Multi Folding Unit FD5000 Machine Code: D454-17

January 2009

Safety, Conventions, Trademarks

Conventions

Common Terms

Symbol	What it means
CII	Core Tech Manual
Ĩ	Screw
E)	Connector
C	E-ring
$\langle n \rangle$	C-ring
	Harness clamp
FFC	Flexible Film Cable
JG	Junction Gate
LE	Leading Edge of paper
LEF	Long Edge Feed
SEF	Short Edge Feed
TE	Trailing Edge of paper
S31E	The "Emitter" sensor of a sensor pair
S31R	The "Receptor" sensor of a sensor pair

This is a list of symbols and abbreviations used in this manual.



The notations "SEF" and "LEF" describe the direction of paper feed, with the arrows indicating paper feed direction.

Warnings, Cautions, Notes

In this manual, the following important symbols and notations are used.

WARNING

• A Warning indicates a potentially hazardous situation. Failure to obey a Warning could result in death or serious injury.

• A Caution indicates a potentially hazardous situation. Failure to obey a Caution could result in minor or moderate injury or damage to the finisher or other property.

🔂 Important

• Obey these guidelines to avoid problems such as misfeeds, damage to originals, loss of valuable data and to prevent damage to the machine.

Note

• This information provides tips and advice about how to best service the machine.

General Safety Instructions

For your safety, please read this manual carefully before you use this product. Keep this manual handy for future reference.

Safety Information

Always obey the following safety precautions when using this product.

Safety During Operation

In this manual, the following important symbols and notations are used.

Switches and Symbols

Where symbols are used on or near switches on machines for Europe and other areas, the meaning of each symbol conforms with IEC60417.



Responsibilities of the Customer Engineer

Reference Material for Maintenance

- Maintenance shall be done using the special tools and procedures prescribed for maintenance of the machine described in the reference materials (service manuals, technical bulletins, operating instructions, and safety guidelines for customer engineers).
- In regard to other safety issues not described in this document, all customer engineers shall strictly obey procedures and recommendations described the "CE Safety Guide".
- Use only consumable supplies and replacement parts designed for use of the machine.

Before Installation, Maintenance

Power

- Always disconnect the power plug before doing any maintenance procedure. After switching off the
 machine, power is still supplied to the main machine and other devices. To prevent electrical shock,
 switch the machine off, wait for a few seconds, then unplug the machine from the power source.
- Before you do any checks or adjustments after turning the machine off, work carefully to avoid injury. After removing covers or opening the machine to do checks or adjustments, never touch electrical components or moving parts (gears, timing belts, etc.).
- After turning the machine on with any cover removed, keep your hands away from electrical components and moving parts. Never touch the cover of the fusing unit, gears, timing belts, etc.

Installation, Disassembly, and Adjustments

- After installation, maintenance, or adjustment, always check the operation of the machine to make sure that it is operating normally. This ensures that all shipping materials, protective materials, wires and tags, metal brackets, etc., removed for installation, have been removed and that no tools remain inside the machine. This also ensures that all release interlock switches have been restored to normal operation.
- Never use your fingers to check moving parts causing spurious noise. Never use your fingers to lubricate moving parts while the machine is operating.

Special Tools

- Use only standard tools approved for machine maintenance.
- For special adjustments, use only the special tools and lubricants described in the service manual. Using tools incorrectly, or using tools that could damage parts, could damage the machine or cause injuries.

During Maintenance

General

- Before you begin a maintenance procedure: 1) Switch the machine off, 2) Disconnect the power plug from the power source, 3) Allow the machine to cool for at least 10 minutes.
- Avoid touching the components inside the machine that are labeled as hot surfaces.

Safety Devices

WARNING

- Never remove any safety device unless it requires replacement. Always replace safety devices immediately.
- Never do any procedure that defeats the function of any safety device. Modification or removal of a safety device (fuse, switch, etc.) could lead to a fire and personal injury. Always test the operation of the machine to ensure that it is operating normally and safely after removal and replacement of any safety device.
- For replacements use only the correct fuses or circuit breakers rated for use with the machine. Using replacement devices not designed for use with the machine could lead to a fire and personal injuries.

Organic Cleaners

- During preventive maintenance, never use any organic cleaners (alcohol, etc.) other than those described in the service manual.
- Make sure the room is well ventilated before using any organic cleaner. Use organic solvents in small
 amounts to avoid breathing the fumes and becoming nauseous.
- Switch the machine off, unplug it, and allow it to cool before doing preventive maintenance. To avoid fire or explosion, never use an organic cleaner near any part that generates heat.
- Wash your hands thoroughly after cleaning parts with an organic cleaner to contamination of food, drinks, etc. which could cause illness.
- Clean the floor completely after accidental spillage of silicone oil or other materials to prevent slippery surfaces that could cause accidents leading to hand or leg injuries. Use "My Ace" Silicone Oil Remover (or dry rags) to soak up spills. For more details, please refer to Technical Bulletin "Silicone Oil Removal" (A024-50).

Ozone Filters

- Always replace ozone filters as soon as their service life expires (as described in the service manual).
- An excessive amount of ozone can build up around machines that use ozone filters if they are not replaced at the prescribed time. Excessive ozone could cause personnel working around the machine to feel unwell.

Power Plug and Power Cord

WARNING

- Before servicing the machine (especially when responding to a service call), always make sure that the power plug has been inserted completely into the power source. A partially inserted plug could lead to heat generation (due to a power surge caused by high resistance) and cause a fire or other problems.
- Always check the power plug and make sure that it is free of dust and lint. Clean it if necessary. A dirty plug can generate heat which could cause a fire.
- Inspect the length of the power cord for cuts or other damage. Replace the power cord if necessary. A frayed or otherwise damaged power cord can cause a short circuit which could lead to a fire or personal injury from electrical shock.
- Check the length of the power cord between the machine and power supply. Make sure the power cord is not coiled or wrapped around any object such as a table leg. Coiling the power cord can cause excessive heat to build up and could cause a fire.
- Make sure that the area around the power source is free of obstacles so the power cord can be removed quickly in case of an emergency.
- Make sure that the power cord is grounded (earthed) at the power source with the ground wire on the plug.
- Connect the power cord directly into the power source. Never use an extension cord.
- When you disconnect the power plug from the power source, always pull on the plug, not the cable.

After Installation, Servicing

Disposal of Used Items

• Always dispose of used items (developer, toner, toner cartridges, OPC drums, etc.) in accordance with the local laws and regulations regarding the disposal of such items.

• To protect the environment, never dispose of this product or any kind of waste from consumables at a household waste collection point. Dispose of these items at one of our dealers or at an authorized collection site.

Points to Confirm with Operators

At the end of installation or a service call, instruct the user about use of the machine. Emphasize the following points.

- Show operators how to remove jammed paper and troubleshoot other minor problems by following the procedures described in the operating instructions.
- Point out the parts inside the machine that they should never touch or attempt to remove.
- Confirm that operators know how to store and dispose of consumables.
- Make sure that all operators have access to an operating instruction manual for the machine.
- Confirm that operators have read and understand all the safety instructions described in the operating instructions.
- Demonstrate how to turn off the power and disconnect the power plug (by pulling the plug, not the cord) if any of the following events occur: 1) something has spilled into the product, 2) service or repair of the product is necessary, 3) the product cover has been damaged.
- Caution operators about removing paper fasteners around the machine. They should never allow paper clips, staples, or any other small metallic objects to fall into the machine.

Safety Instructions for this Machine

- 1. The installation must be done by trained service technicians.
- 2. This machine weighs 316 kg. (695 lb.). At least four persons are required to remove the machine from its pallet and position it for installation.
- 3. To prevent fire hazards never use flammable solvents around the machine.
- 4. Never place any object on the machine.
- 5. If anything falls into the machine, turn off the main power switch on the right side of the machine, then disconnect the power cord from the power source.
- 6. Locate the machine on a sturdy flat surface where it will not be exposed to excessive vibration.
- 7. To avoid fire hazard, confirm that the ventilation ports are not blocked, so air can flow freely.
- 8. Gas generated by the molten glue can irritate the eyes, throat, and nose. The machine should always be used in a well ventilated room.
- 9. To avoid the dangers of fire and electrical shock, make sure that the machine is never exposed to:
 - Excessive high temperatures and/or humidity

- Dust
- Water
- Direct sunlight
- Open flame
- Corrosive gases

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1. Replacement and Adjustment

Exterior and Inner Covers

Front Door Upper Cover



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1. Open the front door [A].



2. Hinge cover [A] (x 1)



3. Cross-piece [A] (🕅 x 2)



4. Front door upper cover [A] (🖗 x 2)

Top Cover

- 1. Open the front door.
- 2. Hinge cover (p.13 "Front Door Upper Cover")
- 3. Cross-piece (
 p.13 "Front Door Upper Cover")



4. Top cover [A] (x 2)

Inner Upper Cover

1. Top cover (🖝 p.14)



- 2. Remove the knobs [A] ($\overline{(3)} \times 1$ each).
- 3. Inner upper cover [B] (x 2)
 - Release the hooks [C] to remove the inner upper cover.

Front Door

- 1. Top cover (🖝 p.14)
- 2. Inner upper cover (🖝 p.15)



- 3. Remove the screw [A].
- 4. Loosen three screws [B].
- 5. Lift up the hinge bracket [C].
- 6. Front door [D]

Folding Unit Cover

1. Open the front cover.



- 2. Remove the knob [A] ((() x 1).
- 3. Remove four knobs [B] (x 1 each).
- 4. Folding unit cover [C] (x 3, hook x 2)

Inner Lower Cover

1. Open the front cover.



2. Inner lower cover [A] (x 1, hook)

Rear Upper Cover



1. Rear upper cover [A] (🖗 x 4)

Rear Lower Cover

1. Rear upper cover (🖝 p.17)



2. Rear lower cover [A] (🖉 x 3)

Top Rear Cover

1. Rear upper cover (🖝 p.17)



2. Top rear cover [A] (🕅 x 4)

Top Tray

- 1. Top rear cover (🖝 p.18)
- 2. Inner upper cover (🖝 p.15)



3. Release the hook [A], and remove the top tray [B] ($\not\!\!\!\! \partial^2 x$ 1).

Top Tray Right Cover

1. Top tray (🖝 p.18)



2. Top tray right cover [A] (P x 1)

Pulling Out the Folding Unit Drawer



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- 1. Open the front door [A]
- 2. Pull out the folding unit drawer [B].

Electrical Components: Rear Side

Main Board

1. Rear upper cover (p.17)



2. Main board [A] (🕮 x all, 🌶 x 7)

Horizontal Transport Motor

- 1. Rear upper cover (p.17)
- 2. Top rear cover (IPP p.18)

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3. Horizontal transport motor bracket [A] (🕮 x 1, 🌶 x 2)



4. Horizontal transport motor [A] (x 2)

Top Tray Exit Motor

- 1. Rear upper cover (🖝 p.17)
- 2. Top rear cover (p.18)



3. Top tray exit motor bracket [A] (🕬 x 1, 🛱 x 1, 🎓 x 2)



4. Top tray exit motor [A] (* x 2)

Top Tray Transport Motor

- 1. Rear upper cover (🖝 p.17)
- 2. Top rear cover (p.18)



3. Main board bracket [A] (x all, ⋧ x 5, ground cable x 1)



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4. Top tray transport motor bracket [A] (🕬 x 1, 🌮 x 2)



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5. Top tray transport motor [A] (x 2)

Entrance JG (Junction Gate) Motor

1. Rear upper cover (p.17)



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2. Entrance JG motor [A] (⇔x 1, ♥ x 1, १ x 2)

Dynamic Roller Lift Motor

- 1. Rear upper cover (p.17)
- 2. Top rear cover (p.18)
- 3. Main board bracket (* p.23 "Top Tray Transport Motor")



4. Rear upper stay [A] (☆ x 3, ∦ x 6)



5. Dynamic roller lift motor bracket [A] (🕬 x 1, 🌮 x 2)



6. Dynamic roller lift motor [A] (X 2)

Crease Motor

- 1. Rear upper cover (p.17)
- 2. Rear lower cover (MP p.17)
- 3. Top rear cover (p.18)
- 4. Main board bracket (🖝 p.23 "Top Tray Transport Motor")



5. Crease motor [A] (🕮 x 2, 🌶 x 4)

Dynamic Roller Transport Motor

1. Rear upper cover (p.17)



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2. Dynamic roller transport motor bracket [A](🕬 x 1, 🌮 x 2)



3. Dynamic roller transport motor ($\mathscr{F} \times 2$)

Registration Roller Release Motor

- 1. Rear upper cover (m p.17)
- 2. Rear lower cover (mp.17)



3. Registration roller release motor bracket [A] (💷 x 1, 🌮 x 2)



4. Registration roller release motor [A] ($\mathscr{F} \times 2$)

Registration Roller Transport Motor

- 1. Rear upper cover (p.17)
- 2. Rear lower cover (mp.17)



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3. Registration roller transport motor bracket [A] (🗊 x 1, 🌮 x 2)



Electrical Components: 1st Stopper

Fold Plate Motor

- 1. Rear upper cover (🖝 p.17)
- 2. Rear lower cover (p.17)



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3. Fold plate motor bracket [A] (⇔x 3, 🕬 x 1, № x 2)



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4. Fold plate motor [A] (x 2)

Direct-Send JG Motor

1. Rear upper cover (🖝 p.17)

2. Rear lower cover (🖝 p.17)



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3. Rear lower stay [A] (🛱 x 5, 🖗 x 2)



d454r353

4. Direct-Send JG motor bracket [A] (⇔x 1, ♥ x 1, १ x 2)



5. Direct-Send JG motor [A] (*P* x 2)

1 st Fold Motor

- 1. Rear upper cover (🖝 p.17)
- 2. Rear lower cover (🖝 p.17)



3. 1st fold motor [A] (🕮 x 1, 🌶 x 4)

FM6 Pawl Motor

- 1. Rear upper cover (🖝 p.17)
- 2. Rear lower cover (🖝 p.17)





4. FM6 pawl motor [A] (₽ x 2)

2nd Fold Motor

- 1. Rear upper cover (🖝 p.17)
- 2. Rear lower cover (🖝 p.17)


3. 2nd fold motor bracket [A] (⇔ x 1, ⊯ x 1, ≯ x 3)



d454r119

4. 2nd fold motor [A] (x 2)

Jogger Fence Motor

1. Pull out the folding unit drawer (🖝 p.20).



2. Jogger fence motor bracket [A] (⇔x 1, ♥ x 1, १ x 2)



3. Jogger fence motor [A] (🖉 x 2)

1st Stopper Unit

- 1. Folding unit cover (🖝 p.16)
- 2. Rear upper cover (🖝 p.17)
- 3. Rear lower cover (🖝 p.17)



4. Drawer stopper [A] (🖗 x 1)



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5. Belt tension bracket [A] (🖉 x 2)

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6. Release two clamps [A].

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7. Disconnect two connectors [B].



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8. Remove two screws [A].



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d454r165

- 9. Release two clamps [A].
- 10. Disconnect two connectors [B].
- 11. Pull out the folding unit drawer (🖝 p.20).



12. Hold the 1st stopper unit [A], and then remove it ($\mathscr{P} \times 2$).

Important

• The 1st stopper unit cannot hang the folding unit drawer without the two screws. If you remove the 1st stopper unit without any support, the 1st stopper unit can fall and be broken.

Positioning Roller Motor

1. 1st stopper unit (🖝 p.36)



d454r145

d454r143

2. Positioning roller motor bracket [A] (🗟 x 1, 🕬 x 1, 🌶 x 2)



3. Positioning roller motor [A] (🕅 x 2)

1st Stopper Motor

1. 1st stopper unit (mrp.36)



d454r144

d454r143

2. 1st stopper motor [A] (⇔x 1, 🕬 x 1, 𝒫 x 2)

Jogger Fence HP Sensor

1. 1st stopper unit (🖝 p.36)



2. Jogger fence motor bracket [A] (🖉 x 2)



3. Jogger fence timing belt bracket [A] (* x 2)



4. Jogger fence HP sensor [A] (hooks, 💷 x 1)

Positioning Roller HP Sensor

1. 1st stopper unit (🖝 p.36)



d454r152

2. Positioning Roller HP sensor [A] (hooks, 💷 x 1)

1st Stopper Paper Sensor

1. 1st stopper unit (🖝 p.36)



d454r149



3. 1 st stopper paper sensor [A] (hooks)

1 st Stopper HP Sensor

1. 1st stopper unit (🖝 p.36)



2. 1st stopper HP sensor bracket [A] (🕅 x 1)



3. 1st stopper HP sensor [A] (hooks)

Registration Sensor

1. Pull out the folding unit drawer (
Pull Out the Folding Unit Drawer)



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2. Jam removal door [A] (🛱 x 3, 🌶 x 1, 🖏 x 1)



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- 3. Registration sensor bracket [A] (🕅 x 1)
- 4. Registration sensor [B] (hooks, 💷 x 1)

Electrical Components: 2nd Stopper

2nd Stopper Unit

- 1. 1st stopper unit (🖝 p.36)
- 2. Jam removal door (🖝 p.44 "Registration Sensor")



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d454r197

3. Remove two screws [A] at the rear side of the folding unit drawer.





- 4. Remove the spring [A] for the solenoid spring [B] for the guide plate.
- 5. Remove the arm [C] for the guide plate.



- 6. Release the clamp [A] and disconnect two connectors [B].
- 7. Pull out the folding unit drawer.





8. Top stay [A] (🖗 x 3)



9. Move down the 2nd stopper unit [A] a little bit ($\mathscr{F} \times 2$).



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d454r208

10. Open the jam removal door [A], and then remove the 2nd stopper unit [B].

2nd Stopper Motor

1. 2nd stopper unit (🖝 p.46)



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2. 2nd stopper motor [A] (🛱 x 1, 📬 x 1, 🌮 x 2)

2nd Stopper HP Sensor

1. 2nd stopper unit (🖝 p.46)



d454r207

2. 2nd stopper HP sensor bracket [A] (P x 1)



3. 2nd stopper HP sensor [A] (hooks, 🕬 x 1)

2nd Stopper Paper Sensor

1. 2nd stopper unit (🖝 p.46)



d454r207

2. 2nd stopper paper sensor bracket [A] (F x 1)

1



3. 2nd stopper paper sensor [A] (🕬 x 1)

Bypass Exit Paper Sensor

- 1. Pull out the folding unit drawer.
- 2. 2nd stopper unit (🖝 p.46)



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3. Bypass exit paper sensor bracket [A] (🖉 x 1)



4. Bypass exit paper sensor [A] (🕮 x 1)

Electrical Components: 3rd Stopper

3rd Stopper Unit

- 1. Folding unit cover (🖝 p.16)
- 2. Rear upper cover (🖝 p.17)
- 3. Rear lower cover (🖝 p.17)



4. Drawer stopper [A] (🖉 x 1)



- 5. Release the clamp [A].
- 6. Disconnect two connectors [B].
- 7. 2nd fold motor bracket (🖝 p.34 "2nd Fold Motor")



8. Remove two screws [A].



9. Hold the 3rd stopper unit [A], and then remove it (\mathscr{F} x 2).

Comportant)

• The 3rd stopper unit cannot hang the folding unit drawer without the two screws. If you remove the 1st stopper unit without any support, the 3rd stopper unit can fall and be broken.

3rd Stopper Motor

1. 3rd stopper unit (🖝 p.53)



2. 3rd stopper motor [A] (⇔x 1, ⊯ x 1, ∦ x 2)

3rd Stopper Paper Sensor

1. Pull out the folding unit drawer.



2. 3rd stopper paper sensor bracket [A] (🖉 x 1)

1



3. 3rd stopper paper sensor [A] (🕬 x 1)

3rd Stopper HP Sensor

1. Pull out the folding unit drawer.



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2. 3rd stopper HP sensor bracket [A] (P x 1)



3. 3rd stopper HP sensor [A] (💷 x 1)

Direct-Send JG (Junction Gate) HP Sensor

- 1. Rear upper cover (🖝 p.17)
- 2. Rear lower cover (🖝 p.17)



3. Direct-Send JG HP sensor bracket [A] (🎤 x 1, 📬 x 1)



4. Direct-Send JG HP sensor [A] (hooks)

Registration Roller HP Sensor

- 1. Rear upper cover (🖝 p.17)
- 2. Rear lower cover (🖝 p.17)



3. Registration roller HP sensor bracket [A] (🎤 x 1, 🕬 x 1)



4. Registration roller HP sensor [A] (hooks)

Fold Plate HP Sensor

- 1. Rear upper cover (🖝 p.17)
- 2. Rear lower cover (🖝 p.17)



3. Fold plate HP sensor bracket [A] (🎤 x 1, 🕬 x 1)

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4. Fold plate HP sensor [A] (hooks)

Entrance JG (Junction Gate) HP Sensor

1. Rear upper cover (🖝 p.17)



2. Entrance JG HP sensor [A] (hooks, 🚅 x 1)

Top Tray Exit Sensor

1. Top cover (🖝 p.14)



2. Top tray exit sensor bracket [A] (🖉 x 1)



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3. Top tray exit sensor [A] (💷 x 1)

Entrance Sensor



d454r308

1. Entrance sensor bracket [A] (🖉 x 1)



2. Entrance sensor [A] (hooks, 🗇 x 1)

Top Tray Exit Sensor

1. Top tray right cover (🖝 p.19)



2. Top tray exit sensor bracket [A] (P x 1)



3. Top tray exit sensor [A] (hooks, 💷 x 1)

Electrical Components: Main 1

Top Tray Full Sensor (E)

1. Top tray (🖝 p.18)



2. Paper exit cover [A] (Ĝ² x 1)



d454r073

3. Top tray full sensor (E) bracket ($\hat{\mathscr{F}}$ x 1)



4. Top tray full sensor (E) [A] (𝔅 x 1, ⊑╝ x 1)

Top Tray Full Sensor (R)

1. Top tray (🖝 p.18)



2. Top tray full sensor (R) [A] (♂ x 1, ⊂ x 1)

Vertical Path Paper Sensor

1. Top tray (🖝 p.18)



2. Remove the bracket (🖗 x 5)



- d454r312
- 3. Vertical path paper sensor [A] (⊑[™] x 1, hooks)

Horizontal Path Paper Sensor

1. Top tray (🖝 p.18)



2. Remove the bracket ($\hat{\mathscr{F}} \times 2$)



d454r372

3. Horizontal path paper sensor [A] (⊑^J x 1)

Horizontal Path Exit Sensor

1. Top tray (🖝 p.18)



2. Remove the bracket ($\hat{\mathscr{F}} \ge 5$)



3. Horizontal path exit sensor (☞ [A] x 1)

Discharge Brush 1

1. Top cover (🖝 p.14)



2. Discharge brush 1 [A] (🖗 x 2)

Discharge Brush 2

1. Top tray (🖝 p.18)



d454r313

2. Discharge brush 2 [A] (🌶 x 1)

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Discharge Brush 3



1. Discharge brush 3 [A] (🖗 x 2)

PSU



d454r349

1. Left lower bracket (🖗 x 6)


d454r178

2. PSU [A] (곍 x 6, ⊑╝ x 4)

First Fold Unit

1. 1st stopper unit (🖝 p.36)



d454r191a

2. Jam removal door [A] (🖗 x 1, 🛱 x 3, 🕅 x 1)



3. Remove two guide plates [A] (each $\mathscr{F} \times 2$)



d454r373

- 4. Registration roller transport motor bracket [A] (🖝 p.29 "Registration Roller Transport Motor")
- 5. Registration roller release motor bracket [B] (🖝 p.28 "Registration Roller Release Motor")
- 6. Fold plate motor bracket [C] (🖝 p.31 "Fold Plate Motor")
- 7. Timing belt of the 1st plate motor [D]



8. Remove three screws on the rear side.







d454r246

9. Disconnect four harnesses [A] on the rear side.



10. Release two clamps [A].



Lower guide plate [A], keep the upper guide plate [B] up a little and remove the first fold unit (\$ x 3, snap fit [C] x 1)

Dynamic Roller HP Sensor

1. First fold unit (🖝 p.71)



2. Dynamic roller HP sensor bracket ($\hat{\mathscr{F}} \times 1$)



3. Dynamic roller HP sensor [A] (⊑[∭] x 1)

Electrical Components: Main 2

Bypass Entrance Paper Sensor

- 1. Folding unit cover (🖝 p.16)
- 2. Rear upper cover (🖝 p.17)
- 3. Rear lower cover (🖝 p.17)



4. Disconnect the bypass entrance paper sensor harness [A] from the connector [B] ($\textcircled{B} \times 2$).



5. Remove the clip [A] for the bypass entrance guide plate.



6. Push the bypass entrance guide plate [A] to the rear, then slide it to the left, and remove it.





7. Bypass entrance paper sensor bracket [A] ($\hat{\mathscr{F}}$ x 1)



8. Bypass entrance paper sensor [A] (♀ x 1, ♀ x 1, ≡ x 1)



Reinstalling the bypass entrance paper sensor

4101100

Put the harness of the bypass entrance paper sensor through the hole [A] in the rear frame of the drawer.

First/ Second/ Third Fold Roller

1. First fold unit (🖝 p.71)



d454r291

- 2. Tension bracket [A] (spring x 1, \mathbb{C} x 1)
- 3. Rear bracket [B] (🖗 x 3)



4. Remove the gear [A] ($\mathbb{C} \ge 1$)



d454r294

5. Guide plate [A] (🐼 x 1)



- 6. Remove the spring [A] at the front side.
- 7. Remove six gears (clip x 1 each)



8. Remove the links [A] (clip x 1 each).



- 0454r29
- 9. Tension bracket [A] (\mathbb{C} x 1)
- 10. Remove the front bracket [B] ($\hat{\mathscr{F}} \times 2$).







d454r300

- 11. Third fold roller with the guide plate [A]
- 12. Remove the guide plate [B].

13. Second fold roller [C].



14. Remove the gear [A] ($\mathbb C$ x 1), and then the first fold roller [B].

Fourth / Fifth Fold Roller

- 1. Rear upper cover (🖝 p.17)
- 2. Rear lower cover (🖝 p.17)
- 3. Drawer stopper (🖝 p.53 "3rd Stopper Unit")







d454r322

- 4. Remove the links [A] on the front side (clip x 2 each).
- 5. Remove four gears [B].



- 6. Remove the links [A] (pin x 1 each)
- 7. Remove the gear [B] ($\mathbb{C} \times 1$), and the gear [C] (timing belt x 1).



8. Remove the spring [A] and the tension bracket [B] ($\ensuremath{\mathbb{C}} \x 1$).



d454r349

9. Left lower bracket (🖗 x 6)



- 10. Lift up the hook [A] to release the guide plate shaft [B].
- Move the guide plate shaft [B] to the front side (arrow direction), and then remove the guide plate [C].



d454r327

d454r339

- 12. Remove the cam [A] on the front side.
- 13. Fold roller fixing front plate [B] ($\hat{\beta}^2 \times 3$)



d454r341

1

- 14. 2nd fold motor [A] (• p.34)
- 15. 2nd fold pulley gear [B] ($\mathbb{C} \times 1$) and idle gear
- 16. Timing belt [C]
- 17. Spring [D]
- 18. FM6 pawl motor [E] (- p.33)
- 19. Pulley gear [F]



d454r380

- 20. 1 st fold motor [A] (p.33)
- 21. FM6 pawl HP sensor bracket [B]
- 22. FM6 pawl cam gear [C]
- 23. Release the tension bracket [D], and then remove the transmission pulley gear [E] (pin x 1)



24. Remove the entrance guide plate [A] at the 2nd fold unit ($\hat{\mathscr{F}}\times4).$



- 25. Hold the fourth fold roller cam [A] at the rear of the drawer unit.
- 26. Pull the fourth fold roller [B] to the front side 1 .
- 27. Keep the FM6 pawl [C] open, and then remove the fourth fold roller 2.

Note

• Hold the holder [A] when pulling the fourth fold roller [B] in the ① direction.



d454r340

28. Remove the fifth fold roller [A].

Crease Rollers

Crease Rollers: Idle Rollers

- 1. Folding Unit Cover (🖝 p.16)
- 2. Drawer stopper (🖝 p.53 "3rd Stopper Unit")
- 3. Pull out the folding unit drawer fully (🖝 p.20).



d454r383

- 4. Crease jam removal door [A]
- 5. Tension springs [B] (front: 4, rear: 4)
 - The lowest spring should be a black one when reinstalling the springs.



6. Tension brackets [A] (🖗 x 1 each/ front: 4, rear: 4)



d454r385

There are two types of tension brackets at the crease roller area. The difference between these brackets is the number of screw holes ([A]: one hole, [B]: two holes).

- Attach a bracket [A] with one hole to the crease roller frame with one hole.
- Attach a bracket [B] with two holes to the crease roller frame with two holes.



7. Magnet attachment bracket [A] (🖗 x 1)



d454r387

8. Crease rollers: idle rollers [A]

Crease Rollers: Drive Rollers

- 1. Crease Rollers: Idle Rollers (described above)
- 2. Rear upper cover (🖝 p.17)
- 3. Rear lower cover (🖝 p.17)
- 4. Main board bracket (🖝 p.23 "Top Tray Transport Motor")
- 5. Rear upper stay (🖝 p.25 "Dynamic Roller Lift Motor")



- 6. Drawer connector bracket [A] (🖗 x 3)
- 7. Crease motor (🖝 p.26)



8. Crease path guide plate [A] ($\hat{\mathscr{F}} \times 5$)



d454r389

9. Crease roller pulley gears [A] (ℂ x 1 each)



10. Crease roller fixing plate [A] (🖗 x 2)



d454r391

11. Crease rollers: drive rollers [A]

Fold Adjustments

Fine Fold Adjustment

Before You Begin

The fold positions can be adjusted in the User Tools (Operators, Skilled Operators) and the engine SP mode.

Mode	Fold	User Tools ^{*1}	SP
FM1	1 st	0501 Adjust Z-fold Position 1	6750
	2nd	0502 Adjust Z-fold Position 2	6751
FM2	l st	0503 Adjust Half Fold Position	6752
FM3	l st	0504 Adjust Letter Fold-out Position 1	6753
	2nd	0505 Adjust Letter Fold-out Position 2	6754
FM4	l st	0506 Adjust Letter Fold-in Position 1	6755
	2nd	0507 Adjust Letter Fold-in Position 2	6756
FM5	l st	0508 Adjust Double Parallel Fold Position 1	6757
	2nd	0509 Adjust Double Parallel Fold Position 2	6758
FM6	l st	0510 Adjust Gate Fold Position 1	6759
	2nd	0511 Adjust Gate Fold Position 2	6760
	3rd	0512 Adjust Gate Fold Position 3	6761

*¹: These numbers are the same for Operators and Skilled Operators.

FM1 Z-Folding

User Tool Adjustment (Operator, Skilled Operator)

The following standard adjustment of "S" can be done by the operator or skilled operator in the User Tools mode. Only "S" can be adjusted by the operator, as shown in the table below.



d454d911

1

Size	Setting	Default	Range		
A3 SEF	S	2 mm	2 to 25 mm		
B4 SEF	S	2 mm 2 to 17 mm			
A4 SEF	S	2 mm	2 to 17 mm		
DLT	S	2 mm	2 to 20 mm		
LG	S	2 mm	2 to 17 mm		
LT SEF	S	2 mm	2 to 17 mm		
Other	S	2 mm	2 to 17 mm		
Pitch Adj.	1 mm				

Engine SP Adjustment

The following fine adjustment of "S" and "L" can be done by the customer engineer in the SP mode. "L" can be adjusted only for the paper sizes listed in the table below.



d454d911

Size	Setting	Default	Range	Setting	Default	Range
A3 SEF	S	0 mm	±4 mm	L	0 mm	±4 mm
B4 SEF	S	0 mm	±4 mm	L	0 mm	±4 mm
A4 SEF	S	0 mm	±4 mm	L	0 mm	±4 mm
DLT	S	0 mm	±4 mm	L	0 mm	±4 mm
LG	S	0 mm	±4 mm	L	0 mm	±4 mm
LT SEF	S	0 mm	±4 mm	L	0 mm	±4 mm
12"x18"	S	0 mm	±4 mm	L	0 mm	±4 mm
8-Kai	S	0 mm	±4 mm	L	0 mm	±4 mm
Other	S	0 mm	±4 mm	L	0 mm	±4 mm
Pitch Adj.	0.2 mm					

FM2 Half Fold

User Tool Adjustment (Operator, Skilled Operator)

The following standard adjustment of "S" can be done by the operator or skilled operator in the User Tools mode. Only "S" can be adjusted by the operator, as shown in the table below.



d454d912

1

Size	Setting	Default	Range	
A3 SEF	S	0 mm	±10 mm	
B4 SEF	S	0 mm	±10 mm	
A4 SEF	S	0 mm	±10 mm	
DLT	S	0 mm	±10 mm	
lG	S	0 mm	±10 mm	
LT SEF	S	0 mm	±10 mm	
Other	S	0 mm	±10 mm	
Pitch Adj.	±1 mm			

Notes

• No folding adjustment can be done for 13"x19.2", 13"x19", 12.6"x19.2"

Engine SP Adjustment

The following fine adjustment of "S" can be done by the customer engineer in the SP mode.



d454d912

Size	Setting	Default	Range
13"x19.2"	S	0 mm	±4 mm
13"x19"	S	0 mm	±4 mm
12.6"x19.2"	S	0 mm	±4 mm
12.6"x18.5"	S	0 mm	±4 mm
13"x18"	S	0 mm	±4 mm
SR A3 (320x450 mm)	S	0 mm	±4 mm
SR A4 (225x320 mm)	S	0 mm	±4 mm
226x310 mm	S	0 mm	±4 mm
310x432 mm	S	0 mm	±4 mm
A3 SEF	S	0 mm	±4 mm
B4 SEF	S	0 mm	±4 mm
A4 SEF	S	0 mm	±4 mm
B5 SEF	S	0 mm	±4 mm
DLT	S	0 mm	±4 mm
LG	S	0 mm	±4 mm
LT SEF	S	0 mm	±4 mm
12"x18"	S	0 mm	±4 mm

Size	Setting Default		Range	
8-Kai	S	0 mm	±4 mm	
Other	S 0 mm ±4 mm			
Pitch Adj.	0.2 mm			

FM3 Letter Fold-out

User Tool Adjustment (Operator, Skilled Operator)

The following standard adjustment of "S1" can be done by the operator or skilled operator in the User Tools mode. Only "S1" can be adjusted by the operator, as shown in the table below.



d454d913

Size	Setting	Default	Range	Setting	Default	Range	
A3 SEF	S1	0 mm	±10 mm				
B4 SEF	S1	0 mm	±10 mm				
A4 SEF	S1	0 mm	±10 mm				
DLT	S1	0 mm	±10 mm				
LG	S1	0 mm	±10 mm				
LT SEF	S1	0 mm	±10 mm				
Other	S1	0 mm	±10 mm				
Pitch Adj.	1 mm						

Engine SP Adjustment

The following fine adjustment of "S2" and "L" can be done by the customer engineer in the SP mode.



d454d913

Size	Setting	Default	Range	Setting	Default	Range	
A3 SEF	L	0 mm	±4 mm	S2	0 mm	±4 mm	
B4 SEF	L	0 mm	±4 mm	S2	0 mm	±4 mm	
A4 SEF	L	0 mm	±4 mm	S2	0 mm	±4 mm	
B5 SEF	L	0 mm	±3 mm	S2	0 mm	±3 mm	
DLT	L	0 mm	±4 mm	S2	0 mm	±4 mm	
LG	L	0 mm	±4 mm	S2	0 mm	±4 mm	
LT SEF	L	0 mm	±4 mm	S2	0 mm	±4 mm	
12"x18"	L	0 mm	±4 mm	S2	0 mm	±4 mm	
8-Kai	L	0 mm	±4 mm	S2	0 mm	±4 mm	
Other	L	0 mm	±4 mm	S2	0 mm	±4 mm	
Pitch Adj.	0.2 mm						

FM4 Letter Fold-in

User Tool Adjustment (Operator, Skilled Operator)

The following standard adjustment of "S1" can be done by the operator or skilled operator in the User Tools mode. Only "S1" can be adjusted by the operator as shown in the table below.



d454d914

Size	Setting	Default	Range	Setting	Default	Range
A3 SEF	S1	2 mm	2 to 7 mm			
B4 SEF	S1	2 mm	2 to 7 mm			
A4 SEF	S1	2 mm	2 to 7 mm			
DLT	S1	2 mm	2 to 7 mm			
LG	S1	2 mm	2 to 7 mm			
LT SEF	S1	2 mm	2 to 7 mm			
Other	S1	2 mm	2 to 7 mm			
Pitch Adj.	1 mm					

Engine SP Adjustment

The following fine adjustment of "L1" and "L2" can be done by the customer engineer in the SP mode.



d454d914

Size	Setting	Default	Range	Setting	Default	Range		
A3 SEF	L1	0 mm	±4 mm	S1	0 mm	±4 mm		
B4 SEF	L1	0 mm	±4 mm	S1	0 mm	±4 mm		
A4 SEF	L1	0 mm	±4 mm	S1	0 mm	±4 mm		
B5 SEF	L1	0 mm	±4 mm	S1	0 mm	±4 mm		
DLT	L1	0 mm	±4 mm	S1	0 mm	±4 mm		
LG	L1	0 mm	±4 mm	S1	0 mm	±4 mm		
LT SEF	L1	0 mm	±4 mm	S1	0 mm	±4 mm		
12"x18"	L1	0 mm	±4 mm	S1	0 mm	±4 mm		
8-Kai	L1	0 mm	±4 mm	S1	0 mm	±4 mm		
Other	L1	0 mm	±4 mm	S1	0 mm	±4 mm		
Pitch Adj.	0.2 mm							

FM5 Double Parallel Fold

User Tool Adjustment (Operator, Skilled Operator)

The following standard adjustment of "S1" can be done by the operator or skilled operator in the User Tools mode. Only "S1" can be adjusted by the operator as shown in the table below.





d454d915

Size	Setting	Default	Range		
A3 SEF	S1	0 mm	±10 mm		
B4 SEF	S1	0 mm	±10 mm		
A4 SEF	S1	0 mm	±10 mm		
DLT	S1	0 mm	±10 mm		
LG	S1	0 mm	±10 mm		
LT SEF	S1	0 mm	±10 mm		
Other	S1	0 mm	±10 mm		
Pitch Adj.	1 mm				

Engine SP Adjustment

The following fine adjustment of "S1" and "S2" can be done by the customer engineer in the SP mode.

Н

1





d454d915

Size	Setting	Default	Range	Setting	Default	Range	
A3 SEF	S1	0 mm	±4 mm	S2	0 mm	±4 mm	
B4 SEF	S1	0 mm	±4 mm	S2	0 mm	±4 mm	
A4 SEF	S1	0 mm	±4 mm	S2	0 mm	±4 mm	
B5 SEF	S1	0 mm	±4 mm	S2	0 mm	±4 mm	
DLT	S1	0 mm	±4 mm	S2	0 mm	±4 mm	
LG	S1	0 mm	±4 mm	S2	0 mm	±4 mm	
LT SEF	S1	0 mm	±4 mm	S2	0 mm	±4 mm	
12"x18"	S1	0 mm	±4 mm	S2	0 mm	±4 mm	
8-Kai	S1	0 mm	±4 mm	S2	0 mm	±4 mm	
Other	S1	0 mm	±4 mm	S2	0 mm	±4 mm	
Pitch Adj.	0.2 mm						

FM6 Gate Fold

User Tool Adjustment (Operator, Skilled Operator)

The following standard adjustment of "S1" and "S2" can be done by the operator or skilled operator in the User Tools mode.



				-
44	51	40	1	6
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Size	Setting	Default	Range
A3 SEF	S1, S2	2 mm	2 to 12 mm
B4 SEF	S1, S2	2 mm	2 to 12 mm
A4 SEF	S1, S2	2 mm	2 to 12 mm
DLT	S1, S2	2 mm	2 to 12 mm
LG	S1, S2	2 mm	2 to 12 mm
LT SEF	S1, S2	2 mm	2 to 12 mm
Other	S1, S2	2 mm	2 to 12 mm
Pitch Adj.		1 mm	

Engine SP Adjustment

The following fine adjustment of "S1", "S2", and "S3" can be done by the customer engineer in the SP mode.



d454d916

Size	Setting	Default	Range
A3 SEF	S1	0 mm	±4 mm
B4 SEF	S1	0 mm	±4 mm
A4 SEF	S1	0 mm	±4 mm
B5 SEF	S1	0 mm	±4 mm
DLT	S1	0 mm	±4 mm
LG	S1	0 mm	±4 mm
LT SEF	S1	0 mm	±4 mm
8-Kai	S1	0 mm	±4 mm
Other	S1	0 mm	±4 mm
Pitch Adj.		0.2 mm	

Size	Setting	Default	Range
A3 SEF	S2	0 mm	±4 mm
B4 SEF	S2	0 mm	±4 mm
A4 SEF	S2	0 mm	±4 mm
B5 SEF	S2	0 mm	±4 mm
DLT	S2	0 mm	±4 mm
LG	S2	0 mm	±4 mm
LT SEF	S2	0 mm	±4 mm
8-Kai	S2	0 mm	±4 mm

Size	Setting	Default	Range
Other	S1	0 mm	±4 mm
Pitch Adj.		0.2 mm	

Size	Setting	Default	Range
A3 SEF	\$3	0 mm	±4 mm
B4 SEF	\$3	0 mm	±4 mm
A4 SEF	\$3	0 mm	±4 mm
B5 SEF	\$3	0 mm	±4 mm
DLT	\$3	0 mm	±4 mm
LG	\$3	0 mm	±4 mm
LT SEF	\$3	0 mm	±4 mm
12"x18"	\$3	0 mm	±4 mm
8-Kai	\$3	0 mm	±4 mm
Other	S1	0 mm	±4 mm
Pitch Adj.		0.2 mm	

Skew Adjustment

Manual Adjustments by Service Technician

Before You Begin

These adjustments can be done by the service technician adjusting the set and adjustment screws on the multi-folder unit.



The illustration above shows the positions of the three stoppers inside the machine. The positioning of the stoppers is critical because this determines the types of folding.

Front and Rear

The terms "Front" and "Rear" are critical to understanding how paper is skewing during folding. These terms are defined relative to the positioning of the paper in the paper path as it feeds and exits.

- "High" means the distance from the nip of the fold roller to the stopper is too far on one end of the fence.
- "Low" means the distance from the nip of the fold roller to the stopper is too short.



Two examples are shown below.

Example 1: High (Stopper Too Far From The Nip)


The black arrow shows the direction of paper feed from right to left. When the skew sheet is opened the **Front** edge is **longer** than the **Rear** edge.

Example 2: FM2: Low (Stopper to Close to the Nip)



The black arrow shows the direction of paper feed from right to left. When the skew sheet is opened the **Front** edge is **shorter** than the **Rear** edge.

Skew Correction Reference Diagrams and Table

Skew Correction Reference Diagrams

Key

Symbol/Color	What It Means
1	Stopper 1 needs adjustment
2	Stopper 2 needs adjustment
3	Stopper 3 needs adjustment
Blue line	Peak fold (points left)
Green line	Valley fold (points right)





General Procedure



d454d922

- 1. Retrieve the first folded paper from the top of the multi-folder. The first sheet is on the bottom of the stack.
- 2. If a fold is skewed, spread the paper out in the direction of paper feed shown in the diagrams above.
- 3. Carefully measure the distances between the folds between L1, L2, L3.
- 4. Compare the Front and Rear measurements.
- 5. Refer to the table below to determine where the paper is skewing and what type of adjustment is required.

Skew Correction Reference Table	Skew	Correction	Reference	Table
---------------------------------	------	------------	-----------	-------

	LI	L2	L3	S1	S2	\$3
FM1		F Long	F Long		Lower F	Raise F
		F Short	F Short		Raise F	Lower F
FM2	F Long			Raise F		
	F Short			Lower F		
FM3	F Long	F Long		Raise F	Lower F	
	F Short	F Short		Lower F	Raise F	
FM4	F Long	F Long		Raise F	Lower F	
	F Short	F Short		Lower F	Raise F	
FM5	F Long	F Long		Raise F	Lower F	
	F Short	F Short		Lower F	Raise F	
FM6	F Long	F Long	F Long	Lower F	Lower F	Raise F
	F Short	F Short	F Short	Raise F	Raise F	Lower F

Table Key

You must refer to the "Skew Correction Reference Diagrams". The following abbreviations are used in the table above.

Term	What It Means
F Long	Front measurement of L1, L2, or L3 is longer than Rear
F Short	Front measurement of L1, L2, or L3 is shorter than Rear
S1, S2, S3	Refers to Stopper 1, Stopper 2, Stopper. In the diagrams these are annotated as: ①, ②, ③ respectively.
Raise F	Raise the front end of the stopper fence. For more, see below.
Lower F	Lower the front end of the stopper fence. For more, see below.

Example: FM1 (Z-fold)



d454d921

First, compare the L2 measurements.

- In this example, imagine that L2 is longer at the front than at the rear.
- Look at the table, in the row for FM1, and the column for L2.
 - 'F Long' means Front measurement longer than Rear
 - 'F Short' means Rear measurement longer than Front
- L2 is longer at the front, so we have an 'F Long' situation.
- Then look at the next line, below 'F Long'. It says 'Lower F on S2'.
- This means you must lower the front end of stopper 2.

Then, compare the L3 measurements.

- In this example, imagine that L3 is longer at the front than at the rear.
- Look at the table, in the row for FM1, and the column for L3.
 - 'F Long' means Front measurement longer than Rear
 - 'F Short' means Rear measurement longer than Front
- L3 is longer at the front, so we have an 'F Long' situation again.
- Then look at the next line, below 'F Long'. It says 'Raise F on S3'.
- This means you must raise the front end of stopper 3.

Stopper Adjustment Procedures

1. Use the "Skew Correction Reference Diagrams" and "Skew Correction Reference Table" in the previous section to determine the location of the skew and which stopper needs adjustment.

1



2. Now you are ready to do the adjustment on the multi-folder unit.

- 3. The illustration above shows the location for each stopper adjustment.
 - Each stopper is equipped with two screws.
 - The black plastic screw is the Set screw and the metal silver screw is the Adjustment screw.



d454d941

4. Remove the Set screw.



d454d942

5. Turn the Adjustment screw to do the adjustment for the stopper.

1st, 3rd Stopper

- Turn the Adjustment screw **clockwise** to **lower** the front end of the fence. -or-
- Turn the Adjustment screw **counter-clockwise** to **raise** the front of the fence.

2nd Stopper

• Turn the Adjustment screw **clockwise** to **raise** the front end of the fence.

-or-

• Turn the Adjustment screw counter-clockwise to lower the front of the fence.



d454d943

6. Fasten the Set screw in the hole of the diagonal cutout near the hole where you removed it.

Note

- The diagonal cut may be above or below the original hole, depending on which stopper you are adjusting.
- The photo above shows the Set screw for Stopper 2.
- 7. Tighten the Set screw so the plate holds the adjustment.

1. Replacement and Adjustment

Overview



The illustration above shows the roller groups and their related motors.



The illustration above shows the paper path junction gates and the solenoids and motors that operate them.

Stoppers, Stopper Motors



The illustration above shows the stoppers and the motors that operate them.

Paper Path

Paper Registration



When paper is fed to the pre-stacker, the position of each sheet in the paper path is adjusted to correct skew:

- Leading edge of the sheet hits the registration roller and stops.
- The upstream rollers continue to rotate 5 mm.
- The leading edge of the paper buckles against the stationary registration roller to correct skew.
- The registration roller starts rotating again after the paper has been straightened in the paper path.

2



Pre-Stacking



d454d304

Up to three sheets of paper can be pre-stacked for folding.

The left illustration shows the parts that operate during pre-stacking.

- The paper enters the machine [A].
- The lower entrance junction gate [B] opens and guides the paper to the TE stop pawl [C].
- The paper pushes the TE stop pawl aside so it can pass.



d454d305

The dynamic roller [A] raises after the leading edge of the paper passes the TE stop pawl [B]. The TE stop pawl returns to its home position [C] after the trailing edge of the sheet passes.

After the trailing edge of the paper passes the dynamic roller, the positioning roller [D] starts to rotate and feeds the paper as far as stopper 1 [E].

2



The dynamic roller [A] lowers when the leading edge reaches stopper 1 [B] within the time prescribed for feeding for the size of the paper selected for the job.

The TE stop pawl [C] presses on the 1st sheet to prevent the leading edge of the 2nd sheet from hitting it. The operation sequence for stacking the 2nd and 3rd sheets is the same as that of the 1st sheet.



The dynamic roller [A] raises after the leading edge of the 3rd (and last sheet) passes the TE stop pawl. The position roller [B] rotates twice only after the last sheet has been pre-stacked.



2

After the last sheet has been pre-stacked, the TE stop pawl [A] lowers and the sheets are jogged vertically (top to bottom).

Next, with the TE stop pawl pressing down on the trailing edges of the stacked sheets, the stack [B] is jogged horizontally (front to back).

2



Finally, after all three sheets have been pre-stacked and jogged, the fold blade [A] pushes the stacked sheets into the nip of the fold rollers [B].

Junction Gates



2

Entrance Junction Gates

(1) (2) Entrance Junction Gates



There are two junction gates in the paper path at the entrance of the multi-folder.



Both junction gates remain at their home positions when paper is fed straight through the multi-fold unit to the next unit downstream.

For Folding



When folding is selected, the lower entrance junction gate raises and guides the paper to the fold units below:

- Upper entrance junction gate remains at default position.
- Lower junction gate rotates up and guides paper down.

Exit to Top Tray



When draft copies are sent to the top tray:

- The upper entrance junction gate rotates down.
- The lower junction gate remains at default position.

Direct Send Junction Gate



This is the direct send junction gate at its home position.



The junction gate rotates to the right and paper is sent downstream without passing stopper 2. This is down for FM2 mode only when the paper is folded into equal halves.



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The illustration above shows the actual location and appearance of the direct send junction gate.



For all fold modes other than FM2 (Half Fold) the direct send junction gate remains at its home position.

- For FM2 the direct send junction gate motor rotates the junction gate [B] to position [C].
- After the job is finished the motor rotates the junction gate back to its home position [A].

Other Fold Modes



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For the other fold modes (FM1, FM3 to FM6) the junction gate remains at its home position and does not touch the paper.

Bypass Junction Gate



This is the bypass junction gate at its home position.

For FM1 (Z-fold), FM6 (Gate Fold)

When FM1 (Z-fold) or FM6 (Gate Fold) is selected, the bypass junction gate raises and allows paper to pass to folder unit 2.



For fold modes other than FM1, FM6 the bypass junction gate remains at it default position. Paper passes over the top of the bypass junction gate and into the bypass paper path.

Exit, Reverse, and Top Tray Junction Gates



These three junction gates are shown above at their default positions.



For straight-through paper feed the junction gates remain at their home positions. Paper passes straight through the multi-folder to the next peripheral unit downstream.



All three junction gates operate to guide folded paper to the top tray:

- Exit junction gate rotates left
- Reverse junction gate raises
- Top tray junction gate lowers

This sequence guides the folded paper to the top tray.

Note: Only Z-folded paper is allowed to exit the multi-folder and pass downstream to other peripheral units. In this case, the junction gates remain at their default positions. The exit junction gate sensor (5) guides the paper toward the multi-folder exit above.

Paper Folding

Flex-Nip Folding



This machine uses the flex-nip method to fold paper.

In this method of folding a stopper fence ① is raised or lowered to the correct height for the size of the paper and the type of fold to be done. A sheet of paper ② descends, hits the stopper and stops. However, the upstream rollers continue to rotate. This causes the paper ④ to bulge and flex toward the nip of the rotating fold rollers on the left. When the paper ⑤ reaches the rotating rollers it feeds into the nip. The rollers catch the paper, pull it into the nip, and form the fold.

In this machine:

- There are three fold stoppers placed at strategic positions in the fold path.
- Not all the stoppers are used for folding. Only the stoppers needed for the type of folding are used.



When two or more sheets are fed together, a fold assist plate ① pushes the flexed paper toward the rotating fold rollers. The fold plate is used only when more than one sheet of paper is fed at a time. Up to three sheets can be fed.

2



The illustration above shows the stopper locations. Note the locations of Stopper 1, Stopper 2, and Stopper 3.

Folding Methods

There are six Folding Methods (FM):



FM1	Z-Folding
FM2	Half Fold

FM3	Letter Fold-out
FM4	Letter Fold-in
FM5	Double Parallel Fold
FM6	Gate Fold

FM1 Z-Folding





In Fold Method 1 (FM1):

- The leading edge of the paper feeds into the nip of fold rollers ① and ②.
- The paper is stopped by Fold Stopper 2. The paper flexes toward the nip of fold rollers (2) and (3) which performs the first fold.
- Next, the paper is stopped by Fold Stopper 3. The paper flexes toward the nip of fold rollers ④ and ⑤ which performs the second fold and feeds the paper into the exit path.
- Fold Stopper 1 is not used.

FM2 Half Fold



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In Fold Method 2 (FM2):

- The leading edge of the paper is stopped by Fold Stopper 1.
- The paper flexes toward the nip of fold rollers ① and ② which performs the first fold and feeds the folded edge of the paper into the nip of fold rollers ② and ③.
- Fold rollers 2 and 3 feed the paper into the exit path.
- Fold Stoppers 2, and 3 are not used.



In Fold Method 3 (FM3):

- The leading edge of the paper is stopped by Fold Stopper 1.
- The paper flexes toward the nip of fold rollers ① and ② which performs the first fold.
- Fold Stopper 2 stops the paper and flexes it into the nip of fold rollers 2 and 3.
- Fold rollers ② and ③ perform the second crease and feed the folded paper in exit path.
- Fold Stoppers 3 is not used.

FM4 Letter Fold-in



In Fold Method 4 (FM4):

- The leading edge of the paper is stopped by Fold Stopper 1.
- The paper flexes toward the nip of fold rollers ① and ② which performs the first fold.
- Fold Stopper 2 stops the paper and flexes it into the nip of fold rollers 2 and 3.
- Fold rollers 2 and 3 perform the second crease and feed the folded paper in exit path.
- Fold Stopper 3 is not used.

FM3 and FM4 follow the same sequence but the resultant fold is different:

- In FM3 Fold Stopper 1 is positioned high so a short length of paper is allowed to feed before flexing toward the nip starts.
- In FM4 Fold Stopper 1 is positioned low so a long length of paper is allowed to feed before flexing toward the hip starts.
- This positioning of Fold Stopper 1 accounts for the difference in folding at the next nip.

FM5 Double Parallel Fold

FM5: Double Parallel Fold







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In Fold Method 5 (FM5):

- The leading edge of the paper is stopped by Fold Stopper 1.
- The paper flexes toward the nip of fold rollers ① and ② which performs the first fold.
- Fold Stopper 2 stops the paper and flexes it into the nip of fold rollers 2 and 3.
- Fold rollers ② and ③ perform the second crease and feed the folded paper in exit path.
- Fold Stopper 3 is not used.

FM3, FM4, and FM5 follow the same sequence but the resultant fold is different:

- In FM5 Fold Stopper 1 is positioned so the paper will fold into halves when it enters the first nip.
- This critical positioning of Fold Stopper 1 accounts for the difference in folding at the next nip.

FM6 Gate Fold





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In Fold Method 6 (FM6):

- The leading edge of the paper is stopped by Fold Stopper 1.
- The paper flexes toward the nip of fold rollers ① and ② which performs the first fold.
- Fold Stopper 2 stops the paper and flexes it into the nip of fold rollers 2 and 3.
- Fold rollers 2 and 3 perform the second fold and feed the folded paper to Stopper 3.
- Fold Stopper 3 stops the paper and flexes it into the nip of fold roller ④ and ⑤.
- Fold roller ④ and ⑤ form the third crease and feed the folding paper into the exit path.
- All three stoppers are used with this method.



A mechanism is provided to prevent the leading edge from catching and folding over on itself [A] when the 3rd fold is done.



Operation sequence for folding three sheets:

• At power on (initialization) the FM6 junction gate [A] moves to home position.

The three sheets are pre-stacked then the first two folds are done

• The FM6 stop pawl moves to the operation position [B].



[A]	After the 2nd fold the sheet(s) are sent to the 3rd stopper for the last fold.
[B]	The leading edge of the sheets(s) hit stopper 3 and the upstream rollers continue rotate (equivalent to 18 mm of feed) to flex paper toward the fold rollers.
[C]	The edge of the FM6 pawl is raised to flatten the leading edge so it cannot bend back on itself as the paper enters the nip of the fold rollers.
[D]	When the 3rd fold starts the FM6 pawl returns to its home position.
Fold Adjustments with SP Codes

The fold positions can be adjusted in the User Tools (Operators, Skilled Operators) and the engine SP mode.

Mode	Name	Fold	User Tools ^{*1}	SP*2
FM1	Z-Fold	1 st	0501	6750
		2nd	0502	6751
FM2	Equal Halves	1 st	0503	6752
FM3	LT Fold Out	1 st	0504	6753
		2nd	0505	6754
FM4	LT Fold In	1 st	0506	6755
		2nd	0507	6756
FM5	Double Parallel	1 st	0508	6757
		2nd	0509	6758
FM6	Gate Fold	1 st	0510	6759
		2nd	0511	6760
		3rd	0512	6761

*¹: These numbers are the same for Operators, Skilled Operators.

 *2 : The ranges for these SP codes are the same: [-4 to +4 / 0 / 0.2 mm]

Crease Rollers



The amount of pressure exerted by the crease rollers can be adjusted. This can be done to eliminate splitting that can occur with coated paper and other types of media. The adjustment is a manual adjustment done on springs.]

Adjustment range

	R1	R2	R3	R4
Default Load	26 N	45 N		
Load Adjustment Possible (Hook 4 mm Distance)	-4.5 N		-9.5 N	1

A projection fixed in slot and attached to a spring shortens the length to roller can be lowered. There are four crease rollers. Springs at the front and rear ends of each roller can be adjusted.

2

Tray Full



A pair sensors are used to detect the tray full condition. At the start of every job:

- Tray full sensor (Emitter) [A] emits a signal to tray full sensor (Receptor) [B].
- As long as the signal remains unbroken the multi-folder will continue to operate and feed folded paper to the top of the unit [C].
- When the top of the stack grows high enough to interrupt the signal between the tray full sensors [D], this will signal the machine to shut down the line temporarily.
- After the operator removes the stack from the top tray, folding and paper exit will resume.

Electrical Components

Transport Sensors



Operation Sensors



Motors, Solenoids



Paper Transport Motors



1.	Horizontal Transport Motor	7.	2nd Fold Motor
2.	Top Tray Exit Motor	8.	1st Fold Motor
3.	Top Tray Transport Motor	9.	Fold Plate Motor
4.	Dynamic Roller Lift Motor	10.	Registration Roller Release Motor
5.	Crease Motor	11.	Dynamic Roller Transport Motor
6.	FM6 Pawl Motor	12.	Registration Roller Transport Motor

2

Fold Motors



1.	Entrance JG Motor
2.	Direct Send JG Motor
3.	Positioning Roller Motor
4.	Stopper 3 Motor
5.	Stopper 1 Motor
6.	Jogger Fence Motor
7.	Stopper 2 Motor

Motors, Solenoids Around the Top Tray



1.	Horizontal Transport Motor	
2.	Top Tray Exit Motor	
3.	Reverse JG Solenoid	
4.	Exit JG Solenoid	
5.	Top Tray Transport Motor	
6.	Entrance JG Solenoid	
7.	Top Tray JG Solenoid	

Motors, Sensors Top



1.	Dynamic Roller Lift Motor	
2.	Dynamic Roller Transport Motor	
3.	Dynamic Roller HP Sensor	
4.	Fold Plate Motor	
5.	Registration Sensor	

Motors, Sensors Bottom

1.

2.

3.

4.

5.

6.



Sensors Around Top Tray



1.	Top Tray Full Sensor (R)
2.	Entrance JG HP Sensor
3.	Top Tray Full Sensor (E)
4.	Top Tray Exit Sensor
5.	Top Tray Paper Path Sensor
6.	Entrance Sensor
7.	Horizontal Path Paper Sensor
8.	Vertical Path Paper Sensor
9.	Horizontal Path Exit Sensor

Fold Motors, Sensors, Solenoids



1.	Stopper 2 Motor	8.	Stopper 1 HP Sensor
2.	Stopper 2 HP Sensor	9.	Stopper 3 Paper Sensor
3.	Jogger Fence Motor	10.	Stopper 3 HP Sensor
4.	Stopper 2 Paper Sensor	11.	Stopper 3 Motor
5.	Stopper 1 Paper Sensor	12.	Positioning Roller Motor
6.	Positioning Roller HP Sensor	13.	Direct Send JG Motor
7.	Stopper 1 Motor	14.	LE Stop Pawl Solenoid



1.	Bypass Entrance Paper Sensor
2.	Bypass Exit Paper Sensor
3.	FM6 Pawl HP Sensor
4.	2nd Fold Motor
5.	FM6 Pawl Motor
6.	Bypass JG Solenoid
7.	Crease Motor

Boards, Switches, Fan



1.	Main Board
2.	Front Door Switch
3.	PSU
4.	PSU Fan
5.	Breaker Switch

Component List

Motors		
м	Entrance JG Motor	Operates the entrance junction that directs paper from the upstream device to the 1) horizontal paper path, 2) paper fold path, 3) top tray.

Motors		
м	Top Tray Transport Motor	Drives the transport rollers that feed unfolded paper to the downstream unit. Reverses and feeds folded paper to the folded paper tray.
м	Horizontal Transport Motor	Drives the entrance roller at the entrance where the paper from the upstream device is received. Drives the exit roller that feeds the paper out to the downstream unit. Drives other transport rollers in the horizontal paper path.
м	Top Tray Exit Motor	Drives the exit roller that feeds paper into the top tray.
м	1 st Fold Motor	Drives the 1st fold roller.
м	Jogger Fence Motor	Moves the jogger fence according to the width of the paper to align its edges.
м	Positioning Roller Motor	Operates the positioning roller when the paper strikes stopper 1 when more that one sheet of paper is stacked for folding.
м	Stopper 1 Motor	Moves Stopper 1 to the correct position for folding according to the paper size.
м	Fold Plate Motor	Operates the fold plate for the first fold during multi- sheet folding. Operates Stopper 1 1 during Z-folding.
м	Registration Roller Release Motor	Releases the pressure of the registration roller so paper can be stacked for multi-sheet folding.
м	Dynamic Roller Lift Motor	Raises and lowers the dynamic roller to the correct position for folding.
м	Stopper 2 Motor	Moves Stopper 2 to the correct position for folding according to the paper size.
м	Dynamic Roller Transport Motor	Drives the Dynamic roller.
м	Registration Roller Transport Motor	Drives the registration roller.
м	Direct-Send JG Motor	Operates the direct send junction gate to the Stopper 2.

Motors		
м	FM6 Pawl Motor	Drives the double-flap pawl that prevents bending of the leading edge when the 3rd fold is executed for FM6 folding (Fourths with 2 Flaps In)
м	Stopper 3 Motor	Moves Stopper 3 to the correct position for folding according to the paper size.
м	2nd Fold Motor	Drives 3rd fold roller. Reverses when the paper does not pass through the 3rd fold unit.
м	Crease Motor	Drives the crease rollers.

Sensors		
S	Top Tray Exit Sensor	Checks for the presence of paper at power on. Detects paper jams at the exit of the top tray. Used to create timing for control of paper fed to the top tray.
S	Entrance Sensor	Checks for the presence of paper at power on. Detects paper jams of paper fed from the upstream unit. Used to create timing for operation of the shift roller during multiple-sheet folding.
S	Entrance JG HP Sensor	Detects when the entrance junction gate is in and out of its home position.
S	Horizontal Path Paper Sensor	Checks for the presence of paper at power on.
S	Top Tray Paper Path Sensor	Checks for the presence of paper at power on. Also checks for jams during paper feed.
S	Top Tray Full Sensor (E)	Detects when the top tray is full.
S	Top Tray Full Sensor (R)	Detects when the top tray is full.
S	Horizontal Path Exit Sensor	Checks for the presence of paper at power on. Checks for paper jams when paper exits to the downstream unit. Used to create timing for paper exit to the downstream unit.
S	Vertical Path Paper Sensor	Checks for the presence of paper at power on.

Sensors		
S	Positioning Roller HP Sensor	Detects when the jog roller is in and out of its home position.
S	Stopper 1 Paper Sensor	Checks for the presence of paper at power on. Also checks for jams during paper feed. Detects the condition of the stacked sheets during multi- sheet folding.
S	Stopper 1 HP Sensor	Detects when Stopper 1 is in and out of its home position.
S	Jogger Fence HP Sensor Detects when jogger fence is in and out of it position.	
S	FM6 Pawl HP Sensor Detects when the FM! pawl is in and out o position.	
S	Registration Sensor	Checks for the presence of paper at power on. Also checks for jams during paper feed. Used to create timing for registration buckle adjustment during paper feed. Detects the condition of the stacked sheets during multi-sheet folding.
S	Registration Roller HP Sensor	Detects when registration roller is in and out of its home position.
S	Dynamic Roller HP Sensor	Detects when dynamic roller is in and out of its home position.
S	Fold Plate HP Sensor	Detects when the fold plate is in and out of its home position.
S	Direct-Send JG HP Sensor	Detects when the direct-send junction gate is in and out of its home position.
S	Stopper 2 Paper Sensor	Checks for the presence of paper at power on. Also checks for jams during paper feed. Used to create operation timing of the LE pawl solenoid.
S	Stopper 2 HP Sensor	Detects when Stopper 2 is in and out of its home position.
S	Bypass Exit Paper Sensor	Checks for the presence of paper at power on.
S	Bypass Entrance Paper Sensor	Checks for the presence of paper at power on.

Sensors		
S	Stopper 3 Paper Sensor	Checks for the presence of paper at power on. Also checks for jams during paper feed. Used to create the timing that operates the 2nd fold motor during FM6 folding
S	Stopper 3 HP Sensor	Detects when Stopper 3 is in and out of its home position.

Switches		
SW	Breaker Switch	-
SW	Front Door Switch (SW1)	Detects when the front door is opened or closed. When the front door is opened the interlock switch cuts off the 24V power supply.

Solenoids		
SOL	Top Tray JG Solenoid	Operates the junction gate that sends the paper to the top tray after the direction of the paper has been reversed up and out of the horizontal paper path.
SOL	Exit JG Solenoid	Operates the exit junction gate that directs paper from the multi-fold unit to the exit for the downstream unit or to the exit for the folded paper tray.
SOL	Reverse JG Solenoid	Operates the junction gate that opens the horizontal feed path to paper sent from the fold crease unit.
SOL	LE Stop Pawl Solenoid	Operates the pawl that prevents bending of the leading edge while the paper is being folded in the 2nd fold unit.
SOL	Bypass JG Solenoid	Operates the bypass junction gate which directs paper from the 2nd fold unit to either the bypass or the 3rd fold unit.

Boards		
РСВ	PSU	Supplies the 24V power for the operation of the motors and solenoids, and the 5V power for the main board and sensors.
РСВ	PSU Fan	Cools the PSU.

Boards		
РСВ	Main Board	Controls operation of the motors, solenoids, sensors, and interface with the main machine.