
PAPER FOLDER

DF-920/915

MAINTENANCE MANUAL

2nd Edition

Duplo

About This Manual

This maintenance manual is intended for those familiar with maintenance work of the Duplo paper folder DF-500 series. Sections found in the maintenance manual of the DF-520N have been omitted. Refer to the maintenance manual for DF-520N for these sections.

Precautions on Maintenance

- Disconnect the power cord from the outlet to ensure safety when implementing maintenance work.
- Use a non-flammable type air spray. Read the instructions on use carefully and be sure to observe them.
- Notify users who have remodeled this unit that they are required to ensure safety at their own responsibility.

Consumables Used for Maintenance (Grease, etc.)

This manual lists the standard products and specifications for consumables used in maintenance such as grease, etc. If these products are not available, use products that comply with the specifications indicated.

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CHAPTER 1

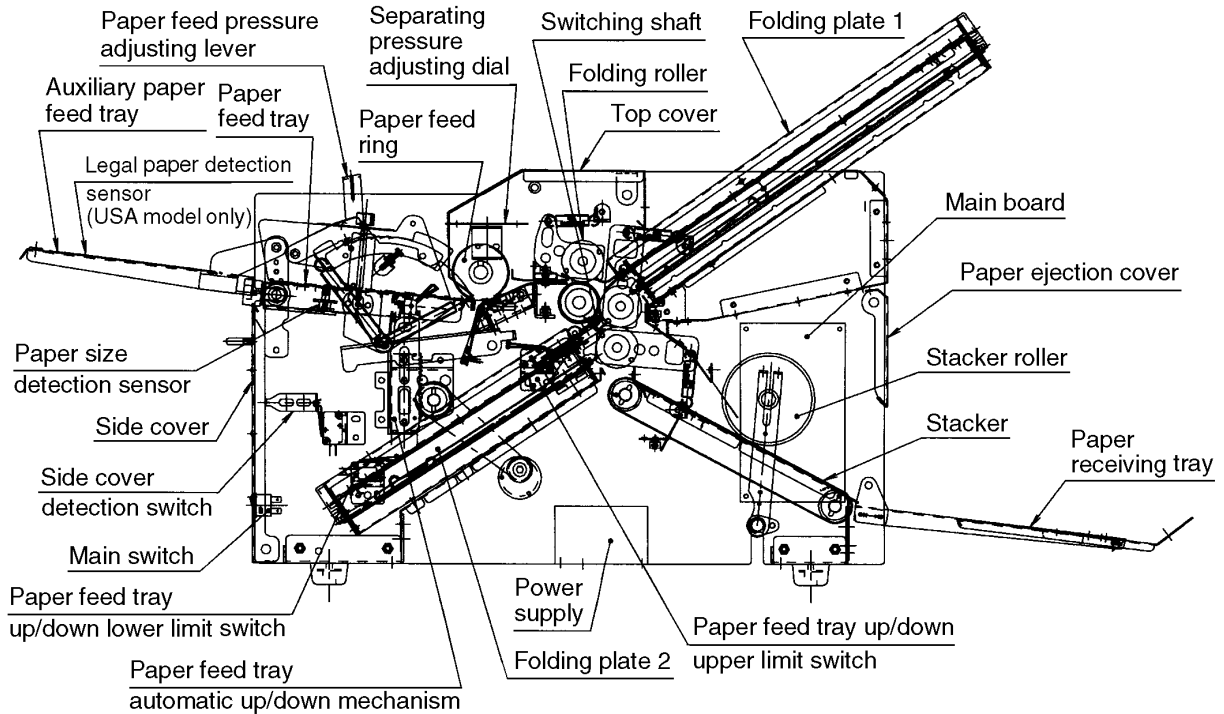
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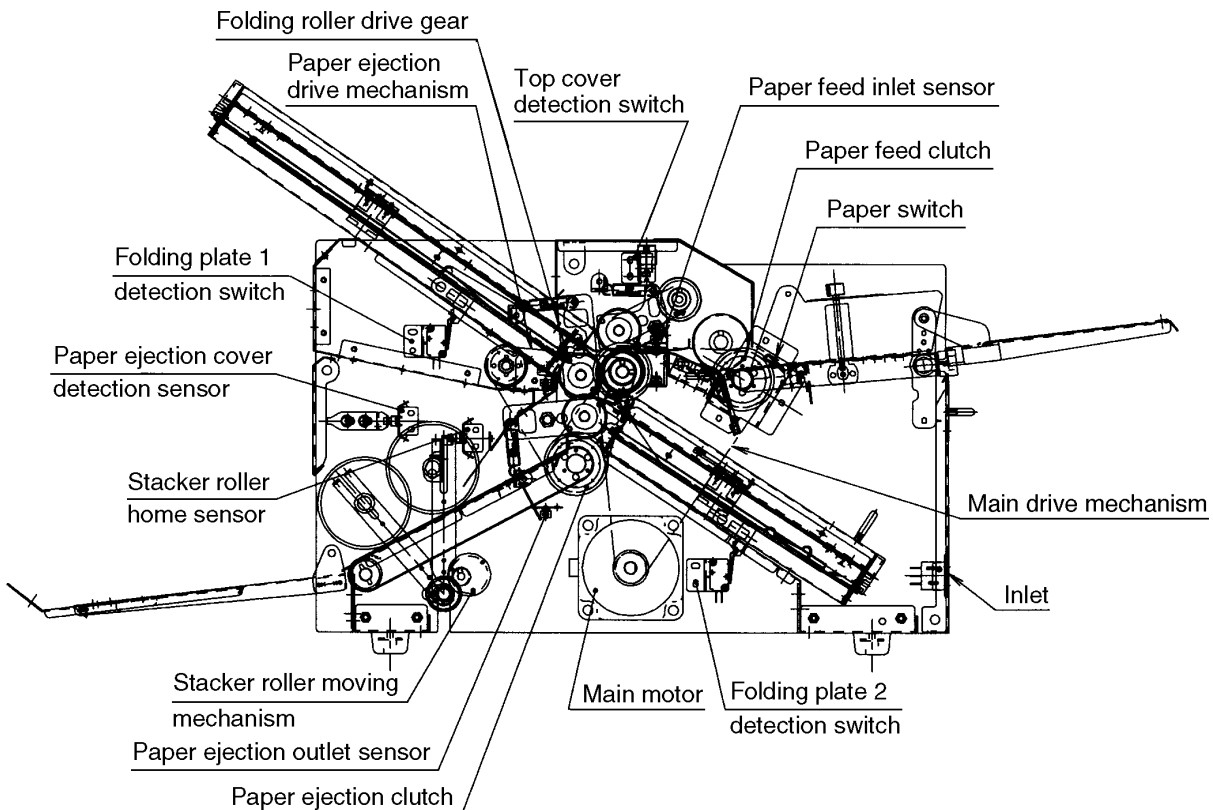
1. OUTLINE OF MACHINE

1-1. Names of Parts

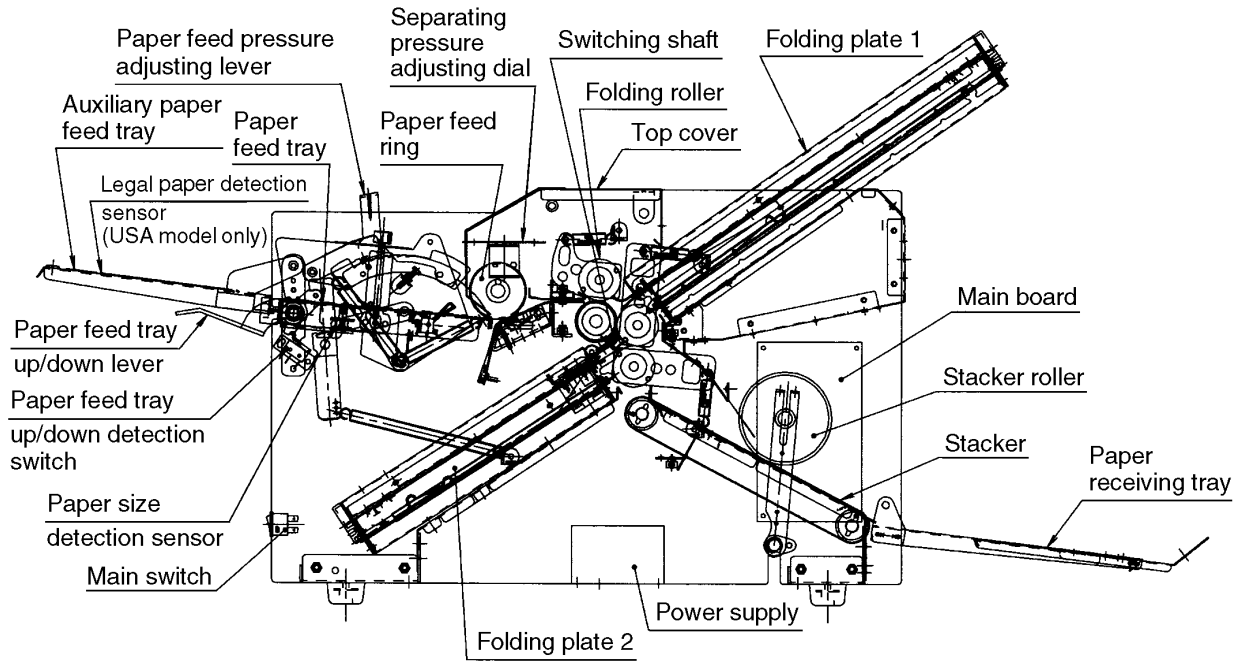
◆ DF-920



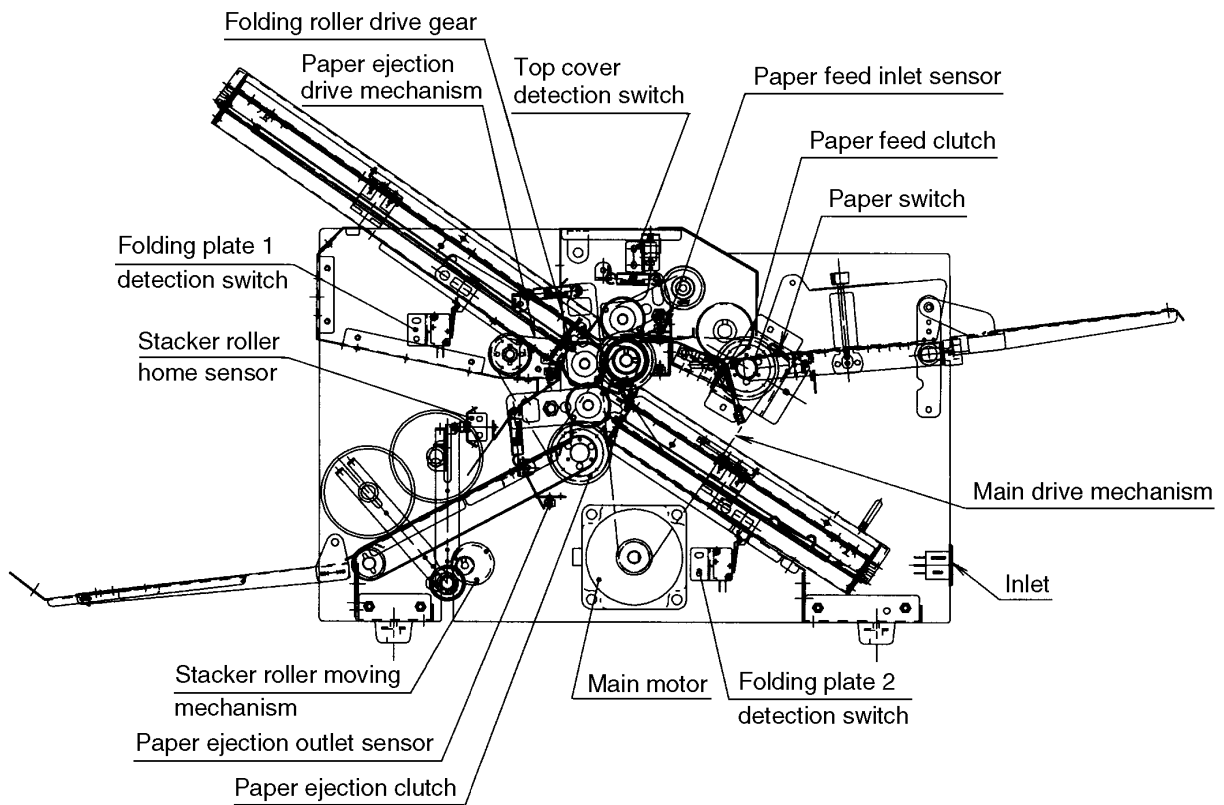
Front view (Operating side)



Rear view (Drive side)



Front view (Operating side)



Rear view (Drive side)

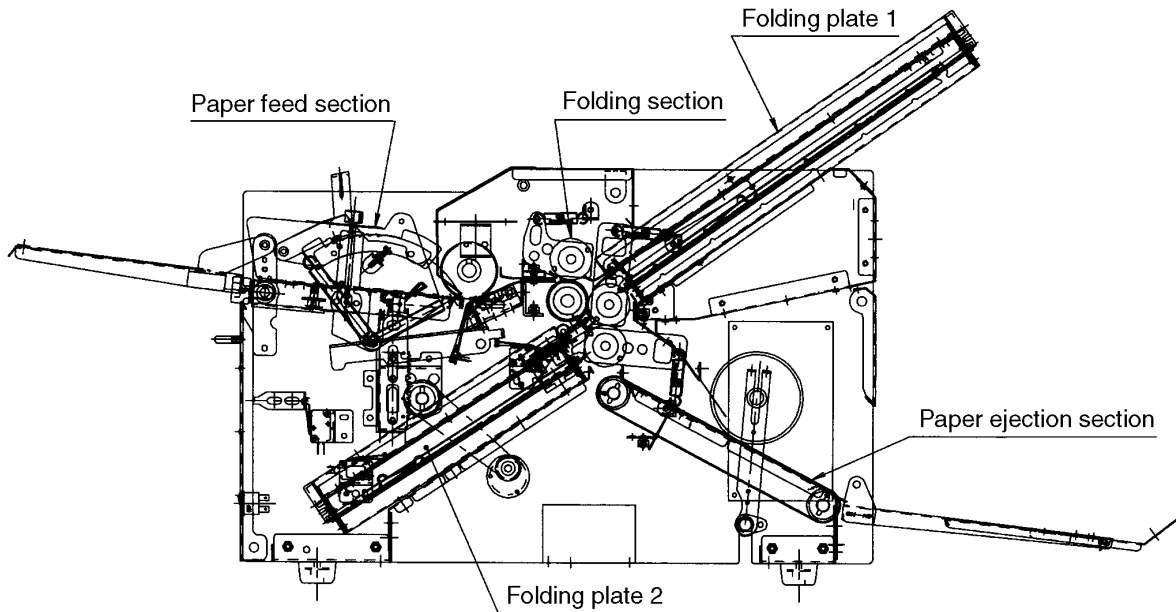
1-2. Layout of Folding Plates and Folded Size by Folding Mode

The DF-900 series is equipped with folding plates to ensure smooth paper conveyance from paper feed to ejection. This section describes the layout of folding plates and folded size by folding plates 1 and 2 in each folding mode.

1-2-1. Layout of folding plates

As seen from the control panel side, the paper feed section is located at the top left, folding plate 1 at the top right, folding plate 2 at the bottom left, and paper ejection section at the bottom right.

This layout subjects paper to the least stress from paper feed to ejection. However, because folding plate 2 is located at the lower side of the paper feed section, this makes adjustment of the folded size by hand difficult, and all folded size adjustments must be performed on the control panel.

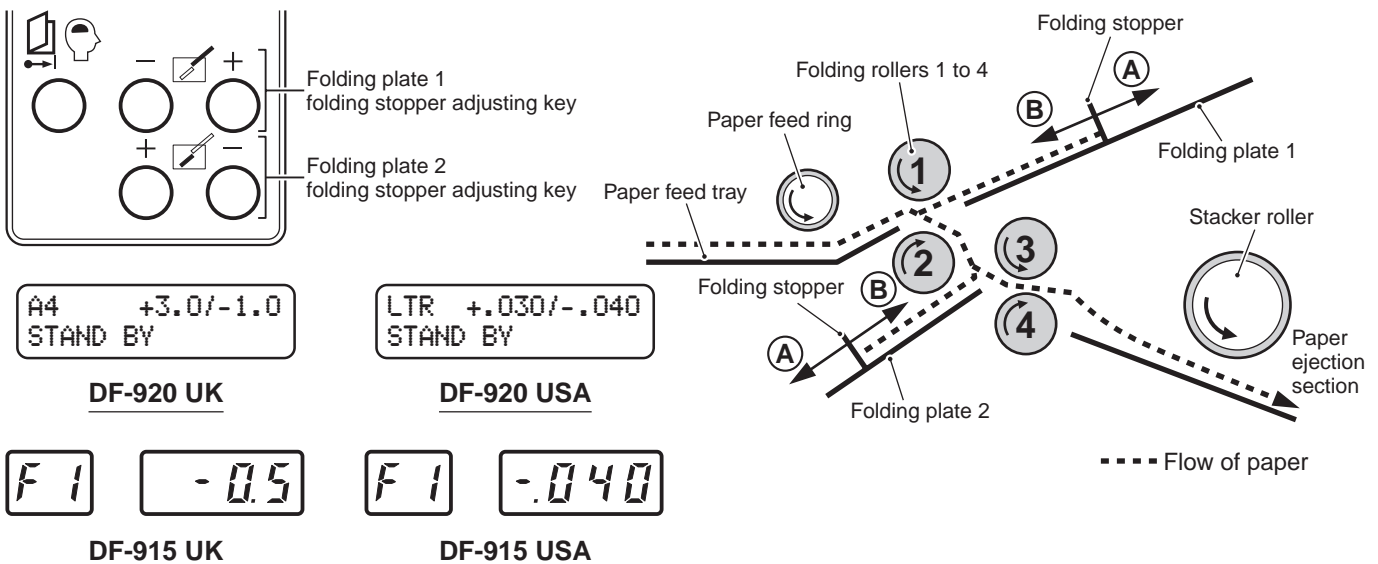


Adjusting the folded size (folding position)

Folded size (folding position) is adjusted by moving the folding stopper using the folding stopper adjusting keys of folding plates 1 and 2 on the control panel.

Each time the key is pressed, the folding stoppers move by 0.125 mm (0.005"). The window shows the distance moved. At this point, the folding stoppers do not move. They move when the start or test key is pressed.

Pressing the "+" key moves the folding stoppers of folding plates 1 and 2 in direction (A) shown in the figure. Pressing the "-" key moves them in direction (B).



1-2-2. Folded size by folding plates 1 and 2 in each folding mode (theory)

The values in the table below are theoretical values. In actual use, folded size is finely adjusted according to the folding mode to prevent dog ears and curling of paper.

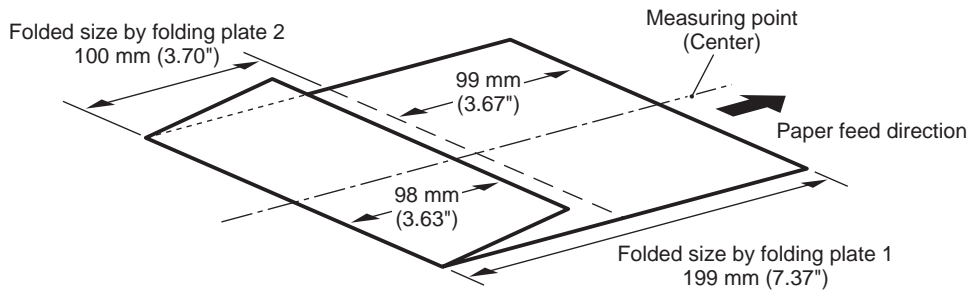
Folding mode	Single fold	Double fold	Irregular accordion fold	Letter fold	Accordion fold	Brochure fold
Folded size by folding plate 1 (Ratio to paper length)	1/2	1/2	1/4	2/3	1/3	3/4
Folded size by folding plate 2 (Ratio to paper length)	0	1/4	1/4	1/3	1/3	1/4

Example: Letter folding A4 (Letter) paper

A4 (Letter) paper length: 297 mm (11")

- Folded size by folding plate 1: 199 mm (7.37") (About 2/3 of paper length)
- Folded size by folding plate 2: 100 mm (3.70") (About 1/3 of paper length)

* Measure the folded size at the center of the paper.



* () shows the folded size for letter size paper.

2. OUTLINE OF MECHANISMS AND ADJUSTMENTS

2-1. Folding Section and Drive Mechanism

The folding section is the most basic paper folding mechanism. It is composed of folding rollers, press lever, reference stoppers, etc.

The drive mechanism distributes driving force from the main motor to the folding rollers, paper feed mechanism, and stacker mechanism.

2-1-1. Cleaning the folding rollers

Clean off dirt on the surface of the idler roller, center press roller, and folding rollers 1 and 2 with alcohol. Use of other solvents may deform the surface of the rubber roller.

Note Always turn off the power when cleaning. Also take precautions against fire and ensure ventilation when using alcohol.

2-1-2. Replacing folding rollers

(1) Removing/attaching order of folding rollers

Remove in the order of idler roller, center press roller, folding roller 1, and folding roller 2.

Attach in the reverse order of the above.

- Note**
- As the center press roller is incorporated with a switching shaft unit, be careful not to deform the switching angle during removal.
 - As the folding rollers are incorporated with keys, collars, and flat pins for securing the drive gears (helical gears), be careful not to lose these during removal.
 - Make sure that there is no grease or oil on the side of the switching shaft passed by paper.

(2) Attaching the press lever

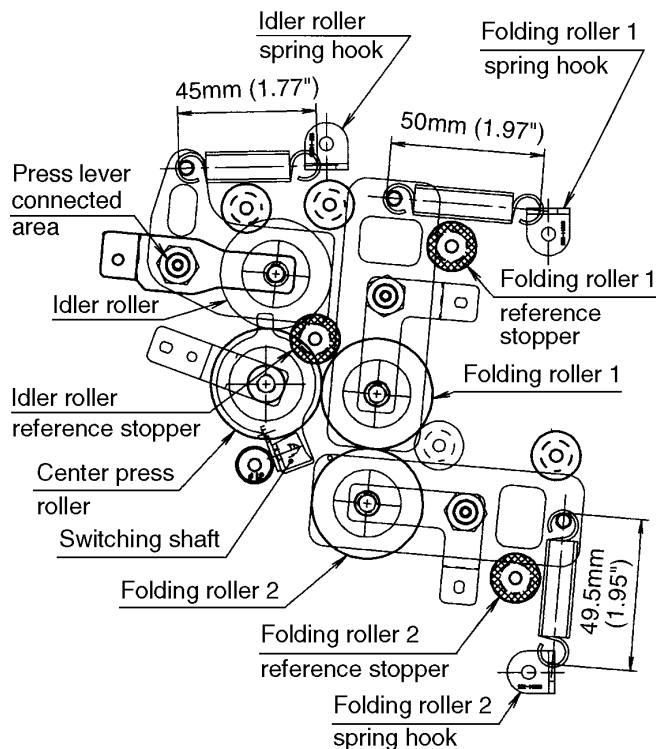
Apply a small amount of oil to the area where the press reference pillar and press lever are connected.

(Orelube G90-140: Equivalent to ISO #460)

(3) Attaching the reference stoppers

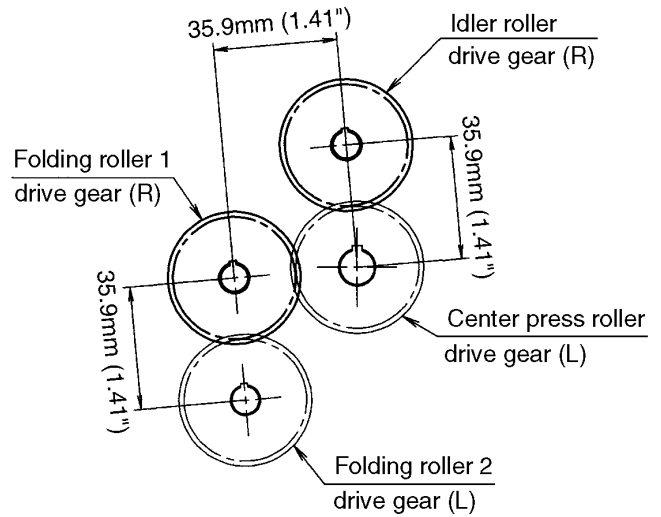
● The reference stoppers minimize deformation of the rubber roller (nip), maintain appropriate distance between the folding roller shafts, and maintain backlash of the drive gear (helical gear).

● Secure the reference stoppers in the order of idler roller, folding roller 1, and folding roller 2 with the folding rollers in contact.

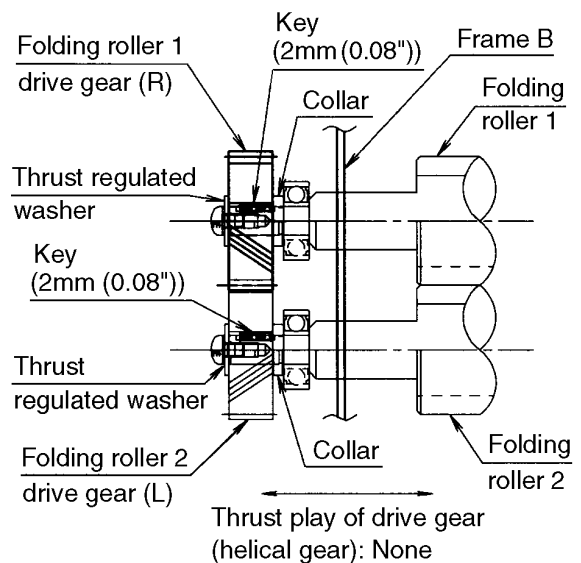
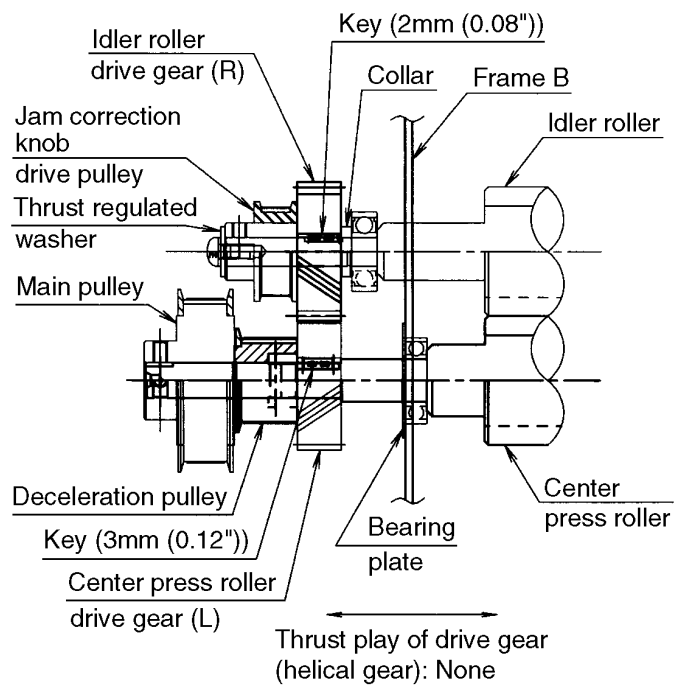


(4) Attaching the drive gear (helical gear) of folding roller

- Attach the press spring T and regulated stopper after attaching the drive gear. This helps facilitate attaching of the drive gear.
- Attach the key, flat pin, and deceleration pulley for securing the drive gear to the center press roller.
- Attach the key, collar, timing pulley, and thrust regulated washer for securing the drive gear to the idler roller.
- Attach the key, collar, and thrust regulated washer for securing the drive gear to folding rollers 1 and 2.
- The teeth of the helical gear is subject to force in the thrust direction during rotation. When securing the thrust regulated washer with screws, check that the helical gear does not move in the thrust direction. Using gears in the thrust play state may cause abnormal wear on the gear teeth side and wrinkles of the paper due to paper slipping.



Backlash of whole circumference of drive gear (helical gear): 0.1 to 0.2mm (0.004" to 0.008")



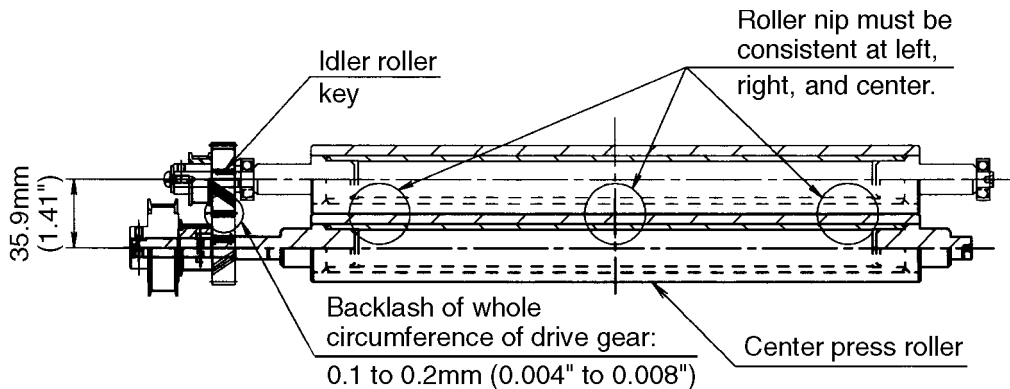
- After attaching the drive gear, apply press force to all folding rollers, and check the following points.
 - Rotate the folding rollers for one round, and check that there is uniform roller nip (surface hollowing amount of rubber roller) in all directions (left, right, center) between all folding rollers.
 - Make sure that gear engagement is ample, and the rollers rotate smoothly.

At this time, if the nip amount on the left and right differs between folding rollers, paper may slip.

- Roller nip : 0.1 mm (0.004") (folding roller shaft distance: 35.9 mm (1.41"))
- Folding roller drive gear backlash: 0.1 to 0.2 mm (0.004" to 0.008") for above distance between folding roller shafts

Check the gear backlash with the folding roller key removed.

- Apply grease to the whole circumference of the drive gear. (Orelube G1650: Equivalent to NLGI #1)

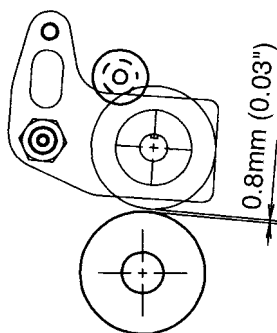


(5) Attaching the regulated stopper

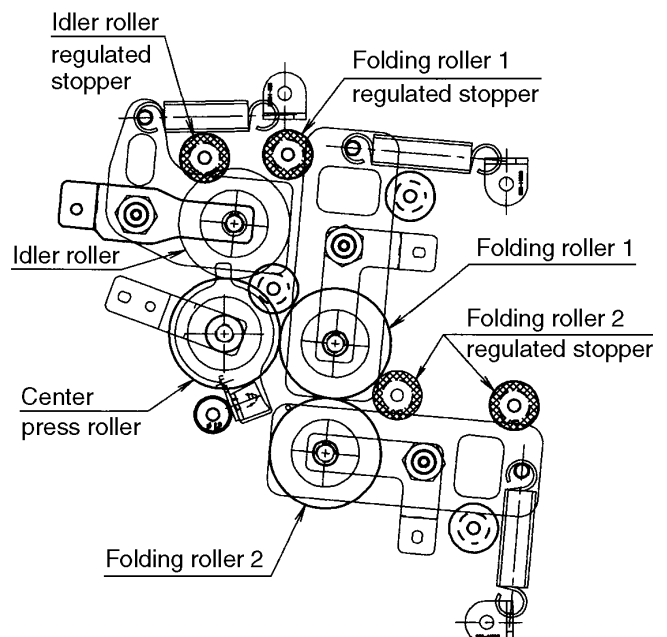
- The regulated stopper helps prevent inference between teeth resulting from excess distance between the drive gears (helical gears), maintaining proper engagement all the time, and regulating force in the thrust direction imposed on the helical gear.

- The regulated stopper is secured at the position indicated in the figure. The regulated movement amount of each folding roller is as follows.

- Idler roller : 0.8 mm (0.03") (1.5°)
- Folding roller 1 : 0.8 mm (0.03") (1.5°)
- Folding roller 2 : 1.1 mm (0.04") (2°)



Regulated movement amount of idler roller

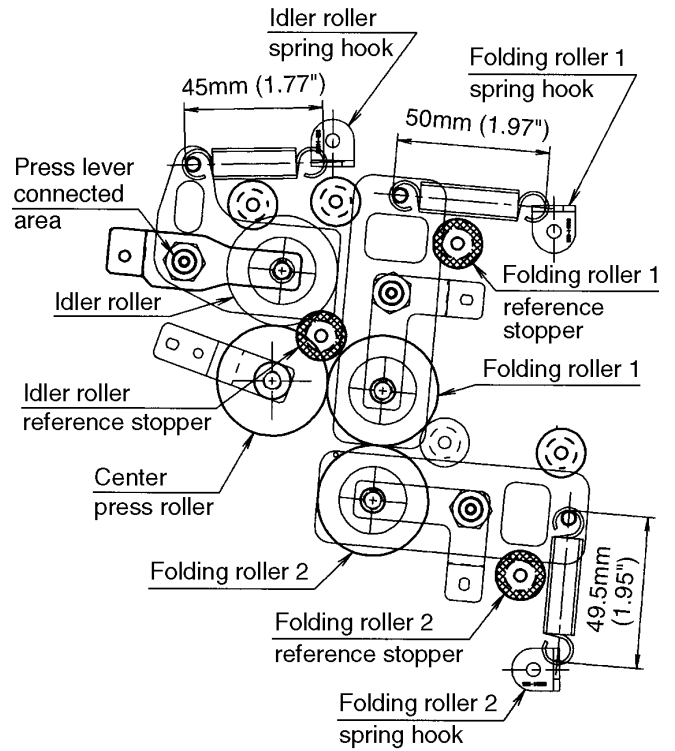


(6) Attaching the press spring T

① Secure the spring hook at the position shown in the figure, and attach the press spring T. (Primary adjustment in the assembly stage)

- Spring T inner dimensions of idler roller:
45 mm (1.77")
(Spring pressure: 23.5 N \pm 8.5%)
- Spring T inner dimensions of folding roller 1:
50 mm (1.97")
(Spring pressure: 38.8 N \pm 8.5%)
- Spring T inner dimensions of folding roller 2:
49.5 mm (1.95")
(Spring pressure: 37.2 N \pm 8.5%)

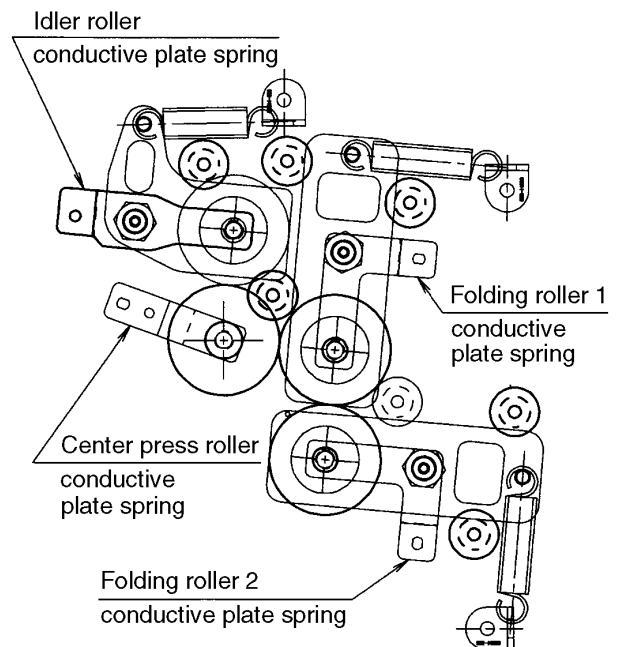
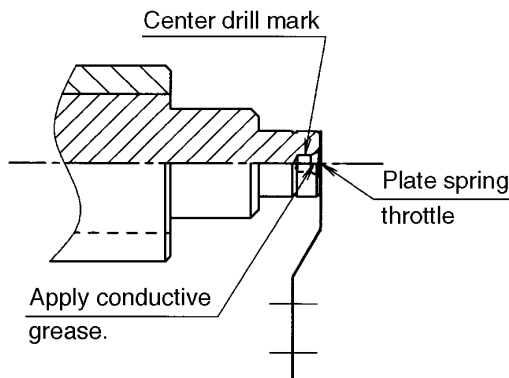
② Perform test folding, and if wrinkles or extreme folding misalignment along the sides of the paper occur, check the balance between the left and right pressure, and adjust by changing the spring hooking direction. (Secondary adjustment by passing paper)



(7) Attaching the plate spring (grounding conduction)

The plate spring helps static electricity accumulated in folding rollers to escape to the chassis.

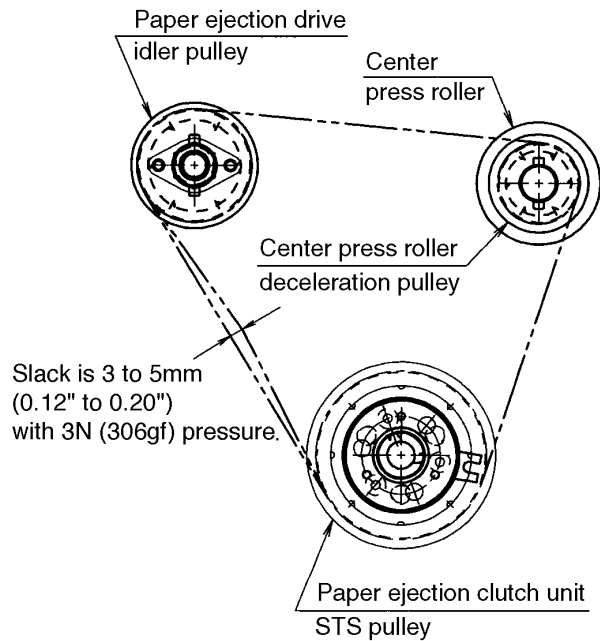
- ① Attach so that the center drill mark of the folding roller edge and throttle of the plate spring contact. Check that no anticorrosive coating is applied to the contact area of the folding roller edge.
- ② Apply conductive grease to the plate spring. (Dow Corning MOLY KOTE 41)



(8) Adjusting the tension of the paper ejection drive timing belt

- Inappropriate tension of the belt may cause such problems as noise, slips, etc.

- Using a tension gauge of 5 N (510 gf), apply pressure of 3 N (306 gf) to the belt, and check that the belt slacks by 3 to 5 mm (0.12" to 0.20").

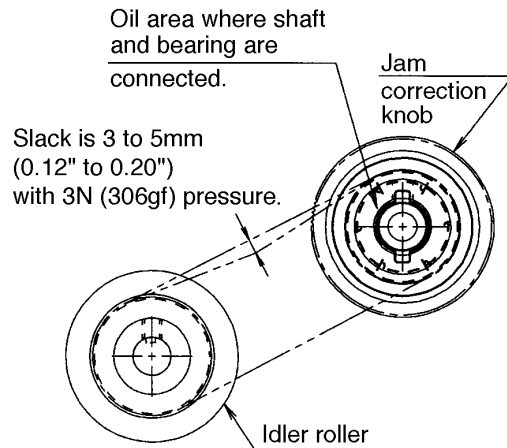


(9) Adjusting the tension of the drive belt for the jam correction knob

The jam correction knob rotates the folding rollers during jam correction and cleaning of folding rollers to facilitate work.

① Check that when the jam correction knob is rotated, the folding rollers rotate smoothly.

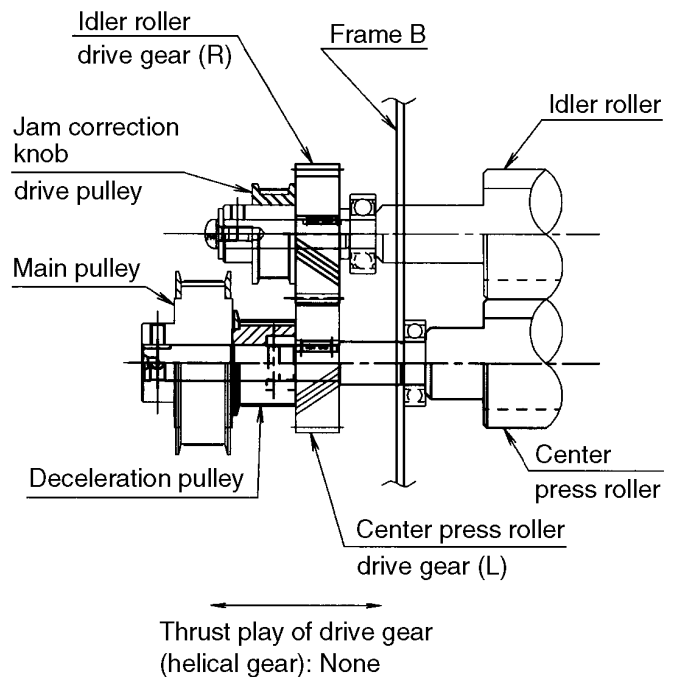
② Using a tension gauge of 5 N (510 gf), apply pressure of 3 N (306 gf) to the belt, and check that the belt slacks by 3 to 5 mm (0.12" to 0.20").



(10) Attaching the main pulley of the center press roller, and jam correction knob drive pulley of the idler roller

① While pressing the main pulley against the frame B side so that there is no thrust play of the helical gear, attach it to the center press roller.

② While pressing the knob drive pulley against the frame B side so that there is no thrust play of the helical gear, attach it to the idler roller.



2-1-3. Adjusting the tension of the main drive timing belt

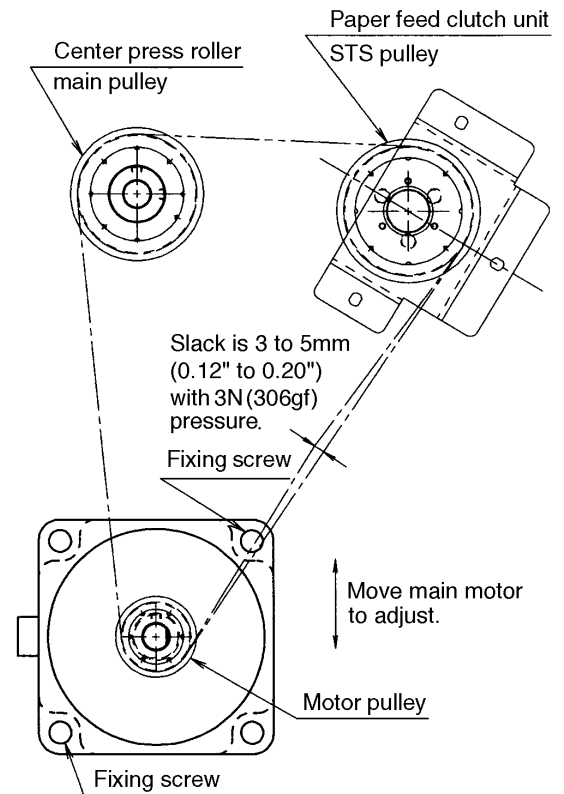
Inappropriate tension of the belt may cause such problems as noise, slips, etc.

- ① Set the drive belt on the paper feed clutch unit, and secure the bracket.



“2-1-6. Attaching the paper feed clutch unit”

- ② Loosen the two screws securing the main motor and adjust the tension of the belt so that it slacks by 3 to 5 mm (0.12" to 0.20") when a pressure of 3 N (306 gf) is applied to the belt using a 5 N (510 gf) tension gauge.



2-1-4. Paper ejection drive shaft

The stacker belt is driven at high speed intermittently using the electromagnetic clutch to enhance stacking performance and processing speed.

Replace the paper ejection clutch using the following procedure.

① Check the accessories provided with the paper ejection clutch unit.

- Shim (adjusting washer, $t = 0.1$): 3
- Collar: 1

② Check for thrust play of the paper ejection drive shaft at frame F side. At shipment, a shim (adjusting washer) is inserted between the paper ejection drive shaft and bearing to control thrust play to below 0.1 mm (0.004").

Check that thrust play is not minus (pressed state).

③ While ensuring the ② state, attach and secure the clutch rotor at frame B side.

④ Attach the collar, shim, armature (STS pulley) provided with the paper ejection clutch unit as a set to the drive shaft.

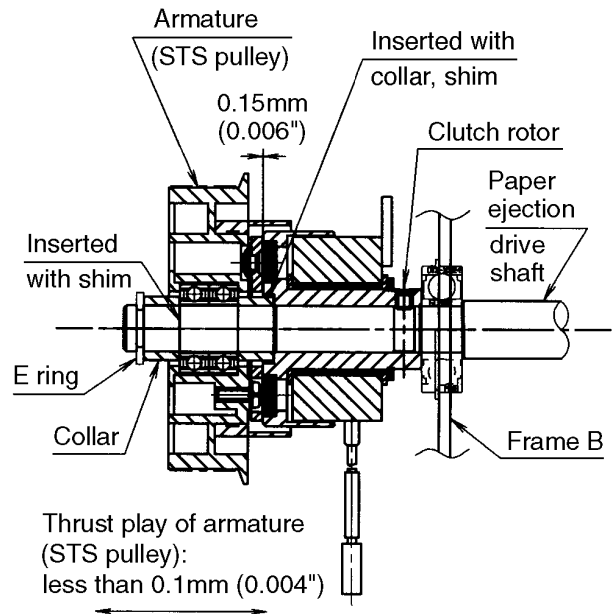
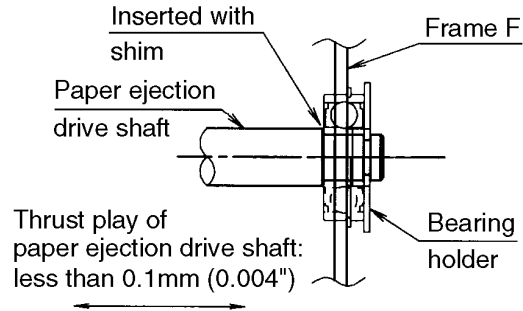
Note

- As the paper ejection clutch unit is adjusted to an air gap (0.15 mm (0.006")) at shipment, always attach the above parts to the machine as a set.
- Do not apply oil to the contacting area of the clutch rotor and armature.

⑤ Using the shim provided, adjust so that thrust play of the collar and E ring outside the armature becomes less than 0.1 mm (0.004").

⑥ Check that the armature rotates smoothly. Also check that paper ejection drive shaft does not rotate when the armature rotates.

⑦ Apply a very small amount of oil to the area where the drive shaft and bearing are connected. (Orelube G90-140)



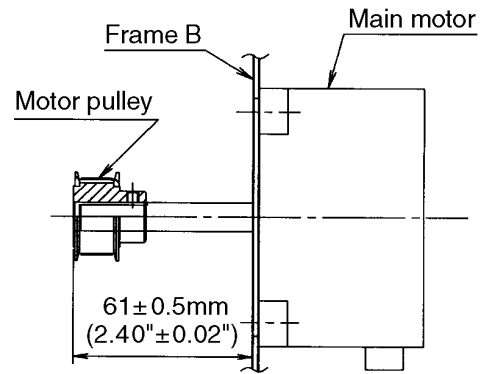
Armature (STS pulley) of paper ejection clutch unit must rotate smoothly.

2-1-5. Attaching the motor pulley

If the motor pulley is not attached at the proper position, slipping of the drive belt and abnormal wear may result.

Replace the main motor using the following procedure.

- ① Attach the motor pulley to the main motor at the position shown in the figure.
- ② After attaching, rotate the main motor and check that the belt does not slip.

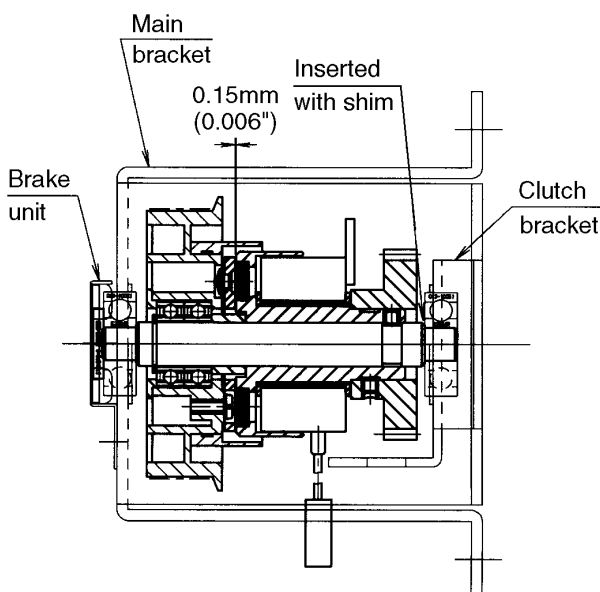


2-1-6. Attaching the paper feed clutch unit

With the DF-900 series, an electromagnetic clutch is used as a paper feed clutch to enhance processing speed and stabilize paper feed performance.

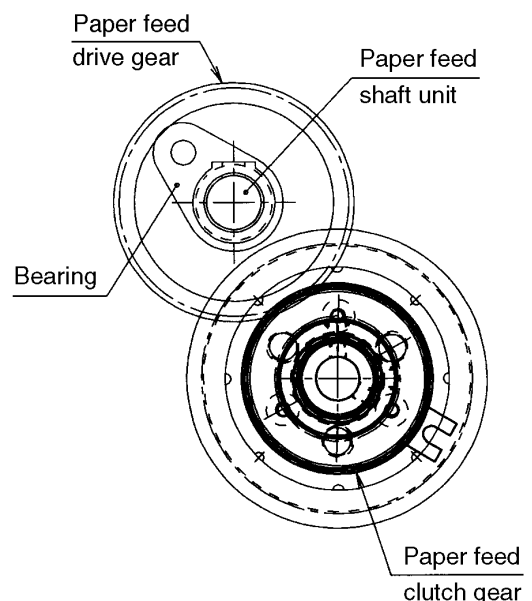
Replace the paper feed clutch using the following procedure.

- ① Check for thrust play of the paper feed clutch drive shaft at the clutch bracket side. At shipment, a shim (adjusting washer) is inserted between the paper feed clutch drive shaft and bearing to control thrust play to below 0.1 mm (0.004").
Check that thrust play is not minus (pressed state).
- ② While ensuring the ① state, insert the bearing at the main bracket side, and secure the paper feed clutch unit.
- ③ Apply a very small amount of oil to the area where the drive shaft and bearing are connected. (Orelube G90-140)
- ④ Check that the paper feed drive gear (42T) and paper feed clutch gear (33T) are engaged appropriately along the whole circumference (backlash: 0.1 to 0.2 mm (0.004" to 0.008")), and that they rotate smoothly.
Adjust the backlash by changing the clutch bracket position.
- ⑤ Apply grease to the whole circumference of the gear teeth. (Orelube G1650)



Thrust play of paper feed clutch drive shaft: less than 0.1 mm (0.004")

Armature (STS pulley) of paper feed clutch unit must rotate smoothly.

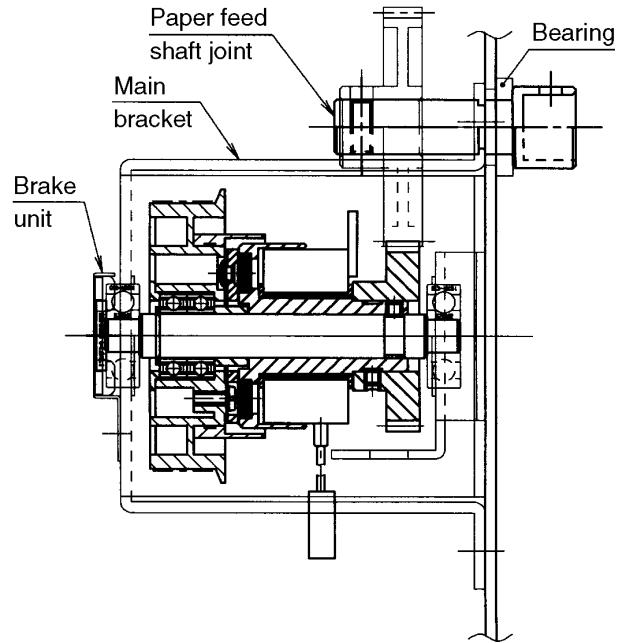


Backlash of whole circumference of paper feed drive gear: 0.1 to 0.2mm (0.004" to 0.008")

2-1-7. Attaching the brake unit

The brake unit reduces inconsistency in the stopping position of the paper lead edge during paper feed, and stabilizes the jam detection timing and number of sheets processed.

- ① To prevent abnormal sounds due to the use of the friction brake mechanism, apply a very small amount of grease to the urethane area of the brake unit and attach. (Orelube G1650)
- ② After attaching the brake unit, check that the rotating torque of the paper feed shaft unit is 0.0147 to 0.0245 Nm (0.15 to 0.25 kgf • cm) with the paper separator and paper feed ring not in contact. However, even if the rotating torque does not meet the above value, if the stopping position of the paper lead edge is stable without touching the paper feed inlet sensor it means that paper feed is stable and no re-adjustments are required.
- ③ Apply a very small amount of oil to the area where the paper feed shaft joint and bearing are connected. (Orelube G90-140)



2-2. Paper Feed Tray

As the paper feed tray mechanism is more or less the same as the DF-520N, only the differences are described in this section.

2-2-1. Automatic paper size detection

Photosensors are located at the standard paper size positions. Paper size is detected when the shield attached to the paper feed guide blocks a sensor.

For USA models, the auxiliary paper feed tray is also provided with a photosensor to differentiate between legal size and letter size.

The automatic detection range is within ± 7 mm (0.28") from standard paper size.

The paper feed guides move together left and right from the center of the paper feed tray.

Standard paper size which can be automatically detected

UK model : A3, B4, A4, B5, A5, B6 (6 types)

USA model: LGR, LGL, LTR, STMT, INV (5 types)

2-2-2. Paper size which can be stacked

- Distance moved by paper feed guide : Maximum 310 mm (12.2")
: Minimum 76 mm (3.0")
- Paper width which can be fed : Maximum 305 mm (12.0") * 297 mm (11.7") in specifications: Width of A3 paper
: Minimum 76 mm (3.0") * Width of B7 paper
- Paper length which can be fed: Maximum 432 mm (17.0")
: Minimum 128 mm (5.1") * Length of B7 paper

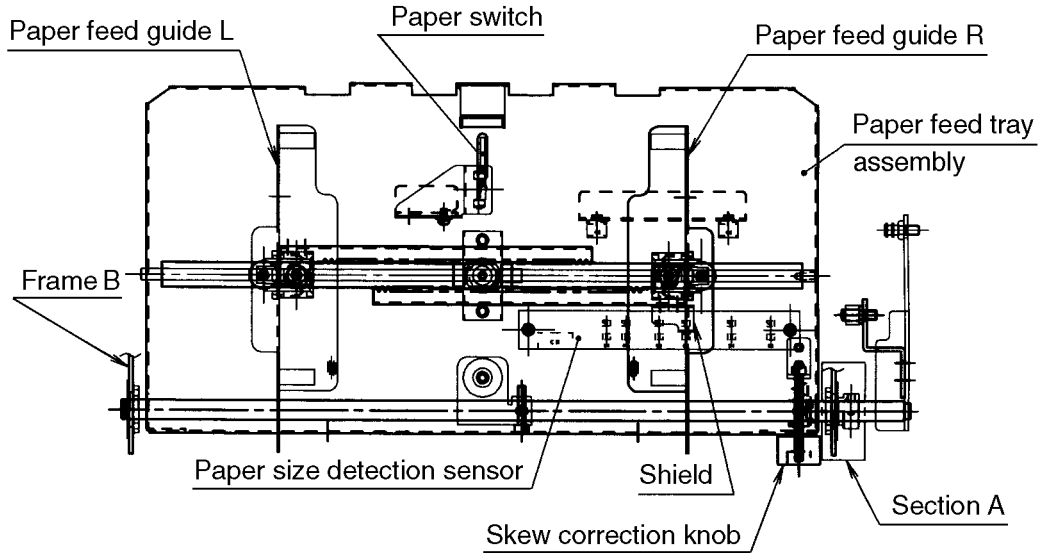
The above values are design specifications. In actual use, values given in instruction manual apply because they are restricted by the length of the folding plate and paper receiving allowance of the paper ejection section.

- Maximum paper size : 297 (width) \times 432 (length) mm (11.7" \times 17.0")
- Minimum paper size : 128 (width) \times 182 (length) mm (5.1" \times 7.2")

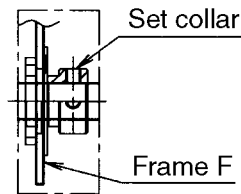
* B7 and A6 paper can be folded under certain conditions.

2-2-3. Attaching the paper feed tray assembly

- Take note when attaching the paper feed tray assembly because the direction of the set collar differs between the DF-920 and DF-915 according to whether the paper feed tray up/down lever is provided or not.
- Secure the set collar with some thrust play (0.1 to 0.2 mm (0.004" to 0.008")). Otherwise, load increases when the paper feed tray rises, resulting in insufficient paper feed pressure even if the pressure is adjusted, and paper slips occur easily.
- Apply a very small amount of oil to the area where the fixed plate bearing and hinge rod are connected. (Orelube G90-140)

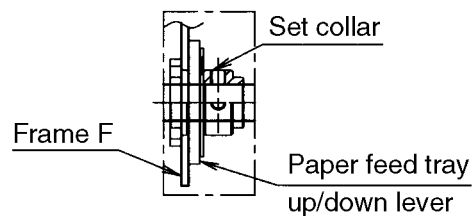


DF-920 set collar
attaching direction



Thrust play:
0.1 to 0.2mm (0.004" to 0.008")

DF-915 set collar
attaching direction



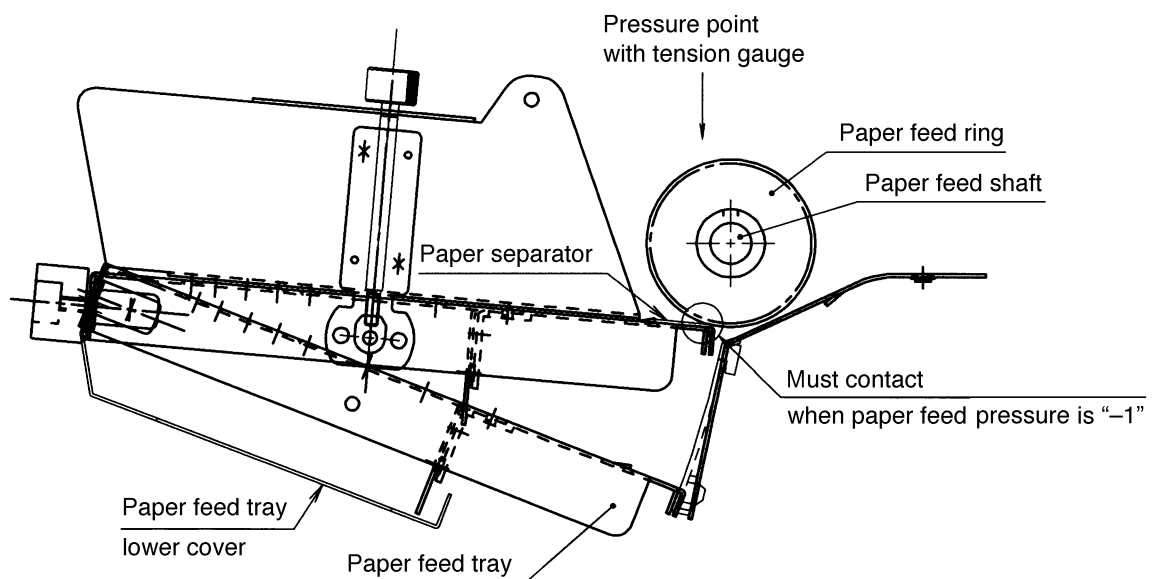
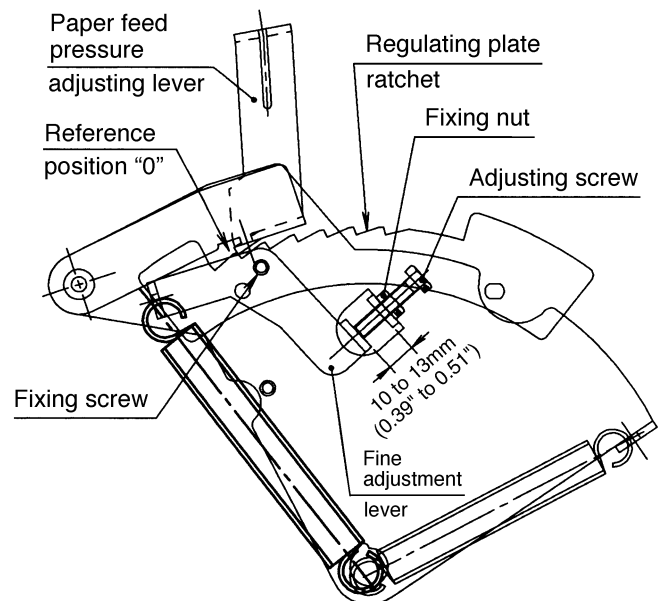
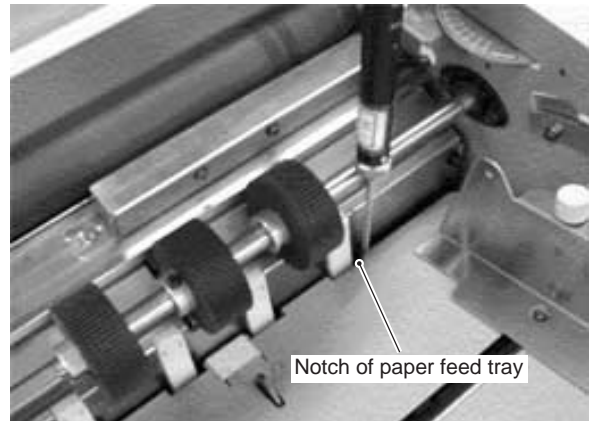
Thrust play:
0.1 to 0.2mm (0.004" to 0.008")

Enlargement of section A

2-2-4. Adjusting the paper feed pressure

Adjust to the reference paper feed pressure to prevent double-feeding and slipping of paper.

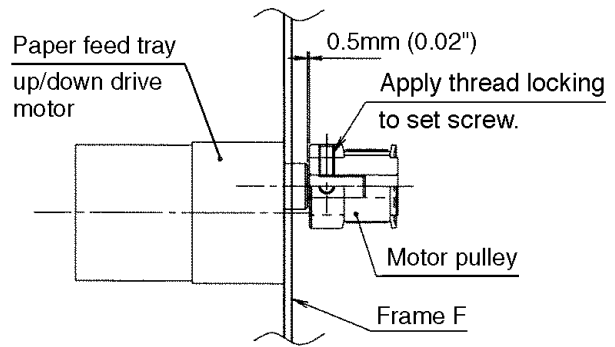
- ① Attach the paper feed tray lower cover, raise the paper feed tray, and set the paper feed pressure adjusting lever to the reference position "0".
- ② Press a 30 N (3.06 kgf) tension gauge against the notch of the operating side of the paper feed tray, and gradually increase the pressure until the paper feed shaft and tension gauge contact. Rotate the adjusting screw so that the tension gauge value becomes 6 ± 0.18 N (612 ± 18 gf) in this state. The clearance between the bracket and fine adjustment lever should be around 10 to 13 mm (0.39" to 0.51").
- ③ After adjusting, tighten the fixing nut and fixing screw to secure the fine adjustment lever.
- ④ Set the paper feed pressure adjusting lever to "-1". Check that the paper feed tray can be pushed down smoothly by hand, and check that when the paper feed tray is raised gently, the paper separator at the tip of the paper feed tray touches the paper feed ring.
- ⑤ Check that the paper feed tray moves up and down smoothly.
- ⑥ Apply a very small amount of grease to the regulating plate ratchet. (Orelube G1650)



2-2-5. Automatic up/down mechanism of paper feed tray (DF-920 only)

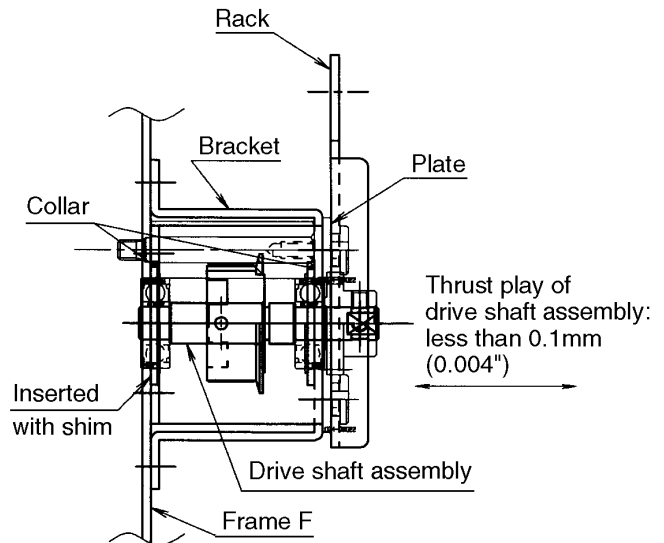
If this mechanism has been removed during motor replacement, attach it using the following procedure.

① Attach a pulley to the drive motor at the position shown in the figure.



② Apply a very small amount of thread locking to the set screw. (Loctite 242: Medium strength/for screws)

③ Check for thrust play of the drive shaft assembly. At shipment, a shim (adjusting washer) is inserted between the collar and bearing (outer ring) at frame F side to control thrust play to below 0.1 mm (0.004"). Check that thrust play is not minus (pressed state).

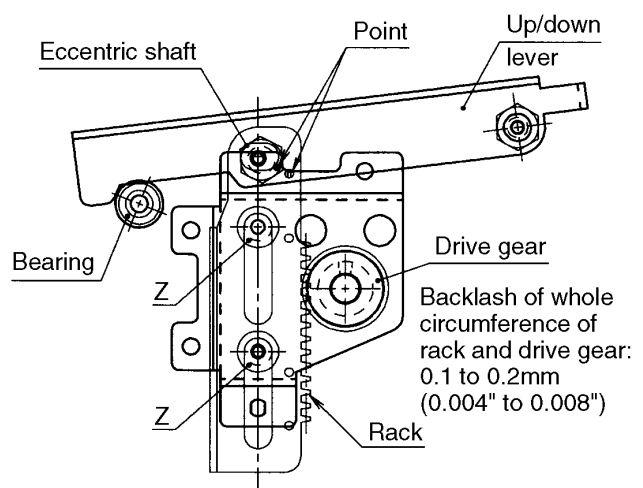


④ While ensuring the ③ state, insert the bearing and collar at the bracket side, and secure the bracket.

⑤ Apply a very small amount of oil to the area where the drive shaft and bearing are connected. (Orelube G90-140)

⑥ Attach the plate and rack so that their surfaces touch and slide.

⑦ Adjust the points on the eccentric shaft and rack, and secure temporarily. (Primary adjustment)



⑧ Move the rack up and down, and check that there is appropriate backlash (0.1 to 0.2 mm (0.004" to 0.008")) where the rack and gear engage, and the rack moves smoothly. Do not tighten the set screw of the gear just yet. Tighten after completing the adjustment of "2-2-7".

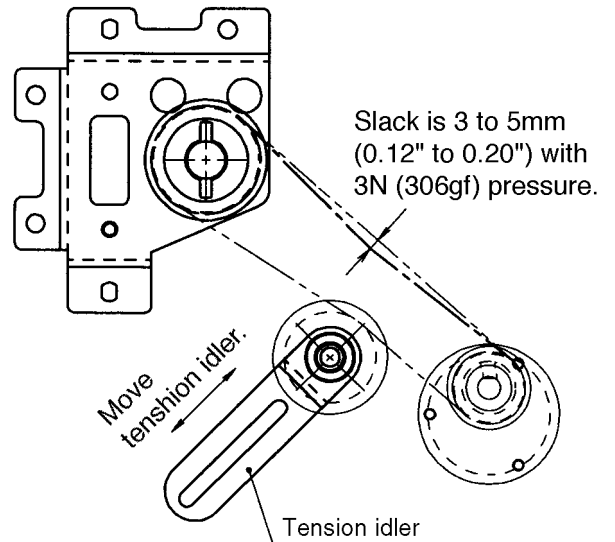
The rack fulcrum Z (0Z4-08022) is designated as a semi-durable part. Replace it appropriately after 50000 times of up/down movements of the paper feed tray.

⑨ Apply grease to the following parts. (Orelube G1650)

- Contacting area between the up/down lever and bearing outer ring
- Connected area and sliding area of the eccentric shaft and rack long hole
- Connected area and sliding area of the Z part and rack long hole
- Sliding area of the plate and rack
- Engaged area of the rack and gear

2-2-6. Adjusting the tension of the paper feed tray automatic up/down drive timing belt (DF-920 only)

- If the tension of the belt is not appropriate, problems such as faulty drive and jumping of the belt will occur.
- Move the tension idler and adjust the tension of the belt so that it slacks by 3 to 5 mm (0.12" to 0.20") when a pressure of 3 N (306 gf) is applied to the belt using a 5 N (510 gf) tension gauge.



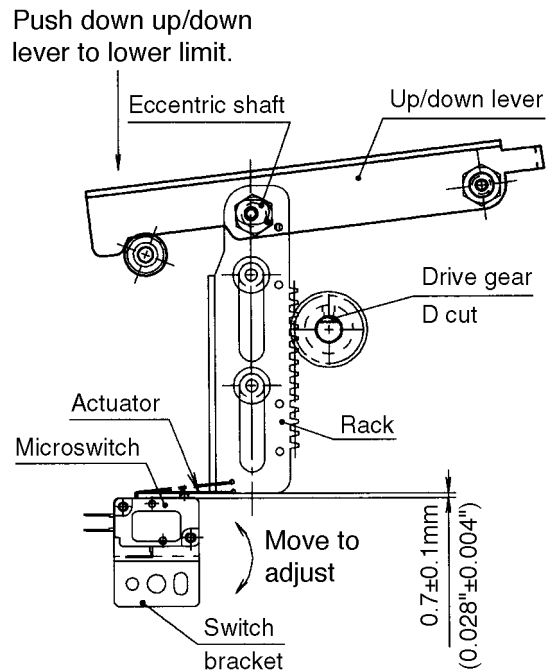
2-2-7. Adjusting the stopping position of the paper feed tray when rising/descending and paper stacking amount

◆ DF-920

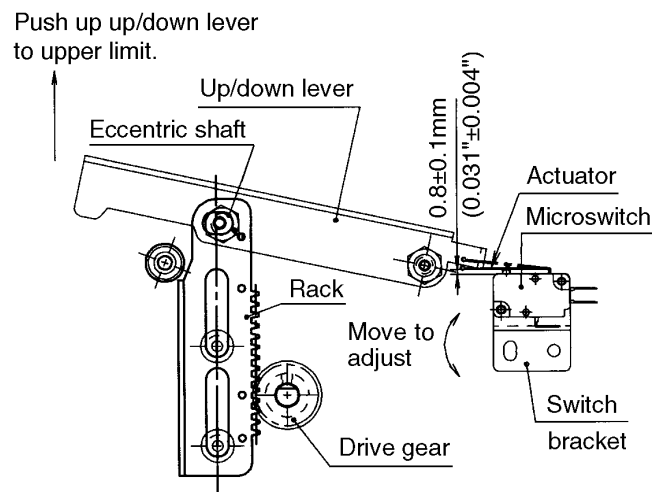
To ensure paper stacking amount which can satisfy specifications, adjust the stopping position (motor drive range) of the paper feed tray during automatic up/down.

Perform adjustments as follows without the paper feed tray automatic up/down drive gear of section “2-2-5” secured.

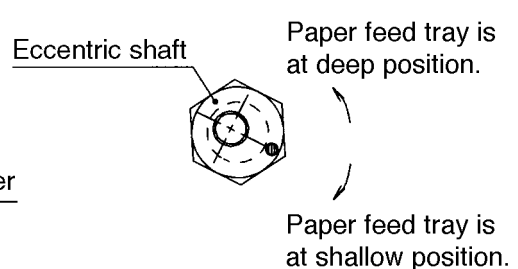
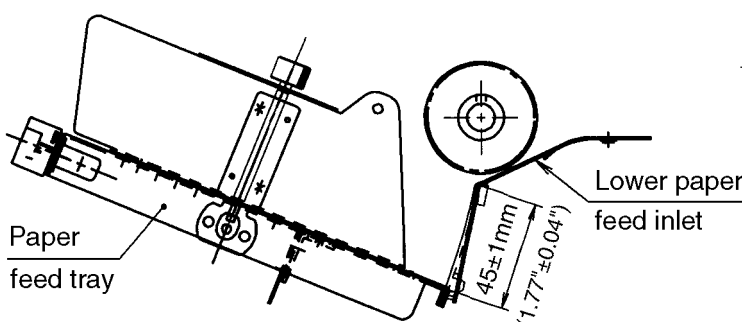
- ① Move the switch bracket for the length of the long hole and adjust so that when the up/down lever is pressed down to the lower limit, the actuator of the lower limit detection microswitch turns ON the switch, and a clearance of $0.7 \pm 0.1 \text{ mm}$ ($0.028'' \pm 0.004''$) is formed at the position shown in the figure.
- ② Move the switch bracket for the length of the long hole and adjust so that when the up/down lever is pressed up to the upper limit, the actuator of the upper limit detection microswitch turns ON the switch, and a clearance of $0.8 \pm 0.1 \text{ mm}$ ($0.031'' \pm 0.004''$) is formed at the position shown in the figure.
- ③ Tighten the set screw of the drive gear D cut, and lower the paper feed tray to the lower limit position from the control panel.
- ④ Rotate the eccentric shaft and adjust so that the paper feed tray stops at a depth of $45 \pm 1 \text{ mm}$ ($1.77'' \pm 0.04''$) from the bent part of the lower paper feed inlet. The paper stacking amount given in specifications is 500 sheets (approximately 44 mm (1.73'')) for fine quality paper 64 g/m² (16 lb).



When the paper feed tray descends



When the paper feed tray rises



⑤ After adjusting the paper stacking amount, raise and lower the paper feed tray from the control panel, and check the following.

To raise the paper feed tray from the control panel, press the “+” key of the folding plate 1 folding stopper adjusting key while pressing the stop key.

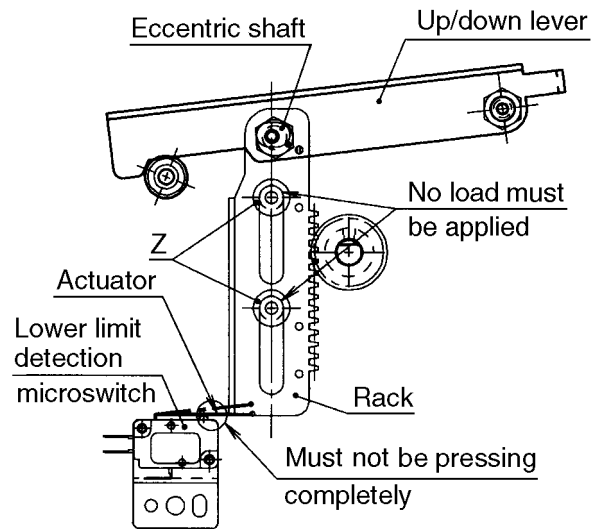
To lower the paper feed tray, press the “-” key of the folding plate 1 folding stopper adjusting key while pressing the stop key.

The paper feed tray can also be raised and lowered using the maintenance mode “Code No.24: Paper feed tray up/down motor test”.

See “3. MAINTENANCE MODE” in CHAPTER 2 ELECTRICAL COMPONENTS

When the paper feed tray descends

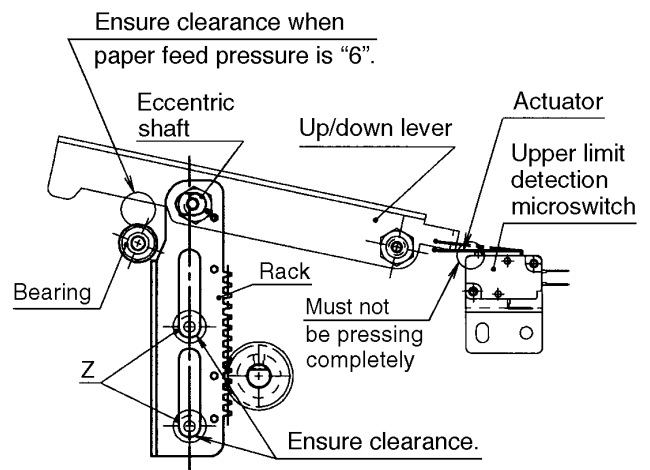
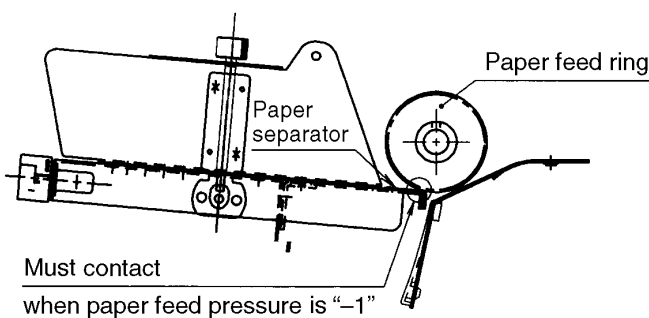
- The actuator of the lower limit detection microswitch should not be pressing the switch completely, and no load should be applied on Z at the rack long hole upper edge from overrun of the drive motor. (When load is applied to Z, the slack of the opposite tension idler side of the drive belt changes.)
- The paper feed tray stops at the specified position of the paper stacking amount (approximately 44 mm (1.73")).



When the paper feed tray descends

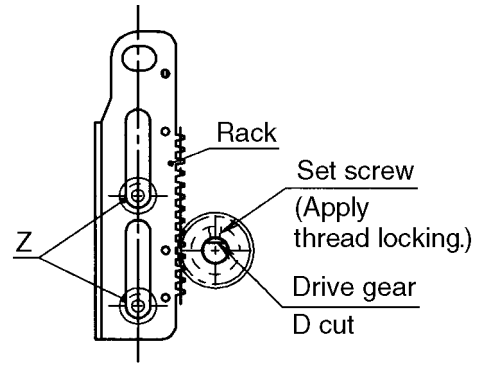
When the paper feed tray rises

- When the paper feed pressure setting is “-1”, the paper separator at the tip of the paper feed tray touches the paper feed ring to maintain appropriate paper feed pressure.
- The actuator of the upper limit detection microswitch must not be pressing the switch completely, and there should be a clearance between the rack long hole lower edge and Z.
- When the paper feed pressure setting is “6”, there should be a clearance between the up/down lever and bearing outer ring so that the paper feed pressure set is not affected.



When the paper feed tray rises

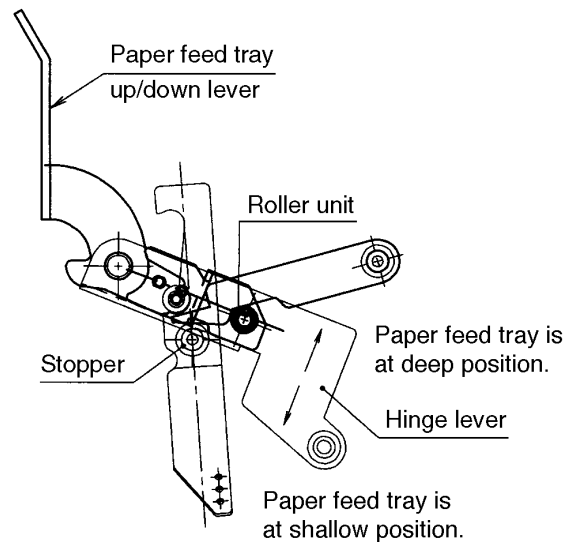
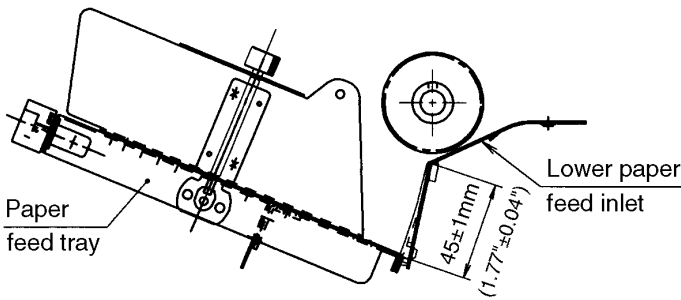
- ⑥ Secure the set screw of the drive gear, and apply a very small amount of thread locking to the set screw. (Loctite 242: Medium strength)



◆ DF-915

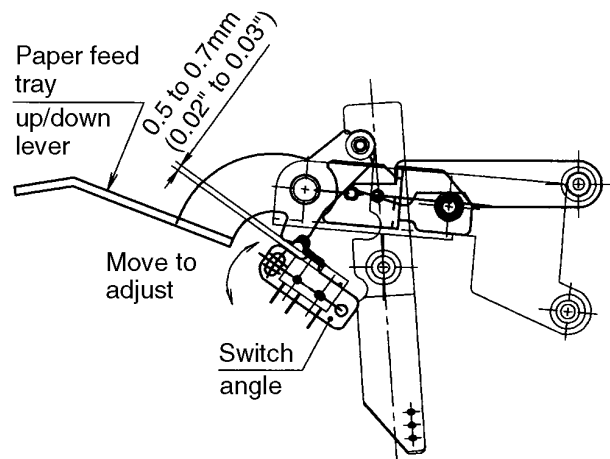
Adjust the paper feed tray stopping position so that the paper stacking amount satisfies the specifications, and the position of the tray is detected accurately when the tray is raised/lowered manually.

- ① Move the roller unit of the hinge lever up and down and adjust so that when the paper feed tray up/down lever is raised and the paper feed tray is lowered, the hinge lever touches the stopper, and the paper feed tray stops at a depth of 45 ± 1 mm ($1.77'' \pm 0.04''$) from the bent part of the lower paper feed inlet. The paper stacking amount given in specifications is 500 sheets (approximately 44 mm (1.73'')) for fine quality paper 64 g/m^2 (16 lb).



When the paper feed tray descends

- ② Move the switch angle and adjust so that when the paper feed tray up/down lever is lowered and the paper feed tray is raised, the actuator of the microswitch turns ON the switch and a clearance of 0.5 to 0.7 mm (0.02" to 0.03") is formed at the position shown in the figure.
- ③ After completing the adjustment in ②, check that the R hinge of the actuator and the actuator press of the paper feed tray up/down lever do not press the actuator by continuous point contact and cause damage. The switch angle is provided with a stopper to prevent damage of the switch by the damage of the actuator.

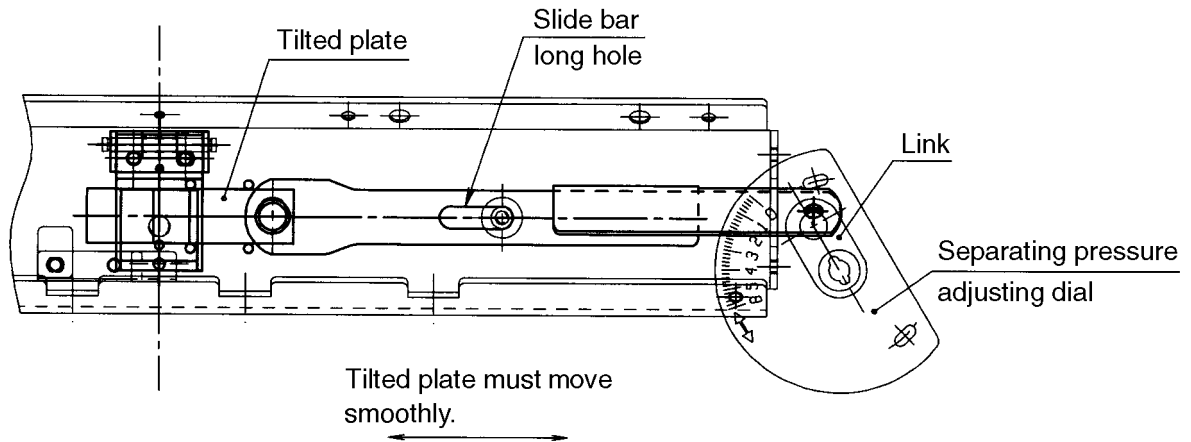


When the paper feed tray rises

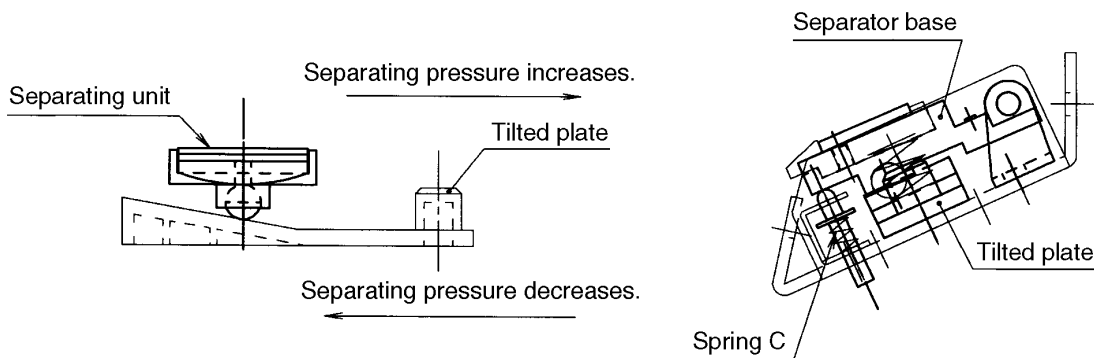
2-3. Separating Mechanism

The separating mechanism is more or less the same as the DF-520N.

- The separating pressure can be set in seven steps from 0 to 6 to handle special coated paper. For this reason, the separator base is located on the tilted plate to which it is connected by the link mechanism. When the separating pressure adjusting dial is rotated, the tilted plate moves and forced pressure is applied to the separator base.



- When the separating pressure scale value is standard “0”, the forced pressure is released, and only pressure of spring C (approximately 120 g) is applied to the separator base.
- When the separating pressure adjusting dial is rotated, forced pressure is applied to the separator base if the scale value is within 3.5 (design value is 2.5).



Setting the separating pressure

When using normal paper, set the separating pressure to standard “0”, and increase 0.5 at a time if double-feed occurs. For coated paper, set the separating pressure to “2.5 to 3.5”. However, first set to “2.5” and increase 0.5 at a time if double-feed occurs.

Using at a high separating pressure from the beginning causes problems such as paper jam at the separator and abnormal wear of the paper feed ring.

2-4. Paper Feed Inlet

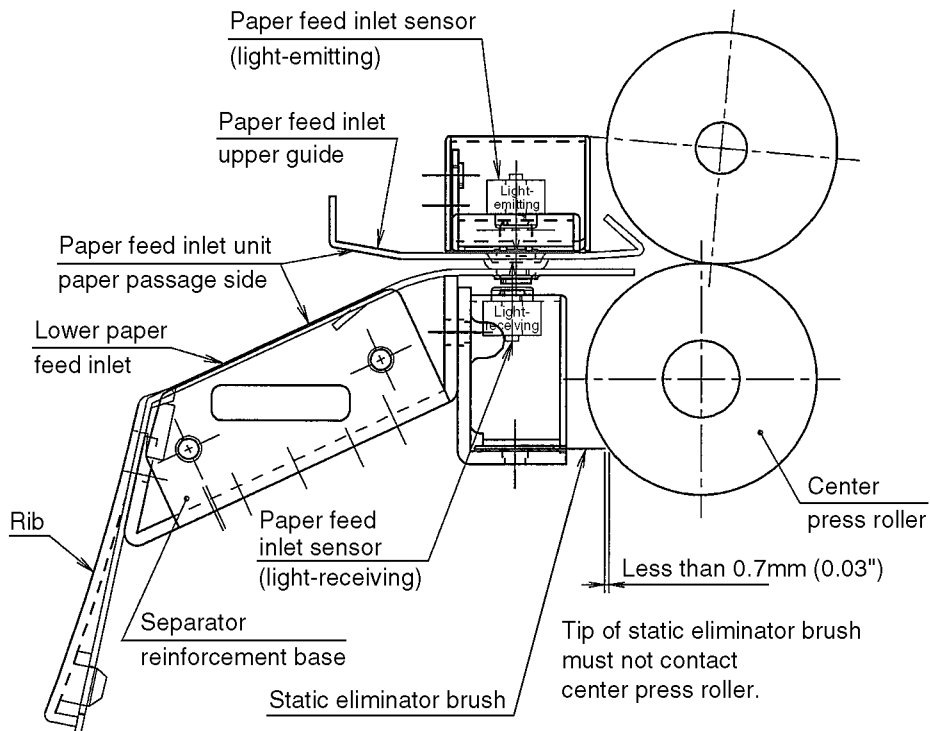
The following changes have been made in the paper feed inlet mechanism from the DF-520N.

- The curvature of the rib shape has been changed so that paper is fed properly to the very last sheet even in multiple paper feed (500 sheets) of small size paper (B6, INV, etc.) by automatic rise/descent of the paper feed tray.
- To enhance the processing speed, a transmissive sensor (paper feed inlet sensor) is provided at the paper feed inlet.
By changing the delay time based on the paper feed inlet sensor for all paper sizes and folding modes, paper can be fed at the optimum paper feed timing.
- To eliminate static electricity, a static eliminator brush is provided at the paper feed inlet sensor (light-receiving).

2-4-1. Replacing the paper feed inlet unit

When replacing the paper feed inlet unit, take note of the following points.

- After replacing the paper feed inlet sensor, check that one sheet of 52.3 g/m² (14 lb) paper is detected properly.
- The static eliminator brush is made of carbon fiber with high non-contact static elimination effects. When replacing the static eliminator brush, attach it at the position shown in the figure so that it does not touch the center press roller.



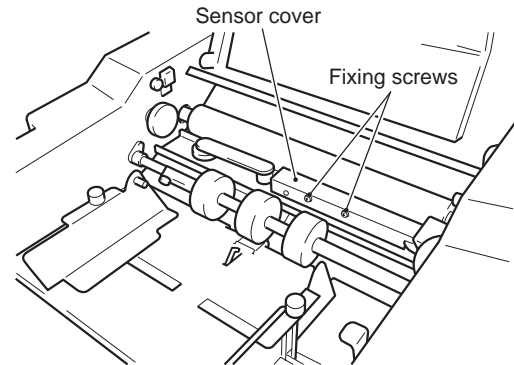
2-4-2. Cleaning the paper feed inlet sensor

The paper feed inlet sensor will not function if adhered with printing powder and paper dust, and an error message will be displayed.

The LCD of the DF-920 displays “JAM FEED SECT” while the right window of the DF-915 displays “J1-2”.

When these messages appear, clean the sensor.

- ① Remove the two fixing screws, and remove the sensor cover attached to the paper feed inlet upper guide.



- ② Use a cloth or cotton swab to remove powder or paper dust adhered to the paper feed inlet sensor (light-emitting).
- ③ Remove the paper feed inlet sensor (light-emitting), insert a cotton swab into the hole to remove powder or paper dust adhered to the paper feed inlet sensor (light-receiving).

Note If the sensor is very dirty, remove the paper feed inlet upper guide to clean.

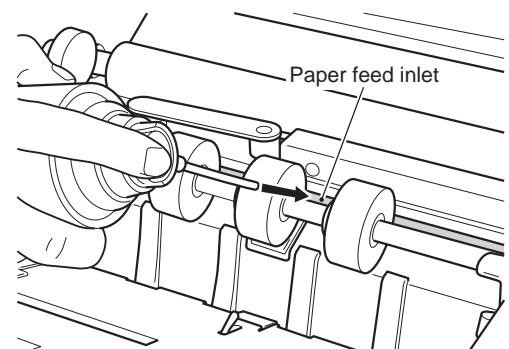
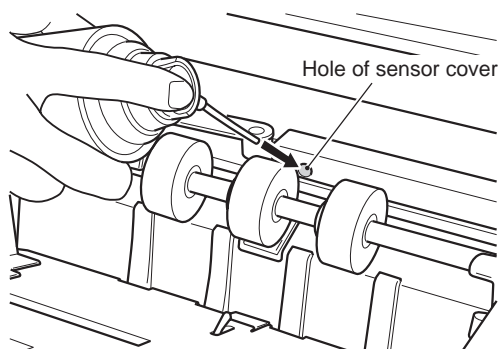
- ④ Reinstall the paper feed inlet sensor (light-emitting) and sensor cover back to their original positions.

Note Be sure to perform this cleaning together with the “2-5-6. Cleaning the paper ejection outlet sensor” described later as a set when visiting users for maintenance work.

2-4-3. Providing instructions on cleaning the paper feed inlet sensor to users

“21. CLEANING THE UNIT” in the instruction manual (chapter 20 in the case of the DF-915) describes the method of cleaning using an Air Duster (a commercially available air spray for eliminating dust). Explain the details carefully to users and instruct them on use.

With this method, the nozzle of the Air Duster is inserted into the hole of the sensor cover and paper feed inlet and sprayed briefly.



2-5. Paper Ejection Mechanism

To enhance paper ejection stack performance and processing speed, the paper ejection drive mechanism is intermittently driven by the electromagnetic clutch. To improve operability, the movement of the stacker roller has been made automatic.

2-5-1. Replacing the stacker belt

Take note of the following points when replacing the belt.

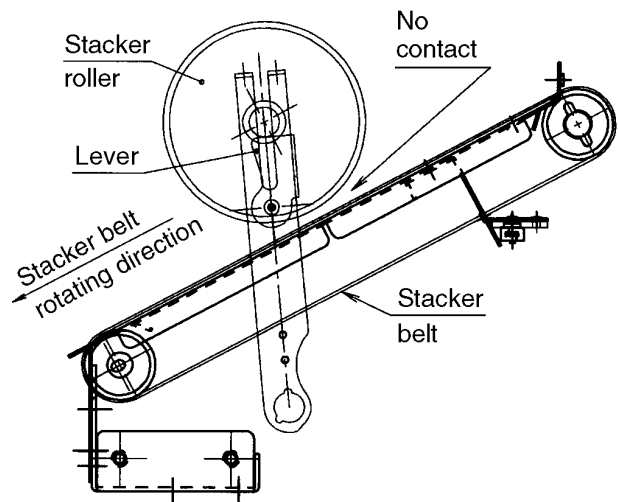
- Belt front/back : The green side is the front.
- Rotating direction of the belt: The rotating direction is indicated by an arrow on the belt back (black side).

2-5-2. Adjusting the tension of the stacker belt

Perform the following check and adjustment if the stacker belt slips while rotating.

Normally, the belt slips due to the change in the frictional coefficient between the stacker plate and belt back from the load of the stacker roller.

- ① If the belt slips with the stacker roller and belt not contacting (the stacker roller is raised), perform step ②.
- ② If the belt does not slip in this state, perform step ③.

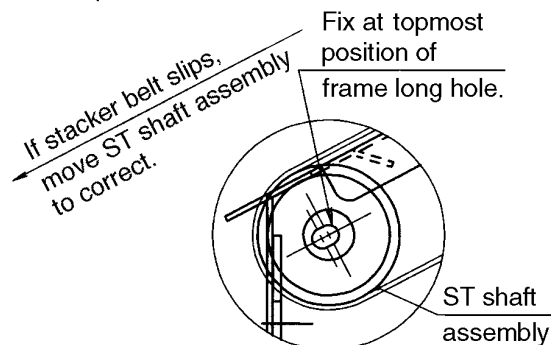
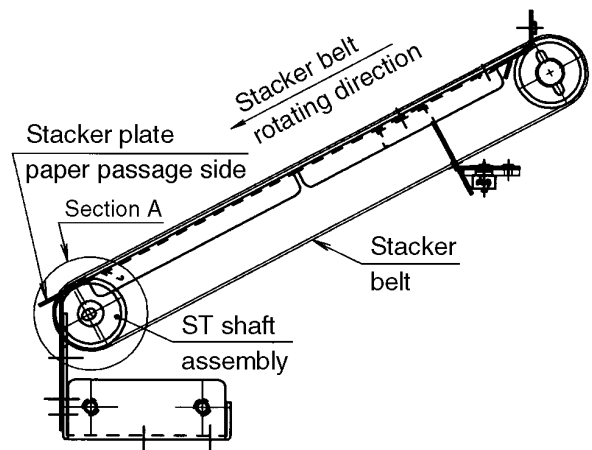


- ② Generally, the ST shaft assembly is fixed at the topmost position of the frame long hole. This state is the recommended stretch rate of the belt. (Stretch rate: 4%)

If the belt slips, loosen the screw fixing the ST shaft assembly, and adjust the tension of the belt by moving the assembly.

The adjusting range is within 2 mm (0.08").

- ③ The area where the stacker plate and belt back contact each other is pasted with a Teflon tape to reduce the frictional coefficient. The belt may start to slip when the effects of the tape drop. In such cases, paste a new tape.
- (NITTO DENKO NITOFロン tape No.973UL t0.13 × W15)



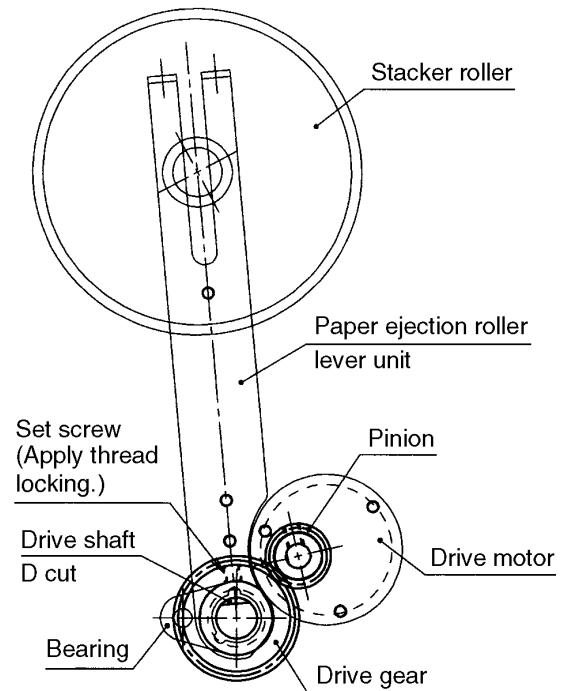
Enlargement of section A

2-5-3. Paper ejection roller lever unit

The basic configuration of this unit is more or less the same as the DF-520N.

If the paper ejection roller lever unit has been removed during the replacement of the drive motor, attach it using the following procedure.

- ① Apply a very small amount of oil to the area where the drive shaft of the paper ejection roller lever unit and bearing are connected. (Orelube G90-140)
- ② Check that there is appropriate backlash (0.1 to 0.2 mm (0.004" to 0.008")) at the area where the drive gear of the paper ejection roller lever unit and pinion are engaged, and that they rotate smoothly.
- ③ Apply grease to the engaged gear teeth. (Orelube G1650)
- ④ Secure the set screw of the drive gear, and apply a very small amount of thread locking to the set screw. (Loctite 242: Medium strength)



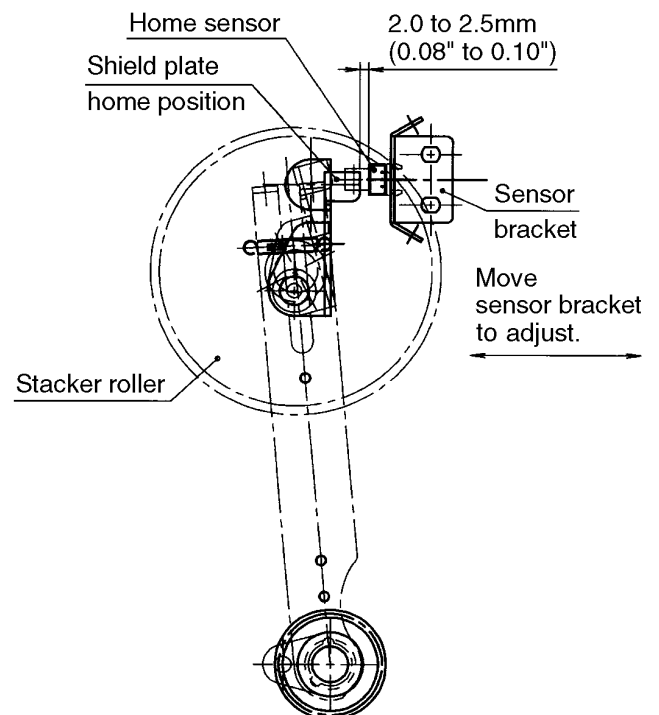
Backlash of whole circumference of pinion and drive gear: 0.1 to 0.2mm (0.004" to 0.008")

2-5-4. Adjusting and checking the stacker roller home sensor

The stopping position of the stacker roller moves automatically in six steps according to the folded paper length. The moving distance is controlled by the moving duration from the home sensor.

- ① When the switch lever is at the home position, secure the sensor bracket with a clearance of 2.0 to 2.5 mm (0.08" to 0.10") between the switch lever shield and home sensor.
- ② After adjusting, check that the home sensor turns ON and OFF properly in the maintenance mode.

 "3. MAINTENANCE MODE" in CHAPTER 2 ELECTRICAL COMPONENTS

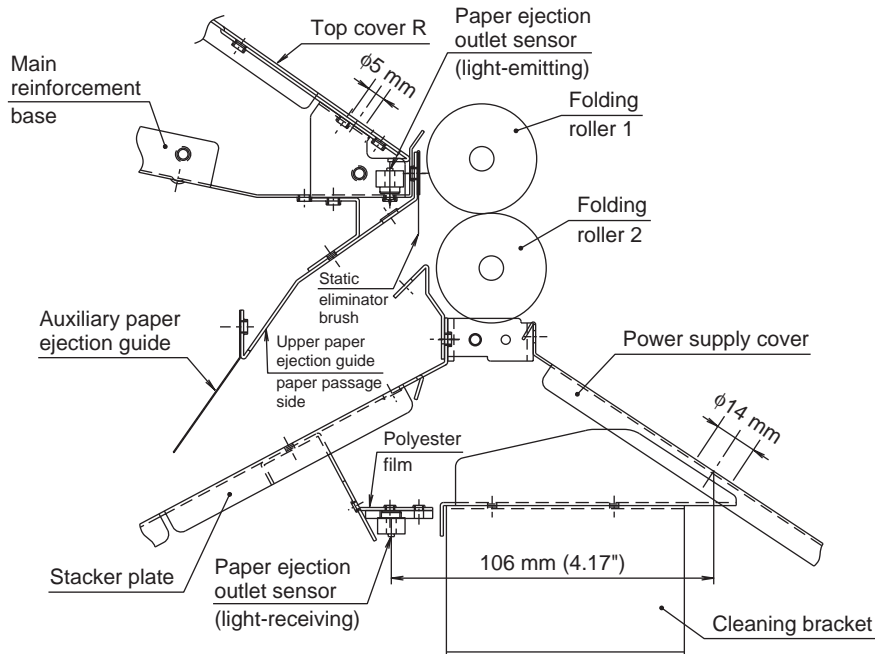


2-5-5. Replacing the paper ejection outlet sensor

To detect jams in the paper ejection section, a transmissive sensor (paper ejection outlet sensor) is provided at the main reinforcement base and stacker plate. To eliminate static electricity of the paper ejected, a static eliminator brush (stainless fiber) is provided on the upper paper ejection guide.

Take note of the following points when replacing the paper ejection outlet sensor.

- After replacing the paper ejection outlet sensor, check that one sheet of 52.3 g/m² (14 lb) paper is detected properly.
- To prevent accumulation of paper dust on the sensor surface, the paper ejection outlet sensor (light-receiving) protection cover is pasted with a polyester film.



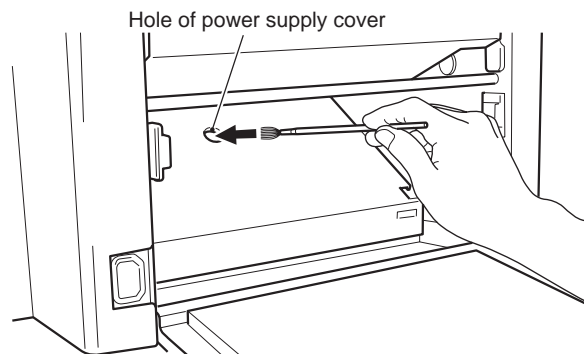
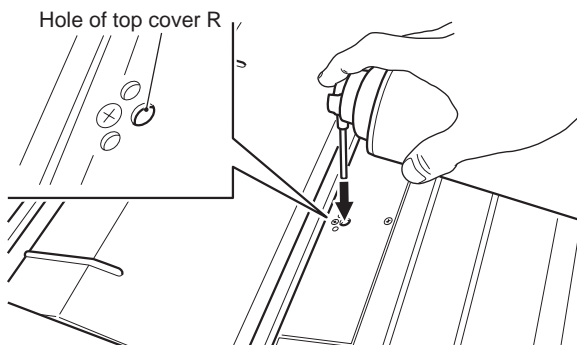
2-5-6. Cleaning the paper ejection outlet sensor

The paper ejection outlet sensor will not function if adhered with printing powder and paper dust, and an error message will be displayed.

The LCD of the DF-920 displays "JAM EXIT" while the right window of the DF-915 displays "-J2-".

When these messages appear, clean the sensor with an Air Duster (a commercially available air spray for eliminating dust) as well as a paintbrush, etc.

- ① Remove folding plate 1 to clean the paper ejection outlet sensor (light-emitting).
Insert the nozzle of the Air Duster into the hole ($\phi 5$ mm) of the top cover R, and spray briefly.
- ② Remove folding plate 2 to clean the paper ejection outlet sensor (light-receiving).
Insert the paintbrush straight in from the hole ($\phi 14$ mm) of the power supply cover along the cleaning bracket, and gently clean the top of the sensor with the brush.

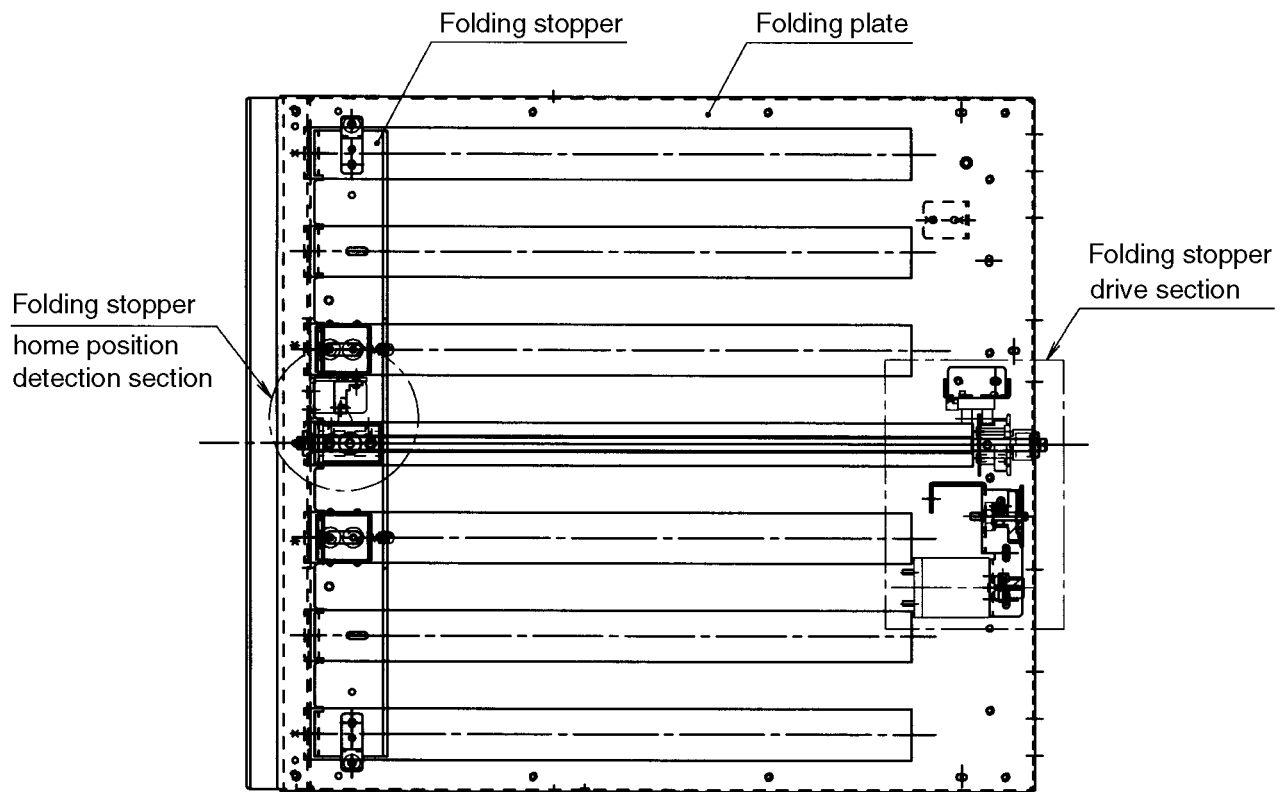


2-5-7. Providing instructions on cleaning the paper ejection outlet sensor to users

"21. CLEANING THE UNIT" in the instruction manual (chapter 20 in the case of the DF-915) describes the same cleaning method as above. Explain the details carefully to users and instruct them on use.

2-6. Folding Plates

As the folding plate mechanism is more or less the same as the DF-520N, only important differences are described in this section.



Overall view of folding plate mechanism

(1) Movement control of folding stopper

A slit plate (index plate) divided into 12 parts (pulses) is mounted to a screw shaft with a pitch of 1.5 mm (0.06"). The number of slits (pulses) is counted by two photointerrupters (index sensor) to control the moving distance and direction of the folding stopper.

The minimum distance moved by the stopper is 0.125 mm (0.005") of one pulse of the above index plate.

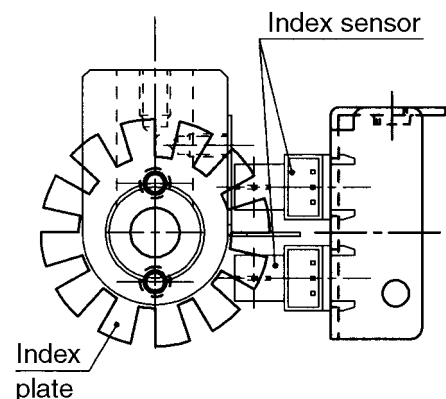
The restricted value of each folding plate is shown below.

Moving distance of folding stopper

	Maximum distance moved by folding stopper from home position
Folding plate 1	288.5 mm (11.36")
Folding plate 2	180.5 mm (7.11")

Limitations of length of folded plane

	Maximum folded plane length	Minimum folded plane length
Folding plate 1	325 mm (12.79")	42 mm (1.65")
Folding plate 2	217 mm (8.54")	47 mm (1.85")

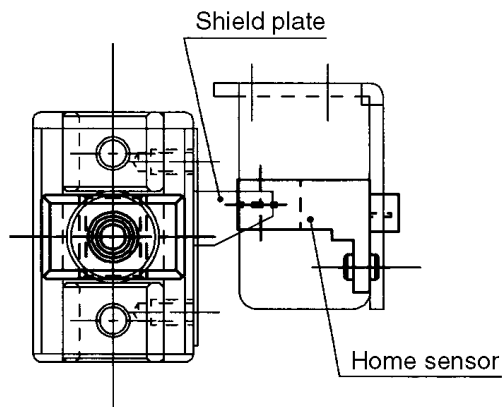


(2) Adjusting the home position of the folding stopper

The home position of the folding stopper is the basic position where the shield plate blocks the home sensor added with the correction value set in the following maintenance mode.

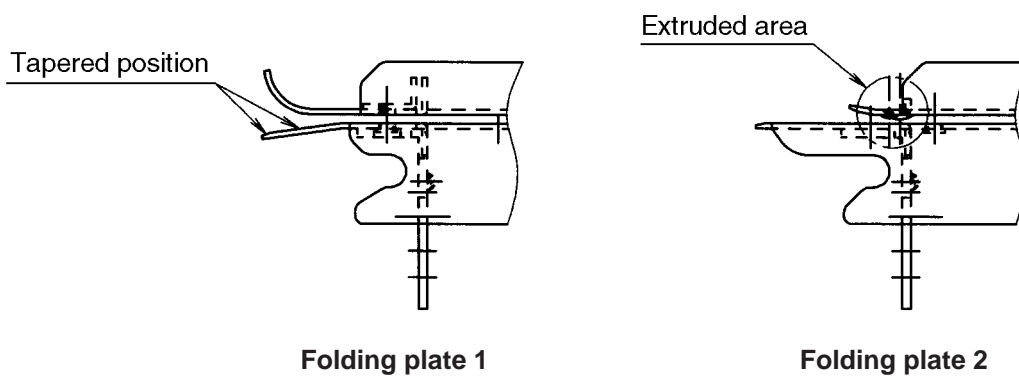
See "3. MAINTENANCE MODE" in CHAPTER 2 ELECTRICAL COMPONENTS

- Correction value of folding plate 1 home position (Maintenance mode code No.1)
- Correction value of folding plate 2 home position (Maintenance mode code No.2)
- Correction value of switching shaft home position (Maintenance mode code No.3)



(3) Shape of paper inlet of folding plate

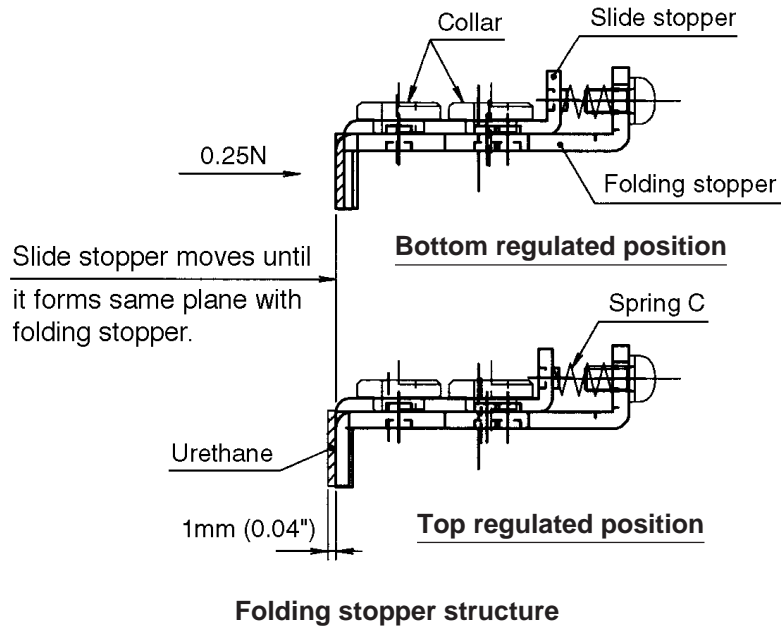
The lower guide of folding plate 1 is tapered to facilitate entrance and exit of paper to and from the folding roller. The upper guide of folding plate 2 is extruded (deep drawing) to reduce the local clearance of the conveyance route in the aim to reduce W dent and dog ears.



(4) Structure of folding stopper

To reduce the collision sound when the lead edge of the paper collides with the folding stopper, a double-stopper structure where a slide stopper is mounted onto the folding stopper is provided.

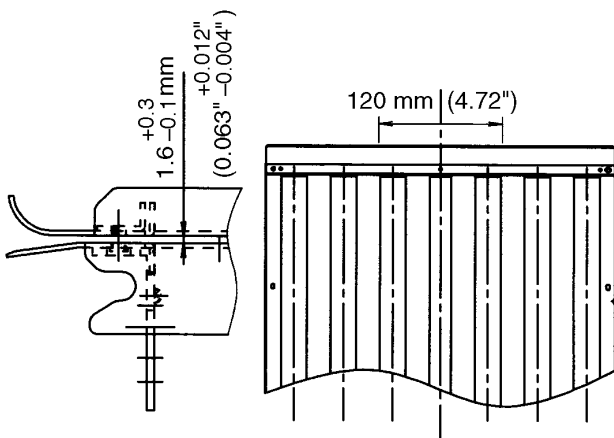
The side of the slide stopper which collides with the paper is also pasted with urethane to simultaneously reduce the collision sound and paper bending.



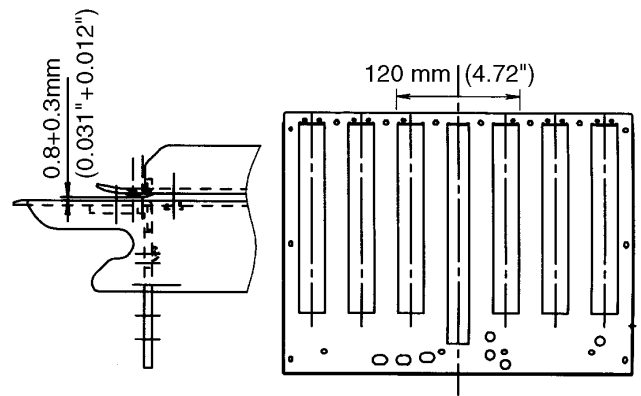
2-6-1. Adjusting the clearance of the conveyance route of the folding plate

To prevent paper jamming at the folding plate, check that the clearance of the conveyance route of the folding plate satisfies the following values within the 120 mm (4.72") range from the center of the folding plate.

- Folding plate 1: $1.6 \begin{smallmatrix} +0.3 \\ -0.1 \end{smallmatrix}$ mm ($0.063 \begin{smallmatrix} +0.012 \\ -0.004 \end{smallmatrix}$ ")
- Folding plate 2: $0.8 + 0.3$ mm ($0.031 \begin{smallmatrix} + \\ +0.012 \end{smallmatrix}$ ")



Folding plate 1

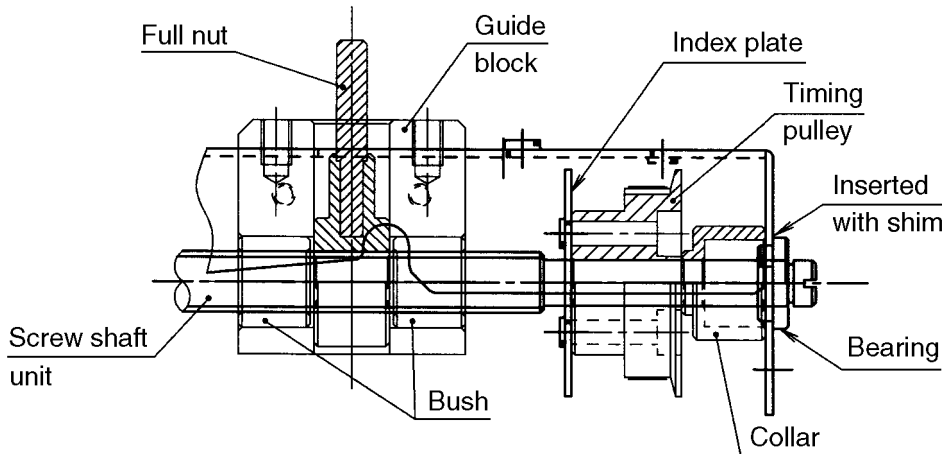


Folding plate 2

2-6-2. Checking and adjusting the thrust play of the screw shaft unit

Check the following points when folding misalignment along the vertical length of the paper and folding plate motor lock occurs.

- Check that a shim is inserted between the chassis and bearing at the folding plate motor side so that the thrust play of the screw shaft unit becomes 0.1 to less than 0.15 mm (0.004" to less than 0.006"), and that the unit moves lightly and smoothly.
- Apply a very small amount of oil to the area where the screw shaft and bearing are connected. (Orelube G90-140)
- To prevent folding plate motor lock, never apply oil or grease to the sliding area where the screw shaft, full nut, and guide block bush are connected.



Thrust play of screw shaft unit:
0.1 to less than 0.15 mm (0.004" to less than 0.006")

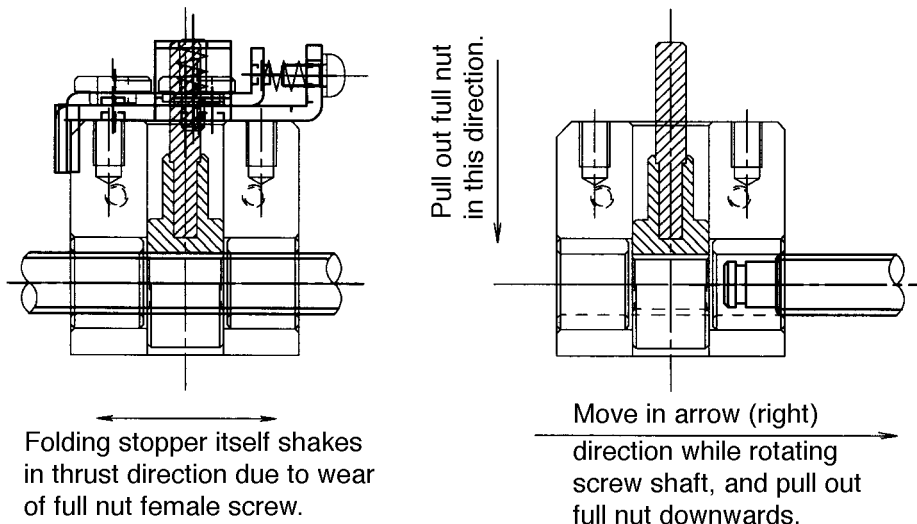


2-6-3. Replacing the full nut

If the female screw of the full nut (resin) wears due to extended use, thrust play between the screw shaft and full nut increases, resulting in reduced folding stopper stop accuracy and increased folding misalignment along the vertical length of the paper due to play of the folding stopper itself.

When these problems occur, replace the full nut.

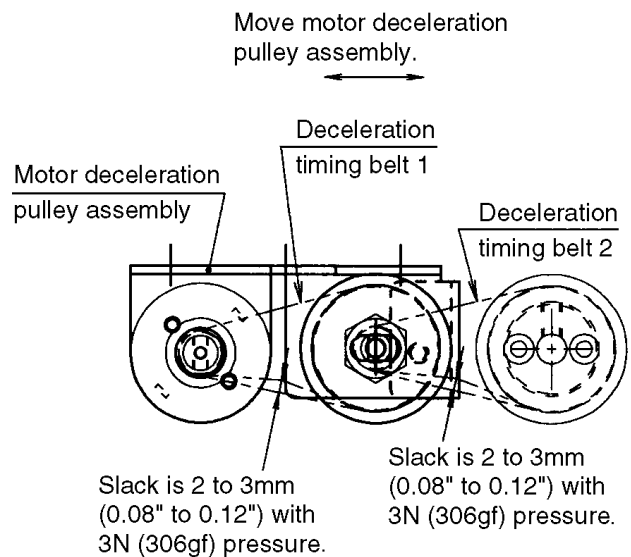
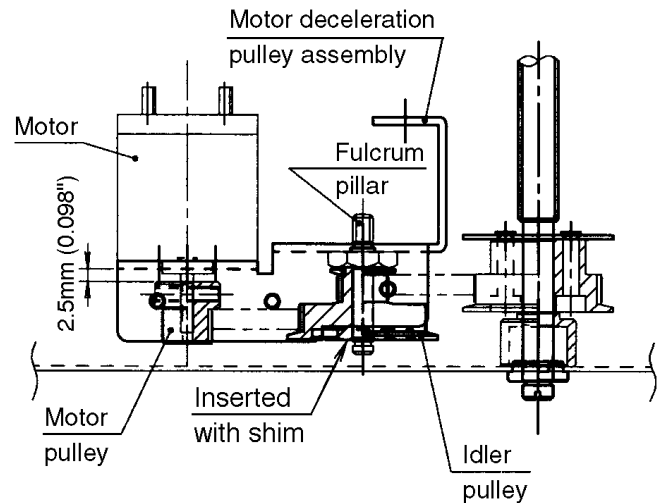
The full nut cannot be replaced by merely pulling it upwards because the screw is cut on the whole block circumference for higher durability. Rotate the screw shaft as shown in the figure, move in the right direction, and pull the full nut downwards.



2-6-4. Motor deceleration pulley assembly

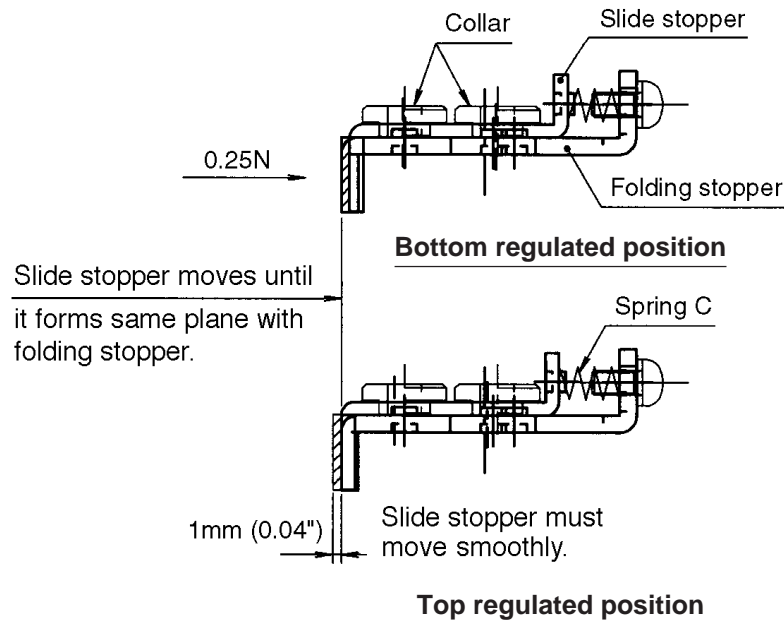
If the tension of the belt is not appropriate, problems such as folding plate motor lock and jumping of the belt occur.

- ① Tighten the set screw with a torque of 0.69 Nm (7.0 kgf • cm), and secure the motor pulley at the position shown in the figure.
- ② Check that a shim is inserted between the idler pulley and E ring so that the thrust play becomes 0.1 to 0.3 mm (0.004" to 0.012").
- ③ Apply a very small amount of oil to the area where the idler pulley and fulcrum pillar are connected. (Orelube G90-140)
- ④ Apply a pressure of 3 N (306 gf) to deceleration timing belt 1 using a tension gauge of 5 N (510 gf), and check that the belt slacks by 2 to 3 mm (0.08" to 0.12").
- ⑤ Apply a pressure of 3 N (306 gf) to deceleration timing belt 2 using a tension gauge of 5 N (510 gf), then move the motor deceleration pulley assembly and adjust the tension of the belt so that it slacks by 2 to 3 mm (0.08" to 0.12").



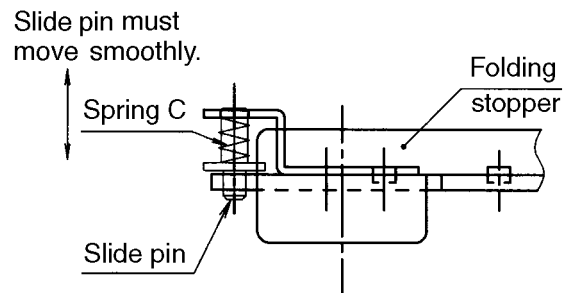
2-6-5. Adjusting the position of the folding stopper and slide stopper

- ① Tighten the M3 screw with a torque of 0.64 Nm (6.5 kgf • cm) and secure the collar.
- ② Check that when a pressure of 0.25 N (25 gf) is applied to the slide stopper using a tension gauge of 1 N (102 gf), the slide stopper moves smoothly to the bottom regulated position, and when the tension gauge is removed, it returns promptly to the top regulated position.
The distance moved by the slide stopper is 1 mm (0.04").
- ③ Apply a very small amount of thread locking to the collar fixing screw from the back of the folding stopper.
(Three Bond 1401B: For preventing loosening)



2-6-6. Folding stopper slide pin

A slide pin is provided at both ends of the folding stopper so that the folding stopper moves horizontally, thus preventing abnormal low speed movements due to load changes and abnormal noise.

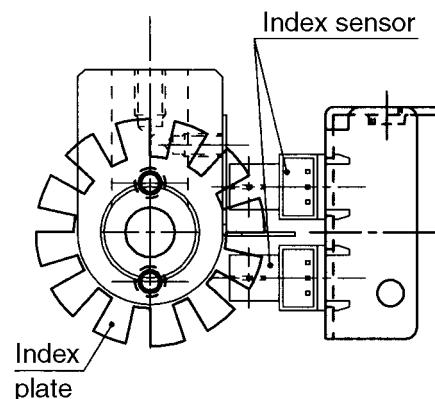


2-6-7. Checking the operations of the index sensor

- ① Check that the two photointerrupters are attached parallel to each other.
- ② When the screw shaft is rotated by hand, check that the two sensors turn ON and OFF properly in the maintenance mode.

See "3. MAINTENANCE MODE" in CHAPTER 2 ELECTRICAL COMPONENTS

- ③ Check that the folding stopper moves away from the home position when the "+" key of the folding stopper adjusting key on the control panel is pressed, and towards the home position when the "-" key is pressed.

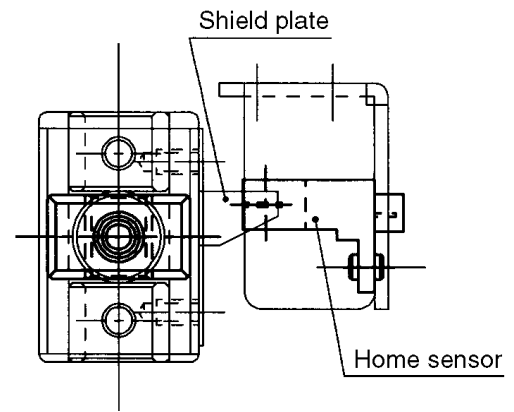


2-6-8. Checking the operations of the home sensor

Check that the home sensor turns ON and OFF properly in the maintenance mode.



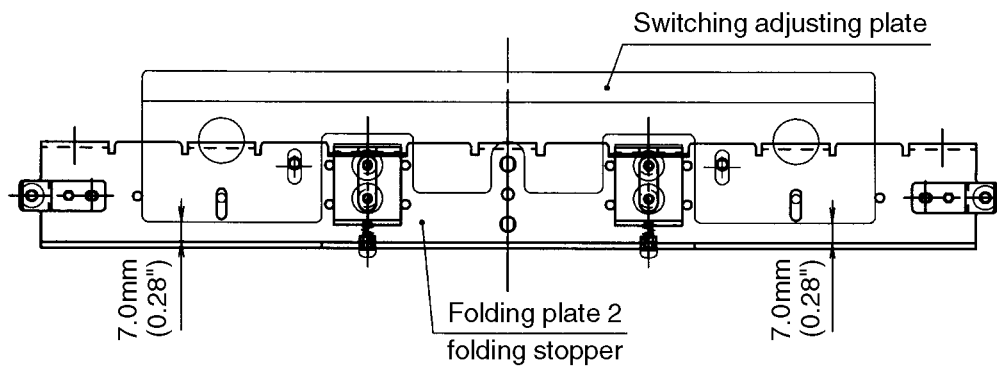
“3. MAINTENANCE MODE” in CHAPTER 2 ELECTRICAL COMPONENTS



2-6-9. Fixed position of the switching adjusting plate of folding plate 2 folding stopper

Adjusting plate for setting the switching shaft to the regulated stopping position in single folding.

- ① Secure the switching adjusting plate at the position (7.0 mm (0.28")) shown in the figure while paying attention to the left and right parallelity.
- ② Apply a very small amount of thread locking to the fixing screw of the switching adjusting plate.
(Loctite 242: Medium strength)



2-6-10. Adjusting the parallelity of the folding stoppers

Adjust the parallelity of the lead edge of paper fed and folding stoppers of folding plates 1 and 2 to reduce folding misalignment along the sides of the paper.

- ① Remove the paper feed tray lower cover, and adjust the skew correction knob of the paper feed tray to the standard position.

Adjust both the paper feed pressure and paper separating pressure to "0" on the scale.

- ② Stack well aligned 80 g/m² (20 lb) fine quality paper (vertical grain) on the paper feed tray, adjust the paper feed guides to the paper width properly, and secure them.

If the paper feed guides are not adjusted to the paper width, folding misalignment along the sides of the paper occurs.

- ③ Select "Code No.28: Folding stopper parallelity mode" of the maintenance mode, and press the start key.



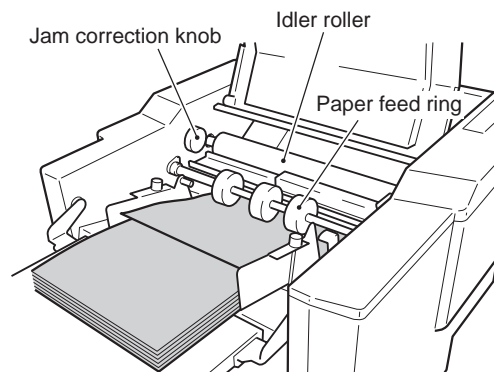
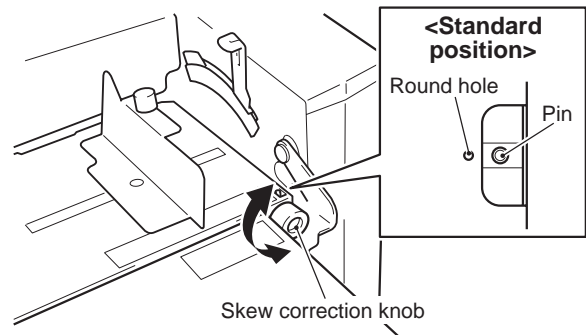
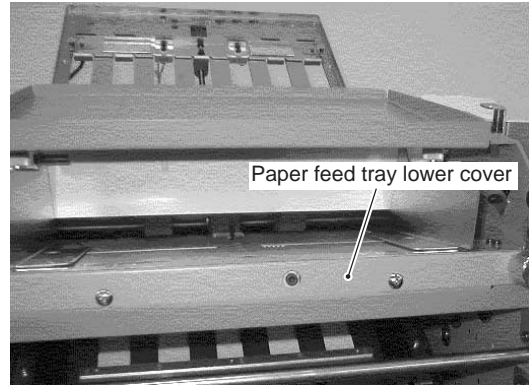
"3. MAINTENANCE MODE" in CHAPTER 2 ELECTRICAL COMPONENTS

For DF-920, selecting this mode and pressing the start key causes the paper feed tray to rise automatically, and the folding stoppers of folding plates 1 and 2 move to the set position.

For DF-915, selecting this mode and pressing the start key after lowering the paper feed tray up/down lever and raising the paper feed tray moves the folding stoppers to the set position.

- ④ Rotate the paper feed ring by hand, and feed the lead edge of the paper to the idler roller.

- ⑤ Rotate the jam correction knob, and move the lead edge of the paper near the slide stopper of folding plate 1.



Adjusting method when the folding mode is set to brochure fold

When adjusting the parallelity of the folding stoppers, there is a need to move the folding stoppers away from the home position. When the folding mode is set to brochure fold, as the folding stoppers are set away from the home position, parallelity deviation can be seen more clearly.

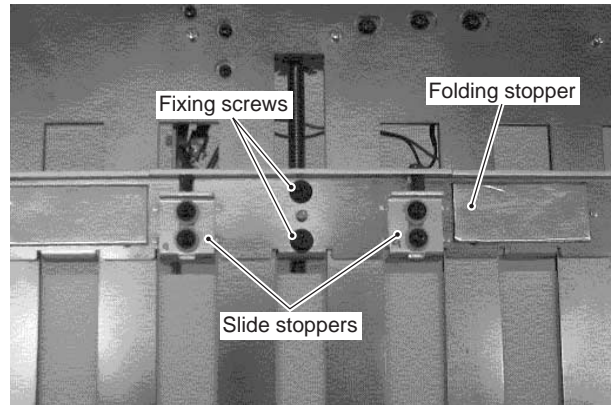
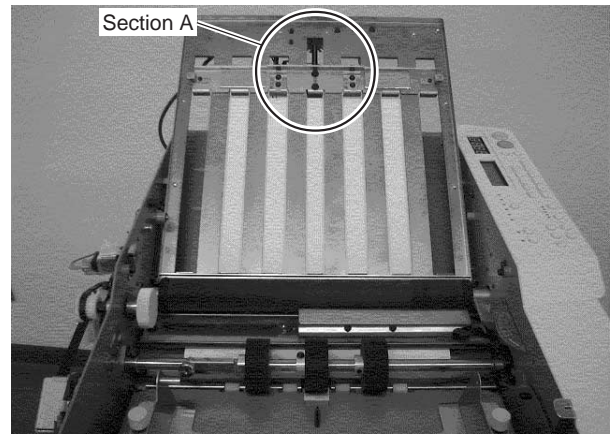
Set the folding mode to brochure fold after step ②, and proceed to step ③.

⑥ Loosen the fixing screws of the folding stopper, and adjust so that the folding stopper becomes parallel to the lead edge of the paper, and then tighten the fixing screws.

⑦ If paper slips during conveyance in ⑤, check the left and right roller nips of the idler roller.



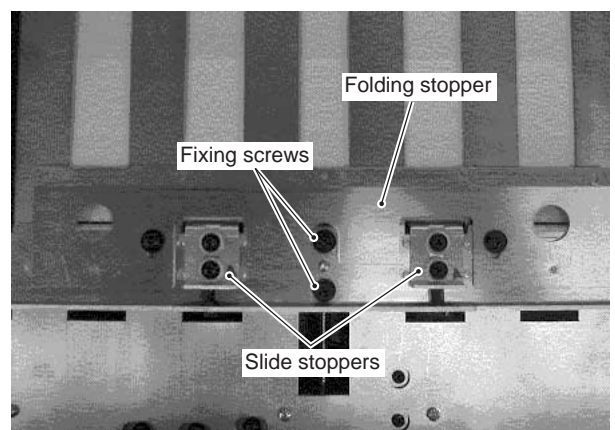
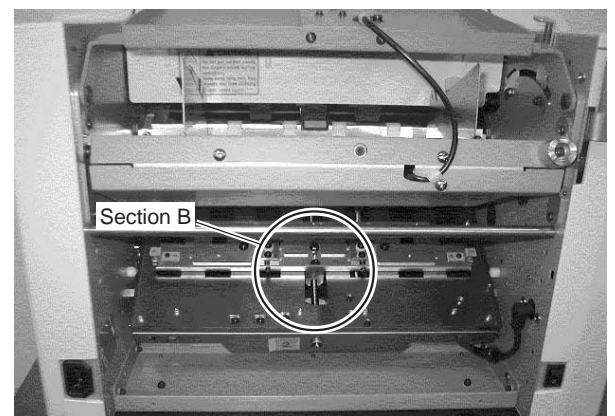
“2-1-2. (4) Attaching the drive gear (helical gear) of folding roller”



Enlargement of section A

⑧ Rotate the jam correction knob, and move the lead edge of the paper near the slide stopper of folding plate 2.

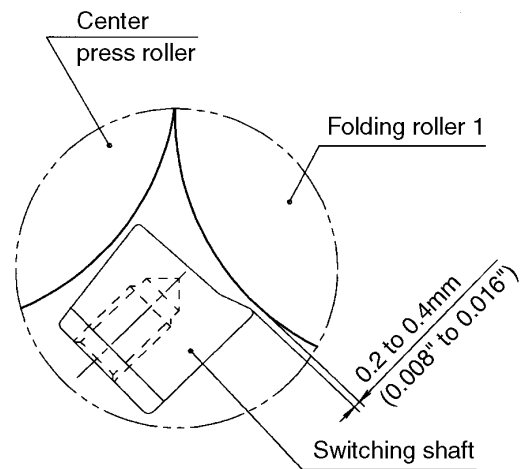
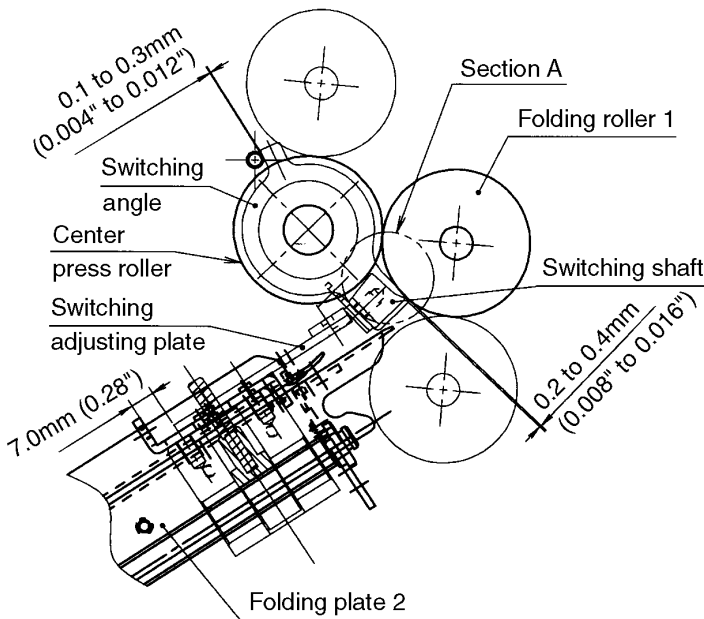
⑨ Loosen the fixing screws of the folding stopper, and adjust so that the folding stopper becomes parallel to the lead edge of the paper, and then tighten the fixing screws.



Enlargement of section B

2-6-11. Adjusting the home position of the switching shaft (stopping position) in single folding

- The switching shaft switches the paper conveyance route between single folding and other folding modes.
- To adjust the home position of the switching shaft, adjust the clearance between folding roller 1 and tip of the switching shaft to 0.2 to 0.4 mm (0.008" to 0.016") when the folding stopper of folding plate 2 is stopping at the home position.
If this adjustment is not carried out appropriately, problems may occur in folding which may cause conveyed paper to become thick such as the single folding of thick paper and cross folding. These problems include flattening of the lead edge of folded paper and paper jam at the folding roller.
In the single folding of thin paper, one folding wrinkle line occurs near the 15 mm (0.59") position from the folded line.
- The correction value of the switching shaft home position adjustment in the maintenance mode does not affect the folding size.

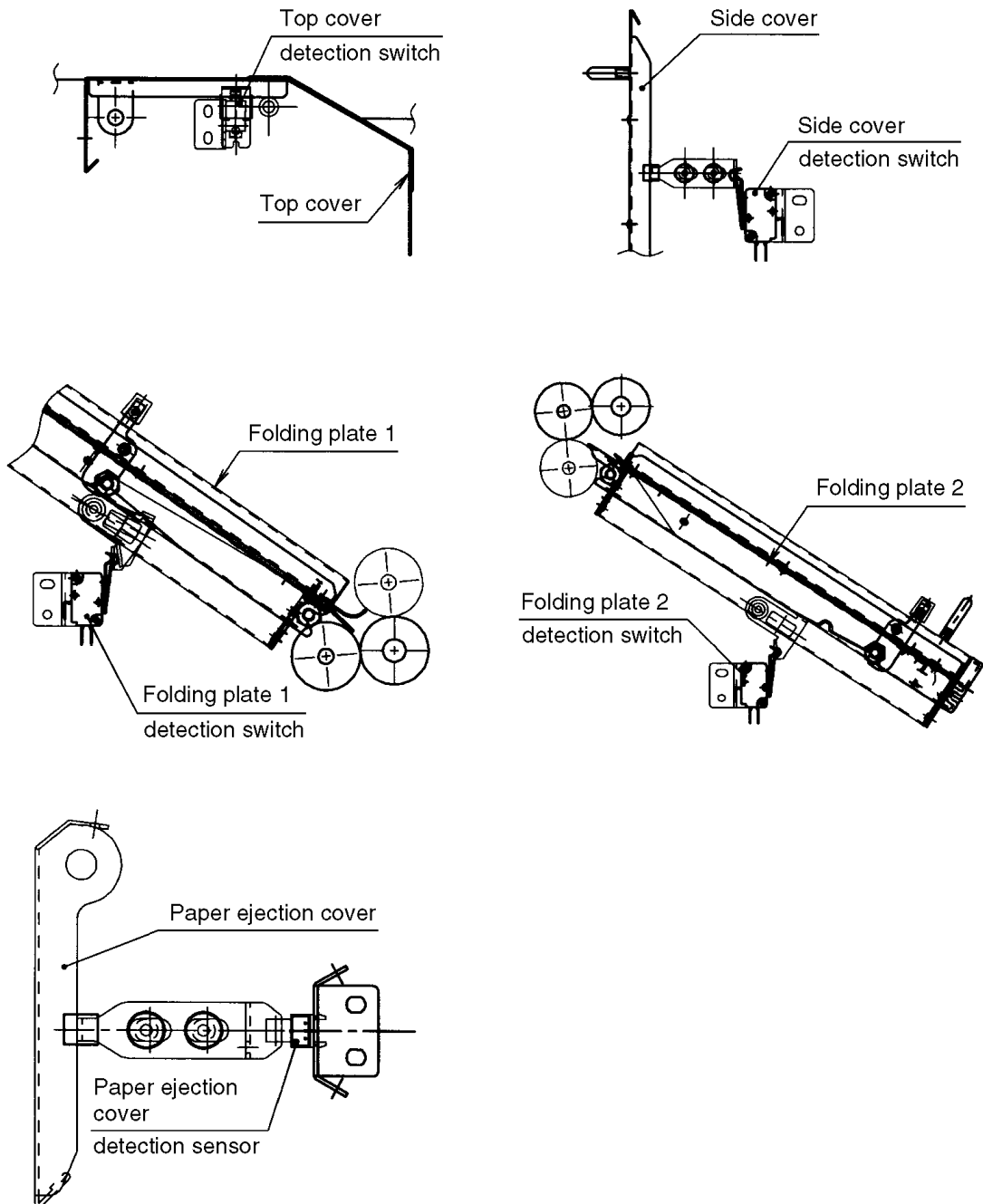


Enlargement of section A

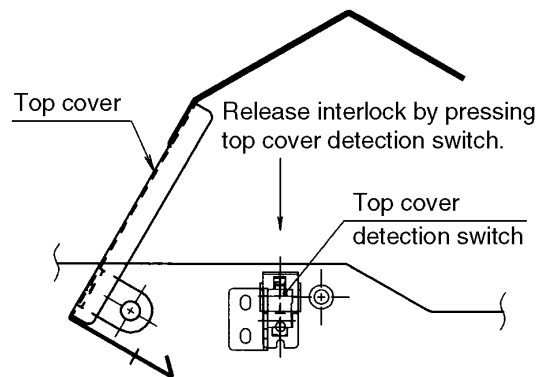
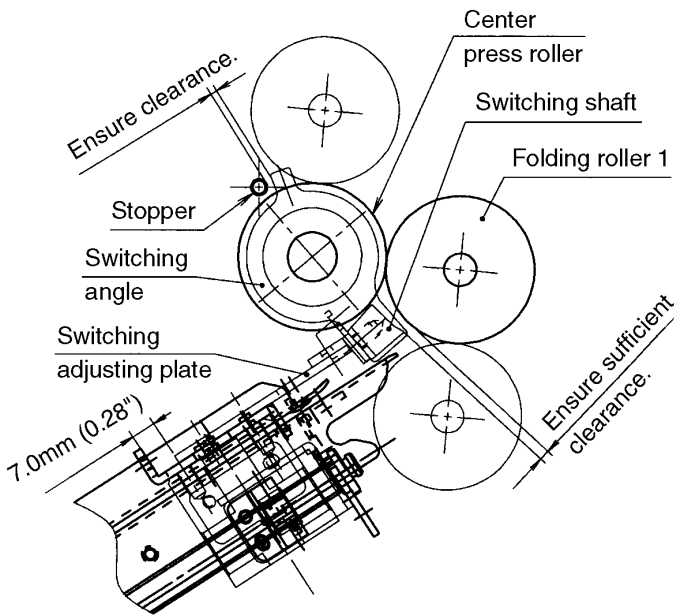
① For DF-920, select “Code No.3: Switching shaft home position adjustment” of the maintenance mode with all interlock switches (top cover, side cover, folding plate 1, folding plate 2 detection switches) and paper ejection cover detection sensor ON.

For DF-915, select “Code No.3: Switching shaft home position adjustment” of the maintenance mode with all interlock switches (top cover, folding plate 1, folding plate 2 detection switches) ON.

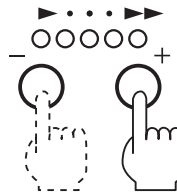
See “3. MAINTENANCE MODE” in CHAPTER 2 ELECTRICAL COMPONENTS



- ② Pressing the clear key while pressing the stop key initializes the folding stopper, and moves the folding stopper of folding plate 2 to the home position.
- ③ Open the top cover (leave the detection switch ON), and check that there is clearance between the protrusion of the switching angle and stopper (M4).
If there is no clearance, it means that the switching adjusting plate is pushing the switching shaft excessively, and this may cause the urethane sheet of the switching shaft to peel off or motor lock.

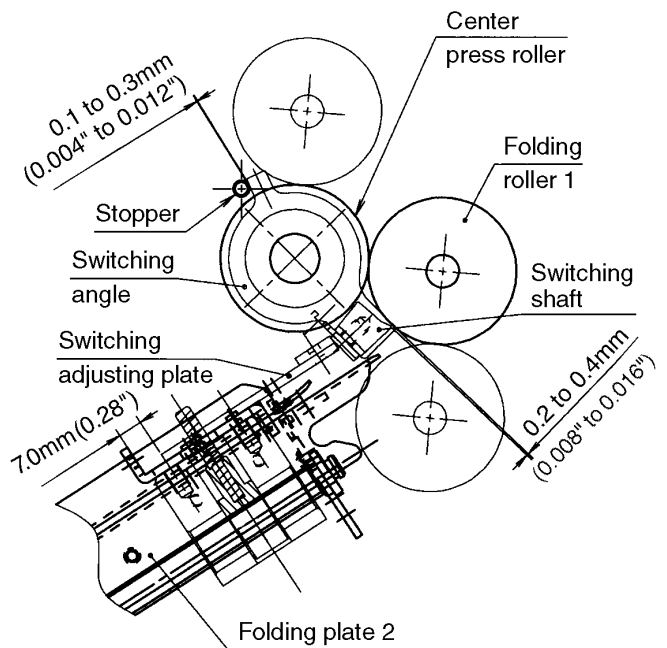


- ④ With the top cover opened (detection switch in the ON state), press the speed key and adjust the clearance between the protrusion of the switching angle at the left and right frames and stopper (M4) to 0.1 to 0.3 mm (0.004" to 0.012").



Adjusting method

- Pressing the "+" speed key increases the correction value by 1, and moves the folding stopper of folding plate 2 by 0.125 mm (0.005") in the opposite direction of the home position. (The clearance between folding roller 1 and switching shaft tip widens.)
- Pressing the "-" speed key decreases the correction value by 1, and moves the folding stopper of folding plate 2 by 0.125 mm (0.005") in the direction of the home position. (The clearance between folding roller 1 and switching shaft tip becomes smaller.)
- The settable correction values range from "-20" to "+5". The position of the folding stopper ranges from -2.5 to +0.625 mm (-0.10" to +0.02") with the home position as 0 mm (0").



- ⑤ After adjusting the clearance, single fold thick and thin paper, and check for problems of the folded line. If the clearance is too narrow, paper jams during single folding of thick paper, resulting in scratches and wrinkles near the folded line. If the clearance is too broad, one folding wrinkle line occurs near the 15 mm (0.59") position from the folded line during single folding of thin paper.

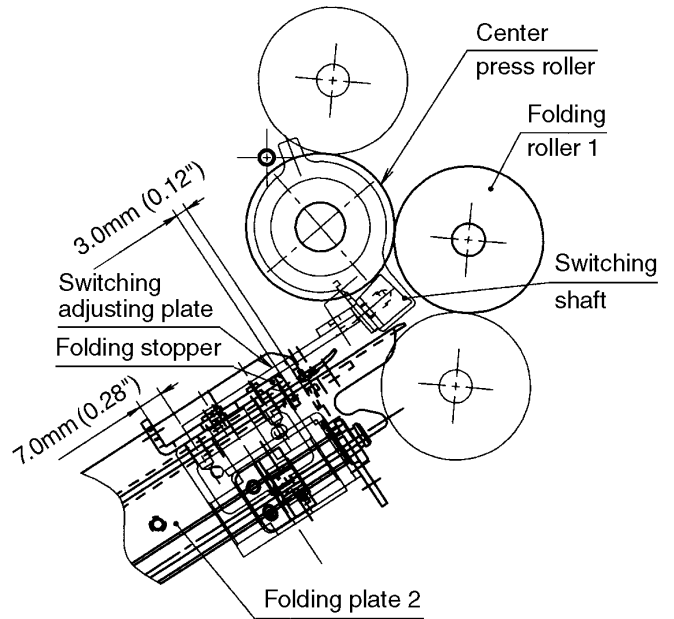
Relation between home position of switching shaft (stopping position) and stopping position of folding stopper (Reference)

- Both folding plates 1 and 2 in electrical design (theory) are set so that the clearance between the tip of the folding stopper and folding plate chassis becomes 3.0 mm (0.12") when the shield blocks the home sensor.

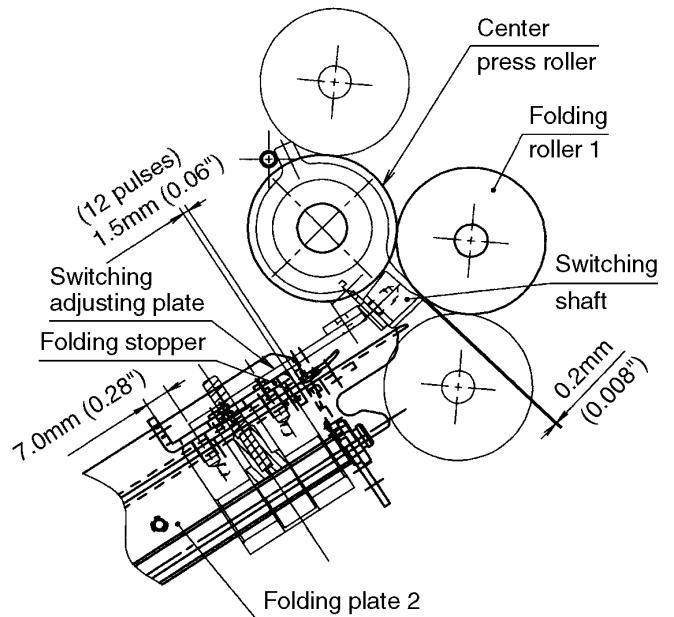
In mechanical design, this clearance is set to 1.5 mm (0.06") (-12 pulses).

This is to easily make the inconsistencies of the home position (stopping position) of the switching shaft occurring due to the accumulation of parts tolerance even by electrical correction.

- When the folding stopper is stopping at the reference position, the reference dimensions of the switching adjusting plate is 7.0 mm (0.28").
- When the folding stopper and switching adjusting plate are stopping at their reference positions, the reference dimensions of the switching shaft stopping position is 0.2 mm (0.008").
- When the switching shaft stopping position is the reference dimension, the correction value of the switching shaft home position is "-12".



Switching shaft home position (stopping position) in electrical design (Theory)



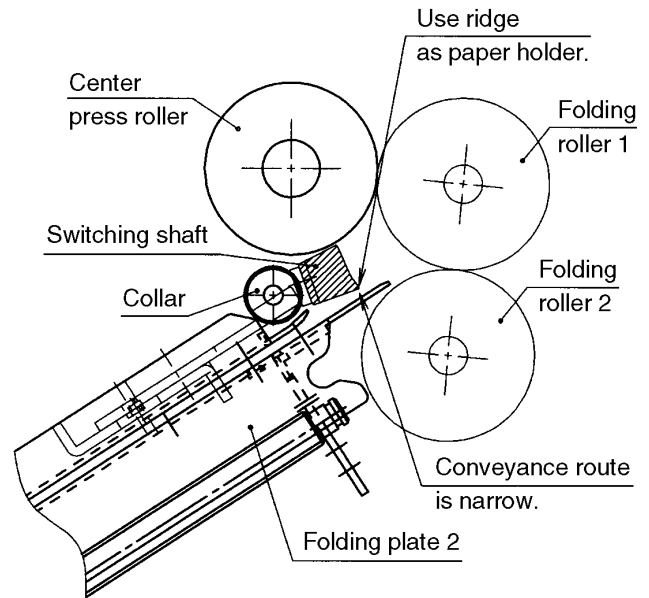
Switching shaft home position (stopping position) in mechanical design

2-6-12. Stopping position of switching shaft in folding modes other than single folding

The stopping position of the switching shaft in folding modes other than single folding is set near the folding roller so that the collar for reducing defects such as double dent and dog ears of brochure folding serves as the stopper of the switching shaft. As a result, the ridge of the switching shaft is used as the holder of the paper ejected from folding plate 2.

At this time, as the conveyance route for paper coming into folding plate 2 becomes narrow, defects such as flattening of the first folded line may occur in the double folding of some thick paper (157 g/m² (40 lb)).

Perform the following solutions for such defects.



(1) Setting the thick paper mode (Can be performed by users.)

Increase the rotational speed of the folding roller temporarily.

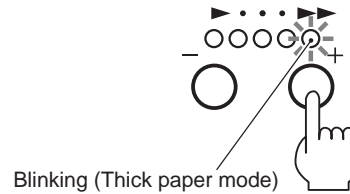
Setting method

Press the "+" speed key and set the maximum processing speed, and press it again for another two seconds. The maximum speed lamp blinks, indicating that the thick paper mode has been set.

Clearing the setting

Press the "-" speed key. The maximum speed lamp stops blinking and lights up, indicating that the thick paper mode has been cleared.

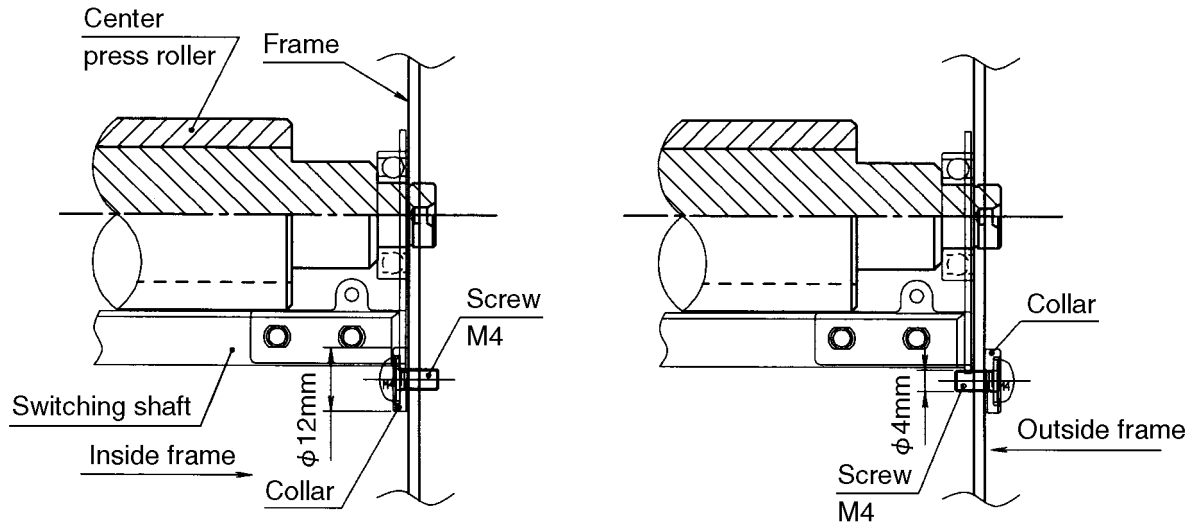
This setting will also be cleared when the power is turned off.



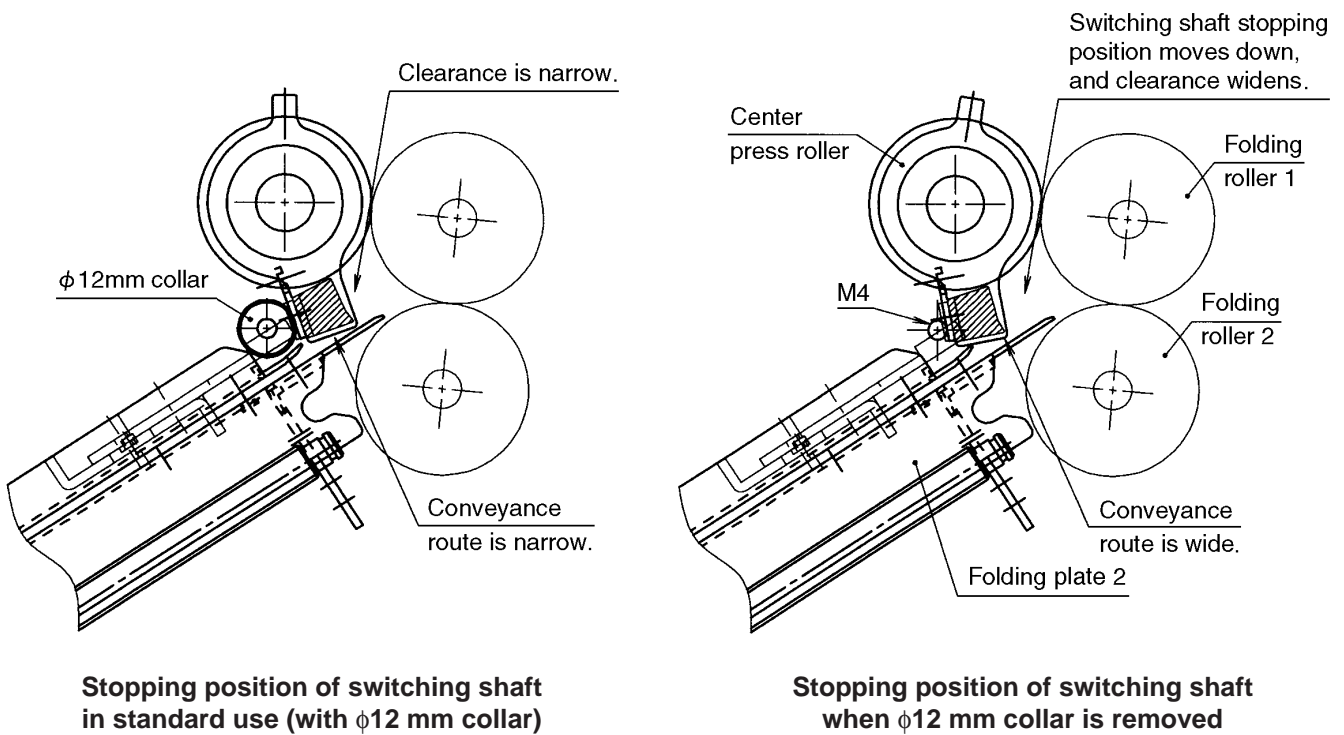
(2) Removing the stopper (collar) of the switching shaft (Can not be performed by users.)

If the defects in (1) thick paper mode cannot be corrected, or when use of brochure folding is minimum, remove the switching shaft stopper (collar).

- ① Remove folding plate 2 from the unit.
- ② Remove the resin collar (white) from inside the frame (two on the left and right of the switching shaft).
- ③ Tighten the screw of the resin collar from outside the frame.



As the diameter of the stopper of the switching shaft changes from $\phi 12$ mm to $\phi 4$ mm, the stopping position of the switching shaft moves back, the conveyance route broadens, allowing thick paper to enter folding plate 2.



2-6-13. Switching shaft cushion (urethane sheet)

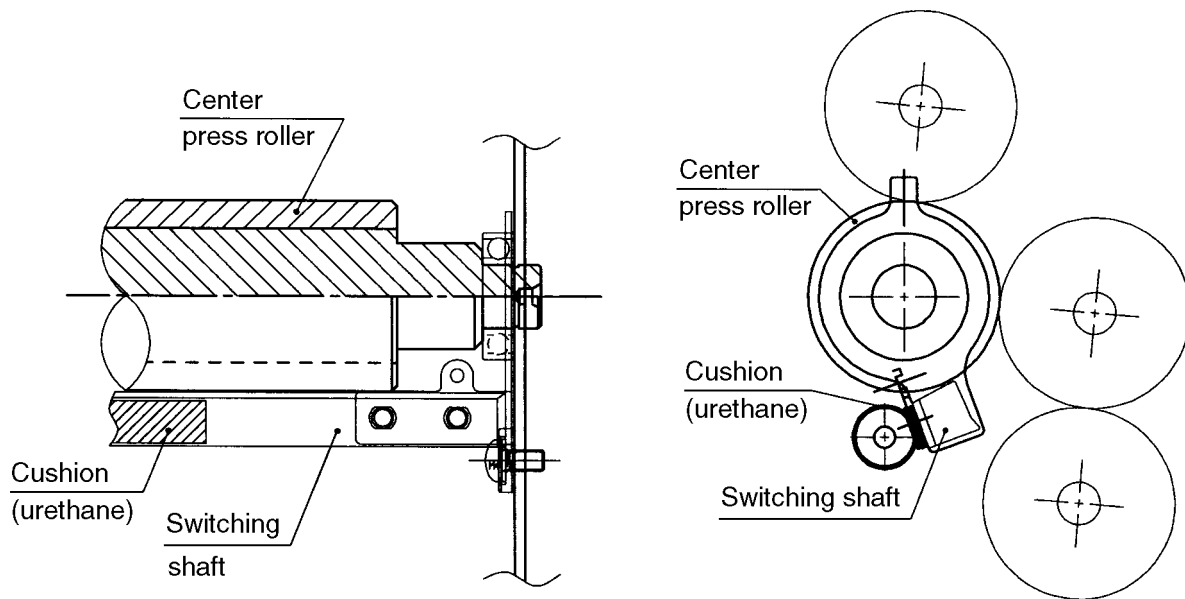
To reduce noise during single folding, a cushion (urethane sheet) is attached to the switching shaft so that the switching shaft and switching adjusting plate do not touch.

Cleaning the urethane sheet surface with alcohol during cleaning of the folding rollers increases the frictional coefficient of the urethane surface excessively to exceed the allowed torque of the folding stopper drive motor in some rare cases. As a result, folding plate 2 may motor lock during initialization (returning of folding stopper to home position) immediately after power ON.

For this reason, do not clean the urethane sheet surface of the switching shaft with alcohol.

When folding plate 2 motor locks

Wipe the cushion (urethane sheet) surface of the switching shaft with a cloth moistened with grease or oil (Orelube G90-140), then wipe immediately with a clean dry cloth to reduce the frictional coefficient of the urethane surface. If no grease or oil is available, move the hand across the urethane surface once.



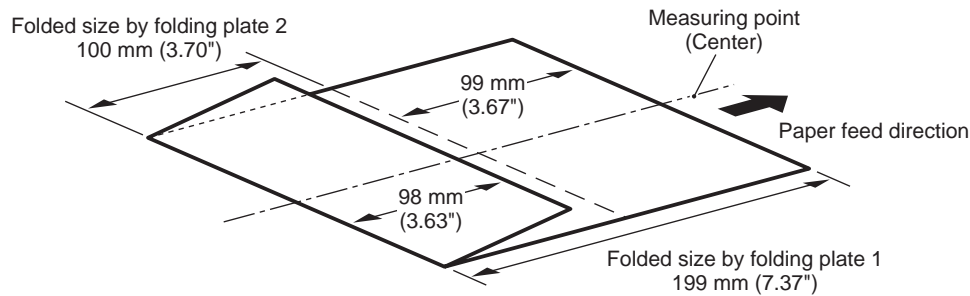
2-6-14. Adjusting folded size

When performing folding operations under the following conditions, adjust so that the folded size becomes the specified value when folded using the folding stoppers of folding plates 1 and 2. Adjust the folded size after completing all other adjustments.

Paper conveyance conditions in adjustment of folded size are described below.

- Paper : A4 (Letter) 80 g/m² (20 lb) fine quality paper (vertical grain)
- Folding mode : Letter fold
- Paper feed pressure : 0 (Standard)
- Skew correction : 0 (Standard)
- Processing speed : Level 5 (MAX)
- Paper separating pressure : 0 (Standard)
- Folding stopper : Parallel

The standard folded sizes under the above conditions are shown in the figure.



* () shows the folded size for letter size paper.

(1) Adjusting folded size by folding plate 1

For DF-920

- ① Turn on the power while pressing both the start and stop keys to enter the maintenance mode.



See "3. MAINTENANCE MODE" in CHAPTER 2 ELECTRICAL COMPONENTS

- ② Select "Code No.1: STOP1 DEFAULT", check the default adjustment value displayed on the LCD and note it down.

1. STOP1 DEFAULT

Adjustment value

- ③ Press the clear key while pressing the stop key to initialize the folding stopper of folding plate 1.
- ④ Press the test key to perform test folding.
- ⑤ Measure the folded size of the second sheet ejected, and enter the adjustment value using the "+" or "-" key of the speed key so that this folded size becomes the specified value.
Each time the "+" key is pressed, the folded size increases by 0.125 mm (0.005").
Each time the "-" key is pressed, the folded size decreases by 0.125 mm (0.005").
The settable adjustment values range from "-20" to "+20". The folded size ranges from -2.5 to +2.5 mm (-0.10" to +0.10").
- ⑥ After setting, check the finish again by test folding.
- ⑦ Repeat the above procedure until the folded size becomes the specified value.

For DF-915

- ① Turn on the power while pressing both the start and stop keys to enter the maintenance mode.



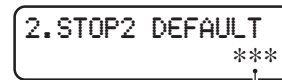
“3. MAINTENANCE MODE” in CHAPTER 2 ELECTRICAL COMPONENTS

- ② Select “Code No.1: Folding plate 1 home position adjustment”, check the default adjustment value displayed on the right 7-segment window and note it down.
- ③ Press the clear key while pressing the stop key to initialize the folding stopper of folding plate 1.
- ④ Press the test key to perform test folding.
- ⑤ Measure the folded size of the second sheet ejected, and enter the adjustment value using the “+” or “-” key of the speed key so that this folded size becomes the specified value.
Each time the “+” key is pressed, the folded size increases by 0.125 mm (0.005”).
Each time the “-” key is pressed, the folded size decreases by 0.125 mm (0.005”).
The settable adjustment values range from “-20” to “+20”. The folded size ranges from -2.5 to +2.5 mm (-0.10” to +0.10”).
- ⑥ After setting, check the finish again by test folding.
- ⑦ Repeat the above procedure until the folded size becomes the specified value.

(2) Adjusting folded size by folding plate 2

For DF-920

- ① Turn on the power while pressing both the start and stop keys to enter the maintenance mode.
- ② Select “Code No.2: STOP2 DEFAULT”, check the default adjustment value displayed on the LCD and note it down.



Adjustment value

- ③ The following procedure is the same as “(1) Adjusting folded size by folding plate 1”.

For DF-915

- ① Turn on the power while pressing both the start and stop keys to enter the maintenance mode.
- ② Select “Code No.2: Folding plate 2 home position adjustment”, check the default adjustment value displayed on the right 7-segment window and note it down.
- ③ The following procedure is the same as “(1) Adjusting folded size by folding plate 1”.

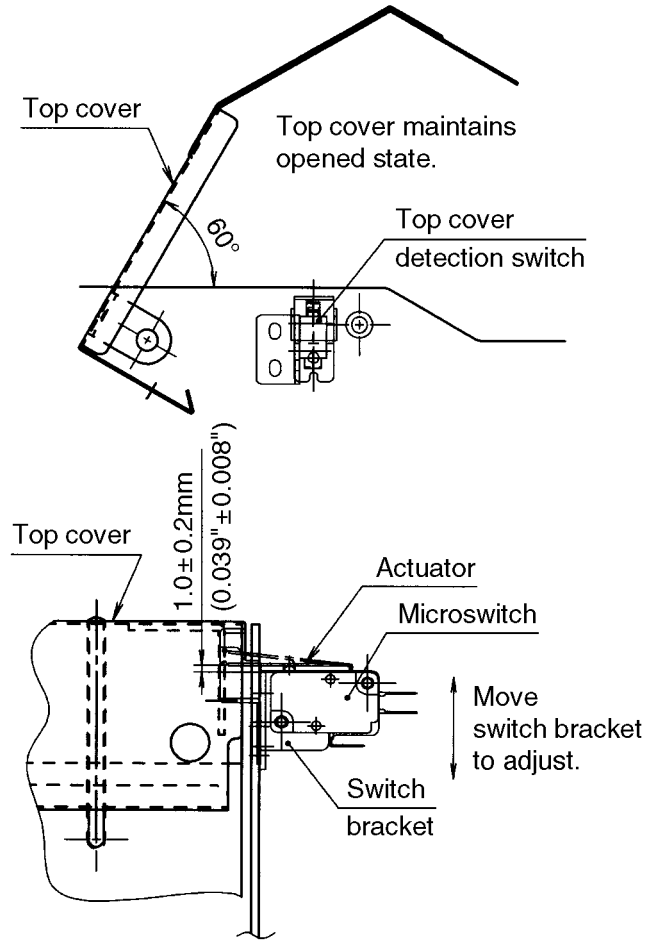
2-7. Exterior and Detection Switches

2-7-1. Adjusting the top cover and detection switch (interlock)

- ① Open and close the top cover and check that it is moderately tight and remains open without falling from its weight at an open/close angle of 60°.
- ② Move the switch bracket for the length of the long hole and adjust so that when the top cover is closed, the actuator of the microswitch turns ON the switch, and a clearance of $1.0 \pm 0.2 \text{ mm}$ ($0.039" \pm 0.008"$) forms at the position shown in the figure.
- ③ After adjustment, check that the detection switch is able to detect the open/close of the top cover in the maintenance mode.



“3. MAINTENANCE MODE” in CHAPTER 2 ELECTRICAL COMPONENTS



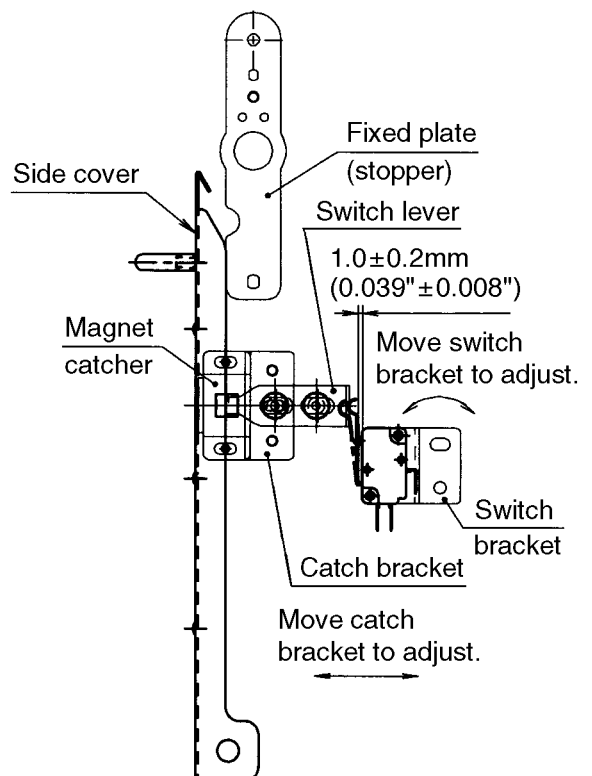
2-7-2. Adjusting the side cover and detection switch (interlock) (DF-920 only)

- ① Open and close the side cover and check that it is moderately tight.
- ② If abnormal sounds are produced (as if the cushion is being rubbed) when the side cover is opened and closed, apply a very small amount of oil to the frame of the cushion contact, and wipe away immediately with a dry cloth.
- ③ Move the switch bracket for the length of the long hole and adjust so that when the side cover is closed, the actuator of the microswitch turns ON the switch, and a clearance of $1.0 \pm 0.2 \text{ mm}$ ($0.039" \pm 0.008"$) forms at the position shown in the figure.
- ④ After adjustment, check that the detection switch is able to detect the open/close of the side cover in the maintenance mode.



“3. MAINTENANCE MODE” in CHAPTER 2 ELECTRICAL COMPONENTS

- ⑤ Move and adjust the catch bracket so that the side cover is suctioned and maintained by the magnet catcher at the stopping position of the stopper.

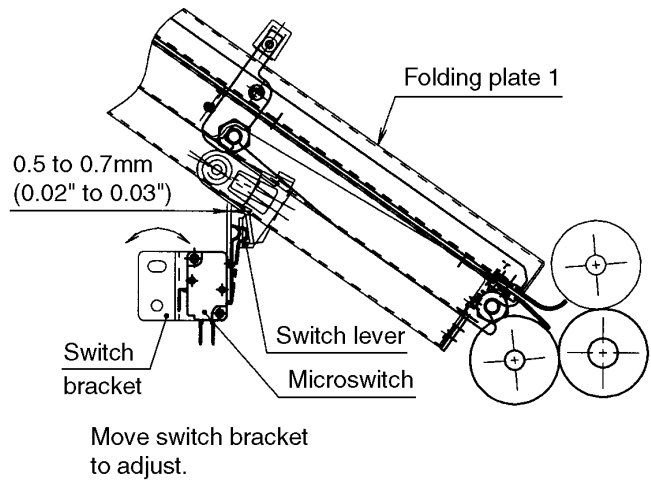


2-7-3. Adjusting folding plate 1 and detection switch (interlock)

① Move the switch bracket for the length of the long hole and adjust so that when folding plate 1 is attached to the unit, the actuator of the microswitch turns ON the switch according to the displacement of the detection lever, and a clearance of 0.5 to 0.7 mm (0.02" to 0.03") forms at the position shown in the figure.

② After adjustment, check that the detection switch is able to detect that folding plate 1 has been attached to the unit in the maintenance mode.

See "3. MAINTENANCE MODE" in CHAPTER 2 ELECTRICAL COMPONENTS



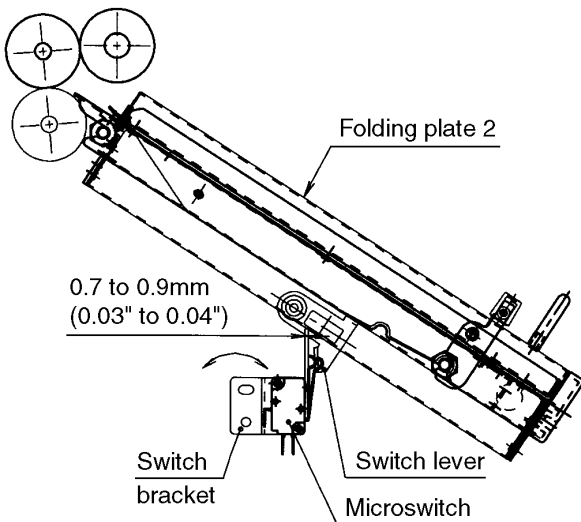
2-7-4. Adjusting folding plate 2 and detection switch (interlock)

① Move the switch bracket for the length of the long hole and adjust so that when folding plate 2 is attached to the unit at the reference position (position of mark "1 (■)" on the label), the actuator of the microswitch turns ON the switch according to the displacement of the detection lever, and a clearance of 0.7 to 0.9 mm (0.03" to 0.04") forms at the position shown in the figure.

② Check that when folding plate 2 is moved to the drop prevention position (position of mark "2 (□)" on the label), the microswitch goes OFF.

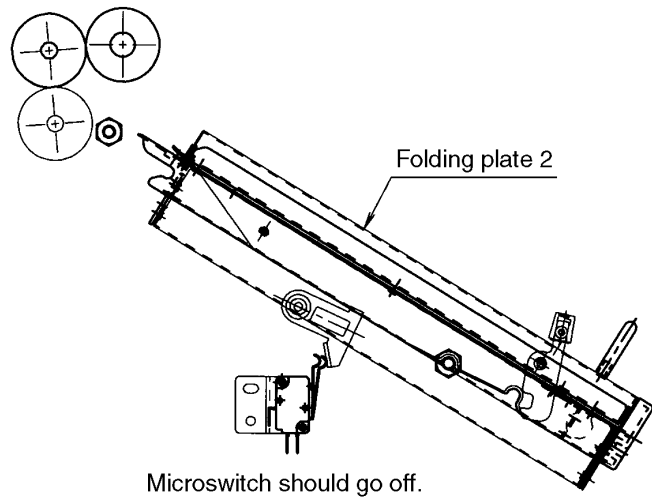
③ After adjustment, check that the detection switch is able to detect that folding plate 2 has been attached to the unit in the maintenance mode.

See "3. MAINTENANCE MODE" in CHAPTER 2 ELECTRICAL COMPONENTS



Move switch bracket to adjust.

Folding plate 2 reference position



Folding plate 2 drop prevention position

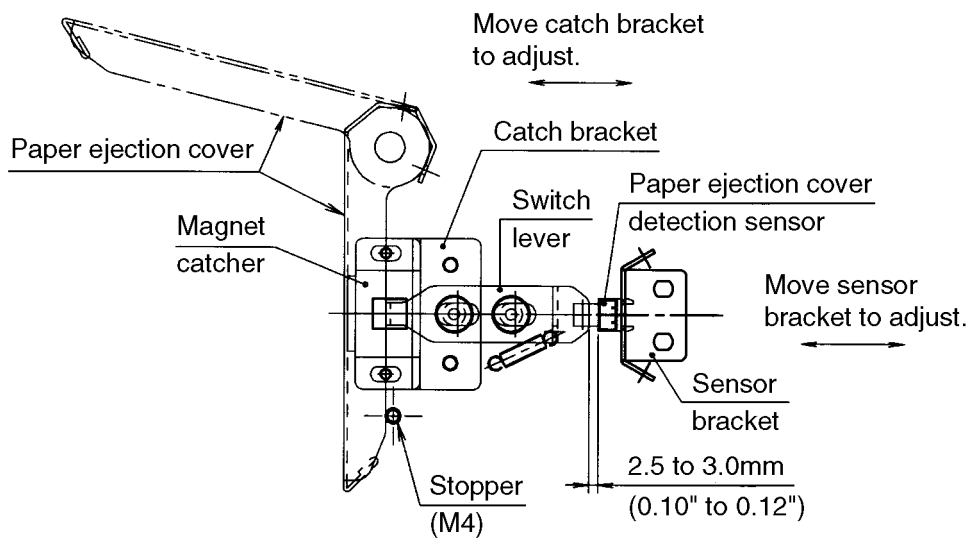
2-7-5. Adjusting the paper ejection cover and detection sensor (DF-920 only)

- ① Open and close the paper ejection cover and check that it is moderately tight.
- ② If abnormal sounds are produced (as if the cushion is being rubbed) when the paper ejection cover is opened and closed, apply a very small amount of oil to the frame of the cushion contact, and wipe away immediately with a dry cloth.
- ③ Move and adjust the sensor bracket so that when the paper ejection cover is closed, the clearance between the switch lever shield and paper ejection cover detection sensor becomes 2.5 to 3.0 mm (0.10" to 0.12").
- ④ After adjustment, check that the detection sensor is able to detect the open/close of the paper ejection cover in the maintenance mode.



“3. MAINTENANCE MODE” in CHAPTER 2 ELECTRICAL COMPONENTS


- ⑤ Move and adjust the catch bracket so that the paper ejection cover is suctioned and maintained by the magnet catcher at the stopping position of the stopper.



3. PERIODIC INSPECTIONS

3-1. Inspection Points and Procedure

In order to maintain stable paper folding performance and quality, perform periodic inspection every time the machine has processed 200,000 sheets or every six months, whichever is faster.

Inspection point	Inspection	Procedure
Paper feed ring, paper separator	Cleaning	Remove paper dust, and clean with alcohol.
Folding roller	Cleaning	Remove paper dust, and clean with alcohol.
Stacker roller moving mechanism	Oiling	Apply oil the sintered bearing.
Jam correction knob	Oiling	Apply oil the sintered bearing.
Paper feed tray automatic up/down mechanism	Greasing, inspection	Apply grease the gear surface and rack. (DF-920 only) Check the wear state of the Z collar.
Paper feed inlet, paper ejection outlet sensors	Cleaning	 “2-4-2. Cleaning the paper feed inlet sensor” “2-5-6. Cleaning the paper ejection outlet sensor”
Folding stopper	Inspection	Check that the fixing screw of the Z collar of the slide stopper is not loose.
Folding plate screw shaft	Cleaning, oiling	Remove paper dust near the female screw groove on the screw shaft and the home sensor, and apply a small amount of oil to the bearing. The area where the screw shaft and the full nut are connected cannot be applied with oil or grease.

3-2. Other General Precautions

3-2-1. Oiling

Apply the specified oil to the following locations.

- Area where shaft and bearing are connected (sintered bearing)
Specified oil: Orelube G90-140 (Equivalent to ISO #460)



Note Make sure no oil adhered to the contact surfaces of the armature and rotor of the electromagnetic clutch, and area where the screw shaft and full nut are connected.

3-2-2. Greasing

Apply the specified grease to the following parts.

- Gear teeth, paper feed tray automatic up/down drive rack related parts, etc.
Specified grease: Orelube G1650 (Equivalent to NLGI #1)
- Plate spring for grounding conduction of folding roller
Specified grease: Dow Corning MOLY KOTE 41 (Conductive grease)



Note Make sure no grease adhered to the contact surfaces of the armature and rotor of the electromagnetic clutch, and area where the screw shaft and full nut are connected.

3-2-3. Preventing screws from loosening

If the following screws have been removed, apply a very small amount of the specified thread locking.





- Set screw of drive gear for automatic up/down of paper feed tray
- Set screw of drive gear for stacker roller
- Fixing screw of folding plate 2 switching adjusting plate
Specified thread locking: Loctite 242 (Medium strength/for screws)
- Fixing screw of slide stopper Z collar
Specified thread locking: Three Bond 1401B (For preventing loosening)

3-2-4. Others



- Make sure that no oil and grease adheres to the timing belt and drive pulley grooves.
- Fill maintenance data (folded size correction data, etc.) changed during machine adjustments in the backup data form pasted to the back of the main cover F.

4. TROUBLESHOOTING GUIDE (MECHANICAL CAUSES)


4-1. When Paper is Conveyed Skewed

Cause	Solution
The left and right nip amount differs between the folding rollers.	Check the attached state of the reference stopper, and make the roller nip the same.  “2-1-2. (3) Attaching the reference stoppers” “2-1-2. (4) Attaching the drive gear (helical gear) of folding roller”
The thrust play of the folding roller drive gear is large.	Adjust so that there is no thrust play.  “2-1-2. (4) Attaching the drive gear (helical gear) of folding roller”
The press pressure of the folding roller is not balanced between the left and right sides.	Adjust the press pressure.  “2-1-2. (6) Attaching the press spring T”
The folding roller is deformed.	Replace the folding roller.  “2-1-2. Replacing folding rollers”


4-2. When Paper Wrinkles

Cause	Solution
The press pressure of the folding roller is strong.	Adjust the press pressure. Especially set the press pressure of folding roller 1 weak. (About 45 to 46 mm (1.77" to 1.81"))  “2-1-2. (6) Attaching the press spring T”
The folding roller is deformed.	Replace the folding roller.  “2-1-2. Replacing folding rollers”


4-3. When Abnormal Sounds (Metal Sliding Sounds) are Produced During Rotation of Folding Rollers

Cause	Solution
The plate spring for grounding conduction has worn out.	Apply conductive grease or replace the plate spring.  “2-1-2. (7) Attaching the plate spring (grounding conduction)”




4-4. When Stacker Belt Rotates Heavily

Cause	Solution
The thrust play of the paper ejection drive shaft and paper ejection clutch is not appropriate.	Adjust so that the thrust play is less than 0.1 mm (0.004").  “2-1-4. Paper ejection drive shaft”

4-5. Stopping Position of Paper Lead Edge Does Not Stabilize During Paper Feed, and Paper Jams Near Paper Feed Inlet Sensor

Cause	Solution
As the rotating load is too light during paper feed drive, paper continuous-feeds.	Wipe off a small amount of grease from the brake unit of the paper feed clutch to decrease the amount. If the brake unit has worn out, replace it.  "2-1-7. Attaching the brake unit"



4-6. When Paper Slips Frequently

Cause	Solution
Contact resistance occurs when the paper feed tray rises, and the reference paper feed pressure is insufficient.	When attaching the paper feed tray to the unit, ensure that thrust play is appropriate.  "2-2-3. Attaching the paper feed tray assembly"
The paper feed pressure adjustment is inappropriate.	Re-adjust the reference paper feed pressure.  "2-2-4. Adjusting the paper feed pressure"
The up/down lever and bearing are touching, and the reference paper feed pressure is insufficient. (DF-920 only)	Adjust the microswitch detection position when the paper feed tray rises.  "2-2-7. Adjusting the stopping position of the paper feed tray when rising/descending and paper stacking amount"



4-7. When Continuous-feed Occurs Frequently with Small Paper (B7, INV, etc.)

Cause	Solution
The processing speed is too fast or the paper feed pressure is too high.	Set the processing speed to less than "4" and the paper feed pressure to "0" or "-1".



4-8. When Stacker Belt Slips

Cause	Solution
The tension of the stacker belt is too weak, or tension differs between the left and right sides.	Adjust the tension of the stacker belt.  "2-5-2. Adjusting the tension of the stacker belt"
The Teflon tape on the stacker plate has worn out.	Replace the Teflon tape.  "2-5-2. Adjusting the tension of the stacker belt"


4-9. When Folding Stopper Moves Abnormally Slow

Cause	Solution
No thrust play of the screw shaft unit.	Adjust so that the thrust play becomes 0.1 to less than 0.15 mm (0.004" to less than 0.006").  "2-6-2. Checking and adjusting the thrust play of the screw shaft unit"
The tension of the drive belt of the screw shaft is too strong.	Adjust so that the belt slacks by the specified amount.  "2-6-4. Motor deceleration pulley assembly"


4-10. When Folding Misalignment Along Vertical Length of Paper is Large

Cause	Solution
Thrust play of the screw shaft unit is large.	Adjust so that the thrust play becomes 0.1 to less than 0.15 mm (0.004" to less than 0.006").  "2-6-2. Checking and adjusting the thrust play of the screw shaft unit"
The full nut has worn out, and the thrust play of the area connected the screw shaft is large.	Replace the full nut.  "2-6-3. Replacing the full nut"



4-11. When Folding Misalignment Along Sides of Paper is Large

Cause	Solution
Paper is conveyed skewed.	Perform "4-1. When Paper is Conveyed Skewed" .
Paper lead edge and folding stopper are not parallel.	Adjust the parallelity of the folding stopper.  "2-6-10. Adjusting the parallelity of the folding stoppers"


4-12. Paper Jams at Folding Unit or Flattening of Folded Line Occurs During Single Folding and When Thick Paper is Used, or Folding Wrinkle Line is Formed at Folded Line with Thin Paper

Cause	Solution
The clearance between the folding roller and switching shaft is too large.	Adjust the clearance.  "2-6-11. Adjusting the home position of the switching shaft (stopping position) in single folding"

4-13. Paper Jams at Folding Unit or Flattening of Folded Line Occurs During Folding Modes Other Than Single Folding and When Thick Paper is Used

Cause	Solution
As the conveyance route is too narrow, the thick paper does not enter the folding rollers easily.	<ul style="list-style-type: none"> ● Increase the processing speed.  "2-6-12. (1) Setting the thick paper mode" ● Change the stopping position of the switching shaft, and widen the conveyance route.  "2-6-12. (2) Removing the stopper (collar) of the switching shaft"

4-14. When Motor Lock of Folding Plate 2 Occurs

Cause	Solution
The frictional coefficient of the cushion (urethane sheet) surface of the switching shaft is high, exceeding the allowed current during motor drive.	Decrease the frictional coefficient.  "2-6-13. Switching shaft cushion (urethane sheet)"



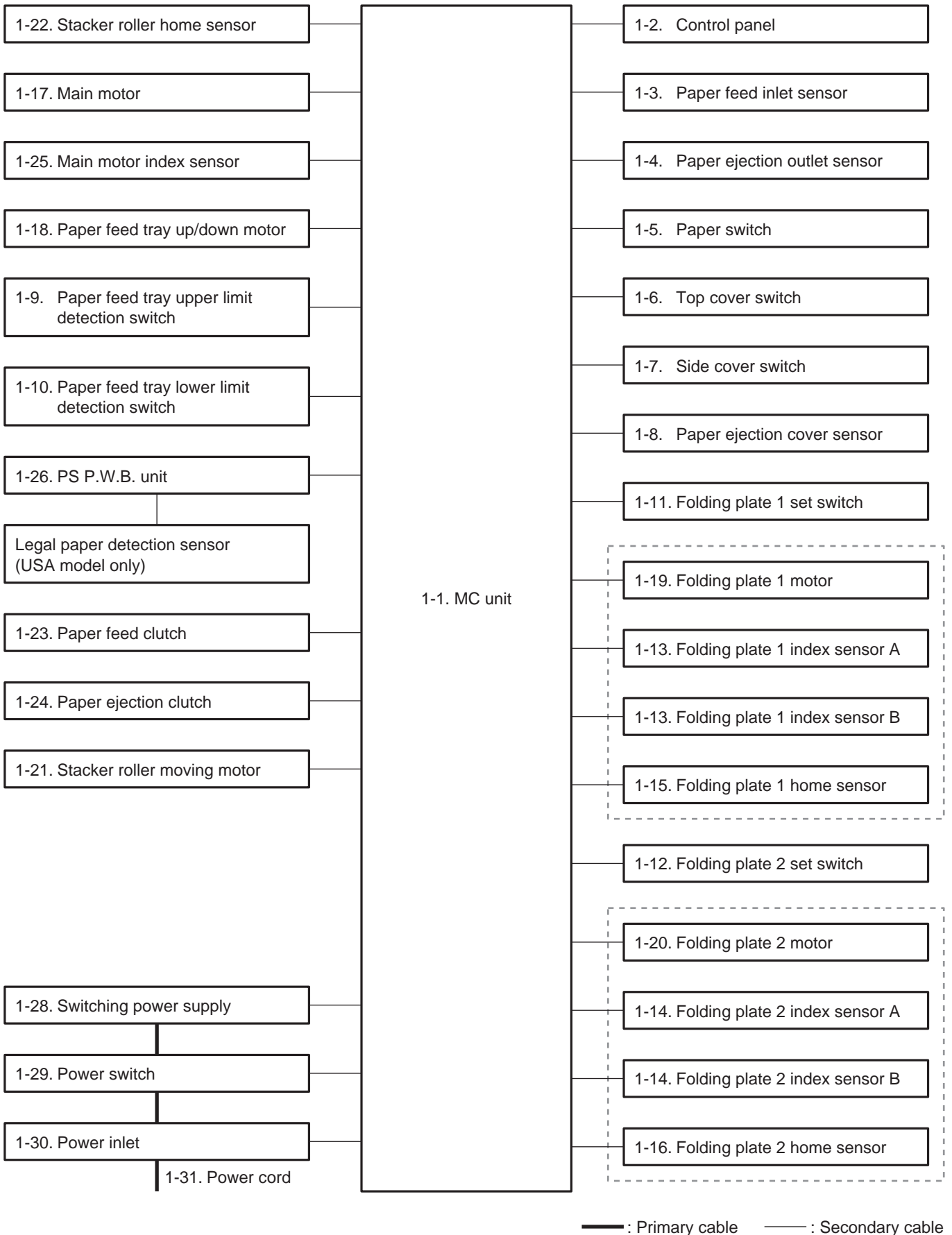
CHAPTER 2

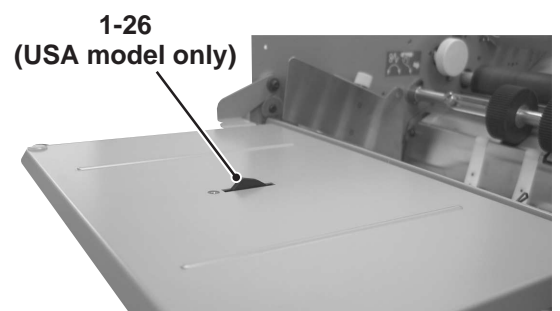
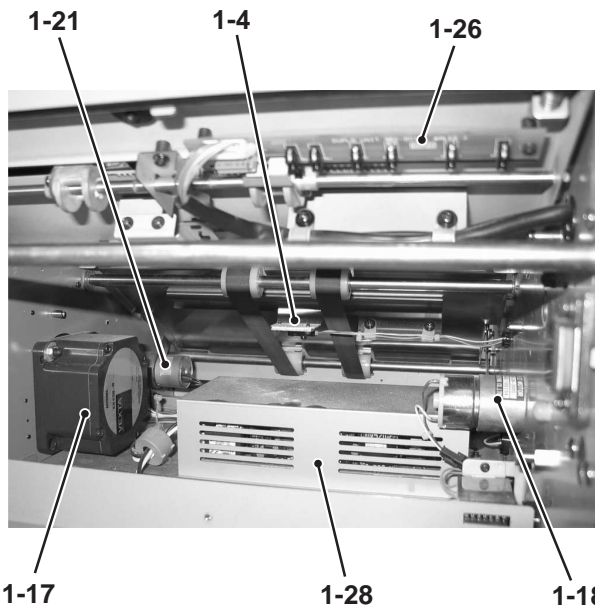
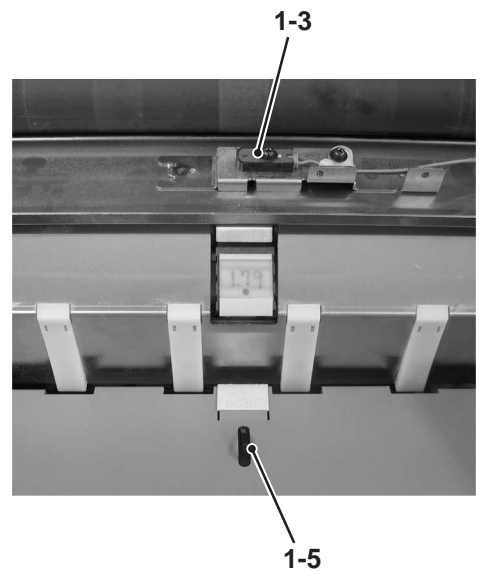
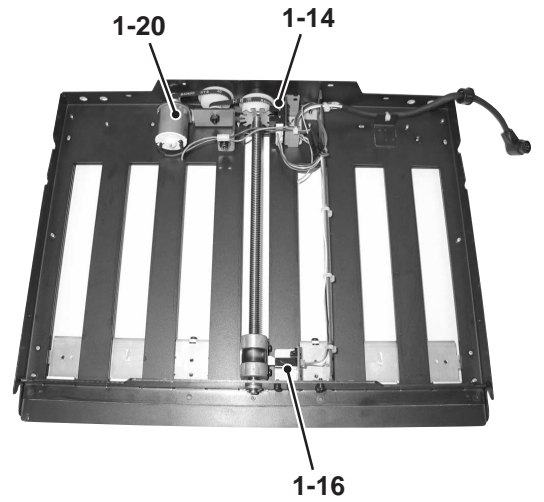
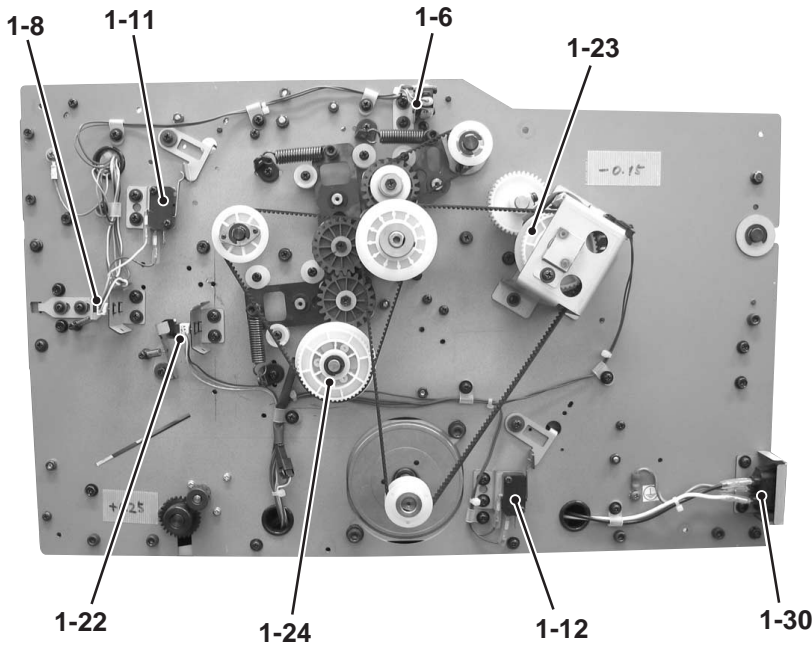
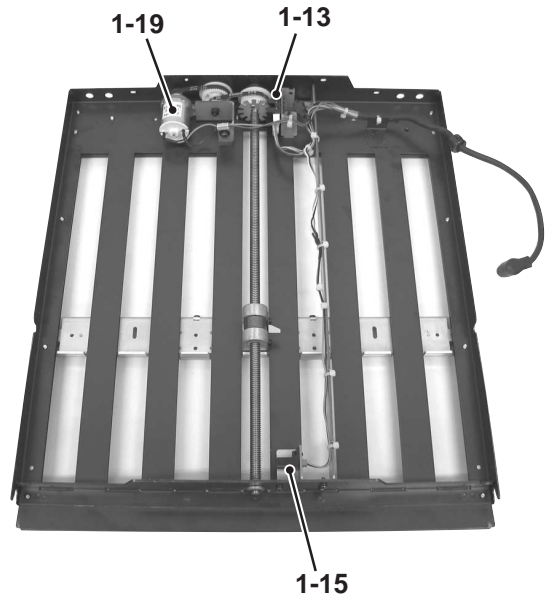
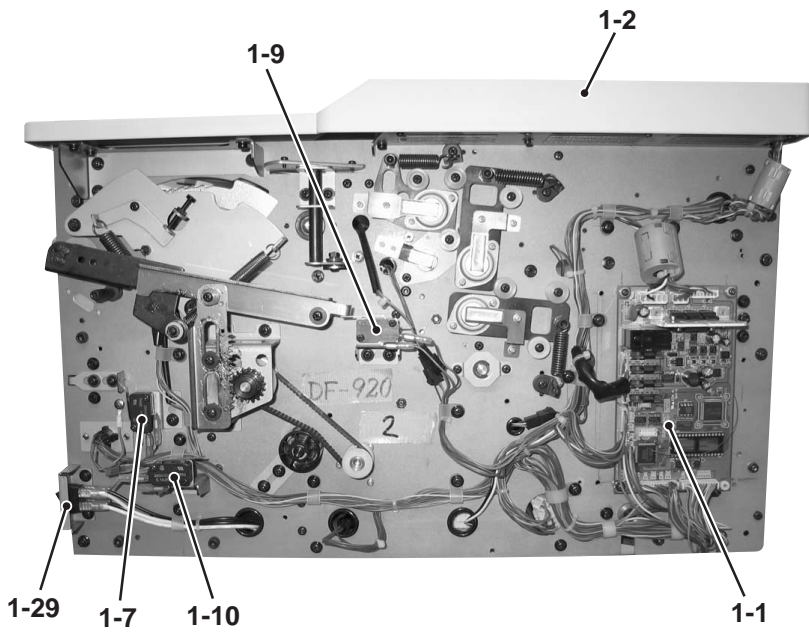
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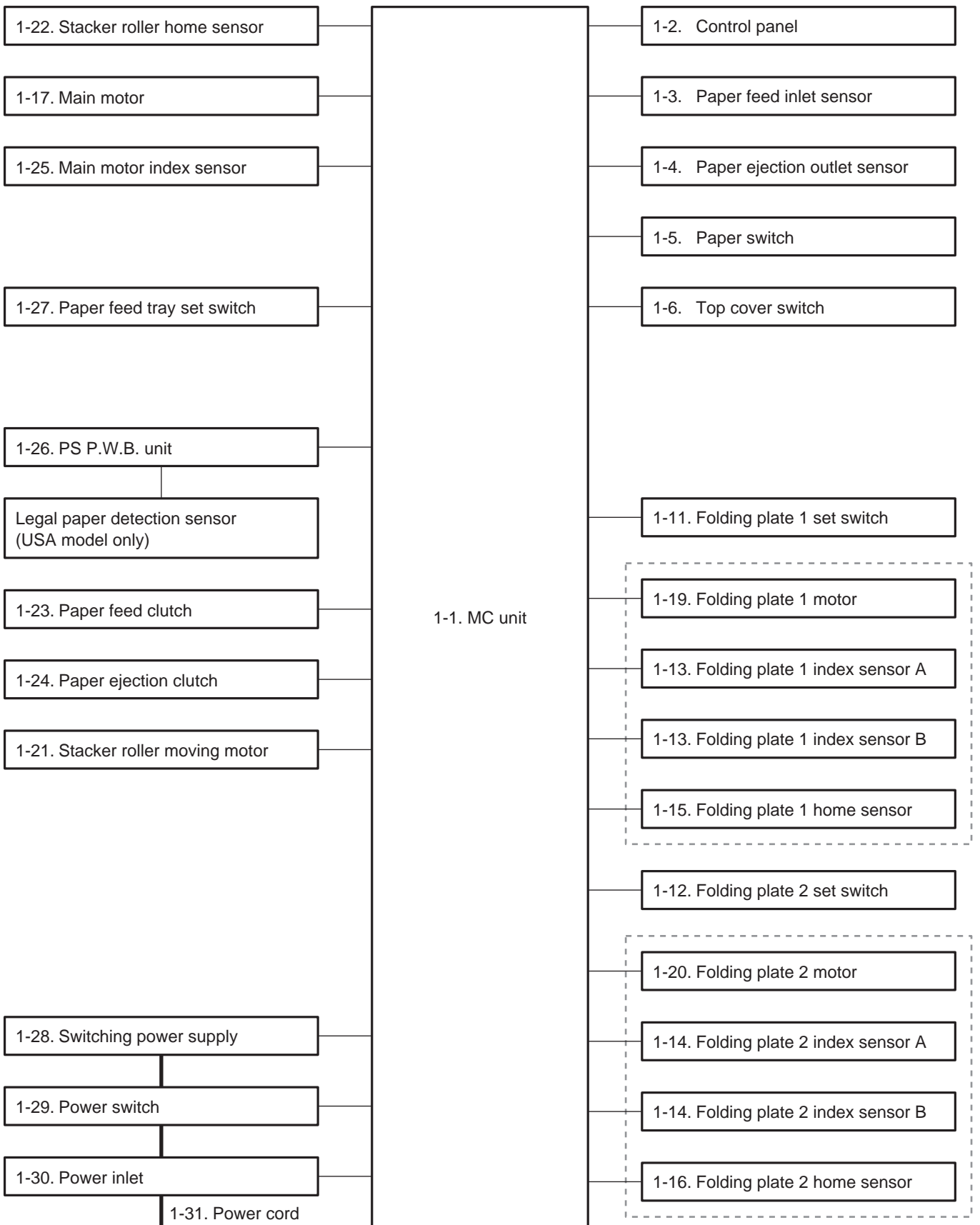
1. BLOCK DIAGRAM OF STRUCTURE AND OUTLINE OF EACH BLOCK

◆ DF-920 block diagram

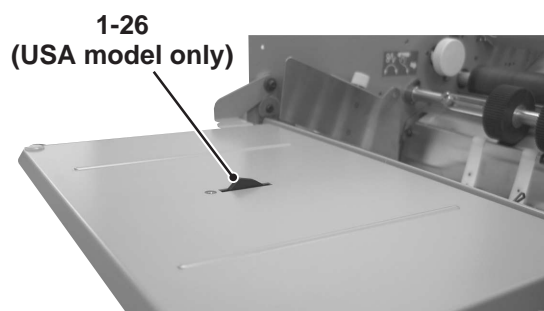
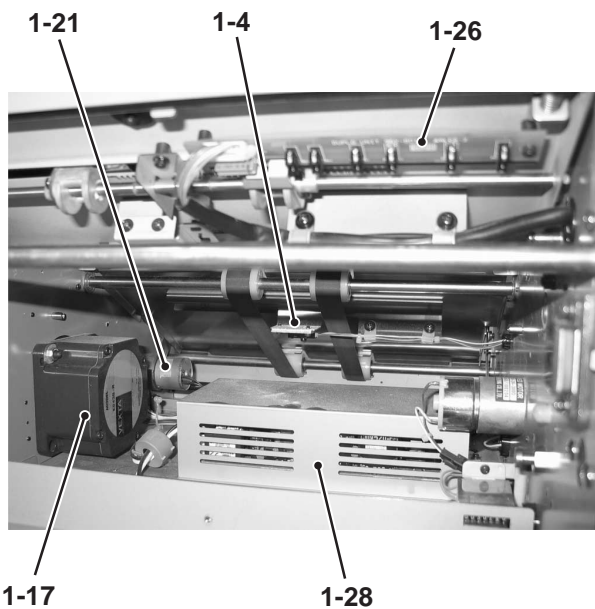
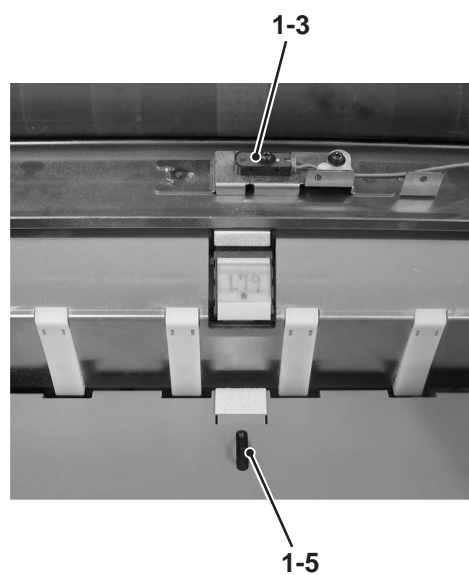
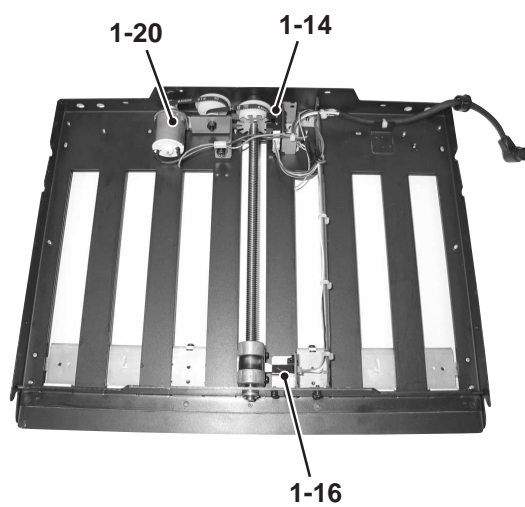
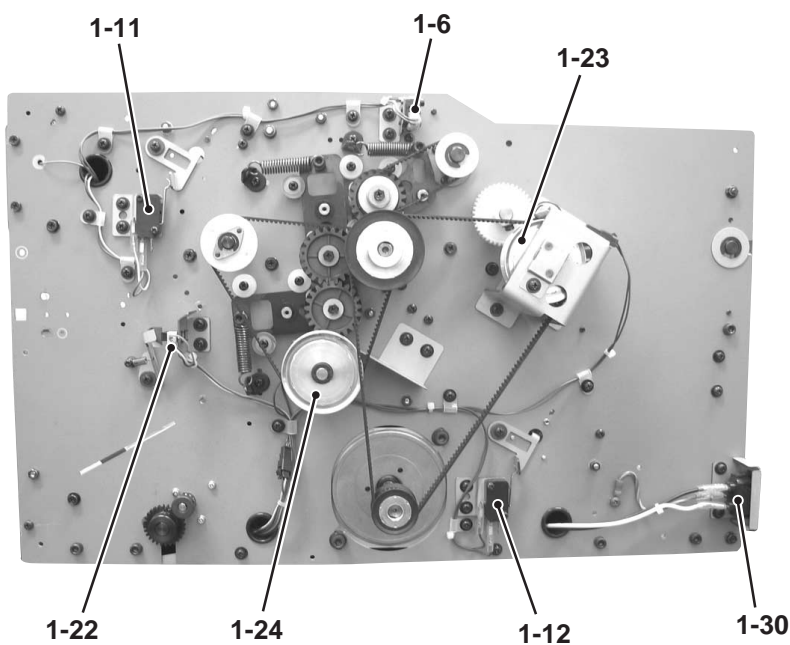
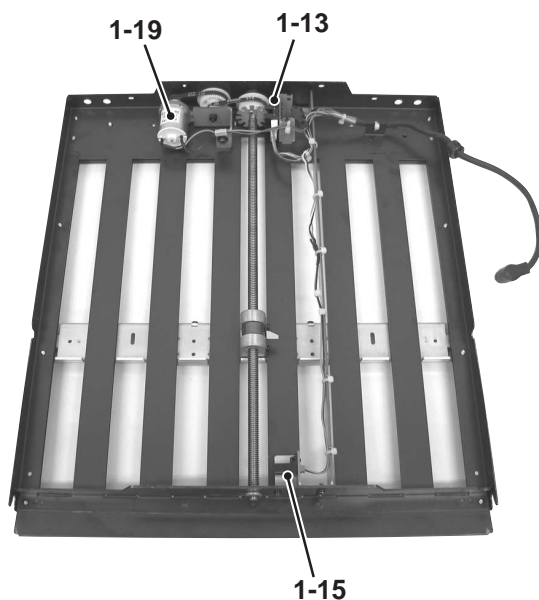
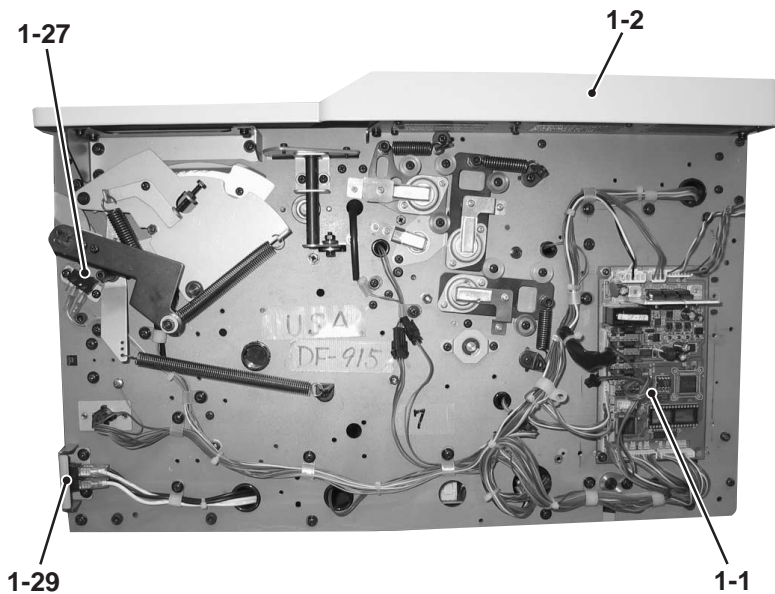




◆ DF-915 block diagram



— : Primary cable — : Secondary cable



1-1. MC Unit

[Part No.: 12H-8003X (DF-920), 12H-8602X (DF-915) Part name: Main unit]

Located inside the operating side cover (below the control panel) and functions to control the whole unit. Mounted with a 1M-byte ROM in the microprocessor which performs control of the whole unit. This board is also mounted with one 256-byte EEPROM, as well as the driving circuits for the DC motor and clutch.

Converts DC +24 V power input from the switching power supply to +5 V, +6.3 V, and +12 V.

Note The power supply used by this unit is DC +5 V and DC +6.3 V (panel displays) for the control system (ICs, sensors, etc.), and DC +24 V for the load system (motors, clutches).

1-2. Control Panel

[Part No.: 12H-9011X (DF-920), 12H-9052X (DF-915) Part name: Control panel unit]

Composed of key switches, 16-character × 2-line LCD (DF-920 only), 7-segment display, and various display LEDs required for operating this unit.

1-3. Paper Feed Inlet Sensor

[Part No.: 11G-8052X (Light-emitting), 11G-8051X (Light-receiving) Part name: Photosensor]

Uses a separation type photointerrupter. Located about 60 mm (2.36") inside from the paper feed ring to detect paper fed.

If the sensor is not blocked even though the paper feed clutch has been driving for more than a certain distance (number of pulses) after it turned ON, it is determined as paper feed error. Likewise, if the sensor continues to be blocked even though the paper feed clutch has been driving for more than a certain distance (number of pulses) after it was blocked, it is determined as paper jam.

Note As the paper folder processing speed can be changed, the sensor ON/OFF timing is based on distance (number of pulses) and not time.

1-4. Paper Ejection Outlet Sensor

[Part No.: 11G-8052X (Light-emitting), 11G-8051X (Light-receiving) Part name: Photosensor]

Uses a separation type photointerrupter. Located about 50 mm (1.97") inside from the stacker roller home position to detect paper ejection.

If the sensor is not blocked even at the timing for the paper to be ejected, or continues to be blocked even though the paper ejection clutch has been driving for more than a certain distance (number of pulses) after it was blocked, it is determined as paper jam.

1-5. Paper Switch

[Part No.: 054-10326 Part name: Paper switch]

Uses a photointerrupter. Incorporated inside the paper feed tray to detect the presence of paper.

1-6. Top Cover Switch

[Part No.: 054-10248 Part name: Microswitch]

Uses the normal open microswitch. Incorporated inside the non-operating side frame. The contact is established when the cover is closed.

Connected to the relay mounted on the MC unit. As the relay contact is established to the DC +24 V supplied to each motor, when the contact of the cover switch or folding plate set switch is opened, power supply to each motor is cut off. Therefore if the top cover is open, the unit cannot start. The unit also stops suddenly when the cover is opened while operating.

1-7. Side Cover Switch (DF-920 only)

[Part No.: 054-10115 Part name: Microswitch]

Uses the normal open microswitch. Incorporated inside the operating side frame. The contact is established when the cover is closed.

If the cover is open, the unit cannot start. The unit also stops suddenly when the cover is opened while operating.

1-8. Paper Ejection Cover Sensor (DF-920 only)

[Part No.: 98R-8023X Part name: Photosensor]

Uses a photointerrupter. Incorporated in the non-operating side frame. The optical axis is blocked when the cover is closed.

When the cover is open, controls so that folding is not carried out. If the cover is opened during folding operations, the unit stops feeding paper and stops operations after paper ejection.

1-9. Paper Feed Tray Upper Limit Detection Switch (DF-920 only)

[Part No.: 054-10248 Part name: Microswitch]

Uses a contact switch. Incorporated in the operating side frame to detect the upper limit position of the level bar. Detects when the level bar rises by the rotation of the paper feed tray up/down motor and reaches the upper limit position.

1-10. Paper Feed Tray Lower Limit Detection Switch (DF-920 only)

[Part No.: 054-10248 Part name: Microswitch]

Uses a contact switch. Incorporated in the operating side frame to detect the lower limit position of the level bar. Detects when the level bar descends by the rotation of the paper feed tray up/down motor and reaches the lower limit position.

1-11. Folding Plate 1 Set Switch

[Part No.: 054-10115 Part name: Microswitch]

Uses the normal open microswitch. Incorporated in the non-operating side frame. The contact is established when folding plate 1 is set. When not set, the unit cannot start.

1-12. Folding Plate 2 Set Switch

[Part No.: 054-10115 Part name: Microswitch]

Uses the normal open microswitch. Incorporated in the non-operating side frame. The contact is established when folding plate 2 is set. When not set, the unit cannot start.

1-13. Folding Plate 1 Index Sensor A/B

[Part No.: 98R-8023X Part name: Photosensor]

Uses two photointerrupters. Located at the side of the folding stopper moving motor inside folding plate 1 to detect the rotation of the motor.

1-14. Folding Plate 2 Index Sensor A/B

[Part No.: 98R-8023X Part name: Photosensor]

Uses two photointerrupters. Located at the side of the folding stopper moving motor inside folding plate 2 to detect the rotation of the motor.

1-15. Folding Plate 1 Home Sensor

[Part No.: 062-10782 Part name: Photosensor]

Uses a photointerrupter. Located inside folding plate 1 to detect the home position of the folding stopper.

1-16. Folding Plate 2 Home Sensor

[Part No.: 062-10782 Part name: Photosensor]

Uses a photointerrupter. Located inside folding plate 2 to detect the home position of the folding stopper.

1-17. Main Motor

[Part No.: 12H-8101X Part name: DC motor]

DC +24 V power supply, output 60 W brushless DC motor. For driving the conveyance section.

1-18. Paper Feed Tray Up/Down Motor (DF-920 only)

[Part No.: 97J-8505X Part name: DC motor unit]

DC +24 V power supply geared motor. For driving the level bar which raises/lowers the paper feed tray.

1-19. Folding Plate 1 Motor

[Part No.: 12H-8111X Part name: DC motor unit]

DC +24 V power supply DC motor. Located inside folding plate 1 for driving the folding stopper.

1-20. Folding Plate 2 Motor

[Part No.: 12H-8111X Part name: DC motor unit]

DC +24 V power supply DC motor. Located inside folding plate 2 for driving the folding stopper.

1-21. Stacker Roller Moving Motor

[Part No.: 96V-8146X Part name: DC motor]

DC +24 V power supply geared motor. Located inside the paper ejection section. For driving the arm for moving the stacker roller.

1-22. Stacker Roller Home Sensor

[Part No.: 98R-8023X Part name: Photosensor]

Uses a photointerrupter. Located inside the non-operating side frame. For detecting the home position of the stacker roller.

1-23. Paper Feed Clutch

[Part No.: 12H-8120X Part name: Paper feed clutch unit]

Uses a DC +24 V electromagnetic clutch (250 mA, coil resistance 96Ω). Located inside the non-operating side frame. Drives for 130 msec (about one rotation) when paper feed is started and feeds paper to the folding roller.

1-24. Paper Ejection Clutch

[Part No.: 12H-8168X Part name: Delivery clutch unit]

Uses a DC +24 V electromagnetic clutch (250 mA, coil resistance 96Ω). Located inside the non-operating side frame. When the folded paper blocks the paper ejection outlet sensor, operates for 130 msec (about one rotation) at the appropriate timing with the stacker roller position to feed paper to the space between the stacker roller and stacker belt.

When paper on the paper feed tray runs out, or when paper feed is stopped using the stop key, after the last sheet of paper reaches the paper ejection outlet sensor, ON/OFF is repeated intermittently until the paper is ejected completely.

1-25. Main Motor Index Sensor

Uses the index inside the main motor for detecting motor rotation. When the motor rotates, outputs pulses at a certain cycle.

1-26. PS P.W.B. Unit

[Part No.: 96V-8016X (UK), 96V-8026X (USA) Part name: PS P.W.B. unit]

When the shield plate below the paper feed guide blocks the sensor of the PS P.W.B. unit, detects the paper size. For USA models, the auxiliary paper feed tray is also provided with a photosensor to differentiate between legal size and letter size.

For UK models, six paper sizes can be detected : A3, B4, A4, B5, A5, and B6.

For USA models, five paper sizes can be detected : LGR, LGL, LTR, STMT, and INV.

1-27. Paper Feed Tray Set Switch (DF-915 only)

[Part No.: 054-00396 Part name: Microswitch]

Uses a contact switch. Detects whether the paper feed tray is set or not. The contact is established when the paper feed tray up/down lever is lowered (paper feed tray is set).

1-28. Switching Power Supply

[Part No.: 057-10033 Part name: Power supply unit]

Outputs DC +24 V (5 A, 10 A at peak) power. Mounted with a 6.3 A fuse (not replaceable).

Used also for 100 V, 120 V, 220 to 240 V, and 50/60 Hz (switching not required).

1-29. Power Switch

[Part No.: 054-10308 Part name: Power switch]

For turning ON/OFF the power supply to the unit.

1-30. Power Inlet

[Part No.: 056-10357 Part name: Inlet]

For connecting the power cord.

1-31. Power Cord

[Part No.: 055-10212 (UK), 055-10209 (USA) Part name: Power cord unit]

For supplying primary power to the unit. Use only the power cord provided with the unit.

2. ERRORS AND CAUSES

2-1. When Paper Jams Occur

When paper jams during processing or the unit is started with paper jammed inside the sensor, a warning buzzer sounds and a message to indicate the error appears on the control panel display (see table below).

The DF-920 LCD shows the error messages on the second line, while DF-915 shows at the 7-segment window on the right side.

When an error message is displayed, inspect near the paper feed inlet sensor or the paper ejection outlet sensor, and remove the jammed paper.

LCD (DF-920)	7-segment window (DF-915)	Description
JAM FEED SECT	J 1 - 2	<ul style="list-style-type: none"> ● The paper feed inlet sensor is blocked for more than the specified distance (number of pulses) during processing. ● Attempted to start with the paper feed inlet sensor blocked.
JAM INSIDE	J 1 - 3	The paper ejection outlet sensor did not turn ON even though the unit drove for the specified distance (number of pulses) after the paper feed inlet sensor turned OFF during processing.
JAM EXIT	- J 2 -	<ul style="list-style-type: none"> ● The paper ejection outlet sensor is blocked for more than the specified distance (number of pulses) during processing. ● Attempted to start with the paper ejection outlet sensor blocked.

Note ● The following causes may be suspected if error messages are displayed even though no paper jam has actually occurred.

- The paper feed inlet sensor or paper ejection outlet sensor is not secured properly.
- The paper feed inlet sensor or paper ejection outlet sensor is faulty.
- The connection between a paper feed inlet sensor or a paper ejection outlet sensor and MC unit is faulty.
- The MC unit is faulty.

● When using the manual feed function, if paper inserted through the manual feed inlet is pulled out to stop paper feed after the main motor has started, even if paper has not entered inside the machine, "JAM INSIDE" (DF-920), "J1-3" (DF-915) will be displayed.

In this case, perform forced ejection or open and then close the top cover or side cover (side cover applies only to DF-920) to recover the normal state.

2-2. Troubleshooting

The DF-920 LCD shows the error messages on the second line, while DF-915 shows at the 7-segment window on the right side (see table below).

LCD (DF-920)	7-segment window (DF-915)	Description
MOTOR ERROR 1	Err 1 ↔ P.OFF (Alternately displayed)	<p>The pulse output of the main motor index sensor is not normal.</p> <p><Causes></p> <ul style="list-style-type: none"> ● The folding mechanism cannot operate due to paper jams, etc. ● Faulty connection between the main motor and MC unit ● Malfunction of the MC unit ● Malfunction of the main motor





LCD (DF-920)	7-segment window (DF-915)	Description
MOTOR ERROR 4	<i>Err 4 ↔ P.OFF</i> (Alternately displayed)	<p>The pulse output of the folding plate 1 index sensor is not normal.</p> <hr/> <p><Causes></p> <ul style="list-style-type: none"> ● The folding mechanism cannot operate due to paper jam inside folding plate 1. ● Foreign objects jammed in the detecting section of the folding plate 1 index sensor. ● Faulty connection between the folding plate 1 index sensor and MC unit ● Malfunction of the folding plate 1 index sensor ● Faulty connection between the folding plate 1 motor and MC unit ● Malfunction of the MC unit ● Malfunction of the folding plate 1 motor ● Improper adjustments of the folding plate 1 mechanism (idling of shaft, etc.)
MOTOR ERROR 5	<i>Err 5 ↔ P.OFF</i> (Alternately displayed)	<p>The pulse output of the folding plate 2 index sensor is not normal.</p> <hr/> <p><Causes></p> <ul style="list-style-type: none"> ● The folding mechanism cannot operate due to paper jam inside folding plate 2. ● Foreign objects jammed in the detecting section of the folding plate 2 index sensor. ● Faulty connection between the folding plate 2 index sensor and MC unit ● Malfunction of the folding plate 2 index sensor ● Faulty connection between the folding plate 2 motor and MC unit ● Malfunction of the MC unit ● Malfunction of the folding plate 2 motor ● Improper adjustments of the folding plate 2 mechanism (idling of shaft, etc.)
MOTOR ERROR 3	<i>Err 3 ↔ P.OFF</i> (Alternately displayed)	<p>The stacker roller home sensor does not turn ON/OFF within the specified time after the stacker roller moving motor turned ON.</p> <hr/> <p><Causes></p> <ul style="list-style-type: none"> ● The stacker roller mechanism cannot operate due to paper jams, etc. ● Foreign objects jammed in the detecting section of the stacker roller home sensor. ● Faulty connection between the stacker roller home sensor and MC unit ● Malfunction of the stacker roller home sensor ● Faulty connection between the stacker roller moving motor and MC unit ● Malfunction of the MC unit ● Malfunction of the stacker roller moving motor ● Improper adjustments of the stacker roller mechanism (idling of shaft, etc.)
MOTOR ERROR 2	—	<p>The paper feed tray upper limit detection switch or paper feed tray lower limit detection switch does not turn ON/OFF within the specified time after the paper feed tray up/down motor turned ON. (DF-920 only)</p> <hr/> <p><Causes></p> <ul style="list-style-type: none"> ● The paper feed tray up/down mechanism cannot operate due to paper jams, etc. ● Faulty connection between the upper limit detection switch or the lower limit detection switch and MC unit ● Malfunction of the upper limit detection switch or the lower limit detection switch ● Faulty connection between the paper feed tray up/down motor and MC unit ● Malfunction of the MC unit ● Malfunction of the paper feed tray up/down motor ● Improper adjustments of the paper feed tray up/down mechanism (idling of shaft, etc.)

2-3. Other Condition Messages

When covers are open or when folding plates are not set, the control panel display shows the conditions of the unit. The DF-920 LCD shows the error messages on the second line, while DF-915 shows at the 7-segment window on the left and right sides.

In some cases, if the message and actual condition differ such as when "TOP COVER OPEN" is displayed despite the cover being closed, other errors may be suspected. The following table shows details.

LCD (DF-920)	7-segment window (DF-915)	Description
TOP COVER OPEN	<i>OPEN</i>	The contact of the top cover switch is open. ----- <Causes> <ul style="list-style-type: none"> ● The top cover is not closed completely. ● The top cover switch is not secured properly. ● The top cover switch is broken or has malfunctioned. ● Faulty connection between the top cover switch and MC unit (Disconnection of bundled wires, improper insertion of connectors) ● Malfunction of the MC unit
SIDE COVER OPEN	—	The contact of the side cover switch is open. (DF-920 only) ----- <Causes> <ul style="list-style-type: none"> ● The side cover is not closed completely. ● The side cover switch is not secured properly. ● Malfunction of the side cover switch ● Faulty connection between the side cover switch and MC unit (Disconnection of bundled wires, improper insertion of connectors) ● Malfunction of the MC unit
DELIVERY COVER	—	The paper ejection cover sensor is OFF. (DF-920 only) * This message is normally displayed when the start key or test key is pressed with the paper ejection cover open. It is not displayed at the instant the paper ejection cover is open. ----- <Causes> <ul style="list-style-type: none"> ● The paper ejection cover is not closed completely. ● The paper ejection cover sensor is not secured properly. ● Malfunction of the paper ejection cover sensor ● Faulty connection between the paper ejection cover sensor and MC unit (Disconnection of bundled wires, improper insertion of connectors) ● Malfunction of the MC unit
F.PLAT-1 SET ERR	<i>- F 1 -</i>	The contact of the folding plate 1 set switch is open. ----- <Causes> <ul style="list-style-type: none"> ● The folding plate 1 is not set properly. ● The folding plate 1 set switch is not secured properly. ● Malfunction of the folding plate 1 set switch ● Faulty connection between the folding plate 1 set switch and MC unit (Disconnection of bundled wires, improper insertion of connectors) ● Malfunction of the MC unit
F.PLAT-2 SET ERR	<i>- F 2 -</i>	The contact of the folding plate 2 set switch is open. ----- <Causes> <ul style="list-style-type: none"> ● The folding plate 2 is not set properly. ● The folding plate 2 set switch is not secured properly. ● Malfunction of the folding plate 2 set switch ● Faulty connection between the folding plate 2 set switch and MC unit (Disconnection of bundled wires, improper insertion of connectors) ● Malfunction of the MC unit

LCD (DF-920)	7-segment window (DF-915)	Description
FEED ERROR		<p>The paper feed inlet sensor does not turn ON even though the paper feed clutch has driven for the specified distance (number of pulses) after it turned ON.</p> <hr/> <p><Causes></p> <ul style="list-style-type: none"> ● The paper stacking method on the paper feed tray is not correct. ● Paper has slipped, etc. due to insufficient paper feed pressure, and paper is not fed correctly. ● The paper separating pressure is too high. ● Malfunction of the paper feed inlet sensor ● Malfunction of the paper feed clutch ● Faulty connection between the paper feed inlet sensor and MC unit (Disconnection of bundled wires, improper insertion of connectors) ● Malfunction of the MC unit
NO PAPER		<p>The paper switch of the paper feed tray turned OFF during processing or attempts were made to start the unit with the paper switch OFF.</p> <hr/> <p><Causes></p> <ul style="list-style-type: none"> ● Paper has run out on the paper feed tray. ● Malfunction of the paper switch ● Faulty connection between the paper switch and MC unit (Disconnection of bundled wires, improper insertion of connectors) ● Malfunction of the MC unit
—		<p>The paper feed tray set switch is OFF. (DF-915 only)</p> <hr/> <p><Causes></p> <ul style="list-style-type: none"> ● The paper feed tray is not set. ● The paper feed tray set switch is not secured properly. ● Malfunction of the paper feed tray set switch ● Faulty connection between the paper feed tray set switch and MC unit (Disconnection of bundled wires, improper insertion of connectors) ● Improper adjustments of the paper feed tray mechanism ● Malfunction of the MC unit
PAPER SIZE ERROR		<p>Paper less than half of the paper size set was fed.</p> <hr/> <p><Causes></p> <ul style="list-style-type: none"> ● Paper of different lengths are stacked together. ● The stacking direction of the paper on the paper feed tray is different. ● The paper length has been registered incorrectly. ● Malfunction of the paper size detection sensor ● Faulty connection between the paper size detection sensor and MC unit (Disconnection of bundled wires, improper insertion of connectors) ● Improper adjustments of the paper feed tray mechanism ● Malfunction of the MC unit

2-4. Emergency Measures When the Paper Switch Damages

When the paper switch damages, folding operations can be performed ignoring the paper switch as an emergency measure until the switch is replaced.

This function is available from the following ROM versions.

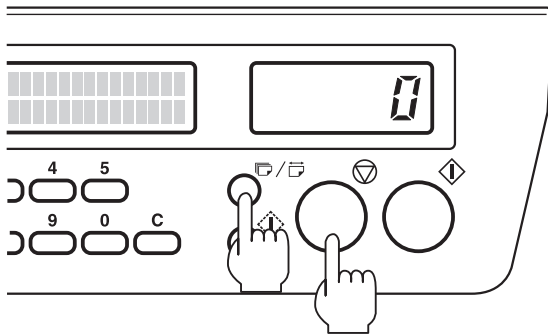
DF-920: 12H-80072 and later

DF-915: 12H-86041 and later

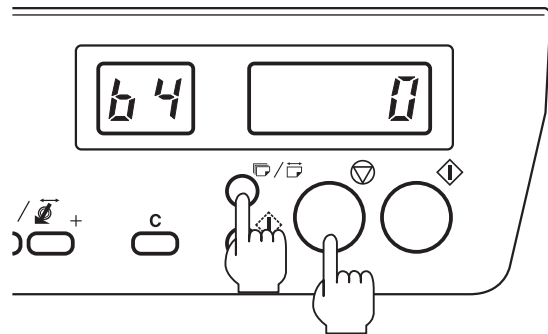
Method

Turn ON the power while pressing the stop and No. of sheets/Paper length keys simultaneously.

This enables folding operations to be carried out because the unit takes that paper is stacked even though the paper switch is not working.



DF-920



DF-915

- Note**
- When the paper switch malfunctions, as the “no paper state” cannot be detected even though paper has run out on the paper feed tray during folding operations, the unit proceeds feeding the next sheet of paper, after which the whole unit stops due to paper feed error. For this reason, the folded paper is not ejected out completed but stops near the stacker roller.
To continue paper folding in this state, replenish paper and resume operations. To end paper folding operations, remove the folded paper near the stacker roller by hand. The folded paper can also be ejected by pressing the test key while pressing the stop key.
 - As settings of this function cannot be registered in the memory, it is cleared when the power of the unit is turned OFF.

3. MAINTENANCE MODE

3-1. Entering the Maintenance Mode

◆ DF-920

- ① To enter the maintenance mode, turn ON the power while pressing both the start and stop keys. Or enter “920” using the numerical keys of the initial screen displayed on the control panel (even if an error message is displayed on the second line), and press the folding mode key while pressing the stop key.
Upon entering the maintenance mode, “MAINTENANCE MENU” is displayed on the first line of the LCD.
- ② Enter the one-digit or two-digit maintenance code using the numerical keys (refer to “**3-3. List of Maintenance Modes**”), and press the folding mode key to enter the desired maintenance mode. If the maintenance code is not known, press custom folding registration key 1 or 2 to select the maintenance mode. (Pressing the key continuously switches the mode continuously.)

◆ DF-915

- ① To enter the maintenance mode, turn ON the power while pressing both the start and stop keys. Or press the adjustment registration key while pressing both the stop key and No. of sheets/Paper length key while the unit is in the standby state (press the adjustment registration key last).
Upon entering the maintenance mode, “— —” is displayed at the 7-segment window on the left side.
- ② Press the “+” or “-” key of the Paper length/Stacker roller position key and select the desired maintenance mode. One-digit or two-digit code No. is displayed at the 7-segment window on the left side. (Pressing the key continuously switches the mode continuously.)

3-2. Setting the Maintenance Mode

Select the desired maintenance mode, and change the settings using the “+” or “-” speed key.
To set another mode, select the maintenance mode to be set.

3-3. List of Maintenance Modes

◆ DF-920

The following table lists the maintenance modes of DF-920.

Code	Setting	1st line of LCD	2nd line of LCD (Setting at shipment)
1	Folding plate 1 home position adjustment	1.STOP1 DEFAULT	Note 1
2	Folding plate 2 home position adjustment	2.STOP2 DEFAULT	Note 2
3	Switching shaft home position adjustment	3.SW BAR ADJUST	Note 3
4	Destination setting	4.AREAS	UK (USA)
5	mm/inch display setting	5.SET MM/INCH	MILLIMETER (INCH)
6	Language setting	6.LANGUAGES	ENGLISH
7	No. of test folding sheets setting	7.TEST FOLD QTY	2 SHEETS
8	Backlight automatic OFF setting	8.BACK LIGHT OFF	30 SEC
9	Buzzer ON/OFF setting	9.BUZZ ON/OFF	ON
10	Power still ON alert setting	10.POWER ON BUZZ	OFF
11	Speed 1 adjustment	11.SPEED1 ADJUST	NORMAL
12	Processing speed adjustment	12.SPEED ADJUST	NORMAL
13	Operation mode setting	13.SET FUNCTION	OFF
14	Total counter	14.TOTAL COUNTER	0000000
15	MC ROM version display	15.MC ROM VER	12H-8*****
16	OP ROM version display	16.PANEL ROM VER	12*8*****
17	Paper ejection cover detection ON/OFF setting	17.DEL CVR SNSR	ON
18	Program version up mode	18.PROG VER UP	
19	Manual feed function ON/OFF setting Note 4	19.H.F ON/OFF	OFF
20	Manual feed timing setting Note 5	20.H.F TIMING	NORMAL
21	Main motor test	21.MAIN MTR TEST	
22	Folding plate motor test	22.F.PLATE MOTOR	
23	Stacker roller moving motor test	23.STACK ROL MTR	
24	Paper feed tray up/down motor test	24.FEED TRAY MTR	
25	Paper feed clutch test	25.FEED CLUTCH	
26	Paper ejection clutch test	26.DLVRY CLUTCH	
27	Simulation mode	27.SIMULATION	RUN W/O PAPER
28	Folding stopper parallelity mode	28.ALIGNMENT	
31	Sensor/switch check	31.CHK SENSOR SW	ABCDEFGHIJKLM
32	Paper size detection sensor check	32.CHK SIZE SNSR	-- ■ ---
33	Main motor index sensor check	33.MAIN MTR INDX	0000
34	Folding plate index sensor check	34.F.PLATE INDEX	1:0000 / 2:0000
36	Panel check mode	36.PANEL CHECK	



- Code No.29, 30, and 35 are currently not used.
- The Note 1 to 3 settings differ by machine because they are finely adjusted at shipment.
- The Note 4 and 5 modes apply to machines with MC ROM versions 12H-80075 and later.

(1) Folding plate 1 home position adjustment (Code No.1)

Mode for adjusting the home position of folding plate 1.



“2-6-14. (1) Adjusting folded size by folding plate 1” in CHAPTER 1 MECHANISM



- This setting differs by machine because it is finely adjusted at shipment. The setting at shipment is indicated on the backup data form inside the operating side cover.
- To change the setting, first note down the current value. After changing the setting, fill in the new value in the backup data form.

(2) Folding plate 2 home position adjustment (Code No.2)

Mode for adjusting the home position of folding plate 2.



“2-6-14. (2) Adjusting folded size by folding plate 2” in CHAPTER 1 MECHANISM



- This setting differs by machine because it is finely adjusted at shipment. The setting at shipment is indicated on the backup data form inside the operating side cover.
- To change the setting, first note down the current value. After changing the setting, fill in the new value in the backup data form.

(3) Switching shaft home position adjustment (Code No.3)

Mode for adjusting the home position of the switching shaft.



“2-6-11. Adjusting the home position of the switching shaft (stopping position) in single folding” in CHAPTER 1 MECHANISM



- This setting differs by machine because it is finely adjusted at shipment. The setting at shipment is indicated on the backup data form inside the operating side cover.
- To change the setting, first note down the current value. After changing the setting, fill in the new value in the backup data form.

(4) Destination setting (Code No.4)

Mode for setting the destination. Can be set to “JAPAN”, “USA”, or “UK”.

At shipment, this is set according to the destination of the unit.

When the EEPROM is initialized, it is set to “JAPAN”.



- Changing the destination setting does not change the (5) mm/inch display setting and (6) language setting. These settings must be changed separately.

(5) mm/inch display setting (Code No.5)

Mode for setting the unit of the size displayed on the LCD or 7-segment window. Can be set to “MILLIMETER” or “INCH”.

At shipment, this is set to mm for Japanese and UK models and to inch for USA model.

When the EEPROM is initialized, it is set to “MILLIMETER”.

(6) Language setting (Code No.6)

Mode for setting the language of the messages displayed on the LCD. Can be set to “JAPANESE” or “ENGLISH”.

At shipment, this is set to “JAPANESE” for Japanese model and to “ENGLISH” for USA and UK models.

When the EEPROM is initialized, it is set to “ENGLISH”.

(7) No. of test folding sheets setting (Code No.7)

Mode for setting the number of sheets to be test folded. Can be set within 1 to 3 sheets.

At shipment, this is set to “2 SHEETS”.

(8) Backlight automatic OFF setting (Code No.8)

Mode for setting the time for the LCD backlight to go OFF automatically when not using the unit. Can be set to “15 SEC”, “30 SEC”, “60 SEC”, or “KEEP LIGHT ON” (always ON).

At shipment, this is set to “30 SEC”.

(9) Buzzer ON/OFF setting (Code No.9)

Mode for setting ON/OFF the buzzer which sounds during key operations, when a process ends, or when errors occur. Can be set to "ON" or "OFF".

At shipment, this is set to "ON".



Note A warning buzzer sounds when motor problems occur even if this setting is set to "OFF". (It will not sound when errors such as paper jams, etc. occur.)

(10) Power still ON alert setting (Code No.10)

Mode for setting the time to sounding a buzzer to alert that the power is still ON when the unit is not used. Can be set to "OFF" (buzzer not sounded), "5 MIN", "15 MIN", or "30 MIN".

At shipment, this is set to "OFF".

(11) Speed 1 adjustment (Code No.11)

Mode for setting the folding roller speed when processing speed is set to 1. Can be set to "NORMAL" or "SLOW". At shipment, this is set to "NORMAL".

When folding thin and flimsy paper, folding problems may occur if the processing speed is set to 1. In such cases, set to "SLOW".



- The speed of processing speed 1 when set to "NORMAL" is about 460 mm/s. Setting to "SLOW" lowers the speed to about 290 mm/s.
- When set to "SLOW", the processing speed 1 LED blinks.
- When set to "SLOW" and firm paper is used, the main motor may lock due to load.

(12) Processing speed adjustment (Code No.12)

Mode for finely adjusting the speed when the processing speed does not satisfy the specifications (200^{+5%}_{-1%} sheets/minute in single folding of B4 paper, 255^{+5%}_{-1%} sheets/minute in single folding of letter size paper for USA). Can be set to "NORMAL", "FAST", or "SLOW".

At shipment, this is set to "NORMAL".

When the EEPROM is initialized, it is set to "NORMAL".

(13) Operation mode setting (Code No.13)

Mode for setting the operation mode of the unit. Can be set to "OFF", "LAST TIME FOLD", or "STOPPER FIXED". At shipment, this is set to "OFF".



- When set to "STOPPER FIXED", after exiting the maintenance mode, be sure to press the clear key while pressing the stop key to perform initialization. Initialization is not carried out even if the power is turned OFF and then ON again. Using the unit without performing initialization may result in incorrect operations.
- The operation mode can be set without entering the maintenance mode. (Refer to the instruction manual.)

(14) Total counter (Code No.14)

Displays the total number of sheets fed into the machine.

(15) MC ROM version display (Code No.15)

Displays the program version of the microprocessor of the MC unit.

(16) OP ROM version display (Code No.16)

Displays the version of the OP unit.

(17) Paper ejection cover detection ON/OFF setting (Code No.17)

Mode for turning the paper ejection cover detection ON/OFF. Can be set to "ON" or "OFF".

At shipment, this is set to "ON".

(18) Program version up mode (Code No.18)

Mode for upgrading the program version.



"7. UPGRADING THE PROGRAM VERSION"

(19) Manual feed function ON/OFF setting (Code No.19)

Mode for turning the manual feed function ON/OFF. Setting to "ON" enables the manual feed function.

At shipment, this is set to "OFF".

When the DF HAND FEED KIT is attached, be sure to set to "ON".



- This mode applies to machines with MC ROM versions 12H-80075 and later.
- To use the manual feed function, the manual feed mode must be set using the separate user mode. For details of the settings, refer to the instruction manual of the DF HAND FEED KIT.

(20) Manual feed timing setting (Code No.20)

Mode for setting the time for the main motor to start after inserting paper (paper feed inlet sensor is ON) when using the manual feed function. Can be set to "FAST", "NORMAL", or "SLOW". The respective paper feed timings are as follows:

"FAST" Paper feed starts about 0.2 seconds after the paper feed inlet sensor turns ON.

"NORMAL" Paper feed starts about 0.5 seconds after the paper feed inlet sensor turns ON.

"SLOW" Paper feed starts about 1.0 seconds after the paper feed inlet sensor turns ON.

At shipment, this is set to "NORMAL".



- This mode applies to machines with MC ROM versions 12H-80075 and later.
- When machines with MC ROM versions 12H-80074 and below are upgraded to 12H-80075 and later, it is set to "FAST". When using in normal conditions, switch to "NORMAL".

(21) Main motor test (Code No.21)

Mode for checking the operations of the main motor.

The main motor rotates when the start key is pressed, and stops when the stop key is pressed.

The rotating speed can also be changed using the speed key.



- The motor will not rotate if any one interlock switch is not closed.

(22) Folding plate motor test (Code No.22)

Mode for checking operations of the motor for moving the folding stoppers of folding plate 1 and 2.

Pressing the "+" key of the folding plate 1 folding stopper adjusting key rotates the folding plate 1 motor, and moves the folding stopper in the reverse home position direction. Pressing the "-" key rotates the folding plate 1 motor, and moves the folding stopper in the home position direction.

Pressing the "+" key of the folding plate 2 folding stopper adjusting key rotates the folding plate 2 motor, and moves the folding stopper in the reverse home position direction. Pressing the "-" key rotates the folding plate 2 motor, and moves the folding stopper in the home position direction.

The motor rotates while the key is pressed, and stops when the key is released.



- As the motor rotates regardless of the limit detection by the home sensor and index sensor, make sure that the folding stopper does not clash into the limit section of the folding plate.
- The motor will not rotate if any one interlock switch is not closed.

(23) Stacker roller moving motor test (Code No.23)

Mode for checking operations of the stacker roller moving motor.

Pressing the "+" key of the folding plate 2 folding stopper adjusting key rotates the stacker roller moving motor, and moves the stacker roller outside. Pressing the "-" key rotates the stacker roller moving motor, and moves the stacker roller inside.

The motor rotates while the key is pressed, and stops when the key is released.



- Pressing the "+" key continuously moves the stacker roller outside the unit and locks the motor.
- The motor will not rotate if any one interlock switch is not closed.

(24) Paper feed tray up/down motor test (Code No.24)

Mode for checking operations of the paper feed tray up/down motor.

Pressing the “+” key of the folding plate 1 folding stopper adjusting key rotates the paper feed tray up/down motor, and raises the paper feed tray. Pressing the “-” key rotates the paper feed tray up/down motor, and lowers the paper feed tray.

The motor rotates while the key is pressed, and stops when the key is released.



Note The motor will not rotate if any one interlock switch is not closed.

(25) Paper feed clutch test (Code No.25)

Mode for checking the operations of the paper feed clutch.

The paper feed clutch operates when the start key is pressed, and stops when the stop key is pressed.



Note Do not leave the unit with the clutch operating. Otherwise, the clutch will overheat, resulting in malfunction.

(26) Paper ejection clutch test (Code No.26)

Mode for checking the operations of the paper ejection clutch.

The paper ejection clutch operates when the start key is pressed, and stops when the stop key is pressed.



Note Do not leave the unit with the clutch operating. Otherwise, the clutch will overheat, resulting in malfunction.

(27) Simulation mode (Code No.27)

Mode for operating each mechanism without using paper.

The simulation mode operates when the start key is pressed, and stops when the stop key is pressed.



Note If operating the unit in the simulation mode, be sure to remove the paper feed ring.

(28) Folding stopper parallelity mode (Code No.28)

Mode for making the folding stoppers of folding plates 1 and 2 parallel.



See “2-6-10. Adjusting the parallelity of the folding stoppers” in CHAPTER 1 MECHANISM

(29) Sensor/switch check (Code No.31)

Mode for checking the states of sensors and switches.

Sensors and switches which are ON are displayed in alphabet at the second line of the LCD. Those which are OFF are displayed as “-”.

The displays correspond to sensors and switches from the left side in the following order.

[A] Paper feed inlet sensor → [B] Paper ejection outlet sensor → [C] Paper switch →
[D] Stacker roller home sensor → [E] Folding plate 1 home sensor →
[F] Folding plate 2 home sensor → [G] Paper feed tray upper limit detection switch →
[H] Paper feed tray lower limit detection switch → [I] Paper ejection cover sensor →
[J] Top cover switch → [K] Side cover switch → [L] Folding plate 1 set switch →
[M] Folding plate 2 set switch

Turning sensors and switches ON/OFF changes the corresponding display (alphabet or “-”), and a buzzer sounds.

(30) Paper size detection sensor check (Code No.32)

Mode for checking the state of the paper size detection sensor.

Sensors which are ON are displayed as “■” at the second line of the LCD, and those which are OFF are displayed as “-”. UK model displays correspond to the B6, A5, B5, A4, B4, and A3 paper size detection sensors from the left side in order.

For USA models, “■” is displayed at the leftmost side, and the second display onwards corresponds to the INV, STMT, LTR, LGR, and LGL paper size detection sensors in order.

The displays change when the paper feed guides are moved, and a buzzer sounds.



Note The LGL detection sensor is the opposite to other sensors, in that “-” is displayed when it is ON, and “■” when OFF.

(31) Main motor index sensor check (Code No.33)

Mode for checking the index sensor inside the main motor.

When the main motor shaft is rotated by rotating the jam correction knob or center press roller, pulse input is performed, and the number of pulses is counted up and displayed at the second line of the LCD.

When the main motor shaft is rotated once, and the number of pulses should be added with 15.



- Note**
- The number of pulses displayed is reset to 0 when the power is turned OFF.
 - The number of pulses is counted up even if the main motor shaft is rotated in the normal or reverse directions.

(32) Folding plate index sensor check (Code No.34)

Mode for checking the index sensor of folding plates 1 and 2.

Check the changes in the states of each sensor by looking at the changes in the number of pulses displayed at the second line of the LCD.

Pressing the “+” key of the folding plate 1 folding stopper adjusting key counts up the number of pulses displayed at the left side of the second line of the LCD, and pressing the “-” key counts down the display.

Pressing the “+” key of the folding plate 2 folding stopper adjusting key counts up the number of pulses displayed at the right side of the second line of the LCD, and pressing the “-” key counts down the display.



- Note** If the direction which changes the number of pulses is opposite to the above, check if the connectors of index sensors A and B of the corresponding folding plate are connected reverse.

(33) Panel check mode (Code No.36)

Mode for checking the LEDs and 7-segment of the control panel.

Pressing the start key lights up the whole 7-segment, and pressing the stop key lights up all LEDs. (Some LEDs may blink depending on the other settings of the maintenance mode.)

◆ DF-915

The following table lists the maintenance modes of DF-915.

Code	Setting	7-segment window (Left side, 2 digits)	7-segment window (Right side, 4 digits) (Setting at shipment)
1	Folding plate 1 home position adjustment	1	Note 1
2	Folding plate 2 home position adjustment	2	Note 2
3	Switching shaft home position adjustment	3	Note 3
4	Model setting	4	915
5	Destination setting	5	Euro (USA)
6	mm/inch display setting	6	mm (INCH)
7	No. of test folding sheets setting	7	2
9	Buzzer ON/OFF setting	9	00
11	Speed 1 adjustment	11	0
12	Processing speed adjustment	12	0
14	Total counter	14	C.*** ↔ ****
15	MC ROM version display	15	1248 ↔ ****
16	OP ROM version display	16	12 * 8 ↔ ****
18	Program version up mode	18	
19	Manual feed function ON/OFF setting Note 4	19	OFF
20	Manual feed timing setting Note 5	20	0
21	Main motor test	21	
22	Folding plate motor test	22	
23	Stacker roller moving motor test	23	
25	Paper feed clutch test	25	
26	Paper ejection clutch test	26	
27	Simulation mode	27	
28	Folding stopper parallelity mode	28	
31	Sensor check (1)	31	****
32	Sensor check (2)	32	***
33	Switch check	33	***
34	Paper size detection sensor check (1)	34	****
35	Paper size detection sensor check (2)	35	**
36	Panel check mode	36	8.8.8.8
37	Motor index sensor check	37	****



- Code No.8, 10, 13, 17, 24, 29, and 30 are currently not used.
- The Note 1 to 3 settings differ by machine because they are finely adjusted at shipment.
- The Note 4 and 5 modes apply to machines with MC ROM versions 12H-86044 and later.

(1) Folding plate 1 home position adjustment (Code No.1)

Mode for adjusting the home position of folding plate 1.



“2-6-14. (1) Adjusting folded size by folding plate 1” in CHAPTER 1 MECHANISM



- This setting differs by machine because it is finely adjusted at shipment. The setting at shipment is indicated on the backup data form inside the operating side cover.
- To change the setting, first note down the current value. After changing the setting, fill in the new value in the backup data form.

(2) Folding plate 2 home position adjustment (Code No.2)

Mode for adjusting the home position of folding plate 2.



“2-6-14. (2) Adjusting folded size by folding plate 2” in CHAPTER 1 MECHANISM



- This setting differs by machine because it is finely adjusted at shipment. The setting at shipment is indicated on the backup data form inside the operating side cover.
- To change the setting, first note down the current value. After changing the setting, fill in the new value in the backup data form.

(3) Switching shaft home position adjustment (Code No.3)

Mode for adjusting the home position of the switching shaft.



“2-6-11. Adjusting the home position of the switching shaft (stopping position) in single folding” in CHAPTER 1 MECHANISM



- This setting differs by machine because it is finely adjusted at shipment. The setting at shipment is indicated on the backup data form inside the operating side cover.
- To change the setting, first note down the current value. After changing the setting, fill in the new value in the backup data form.

(4) Model setting (Code No.4)

Mode for setting the model.

Can be set to “915” (DF-915) or “910” (DF-910).

At shipment, Japanese model is set to “910” and UK, USA models are set to “915”.

When the EEPROM is initialized, it is set to “915”.



- Changing the model setting does not change the (5) Destination setting and (6) mm/inch display setting. These settings must be changed separately.

(5) Destination setting (Code No.5)

Mode for setting the destination. Can be set to “JPN” (JAPAN), “USA”, or “Euro” (UK).

At shipment, this is set according to the destination of the unit.

When the EEPROM is initialized, it is set to “JPN”.



- Changing the destination setting does not change the (4) Model setting and (6) mm/inch display setting. These settings must be changed separately.

(6) mm/inch display setting (Code No.6)

Mode for setting the unit of the size displayed on the 7-segment window. Can be set to “NN” (mm) or “INCH”.

At shipment, this is set to mm for Japanese and UK models and to inch for USA model.

When the EEPROM is initialized, it is set to “NN”.

(7) No. of test folding sheets setting (Code No.7)

Mode for setting the number of sheets to be test folded. Can be set within 1 to 3 sheets.

At shipment, this is set to “2”.

(8) Buzzer ON/OFF setting (Code No.9)

Mode for setting ON/OFF the buzzer which sounds during key operations, when a process ends, or when errors occur. Can be set to "ON" or "OFF".

At shipment, this is set to "ON".



Note A warning buzzer sounds when motor problems occur even if this setting is set to "OFF". (It will not sound when errors such as paper jams, etc. occur.)

(9) Speed 1 adjustment (Code No.11)

Mode for setting the folding roller speed when processing speed is set to 1. Can be set to "0" (NORMAL) or "-1" (SLOW).

At shipment, this is set to "0".

When folding thin and flimsy paper, folding problems may occur if the processing speed is set to 1. In such cases, set to "-1".



- The speed of processing speed 1 when set to "0" is about 460 mm/s. Setting to "-1" lowers the speed to about 290 mm/s.
- When set to "-1", the processing speed 1 LED blinks.
- When set to "-1" and firm paper is used, the main motor may lock due to load.

(10) Processing speed adjustment (Code No.12)

Mode for finely adjusting the speed when the processing speed does not satisfy the specifications (200^{+5%}_{-1%} sheets/minute in single folding of B4 paper, 255^{+5%}_{-1%} sheets/minute in single folding of letter size paper for USA). Can be set to "0" (NORMAL), "1" (FAST), or "-1" (SLOW).

At shipment, this is set to "0".

When the EEPROM is initialized, it is set to "0".

(11) Total counter (Code No.14)

Displays the total number of sheets fed into the machine. (7 digits)

At the 7-segment window on the right side, the first three digits "C.***" and last four digits "****" are displayed alternately for one second each.

Example) "C.123" and "4567" are displayed alternately for one second each.

→ This means that the total number of sheets fed into the machine is 1234567.

(12) MC ROM version display (Code No.15)

Displays the program version of the microprocessor of the MC unit.

The program version is "12H-8****", but at the 7-segment window on the right side, the first four digits "12H8" and last four digits "****" are displayed alternately for one second each.

(13) OP ROM version display (Code No.16)

Displays the version of the OP unit.

At the 7-segment window on the right side, the first four digits "12*8" and last four digits "****" are displayed alternately for one second each.

(14) Program version up mode (Code No.18)

Mode for upgrading the program version.



"7. UPGRADING THE PROGRAM VERSION"

(15) Manual feed function ON/OFF setting (Code No.19)

Mode for turning the manual feed function ON/OFF. Setting to "ON" enables the manual feed function.

At shipment, this is set to "OFF".

When the DF HAND FEED KIT is attached, be sure to set to "ON".



- This mode applies to machines with MC ROM versions 12H-86044 and later.
- To use the manual feed function, the manual feed mode must be set using the separate user mode. For details of the settings, refer to the instruction manual of the DF HAND FEED KIT.

(16) Manual feed timing setting (Code No.20)

Mode for setting the time for the main motor to start after inserting paper (paper feed inlet sensor is ON) when using the manual feed function. Can be set to “-1” (FAST), “0” (NORMAL), or “1” (SLOW). The respective paper feed timings are as follows:

“-1” (FAST) Paper feed starts about 0.2 seconds after the paper feed inlet sensor turns ON.

“0” (NORMAL) Paper feed starts about 0.5 seconds after the paper feed inlet sensor turns ON.

“1” (SLOW) Paper feed starts about 1.0 seconds after the paper feed inlet sensor turns ON.

At shipment, this is set to “0”.



Note ● This mode applies to machines with MC ROM versions 12H-86044 and later.
● When machines with MC ROM versions 12H-86043 and below are upgraded to 12H-86044 and later, it is set to “-1” (FAST). When using in normal conditions, switch to “0” (NORMAL).

(17) Main motor test (Code No.21)

Mode for checking the operations of the main motor.

The main motor rotates when the start key is pressed, and stops when the stop key is pressed.

The rotating speed can also be changed using the speed key.



Note The motor will not rotate if any one interlock switch is not closed.

(18) Folding plate motor test (Code No.22)

Mode for checking operations of the motor for moving the folding stoppers of folding plate 1 and 2.

Pressing the “+” key of the folding plate 1 folding stopper adjusting key rotates the folding plate 1 motor, and moves the folding stopper in the reverse home position direction. Pressing the “-” key rotates the folding plate 1 motor, and moves the folding stopper in the home position direction.

Pressing the “+” key of the folding plate 2 folding stopper adjusting key rotates the folding plate 2 motor, and moves the folding stopper in the reverse home position direction. Pressing the “-” key rotates the folding plate 2 motor, and moves the folding stopper in the home position direction.

The motor rotates while the key is pressed, and stops when the key is released.



Note ● As the motor rotates regardless of the limit detection by the home sensor and index sensor, make sure that the folding stopper does not clash into the limit section of the folding plate.
● The motor will not rotate if any one interlock switch is not closed.

(19) Stacker roller moving motor test (Code No.23)

Mode for checking operations of the stacker roller moving motor.

Pressing the “+” key of the folding plate 2 folding stopper adjusting key rotates the stacker roller moving motor, and moves the stacker roller outside. Pressing the “-” key rotates the stacker roller moving motor, and moves the stacker roller inside.

The motor rotates while the key is pressed, and stops when the key is released.



Note ● Pressing the “+” key continuously moves the stacker roller outside the unit and locks the motor.
● The motor will not rotate if any one interlock switch is not closed.

(20) Paper feed clutch test (Code No.25)

Mode for checking the operations of the paper feed clutch.

The paper feed clutch operates when the start key is pressed, and stops when the stop key is pressed.



Note Do not leave the unit with the clutch operating. Otherwise, the clutch will overheat, resulting in malfunction.

(21) Paper ejection clutch test (Code No.26)

Mode for checking the operations of the paper ejection clutch.

The paper ejection clutch operates when the start key is pressed, and stops when the stop key is pressed.



Note Do not leave the unit with the clutch operating. Otherwise, the clutch will overheat, resulting in malfunction.

(22) Simulation mode (Code No.27)

Mode for operating each mechanism without using paper.

The simulation mode operates when the start key is pressed, and stops when the stop key is pressed.



Note If operating the unit in the simulation mode, be sure to remove the paper feed ring.

(23) Folding stopper parallelity mode (Code No.28)

Mode for making the folding stoppers of folding plates 1 and 2 parallel.



See "2-6-10. Adjusting the parallelity of the folding stoppers" in CHAPTER 1 MECHANISM

(24) Sensor check (1) (Code No.31)

Mode for checking the states of each sensor.

At the 7-segment window on the right side, sensors which are ON are displayed as "1" and those which are OFF are displayed as "0".

The display corresponds to each sensor in the following order.

Paper feed inlet sensor → Paper ejection outlet sensor → Paper switch → Paper feed tray set switch

Turning ON/OFF the sensors changes the corresponding display ("1" or "0") and a buzzer sounds.

(25) Sensor check (2) (Code No.32)

Mode for checking the states of each sensor.

At the 7-segment window on the right side, sensors which are ON are displayed as "1" and those which are OFF are displayed as "0".

The display corresponds to each sensor in the following order.

Stacker roller home sensor → Folding plate 1 home sensor → Folding plate 2 home sensor

Turning ON/OFF the sensors changes the corresponding display ("1" or "0") and a buzzer sounds.

(26) Switch check (Code No.33)

Mode for checking the states of each switch.

At the 7-segment window on the right side, switches which are ON are displayed as "1" and those which are OFF are displayed as "0".

The display corresponds to each switch in the following order.

Top cover switch → Folding plate 1 set switch → Folding plate 2 set switch

Turning ON/OFF the switches changes the corresponding display ("1" or "0") and a buzzer sounds.

(27) Paper size detection sensor check (1) (Code No.34)

Mode for checking the state of the paper size detection sensor.

At the 7-segment window on the right side, sensors which are ON are displayed as "1" and those which are OFF are displayed as "0". UK model displays correspond to the B6, A5, B5, and A4 paper size detection sensors from the left side in order.

For USA models, "1" is displayed at the leftmost side, and the second display onwards corresponds to the INV, STMT, and LTR paper size detection sensors in order.

The displays change when the paper feed guides are moved, and a buzzer sounds.

(28) Paper size detection sensor check (2) (Code No.35)

Mode for checking the state of the paper size detection sensor.

At the 7-segment window on the right side, sensors which are ON are displayed as "1" and those which are OFF are displayed as "0". UK model displays correspond to the B4 and A3 paper size detection sensors from the left side in order.

USA model displays correspond to the LGR and LGL paper size detection sensors from the left side in order.

The displays change when the paper feed guides are moved, and a buzzer sounds.



Note The LGL detection sensor is the opposite to other sensors, in that "0" is displayed when it is ON, and "1" when OFF.

(29) Panel check mode (Code No.36)

Mode for checking the LEDs and 7-segment window of the control panel.

Pressing the start key lights up the whole 4-digit 7-segment window on the right side, and pressing the stop key lights up the 2-digit 7-segment window on the left side and all LEDs. (Some LEDs may blink depending on the other settings of the maintenance mode.)

(30) Motor index sensor check (Code No.37)

Mode for checking the index sensors in the main motor and index sensors of folding plates 1 and 2.

Checking the main motor index sensor

When the main motor shaft is rotated by rotating the jam correction knob or center press roller, pulse input is performed, and the number of pulses is counted up and displayed at the 7-segment window on the right side.

When the main motor shaft is rotated once, and the number of pulses should be added with 15.



- The number of pulses displayed is reset to 0 when the power is turned OFF.
- The number of pulses is counted up even if the main motor shaft is rotated in the normal or reverse directions.

Checking the folding plate 1, 2 index sensor

Check the changes in the states of each sensor by looking at the changes in the number of pulses displayed at the 7-segment window on the right side.

Pressing the “+” key of the folding plate 1 folding stopper adjusting key counts up the number of pulses displayed, and pressing the “-” key counts down the display.

Pressing the “+” key of the folding plate 2 folding stopper adjusting key counts up the number of pulses displayed, and pressing the “-” key counts down the display.



- If the direction which changes the number of pulses is opposite to the above, check if the connectors of index sensors A and B of the corresponding folding plate are connected reverse.

3-4. Precautions for Setting Folding Stopper Fixed Mode (DF-920 only)

When the operation mode is set to the folding stopper fixed mode, if moving the position of the folding stopper for folding plate motor tests or folding plate index sensor check, be sure to turn OFF the power once, and then turn it ON again to perform initialization before starting folding operations, and re-check the positions of the folding stoppers. Starting without performing initialization will result in folding operations at the incorrect stopper position.

Perform initialization by pressing the clear key while pressing the stop key after turning ON the power.



- Initialization will be performed automatically when the clear key is pressed twice from the maintenance mode to return to the normal mode.

4. BACKUP DATA FORM

A backup data form is pasted on the inside of the main cover F (control panel side) for noting down various setting data such as home position adjustment data of folding plates and switching shaft.

If the corresponding setting data has been changed in the maintenance mode, be sure to fill in the changed data in this backup data form.

SER.No. _____

DF-920

120V, 60Hz

220–240V, 50Hz

Code	Function	Default	DATE	INIT	1	2	3	4	5
			Correction Range						
1	STOP1 DEFAULT	0	-20 – +20						
2	STOP2 DEFAULT	0	-20 – +20						
3	SW BAR ADJUST	-4	-20 – +5						
4	AREAS	JAPAN	JAPAN, USA, UK						
5	SET MM/INCH	MM	MM, INCH						
6	LANGUAGES	ENGLISH	JAPANESE ENGLISH	ENGLISH					
7	TEST FOLD QTY	2	1–3 SHEETS	2					
8	BACK LIGHT OFF	30 SEC	15, 30, 60 SEC, KEEP LIGHT ON	30 SEC					
9	BUZZ ON/OFF	ON	ON ⇔ OFF	ON					
10	POWER ON BUZZ	OFF	5, 15, 30 MIN, OFF	OFF					
11	SPEED1 ADJUST	NORMAL	SLOW, NORMAL	NORMAL					
12	SPEED ADJUST	NORMAL	SLOW, NORMAL, FAST	NORMAL					
13	SET FUNCTION	OFF	LAST TIME FOLD STOPPER FIXED OFF	OFF					
14	TOTAL COUNTER	0000000	/	0000000					
15	MC ROM VER	/	12H-8007X						
17	DEL CVR SNSR	ON	ON ⇔ OFF	ON					

*Code numbers are derived from the code numbers in the maintenance mode table.

When changing data, follow the maintenance manual.

NOTE: Changing data at code numbers 1 – 3 may cause a degradation in fold accuracy.

Part Number : 12H-9132X

SER.No. _____

DF-915

120V, 60Hz
220–240V, 50Hz

			DATE						
Code	Function	Default	Correction Range	INIT	1	2	3	4	5
1	STOP1 DEFAULT	0	-20 – +20						
2	STOP2 DEFAULT	0	-20 – +20						
3	SW BAR ADJUST	-4	-20 – +5						
4	MODEL CODE	915	915, 910	915					
5	AREAS	JPN	JPN, USA, Euro						
6	SET MM/INCH	NN	NN, INCH						
7	TEST FOLD QTY	2	1 – 3	2					
9	BUZZ ON/OFF	ON	ON ⇔ OFF	ON					
11	SPEED1 ADJUST	0	0: NORMAL -1: SLOW	0					
12	SPEED ADJUST	0	1: FAST 0: NORMAL -1: SLOW	0					
14	TOTAL COUNTER	C. 0000000		C. 0000000					
15	MC ROM VER		12H-8604 <u>X</u>						

*Code numbers are derived from the code numbers in the maintenance mode table.

When changing data, follow the maintenance manual.

NOTE: Changing data at code numbers 1 – 3 may cause a degradation in fold accuracy.

Part Number : 12H-9133X

5. INITIALIZING THE MEMORY

If for some reason, the EEPROM (nonvolatile memory) data becomes lost and the display does not function normally, initialize and recover the data using the following procedure.

Initializing the memory

- ① While pressing the start key, stop key, and test key together, turn ON the power. This initializes data except for the total count registered in the EEPROM of the MC unit. A buzzer sounds three times when the memory is initialized.
- ② As the data except for the total count was initialized, reset data such as home position adjustment data of folding plates and switching shaft in the maintenance mode while checking the backup data form pasted on the inside of the main cover F.



- Note**
- If data cannot be recovered by the above method, turn ON the power while pressing the start key, stop key, and clear key together (This initializes all data including the total count). Never perform this method except when problems have occurred.
 - Turning ON the power while pressing the test key erases only standard folding adjustment registration and custom folding registration data.

6. PRECAUTIONS ON REPLACING THE MC UNIT

Various data such as home position adjustment data of folding plates and switching shaft and total count memorized by the unit even when the power has been turned OFF are registered in the EEPROM (nonvolatile memory) of the MC unit (board). Therefore if the MC unit has been replaced, attach the EEPROM of the old MC board to the new board if possible.

 **Note** When attaching the EEPROM, take note of the socket direction.

If board replacement can only be done as a whole together with the EEPROM, note down various settings and total count data before replacement on the backup data form pasted on the inside of the main cover F, perform the next step after replacement, and check the data.

(1) Initializing the memory

While pressing the start key, stop key, and clear key together, turn ON the power. This initializes data registered in the EEPROM of the MC unit. A buzzer sounds three times when the memory is initialized.

(2) Setting various data

Reset data such as home position adjustment data of folding plates and switching shaft in the maintenance mode as required.

7. UPGRADING THE PROGRAM VERSION

When upgrading the control program version, prepare a 1M-byte EPROM written with the new version program (Equivalent to STMicroelectronics M27C1001-12F1), and rewrite using the following procedure.

- ① Insert the EPROM written with the new version program into the IC socket of the MC unit (board) with the power OFF.

Note When attaching the EPROM, take note of the socket direction.

- ② While pressing the start key and stop key, turn ON the power. (To enter the maintenance mode)
- ③ For DF-920, enter the code No. "18" of the maintenance mode using the numerical keys, and press the folding mode key. (To enter the program version up mode)
For DF-910, select code No. "18" using the Paper length/Stacker roller position key. (Do not use the folding mode key.)
- ④ Press the start key. (The buzzer will not sound even when the start key is pressed, but this is not a fault.)

Note

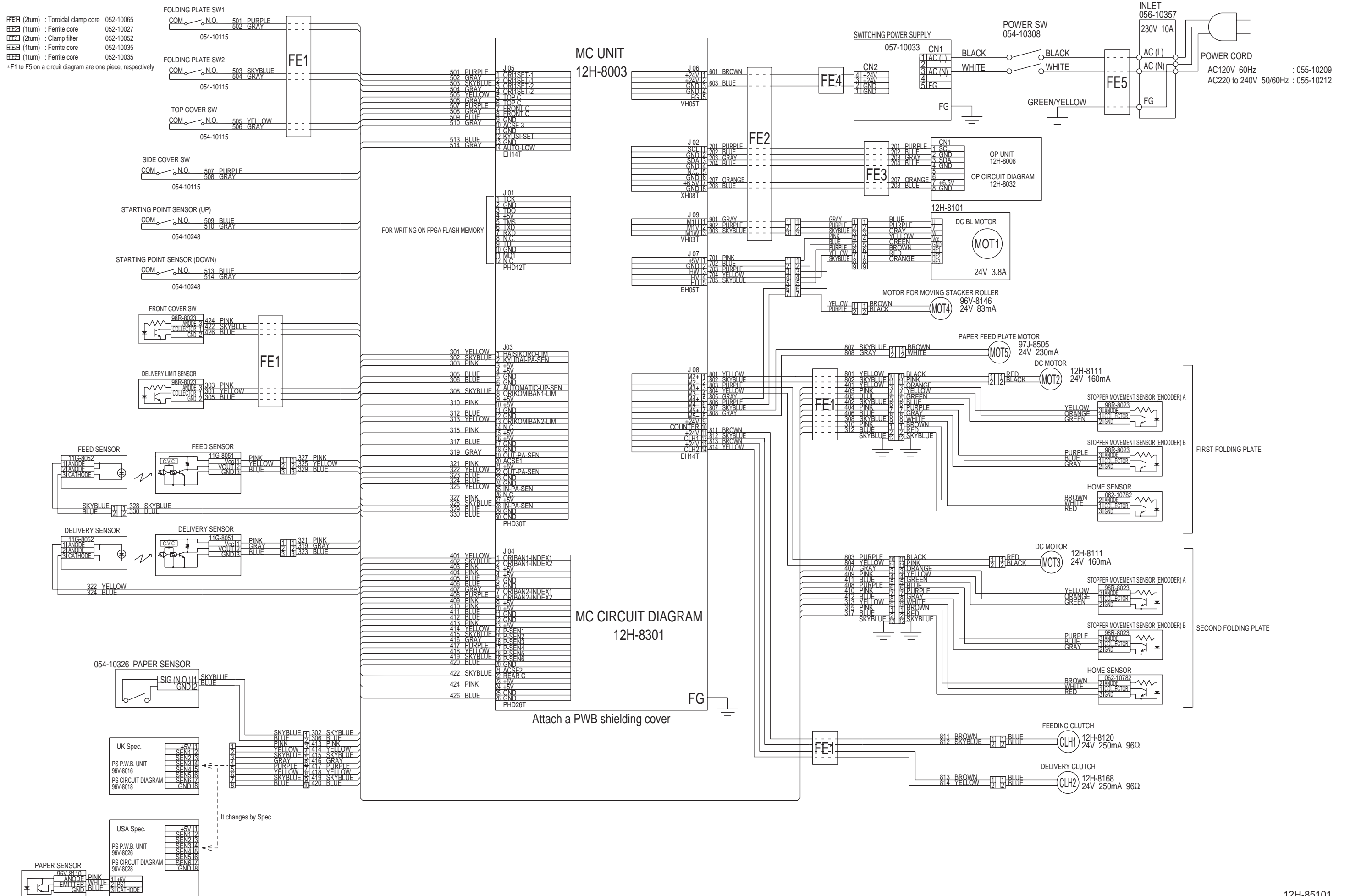
- Never turn OFF the power until rewriting has been completed.
- If rewriting is started normally, all keys will be ineffective until rewriting completes. This is not a fault.
- If the buzzer sounds "pi.pi.pi" when the start key is pressed, it indicates the ID error of the program. The following reasons are possible.
 - The EPROM is not inserted in the socket correctly
 - The program is not written in the EPROM correctly.
 - A program with a different ID is written in the EPROM.

- ⑤ After 15 to 20 seconds later, rewriting completes normally, and the new program starts running automatically. (The same operations are performed when the power is turned ON normally.)

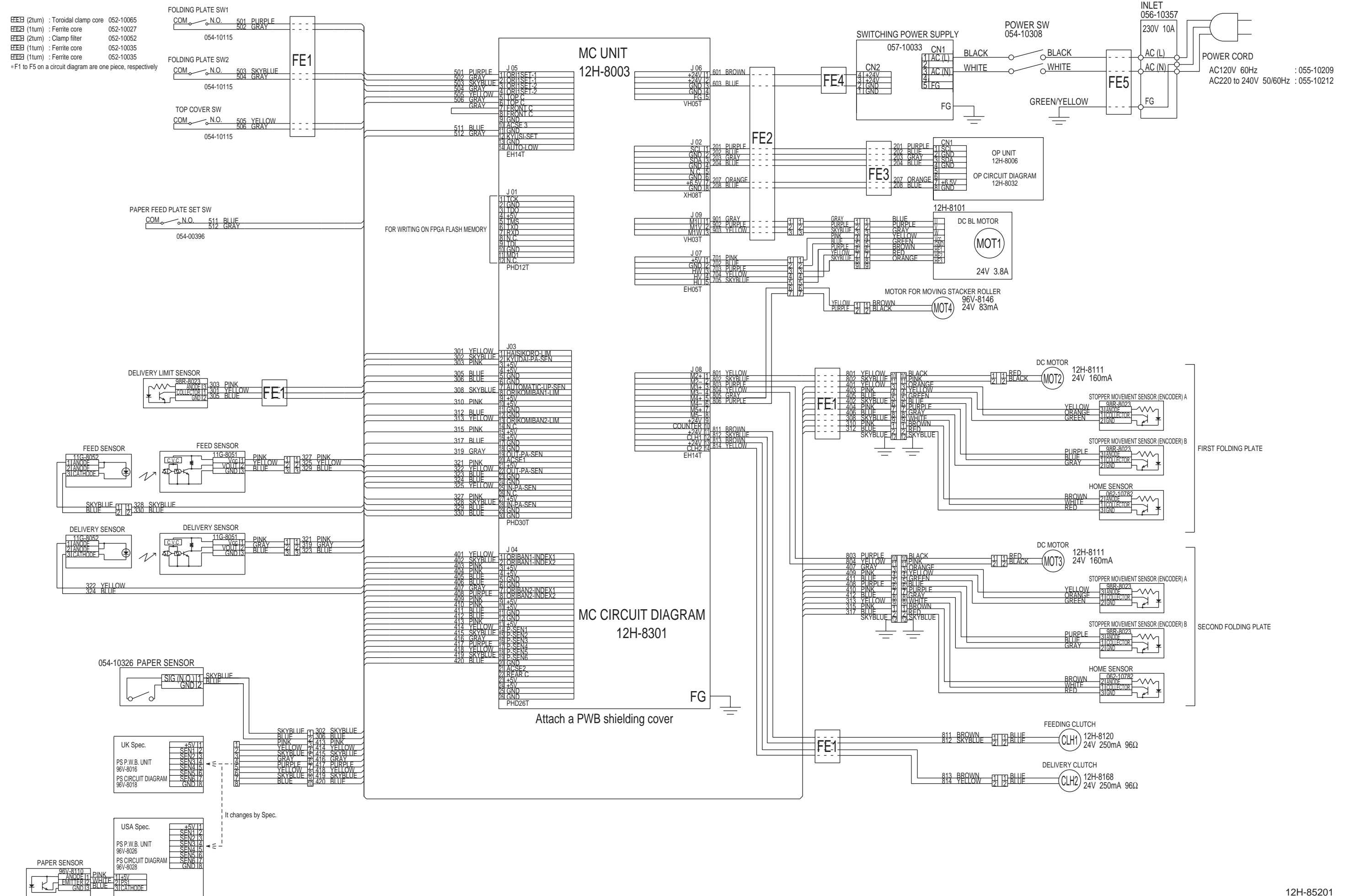
Note As motors will operate if all interlock switches are turned ON even if the operation is carried out with the cabinet cover removed, do not touch the driving parts.

- ⑥ Check that the maintenance mode "Code No.15: MC ROM version display" is set and the new version is displayed.
- ⑦ Turn OFF the power, and remove the EPROM from the IC socket.

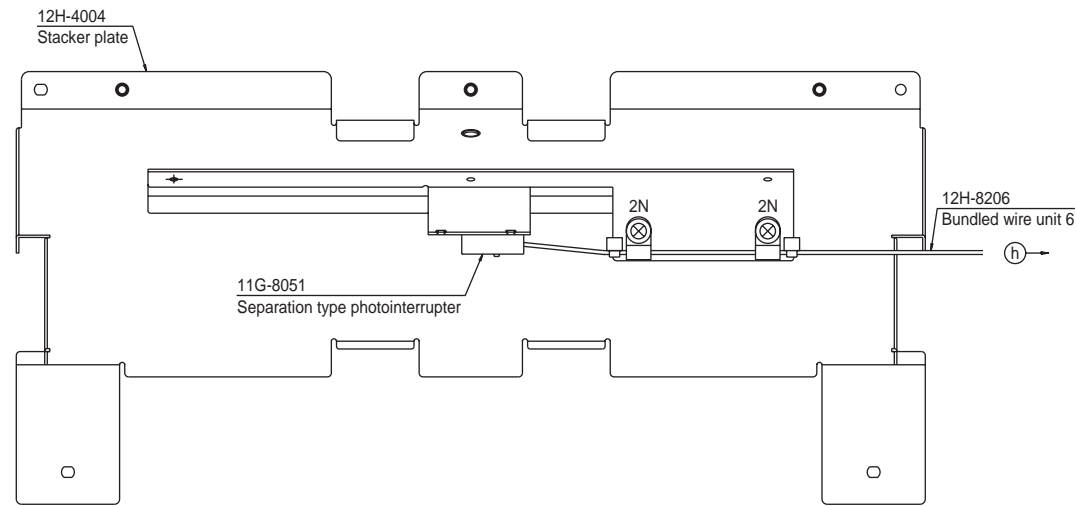
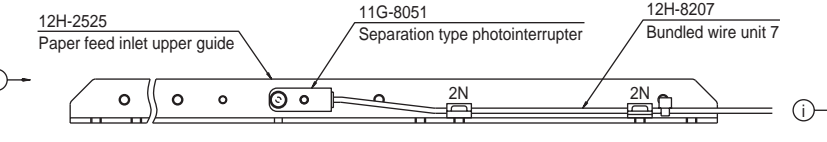
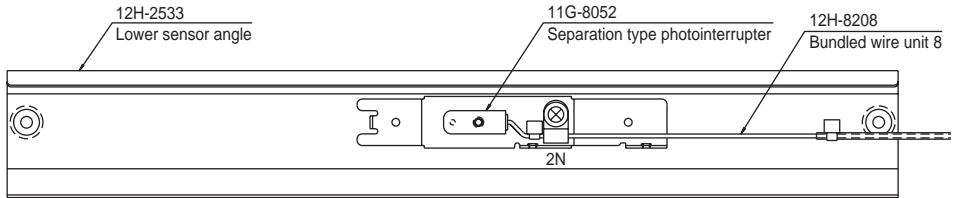
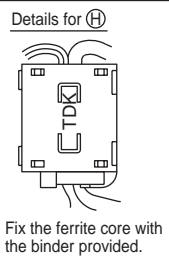
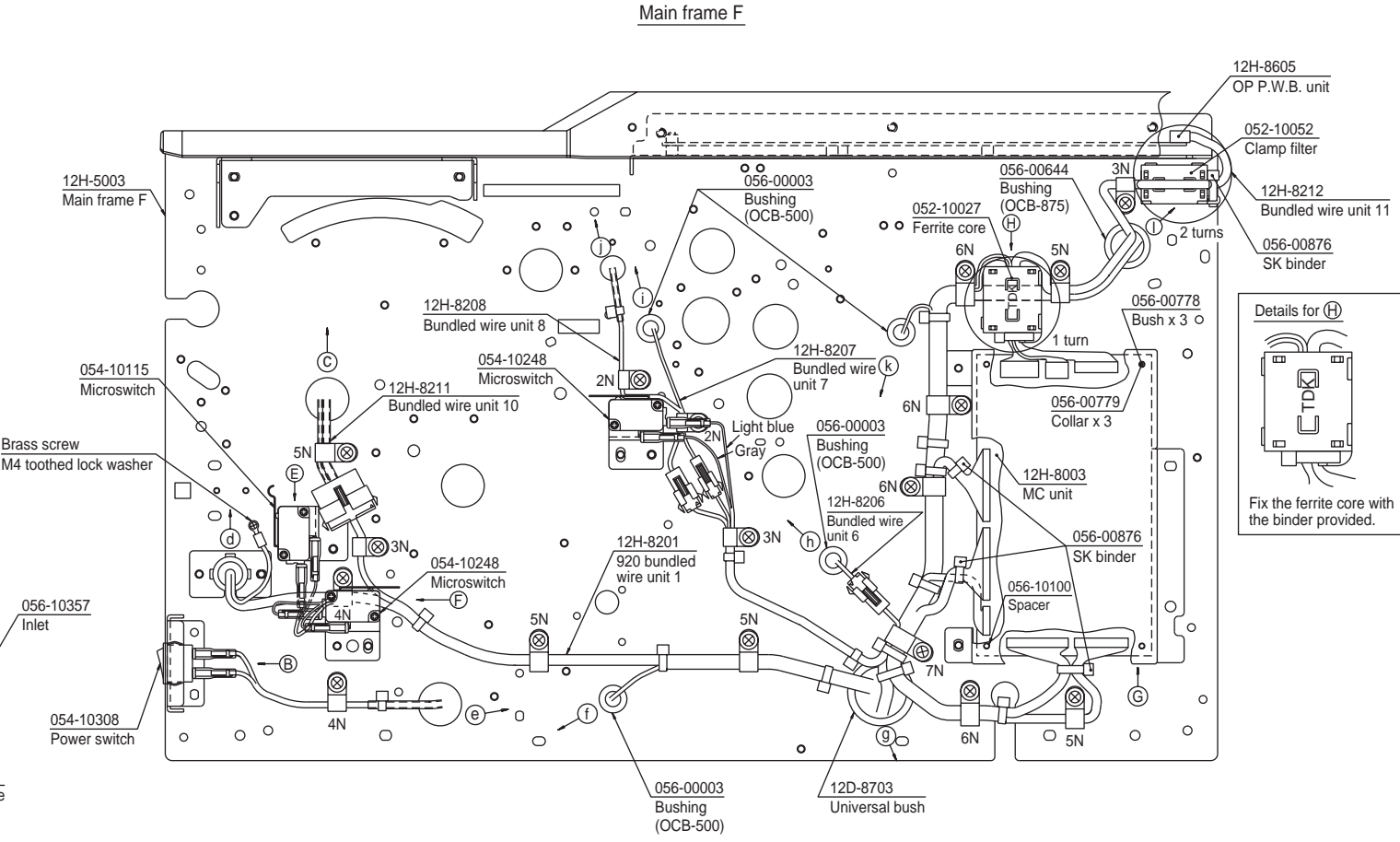
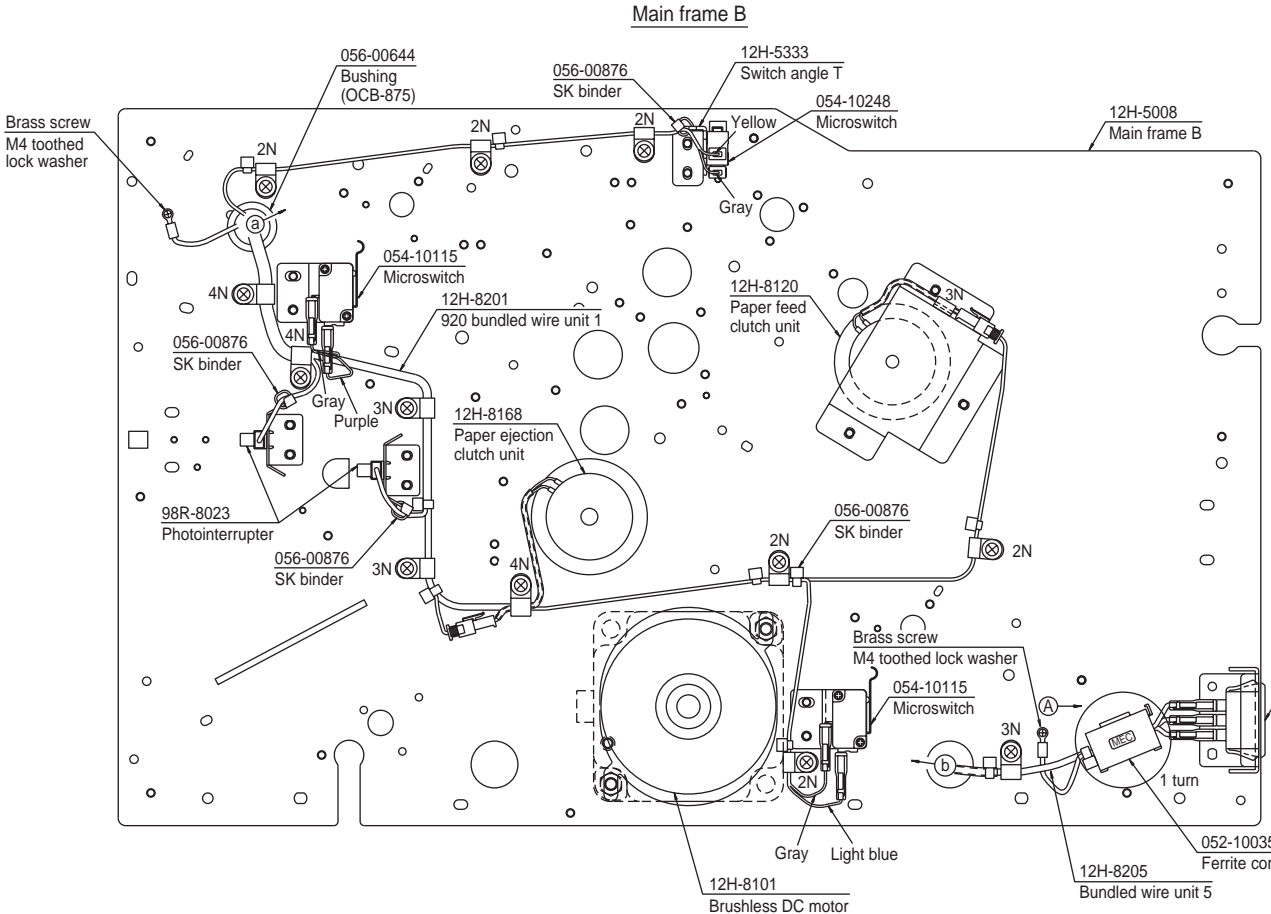
8. OVERALL SCHEMATIC DIAGRAM (DF-920)



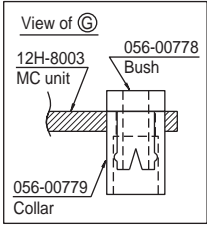
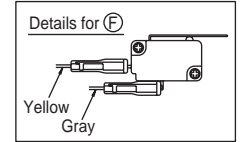
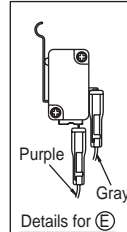
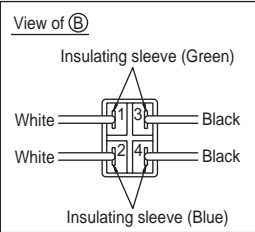
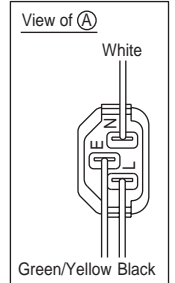
9. OVERALL SCHEMATIC DIAGRAM (DF-915)



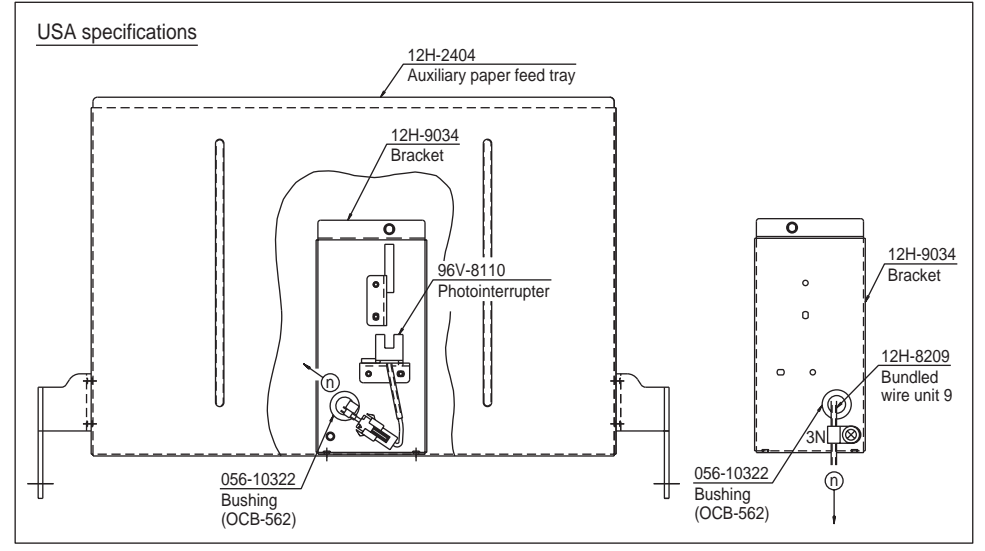
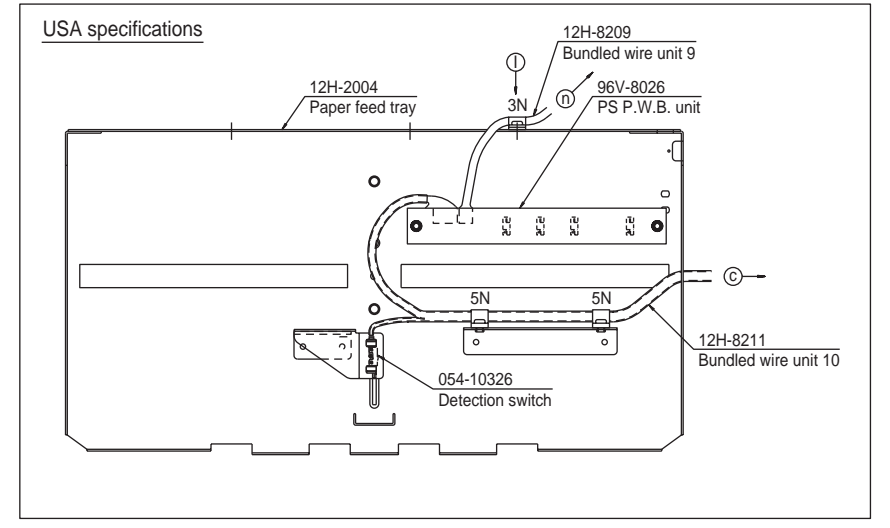
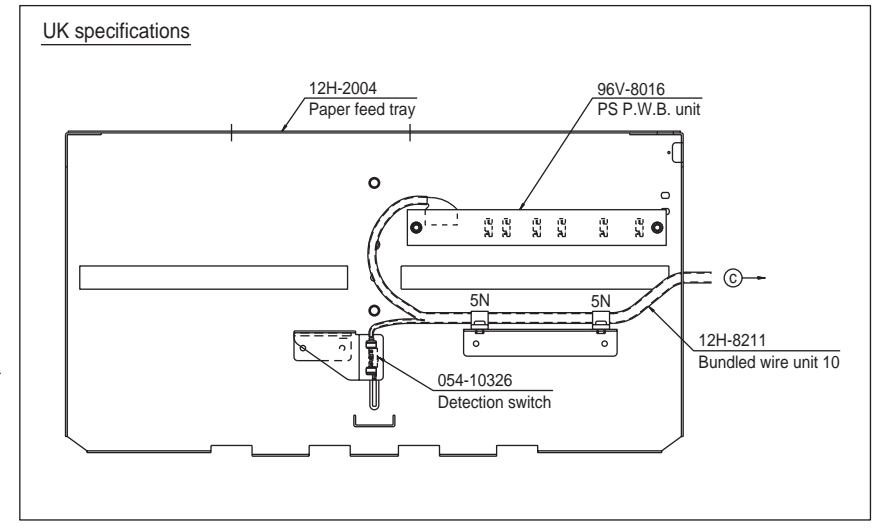
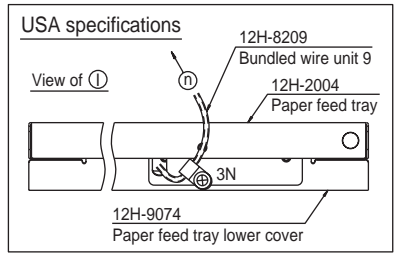
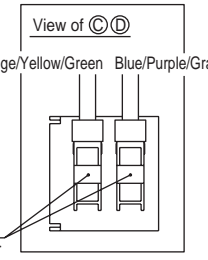
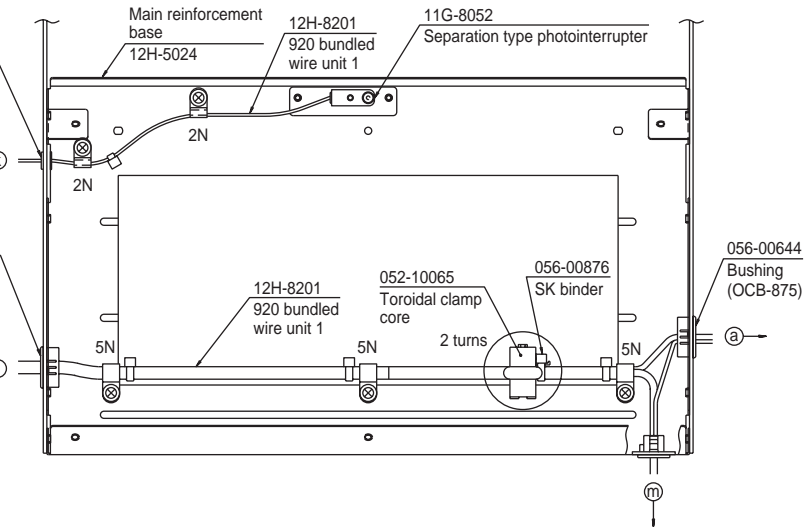
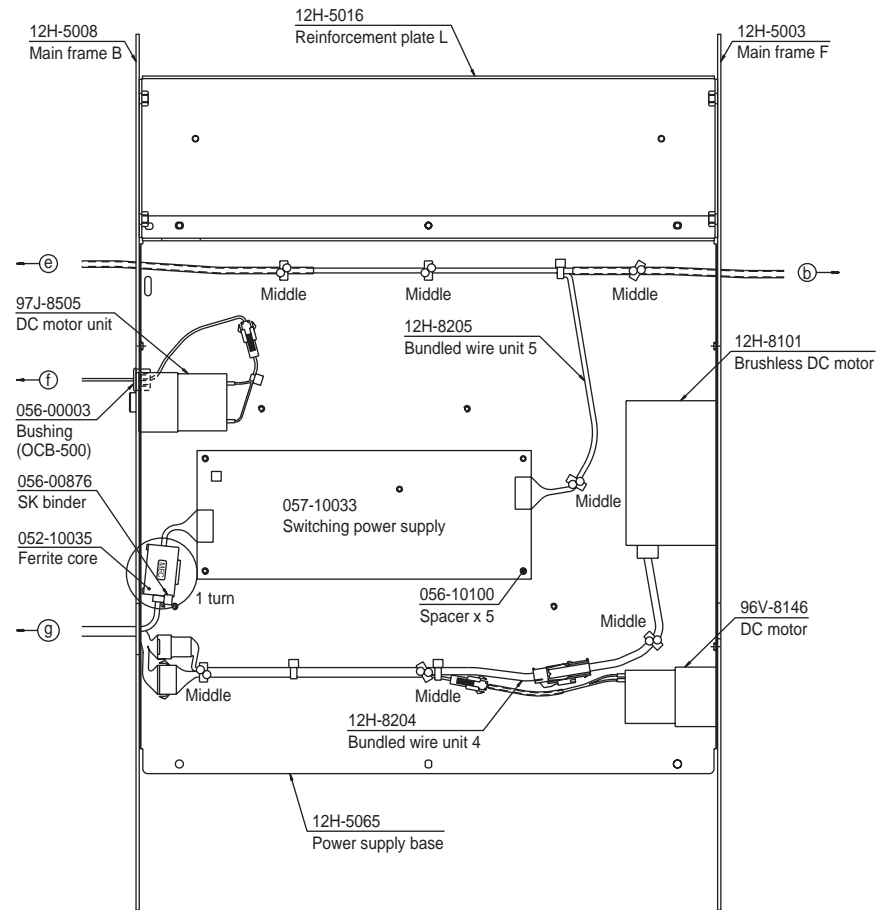
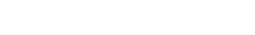
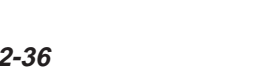
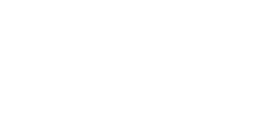
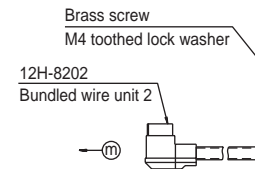
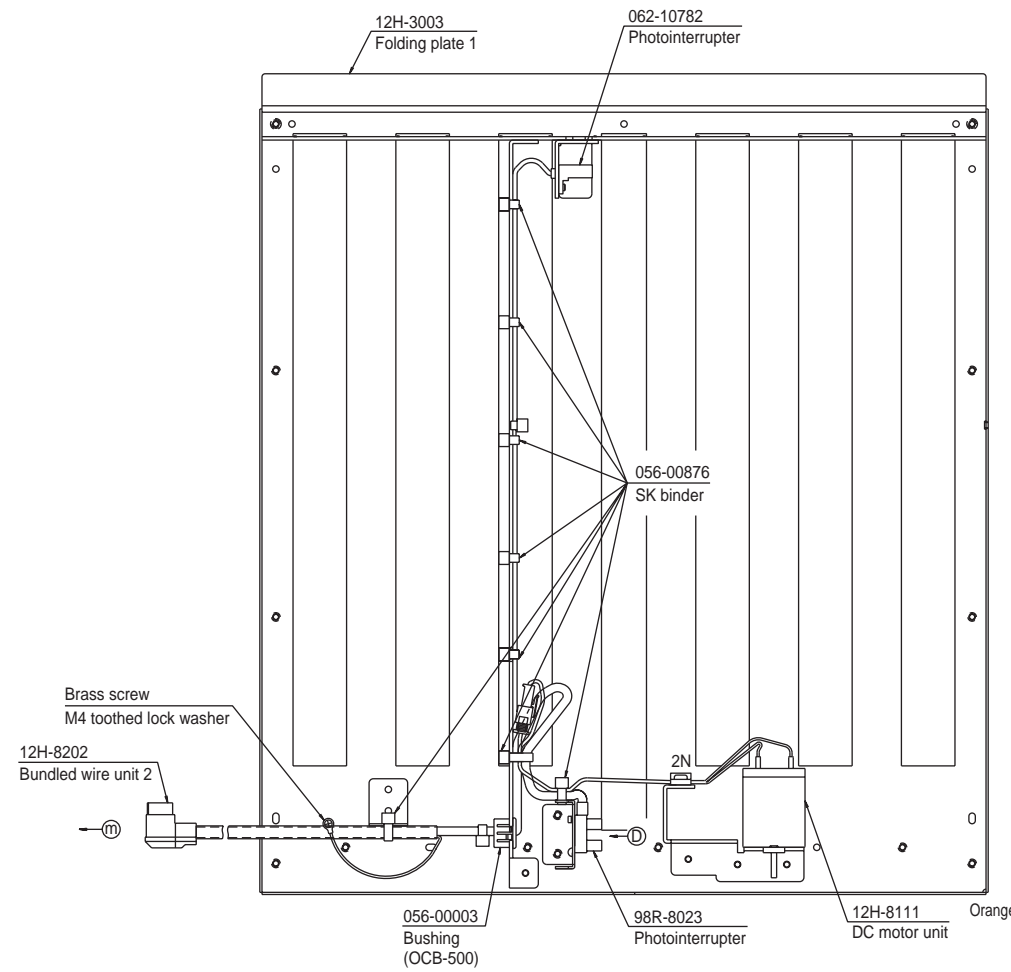
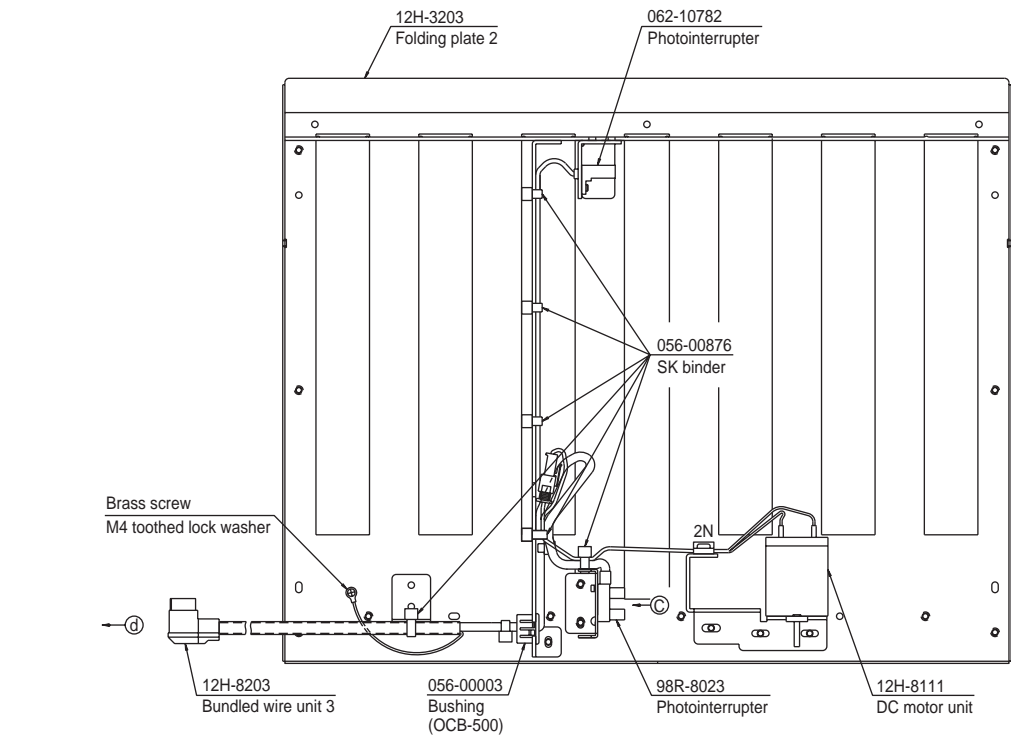
10. WIRING DIAGRAM 1/2 (DF-920)



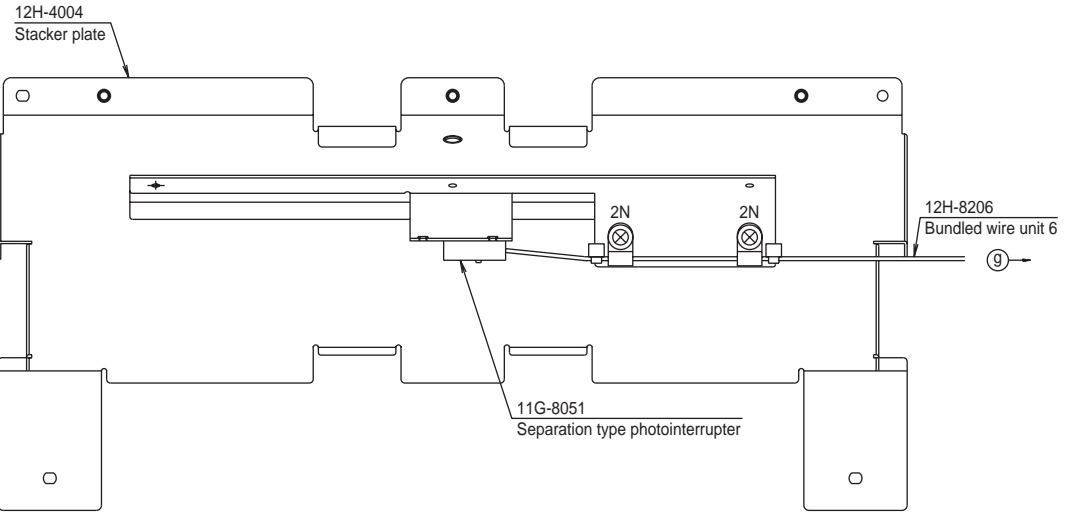
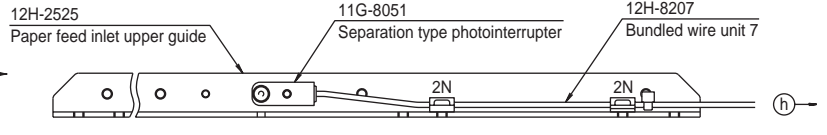
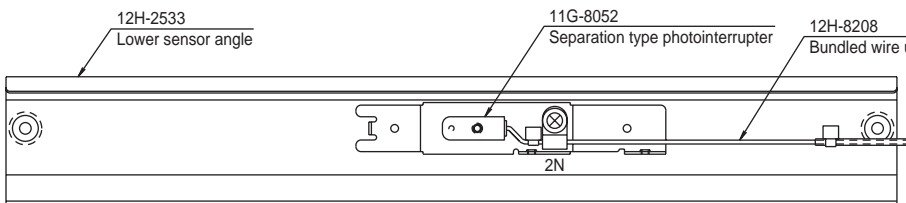
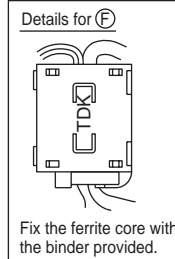
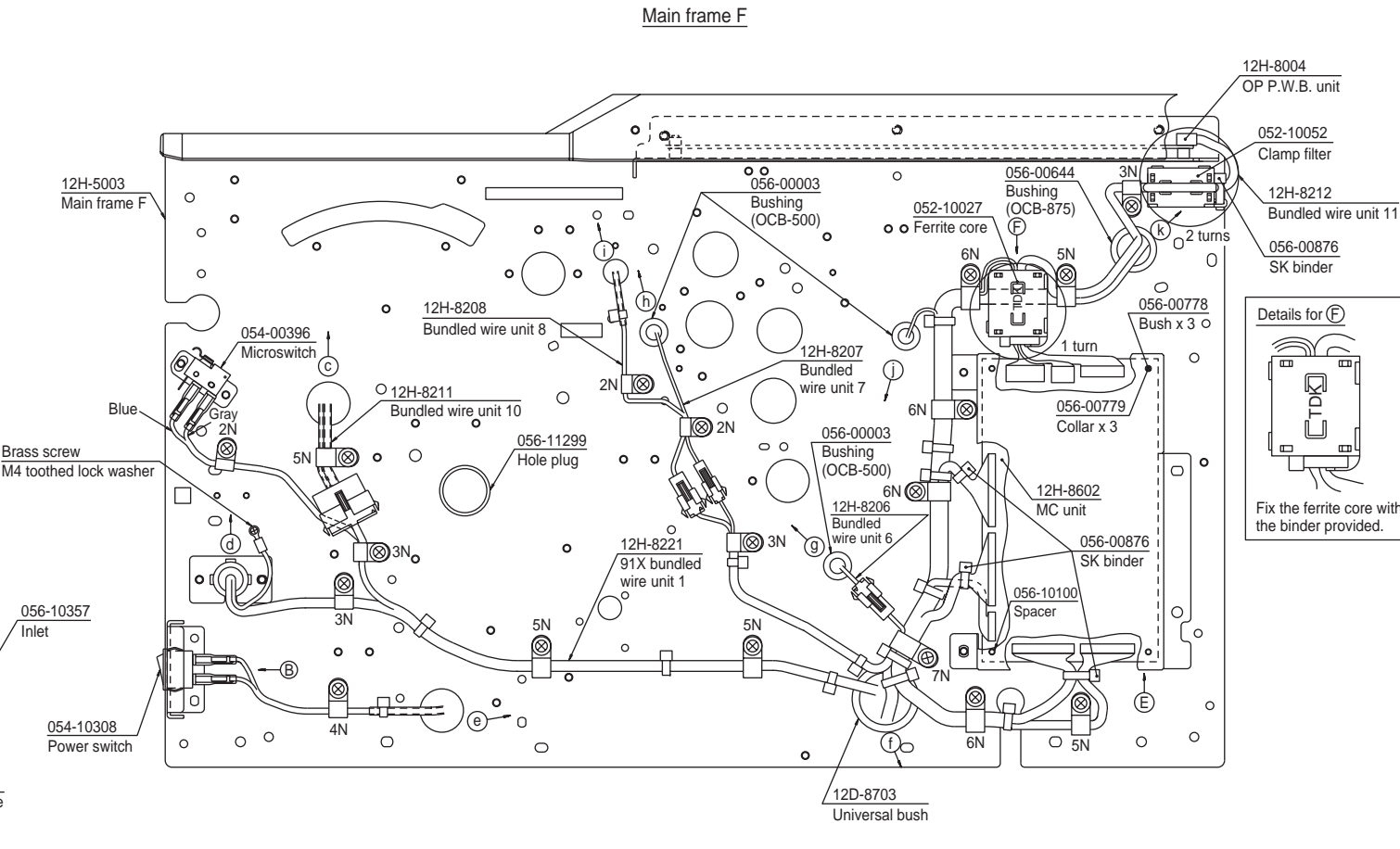
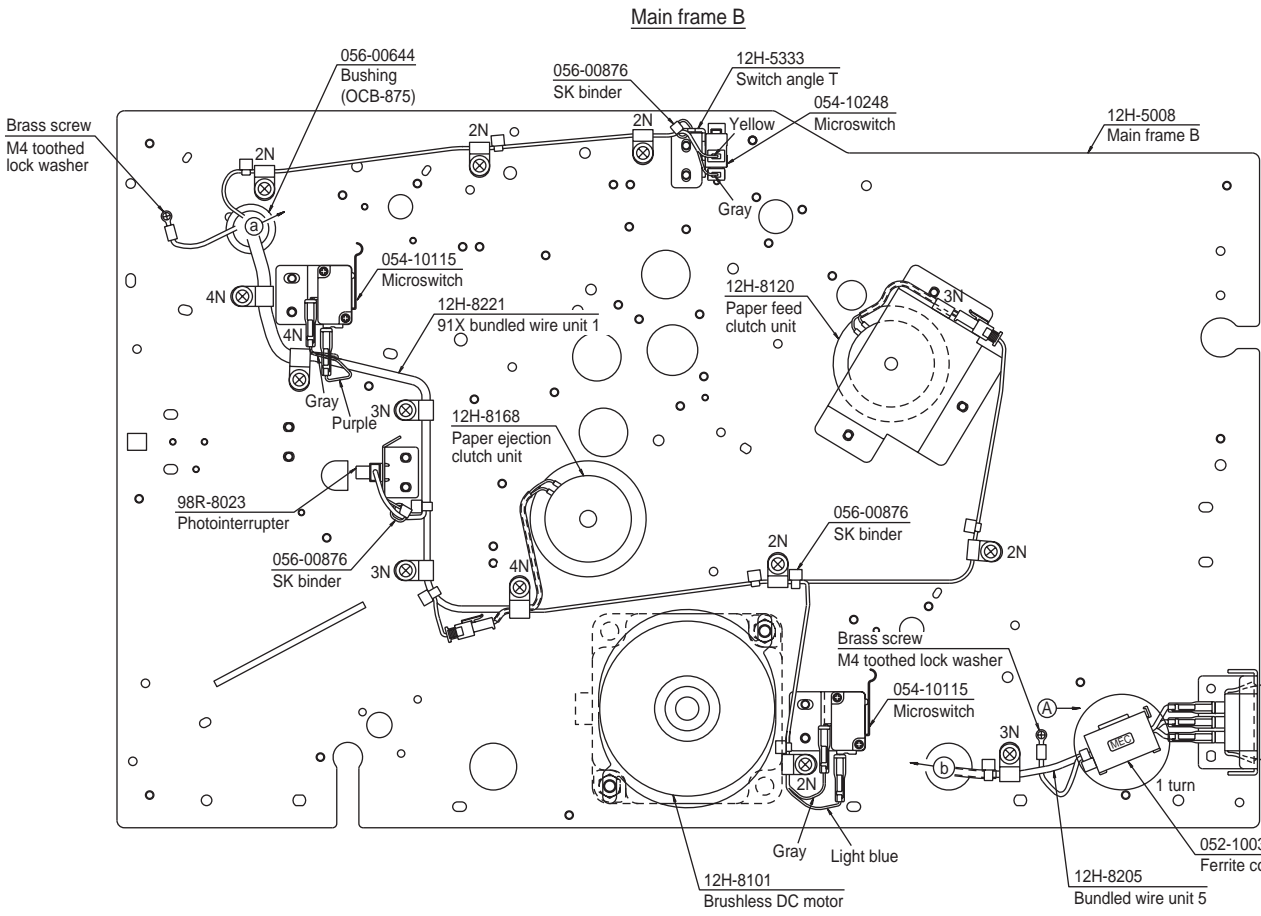
Cable clamp		
2N	056-09001	3302
3N	056-09002	3303
4N	056-09003	3304
5N	056-09004	3305
6N	056-09005	3306
7N	056-09006	3307
Cable clip		
Middle	056-07008	1197



11. WIRING DIAGRAM 2/2 (DF-920)



12. WIRING DIAGRAM 1/2 (DF-915)

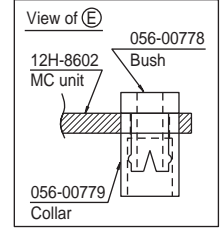
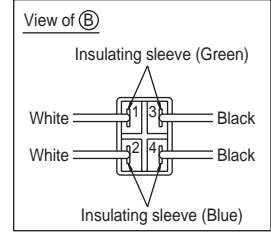
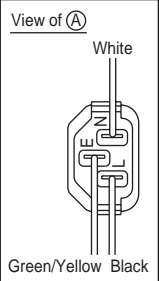


Cable clamp

2N	056-09001	3302
3N	056-09002	3303
4N	056-09003	3304
5N	056-09004	3305
6N	056-09005	3306
7N	056-09006	3307

Cable clip

Middle	056-07008	1197
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13. WIRING DIAGRAM 2/2 (DF-915)

