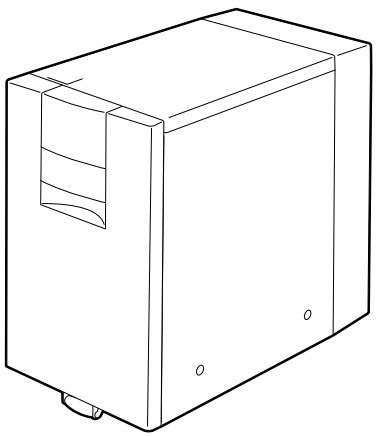
TOSHIBA

SERVICE MANUAL

LARGE CAPACITY FEEDER

MP-4004



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GENERAL PRECAUTIONS FOR INSTALLATION/SERVICE/ MAINTENANCE FOR LARGE CAPACITY FEEDER MP-4004

1) When installing the Large Capacity Feeder MP-4004 to the Equipment, be sure to follow the instructions described in the “Unpacking/Set-Up Procedure for the MP-4004” booklet which comes with each unit of the MP-4004.

2) Installed only by an authorized/qualified person.

3) When transporting/installing the MP-4004, employ two persons. The MP-4004 is fairly heavy and weights approximately 37 kg (82 lb), therefore pay full attention when handling it.

4) Before starting installation, servicing or maintenance work, be sure to turn off and unplug the equipment first.

5) Supplied with power from the equipment, requiring no additional power source.

6) Grounded to the specified positions on the machine frame.

7) When serving or maintaining, be careful about the rotating or operating sections such as gears, pulleys, sprockets, cams, belts, etc.

8) 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.

9) Basically, the machine should not be operated with any parts removed or disassembled.

10) Delicate parts for preventing safety hazard problems (such as thermofuses, door switches sensors, etc. if any) should be handled/installed/adjusted correctly.

11) 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.

12) Use suitable measuring instruments and tools.

13) 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.

14) For the recovery and disposal of used the large capacity feeder, consumable parts, packing materials, used batteries, and RAM-ICs including lithium batteries, it is recommended that the relevant local regulations/rules.

15) Check the procedures and perform them as described in the Service Manual.

16) Make sure you do not lose your balance.

17) Avoid exposure to your skin and wear protective gloves as needed.

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1. SPECIFICATIONS

Function

- Replenishing method
  Front loading method

- Paper
  Size: A4, LT
  Thickness: 64-209 g/m^2 (17-110 lbs. Index)

- Capacity of tray
  4,000 sheets (Stack height: within 428 mm)

- Dimensions
  326 (W) x 599 (D) x 617 (H) mm (when connected to the equipment)

- Weight
  Approx. 37 kg (82 lbs)

- Power supply
  DC5V, 24V (supplied from the equipment)

2. OUTLINE OF THE MACHINE

2.1 Front Sectional View

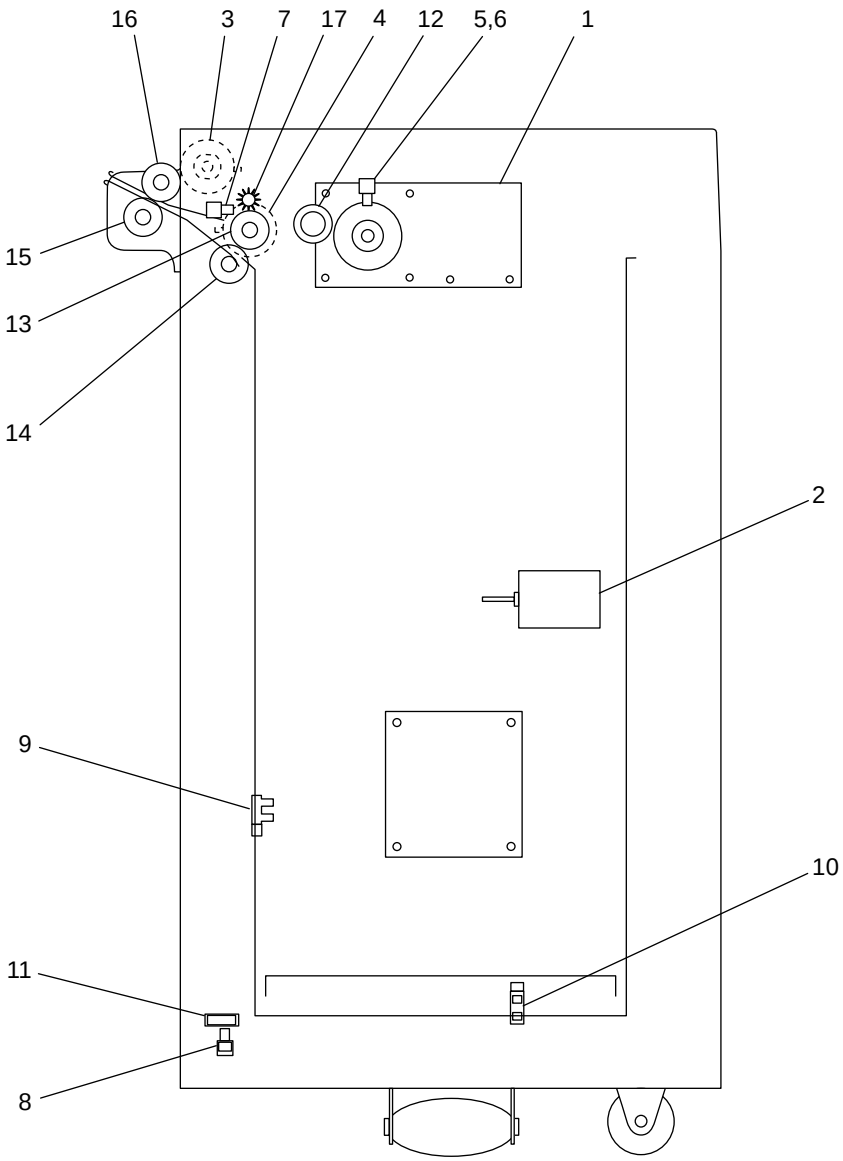


Fig. 2-1

NO.	NAME	NO.	NAME
1	Transport motor (M1)	10	Tray bottom sensor (S6)
2	Tray motor (M2)	11	Door switch (SW1)
3	Transport clutch (CL1)	12	Pickup roller
4	Feed clutch (CL2)	13	Feed roller
5	Empty sensor (S1)	14	Separation roller
6	Tray-up sensor (S2)	15	Transport roller
7	Feed sensor (S3)	16	Transport idler roller
8	LCF set sensor (S7)	17	Brush roller
9	Tray sensor (S5)		

2.2 Electrical Parts Layout

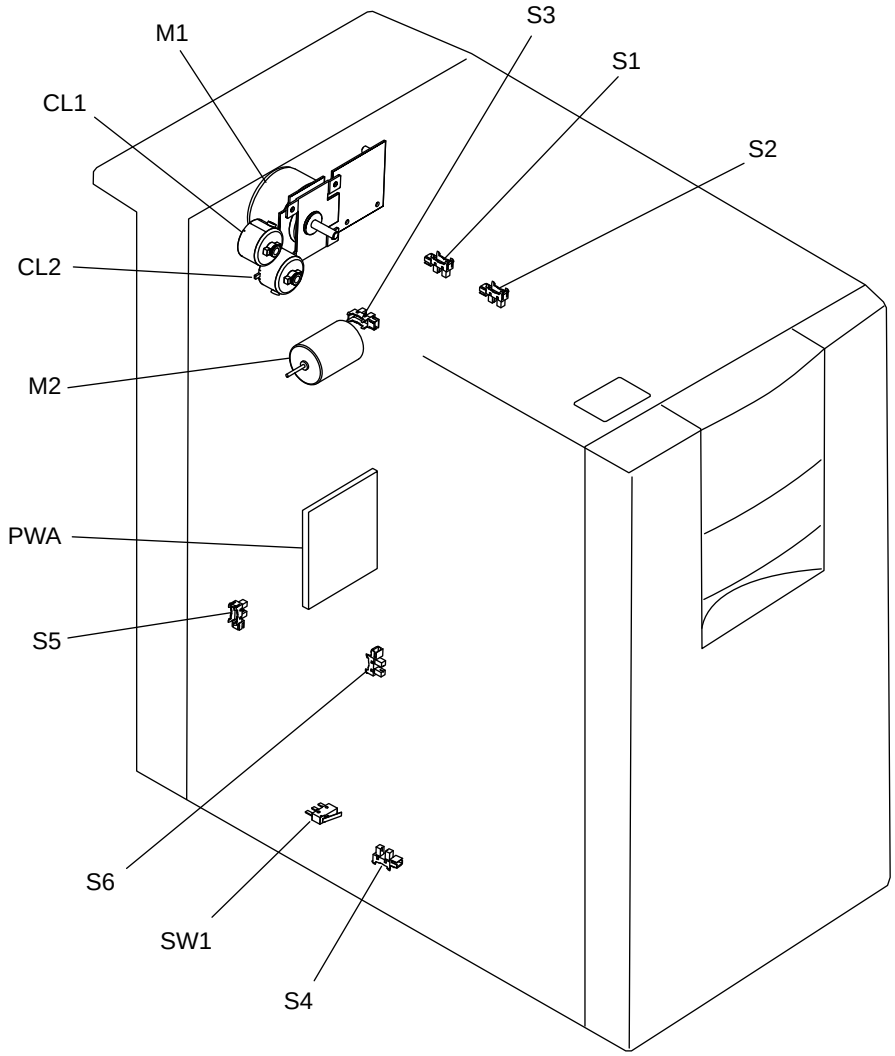


Fig. 2-2

2.3 Electrical Parts

1) Motors

SYMBOL	NAME	FUNCTION	REMARKS
M1	TRNS-MTR Transport motor	Driving of the feeding and transportation	Brushless motor
M2	TRY-MTR Tray motor	Lifting/Lowering of the tray	Brush motor

2) Electromagnetic clutches

SYMBOL	NAME	FUNCTION	REMARKS
CL1	TRNS-CLT Transport clutch	Driving of the transportation	
CL2	FED-CLT Feed clutch	Driving of the feeding	

3) Switches/Sensors

SYMBOL	NAME	FUNCTION	REMARKS
S1	EMP-SNR Empty sensor	Detection of the presence or absence of paper	Photo interrupter
S2	TRY-UP-SNR Tray-up sensor	Detection of the tray upper limit position	Photo interrupter
S3	FED-SNR Feed sensor	Detection of the paper transportation	Photo interrupter
S4	LCF-SET-SNR LCF-set sensor	Detection of the LCF installed to the equipment	Photo interrupter
S5	TRY-SNR Tray sensor	Detection of the drawer installed	Photo interrupter
S6	TRY-BTM-SNR Tray bottom sensor	Detection of the tray lower limit position	Photo interrupter
SW1	DOOR-SW Door switch	Safety switch	Pushing switch

4) PC Board

SYMBOL	NAME	FUNCTION	REMARKS
PWA	PWA-F-LCF LCF PC board	Driving of the feeding Control of the tray driving	

3. GENERAL OPERATION

3.1 Description of Operation

[A] From power ON to standby

1) When the equipment is turned ON, power is also supplied to the feed unit from the equipment to start the pre-running operation. The tray motor (M2) starts to rotate forward to lift the tray.
   The tray motor (M2) stopped rotating and lifting the tray when the tray has been lifted and the tray-up sensor (S2) has been turned ON (H: Sensor light path blocked by the actuator sensor). Papers are assessed to be present when the empty sensor (S1) is turned ON (L: Passing the sensor light path) while they are assessed to be absent when the empty sensor (S1) is turned OFF (H: Sensor light path blocked).
2) When the LCF is not being installed to the equipment (LCF set sensor (S4): OFF) or when the drawer is being pulled out (Tray sensor (S5): OFF), the tray lifting operation is not carried out. In this case, the tray starts to be lifted and the same operation which is until the detection of the paper presence or absence is carried out when it is installed to the equipment and the drawer is inserted.
3) When the feed sensor (S3) is turned ON (L: Passing the sensor light path), that is, when the paper is remaining at the transport path, the LCF detects it as a paper jam and cannot operate.

[B] Standby state

1) When a paper is detected to be present by the above-described operation, the LCF gets into a standby state.
2) When the tray unit is pulled out, the tray is automatically lowered because of its structure, and when it is inserted once again, it is lifted.

[C] Feeding/Transporting operation from the start to the finish of the printing

1) The [START] key is pressed when the equipment decides that the feeding from the LCF. Then, the transport motor (M1) starts to drive after the feed motor of the equipment has been turned ON.
2) The feed clutch (CL2) is turned ON and pickup and feed rollers start to drive to feed a paper from the tray.
3) After the feeding starts, the transport clutch (CL1) is turned ON and the transport roller starts to drive to transport the paper.
4) When the leading edge of the paper has turned ON the feed sensor (S3), the feed clutch (CL2) is turned OFF and stops the feeding operation. The paper transported by the transport roller is sent to the equipment side, where it is transported by the feed unit.
5) When a specified time has passed after the trailing edge of the paper turned OFF the feed sensor (S3), next paper can be fed.
6) When carrying out a continuous printing, the above steps from (2) to (5) are repeated as many papers as printed.
7) When the printing has been finished, the feed motor of the equipment stops rotating and the transport motor (M1) is turned OFF to finish the feeding/transporting operation.

[D] Tray operation during printing

1) When 10~20 sheet of paper have been fed from the tray, the pickup roller is lowered down to a specified height. The tay-up sensor (S2) detects this and the tray motor (M2) rotates forward to lift the tray.

3.2 Error Detection

[A] Jam detection

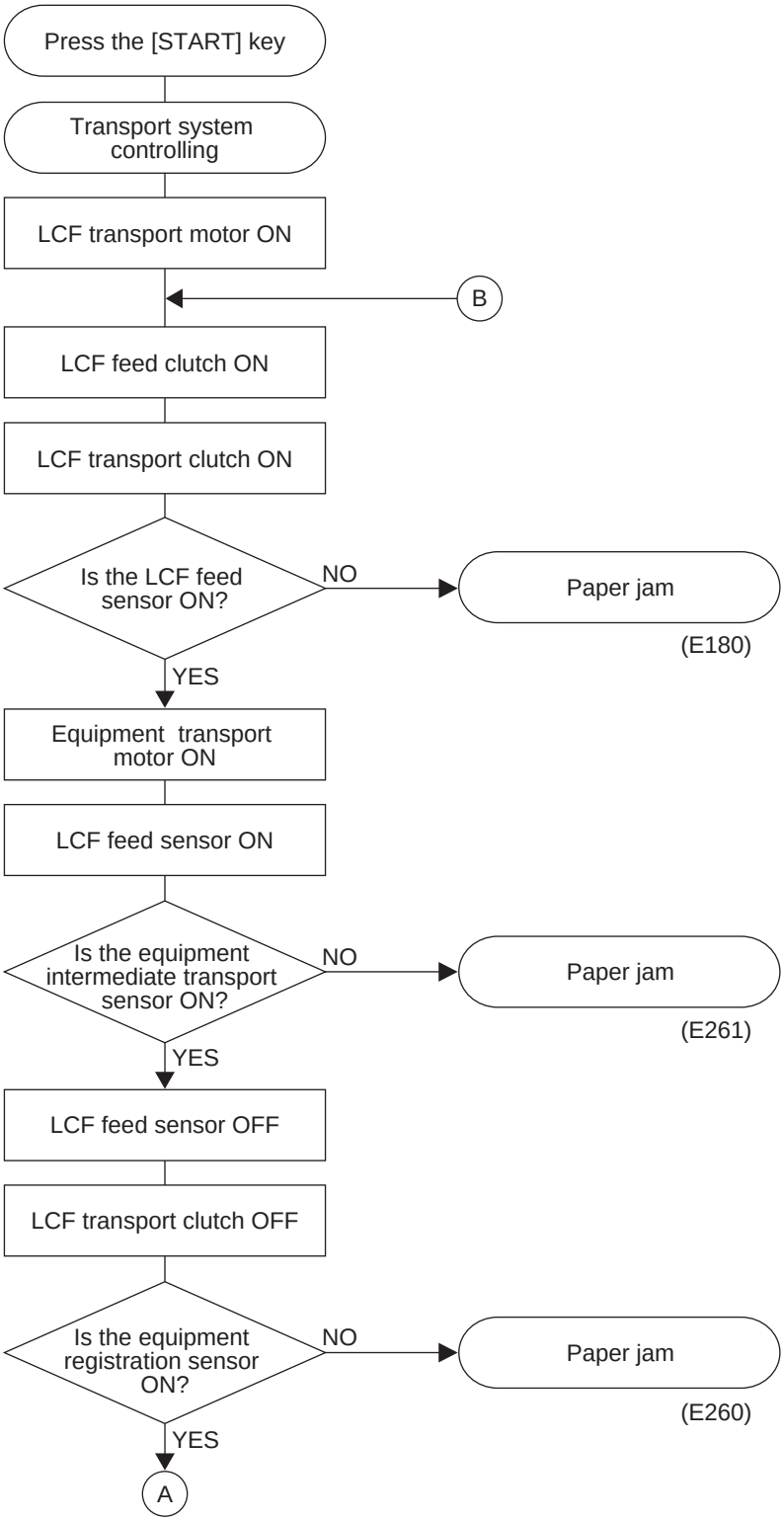
In the following cases, the feed jam takes place.

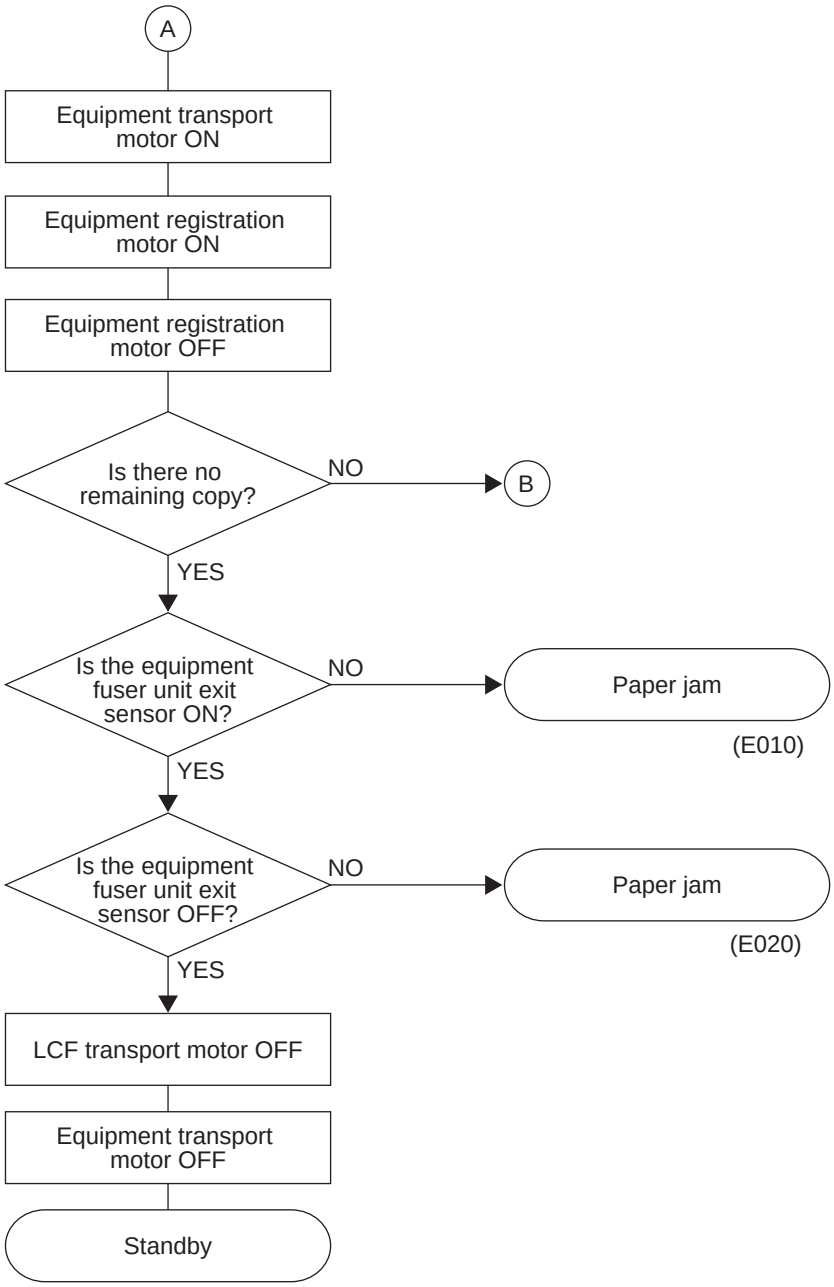
1) When the feed sensor (S3) is not turned ON in a specified time after the feeding has started.
2) When each transport sensor of the equipment does not operate (ON/OFF) in a specified time after the feeding has started at the equipment side.

[B] Call for service

1) When the tray-up sensor (S2) is not turned ON in a specified time after the tray has started to be lifted.

3.3 Flow Chart





4. DISASSEMBLY AND REPLACEMENT

4.1 Covers

[A] Front cover

(1) Pull out the drawer.
(2) Remove 4 screws and take off the front cover.

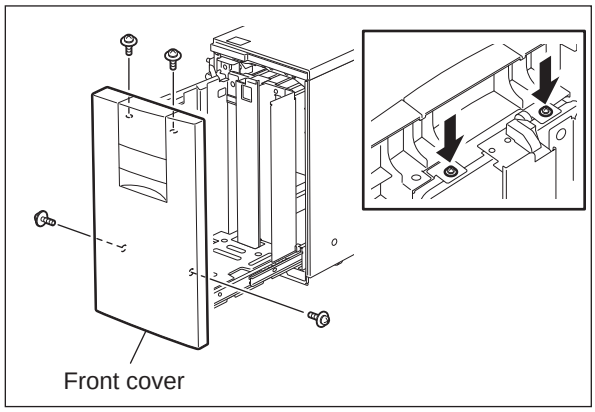


Fig. 4-1

Notes:

1. When installing the front cover, be sure that the arm is not coming off from the bracket.
2. When installing the front cover, adjust the gap between the front and upper cover, and the front and right cover to 3 mm respectively.

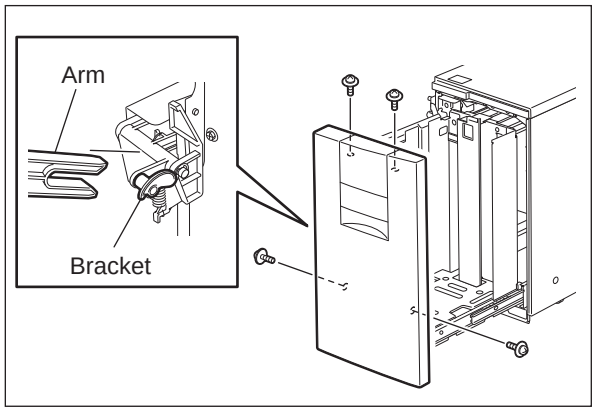


Fig. 4-2

[B] Rear cover

(1) Remove the spacer and slide the harness to the right side.
(2) Remove 4 screws and take off the rear cover.

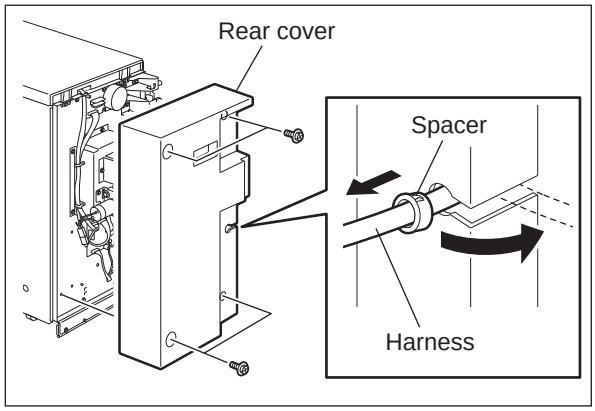


Fig. 4-3

[C] Upper cover

(1) Remove the rear cover.
(📖 P. 4-2 "[B] Rear cover")
(2) Pull out the drawer.
(3) Loosen 4 screws and take off the upper cover.

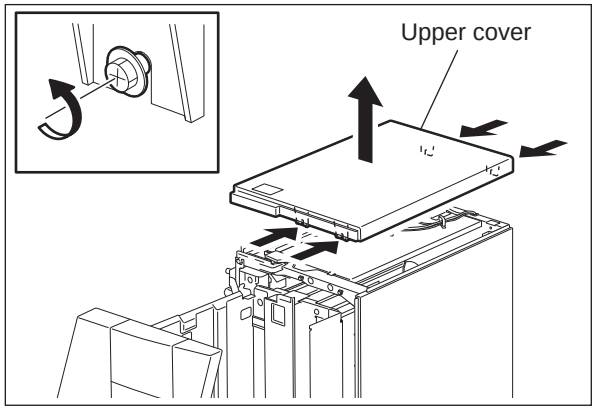


Fig. 4-4

[D] Right cover

(1) Pull out the drawer.
(2) Remove 2 screws and take off the right cover sliding it toward the front side.

Note:
When installing the right cover, align 2 hooks of the right cover with the holes of the frame.

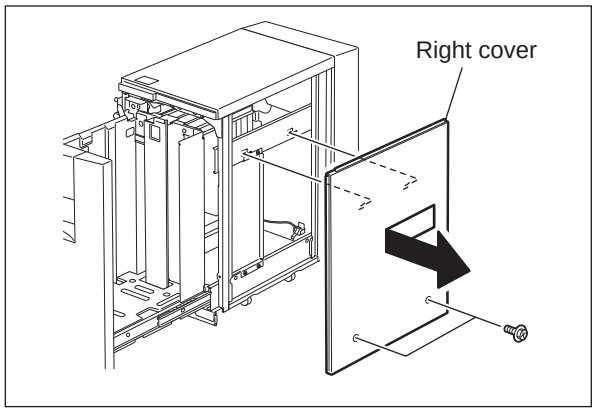


Fig. 4-5

4.2 Feed unit

(1) Remove the upper cover.
(📖 P. 4-2 "[C] Upper cover")
(2) Remove the transport motor.
(📖 P. 4-5 "[C] Transport motor")
(3) Remove the lever.

Note:
Be careful not to install the lever to the wrong position.

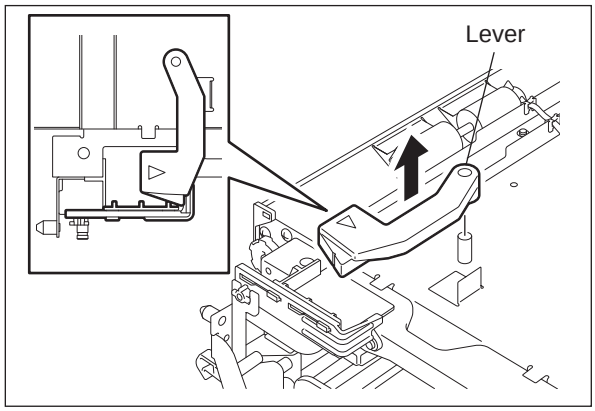


Fig. 4-6

(4) Disconnect 1 connector from the LCF PC board.
(5) Disconnect 1 connector form the tray motor.
(6) Release the harness from the 3 harness clamps.

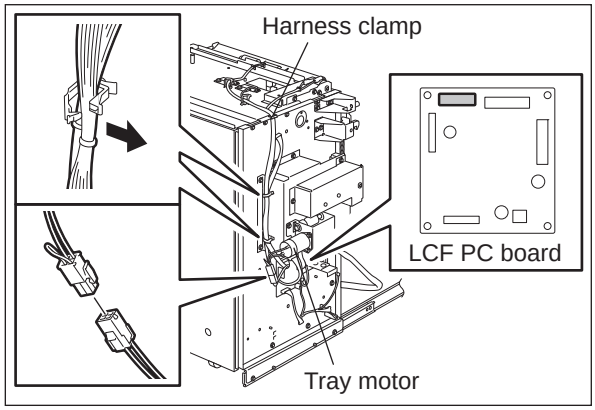


Fig. 4-7

(7) Remove 4 screws and take off the feed unit upward.

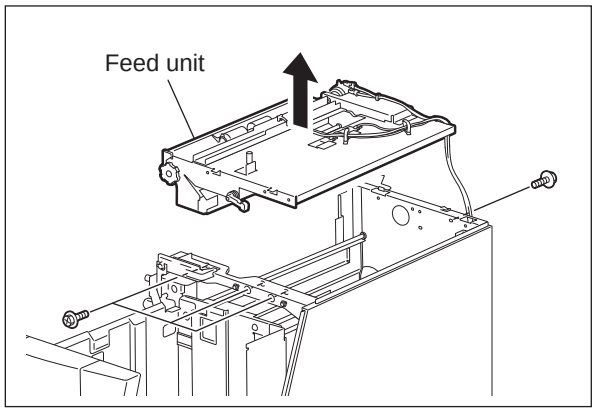


Fig. 4-8

4.3 Electric Parts

[A] LCF PBA

(1) Remove the rear cover.
(📖 P. 4-2 "[B] Rear cover")
(2) Disconnect all connectors from the LCF PBA.
(3) Release 3 locking supports and take off the LCF PC board.

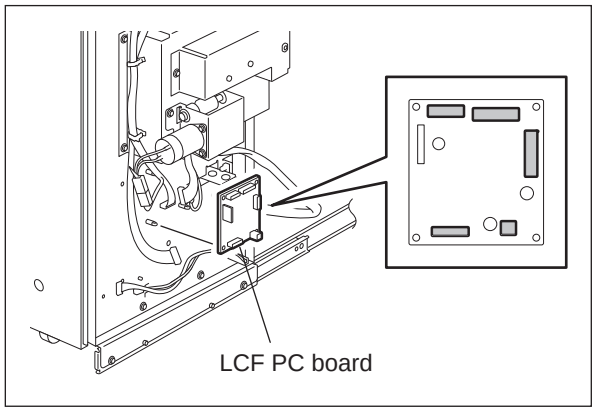


Fig. 4-9

[B] Tray motor

(1) Remove the rear cover.
(📖 P. 4-2 "[B] Rear cover")
(2) Disconnect 1 connector from the tray motor.
(3) Remove 3 screws from the tray motor.
(4) Release the belt and take off the tray motor.

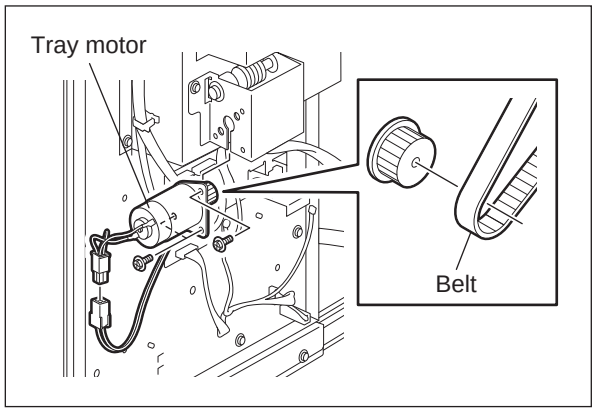


Fig. 4-10

[C] Transport motor

(1) Remove the rear cover.
(📖 P. 4-2 "[B] Rear cover")
(2) Disconnect 1 connector from the transport motor PC board
(3) Remove 2 screws and take off the transport motor.

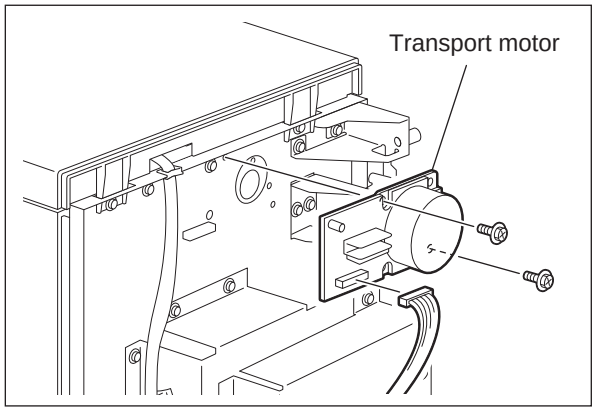


Fig. 4-11

[D] Tray sensor

(1) Remove the rear cover.
(📖 P. 4-2 "[B] Rear cover")
(2) Disconnect 1 connector from the tray sensor.
(3) Release the latches and take off the tray sensor.

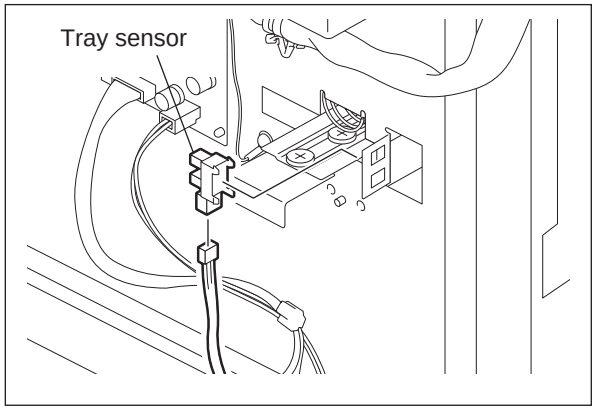


Fig. 4-12

[E] Tray-up sensor, Empty sensor

(1) Remove the upper cover.
(📖 P. 4-2 "[C] Upper cover")
(2) Release the harness from the harness clamp.
(3) Remove 1 screw. Lift up the bracket and disconnect 1 connector from the sensor.

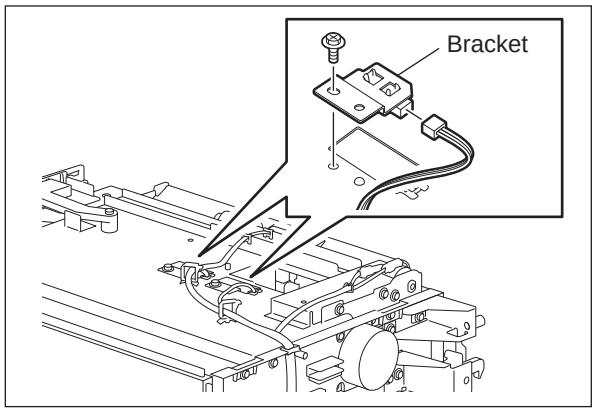


Fig. 4-13

(4) Release the latches and take off the sensor from the bracket.

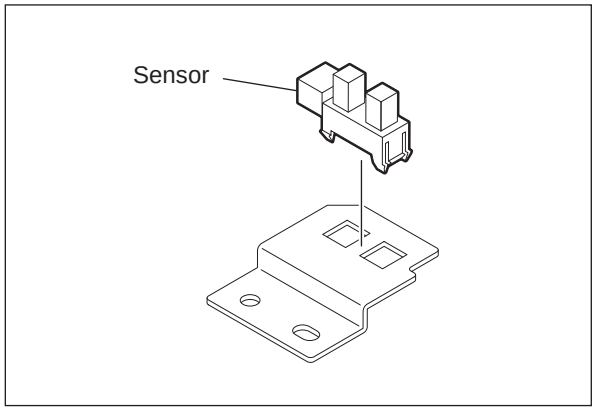


Fig. 4-14

[F] Feed sensor

(1) Remove the upper cover.
(📖 P. 4-2 "[C] Upper cover")
(2) Release the harness from 3 harness clamp.
(3) Remove 1 screw. Lift up the bracket and disconnect 1 connector from the feed sensor.

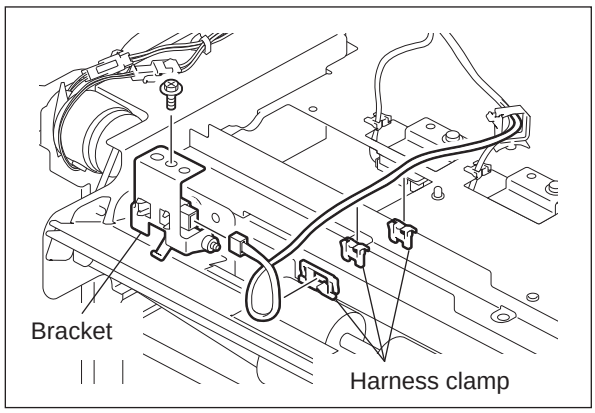


Fig. 4-15

(4) Release the latches and take off the feed sensor from the bracket.

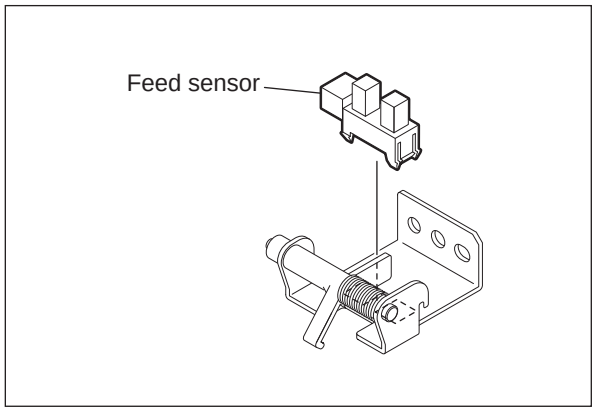


Fig. 4-16

[G] LCF set sensor, Door switch

(1) Remove the right cover.
(📖 P. 4-2 "[D] Right cover")
(2) Remove 1 screw and lift up the cover.
(3) Release the harness from the harness clamp and take off the cover.

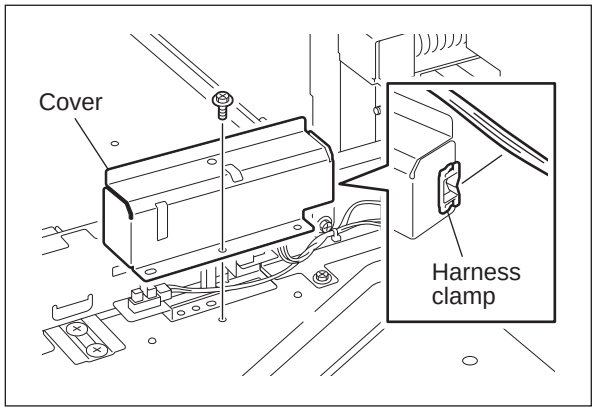


Fig. 4-17

(4) Remove 1 screw and lift up the bracket.
(5) Disconnect connectors from the LCF set sensor and door switch.

Note:
Be careful not to connect the door switch connectors to the wrong terminals.

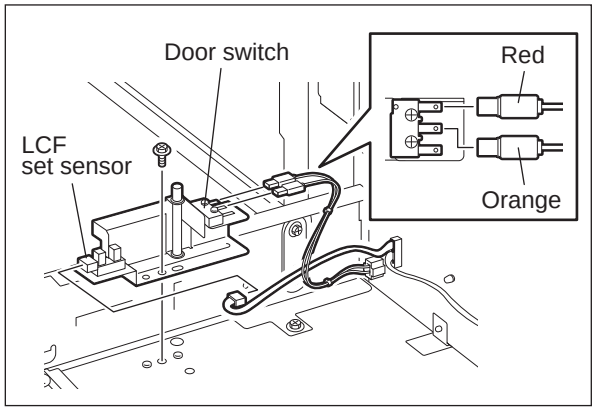


Fig. 4-18

(6) Release the latches and take off the LCF set sensor from the bracket.
(7) Remove 2 screws and take off the door switch from the bracket.

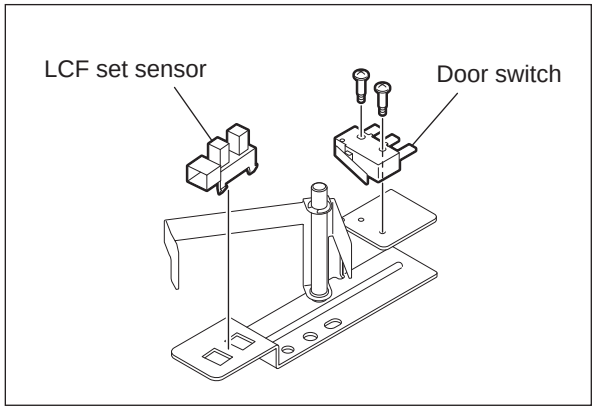


Fig. 4-19

[H] Tray bottom sensor

(1) Remove the rear cover.
(📖 P. 4-2 "[B] Rear cover")
(2) Remove the right cover.
(📖 P. 4-2 "[D] Right cover")
(3) Disconnect 1 connector from the tray bottom sensor.
(4) Release the latches and take off the tray bottom sensor from the frame.

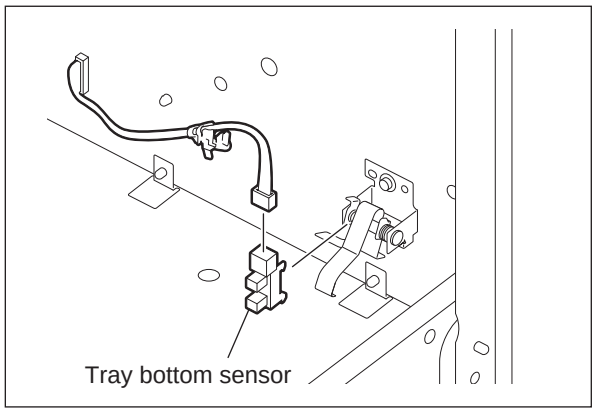


Fig. 4-20

[I] Transport clutch, Feed clutch

(1) Remove the feed unit.
(📖 P. 4-3 "4.2 Feed unit")
(2) Remove 2 screws and take off 2 stoppers.

Note:
When installing 2 stoppers, screw them shut with the hook of the transport clutch and feed clutch caught by the slit of the stopper.

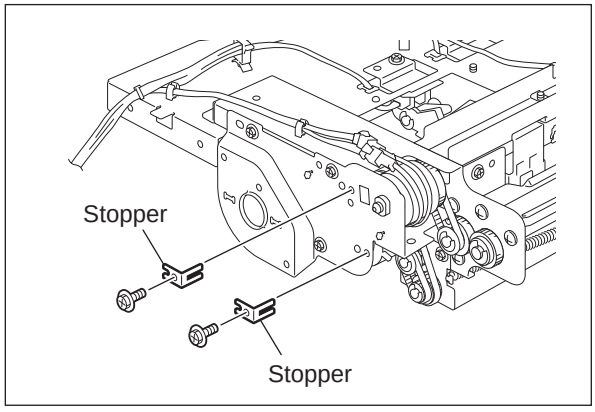


Fig. 4-21

(3) Remove 4 screws and take off the bracket and bushing.

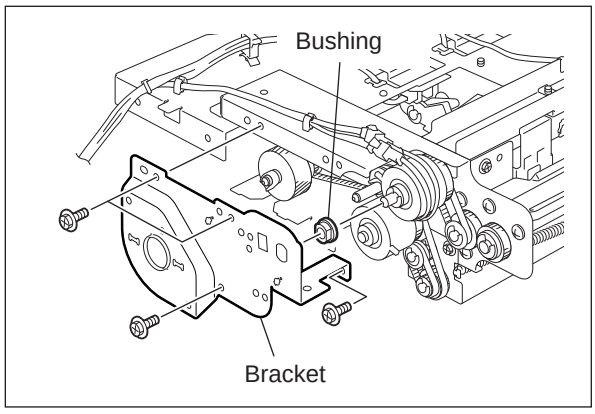


Fig. 4-22

(4) Disconnect 1 connector, use the hex wrench to loosen 1 set screw, and then take off the feed clutch.

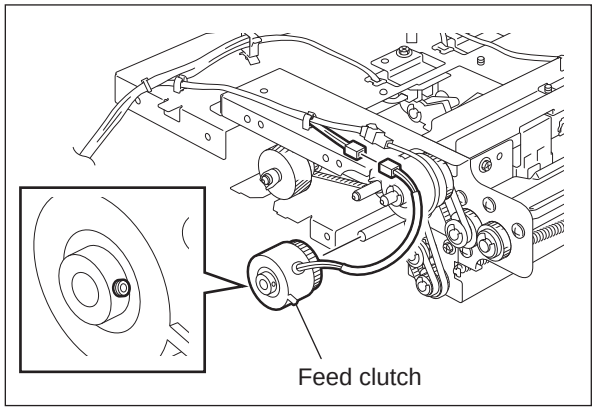


Fig. 4-23

(5) Disconnect 1 connector and take off the transport clutch and belt.

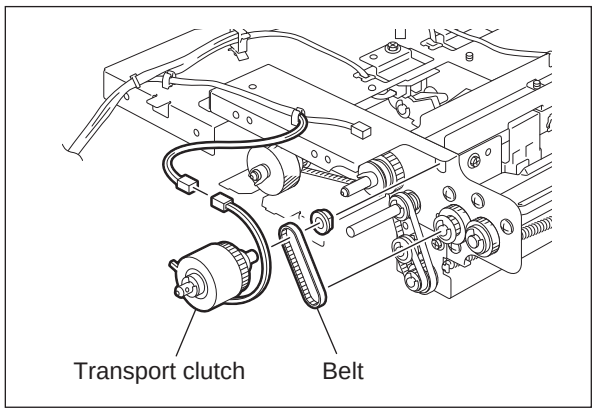


Fig. 4-24

4.4 Rollers

[A] Separation roller

(1) Pull out the LCF from the equipment.
(2) Remove 1 clip and take off the separation roller while pushing the shaft down.

Note:
Be careful not to have the torque limiter come off of the shaft accidentally, as the torque limiter also becomes removable after the feed roller has been removed.

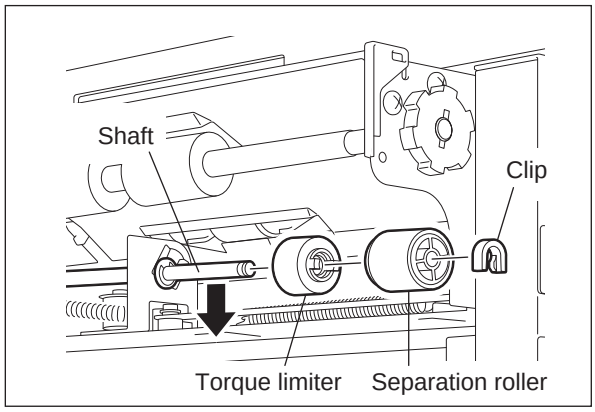


Fig. 4-25

[B] Pickup roller

(1) Remove the right cover.
(📖 P. 4-2 "[D] Right cover")
(2) Close the drawer.
(3) Remove 2 clips and take off 2 pickup rollers.

Note:
Be careful not to install the pickup roller in the wrong direction.

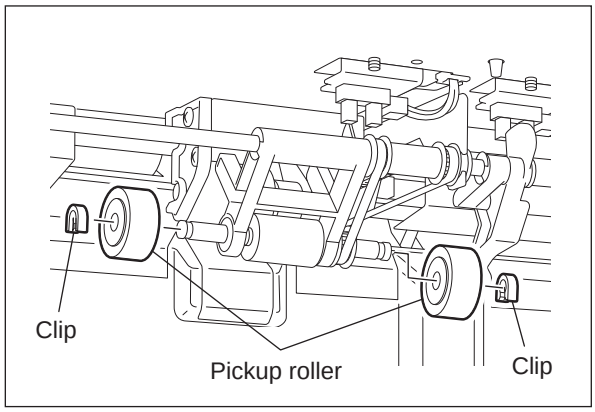


Fig. 4-26

[C] Brush roller, Feed roller

(1) Remove the feed unit.
(📖 P. 4-3 "4.2 Feed unit")
(2) Remove the brush unit while lifting pickup roller unit.

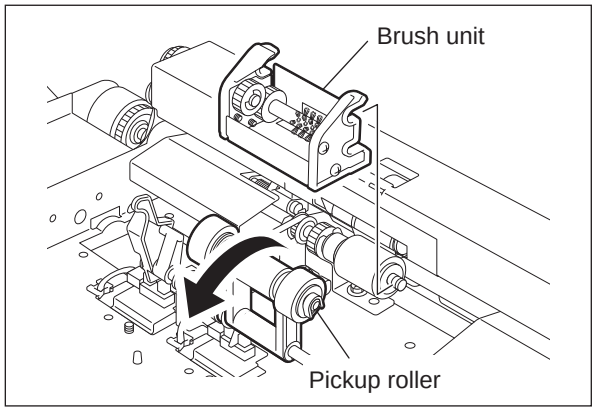


Fig. 4-27

(3) Remove the brush roller from the brush unit.
(4) Remove the gear and pin from the brush roller.

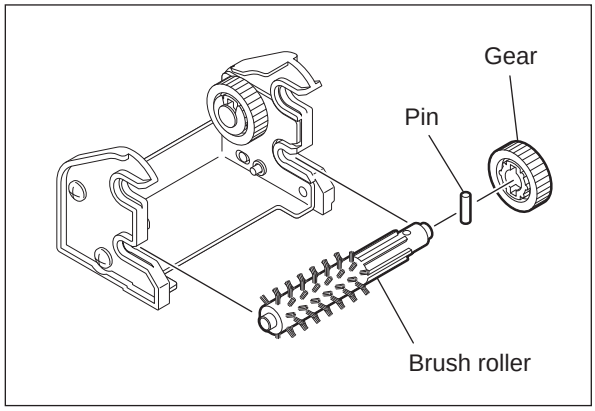


Fig. 4-28

(5) Remove the separation roller while pushing the separation roller down.

Notes:
1. Be careful not to install the feed roller in the wrong direction.
2. Be careful not to have the clutch come off of the shaft accidentally, as the clutch also becomes removable after the feed roller has been removed.

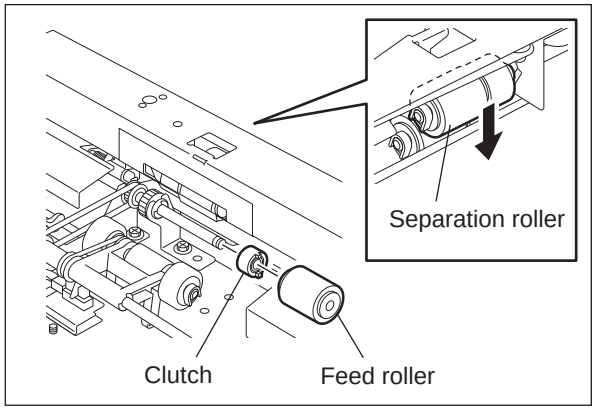


Fig. 4-29

[D] Transport idler roller

(1) Remove the upper cover.
(📖 P. 4-2 "[C] Upper cover")
(2) Remove 2 springs and take off the transport idler roller.
(3) Remove 2 E-rings and take off 2 bushings from the transport idler roller.

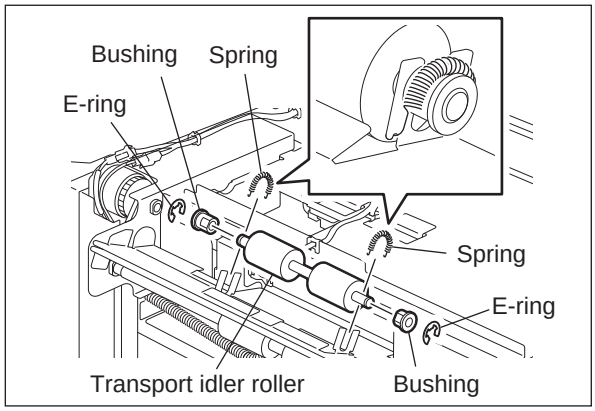


Fig. 4-30

[E] Transport roller

(1) Remove the transport idler roller.
(📖 P. 4-12 "[D] Transport idler roller")
(2) Remove 2 E-rings and take off the gear.
(3) Slide the transport roller to the front side and take off the pin and handle.

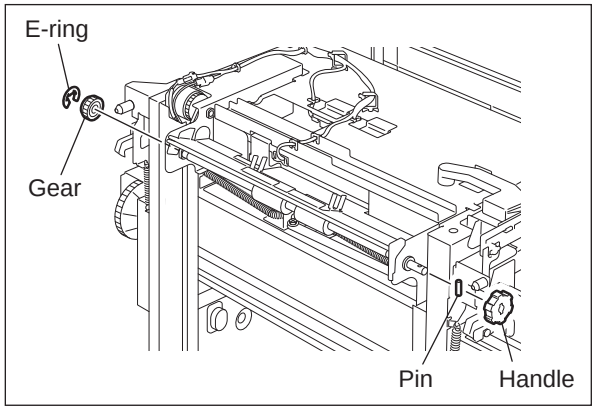


Fig. 4-31

(4) Remove 2 bushings and take off the transport roller.

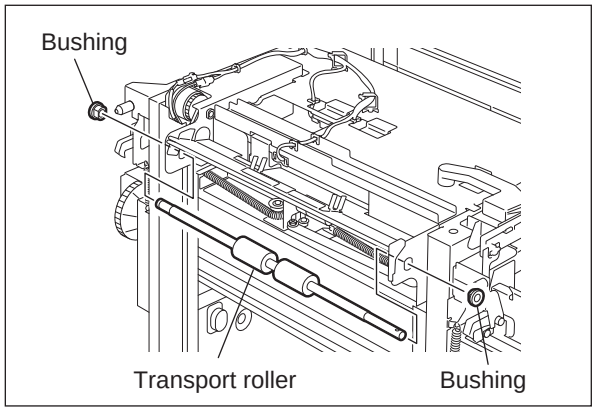


Fig. 4-32

4.5 Tray-up drive unit

[A] Pulley

(1) Remove the tray motor.
(📖 P. 4-4 "[B] Tray motor")
(2) Remove 3 screws and take off the bracket.

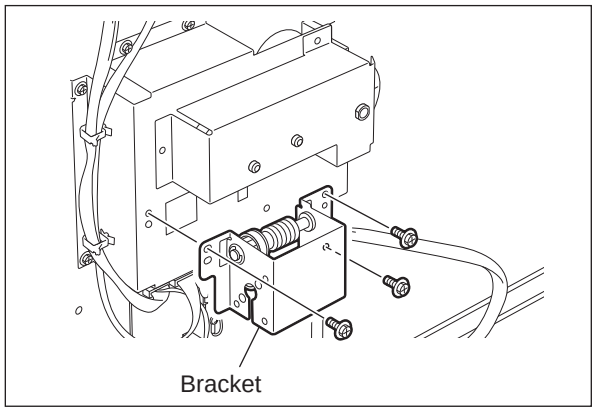


Fig. 4-33

(3) Remove 1 E-ring and take off the bearing.
(4) Loosen 2 setscrews and take off the stopper and bearing.
(5) Remove the relay gear shaft and belt.

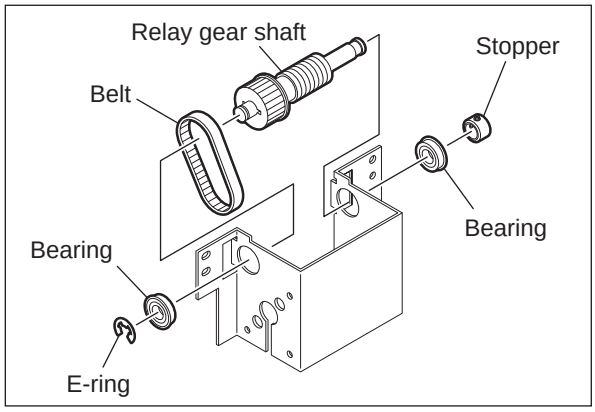


Fig. 4-34

(6) Remove 1 setscrew and take off the gear from the shaft.
(7) Remove 1 E-ring and slide the pulley to the left side.
(8) Remove the pin and pulley from the shaft.

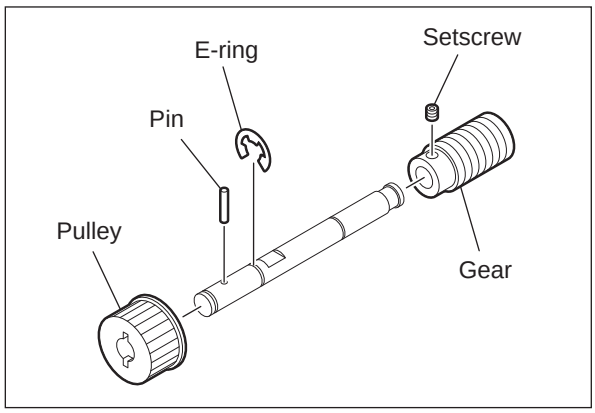


Fig. 4-35

[B] Gear, Coupling

(1) Remove the tray motor.
(📖 P. 4-4 "[B] Tray motor")
(2) Remove the tray motor bracket.
(📖 P. 4-13 "[A] Pulley")
(3) Remove 3 screws and take off the cover and bushing.

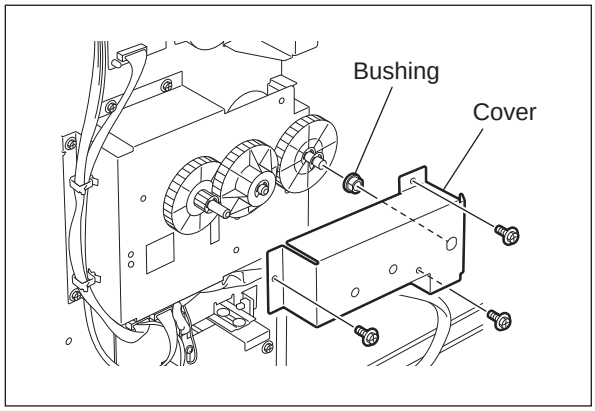


Fig. 4-36

(4) Remove 2 E-ring and take off the 2 gears.

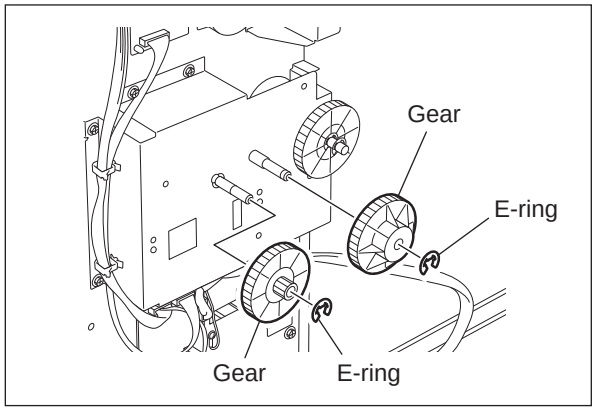


Fig. 4-37

(5) Remove 2 E-rings and take off the gear and pin.

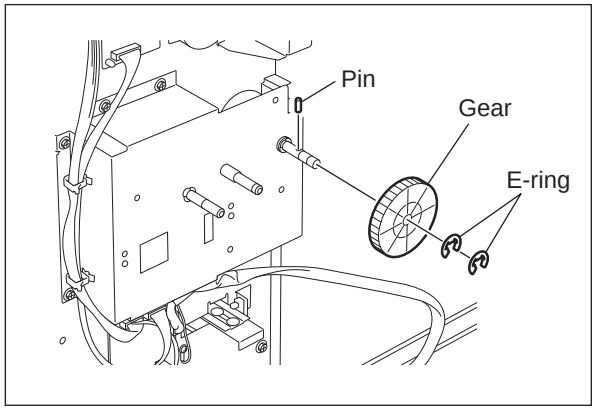


Fig. 4-38

(6) Remove 1 E-ring and take off the bushing, spring and shaft.
(7) Remove the coupling and pin from the shaft.

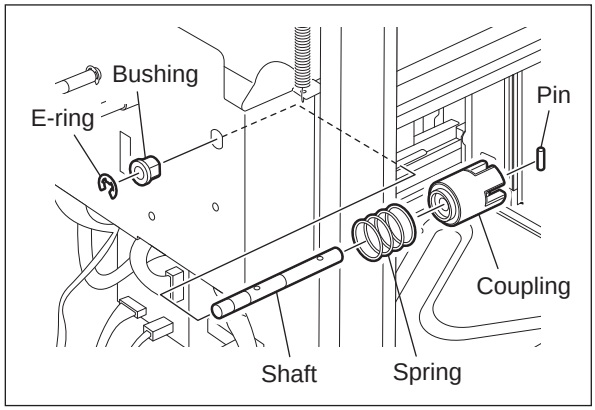


Fig. 4-39

4.6 Transport motor drive unit

[A] Gear, Pulley

(1) Remove the transport clutch and feed clutch. (📖 P. 4-8 "[I] Transport clutch, Feed clutch")
(2) Remove 2 clips and take off the gear, pulley and belt.

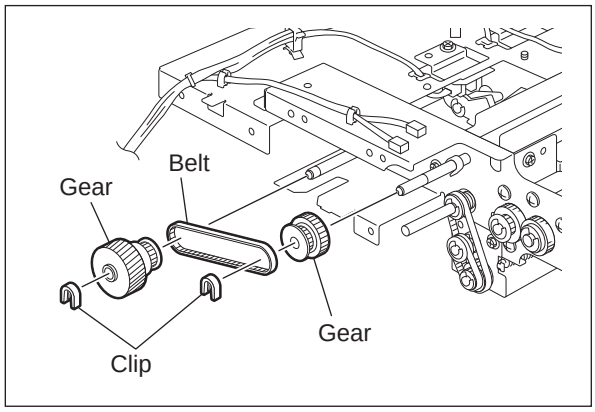


Fig. 4-40

(3) Remove 1 E-ring and take off the gear.

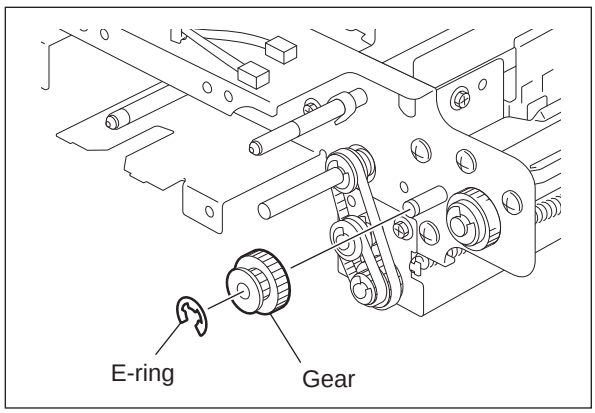


Fig. 4-41

(4) Remove 3 E-rings and take off the gears, belt and pin.

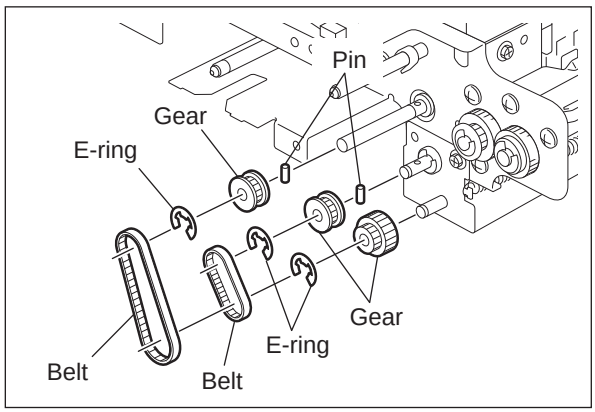


Fig. 4-42

4.7 Drawer unit

[A] Drawer

(1) Pull out the drawer.
(2) Remove 1 screw and take off the stopper.

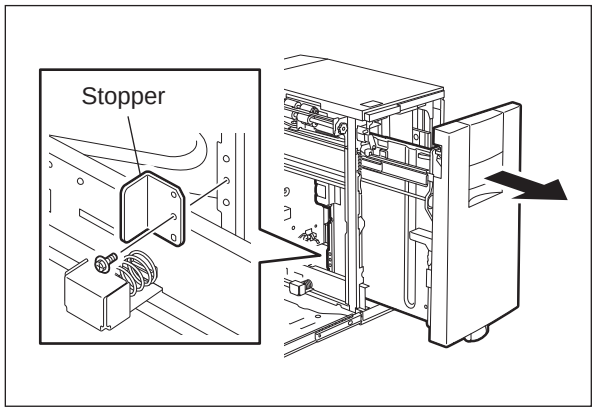


Fig. 4-43

(3) Pull out the drawer unit completely.
(4) Remove 4 screws and take off the drawer pulling it upward.

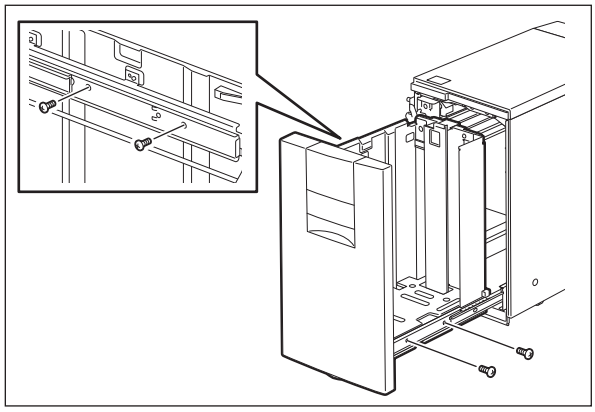


Fig. 4-44

[B] Tray wire

(1) Remove the drawer.
(📖 P. 4-17 "[A] Drawer")
(2) Remove the front cover.
(📖 P. 4-1 "[A] Front cover")
(3) Remove 1 screw and take off the pickup lever guide.
(4) Remove 2 screws and take off the front side guide.

Note:
When installing the side guide, adapt the groove and screw hole to the paper size.
(📖 P. 4-23 "[B] Front side guide")

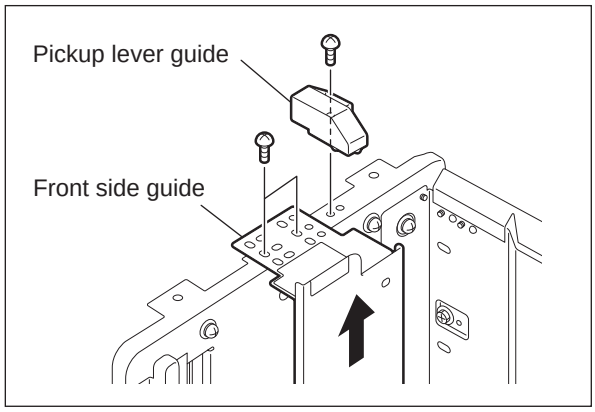


Fig. 4-45

(5) Remove 2 screws and take off the rear side guide.

Note:

When installing the side guide, adapt the groove and screw hole to the paper size. (📖 P. 4-22 "[A] Rear side guide")

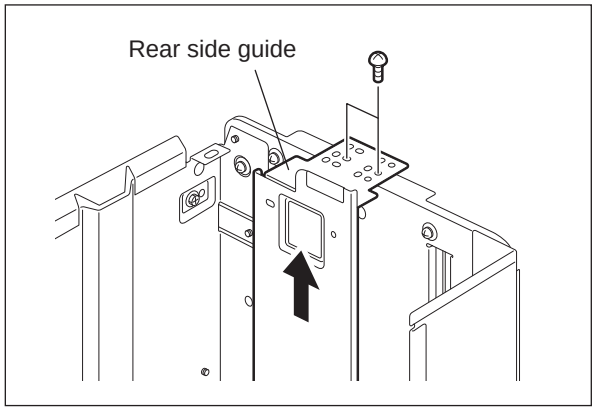


Fig. 4-46

(6) Remove 1 screw and take off the stopper plate, spring and clip from the front side wire tensioner. (same for the rear side)

Note:

When installing the stopper plate, screw it shut after aligning the hole of the stopper plate with the shaft.

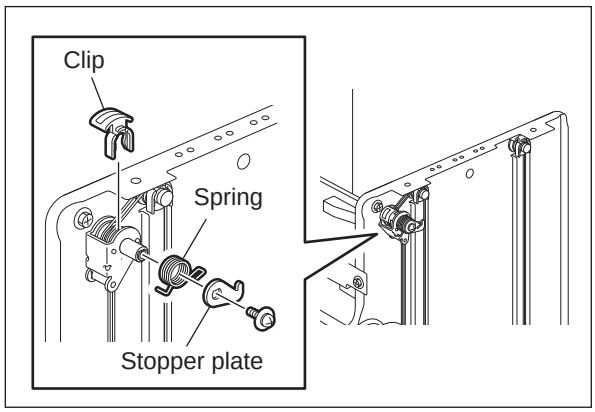


Fig. 4-47

(7) Remove 2 clips and take off the front side wire tensioner and 2 pulleys. (same for the rear side)

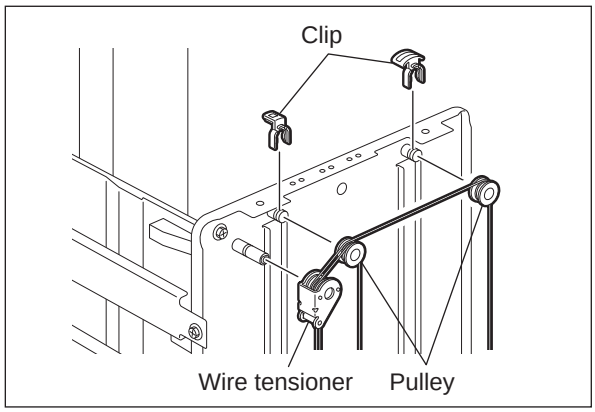


Fig. 4-48

Note:

When installing the wire tensioner and pulley, be sure that the wire is installed to the wire tensioner and pulley as shown in the figure on the right.

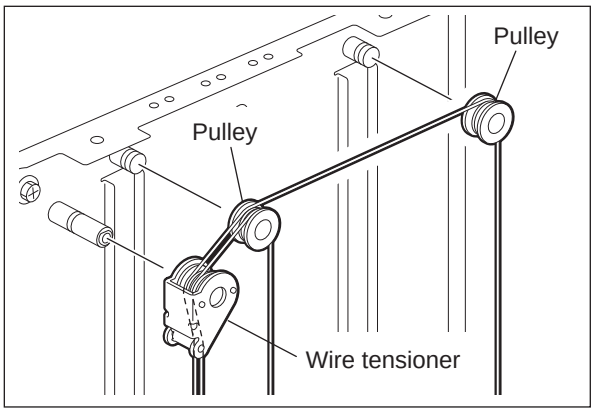


Fig. 4-49

(8) Pull out the tray.
(9) Release the latches and take off 4 wire stoppers.

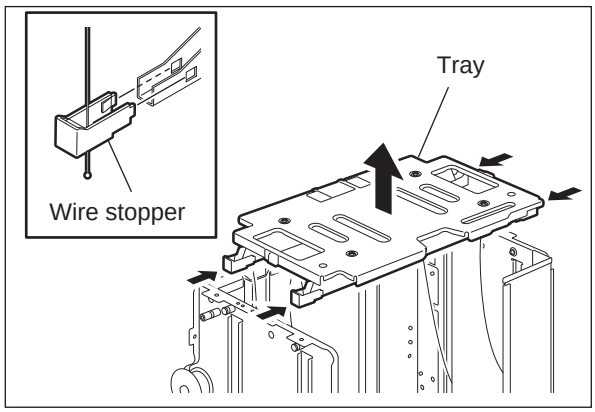


Fig. 4-50

(10) Release the latches and take off the wire clamps from the front/rear side wire tensioners.

Note:

Pay attention to the wire position when installing the wire clamp.

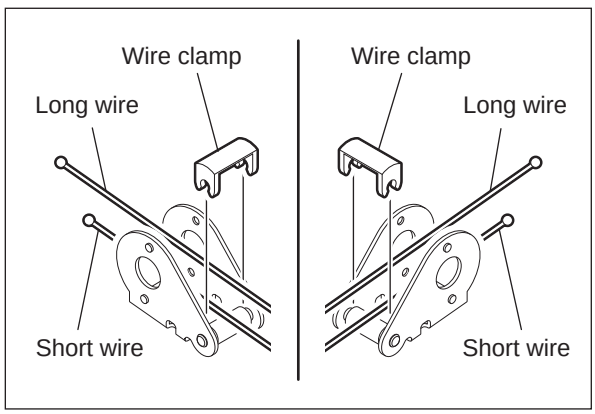


Fig. 4-51

(11) Remove 1 E-ring and take off the front side wire pulley and pin.

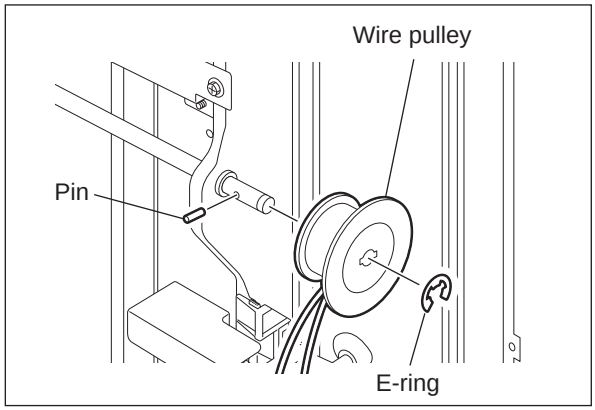


Fig. 4-52

(12) Remove 6 screws and take off the brake unit.

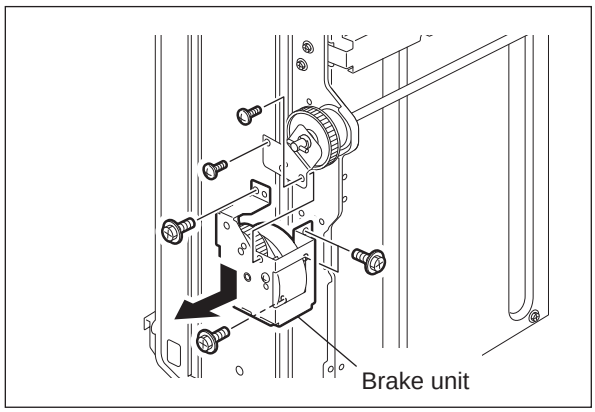


Fig. 4-53

(13) Remove the bush and pull out the rear side pulley with shaft.

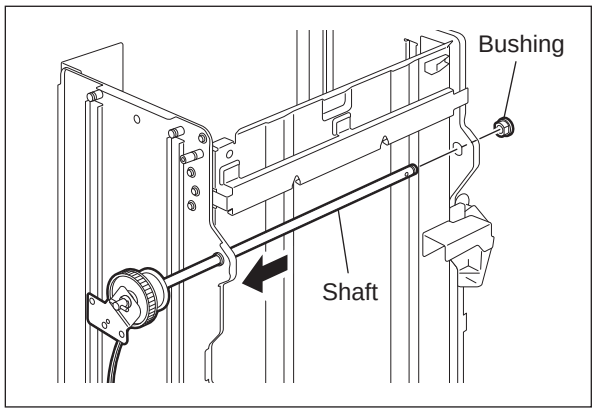


Fig. 4-54

(14) Remove the pulley and pin from the shaft.

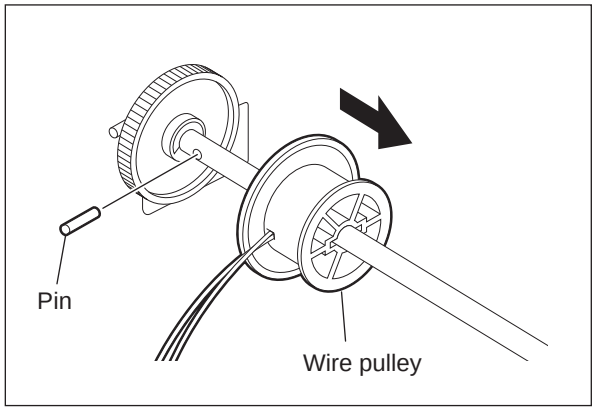


Fig. 4-55

(15) Remove 2 screws. Release the latches and take off the pulley flange.

Note:
Pay attention to the wire installation order when installing the pulley flange.

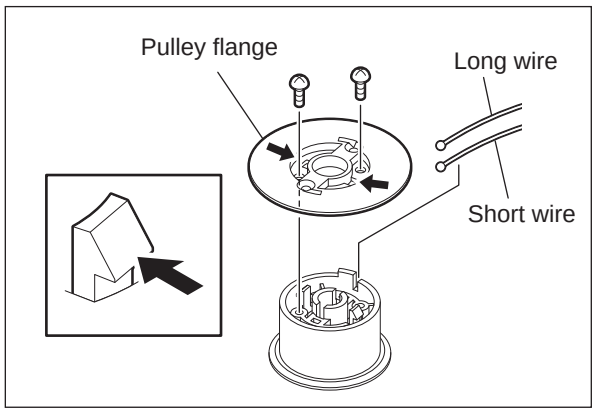


Fig. 4-56

4

4.8 Setting paper guide

When changing the paper size, change the position where the side guide (rear/front) and end guide to be installed to.

[A] Rear side guide

(1) Pull out the drawer.
(2) Remove 1 screw and take off the stopper.

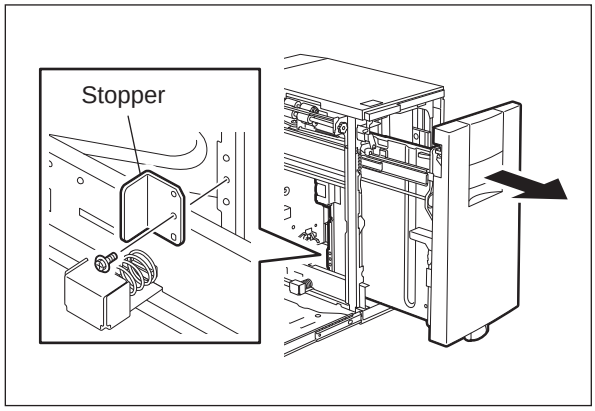


Fig. 4-57

(3) Remove 2 screws and adapt the groove and screw hole to the paper size. Then screw it shut.

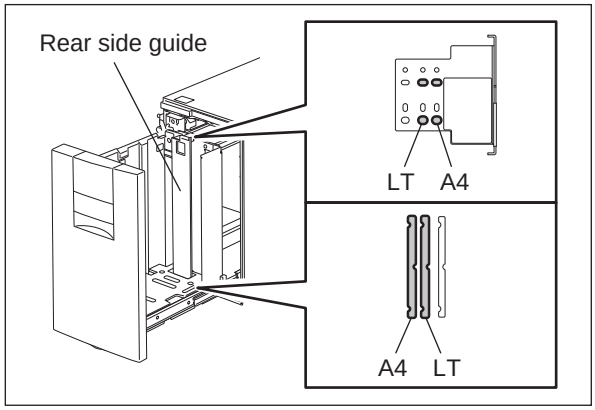


Fig. 4-58

[B] Front side guide

(1) Pull out the drawer.
(2) Remove 1 screw and take off the pickup lever guide.

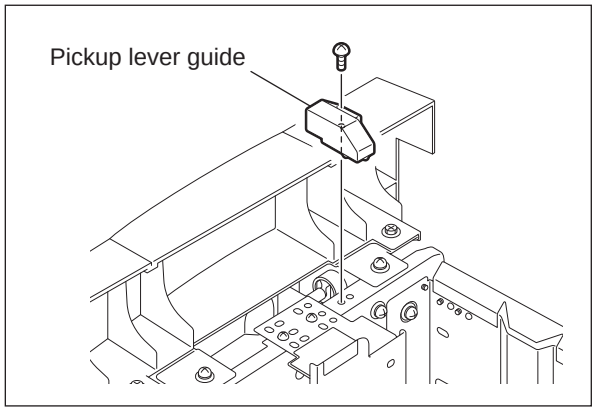


Fig. 4-59

(3) Remove 2 screws and adapt the groove and screw hole to the paper size. Then screw it shut.

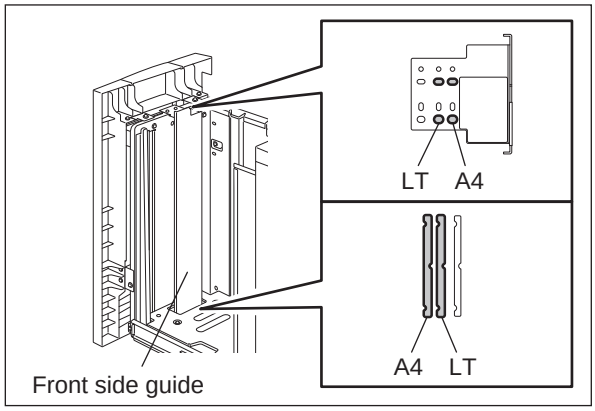


Fig. 4-60

[C] End side guide

(1) Pull out the drawer.
(2) Remove 3 screws.

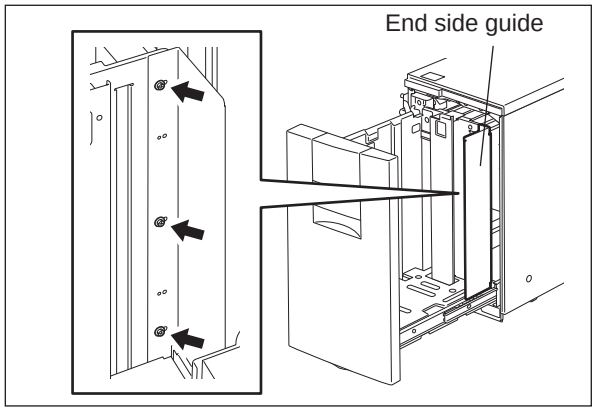


Fig. 4-61

(3) Remove 2 screws while lifting the tray.

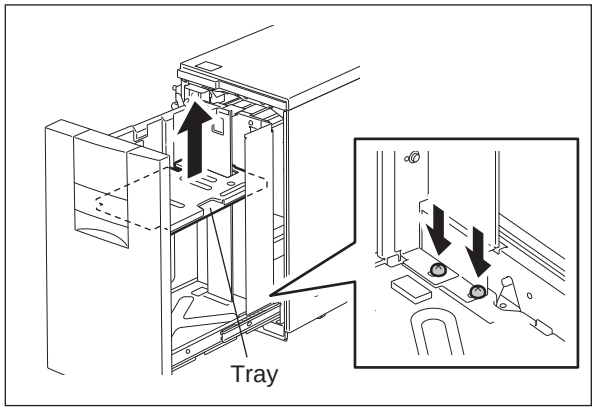


Fig. 4-62

(4) Adapt the groove and screw hole to the paper size. Then screw it shut.

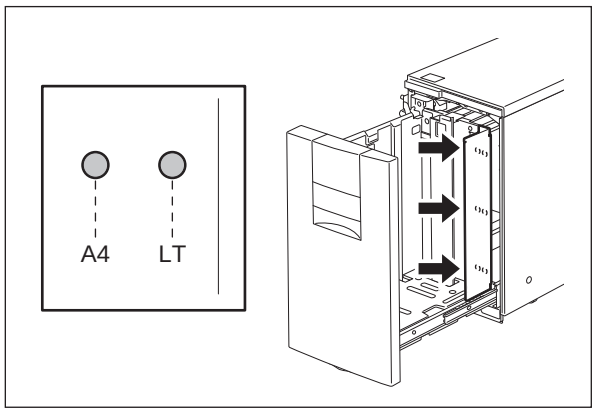


Fig. 4-63

4.9 Adjustment

4.9.1 Sheet sideways deviation adjustment

When the center of the printed image shifts to the front side or rear side, adjust the drawer position taking the following procedure.

<Procedure>

(1) Pull out the drawer.
(2) Loosen 3 screws and move the adjustment board to the right position. Then screw it shut.

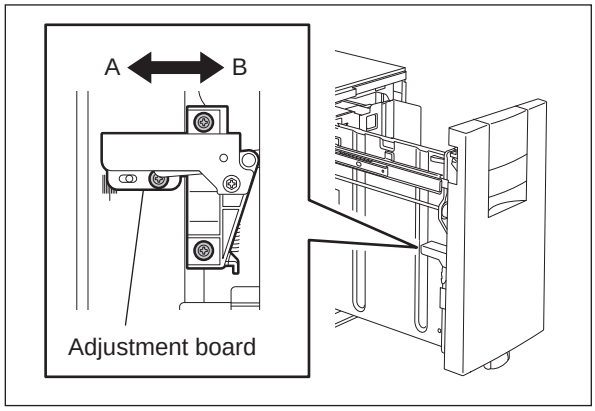


Fig. 4-64

- The center of the printed image shifts to the front side:
  Move the adjustment board to the front side (Arrow (B) in the figure).

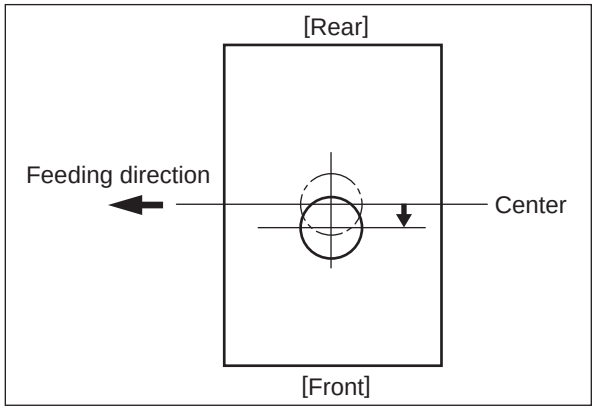


Fig. 4-65

- The center of the printed image shifts to the rear side:
  Move the adjustment board to the rear side (Arrow (A) in the figure).

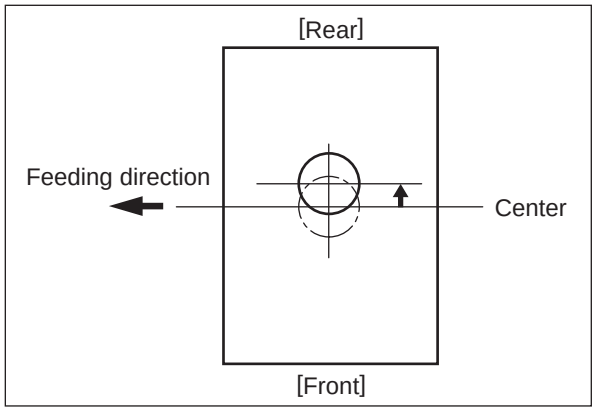


Fig. 4-66

Note:

After the drawer position adjustment, re-adjust the front cover position. Adjustment: loose 4 screws and slide the front cover to adjust the gap between the front and upper cover, and the front and right cover to 3 mm respectively.

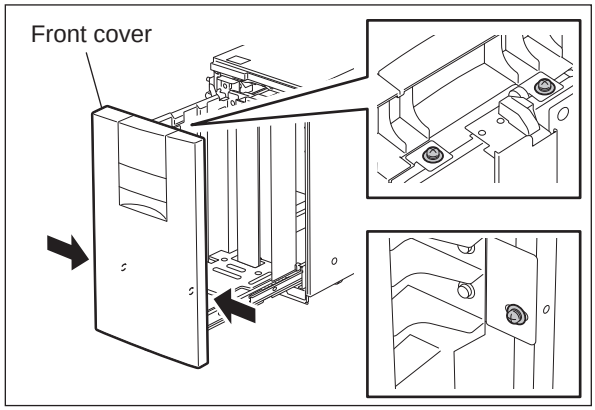


Fig. 4-67

4.9.2 LCF slant adjustment

Compensate the slant of LCF by the adjusting the stoppers.

<Procedure>

(1) Pull out the LCF from the equipment.
(2) Turn 2 screws and adjust the stoppers.
Turn to the right: Stopper moves downward.
Turn to the left: Stopper moves upward.

Note:

When moving the equipment, need to move the stopper upward.

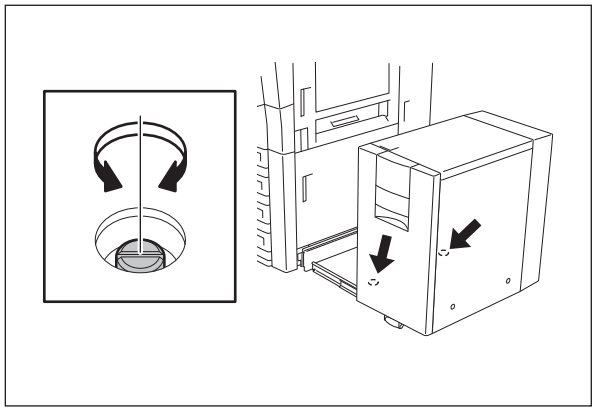


Fig. 4-68

5. ELECTRIC CIRCUIT

5.1 Harness Diagram

Fig. 5-1

5.2 Circuit Diagram

Circuit Diagram (1)

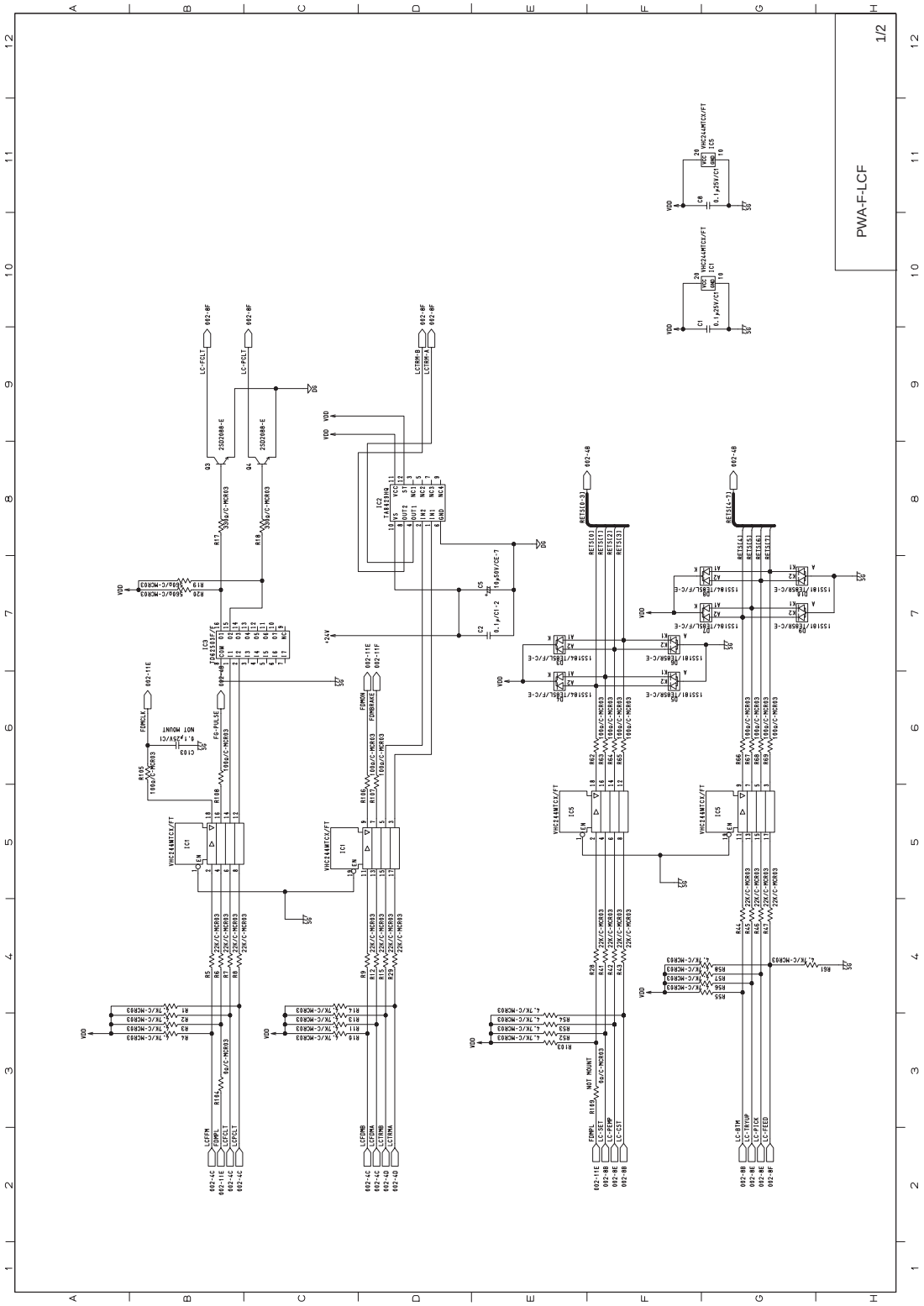


Fig. 5-2

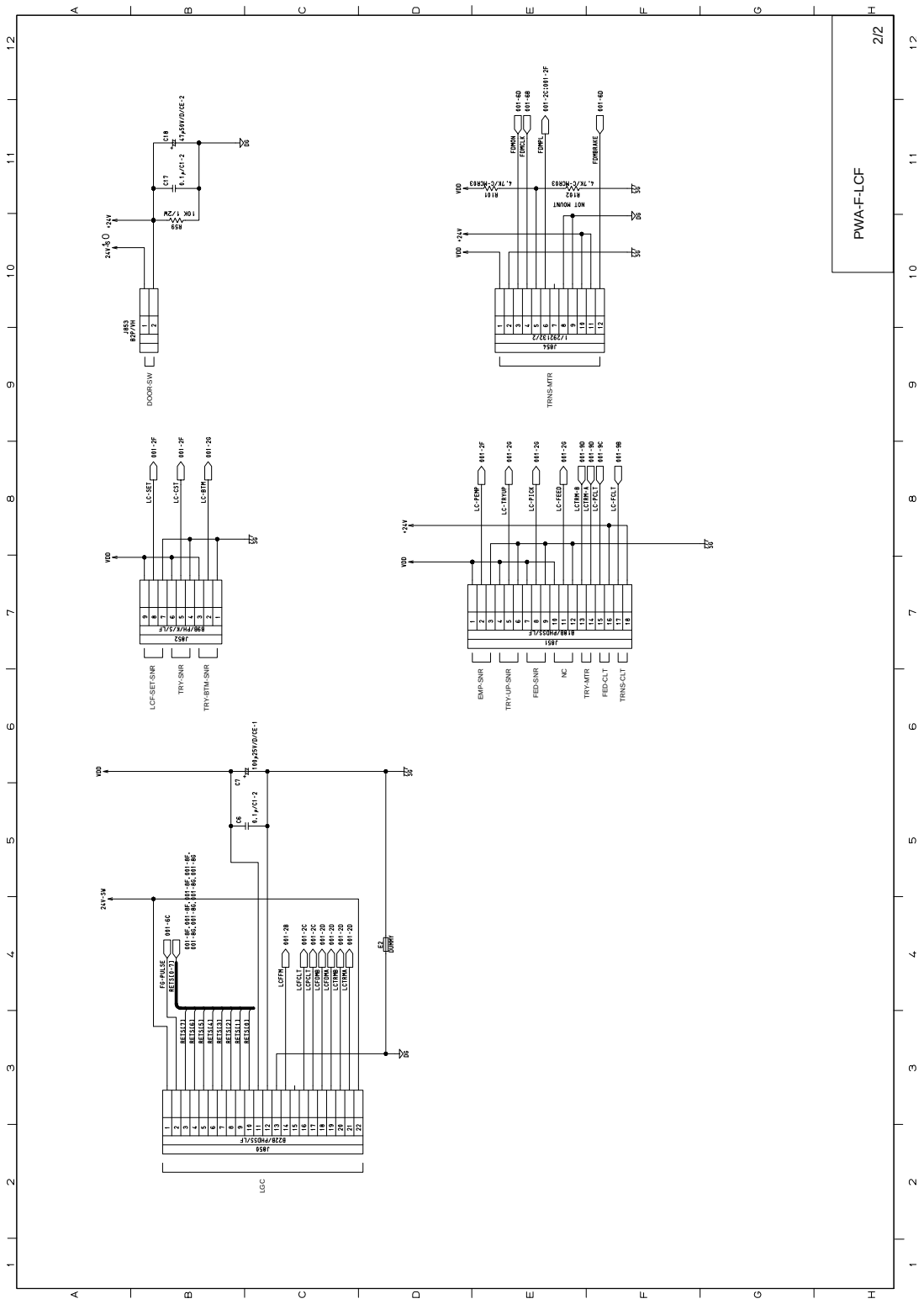


Fig. 5-3

5.3 PC Board

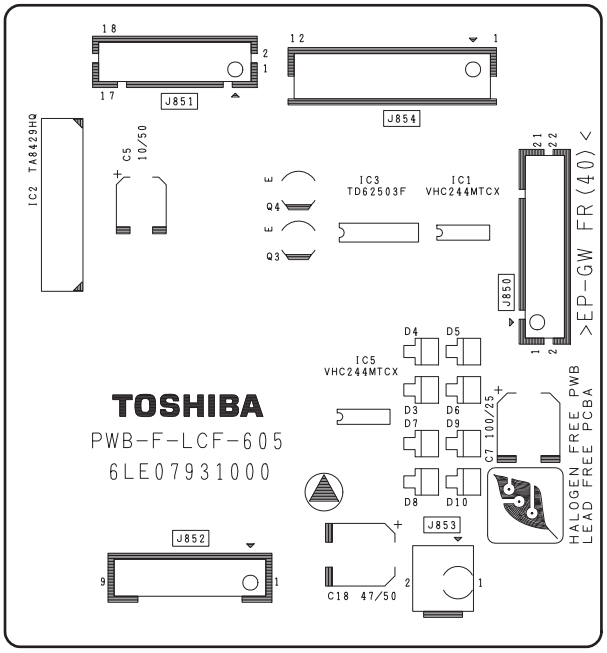


Fig. 5-4

6. PREVENTIVE MAINTENANCE

Symbols used in the checklist

Cleaning	Coating	Replacing
A: Cleaning with alcohol B: Cleaning with soft pad, cloth or vacuum cleaner	W: White grease (Molycoat)	The number of sheet consumed befor replacement (Value x 1,000) R: Replace if deformed or damaged.

Preventive Maintenance Checklist

Notes:

- Perform cleaning and lubrication in the following timing.
  - e-STUDIO520/523: every 450,000 sheets
  - e-STUDIO555/557: every 460,000 sheets
  - e-STUDIO600/603: every 500,000 sheets
  - e-STUDIO655/657: every 515,000 sheets
  - e-STUDIO720/723: every 575,000 sheets
  - e-STUDIO755/757: every 540,000 sheets
  - e-STUDIO850/853: every 600,000 sheets
  - e-STUDIO855/857: every 600,000 sheets
- Be careful not to put oil on the rollers, belt and pulleys when lubricating.

Item to check	Cleaning	Coating	Replacing x 1000	Remarks
Pickup roller	A		500	
Feed roller	A		500	
Separation roller	A		500	
Drive gears (tooth face)		W		
Brush unit	B			*1
Paper path section	B			*2

Remarks “*” in the Preventive Maintenance checklist.

*1. Remove the brush unit, and clean the paper dust of the entire brush unit.

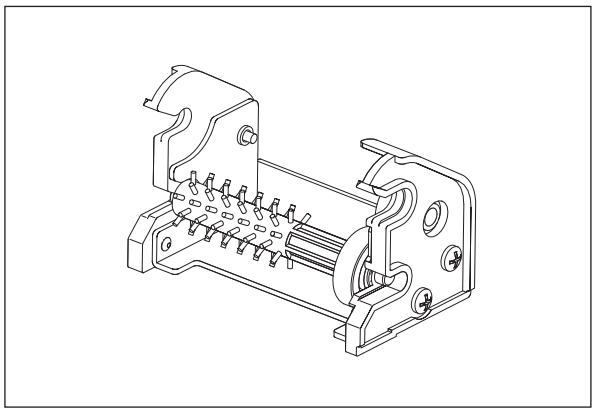


Fig. 6-1

*2. Remove the brush unit and feed roller, clean the paper dust of paper path section and the shaded area of figure bellow.

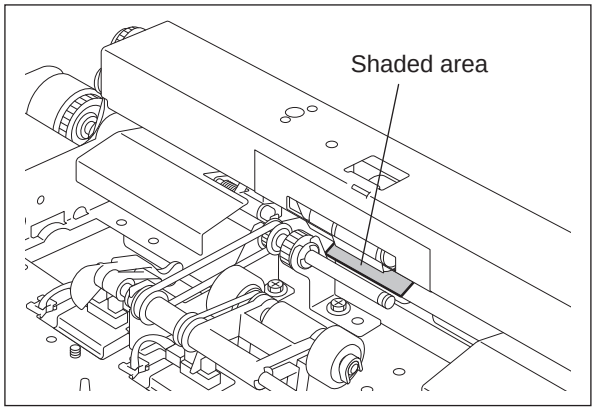


Fig. 6-2

TOSHIBA

TOSHIBA TEC CORPORATION

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