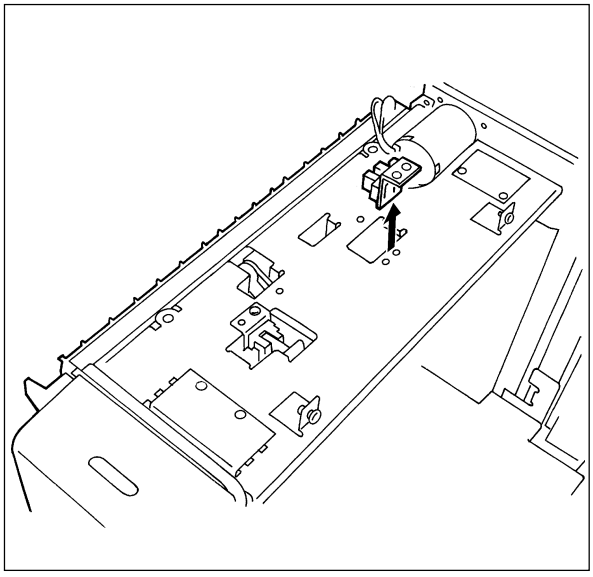


### [E] Tray-up sensor

(1) Remove the top cover. (▶ Ch. 5.1 [A])
(2) Remove one M3 screw to remove the bracket on which the tray-up sensor is installed.

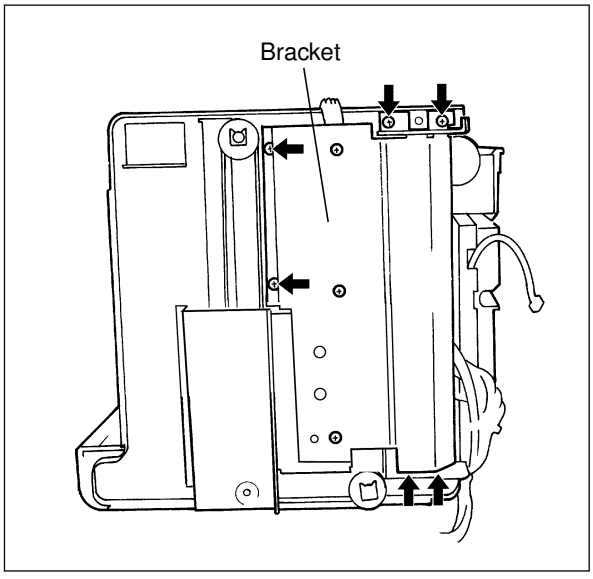



(3) Disconnect the connector from the sensor.
(4) Remove the tray-up sensor from the bracket.

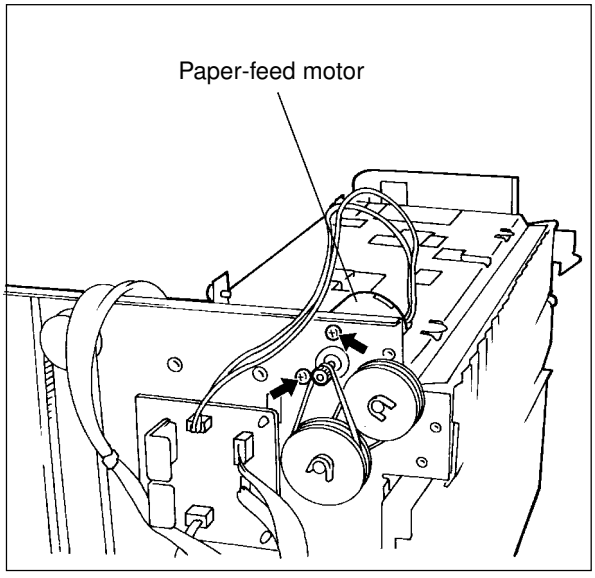


### [F] Paper-feed motor

(1) Remove the top cover. (▶ Ch. 5.1 [A])
(2) Remove the rear cover. (▶ Ch. 5.1 [D])
(3) Remove the inner cover. (▶ Ch. 5.1 [G])
(4) Remove the six M3 screws to remove the bracket which covers the driving section.

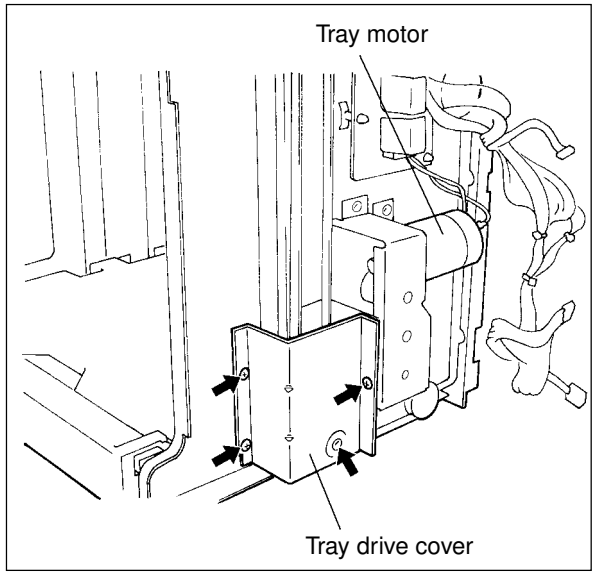


(5) Disconnect the connector of the paper-feed motor from the PC board.
(6) Remove the two M3 screws to take off the paper-feed motor.

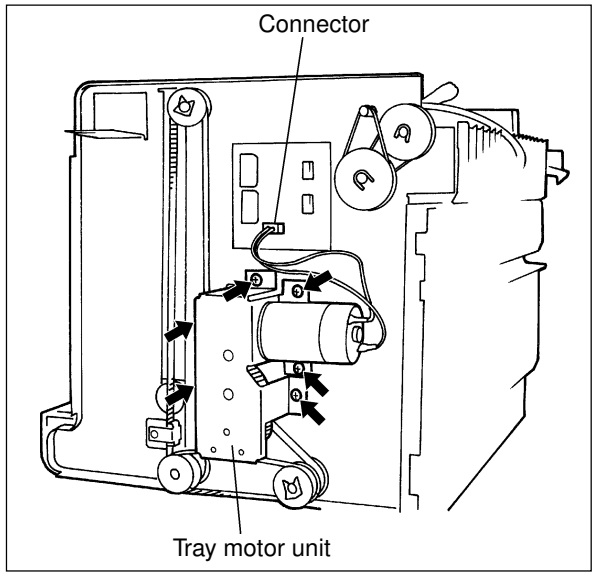



**[G] Tray motor**

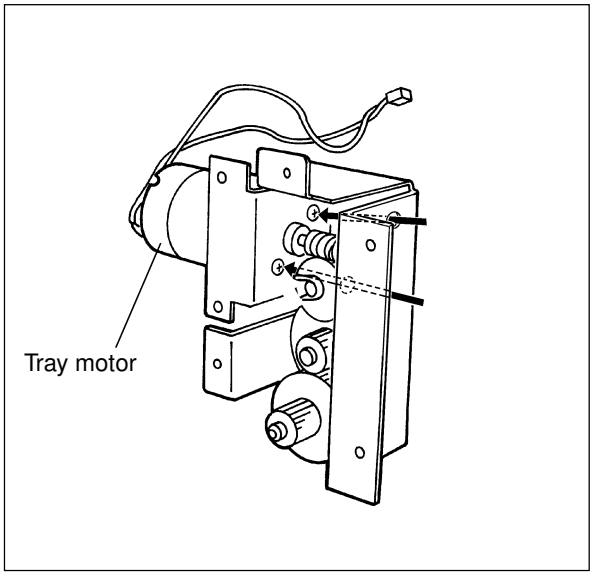
(1) Remove the four M3 screws to remove the tray drive cover.




(2) Disconnect the tray motor connector from the PC board.
(3) Remove the six M3 screws to remove the tray motor unit.



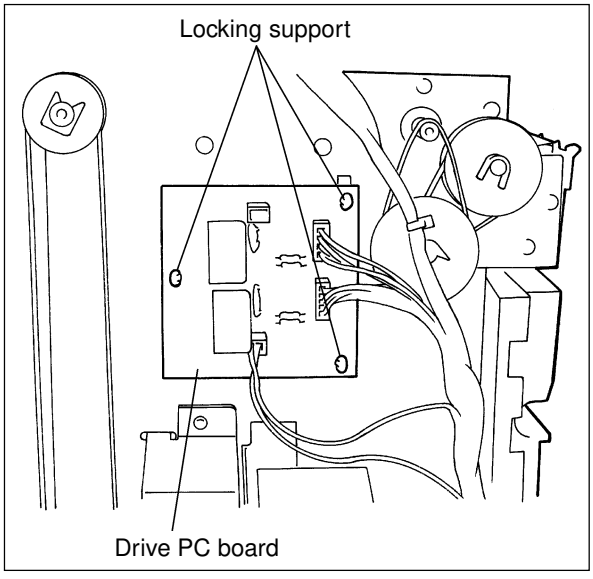
(4) Remove the two M3 screws to remove the tray motor from its bracket.




**[H] Drive PC board**

(1) Disconnect the connectors from the drive PC board.

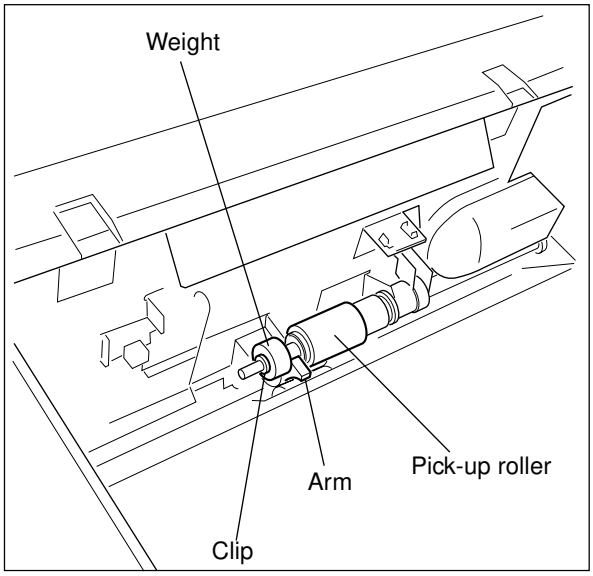
(2) Remove the drive PC board by unlocking it from its three locking supports.



## 5.6 Replacing the Pick-up Roller and the Paper Feed Roller

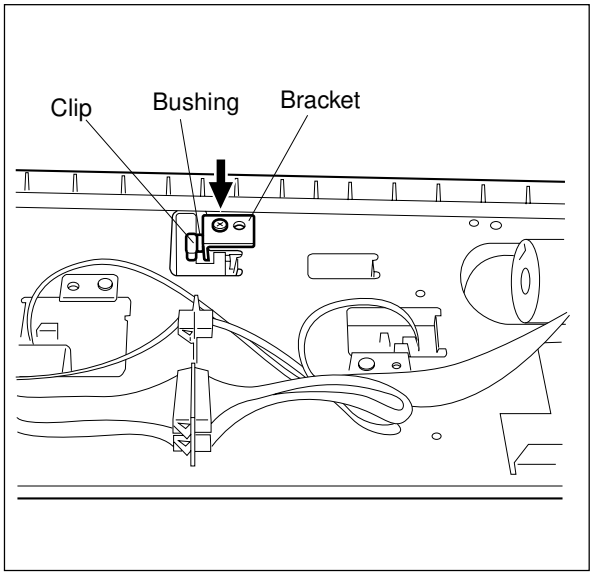
### [A] Pick-up roller

(1) Lower the elevator tray to the bottom.
(2) Remove the top cover. (▶ Ch. 5.1 [A])
(3) Remove the paper empty sensor.
(▶ Ch. 5.5 [D])
(4) Remove the clip.
(5) Remove the weight from the shaft.
(6) Remove the shaft from the arm.
(7) Remove the pick-up roller from its shaft.

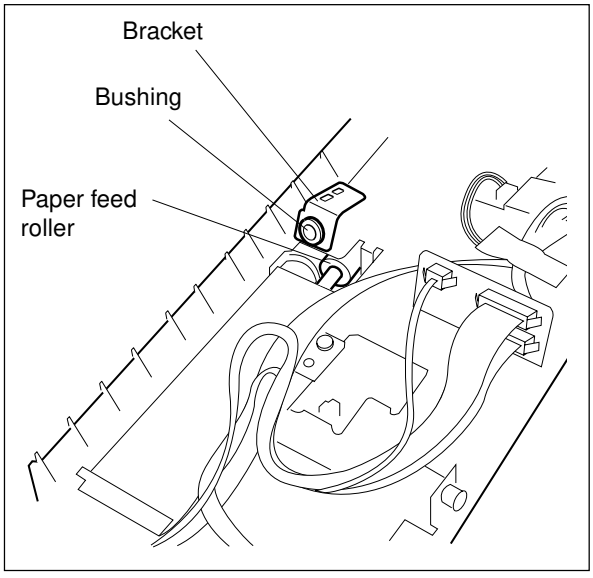



### [B] Paper feed roller

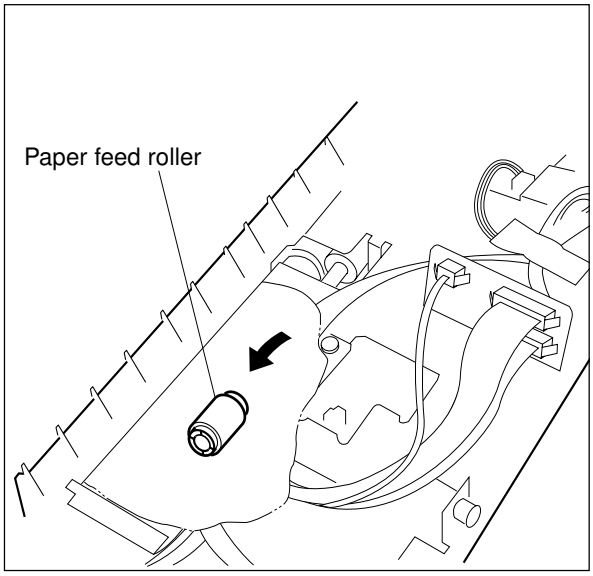
(1) Lower the elevator tray to the bottom.
(2) Remove the top cover. (▶ Ch. 5.1 [A])
(3) Remove the paper-empty sensor.
(▶ Ch. 5.4 [D])
(4) Open the paper-supply door.
(5) Remove the clip.
(6) Remove the bracket which is holding the paper-feed roller shaft (one M3 screw) and bushing.




(7) Remove the arm from the shaft.

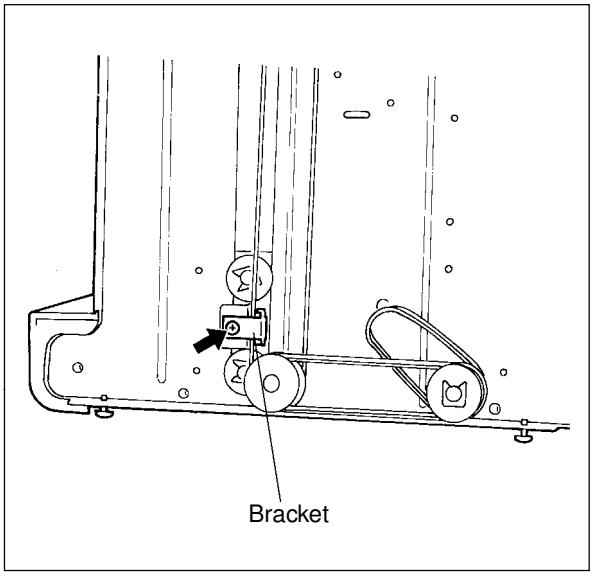


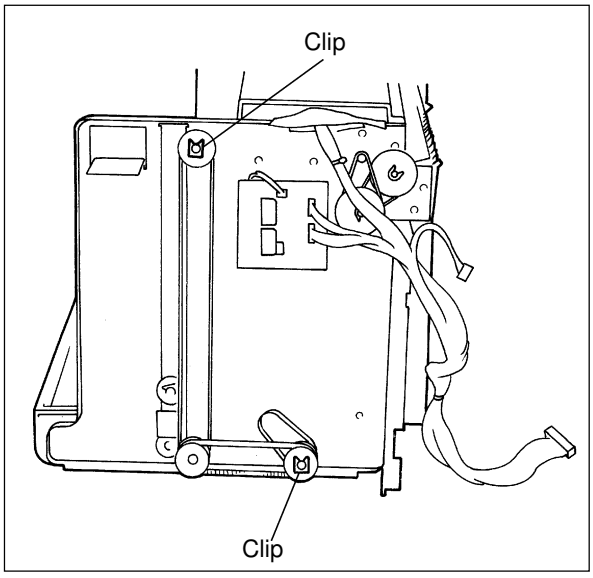
(8) Slide out the paper feed roller along the paper-feed roller shaft.



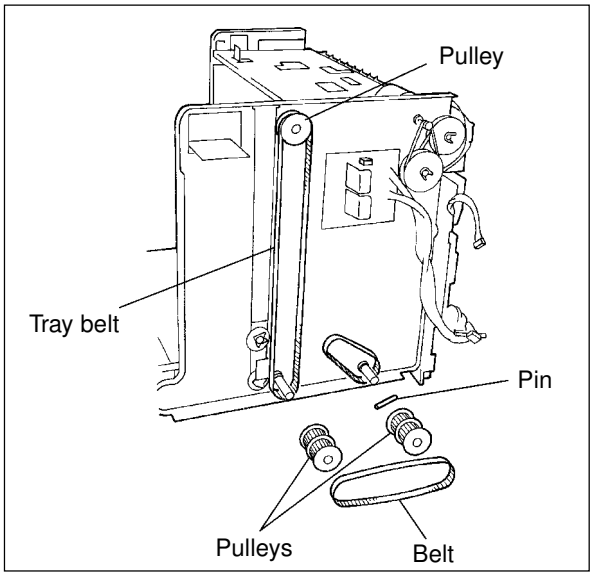
## 5.7 Replacing the Elevator Tray Belt

(1) Remove the top cover. (▶ Ch. 5.1 [A])
(2) Remove the front cover. (▶ Ch. 5.1 [B])
(3) Remove the rear cover. (▶ Ch. 5.1 [D])
(4) Remove the inner cover. (▶ Ch. 5.1 [G])
(5) Remove the paper-supply door. (▶ Ch. 5.1 [F])
(6) Remove the six M3 screws to remove the bracket which covers the driving section. (▶ Ch. 5.5 [F] (4))
(7) Remove the four M3 screws to remove the tray drive cover. (▶ Ch. 5.5 [G] (1))
(8) Disconnect the tray motor connector from the PC board. (▶ Ch. 5.5 [G] (2))
(9) Remove the six M3 screws to remove the tray motor unit. (▶ Ch. 5.5 [G] (3))
(10) Remove one M3 screw to remove the bracket which is holding the tray belt.
(11) Remove the two clips which are fixing the upper and lower pulleys.



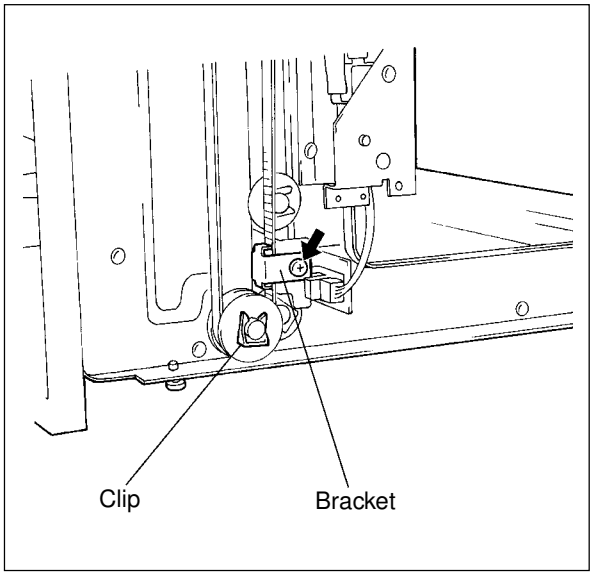




(12) Remove the timing belts and the pulleys.

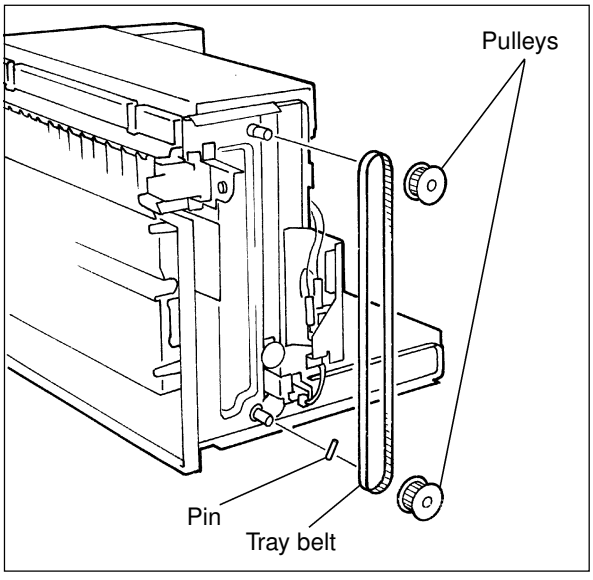


(13) Remove the latch handle. (▶ Ch. 5.1 [C])

(14) Remove one M3 screw to remove the bracket which is holding the tray belt.



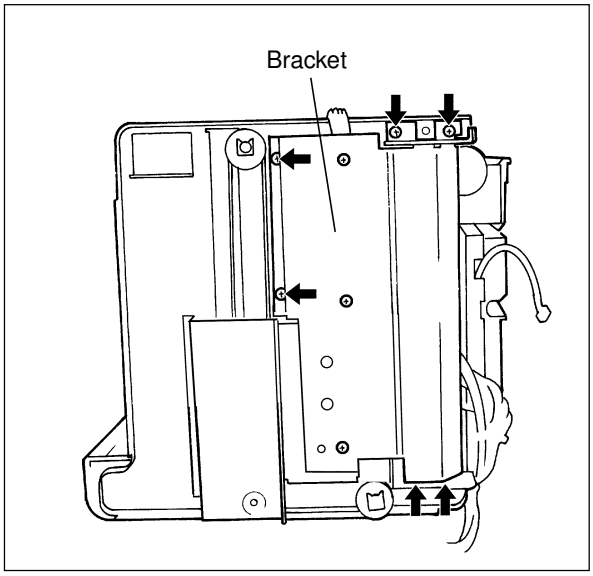

(15) Remove the two clips which are fixing the upper and lower pulleys, to remove the tray belt.



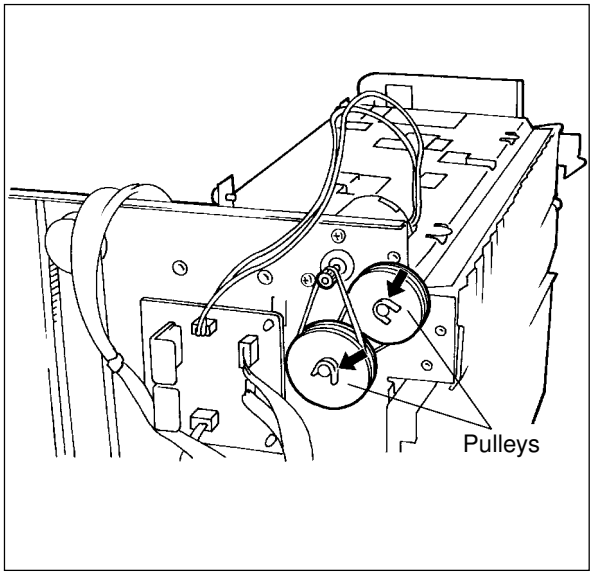
## 5.8 Replacing the Gears and Pulleys of the Drive Gear Unit

### [A] Paper-feed drive section

(1) Remove the top cover. (▶ Ch. 5.1 [A])
(2) Remove the rear cover. (▶ Ch. 5.1 [D])
(3) Remove the paper supply door. (▶ Ch. 5.1 [F])
(4) Remove the six M3 screws to remove the bracket which covers the drive section.

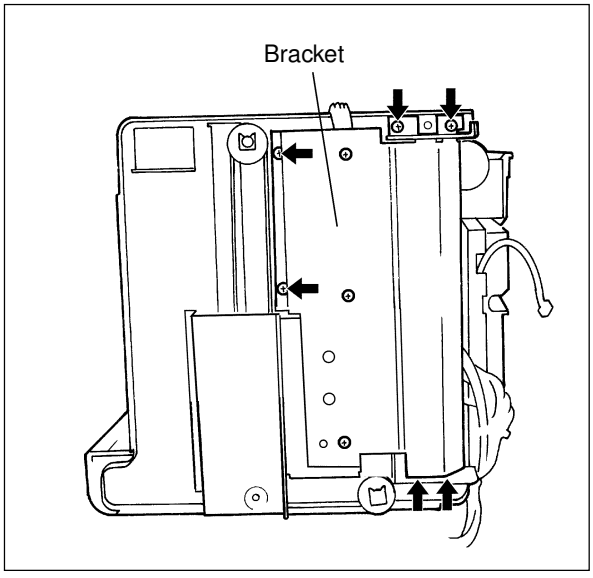



(5) Remove the two clips to take out the pulleys and the timing belts.



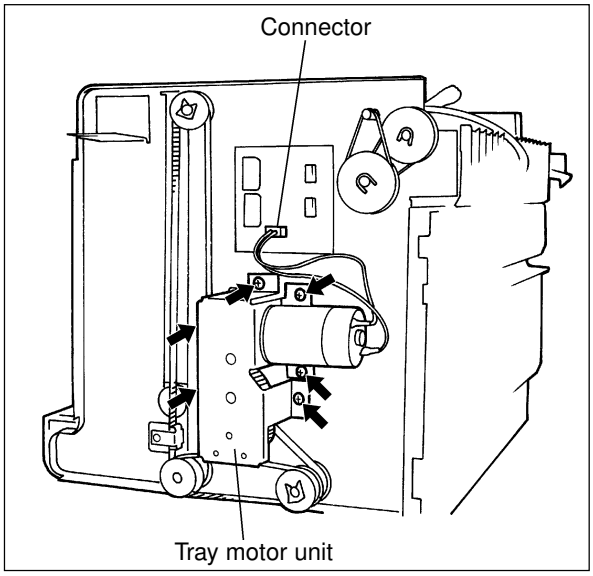

### [B] Tray drive section

(1) Remove the top cover.
(2) Remove the rear cover.
(3) Remove the paper supply door. (▶ Ch. 5.1 [F])
(4) Remove the six M3 screws to remove the bracket which covers the drive section.

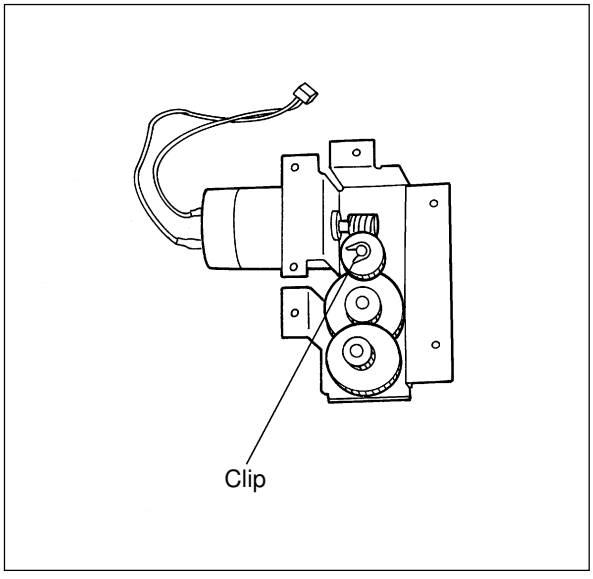


(5) Disconnect the tray motor connector from the PC board.

(6) Remove the six M3 screws to remove the tray drive cover.




(7) Remove the clip to remove the gears.



# 6. LUBRICATION

The teeth of the gears of the tray motor unit should be lubricated with sufficient amount of Molykote (but not with so much as to drip).