Gestetner LANIER RICOH savin

B070/B071

SERVICE MANUAL

001580MIU

RICOH GROUP COMPANIES

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LEGEND

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A3/DLT TRAY KIT (B331)

SEE SECTION B331 FOR DETAILED TABLE OF CONTENTS

LCT (B511)

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3000-SHEET BOOKLET FINISHER (B468)

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BYPASS-TRAY (B512)

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MISC. BOARDS (B580/B581/B596/B582/B609)

SEE SECTION B580/B581/B596/B582/B609 FOR DETAILED TABLE OF CONTENTS

⚠IMPORTANT SAFETY NOTICES

PREVENTION OF PHYSICAL INJURY

1. Before disassembling or assembling parts of the copier and peripherals, make sure that the copier power cord is unplugged.
2. The wall outlet should be near the copier and easily accessible.
3. Note that some components of the copier and the paper tray unit are supplied with electrical voltage even if the main power switch is turned off.
4. If any adjustment or operation check has to be made with exterior covers off or open while the main switch is turned on, keep hands away from electrified or mechanically driven components.
5. If the Start key is pressed before the copier completes the warm-up period (the Start key starts blinking red and green alternatively), keep hands away from the mechanical and the electrical components as the copier starts making copies as soon as the warm-up period is completed.
6. The inside and the metal parts of the fusing unit become extremely hot while the copier is operating. Be careful to avoid touching those components with your bare hands.

HEALTH SAFETY CONDITIONS

1. Never operate the copier without the ozone filters installed.
2. Always replace the ozone filters with the specified ones at the specified intervals.
3. Toner and developer are non-toxic, but if you get either of them in your eyes by accident, it may cause temporary eye discomfort. Try to remove with eye drops or flush with cold water as first aid. If unsuccessful, get medical attention.

OBSERVANCE OF ELECTRICAL SAFETY STANDARDS

1. The copier and its peripherals must be installed and maintained by a customer service representative who has completed the training course on those models.
2. The NVRAM on the controller board has a lithium battery which can explode if replaced incorrectly. Replace the NVRAM only with an identical type. However, the manufacturer recommends replacing the entire NVRAM, not just the battery. Never recharge or incinerate a used NVRAM battery. Dispose of a used NVRAM or NVRAM battery in accordance with local regulations.
3. The danger of explosion exists if the battery on the controller board is incorrectly replaced. Replace the battery only with the equivalent type recommended by the manufacturer. Discard the used controller board battery in accordance with the manufacturer's instructions and local regulations.

SAFETY AND ECOLOGICAL NOTES FOR DISPOSAL

1. Do not incinerate toner bottles or used toner. Toner dust may ignite suddenly when exposed to an open flame.
2. Dispose of used toner, developer, and organic photoconductors in accordance with local regulations. (These are non-toxic supplies.)
3. Dispose of replaced parts in accordance with local regulations.
4. When keeping used lithium batteries in order to dispose of them later, do not put more than 100 batteries per sealed box. Storing larger numbers or not sealing them apart may lead to chemical reactions and heat build-up.

LASER SAFETY

The Center for Devices and Radiological Health (CDRH) prohibits the repair of laser-based optical units in the field. The optical housing unit can only be repaired in a factory or at a location with the requisite equipment. The laser subsystem is replaceable in the field by a qualified Customer Engineer. The laser chassis is not repairable in the field. Customer engineers are therefore directed to return all chassis and laser subsystems to the factory or service depot when replacement of the optical subsystem is required.

⚠WARNING

Use of controls, or adjustment, or performance of procedures other than those specified in this manual may result in hazardous radiation exposure.

⚠WARNING

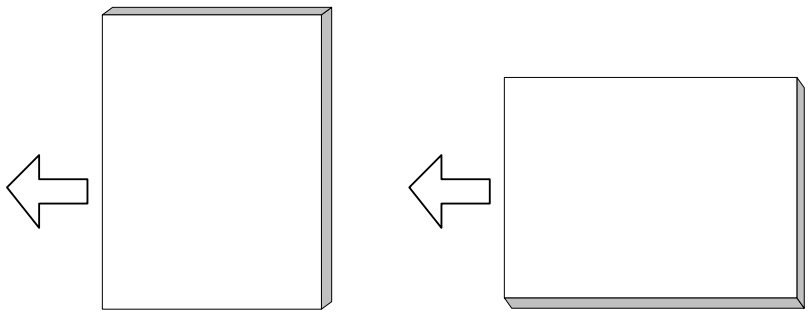
WARNING: Turn off the main switch before attempting any of the procedures in the Laser Unit section. Laser beams can seriously damage your eyes.

CAUTION MARKING:

Conventions in this Manual

This manual uses several symbols.

Symbol	What it means
☛	Refer to section number
CT	See Core Tech Manual for details
	Screw
	Connector
	E-ring
	Clip ring
NA	North America
EUR/A	Europe/Asia



LEF (Long Edge Feed) **SEF (Short Edge Feed)**

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PREVENTIVE MAINTENANCE — TAB POSITION 2

REPLACEMENT AND ADJUSTMENT — TAB POSITION 3
- LCT B511
  - MISC. BOARDS B580/B581/B596/B582/B609

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  3000-SHEET FINISHER B478

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  - COVER INTERPOSER TRAY B470

FIRMWARE HISTORY — TAB POSITION 8

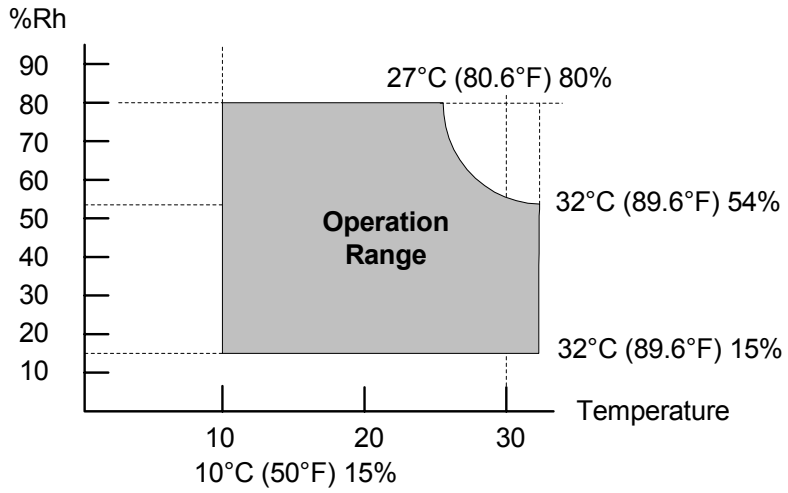
INSTALLATION

1. INSTALLATION PROCEDURES

1.1 INSTALLATION REQUIREMENTS

1.1.1 ENVIRONMENT

1. Temperature Range: 10°C to 32°C (50°F to 89.6°F)
2. Humidity Range: 15% to 80% RH



3. Ambient Illumination: Less than 1,500 lux (do not expose to direct sunlight or strong light)
4. Ventilation: Room air should turn over at least 3 times per hour
5. Ambient Dust: Less than 0.075 mg/m^3
6. If the place of installation is air-conditioned or heated, do not place the machine where it will be:
   1) Subjected to sudden temperature changes
   2) Directly exposed to cool air from an air-conditioner
   3) Directly exposed to heat from a heater
7. Do not place the machine where it will be exposed to corrosive gases.
8. Do not install the machine at any location over 2,000 m (6,500 feet) above sea level.

9. Place the copier on a strong and level base.
10. Do not place the machine where it may be subjected to strong vibrations.
11. Do not connect the machine to a power source shared with another electrical appliance.
12. The machine can generate an electrical field which could interfere with radio or television reception.

1.1.2 MACHINE LEVEL

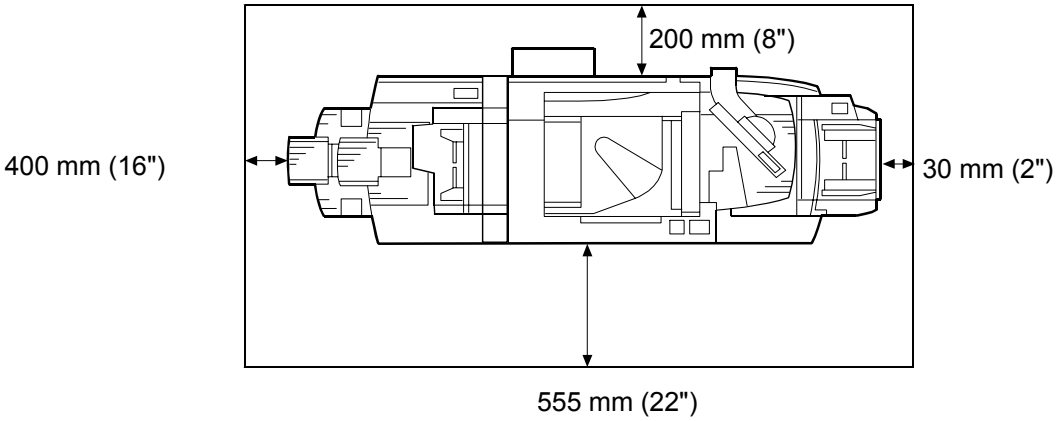
1. Front to back: Within 5 mm (0.2") of level
2. Right to left: Within 5 mm (0.2") of level

NOTE: The machine legs may be raised or lowered in order to level the machine. Set a carpenter's level on the exposure glass.

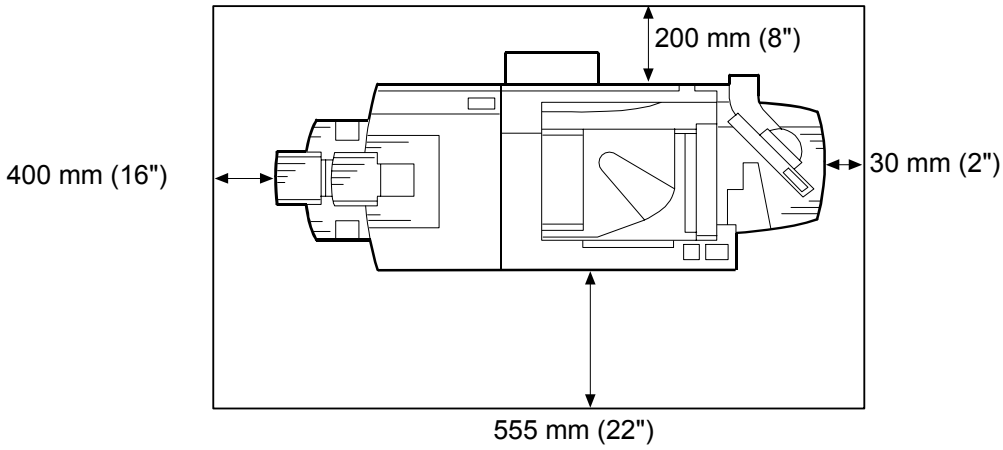
1.1.3 MINIMUM SPACE REQUIREMENTS

Place the copier near the power source, providing clearance as shown below. The same amount of clearance is necessary when optional equipment is installed.

Copier + Finisher + LCT + By-pass Tray



Copier + Finisher

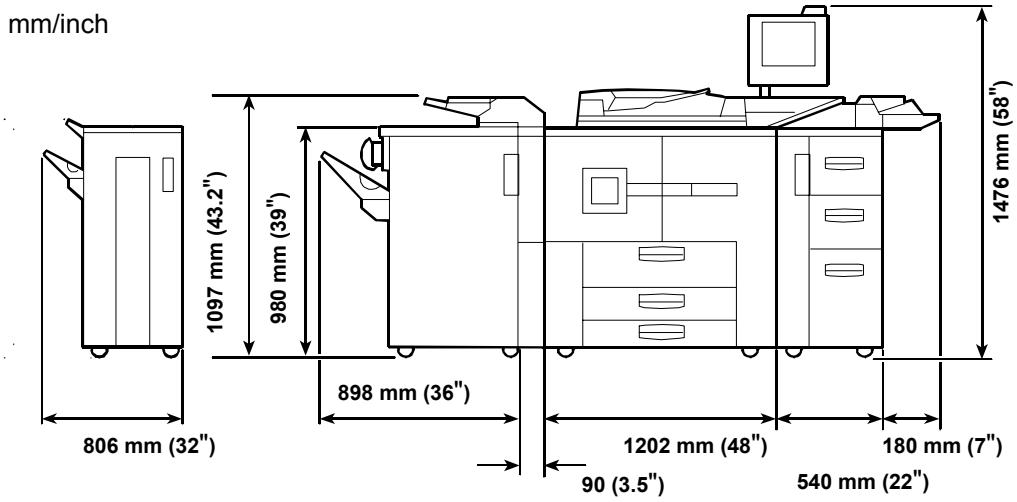


NOTE: The controller box door on the back of the machine swings open and can be removed. (☛1.2.3) Door removal is required only if the machine cannot pass through a narrow door.

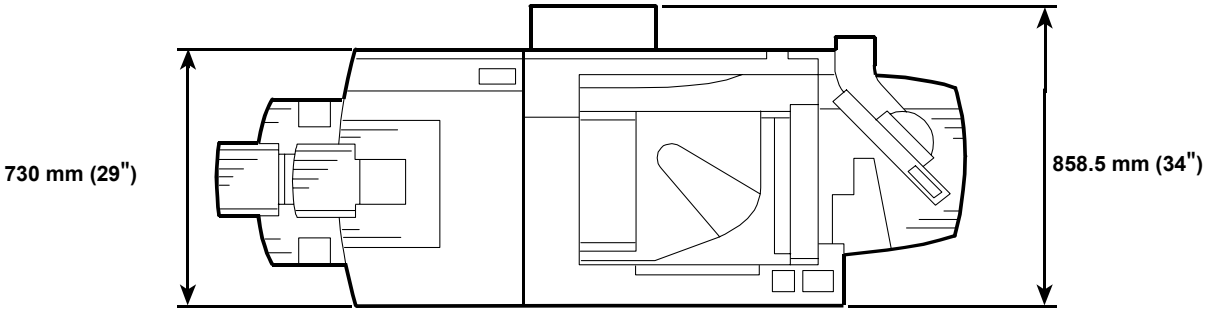
1.1.4 DIMENSIONS

Side View

Unit: mm/inch



Top View

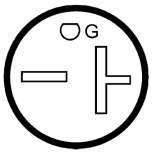


1.1.5 POWER REQUIREMENTS

⚠CAUTION

1. **Make sure that the wall outlet is near the main machine and easily accessible. Make sure the plug is firmly inserted in the outlet.**
2. **Avoid multi-wiring.**
3. **Be sure to ground the machine.**
4. **Never set anything on the power cord.**

Input voltage level:



NEMA 6-20R

North America:
208 to 240 V, 60 Hz: More than 20 A
Europe/Asia:
220 ~240 V, 50/60 Hz: More than 16 A

Note: For USA installations, standard 220V (+/-10%) wall voltage is acceptable.

⚠CAUTION

Never turn off the main power switch when the power LED is lit or flashing. To avoid damaging the hard disk or memory, press the operation power switch to switch the power off, wait for the power LED to go off, and then switch the main power switch off.

The Main Power LED (⏻) lights or flashes at the following times:

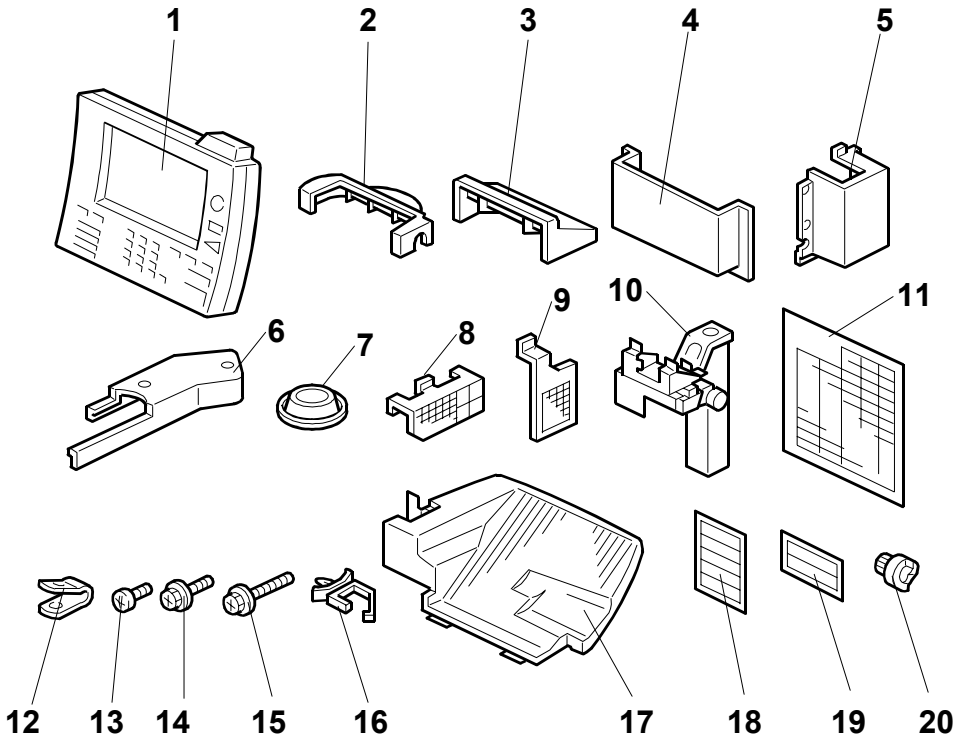
- While the platen cover or ADF is open
- While the main machine is communicating with the network server
- While the machine is accessing the hard disk or memory when reading or writing data.

There are two power switches on the machine:

- **Main Power Switch**.
  Located on the front left corner of the machine and covered by a plastic cover. This switch should always remain on unless the machine is being serviced.
- **Operation Power Switch**.
  Located on the right side of the operation panel. This is the switch normally used by the customer to power the machine on and off.

1.2 COPIER (B070/B071)

1.2.1 ACCESSORIES



Check the quantity and condition of the accessories in the box against the following list:

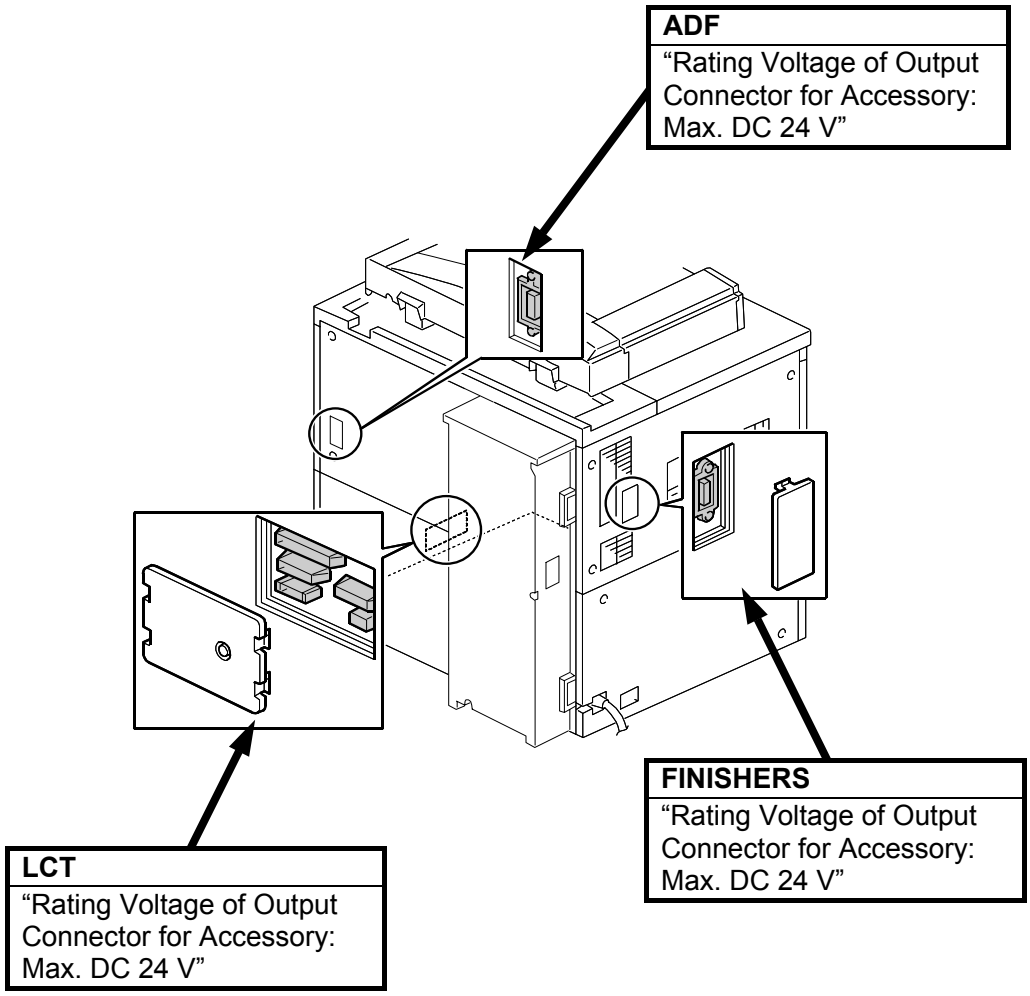
Description	Q'ty
1. Operation Panel	1
2. Lower Cover - Operation Unit Holder	1
3. Upper Cover - Operation Unit Holder	1
4. Operating Instruction Holder	1
5. Right Arm Cover	1
6. Operation Unit Arm	1
7. Leveling Shoes	4
8. Optics Dust Filter	1
9. Dust Filter	1
10. Operation Panel Unit Arm	1
11. Paper Size Decals	1
12. Metal Cable Clamp	1
13. Tapping Screw - M4 x 12	2
14. Philips Pan Head Screw - M4 x 6	1
15. Tapping Screw - M4 x 8	25
16. Nylon Harness Clamp	1
17. ADF Exit Tray	1
18. Paper Size Decals	1
19. Paper Loading Decals	1
20. Toner Hopper Drive Gear (White)	1
Model Name Plate (-10, -15, -22 machines) – not shown	1
Operating Instructions – not shown	1

1.2.2 INSTALLATION

⚠CAUTION

Rating Voltage for Peripherals

Make sure to plug the cables into the correct sockets.

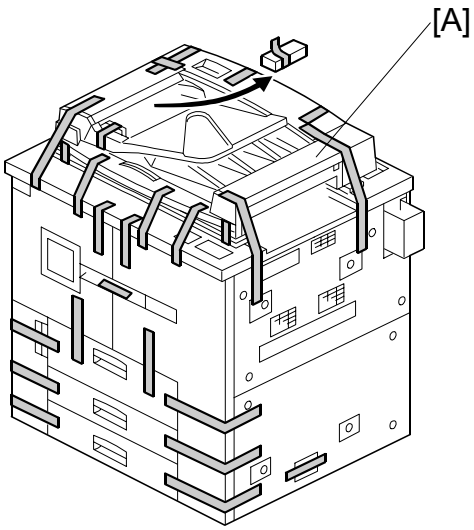


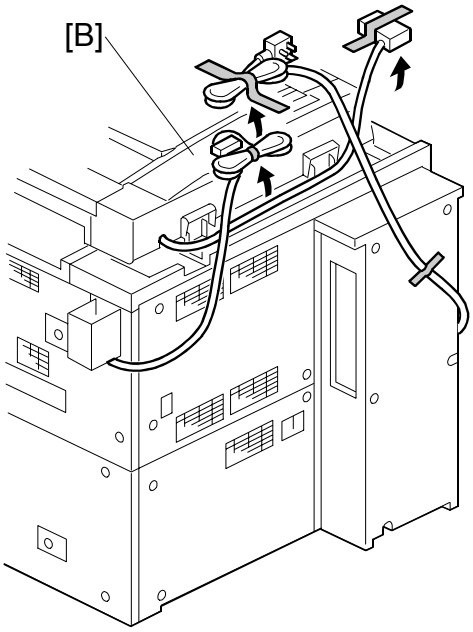
External Tape and Retainers

The installation procedure is not packed with the copier. Always bring this service manual with you.

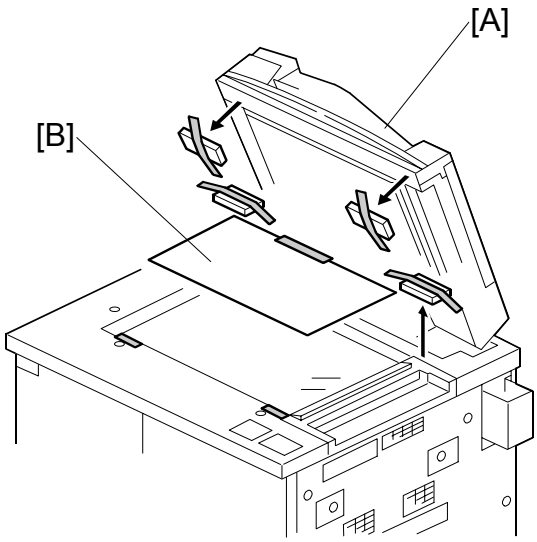
⚠CAUTION

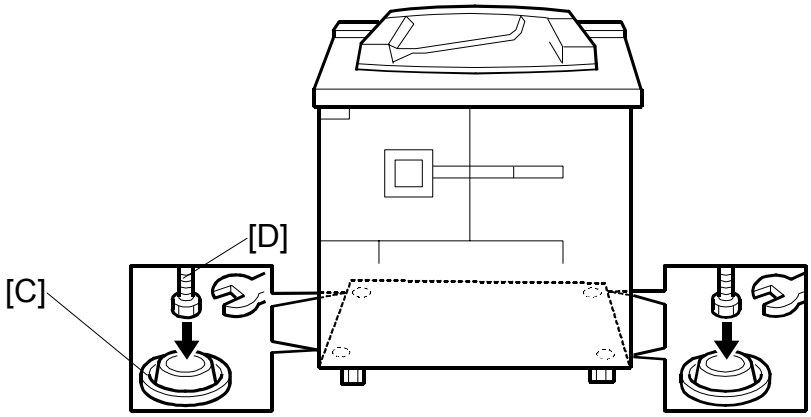
Before performing the following procedures, make sure that the machine is unplugged from the power source.





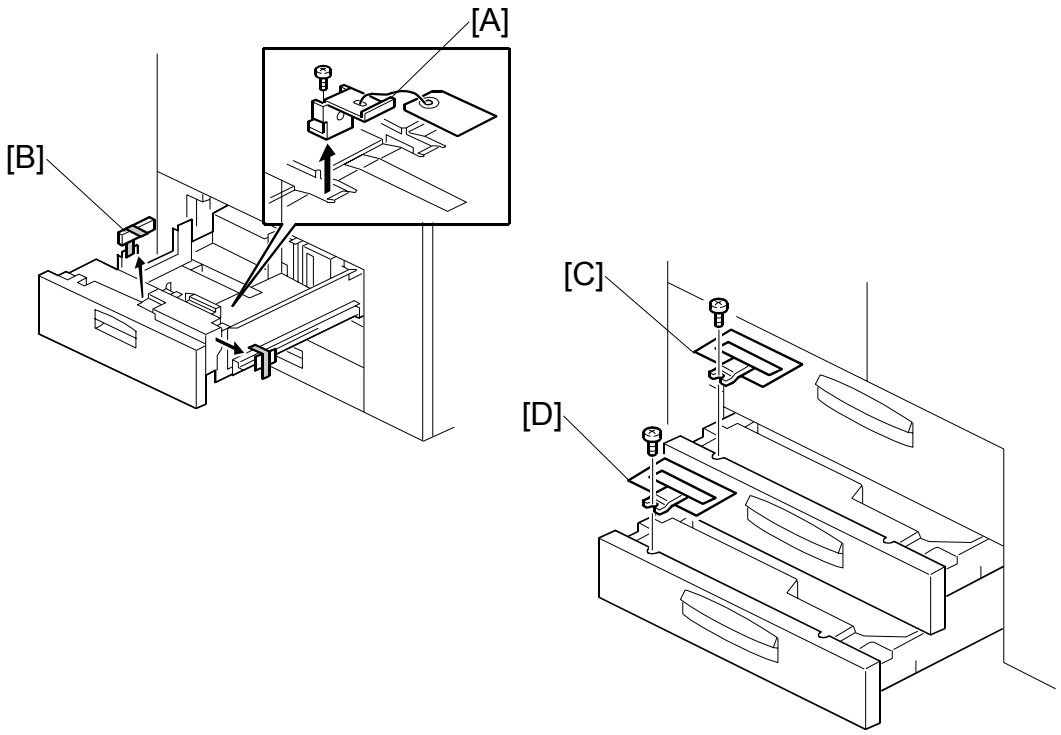
1. Remove all tape from the exterior [A].
2. Remove the tape and retainers from the power cord and cables [B].
   NOTE: Keep the shipping retainers after installing the machine. They can be reused if the machine is moved to another location in the future.



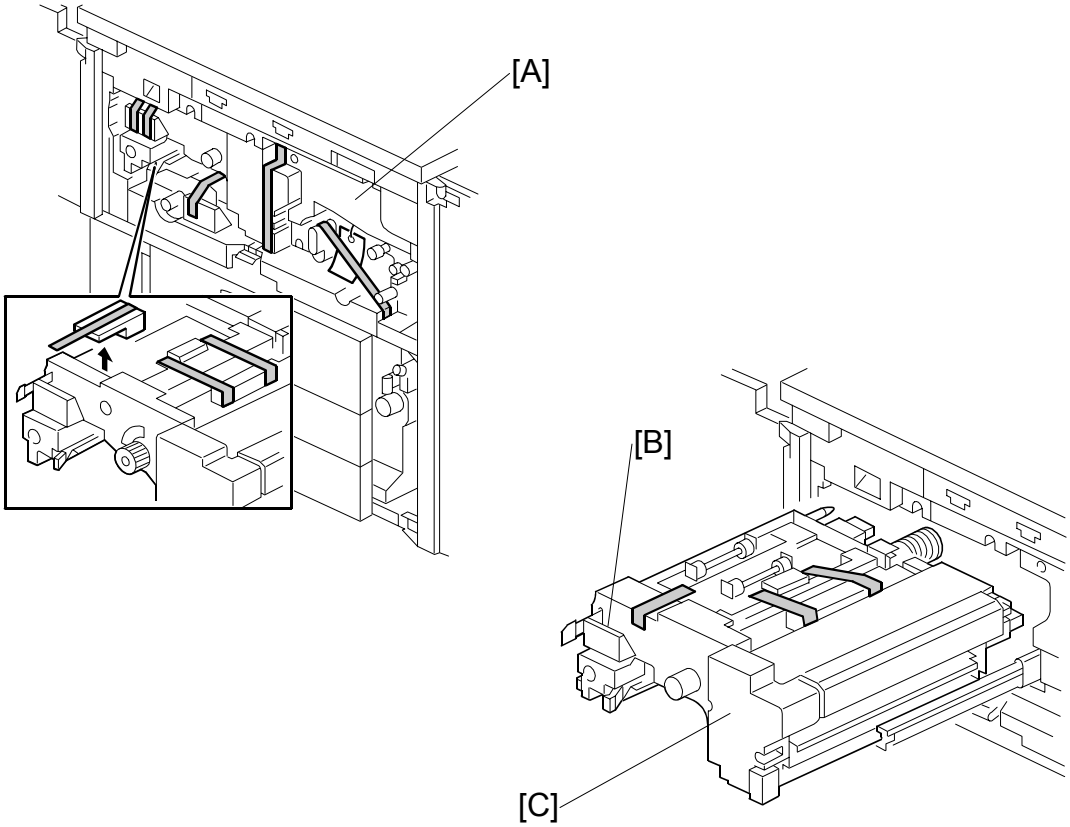


3. Remove all tape and retainers from under the ADF [A].
4. Remove A3 paper [B].
5. Set the leveling shoes [C] (x 4) under the feet [D], then level the machine.

Internal Tape and Retainers

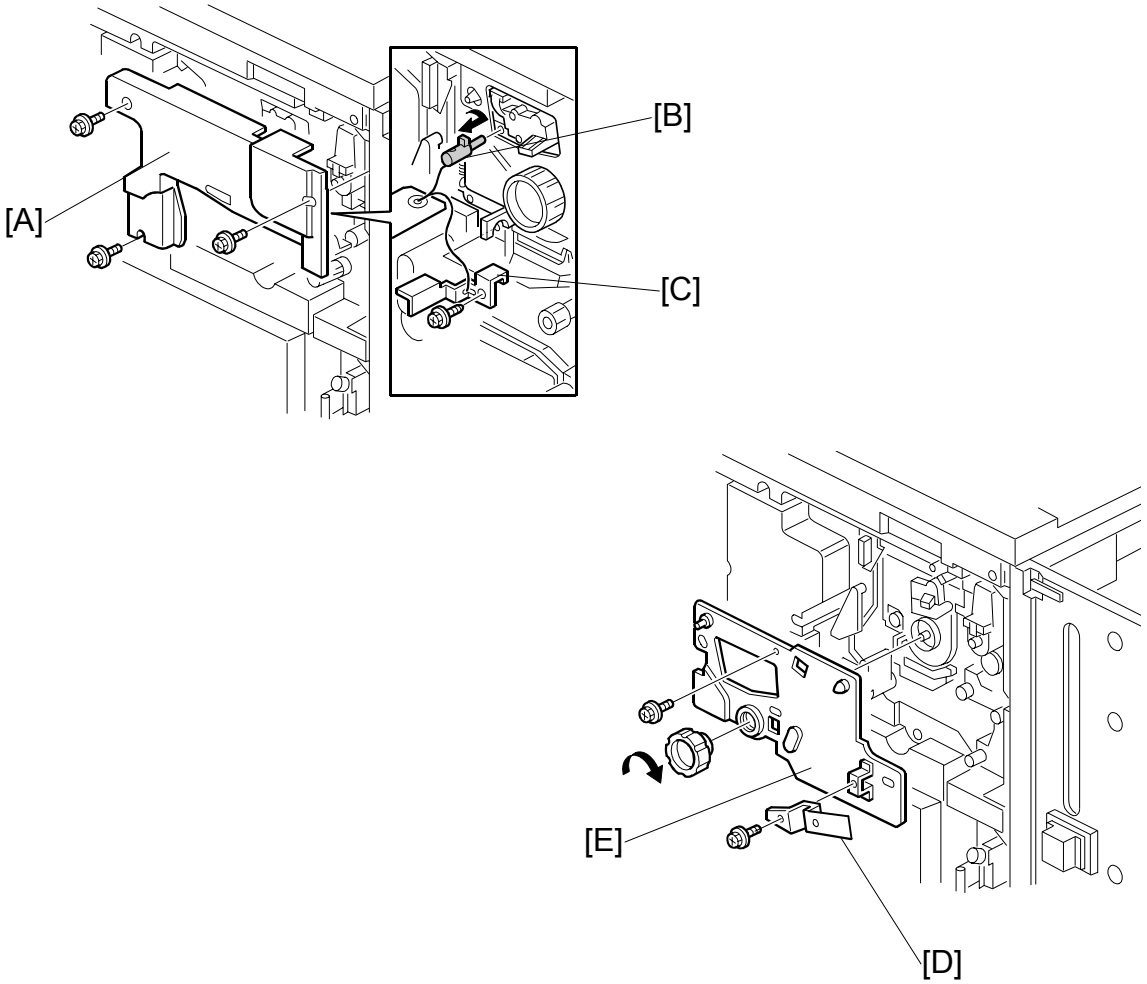


1. Pull out the tandem tray (1st tray), remove the tray lock plate [A] (x 1) and remove the cushion [B].
2. Pull out the 2nd tray and remove the lock plate [C] (x 1).
   NOTE: Be sure the re-attach the screw to the same hole. Do not discard the screw.
3. Pull out the 3rd tray and remove the lock plate [D] (x 1).
   NOTE: Be sure the re-attach the screw to the same hole. Do not discard the screw.

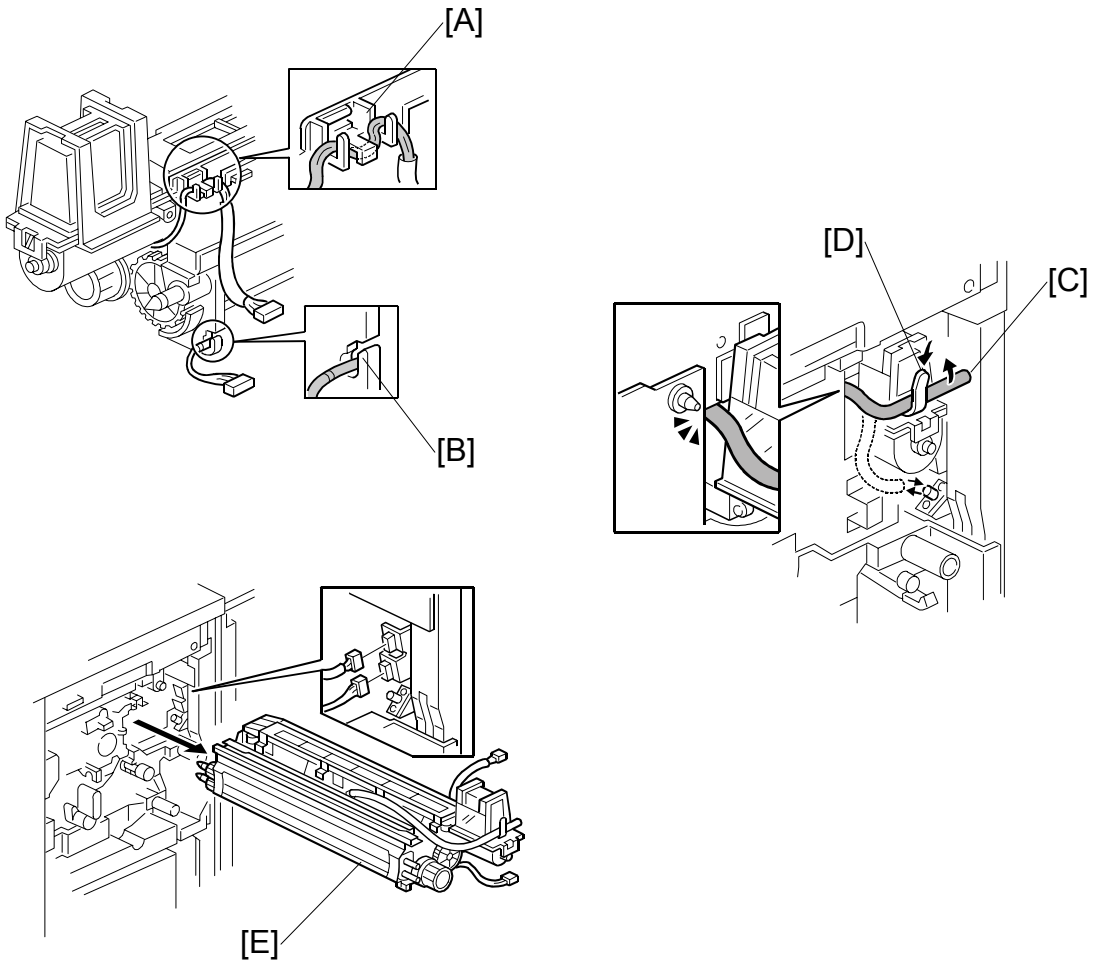


4. Open the front doors and remove all visible tape and retainers from inside the machine [A].
5. Press down lever D2 [B], pull out the fusing unit [C], and remove all tape and retainers from the fusing unit.

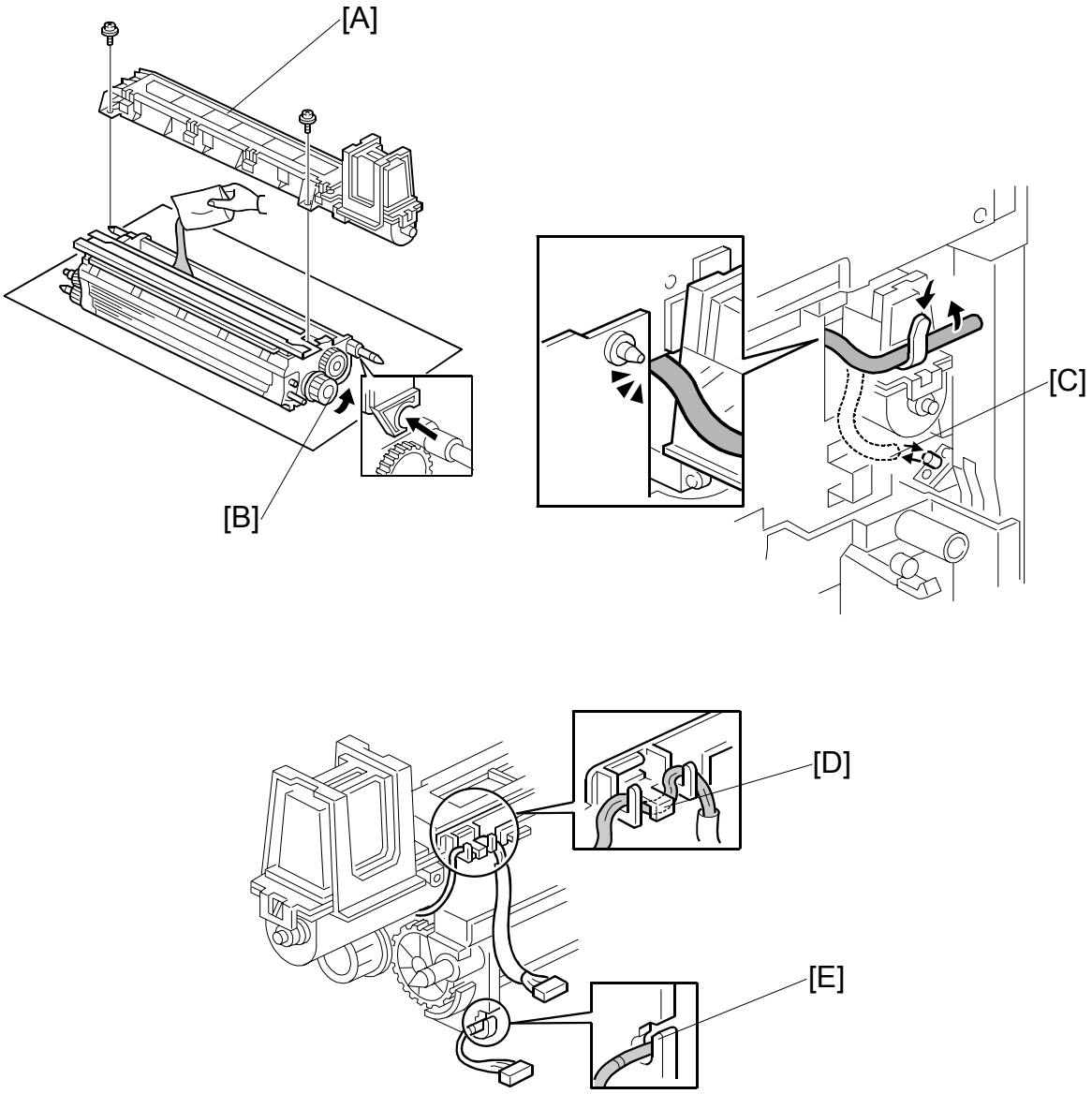
Developer



1. Remove the inner cover [A] (☞ x 3).
2. Rotate the blade release pin [B] clockwise and remove it.
3. Remove the transfer belt lock plate [C] (☞ x 1).
4. Remove the development unit support plate [D].
5. Remove the drum plate [E] (☞ x 1, knob x 1).

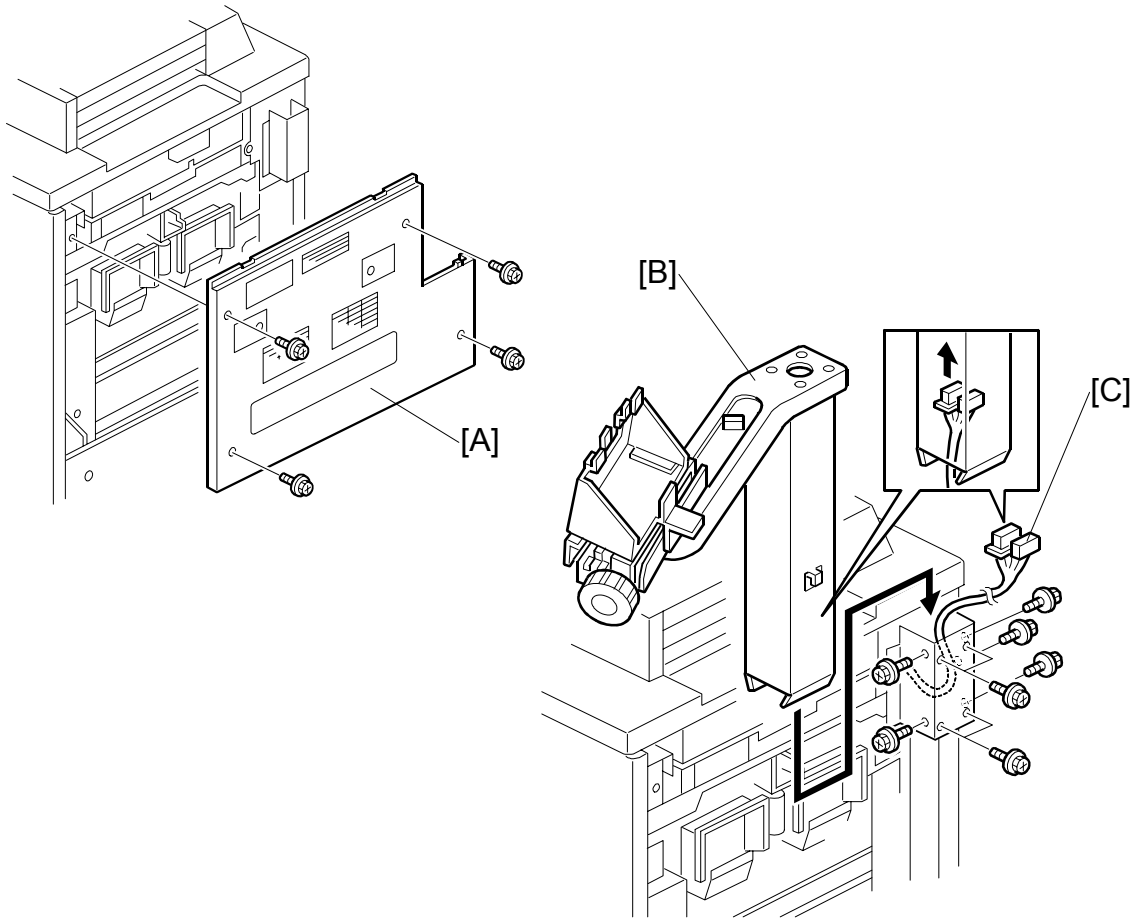


6. Separate the upper connector [A] from the frame then disconnect it.
7. Separate the lower connector [B] from the frame then disconnect it.
8. Disconnect the suction hose [C] and set it on the hook [D] to prevent toner leakage.
9. Pull out the development unit [E] (☞ x 2).
   NOTE: To prevent scratching the drum, push the development unit slightly to the right when pulling it out, and do not pull on the knob.
10. Place the development unit on a clean sheet of paper to prevent foreign matter from being attracted to the sleeve rollers.

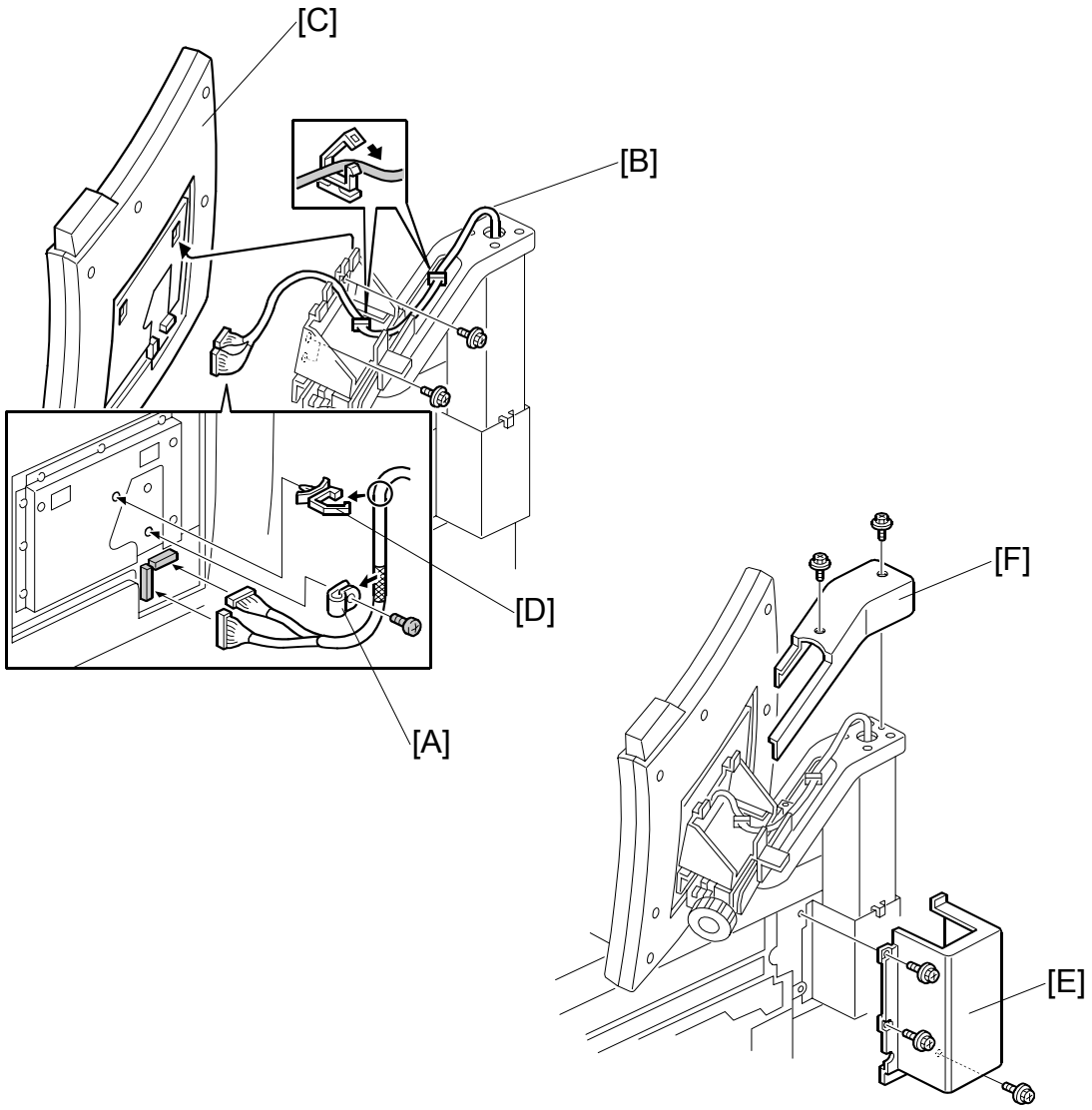


11. Remove the toner hopper [A] (x 2).
12. Pour in one pack of developer while turning the knob [B]. Distribute the developer evenly along the length of the roller.
13. When re-installing the development unit, confirm that:
    - All connectors are re-connected.
    - The suction hose [C] is re-connected to the development unit.
    - The connector cables are re-attached at [D] and [E].

Operation Panel and Display

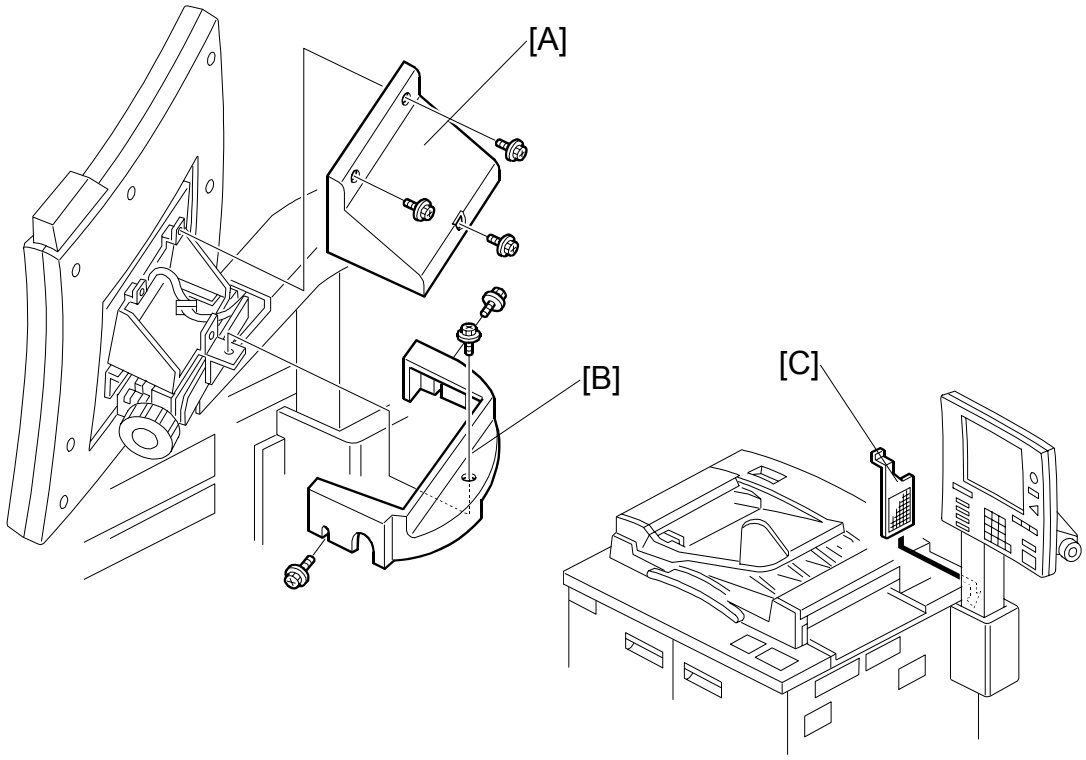


1. Remove the right upper cover [A] (x 4).
2. Pass the harness through the operation unit arm [B], and install the arm (x 2, x 9).
3. Pass the operation unit cable [C] through the support arm and connect it. (x 2).

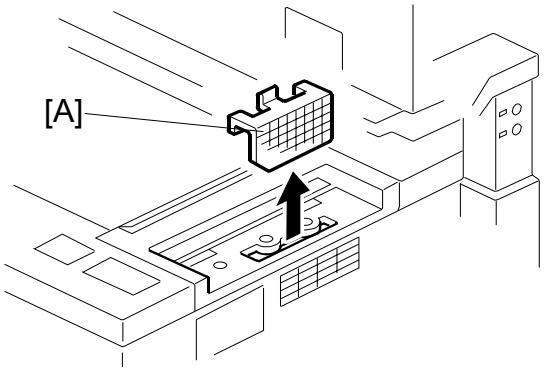


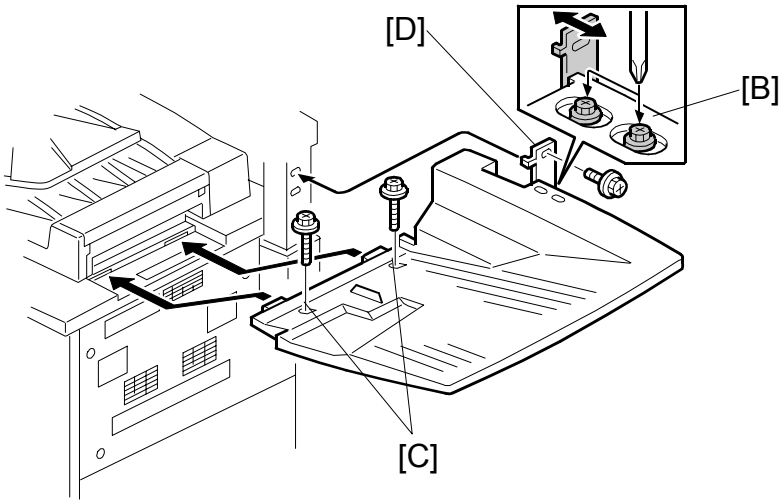
4. Secure the harness clamp [A] on the operation unit (x 1, M4 x 6 brass pan head).
5. Pass the harness [B] through the clamps.
6. Install the operation panel [C] on the arm (x 2, x 4).
7. Set the nylon clamp [D].
8. Install the right arm cover [E] (x 3).
9. Install the arm upper cover [F] (x 2).

Filters and Original Exit Tray



1. Install the upper cover [A] (☞ x 3)
2. Install the lower cover [B] (☞ x 3).
3. Set the dust filter [C].
4. Loosen the bottom knob, adjust the view angle of the operation panel, then tighten the knob.
5. Loosen the side knob, adjust the tilt of the operation panel, then tighten the knob.





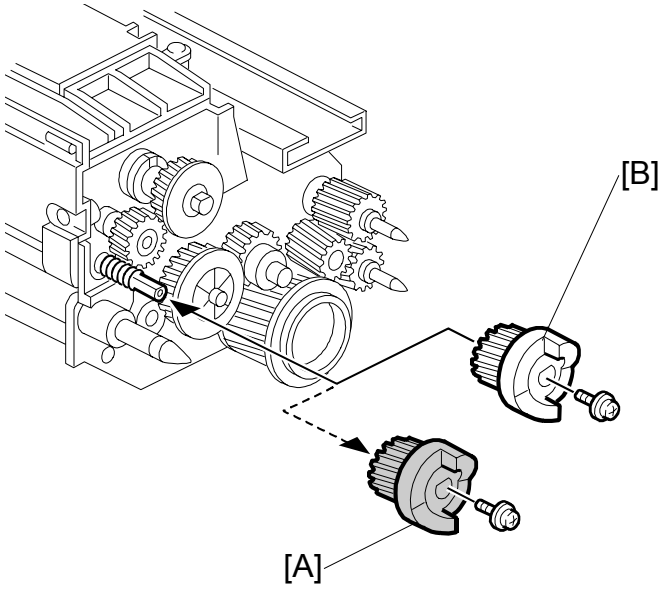
6. Set the optics dust filter [A].
7. Loosen the two screws of the bracket [B].
8. Attach the original exit tray at [C] (🔩 x 2, M4 x 12) and [D] (🔩 x 1, M 4 x 8)
   NOTE: To prevent damage to moving parts inside the machine, never use these long screws (M4 x 12) to fasten any exterior cover.
9. Re-tighten the screws of the bracket [B] (🔩 x 1).
10. Re-attach the right upper cover (🔩 x 4).
11. Remove the tape from the operating instructions holder and attach it to one of the front doors.
12. At the back of the machine, connect the ADF to the copier body.
13. Plug in the power cord, turn the main switch on, then follow the instructions printed on the inside cover of the front door to install the toner bottles.

⟹ *Initializing Developer Supply*

1. When the machine is ready, enter SP mode:
   1) Press C/⊘.
   2) Enter “107”.
   3) Hold down C/⊘ for more than 3 seconds.
2. Press “Copy SP” on the LCD, and perform the TD initial setting:
   1) Select SP2801 (TD Sensor Initial Setting)
⟹ 2) Use the keys displayed on the screen and the numeric keys on the LCD to enter the developer Lot No., then press #.
   NOTE: The Lot No. is embossed on the top edge of the developer packet.
   3) Press “Execute” on the LCD.
   NOTE: This executes the TD initial setting. After about 1 minute, “Completed” is displayed on the screen, and the execution stops automatically.
3. Start to supply toner from the toner bank to the toner hopper:
   1) Select SP2207 002 (Toner Bank Toner Setup).
   2) Press the “Start key” on the LCD.

   This procedure supplies toner to the toner hopper and the toner transport path. It will stop automatically in about 7 minutes. If SP2207 002 fails after SP2801 is completed (an SC code is displayed), repeat only SP2207 002.
4. Execute SP2962 (Auto Process Control Execution).
   NOTE: In step 1, if you enter SP mode immediately after switching the machine on, the system will not execute process control automatically. To ensure that process control calibrates its settings, use this SP to execute process control manually.

Replacing the Joint Gear



1. Switch the copier off and disconnect it from its power source.
2. Remove the development unit.
3. At the back of the toner hopper unit, remove red Joint Gear 15Z [A] and replace it with the white gear [B] provided in the accessory bag.
   NOTE: The red gear is designed to supply toner to the toner hopper only (toner is not supplied to the development roller below).The white gear must be installed in order to supply toner to the development roller below for normal operation.

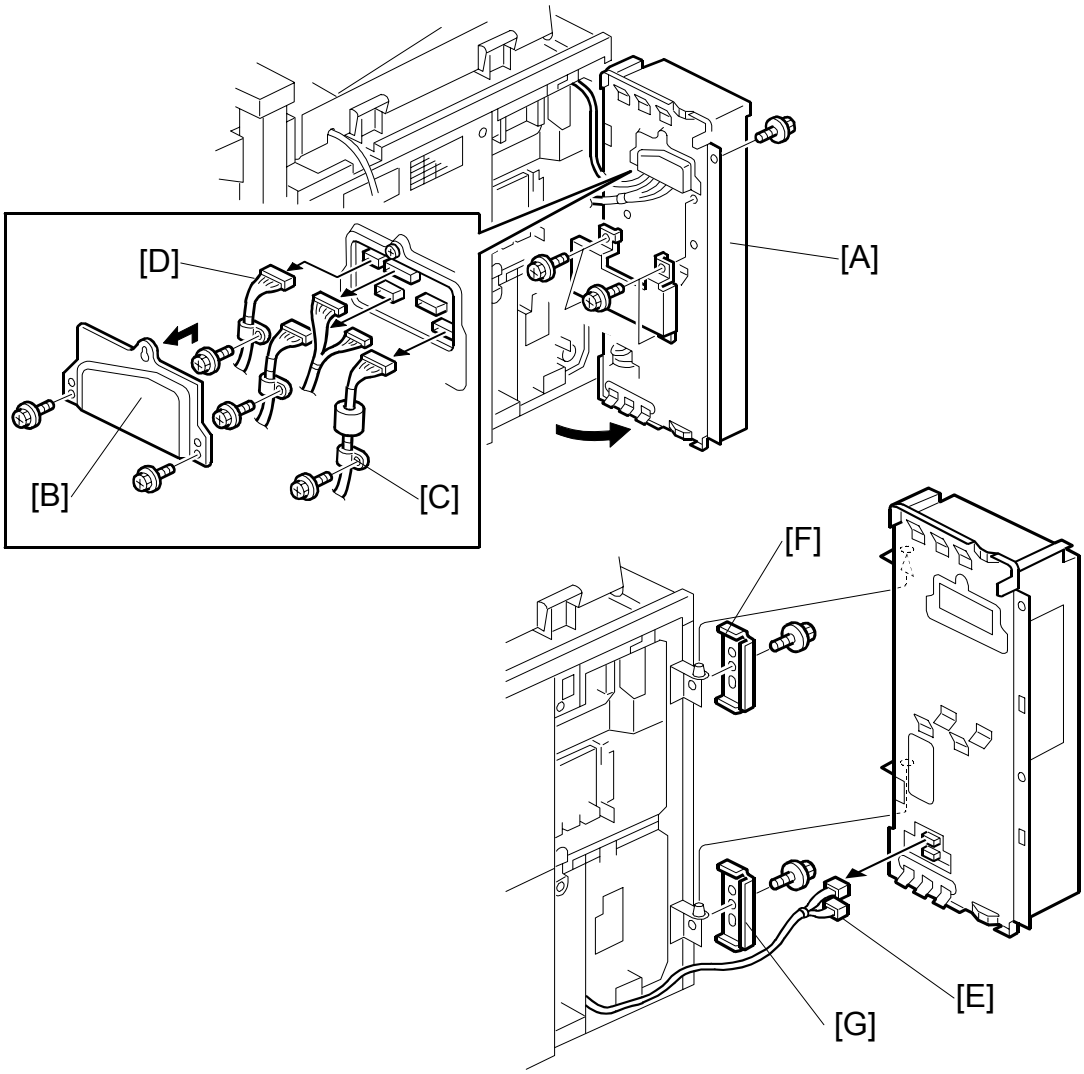
⚠CAUTION
Save the red gear. If the toner hopper is removed at any time and must be refilled with toner again, you must swap the white gear for the red gear, execute SP2207 002, and then remove the red gear and re-install the white gear for normal operation.

Completing the Installation

1. Set the required paper sizes for all paper trays.
   - Tray 1: Use SP5019 002 (Tray Paper Size Selection – 1st Tray)
   - Trays 2 and 3: Use the paper size dial
   - LCT, top two trays, bypass tray, and cover interposer: Position the fences correctly
   - LCT, bottom tray: Use SP5019 007 (Tray Paper Size Selection – 6th Tray)
2. Attach the appropriate paper size decal to each tray (decals are provided in the accessories bag).
3. Attach the face-up decal to the ADF.
4. Check copy quality and machine operation.
   NOTE: The first time the ADF is used, dust on the ADF transport belt will transfer to the exposure glass. To remove this dust, perform SP6008-3 (DF Output Check) for 3 minutes, then check the exposure glass for dust and remove it.
5. Initialize the electrical total counter with SP7825 (Total Counter Clear).
6. Input the supply name with SP5841 (Supply Name Settings) 001 (Toner), 005 Staples), and 006 (Staple Bind (for booklet staples).
7. Install the stamp data (SP5853).(☛5.10.5)

1.2.3 CONTROLLER BOX DOOR REMOVAL

NOTE: Do this procedure only if the machine is too large to pass through a narrow door or passageway.



1. Remove the lock screw [A] (x 1) and swing the door open.
2. Remove the connector plate [B].
3. Remove the clamps [C] (x 2).
4. Disconnect the upper connectors [D] (x 7).
5. Disconnect the lower connectors [E] (x 2).
6. Remove the upper hinge cover [F] (x 1).
7. Remove the lower hinge cover [G] (x 1).
8. Lift the door off the hinges and remove it.

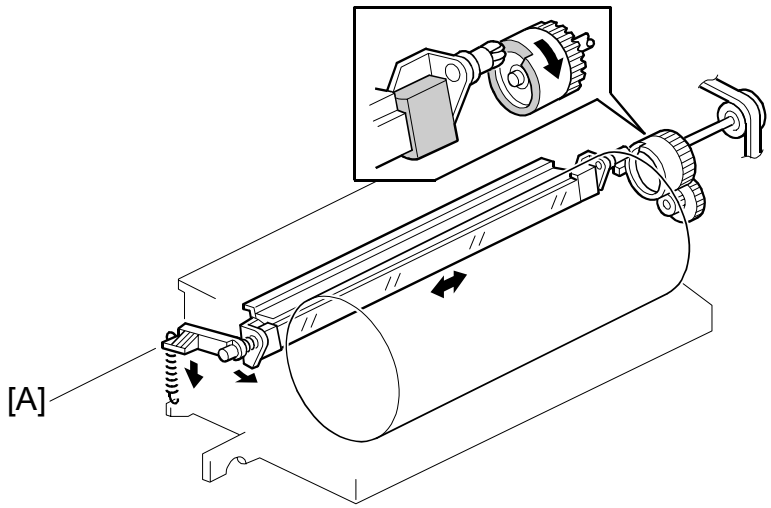
1.2.4 TRANSPORTING THE COPIER

To prevent blockages in the toner supply path, always follow the procedure below before transporting the copier. If this procedure is not done, SC592 (Toner Bank Motor Error) or SC495 (Toner Bottle Unit Error) may be displayed, requiring replacement of the toner transport hose and screw.

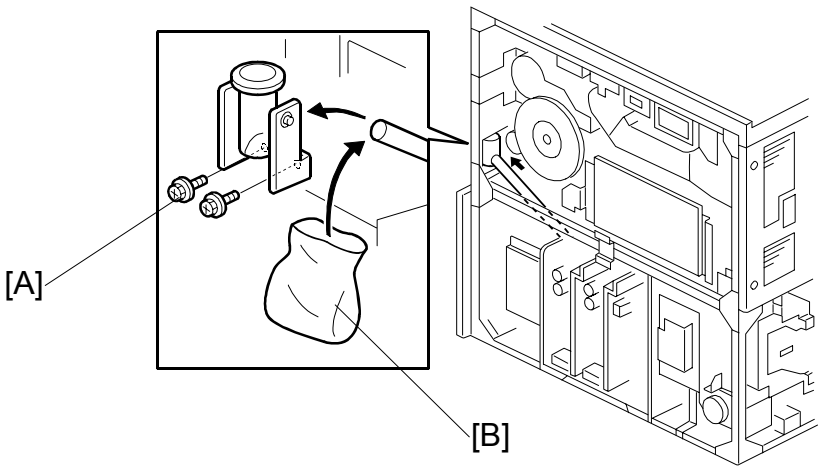
⚠CAUTION

To prevent damaging the toner supply coil inside the toner hose, never bend the toner hose. If the coil is bent, SC592 will be displayed and the hose must be replaced.

Before Moving the Copier



1. To prevent cleaning blade deformation during transportation, lock the release lever [A] in the up position.



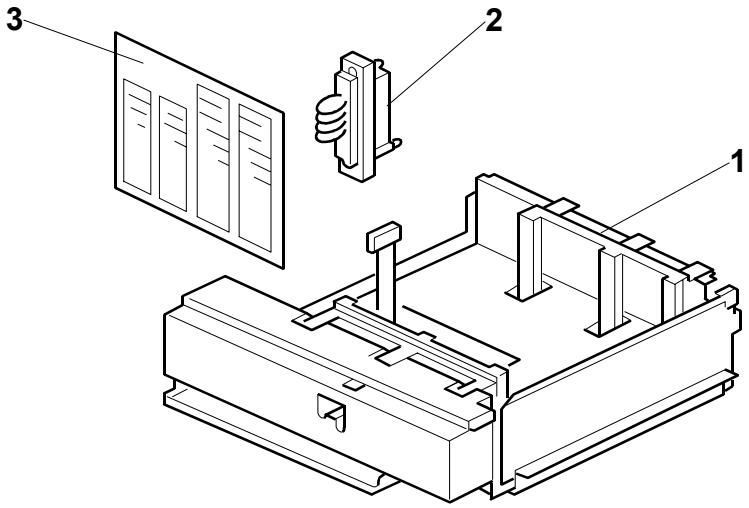
2. Use SP5804 097 (Upper Bottle) and SP5804 098 (Lower Bottle) to close the toner caps, then remove the toner bottles from the bank.
3. Remove the rear upper and rear lower covers.
4. Remove the left upper cover, left lower cover, and right upper cover.
5. Remove the two screws [A] securing the toner supply cylinder.
6. Cover the end of the toner transport coil tube [B] with a plastic bag.
7. Execute SP5804 070 (Output Check – Toner Bank Motor) and SP5804 071 (Output Check – Toner Supply Coil Clutch) to actuate the toner bank motor and toner supply coil clutch for 2 minutes and remove all toner in the supply hose.
8. Re-install all removed parts except the toner bottles.
9. Make sure that three tubes are connected to the toner supply cylinder when putting it back.

After Moving the Copier

1. Load the toner bottles in the toner bank.
2. Remove the right upper cover.
3. Open the cylinder top cover, clean the inner surface of the cylinder with a cloth, then close the cover.
4. Execute SP5804 070 (Output Check – Toner Bank Motor) to switch on the toner supply motor.
5. Execute SP5804 068 (Output Check – Upper Toner Bottle Motor) and SP5804 069 (Output Check – Lower Toner Bottle Motor) to switch on the bottle motors for about 5 to 6 seconds.
   NOTE: To prevent toner overflow in the toner entrance tank, do not execute these SP commands for longer than 5 to 6 seconds.
6. Execute SP5804 071 (Output Check – Toner Supply Coil Clutch) to switch on the toner supply coil clutch. 50 to 60 seconds later, toner is supplied to the toner supply cylinder. Make sure that toner is properly supplied to the cylinder.
7. Execute SP5804 071 and SP5804 070 to switch off the toner supply coil clutch and toner supply motor.
8. Re-install all removed parts.
9. Move the drum cleaning blade lever down away from the shipping position.

1.3 A3/DLT TRAY KIT (B331)

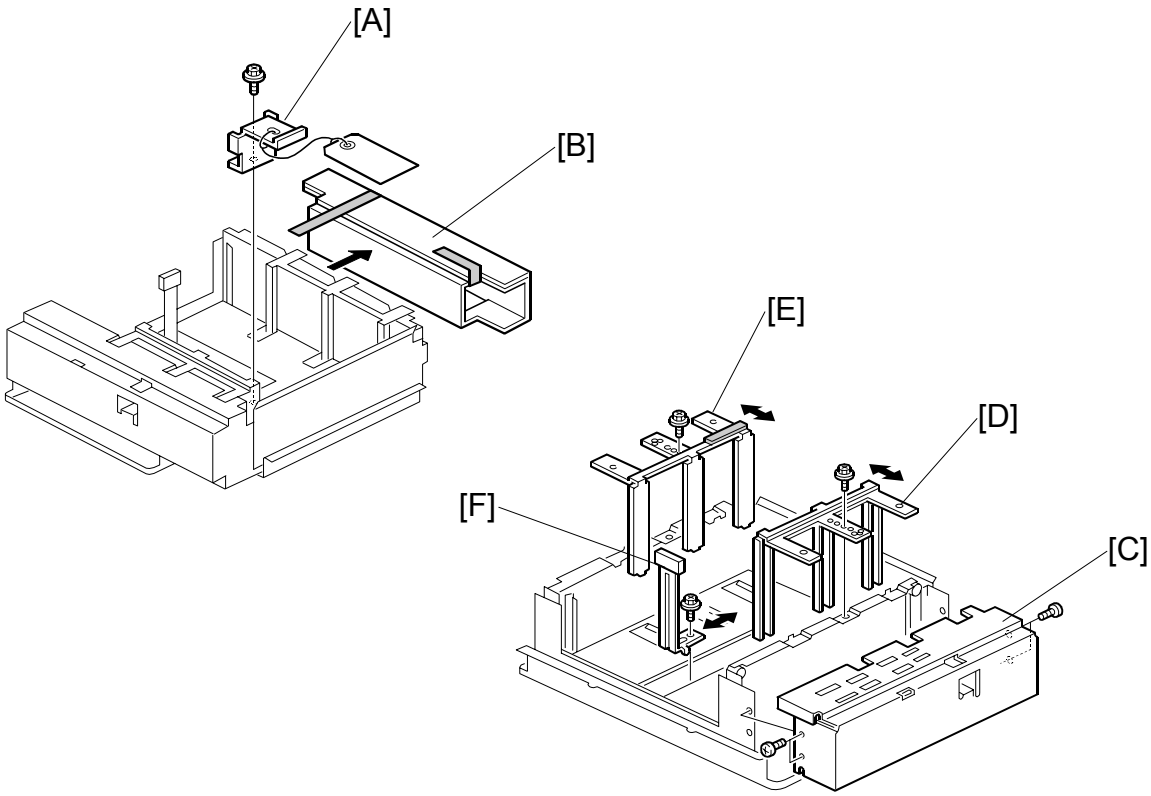
1.3.1 ACCESSORIES



Check the quantity and condition of the accessories in the box against the following list:

Description	Q'ty
1. A3/DLT Tray	1
2. Short Connector	1
3. Paper Size Decal	1

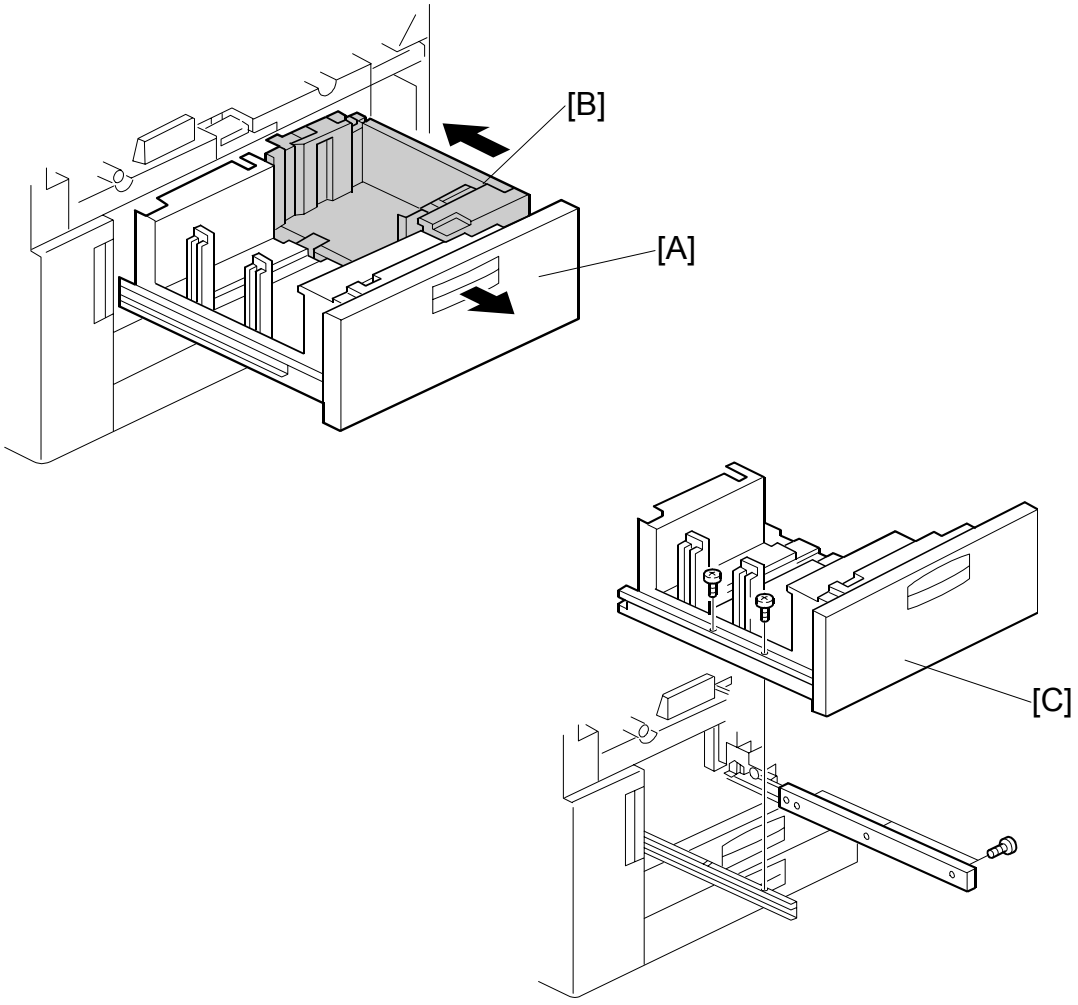
1.3.2 INSTALLATION



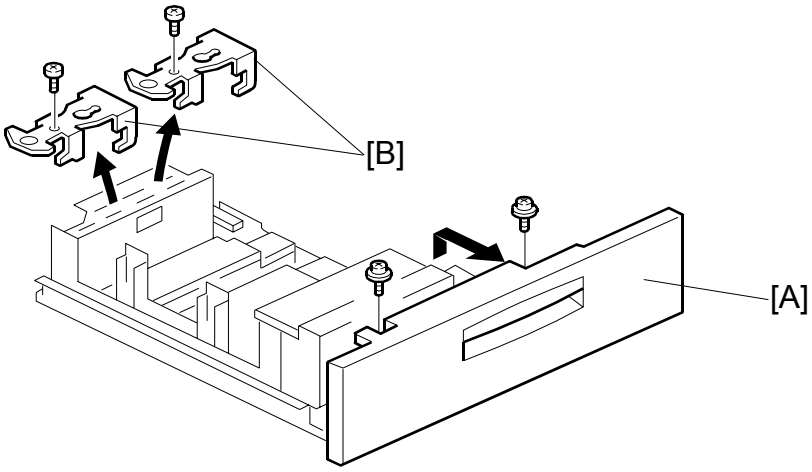
⚠CAUTION

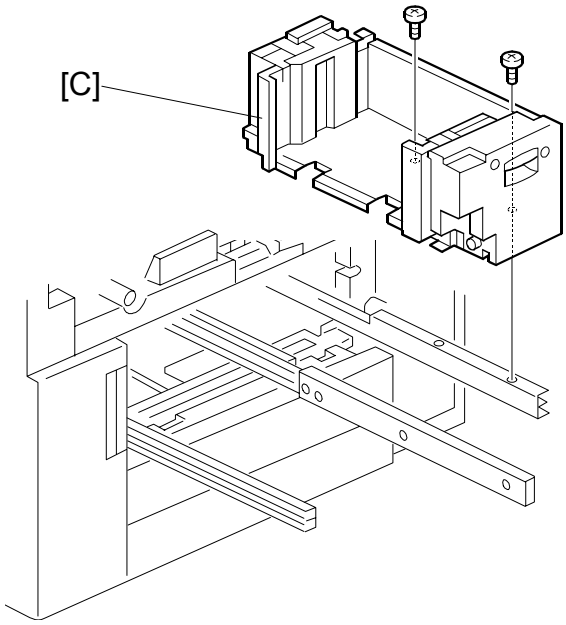
Switch the machine off and unplug it from the power source before starting the following procedure.

1. Remove the shipping material [A] and metal retainer [B] (🔩 x 1).
2. Check the position of the front and back side fences and make sure that they are set for DLT or A3.
3. If you need to adjust the positions of the side fences for the paper to be loaded in the tray, remove the front panel [C] (🔩 x 4).
4. Remove the fences and adjust their positions for the paper to be loaded: front fence [D] (🔩 x 1), back fence [E] (🔩 x 1), and end fence [F] (🔩 x 1)

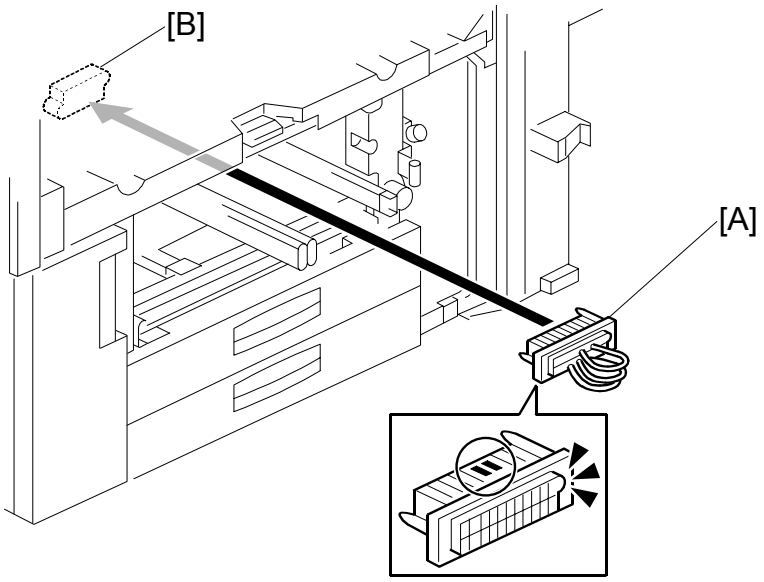


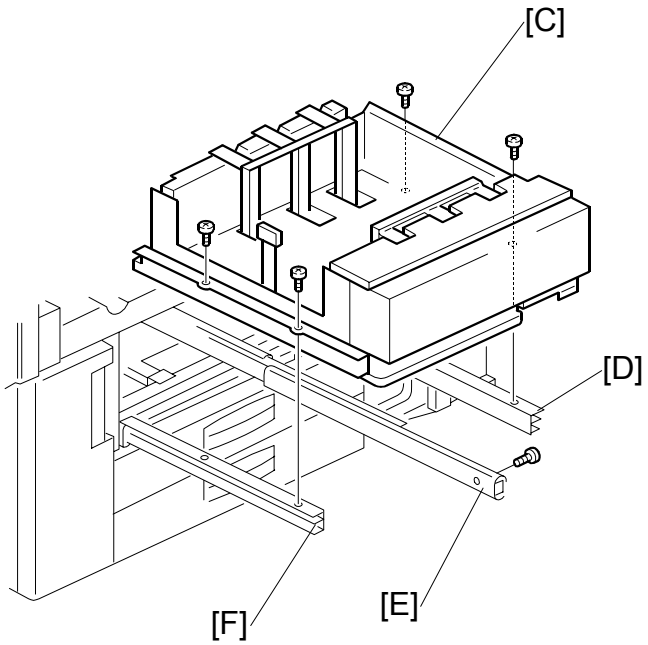
5. Open the front doors.
6. Pull out the tandem feed tray [A] completely.
7. Push the right tandem tray [B] into the machine.
8. Remove the left tandem tray [C] (x 2 left, x 3 right).



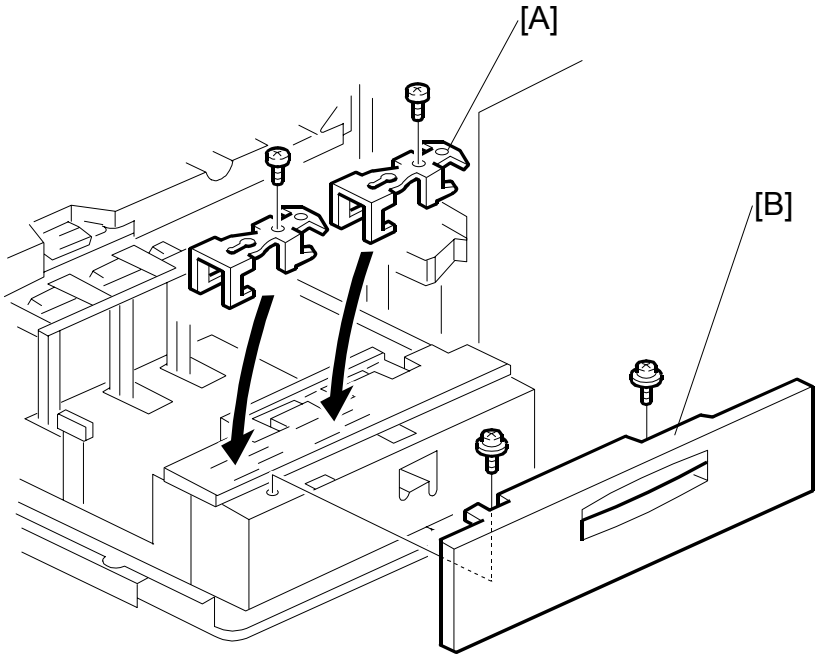


9. From the left tandem tray, remove the front cover [A] (☞ x 2).
10. Remove the safety switch holders [B] (☞ x 2).
11. Pull out the right tandem tray [C] then remove it. (☞ x 2).





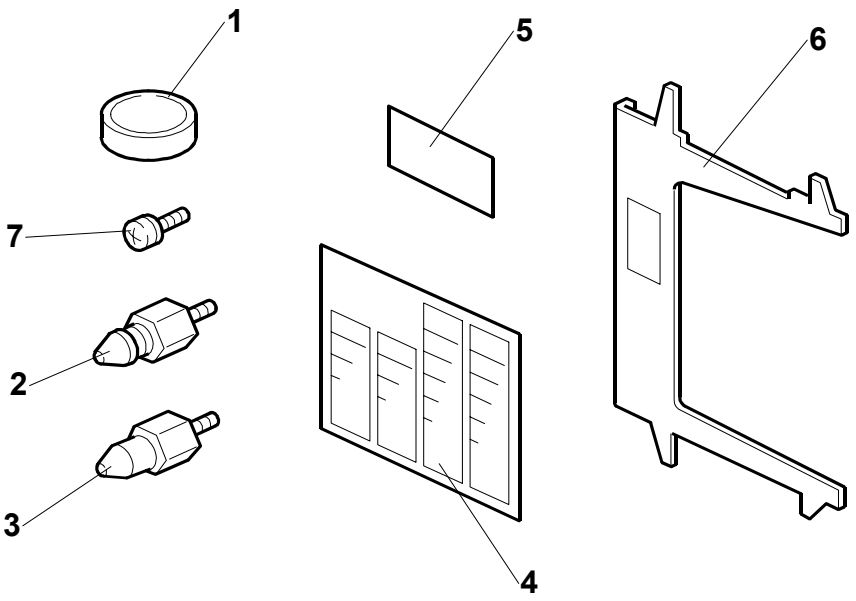
12. Insert the short connector [A] into the socket inside the machine [B].
    NOTE: Hold the connector as shown in the illustration.
13. Using the screws removed in Steps 8 and 11, install the tray [C] on the right rail [D], center rail [E], left rail [F].
    NOTE: You must use the short, silver screws on the left and right rails. If you use one of the longer screws, it will block the movement of the tray on the rails.



14. Re-install the safety switch holders [A] (☞ x 2) removed from the left tandem tray in Step 10.
15. Re-install the front cover [B] (☞ x 2) removed from the left tandem tray in Step 9.
16. Use SP5019 002 to select the paper size for Tray 1 (A3 or DLT).
17. After selecting the paper size, switch the machine off and on to change the indicator on the operation panel.

1.4 LCT (B511)

1.4.1 ACCESSORIES

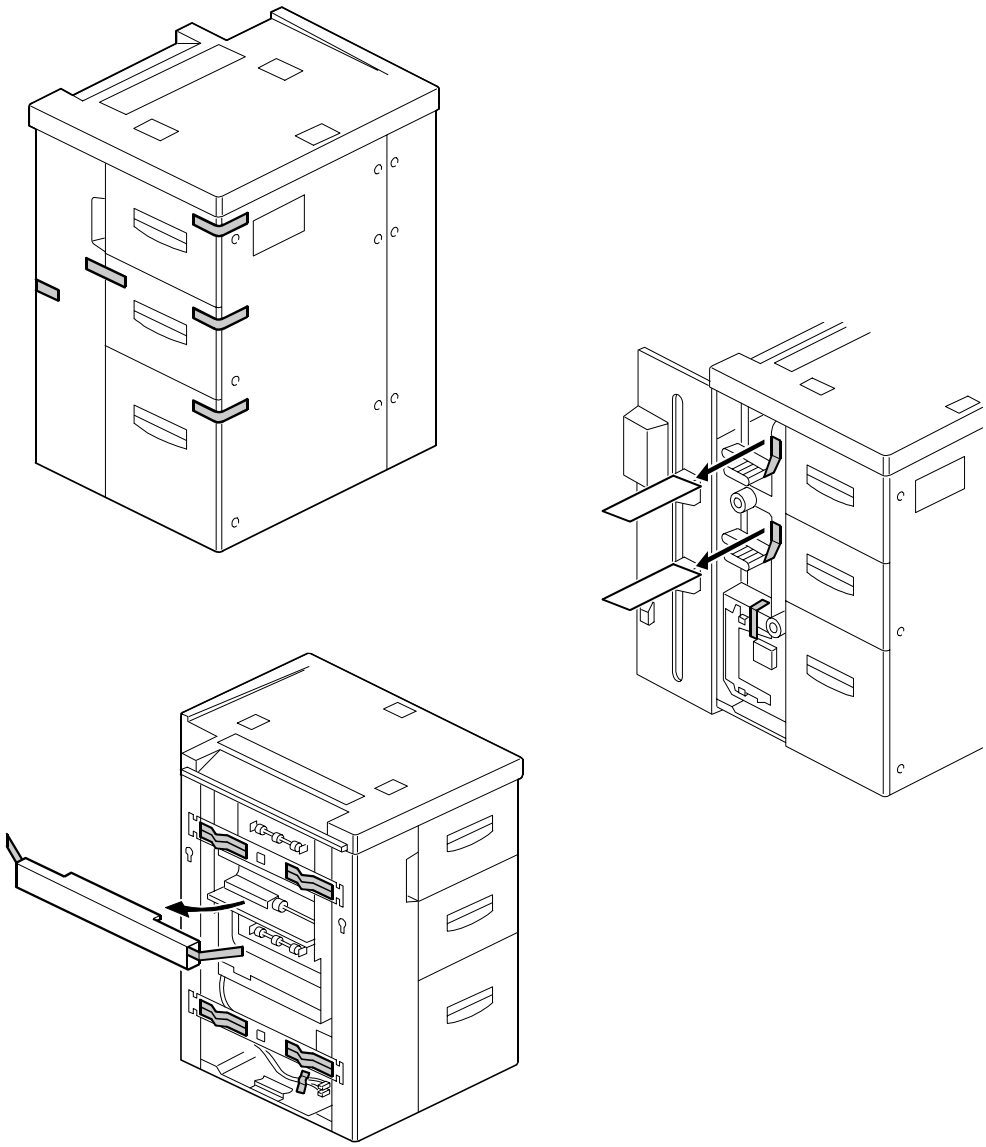


Check the quantity and condition of the accessories in the box against the following list:

Description	Q'ty
1. Leveling Shoes	3
2. Upper Joint Pins	2
3. Lower Joint Pins	2
4. Decal – Paper Size	1
5. Decal – Paper Set	3
6. Tab Paper End Fence	1
7. Philips Screw - M4 x 8	1
8. Installation Procedure – English (not shown)	1

NOTE: The tab paper end fence (6) is located in the LCT unit, mounted on hooks behind the front door.

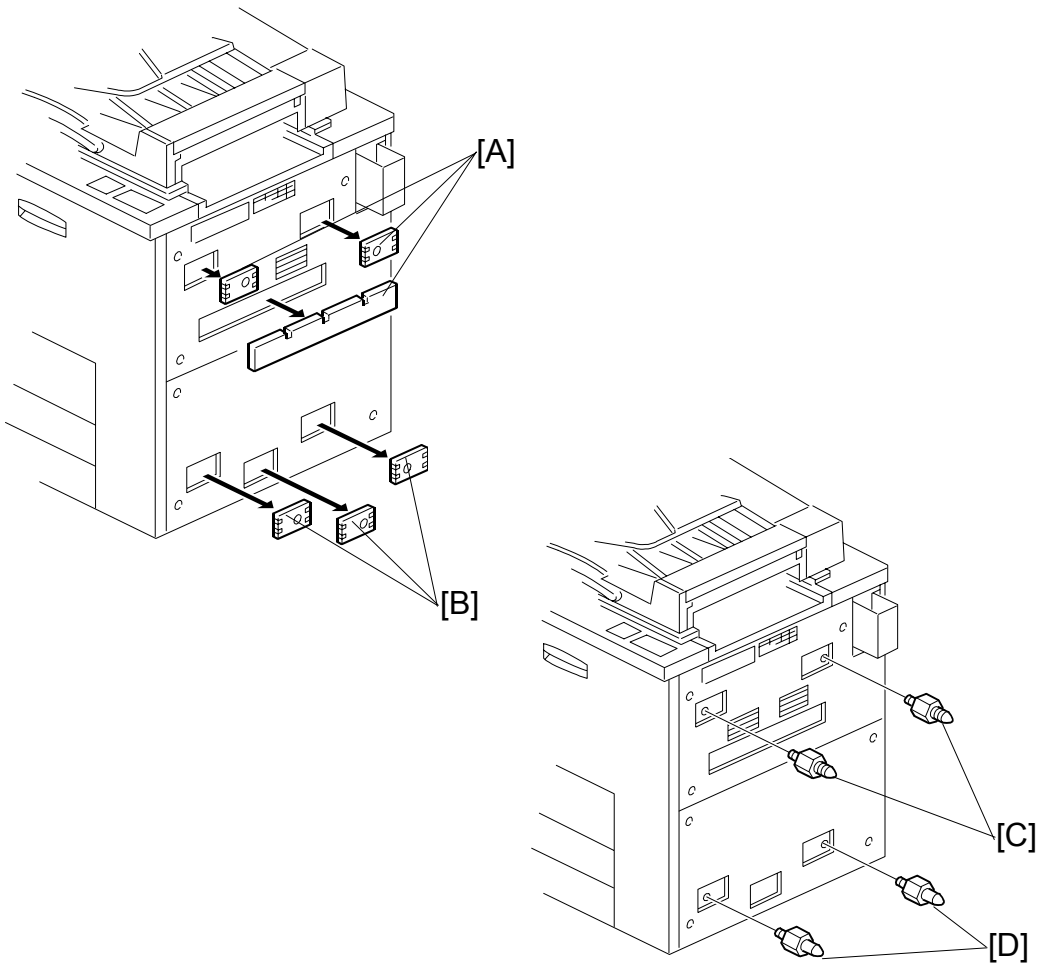
1.4.2 INSTALLATION



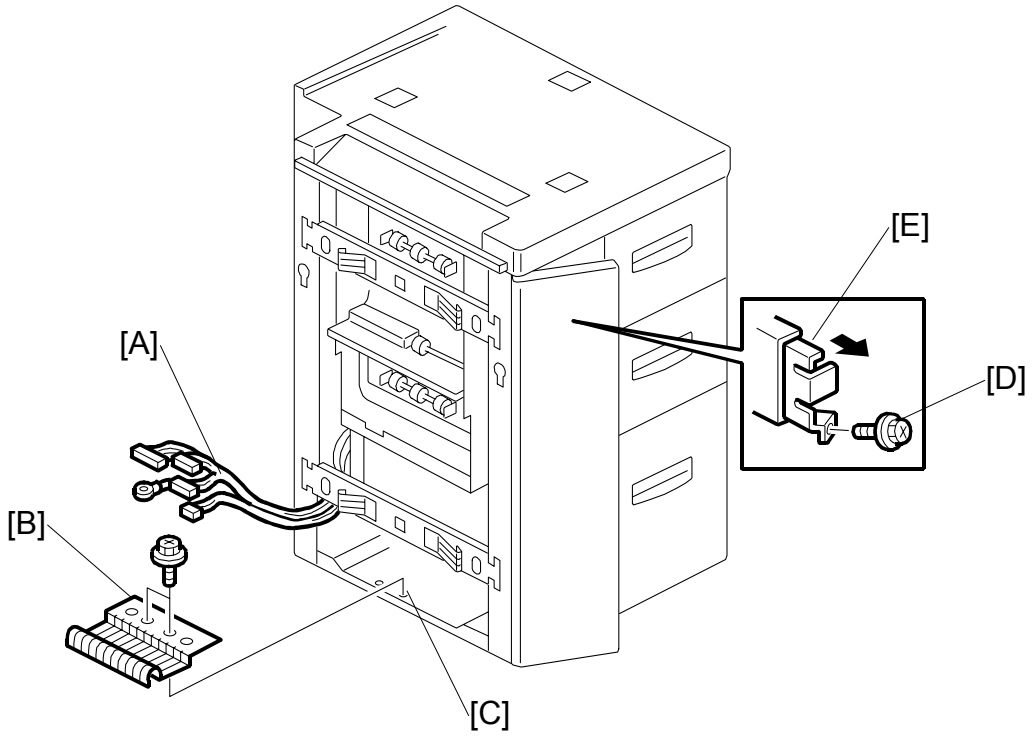
⚠CAUTION

Unplug the power cord before starting the following procedure.

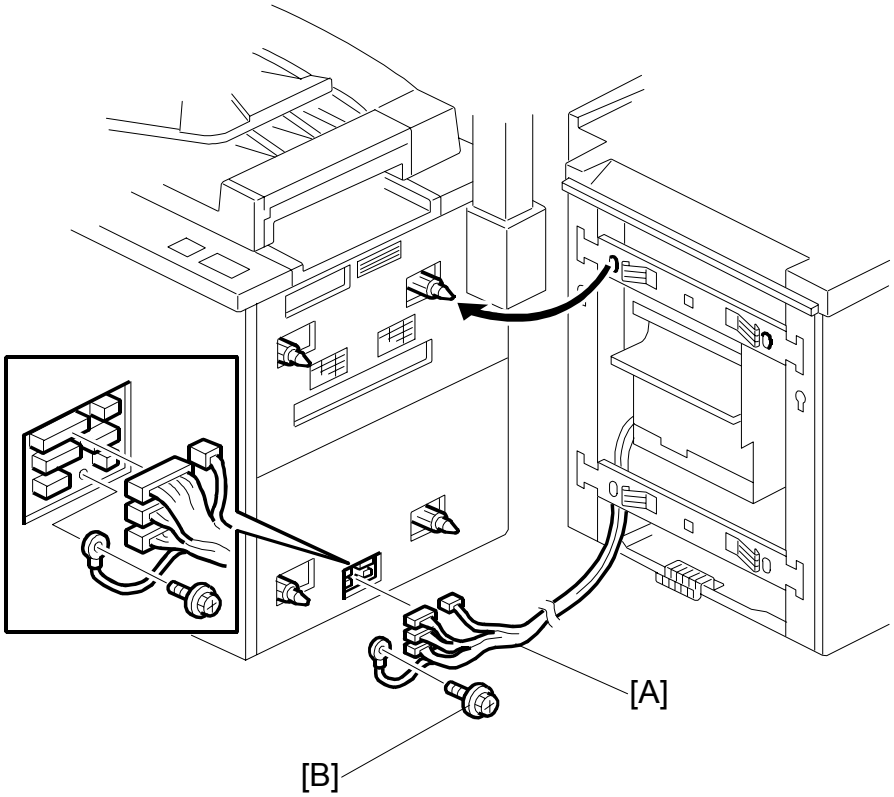
1. Remove the strips of tape on the covers (shown in the top illustration) and the packing material (shown in the bottom illustration).
2. Open the LCT door and remove the shipping retainers and strips of tape holding the levers.



3. Remove the covers [A] from the right upper side.
4. Remove the covers [B] from the right lower side.
5. Install the pins with the grooved rings [C] on the right upper cover.
6. Install the other pins [D] on the right lower cover.



7. Pull the connectors and ground wire [A] out of the LCT unit.
8. Remove the two screws that secure the ground plate [B].
9. Turn the ground plate over, reverse it, then fasten it to the same holes [C] (x 2).
10. Open the front door and remove the lock screw [D] from the lock lever [E].

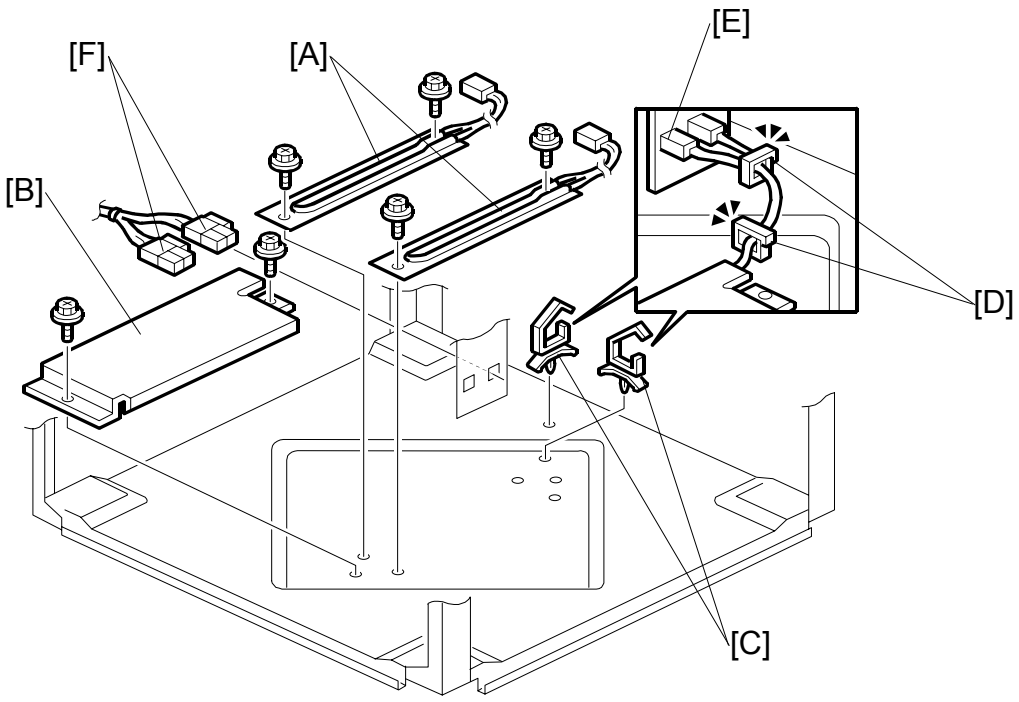


11. Move the LCT to the side of the copier and connect the four connectors [A]
12. Fasten the ground wire screw [B] (🔩 x 1).
13. Align the LCT on the joint pins, and dock the LCT with the right side of the copier.
14. Tighten the lock screw to attach the LCT to the copier ([D] in step 10).
    NOTE: If the lock lever is not seated correctly, pull the spring loaded lock lever forward and release to lock it into the groove.
15. Insert the leveling shoes (x 3) under the leveling feet and level the LCT.
16. Attach the appropriate decals to the trays.

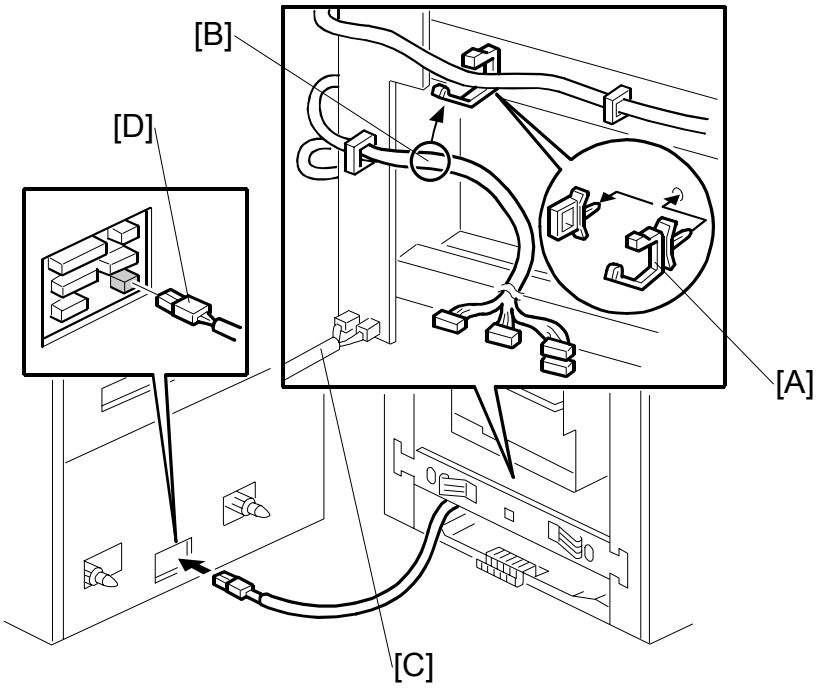
1.4.3 LCT TRAY HEATER (OPTION)

Installation

⚠CAUTION
Before doing this procedure, turn off the main switch and unplug the copier power cord.



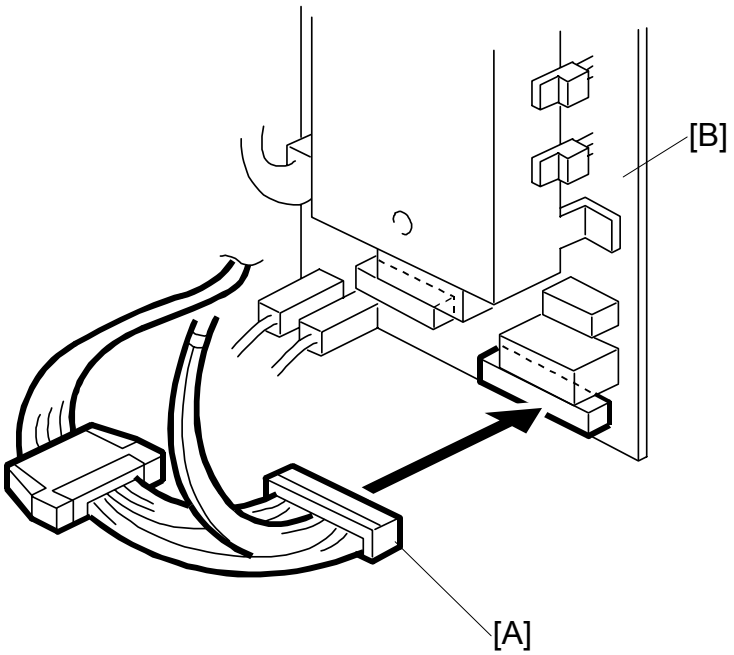
1. Remove the LCT unit from the main copier.
2. Remove the LCT right cover (🔩 x 6).
3. Attach the two condensation heaters [A] (🔩 x 2 each)
4. Attach the heater cover [B] (🔩 x 2)
5. Attach the two harness clamps [C].
6. Lead the heater harnesses [D] through the harness clamps.
7. Push the connectors [E] through the holes.
8. Connect the interface harness connectors [F] to the connectors pushed through the holes.



9. Replace the wire saddle [A] with the new one included in the optional tray heater kit.
10. Lead the connecting harness [B] as shown.

⚠CAUTION
To comply with safety standards, make sure that the connecting harness [B] is not touching the interface harness [C].

11. Connect the connector [D] of the interface harness to the mainframe interface.



⚠CAUTION

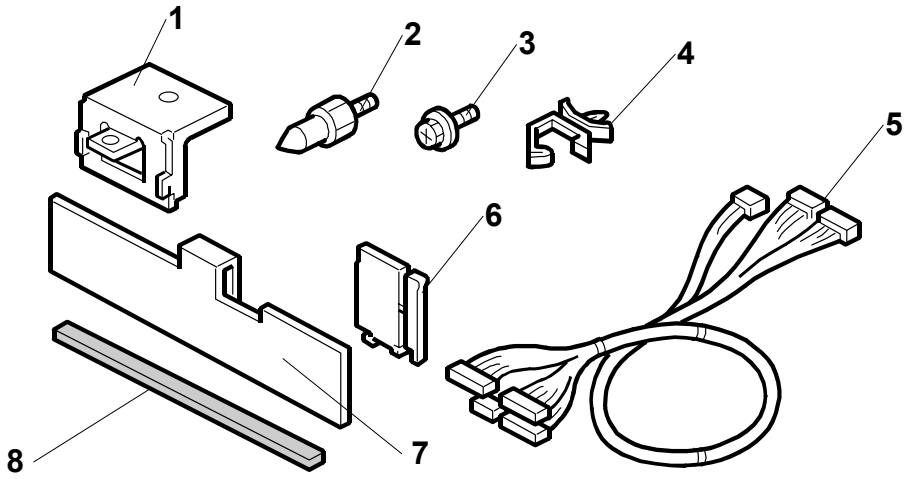
All anti-condensation heaters are disconnected from the AC drive board before shipping. Before plugging in the AC harness connector, make sure that the main switch of the copier is switched off and that the power cord is unplugged.

12. Connect the AC harness connector [A] to the AC drive board [B].
    NOTE: The main switch must be switched off when the heater AC harness connector is connected to the AC drive board, in order for the transfer anti-condensation drum heater to switch on/off with other optional heaters.
13. Hang the harness on the clamp under the AC drive board.

1.5 BYPASS TRAY (B512)

1.5.1 ACCESSORIES

Check the quantity and condition of the accessories in the box against the following list.

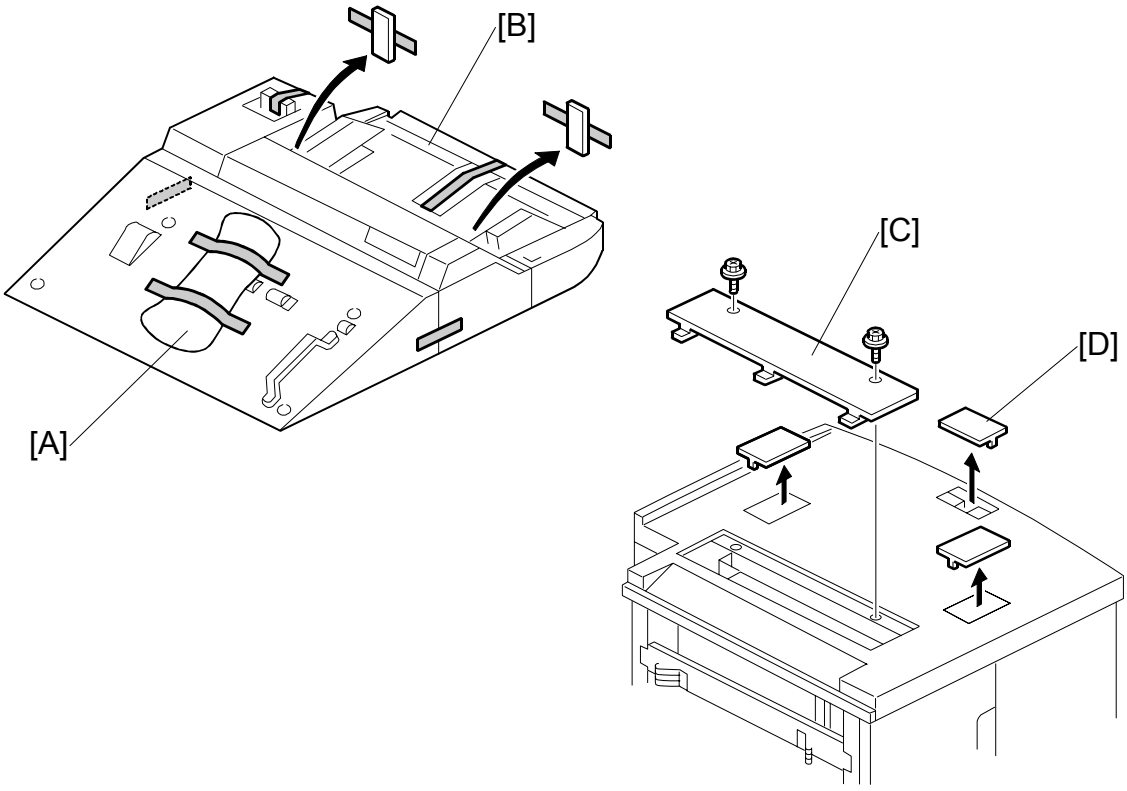


Description	Q'ty
1. Bracket	1
2. Joint Pins	2
3. Tapping Screws	4
4. Harness Clamps	4
5. Cable Harness	1
6. End Fence	1
7. Tab Fence	1
8. Sponge Strip	1

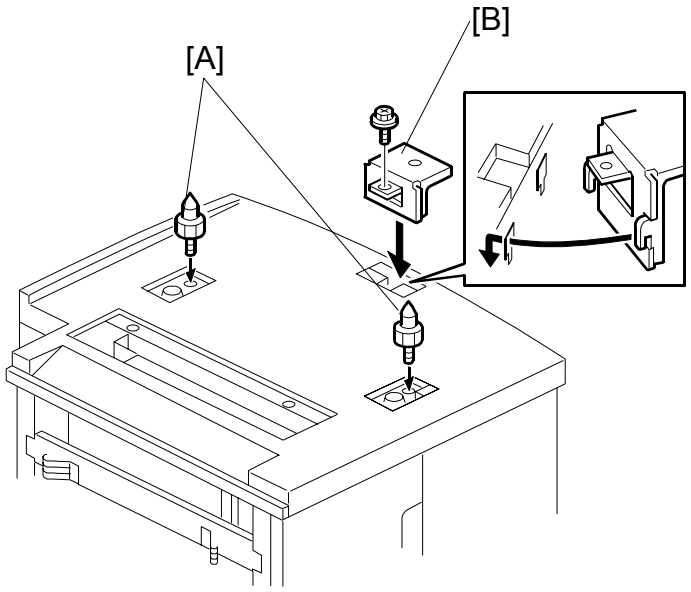
1.5.2 INSTALLATION

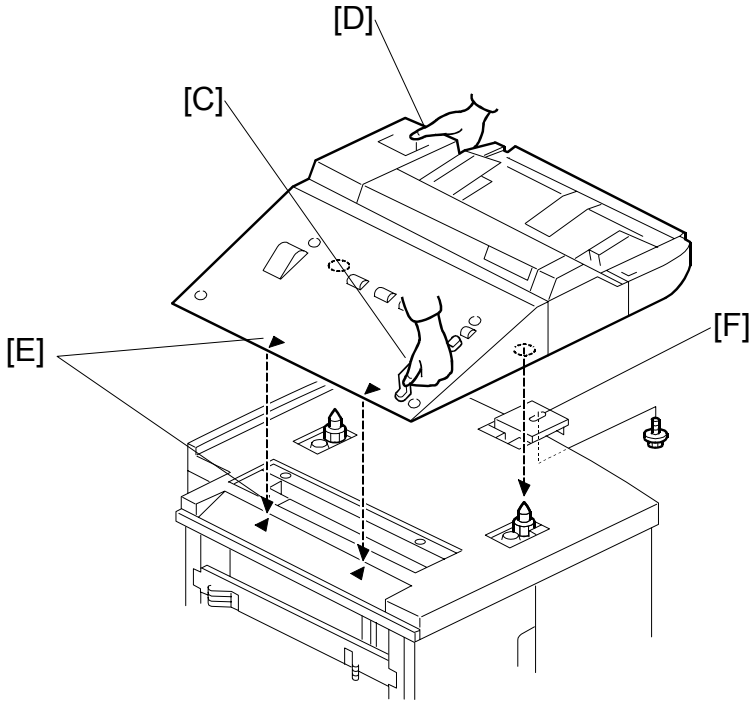
⚠CAUTION

Switch the machine off and unplug the machine before starting the following procedure.

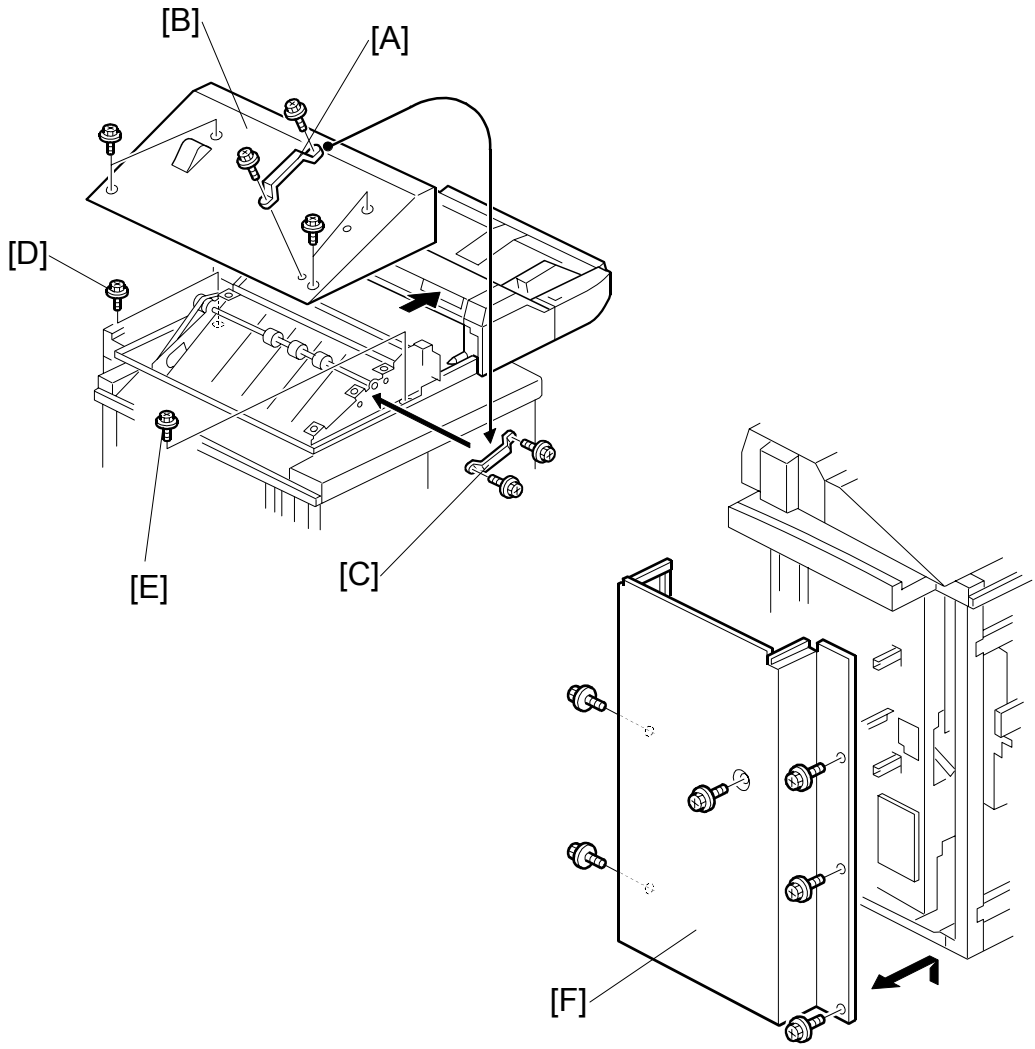


1. If the LCT is connected to the machine, disconnect it.
   CAUTION: To avoid damaging the LCT connectors and ground wire, separate the LCT and copier about 20 cm (8"), and disconnect the connectors (x 4) and ground wire (x 1) before pulling the LCT away from the machine.
2. Remove the tab fence from the left top cover [A].
3. Remove all tapes and shipping material from the bypass tray [B].
4. Remove the paper slot cover [C] (x 2) and discard the screws.
5. Use the edge of a fine tip flathead screwdriver to remove the smaller three covers [D].

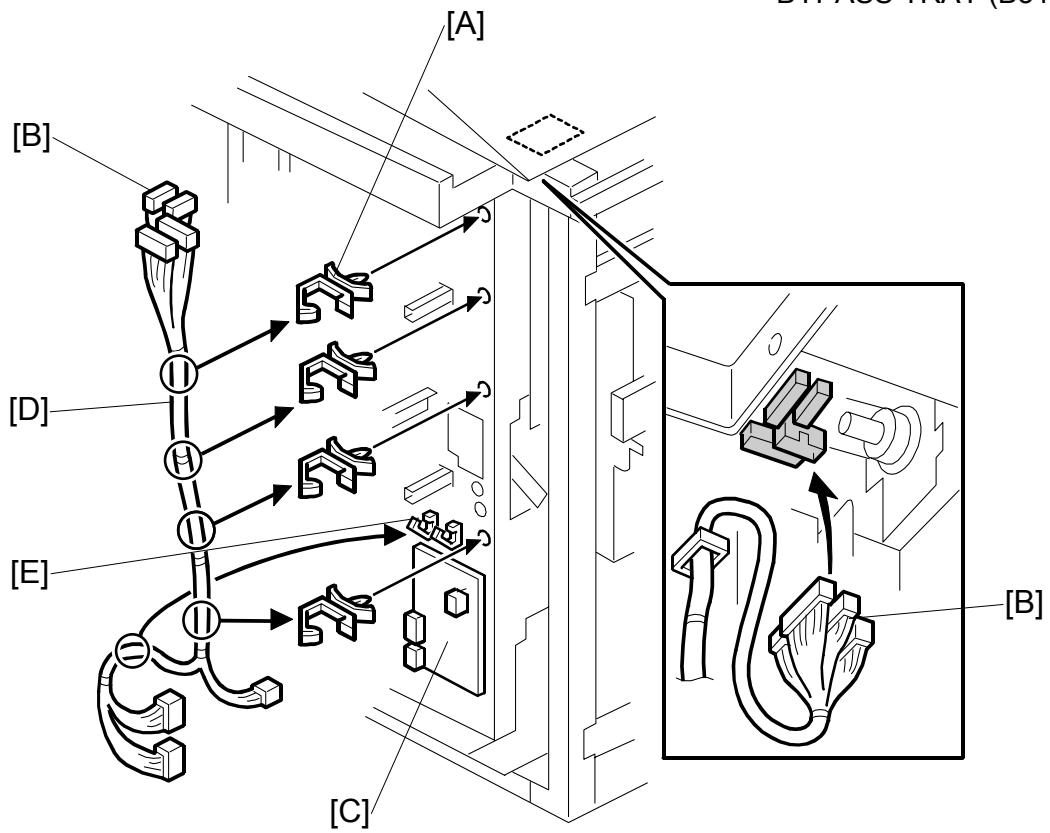




6. Screw in the guide pins [A] (☞ x 2).
7. Attach the bracket [B] provided in the accessories kit (☞ x 1).
8. Grip the bypass tray unit handle [C] and place your hand under the corner [D] diagonal to the handle, lift the unit and set it on top of the LCT.
9. Align the embossed arrows on the top left cover [E] of the bypass tray with the arrows on the LCT top.
10. Fasten the bypass tray to the right bracket [F] (☞ x 1).

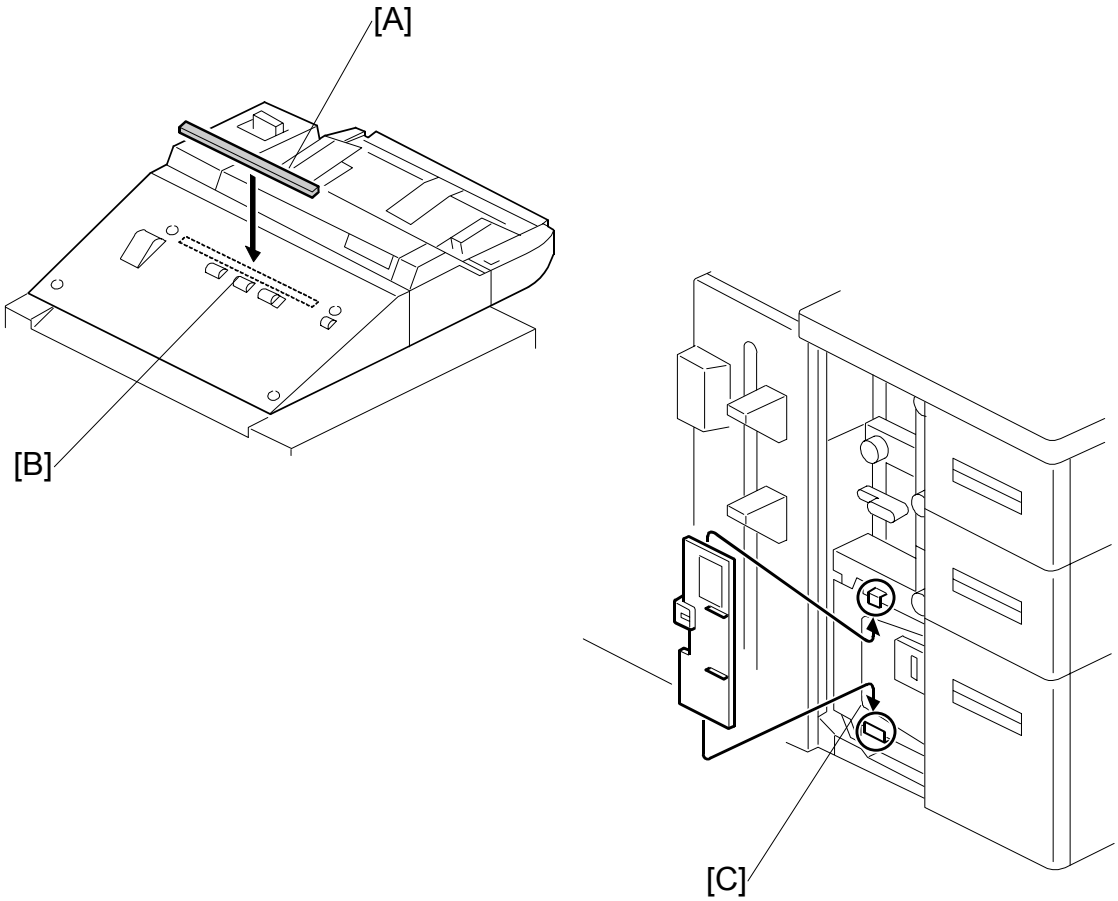


11. Remove the handle [A] (☞ x 2). Save these screws.
12. Remove the bypass tray top left cover [B] (☞ x 4).
13. Use the screws removed above to attach the handle to the front frame [C].
14. Fasten the bypass tray rear frame [D] to the LCT (☞ x 1).
15. Fasten the bypass tray front frame [E] to the LCT (☞ x 1).
16. Re-attach the top left cover [B] (☞ x 4).
17. Remove the rear cover [F] (☞ x 6).



18. Attach the 4 clamps [A] to the holes in the frame.
19. Connect the cable harness connectors [B] to the bypass tray at the top (☞ x 4).
20. Connect the cable harness to the bypass tray main board [C] (☞ x 3). Working from bottom to top, match the shape of the connector to the slot, and connect to:
    - CN531
    - CN532
    - CN530

    NOTE: Insert the connectors gently. If at first you cannot insert the connector, reverse it and try again.
21. Fasten the cable harness [D] to the frame with the 4 clamps attached above.
22. Open the 3 harness clamps [E] (2 above and 1 to the left) of the control board then secure the harness cable
    CAUTION: Make sure that the cable harness is securely clamped at the 7 clamps. If the cable harness is loose, this could interfere with the moving parts inside the LCT.
23. Re-attach the rear cover.



24. Remove the tape from the sponge strip and attach the strip [A] to the top left cover of the bypass tray. Position the strip in the center above the three roller housings [B].
    NOTE: The sponge strip prevents paper or other objects from accidentally falling between the output tray and the left cover.
25. Attach the end fence (follow the instructions on the decal attached to the top of the bypass tray).

NOTE: Open the LCT front door and hang tab sheet fence on the hooks [C] on top of the LCT tab fence. When feeding tab sheets from the bypass tray, follow the decal instructions on the tab fence to install it.

1.6 3000-SHEET FINISHERS (B468/B469)

1.6.1 ACCESSORIES

Check the quantity and condition of the accessories in the box against the following list:

Description	Q'ty
1. Rear joint bracket	1
2. Front joint bracket	1
3. Upper output tray	1
4. Lower output tray	1
5. Tapping screws - M3 x 6	2
6. Tapping screws - M4 x 8	2
7. Tapping screws - M4 x 14	4
8. Cushion (with double-sided tape)	1
9. Ground (earth) plate	1
10. Installation Instructions	1

1.6.2 INSTALLATION

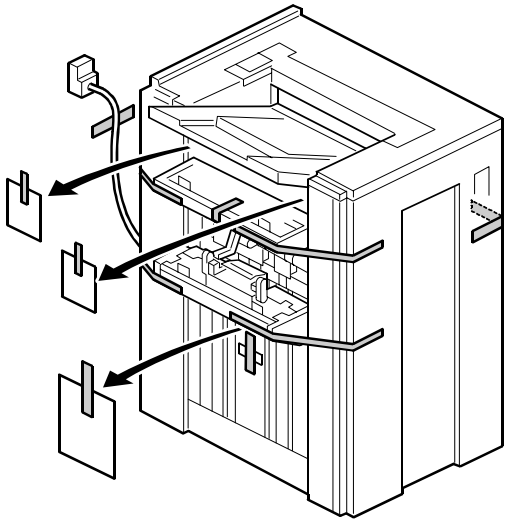
This section describes the common installation instructions for two peripheral devices for three machines:

- **B468 Booklet Finisher**, capable of punching, shifting, stapling, and saddle-stitching with staples. *This booklet finisher can be used with the B064/B065 or the B070 (90 cpm). It cannot be used with the B071 (105 cpm).*
- **B469 Finisher**, capable of punching, shifting, and stapling but with no saddle-stitching unit. *The B469 Finisher can be used with the B064/B065. It cannot be used with the B070 or B071.*

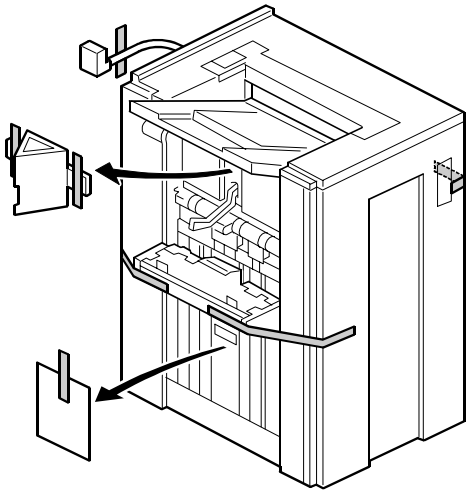
NOTE: Differences in the installation procedure are noted as "**B468**" or "**B469**".

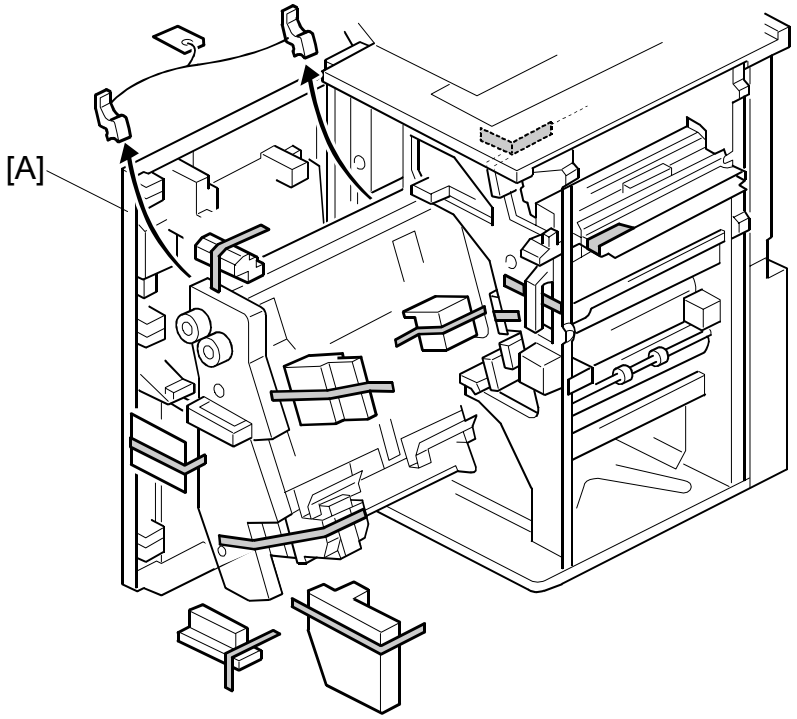
Removing Tapes and Retainers

B468 (B064/B065/B070)



B469 (B064/B065)



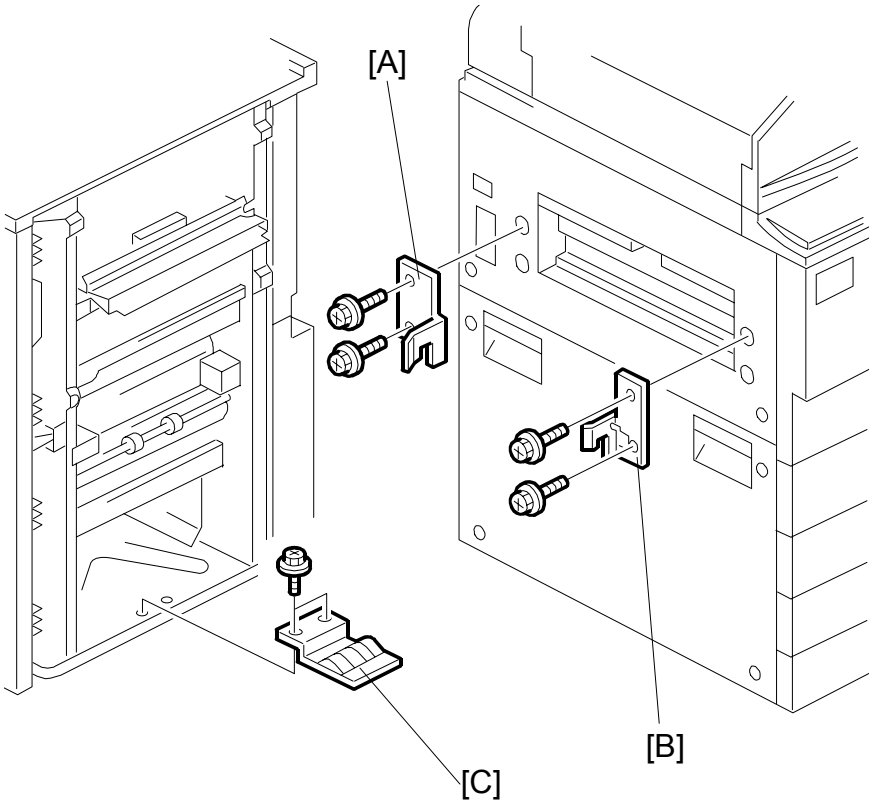


1. Unpack the machine and remove all the wrapping.
2. Remove all filament tape and shipping retainers from the front of the finisher.
3. Open the front door [A] and remove all the tape and shipping retainers from inside the finisher.

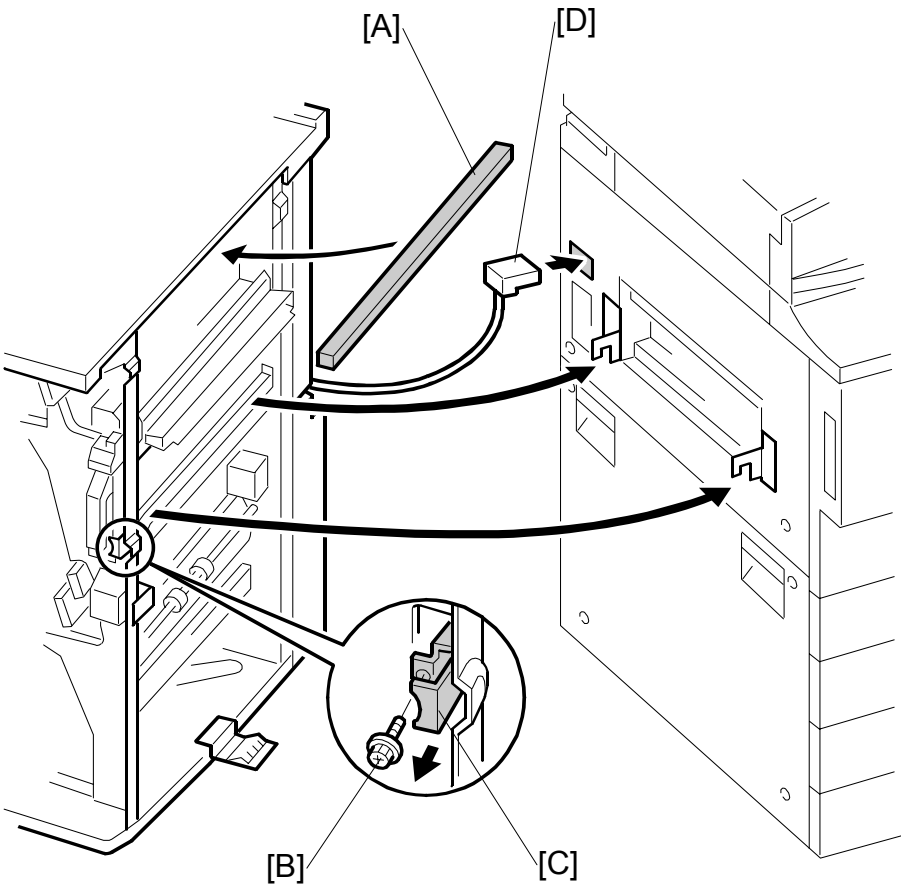
B468/B469 Installation

⚠CAUTION

Switch the machine off and unplug the machine before starting the following procedure.



1. Install the front [A] and rear [B] joint brackets (🔩 x 2 each, M4 x 14).
2. Install the ground plate [C] (🔩 x 2, M3 x 6).

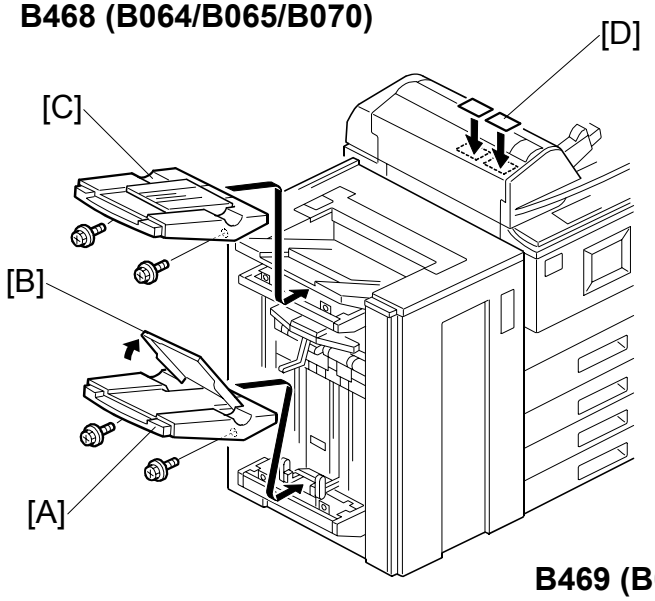


3. Attach the cushion [A] to the right side of the upper cover.
   NOTE: If you are installing the cover interposer tray, do not attach the cushion here. Attach it to the cover interposer tray. The cover interposer tray must be installed before you dock the finisher and tray to the main machine. For details, see the Cover Interposer Tray B470 installation instructions.
4. Remove the screw [B] to release the lock lever [C] (🔩 x 1).
5. Slowly and carefully, to avoid bending the entrance guide plates of the finisher, push the finisher against the side of the machine until the brackets enter the slots.
6. Using the screw [B] removed above, secure the lock lever [C] (🔩 x 1).
7. Connect the plug [D] of the finisher power cord to the connector on the machine.

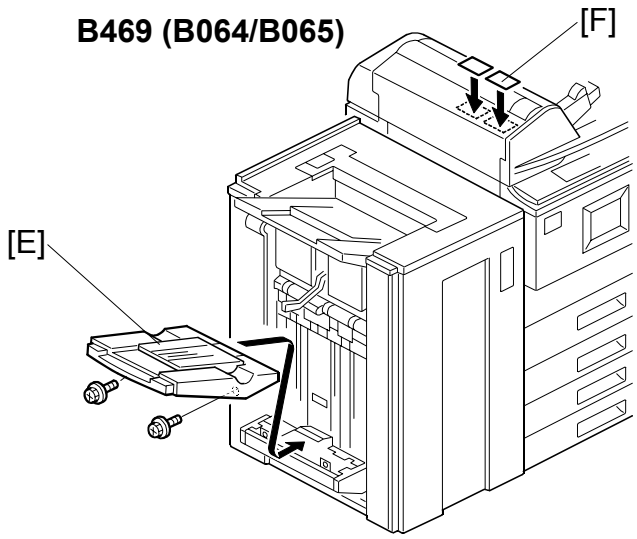
⚠CAUTION

Always move the finisher slowly to avoid bending the entrance guide plates. Bent guide plates could interfere with paper transport from the finisher to the machine.

B468 (B064/B065/B070)



B469 (B064/B065)



B468 (B064/B065/B070)

1. Install the lower output tray [A] (🔩 x 2).
   Note that only the lower output tray has a movable support tray [B].
2. Install the upper output tray [C] (🔩 x 2).
3. Attach the staple position decal [D] to the ADF.

B469 (B064/B065)

1. Install the output tray [E] (🔩 x 2).
2. Attach the staple position decal [F].

Selecting the Staple Supply Name

Enter the SP mode and execute the following information.

5841*	Supply Name Setting		These names appear when the user prints the Inquiry List (B070: Press the Counter key, then press 'Print Inquiry List', B064/B065: Press the Inquiry button in the initial User Tools screen).
	005*	Staple Std	Enter the name of the staples in use for normal stapling (not booklet stapling). This setting should be done for both the B468 and B469.
	006*	Staple Bind	Enter the name of the staples in use for booklet stapling (saddle-stitching). This setting is required only for the B468 for booklet finishing.

Enabling Booklet Binding

To enable booklet binding, you must select the center stapling position.

1. Press the User Tools key.
2. Touch "Copier/Document Server Features".
3. Touch the "Input/Output" tab.
4. Touch any "Stapling Position" button and touch the center (saddle-stitch) stapling symbol.
5. Exit the User Tools mode. Specify the number of copies, touch the center stapling symbol on the operation panel, then start the print job.

This SP adjustment is available but not required at installation. Use this SP to fine adjust the fold/staple position of they are not aligned correctly.

SP6902	Staple Position in Center Folding	Use this SP to fine adjust the fold and staple positions if they are not aligned correctly. See "5. Service Tables".
SP6120	Staple Jogger Adjustment	Allows fine adjustment of the staple unit jogger fences for different paper sizes, if required. For details, see "4. Service Tables".

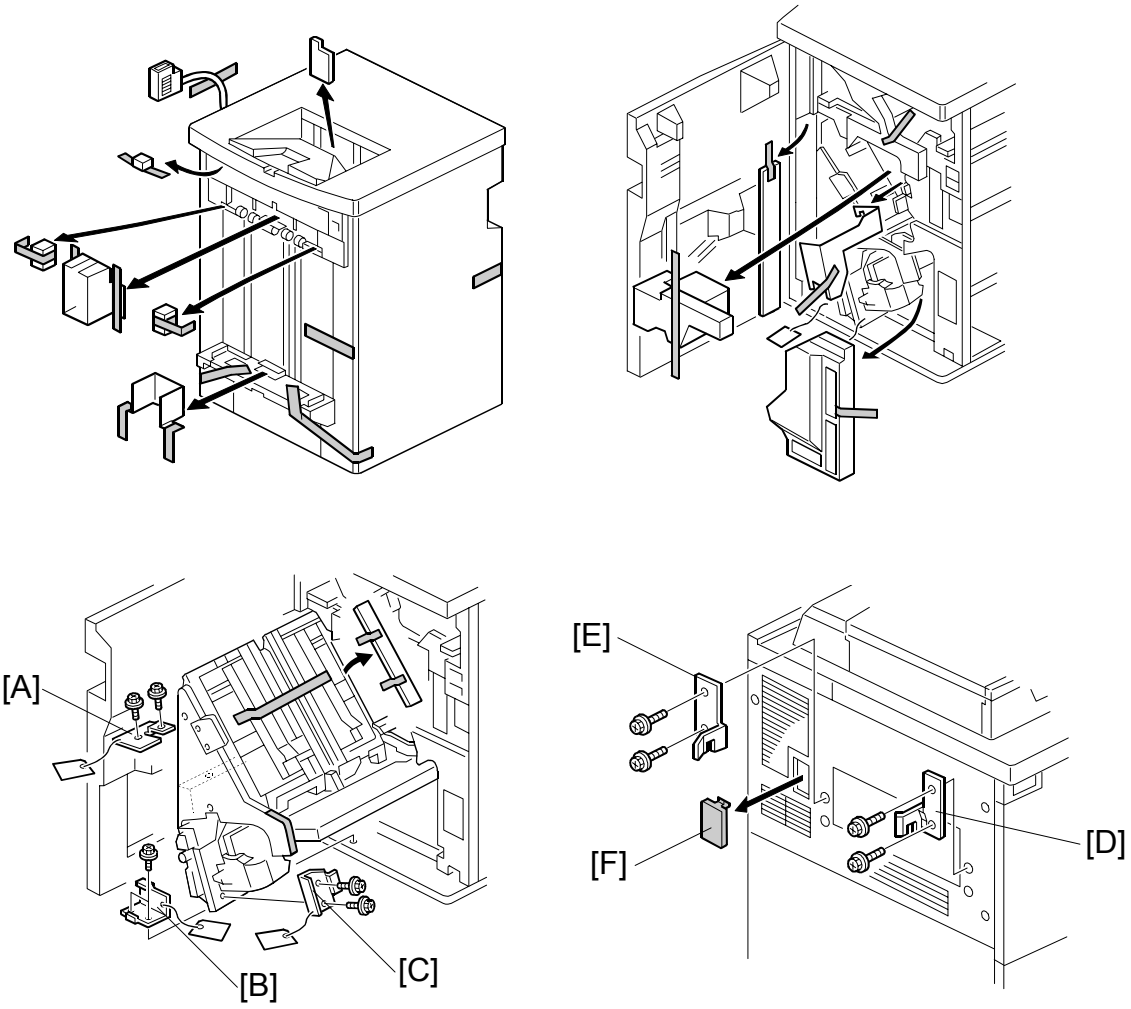
1.7 3000 SHEET FINISHER (B478)

1.7.1 ACCESSORIES

Check the quantity and condition of the accessories in the box against the following list:

Description	Q'ty
1. Front Joint Bracket	1
2. Rear Joint Bracket	1
3. Entrance Guide Plate	1
4. Shift Tray	1
5. Grounding Plate	1
6. Table Extension	1
7. Cushion	1
8. Tapping Screws - M4 x 8	2
9. Tapping Screws - M3 x 6	4
10. Tapping Screws - M3 x 8	4
11. Phillips Screws w/washer - M4 x 14	4
12. Leveling Shoes	4
13. Installation Procedure	1

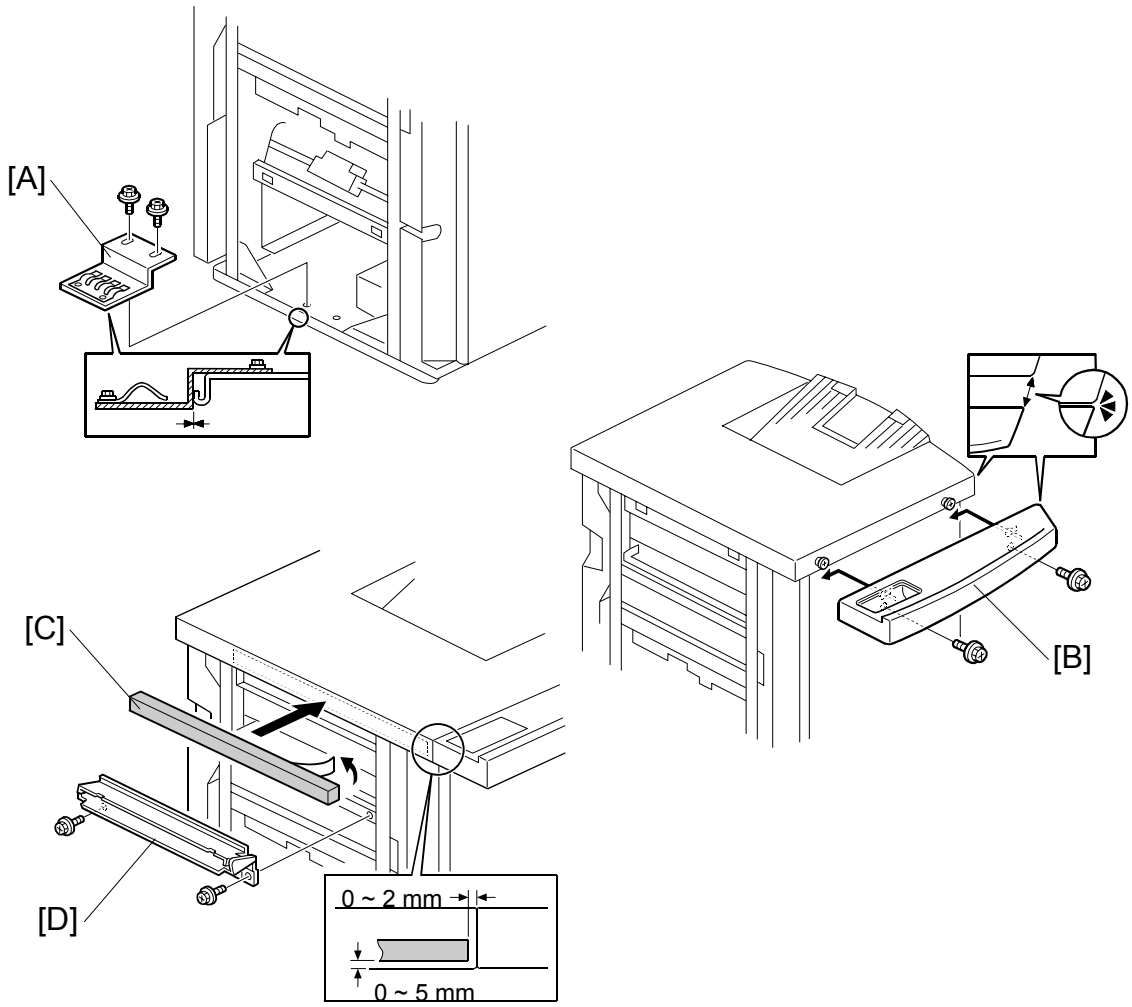
1.7.2 INSTALLATION



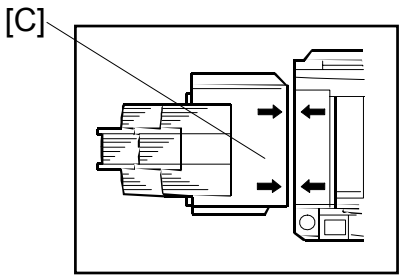
⚠CAUTION

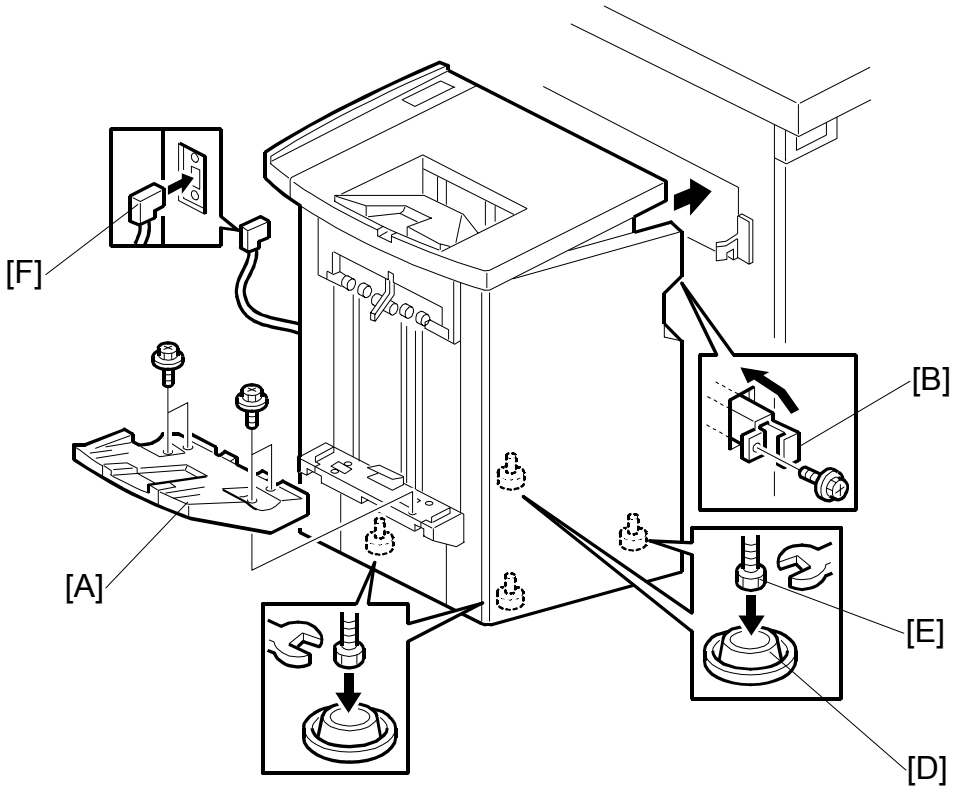
Unplug the machine power cord before starting the following procedure.

1. Unpack the finisher and remove all tapes and shipping retainers.
2. Open the front door and remove the shipping retainers. Remove brackets [A], [B], and [C] (🔩 x 2 each).
3. Install the front joint bracket [D] and rear joint bracket [E] (🔩 x 2 each) (M4 x 14) on the left side of the copier.
4. Remove the connector cover [F].



5. Install the grounding plate [A] (☞ x 2) (M3 x 6).
   NOTE: Set the grounding plate so that there is no gap between the grounding plate and the bottom frame of the finisher (as shown).
6. Install the table extension [B] as shown (☞ x 2) (M4 x 8).
   NOTE: The edge of the table extension should be aligned with the edge of the finisher (as shown).
7. Attach the cushion [C] to the right side of the upper cover.
   NOTE: If you are installing the cover interposer tray, do not attach the cushion here. Attach it to the cover interposer tray. The cover interposer tray must be installed before you dock the finisher and tray with the main machine. For details, see the Cover Interposer Tray B470 installation instructions.
8. Install the entrance guide plate [D] (☞ x 2) (M3 x 6).





9. Attach the shift tray [A] (🔩 x 4) (M3 x 8).
10. Open the front door of the finisher, and remove the screw from the locking lever, then pull out the locking lever [B].
11. Align the finisher on the joint brackets, and lock it in place by pushing in the locking lever [B].
    NOTE: Before securing the locking lever, make sure that the top edges of the finisher and the copier are parallel from front to rear as shown [C].
12. Set the leveling shoes [D] (x4) under the feet [E], then level the machine.
13. Secure the locking lever [B] (🔩 x 1) and close the front door.
14. Connect the finisher cable [F] to the copier.

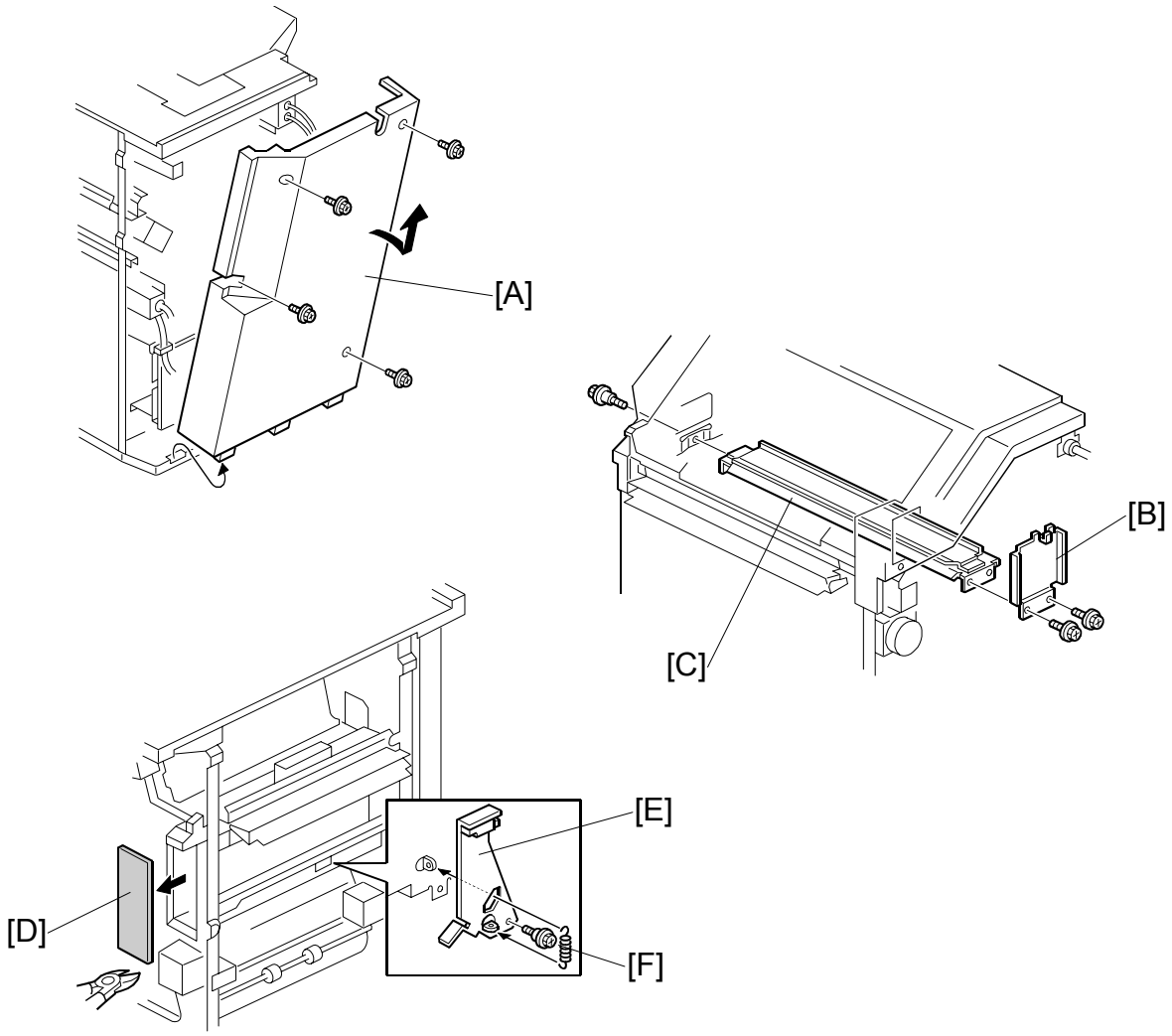
1.8 PUNCH UNIT (B377)

1.8.1 ACCESSORIES

Check the quantity and condition of the accessories in the box against the following list:

Description	Q'ty
1. Punch unit	1
2. Sensor arm	1
3. Hopper	1
4. Step screw	1
5. Spring	1
6. Spacer (2 mm)	1
7. Spacer (1 mm)	1
8. Tapping screw - M3 x 8	1
9. Tapping screw - M3 x 10	2

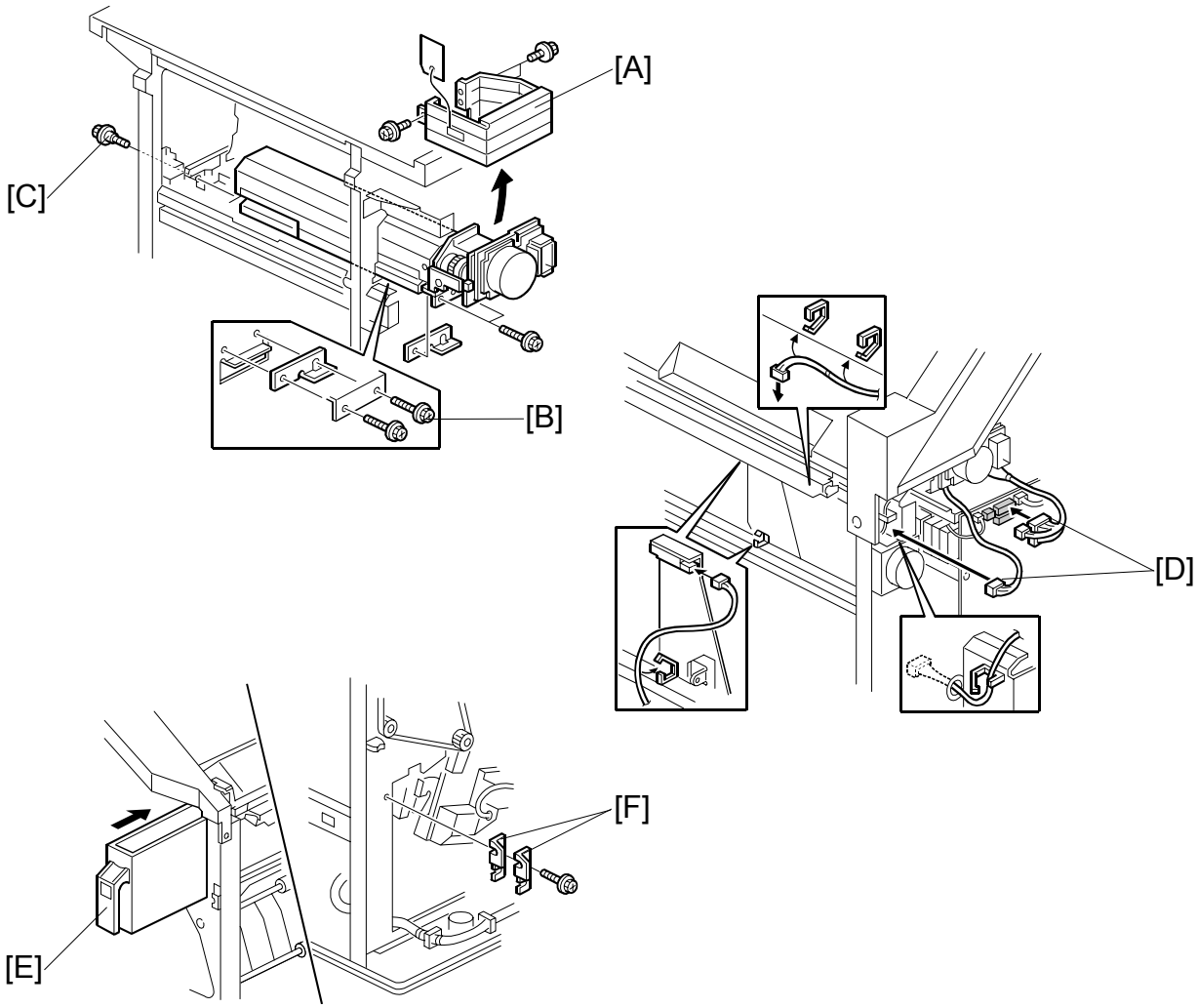
1.8.2 INSTALLATION PROCEDURE



⚠CAUTION

Switch off the main machine and unplug its power cord.

1. If the finisher is connected to the machine, disconnect it.
2. Unpack the punch unit and remove all tapes and shipping retainers.
3. Open the front door and remove the rear cover [A] (🔩 x 4).
4. Remove the bracket [B] (🔩 x 2) and paper guide [C] (🔩 x 1).
5. Remove the plastic knockout [D].
6. Install the sensor bracket arm [E] (🔩 x 1).
   NOTE: Make sure that the sensor arm swings freely on the step screw.
7. Install the spring [F].

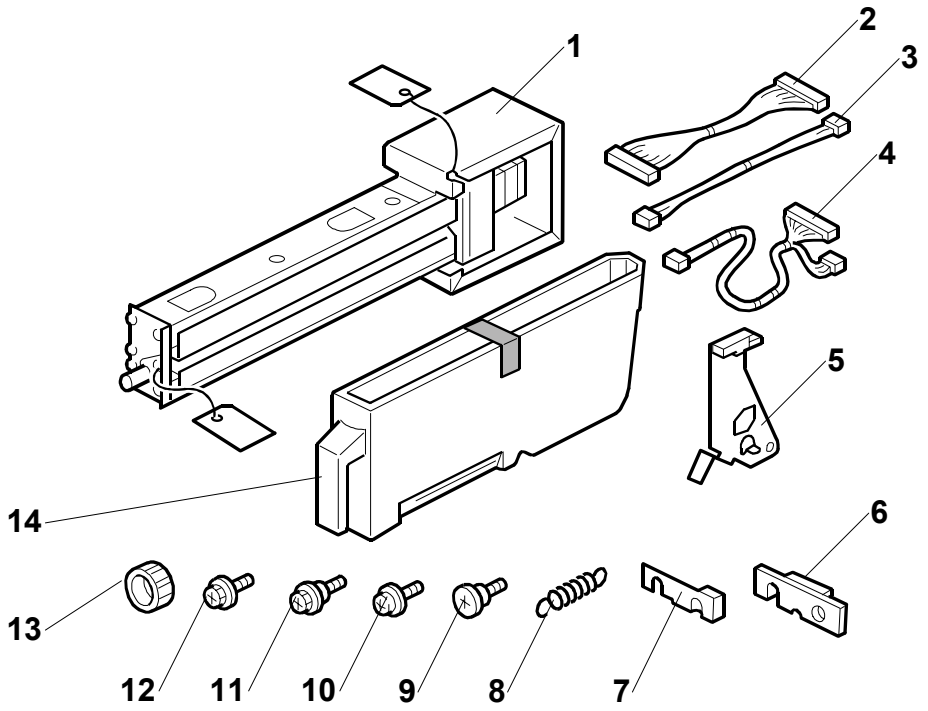


8. Remove the shipping bracket [A] (☞ x 2).
9. Position the 2 mm spacer [B] and secure the punch unit (☞ x 2).
10. Secure the punch unit at the front with the shoulder screw (☞ x 1 [C]).
11. Connect the harnesses [D] and clamp them as shown.
12. Slide the hopper [E] into the machine.
13. Fasten the two 1 mm spacers [F] to the rear frame. These may be used during future adjustments.
    NOTE: The spacers are used to adjust the horizontal positioning of the holes.
14. Reassemble the finisher and check the punch operation.

1.9 PUNCH UNIT (B531/A812)

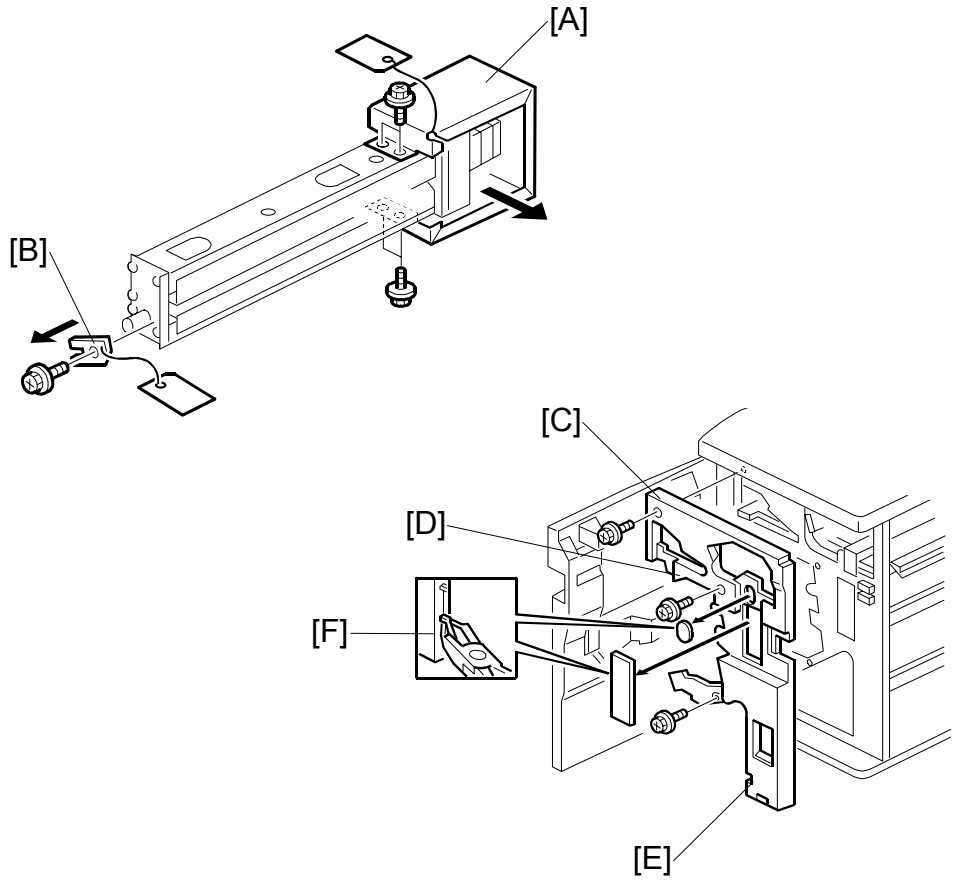
1.9.1 ACCESSORIES

Check the quantity and condition of the accessories in the box against the following list:



Description	Q'ty
1. Punch unit	1
2. Harness Connector Cable - PCB	1
3. Harness Connector Cable - HP Sensor 2	1
4. Harness Connector Cable - HP Sensor 1, Hopper Full	1
5. Sensor Arm and Sensor	1
6. Spacer (2 mm)	1
7. Spacer (1 mm)	2
8. Spring	1
9. Step Screw (large) (M4 x 11)	1
10. Tapping Screw (M4 x 10)	2
11. Step Screw (small) (M3 x 4)	1
12. Machine Screw, Washer (M4 x 6)	1
13. Knob	1
14. Punch Waste Hopper	1

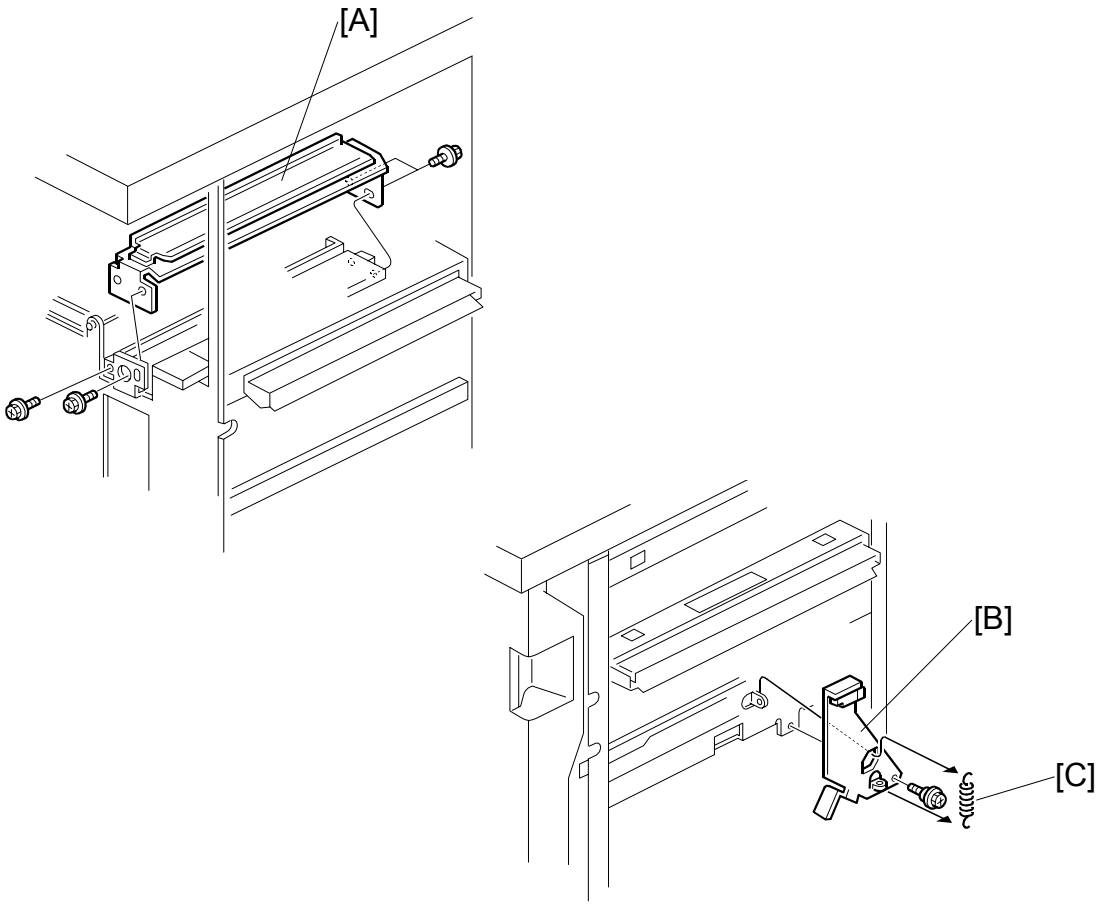
1.9.2 INSTALLATION



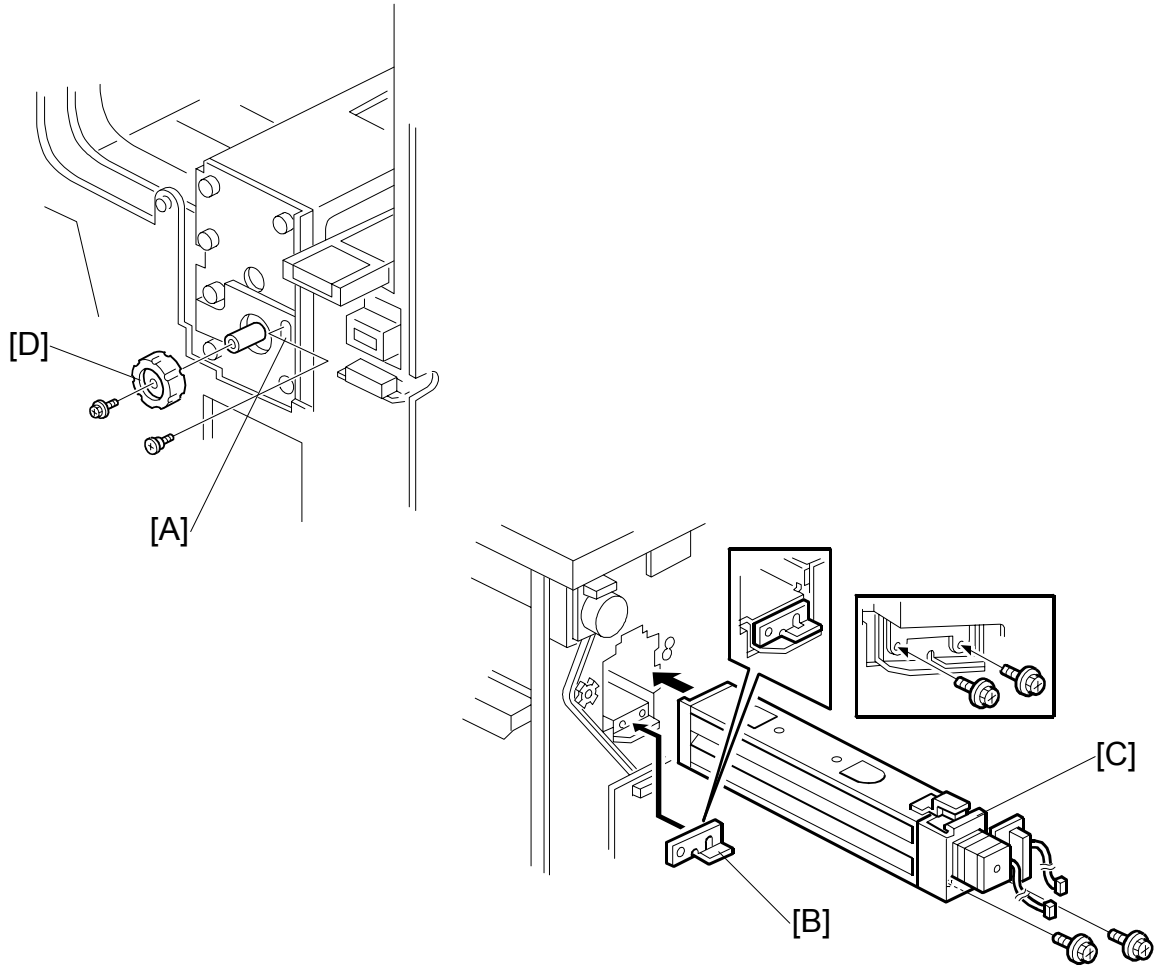
⚠CAUTION

Switch the machine off and unplug the machine before starting the following procedure.

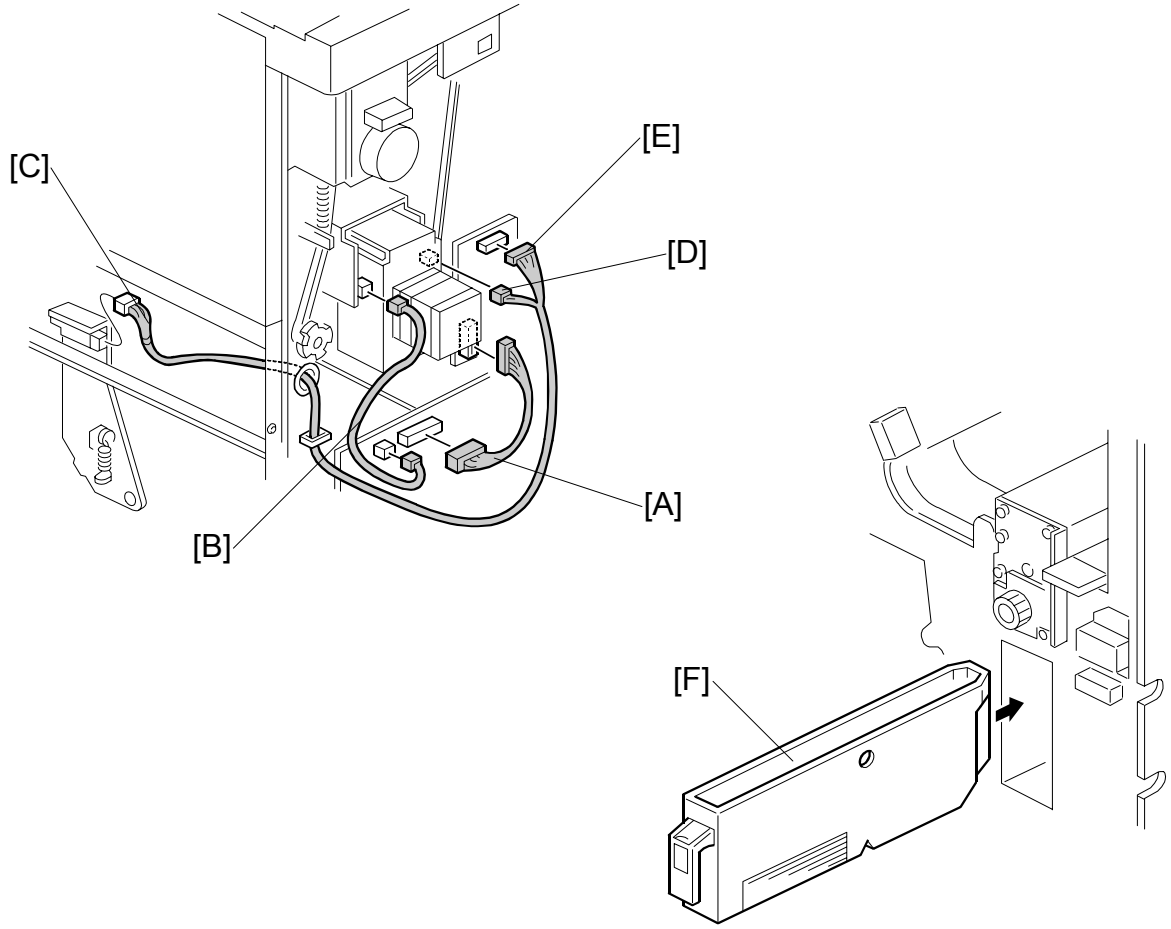
1. If the finisher is connected to the machine, disconnect it.
2. Open the front door and remove the rear cover (🔩 x 2).
3. Unpack the punch unit and remove the motor protector plate [A] (🔩 x 4) and the cam lock plate [B] (🔩 x 1).
4. Remove the inner cover [C] (🔩 x 3).
5. Behind the inner cover at [D] and [E], press the lock tab to the right to release the inner cover from the frame.
6. Remove the plastic knockouts [F].



7. Remove the paper guide [A] (☞ x 4).
8. Install the sensor arm [B] (☞ x 1, small step screw (M3 x 4).
   NOTE: Make sure that the sensor arm swings freely on the step screw.
9. Attach the spring [C].



10. At the front, secure the punch unit [A] with the large step screw (🔩 x 1, M4 x 10).
11. At the rear, position the 2 mm spacer [B] and attach the punch unit [C] (🔩 x 2, M4 x 10).
    NOTE: At the hole just above the lock lever, use one of the screws from the paper guide removed above to fasten the remaining two spacers to the frame. These extra spacers are used to adjust the horizontal position of the punch holes.
12. At the front, fasten the punch unit knob [D] (🔩 x 1).



13. Connect the PCB harness connector [A] to CN129 of the finisher PCB and to CN600 of the punch unit PCB.
14. Connect the HP Sensor 2 harness connector [B] to CN130 of the finisher PCB and to HP Sensor 2.
15. Connect the single end of the hopper full sensor connector cable [C] to the hopper full sensor on the arm (☞ x 1, clamp x 1), then connect the other two connectors to HP Sensor 1 [D] and CN620 [E] of the punch PCB.
    NOTE: No special DIP switch settings are required for this punch unit. The punch unit sends an identification signal to the machine, so it knows what type of punch unit has been installed.
16. Slide the hopper [F] into the finisher.
17. Re-attach the inner cover and rear cover.
18. Close the front door and re-connect the finisher to the machine.

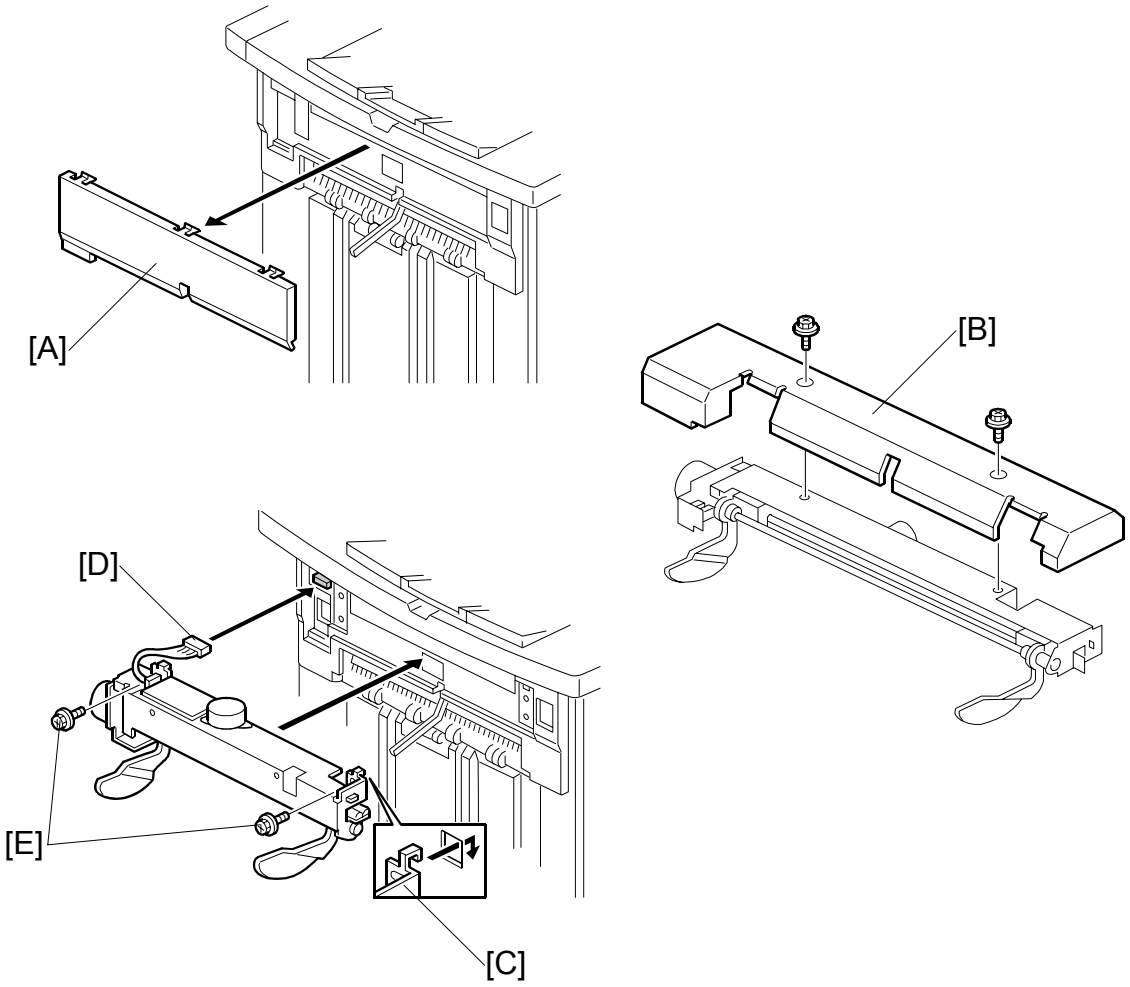
1.10 JOGGER UNIT (B513)

1.10.1 ACCESSORIES

Check the quantity and condition of the accessories in the box against the following list:

Description	Q'ty
1. Jogger Unit B513	1
2. Tapping Screws - M3 x 6	2
3. Installation Procedure	1

1.10.2 INSTALLATION

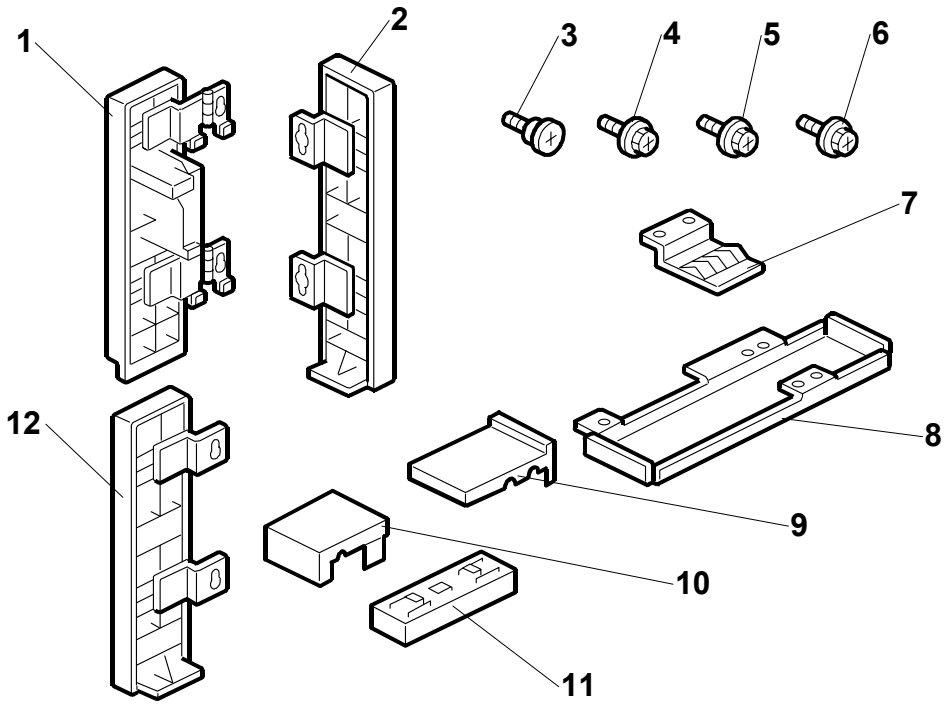


1. Turn the main machine switch off and disconnect the finisher from the main frame.
2. Use the flat head of a screw driver to remove the left upper cover [A] from the finisher and discard it.
3. Remove the cover plate [B] from the jogger unit (x 2). Save the screws.
4. With the jogger unit connector on the left side, hook the frame of the jogger unit [C] into the holes on the left and right side of the finisher frame.
5. On the left side, fasten the connector [D] to the socket (x 1).
6. On the left and right side, attach the jogger unit frame to the side of the finisher with the screws [E] provided (x 2).
7. Re-attach the jogger unit cover to its frame with the screws removed in step 2 (x 2).

1.11 COVER INTERPOSER TRAY (B470)

1.11.1 ACCESSORIES

Check the quantity and condition of the accessories in the box against the following list:



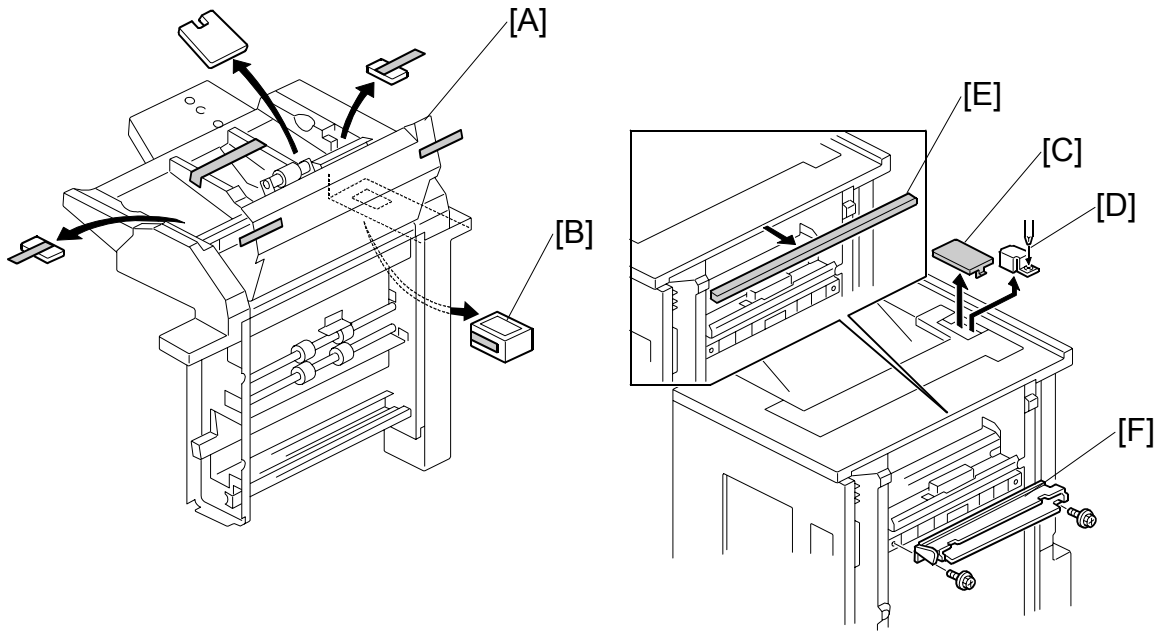
Description	Q'ty
1. Front door extension (top)	1
2. Rear cover extension (bottom)	1
3. Shoulder screws	3
4. Tapping screws – M4 x 8	7
5. Tapping screws – M3 x 8	2
6. Tapping screws – M3 x 6	5
7. Ground Plate	1
8. Plate extension (bottom)	1
9. Right rear cover plate (for B478 only)	2
10. Right front corner plate (for B478 only)	2
11. Spacer (B468/B469 only)	1
12. Front door extension (bottom)	1

1.11.2 INSTALLATION

This procedure describes installation of the Cover Interposer Tray B470 on the Booklet Finisher B468, 3000 Sheet Finisher 469, and 3000 Sheet Finisher B478.

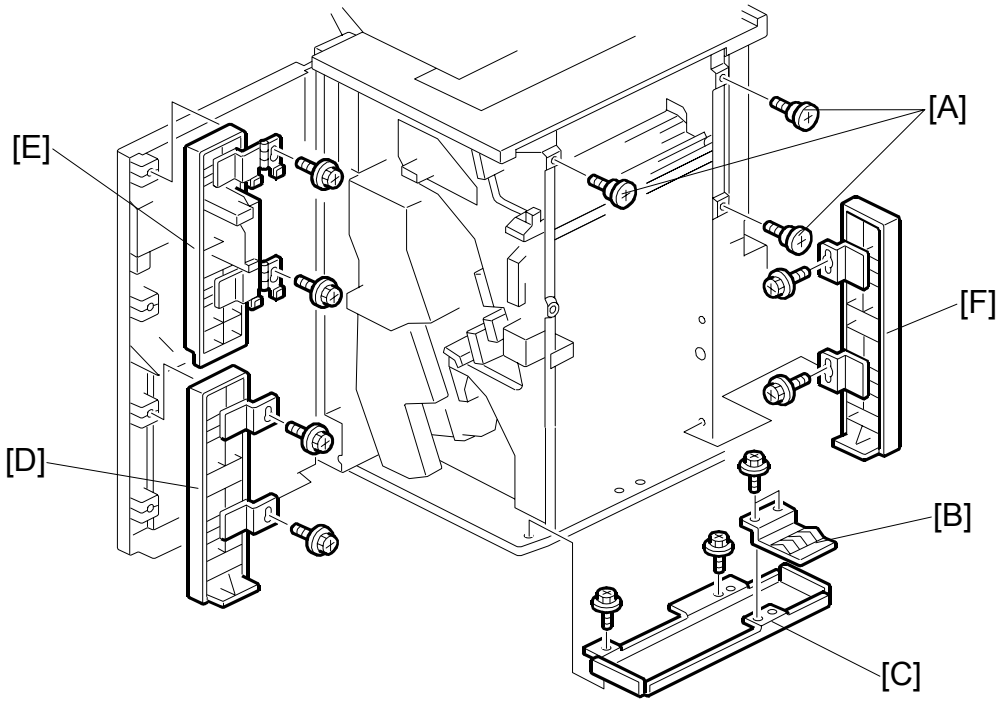
- The B468/B469 require installation of only the front spacer.
- The B478 requires installation of corner plates.

Removing Tapes and Retainers



1. If the finisher is connected to the machine, disconnect it.
2. Remove all tape and retainers from the cover interposer tray [A].
3. Remove the tape and cardboard [B] from the ground connector.
4. Remove the cover [C] of the relay connector.
5. Loosen the screw of the bracket [D] (x 1) then remove the bracket.
   NOTE: If you are installing the cover interposer tray with a previously installed finisher B468/B469/B478, remove the sponge strip [E] from the finisher and save it for re-attachment to the interposer tray.
6. Remove the guide plate [F].

Attaching the Extensions

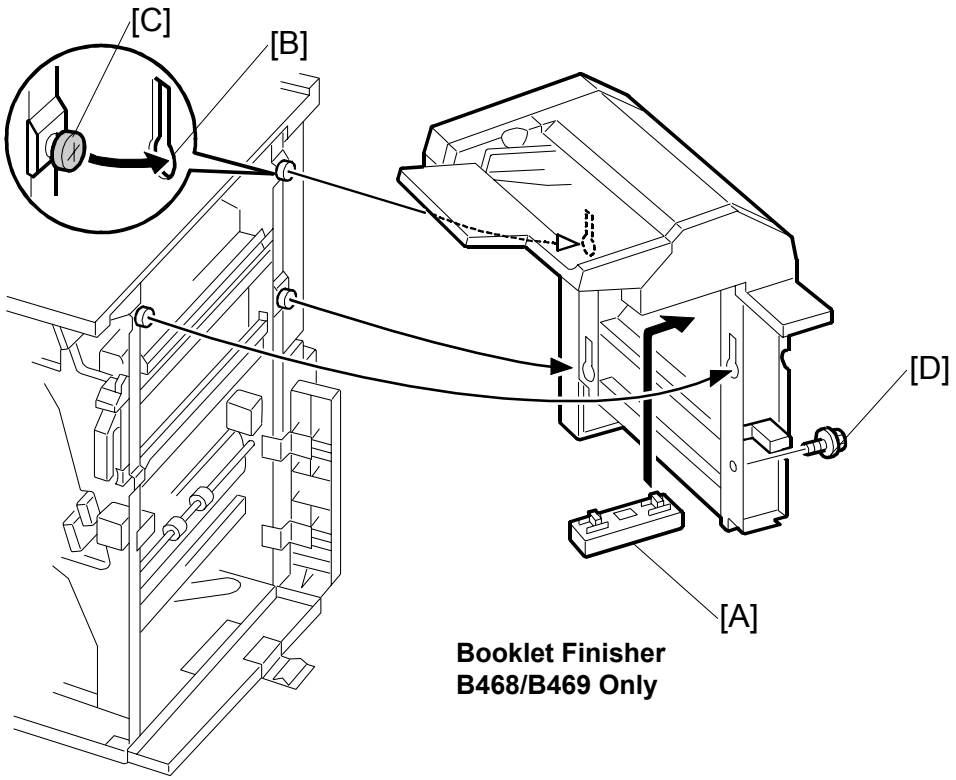


⚠CAUTION

Make sure that the finisher is disconnected from the main machine and that the copier is switched off and unplugged before starting the following procedure.

1. Attach the three shoulder screws [A] (☞ x 3).
2. Remove the ground plate [B] from the finisher and save the screws
3. Attach the bottom plate [C] (☞ x 2, M3 x 6) then re-attach the ground plate to the bottom plate (☞ x 2) with the screws removed in Step 2.
4. Attach the bottom front cover extension [D] (☞ x 2, M4 x 8).
5. Attach the top front cover extension [E] (☞ x 2, M4 x 8).
6. Attach the rear cover extension [F] (☞ x 2, M3 x 6).

Attaching the Interposer Tray



Booklet Finisher
B468/B469 Only

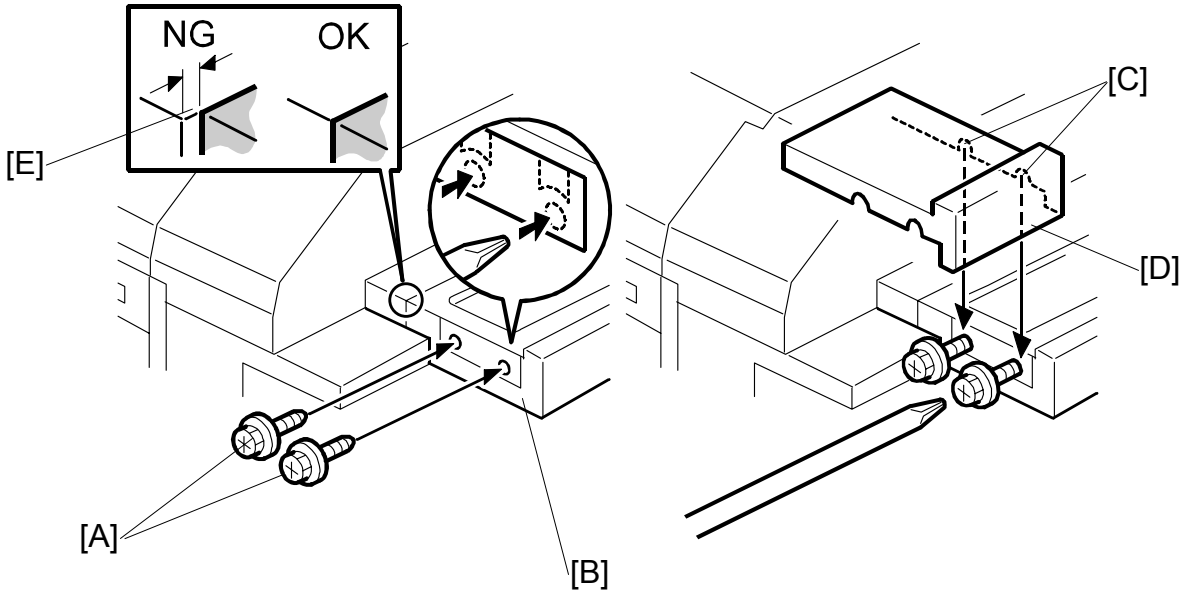
1. If you are installing cover interposer tray on the B468/B469 finisher, insert the spacer [A] and snap it into position.
   NOTE: If you are installing the cover interposer tray on the B478, do not install this spacer. This spacer is for the B468/B469 installation only.
2. Pick up the cover interposer tray, align the keyholes [B] with the shoulder screws [C], then slide the cover interposer down onto the screws.
3. Secure the cover interposer with the screw [D] (🔩 x 1, M3 x 6).

NOTE: 1) If you are installing the cover interposer tray on the B468, skip the next section and go directly to “Docking the Finisher with the Machine” on page 1-74.
2) If you are installing the cover interposer tray on the B478, go to the next section, install the corner plates on the B478, then go to “Docking the Finisher with the Machine” on page 1-74.

Attaching the Corner Plates for the B478

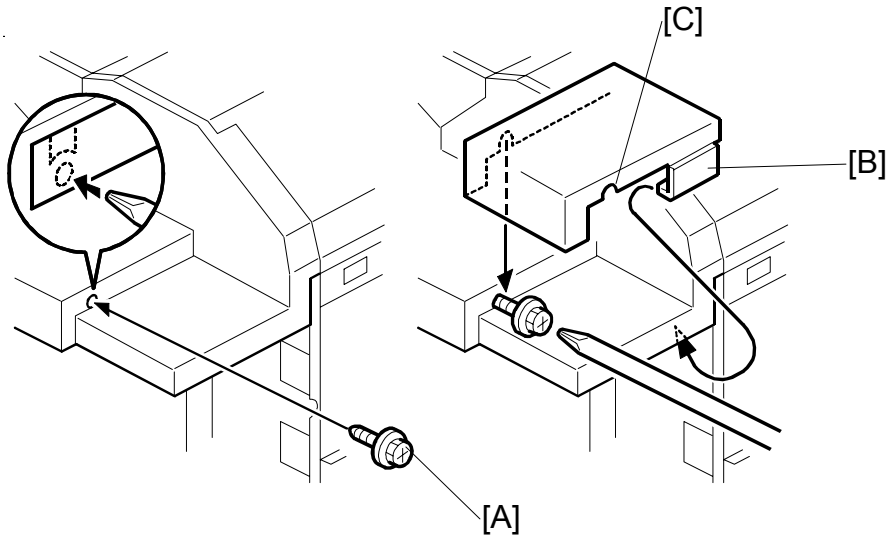
CAUTION: The corner plates are installed on the B478 only. Attach the cover interposer tray to the finisher before attaching the corner plates.

Right Rear Corner Plate (B478 only)



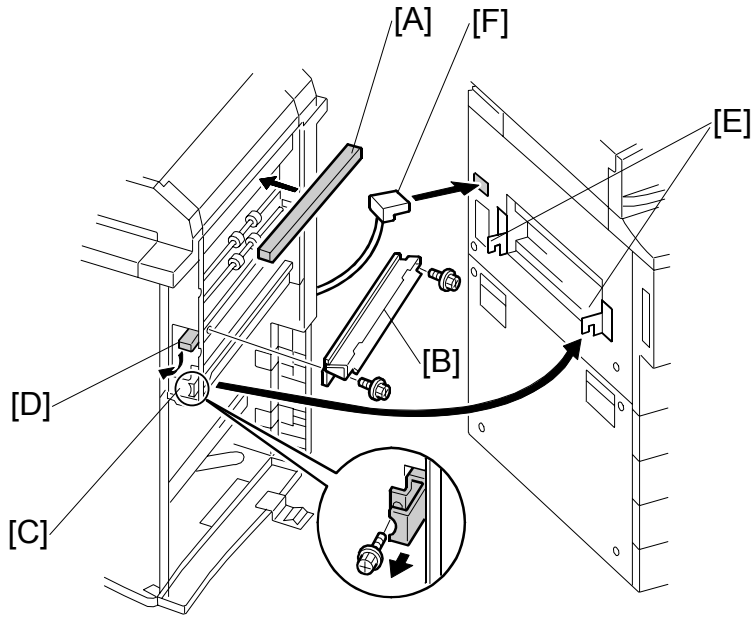
1. Temporarily attach the screws [A] (with about two turns) to the right end of the finisher extension table [B] (🔩 x 2, tapping M4 x 8)
   NOTE: The holes are not visible because they are covered with tape. Just punch the screws through the holes.
2. Align the cutouts [C] of the right rear corner plate [D] with the screws and attach the plate.
   NOTE: If there is a gap [E] between the plate and the tray extension attached to the side of the finisher, loosen the two screws below the table extension (not shown), align the table extension with the corner of the finisher and plate, then re-tighten the tray extension screws.
3. With a long screw driver inserted through the cutouts in the right rear corner plate [D], tighten the screws to fasten the right rear corner plate to the table extension [B].

Right Front Corner Plate (B478 only)



1. Temporarily attach the screw [A] (M4 x 8) with about two turns to fasten to the panel at the right front corner.
   NOTE: The hole is not visible because it is covered with tape. Just punch the screw through the hole.
2. With the clamp [B] under the edge of the corner, align the cutout [C] in the right front corner plate with the screw, then snap it into position.
3. With a long screwdriver inserted into the plate cutout [C], tighten the screw to fasten the right front corner plate.

Docking the Finisher with the Machine



1. Attach the sponge strip [A] provided with the finisher.
   NOTE: If you are installing the cover interposer tray with a previously installed finisher, remove the strip from the finisher and attach it to the cover interposer tray.
2. Attach the guide plate [B] (removed from the finisher) to the cover interposer (🖉 x 2).
   NOTE: Be sure to use the two small tapping screws provided, not the machine screws removed from the finisher with the guide plate.
3. Release the lock lever [C] (🖉 x 1).
4. Lower the transport guide plate [D].
5. Slowly push the finisher against the side of the machine until the brackets [E] enter the slots.

> **⚠CAUTION**
> **Dock the finisher carefully to avoid bending the entrance guide plates. Bent guide plates could interfere with paper transport from the machine to the finisher.**

6. Secure the lock lever [C] (🖉 x 1).
7. Raise the transport guide plate [D] to close it.
8. Plug the connector [E] into the copier.
9. Switch on the machine and execute SP5158 001 ~ 008 to select the default paper sizes for the cover interposer unit. For details, see the service manual “5. Service Tables”.

1.12 INSTALLATION OF MFP CONTROLLER OPTIONS

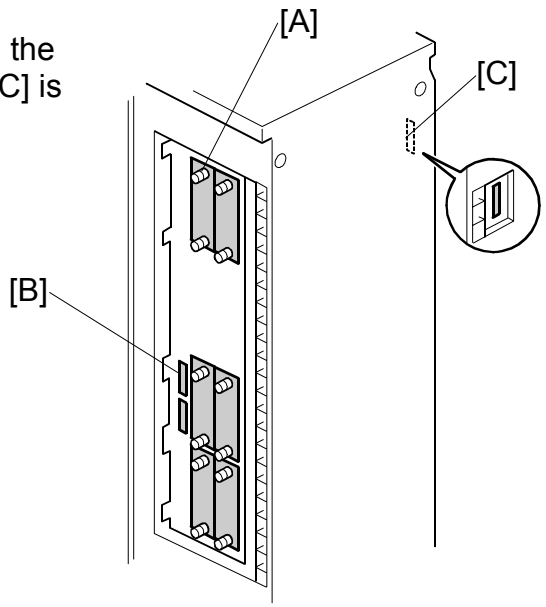
1.12.1 OVERVIEW

To facilitate the installation of MFP options, 6 slots for boards and 3 slots for SD cards are provided on the side of the controller box. Each board or SC card must be inserted into its assigned slot. The slot assignment of each item is listed in the table below, and a decal with the same information is attached to the controller box cover.

MFP Option Slot Assignment

Slot	Decal Name	Description
A1	External CTL	I/F board for an external controller such as EFI
A2	Tandem	Copier Connection Kit B328
B1	File Format Converter	MLB (Media Link Board) B609
B2	Parallel (1284)	IEEE 1284 Centronics Parallel Interface B580
B3	1394/802.11b/USB2.0	IEEE 1394 (FireWire) B581 IEEE 802.11b (Wireless LAN) B582 USB 2.0 B596 **Note**: Only one of the cards can be inserted at a time.
B4	Ethernet	NIC Kit B580 (100Base TX/10BaseT) NIC Board B594 (100Base TX/10BaseT)
C1	Printer/Scanner	SD card for Printer/Scanner Kit B580
C2	Option PDL	SD card for PS3 B613
C3	Service	SD card for Machine Firmware update by the customer engineer.

The large slots [A] are for boards (cards) and the small slots [B] are for the SD cards. Slot C3 [C] is on the other side of the controller box.



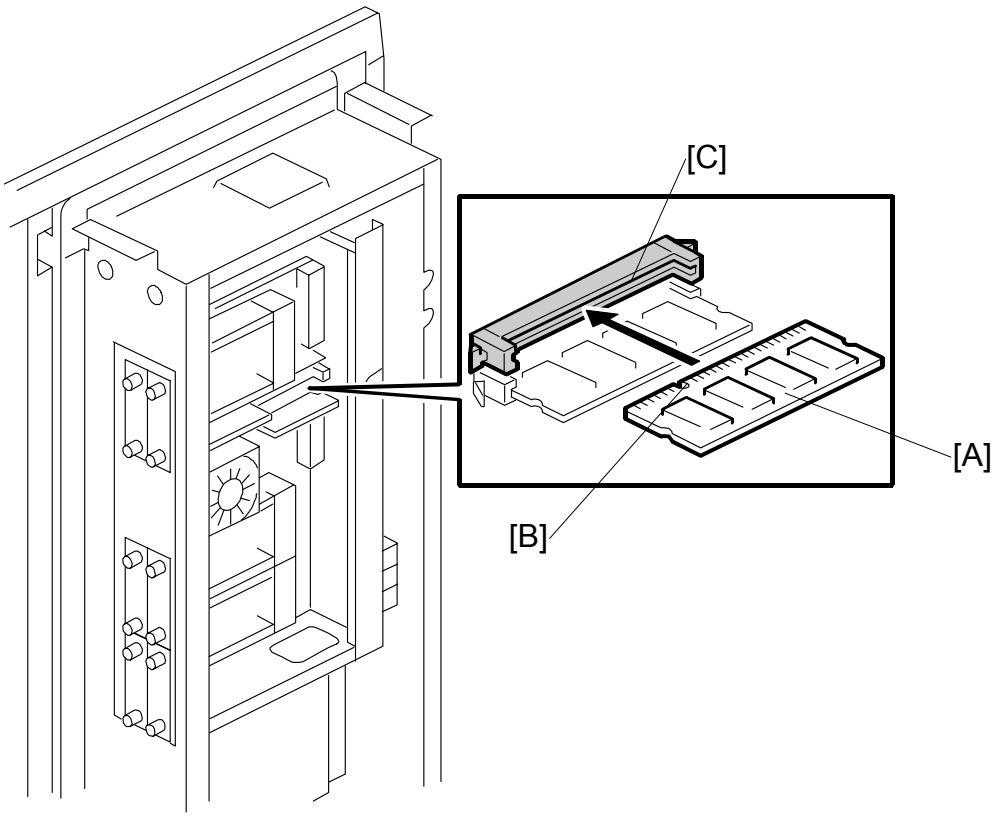
1.12.2 PRINTER/SCANNER KIT (B580)

Accessories

Description	Q'ty
1. NIC Board	1
2. IEEE 1284 Centronics	1
3. Caution Decal	1
4. Printer/Scanner SD Card	1
5. Printer Keytops (English/Symbol)	2
6. Scanner Keytops (English/Symbol)	2
7. Ferrite Core (RFC-10)	1
8. EULA Sheet	1
9. FCC Decal	1

NOTE: The optional 256 MB Memory Kit B585 is required for this installation and must be purchased separately. The memory kit is not provided with the Printer/Scanner Kit B580.

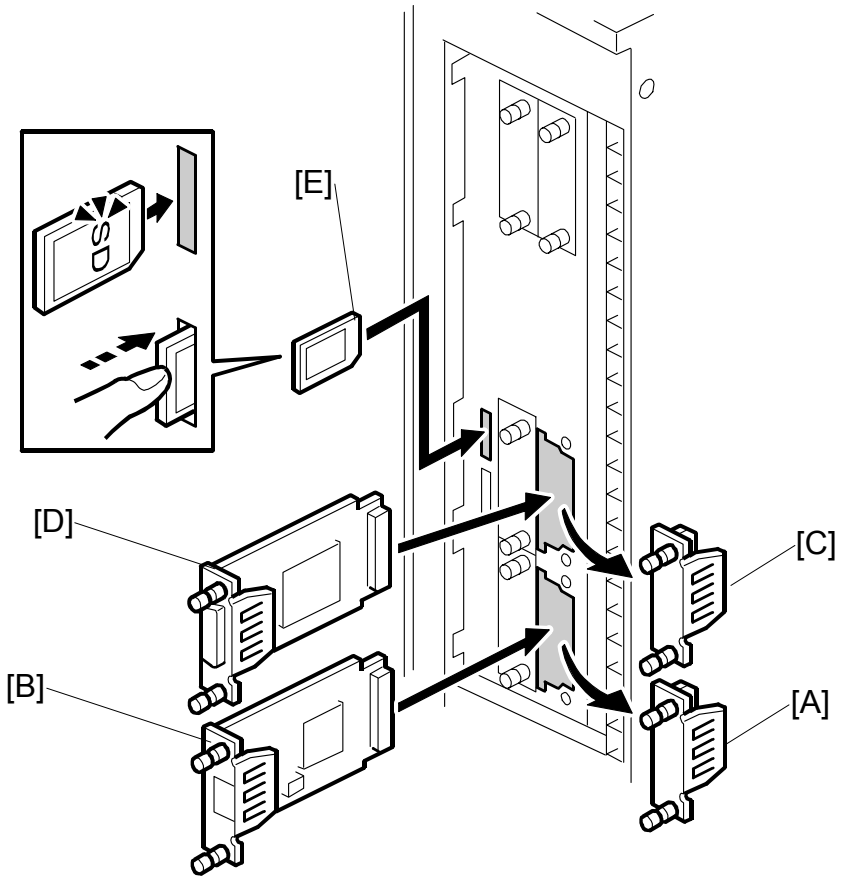
Installation



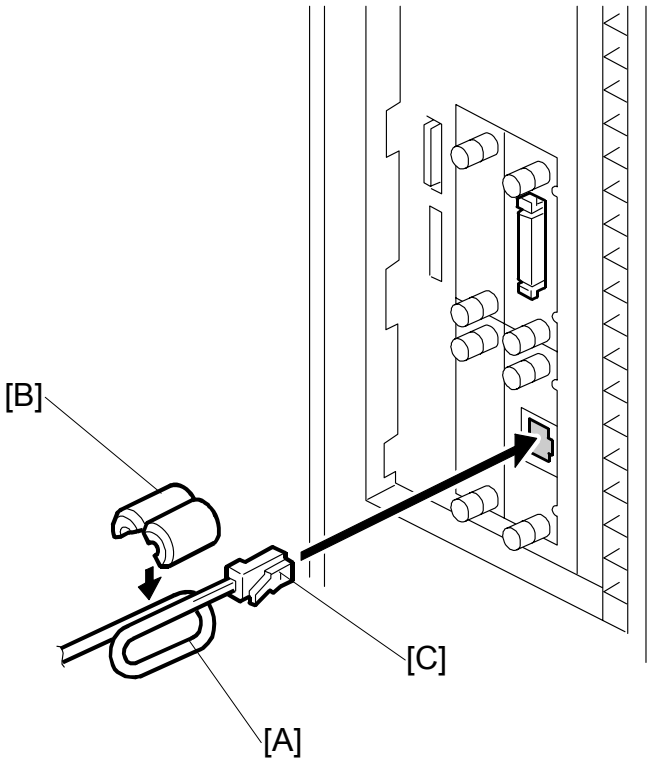
⚠CAUTION

Before you begin this procedure, switch the machine off and disconnect the power plug from the power source.

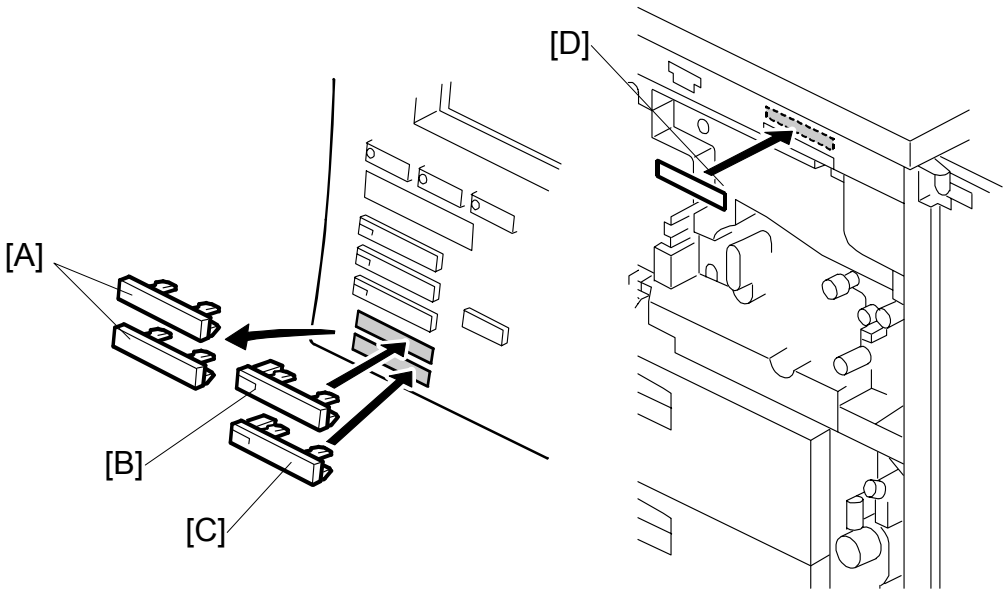
1. Remove the controller box cover (🔩 x 9).
2. Hold the 256 MB memory DIMM [A] with the slot [B] in the edge connector on the left, then insert the DIMM into the slot [C] above the other memory DIMM.
   NOTE: To remove the memory DIMM, spread the spring-loaded clips on either end of the DIMM.
3. Re-attach the controller box cover.



4. Remove the cover [A] of Slot B4 (🔩 x 2).
5. Insert the NIC board [B] into Slot B4 and fasten it with the screws.
6. Remove the cover [C] of Slot B2 (🔩 x 2).
7. Insert the Centronics board [D] into Slot B2 and fasten it with the screws.
8. Hold the SD Card [E] with its label facing the as shown above, then insert it into Slot C1.
   NOTE: Pushing in the SD Card releases it for removal. Make sure the SD Card is inserted and locked in place. If it is partially out of the slot, push it in gently until it locks in place.



9. Wind the cable [A] one full turn around the ferrite core [B], then clamp the core to lock it.
10. Connect the cable [C] to the NIC board.



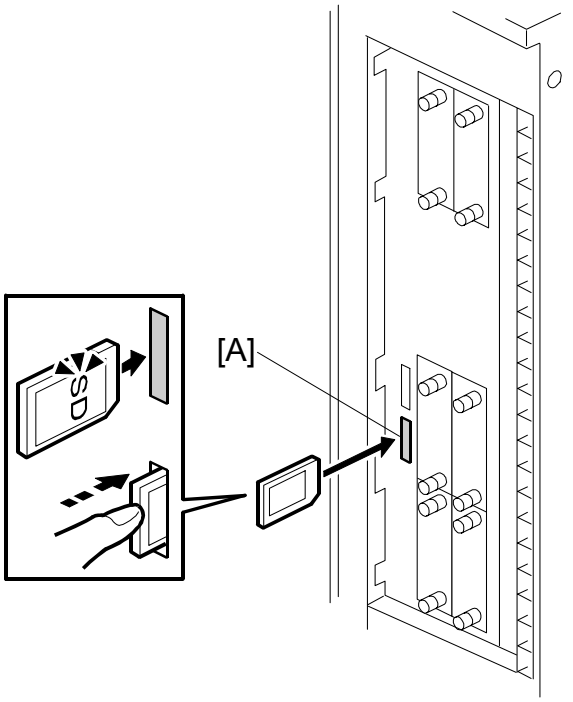
11. On the operation panel, remove the slot covers [A] and discard them.
12. Install the “Printer” keytop [B] then the “Scanner” keytop [C]. Select either the English set or Symbol set for installation. The correct order is:
    - Printer (upper)
    - Scanner (lower)
13. Attach the decal [D] to the main machine.
14. Follow the instructions in the Operation Instructions to complete the installation for the printer/scanner option.

1.12.3 PS3 (B613)

Accessories

Description	Q'ty
1. PostScript3 Emulation SD Card	1
2. Decal	1

Installation



1. Switch the machine off.
2. Insert the PS3 SD Card into Slot C2 [A].
   NOTE: Pushing in the SD Card releases it for removal. Make sure the SD Card is inserted and locked in place. If it is partially out of the slot, push it in gently until it locks in place.
3. Switch the machine on.

1.12.4 USB 2.0 (B596)

Accessories

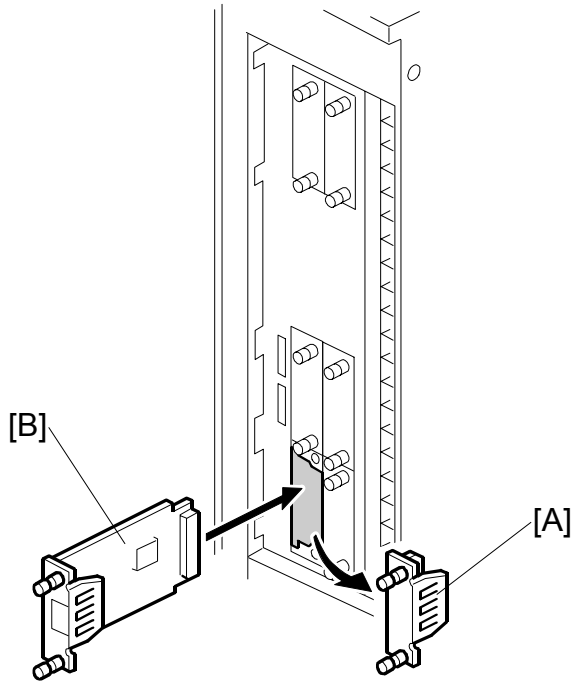
Description	Q'ty
1. USB 2.0 Board	1

Installation

Only one PCI slot (B3) is available for one of these options:

- USB 2.0
- IEEE 801.11b (Wireless LAN)
- IEEE 1394 (FireWire)

If another card is installed in B3, you must remove it before installing USB 2.0 B596.



1. Switch the machine off.
2. Remove the cover [A] of Slot B3 (🔩 x 2).
3. Insert the USB 2.0 board [B] into Slot B3 and fasten it with the screws.
4. Print a configuration page to confirm that the machine recognizes the installed board for USB2.0:
   User Tools > Printer Features > List Test Print > Configuration Page

1.12.5 IEEE 1394 KIT (B581)

Accessories

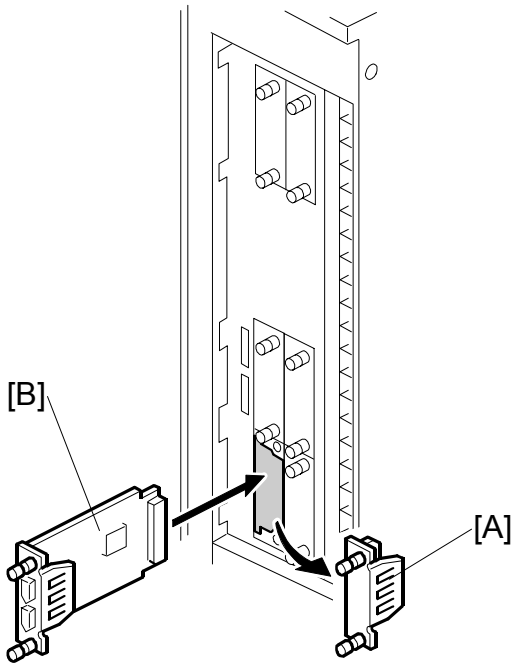
Description	Q'ty
1. IEEE 1394 Board	1
2. 4-Pin Cable	1
3. 5-Pin Cable	1

Installation

Only one PCI slot (B3) is available for one of these options:

- USB 2.0
- IEEE 801.11b (Wireless LAN)
- IEEE 1394 (FireWire)

If another card is installed in B3, you must remove it before installing IEEE 1394 B581.



1. Switch the machine off.
2. Remove the cover [A] of Slot B3 (🔩 x 2)
3. Insert the IEEE 1394 board [B] into Slot B3 and fasten it with the screws.
4. Switch the machine on and print a configuration page to confirm that the machine recognizes the installed board for IEEE 1394 (FireWire):
   User Tools> Printer Features> List Test Print> Configuration Page

1.12.6 IEEE 802.11B (B582)

Accessories

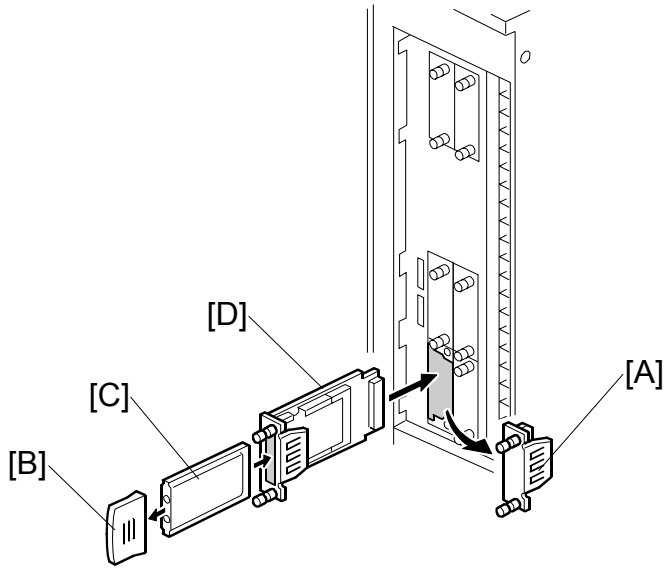
Description	Q'ty
1. IEEE 801.11b Board	1
2. PCI Card	1
3. Antennas	2
4. Velcro pads	2

Installation

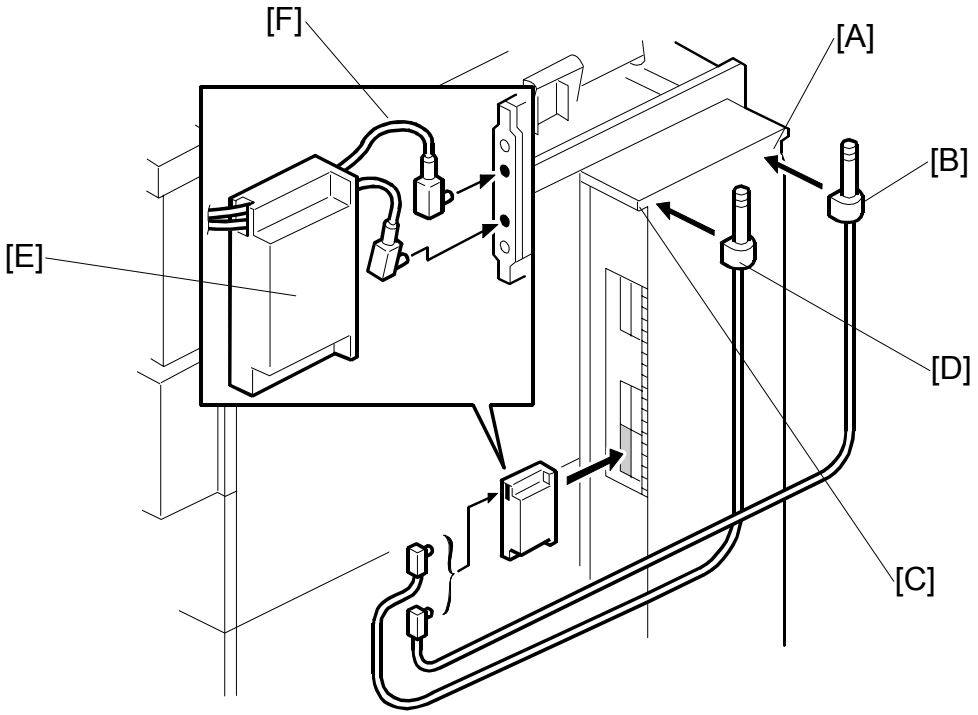
Only one PCI slot (B3) is available for one of these options:

- USB 2.0
- IEEE 801.11b (Wireless LAN)
- IEEE 1394 (FireWire)

If another card is installed in B3, you must remove it before installing IEEE 802.11b B582.



1. Switch the machine off.
2. Remove the cover [A] of Slot B3 (🔩 x 2).
3. Detach the plastic protector [B] from the PCI card.
4. Insert the PCI card [C] into the wireless LAN board.
5. Insert the wireless LAN board [D] into Slot B3 and fasten it with the screws.



6. Remove the tape from the back of the Velcro patch, attach the patch to the right corner [A] of the controller box, then attach the antenna [B] to the patch.
7. Remove the tape from the back of the Velcro patch, attach the patch to the left corner [C] of the controller box, then attach the antenna [D] to the patch.
8. Pass the connectors through the cover [E].
9. Connect each antenna to a terminal [F] and attach the cover.

   NOTE: 1) Attach the antennas as described above. However, if you change the location of either antenna, please remember that the antennas should be separated by at least 40~60 mm (1.5~2.5").
   2) Set up the antennas in an area that is free of interference from electrical equipment that generates a strong electromagnetic field.
   3) Always detach the antennas from the corners of the machine and disconnect them before moving the machine.
   4) If reception is poor, move the machine and antennas closer to the access point.

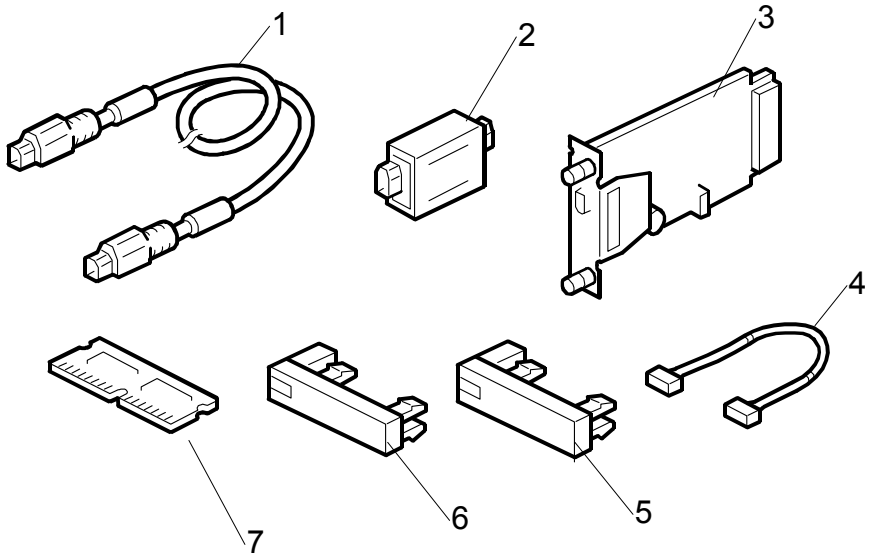
10. Switch the machine on and print a configuration page to confirm that the machine recognizes the installed board for IEEE 802.11b (Wireless LAN):

    User Tools> Printer Features> List Test Print> Configuration Page

⇒1.12.7 COPIER CONNECTION KIT (B328)

Accessories

Check the quantity and condition of the accessories in the box against the following list:



Description	Q'ty
Interface Cable 1394	3
Repeater Hub 1394	2
Connection PCB	2
Power Repeater Cable	2
"Other Function" Keytops (NA, EU 1 ea.)	2
"Printer/Other Function" Keytops (NA, EU 1 ea.)	2
SDRAM DIMM 64 MB	2

Preparation

Before you begin the installation procedure, you must first:

- Determine the distance between the machines to be connected.
- Determine whether the printer/scanner option is installed on the machines.

Measure the distance between the machines, then decide how many cables and repeater hubs are required.

DISTANCE	POWER REPEATER HUBS	INTERFACE CABLES
Up to 4.5 m (14.8 ft.)	None	1
4.5 ~ 9.0 m (14.8 ~ 29.5 ft)	1	2
9.0 ~ 13.5 m (29.5 ~ 112.5 ft.	2	3

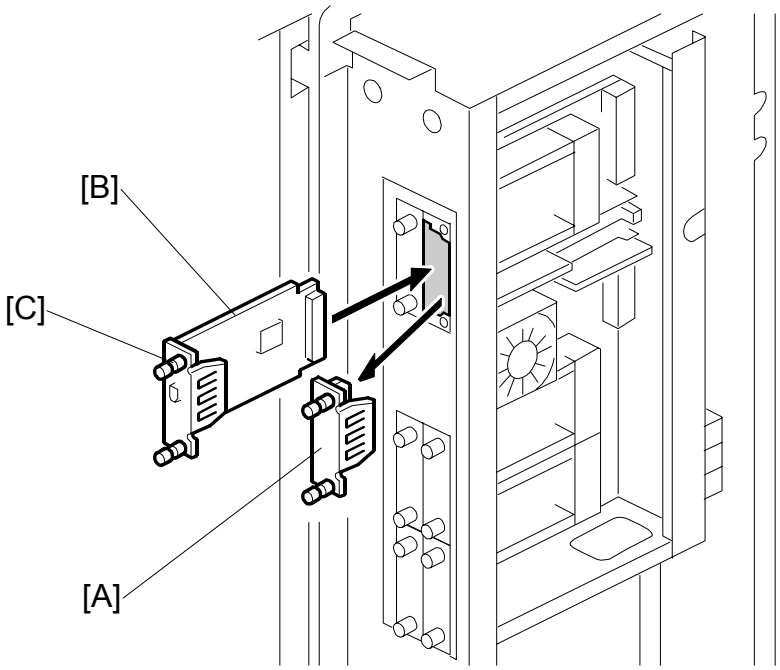
⇒

Two sets of keytops (2 per set, 1 for NA, 1 for EU) are provided for each machine, but you need to install only one keytop on each machine.

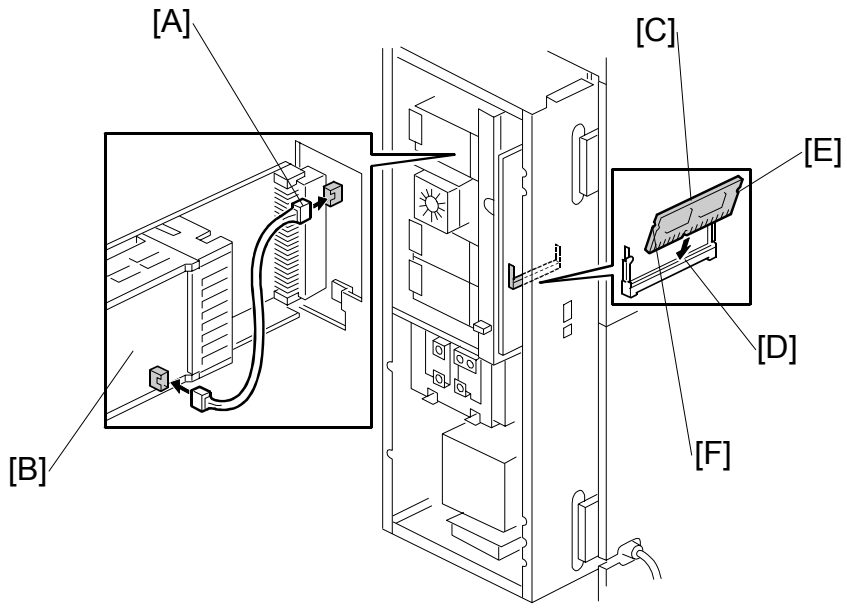
- Install the key labeled “Printer/Other Function” (or its equivalent symbol keytop for EU) on a machine with the printer/scanner option installed
- Install the key labeled “Other Function” (or its equivalent symbol keytop for EU) on a machine without the printer/scanner option.

Installation Procedure

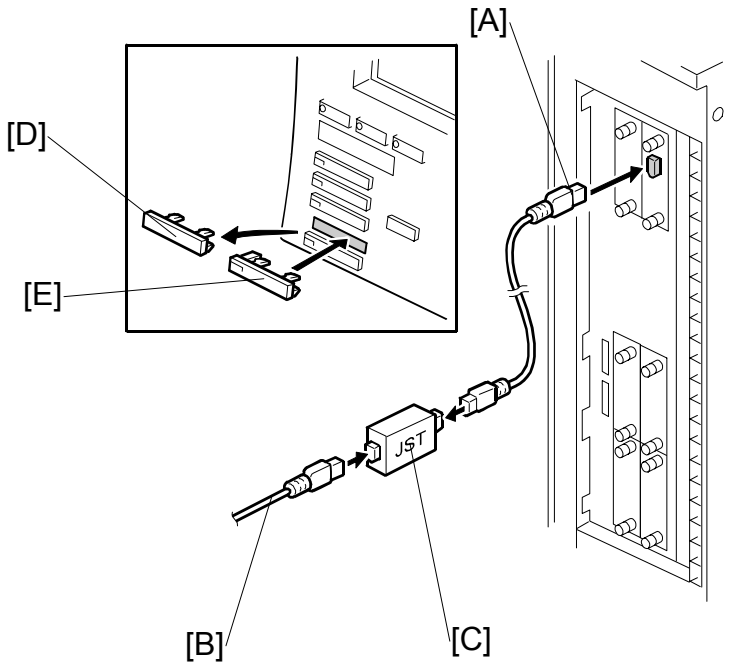
⚠CAUTION
Switch the machine off and unplug the machine before starting the following procedure.



1. Switch the main power switch off.
2. Remove the controller box cover. (🔩 x7)
3. Remove the cover [A] from slot A2.
4. Align the PCB with the bottom groove, and push the connection PCB [B] into the slot.
   NOTE: Make sure that the edge of the PCB is in the groove before you push the card into the machine.
5. Fasten the PCB with the attached screws [C].



6. Connect the power repeater cable [A] to the mother board at CN149.
7. Connect the other end of the power repeater cable the connection PCB [B].
8. Insert the 64 MB SDRAM DIMM [C] into the slot on the mother board.
   - Set the edge connector at a 45 degree angle with the slot on the edge connector [D] aligned with the post below.
   - Press down slightly then push the DIMM toward the mother board until it snaps into place.
   - Make sure that the notches on both sides of the DIMM [E] [F] engage the pawls of the spring loaded arms so the DIMM is perpendicular.
9. Re-attach the controller box cover.
10. Repeat Steps 1 to 9 to install the connection PCB and 64 MB DIMM on the slave machine.



11. Insert one end of the interface cable [A] to the connection PCB inserted in slot A2.
12. If additional interface cables are required, connect the cables [B] with the repeater hubs [C].
13. On the operation panel of the both machines, remove the second cover (or Printer key) from the bottom [D].
14. Install an appropriate key for each machine:

    Attach the “Printer/Other Function” key [E] (or its equivalent symbol keytop for EU) if the printer/scanner option is installed in the machine.

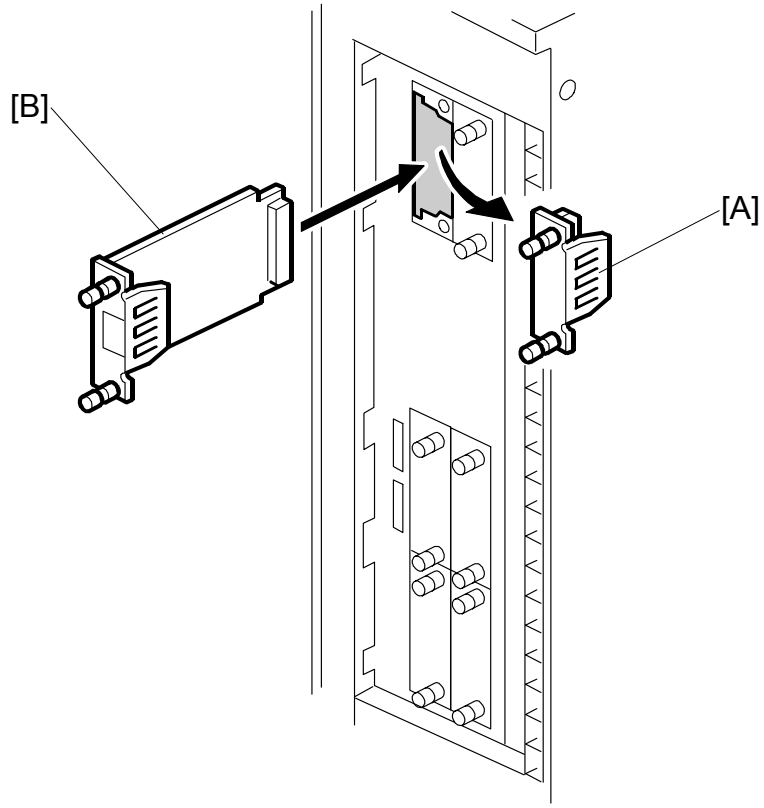
    -or-

    Attach the “Other Function” key [E] (or its equivalent symbol keytop for EU) if the printer/scanner is not installed in the machine.
15. Attach the other end of the connection cable to the connection PCB installed in the other machine.

⟹ 16. The following software must be downloaded onto both the master and slave machine.
- SYSTEM Ver. V3.04.1(install first) or later
- NCS (NIB) Ver. 4.13.3 or later
- NetFile Ver. 3.04.2 or later
- BCU (Engine) V4.01.1 or later
- LCDC (NA, EU) Ver. 2.09 or later

NOTE: For details about downloading procedures, see Section “5. Service Tables” of the Service Manual.

⇒1.12.8 EFI (G353)



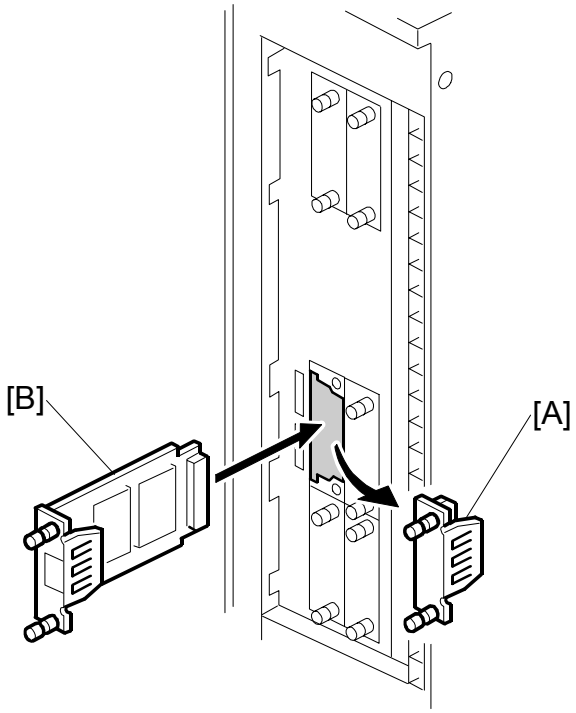
1. Switch the machine off.
2. Remove the cover [A] of Slot A1 (🔩 x 2).
3. Insert the EFI Board G353 [B] into Slot A1 and fasten it with the screws.

⇒1.12.9 MLB (B609)

Accessories

Description	Q'ty
1. MLB Board	1
2. Instructions	1

Installation



1. Switch the machine off.
2. Remove the cover [A] of Slot B1 (🔩 x 2).
3. Insert the MLB board [B] into Slot B1 and fasten it with the screws.
4. Switch the machine on.

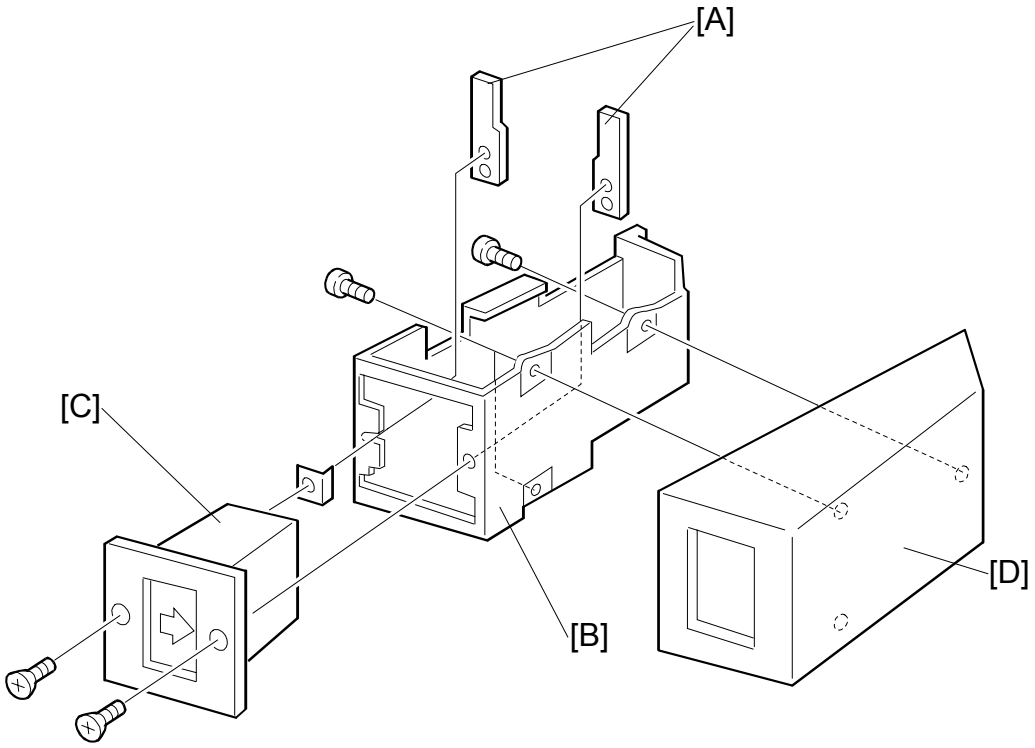
⇒1.13 KEY CARD COUNTER

1.13.1 ACCESSORIES

Description	Q'ty
1. Key Counter Cover	1
2. Key Counter Plates	2
3. Key Counter Bracket	1
4. Machine screw M3 x 6	1
5. Shoulder Screw M3 x 4	1
6. Tapping Screws M4 x 8	3
7. Machine Screws M3 x 20	2
8. External Screw M3 x 20	1
9. Machine Screw (Flathead) M4 x 16	1
10. Extension Cable (for LCT Installation)	1
11. Extension Cable Clamps (for LCT Installation)	6

⇒1.13.2 INSTALLATION

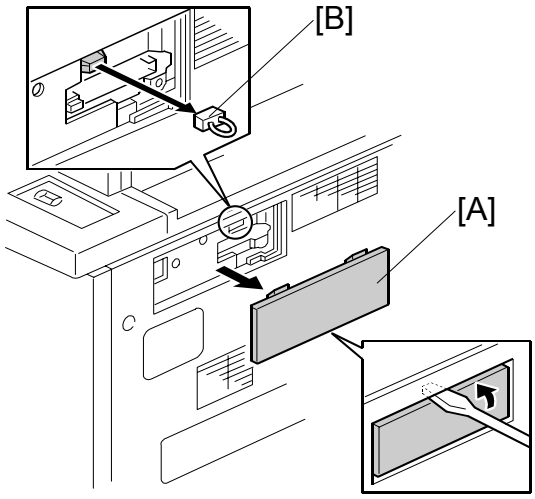
Assembling the Key Counter

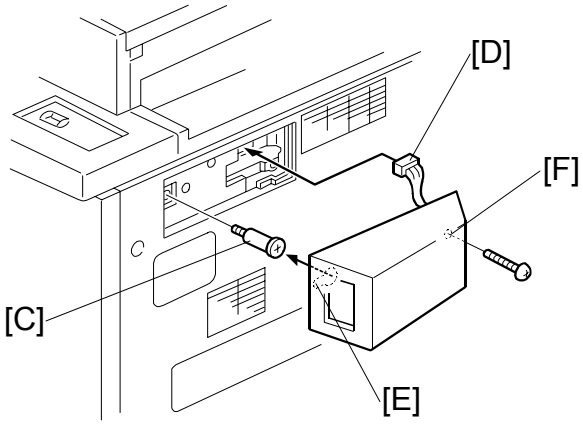


1. While holding the key counter plates [A] inside the key counter bracket [B], insert the key counter holder [C]
2. Fasten the key counter holder [C] through the bracket plate to the counter plates [A] (🔩 x 2).
3. Fasten the cover [D] to the key counter bracket [B] (🔩 x 2).

⟹ *Attaching the Key Counter to the Copier*

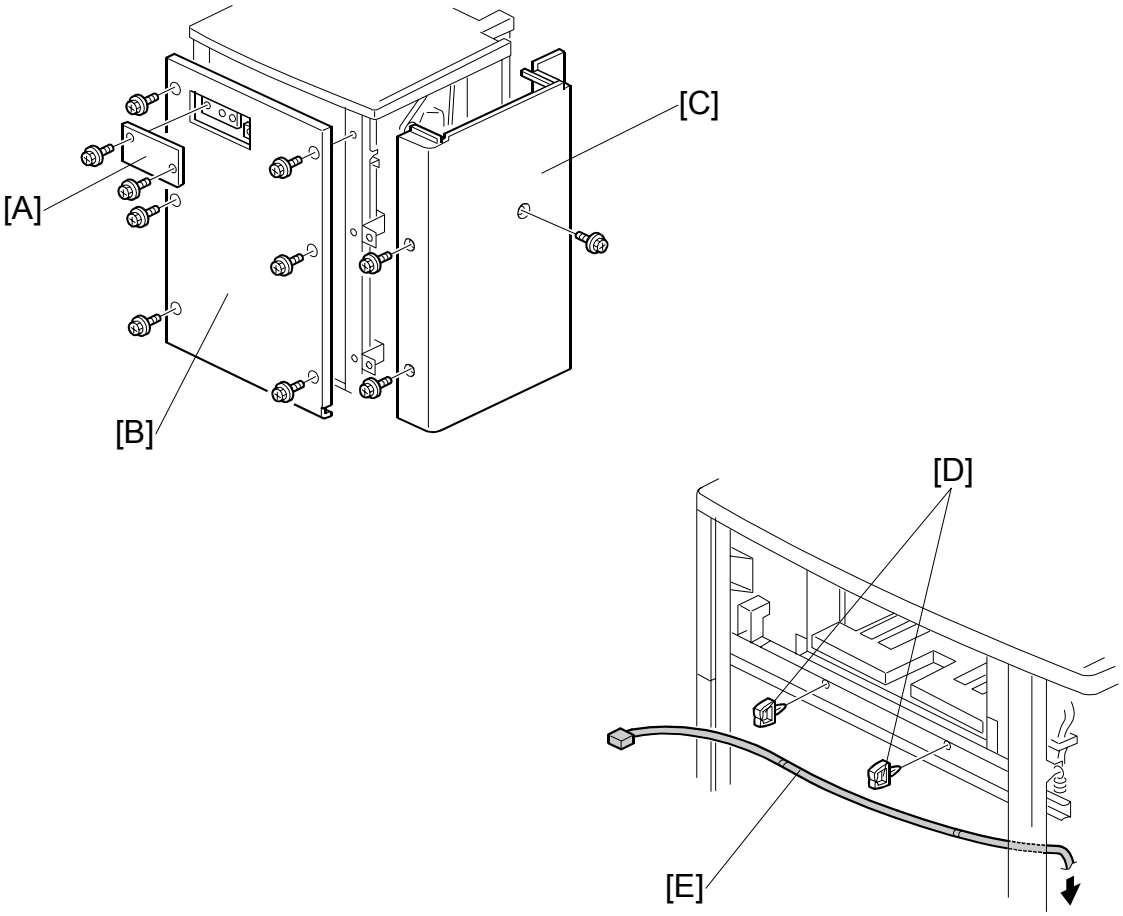
Attach the key counter to the copier if the LCT is not installed.



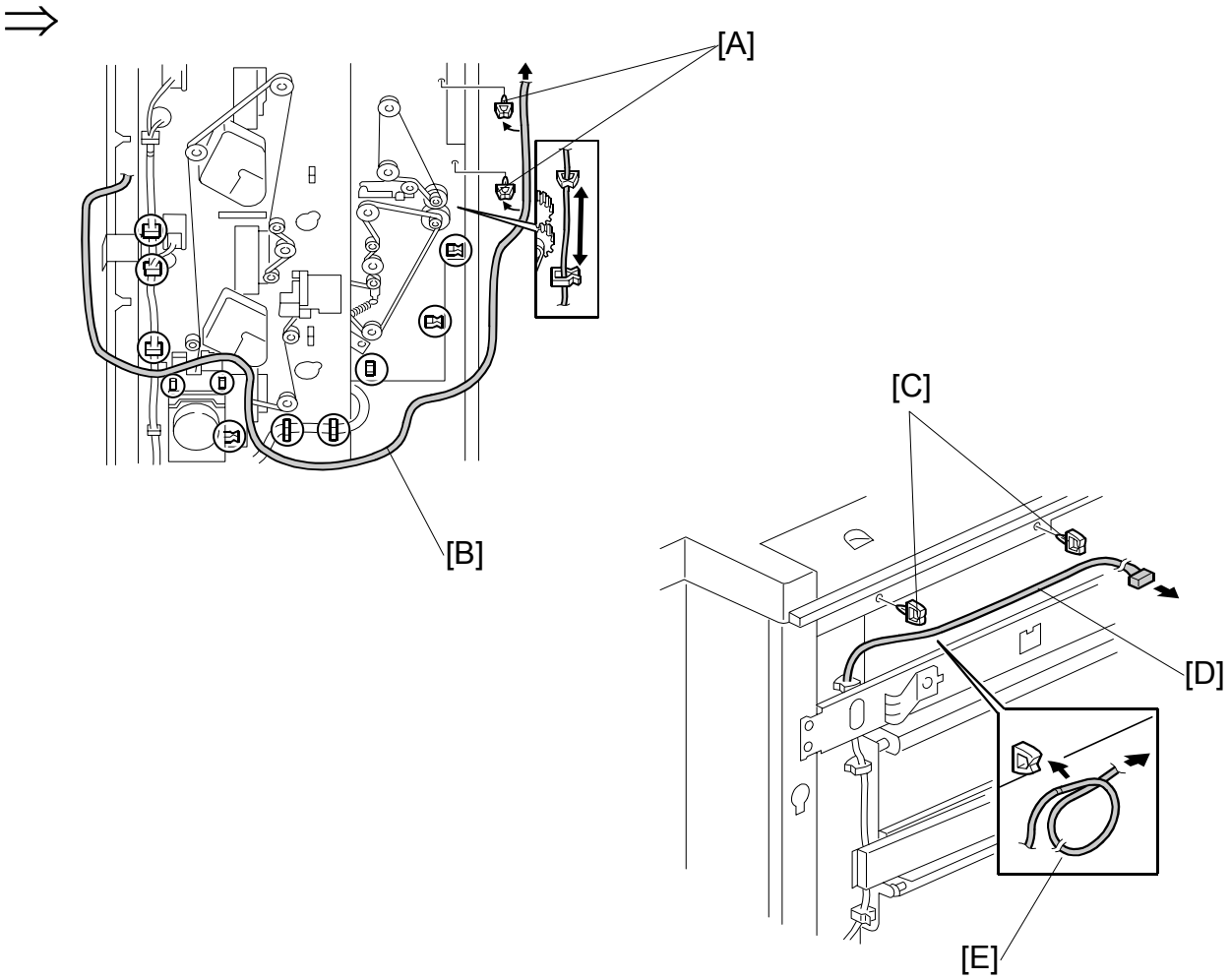


1. On the right side of the copier, remove the small cover [A].
2. Remove the jumper connector [B].
3. Fasten the shoulder screw [C] to the side of the machine.
4. Connect the key count assembly [D].
5. Fit the keyhole of the key counter bracket [E] over the head of the shoulder screw, then slide it back.
6. Fasten the key counter assembly [F] to the copier (🔩 x 1).
7. Do the User Tool and SP mode settings described at the end of this section.

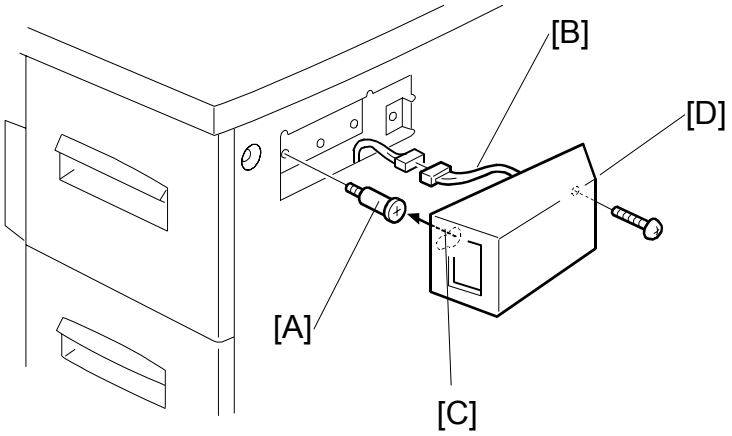
⟹ *Attaching the Key Counter to the LCT*

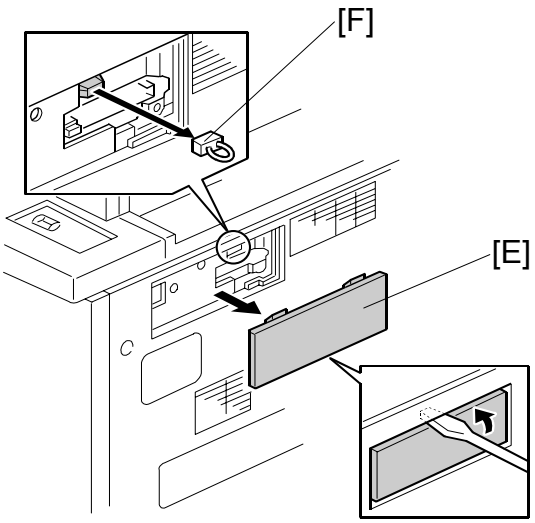


1. On the LCT right cover, remove the cover [A] (☞ x 2).
2. Remove the LCT right cover [B] (☞ x 6).
3. Remove the LCT rear cover [C] (☞ x 3).
4. On the right side of the LCT, attach 2 clamps [D].
5. Attach the extension cable [E] to the 2 clamps.

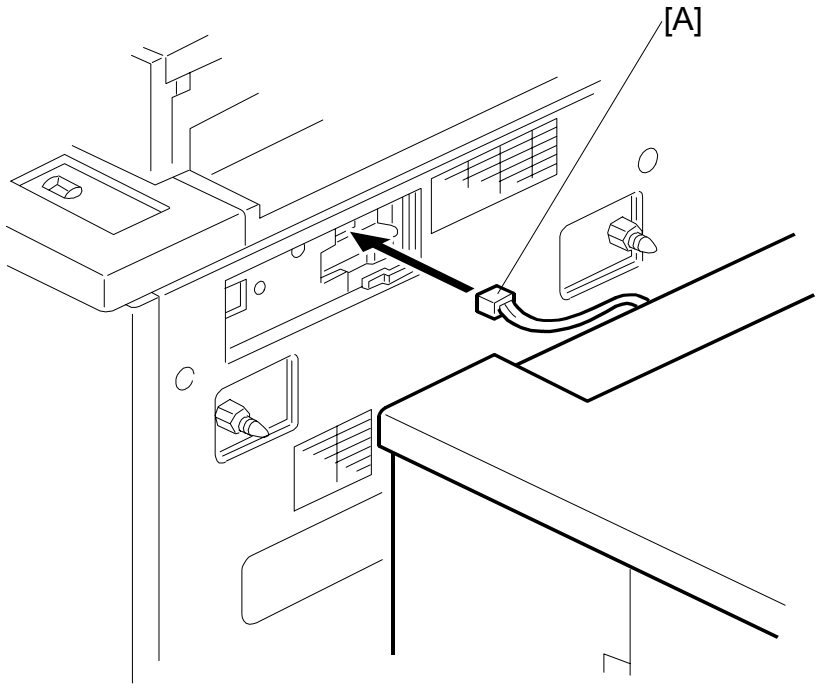


6. On the rear side of the LCT, attach 2 clamps [A].
7. Route the cable [B] as shown.
8. On the left side of the LCT, attach 2 clamps [C].
9. Route the cable [D] as shown.
10. If the cable from the right cover is too long, loop it [E] to make it shorter.





11. Re-attach the right LCT cover.
12. Fasten the shoulder screw [A] to the side of the LCT.
13. Connect the key count assembly [B].
14. Fit the keyhole of the key counter bracket [C] over the head of the shoulder screw, then slide it back.
15. Fasten the key counter assembly [D] to the LCT (🔩 x 1).
16. On the right side of the copier, remove the small cover [E].
17. Remove the jumper connector [F].



18. Connect the extension cable [A] from the LCT to the copier.
19. Dock the LCT to the copier.

User Tool and SP Mode Settings

1. Instruct the key operator to enable the key counter with the User Tools setting: User Tools> System Settings> Key Counter Management> then click the ON button for the items you want to enable for the counter (Copier, Document Server, Printer, Scanner).
2. Enter the SP mode and set SP5113 (Optional Counter Type) to 002 (Key Card (Countdown Type)) or 005 (MF Key Card).
   NOTE: If the counter is a countdown type, you must select 002.
3. Enter the SP mode and set SP5121 to “0” (Paper Feed Count) or “1” (Paper Exit Count) to determine whether the counter counts at paper feed-in or a paper exit.

PREVENTIVE MAINTENANCE

2. PREVENTIVE MAINTENANCE

2.1 PM PARTS

The amounts mentioned (K=1,000) as the PM interval indicate the number of prints or copies unless stated otherwise. These numbers are based on the PM counter.

Symbol Key for PM Tables

I: Inspect. Clean, replace, or lubricate as needed.
C: Cleaning required.
R: Replacement required.
L: Lubrication required.

⚠WARNING
Turn off the main power switch and unplug the machine before performing any procedure in this section. Laser beams can seriously damage the eyes.

2.1.1 MAIN MACHINE

Main Unit PM Parts

	350K	700K	1000K	Expected	Note
OPTICS					
Exposure Glass	I	I	R		Dry cloth.
1st~3rd Mirrors	I	I	I		Optical cloth.
APS Sensor	I	I	I		Dry cloth.
Scanner Rail	I	I	I		Dry cloth
Scanner Filter		C			Blower brush.
Toner Shield Glass	C	C	C		Optical cloth.

	350K	400K	700K	800K	1050K	Expected	Note
DEVELOPMENT							
Side Seals (x2)	C		C		C		Blower brush, dry cloth
Development Unit	I		I		I	9300K	
Development Roller	C		C		C		Dry cloth. *1
Development Doctor Blade	C		C		C		Insert the paper dust cleaner behind the blade to rub away the paper dust. *1
Entrance Seal	C		C		C		Blower brush or dry cloth
Toner Hopper (Outside)	I		I		I		
Gears (All)	I		I		I		Blower brush
Toner Filter (Center)		R		R		820K	
Toner Filter (front)		R		R		820K	
Developer	R		R		R		SP2801 (TD Sensor Initial Setting). Before execution, be sure to enter the Lot No. for the new developer.
Waste Toner Collection bottle	At 2400K, inspect, empty and clean. *2						
Suction Toner Collection Bottle	At 2500K replacement is required. *2						
Development Suction Motor Assy	At 2500K replacement is required. *2						

*1: Cleaning required when developer is replaced.
*2: K count assumes copying and printing on A4 LEF.

NOTE: If toner sticks to the development roller, the bias voltage will increase in that area. This may in turn cause dirty background on copies. Therefore, the development rollers should be cleaned whenever the developer is replaced.

	350K	500K	700K	1000K	1050K	Note
AROUND THE DRUM						
Side Seals	I		I		I	Blower brush, dry cloth
Ground Plate Screw	I		I		I	Conductivity check. Alcohol or water
Drum Filter	C		C		C	Blower brush
Cleaning Unit	I		I		I	Blower brush, dry cloth
Cleaning Brush Seal	I		I		I	
Cleaning Entrance Seal	C		C		C	
ID Sensor	C		C		C	
Transfer Unit Entrance Stay	C		C		C	
Corona Wire Casing	C		C		C	Dry cloth
Drum Potential Sensor	C		C		C	Blower brush
Quenching Lamp	C		C		C	Blower brush, dry cloth
Cleaning Brush	R		R		R	
Toner Filter Assy	R		R		R	(**Note 2**)
Transfer Belt Cleaning Blade	C	R	C	R		Dry Cloth (**Note 3**)
Cleaning Blade	R		R		R	(**Note 1**)
Grid Plate	R		R		R	(**Note 4**)
Charge Corona Wire	R		R		R	
Wire Cleaner	R		R		R	
Wire Cushion	R		R		R	
Pick-Off Pawls	R		R		R	(**Note 5**)
Transfer Belt		R		R		(**Note 3**)
Transfer Belt Cleaning Bias Roller	C	C	C	C		Alcohol
Transfer Belt Bias Brush		C		C		Blower brush
Rear Casing Guide		C		C		Dry cloth
Exit Bias Plate		C		C		Blower brush when transfer belt is replaced.
Belt Drive Roller		C		C		Alcohol, when transfer belt is replaced.
Belt Roller		C		C		
Cleaning Bias Roller ϕ6		C		C		Alcohol, when transfer belt is replaced. Apply conductive grease to electrical contacts.
Carrier Catcher	I		I		I	

NOTE: 1) Improper cleaning can cause vertical white or black lines.
2) Failure to change the filter could cause complete clogging in the flow of the toner.
3) Failure to replace the cleaning blade could cause toner to cling to the transfer belt, dirty back sides of copies, poor paper separation, or pawl marks on paper.
4) Failure to replace this item could cause the machine to return SC300, SC301, SC303, or SC304 due to a corona housing leak.
5) Failure to replace worn pawls could cause them to wear and sharpen, thus increasing the chance of scouring the drum surface.

	350K	500K	600K	Expected	Note
FUSING UNIT					
Pressure Roller, Cleaning Roller Bearings	I				Inspect only (**Note 1**)
Fusing Lamps (x3)	I				Inspect only
Pressure Roller Cleaning Roller	C				Dry cloth (water or alcohol can also be used if necessary)
Fusing Entrance Guide Plate	C				Water or alcohol
Oil Supply & Cleaning Web Assembly (**Note 8**)	R (EUR/A)		R (US)		After replacement, reset SP1902 001 (Web Motor Control – Web Consumption) to 0.
Hot Roller ϕ70			R	750K	
Hot Roller Strippers	C **Note 6**		R **Note 2**		Dry cloth
Pressure Roller Strippers	I				Dry cloth
Fusing Exit Roller	I				Water, alcohol
Pressure Roller		R		600K	When replacing, lubricate with Barrierta 55L or S552R.
Web Cleaning Roller			R	700K	(**Note 3**)
Hot Roller Ball Bearings			I **Note 4**		Inspect only
Pressure Roller Ball Bearings		I **Note 5**			
Hot Roller Bushings			I **Note 4**		When replacing hot roller, lubricate with Barrierta 55L or S552R.
Pressure Roller Bushings		I **Note 5**	I		Inspect only
Hot Roller Gears	L				Lubricate (Barrierta 55L or SS552R)
Fusing Exit Guide Plates (Upper, Lower)	I				Dry cloth wrapped around a metal scale
Cooling Entrance Guide Plate	I				
Fusing Web Brake Pad			R	700K	Dry cloth (**Note 7**)

NOTE: 1) Clean when servicing pressure roller or cleaning roller.
2) Replace when hot roller is replaced.
3) Replace with when oil supply & cleaning web is replaced, or after cleaning web end.
4) Inspect when hot roller is replaced.
5) Inspect when pressure roller is replaced.
6) Clean when replacing cleaning web.
7) Use dry cloth to clean oil from stopper when replacing cleaning web.
8) Europe: Near-end = 350K, US: Near-end = 600K

	350K	700K	1000K	Expected	Note
PAPER FEED					
Grip Rollers	C	C	C		Damp cloth
Relays Rollers	C	C	C		
Paper Feed Guide Plate	I	I	I		
Upper and Lower Registration Rollers	C	C	C		
Registration Sensor	C	C	C		Blower brush
Relay Sensor	C	C	C		Remove paper dust.
Paper Dust Remover	C	C	C		
Paper Feed Sensor	C	C	C		Blower brush
Paper Feed Rollers			R		Replace together.
Pick-Up Rollers			R		
Separation Rollers			R		

	350K	700K	1050K	Expected	Note
DUPLEX UNIT					
Transport Rollers	C	C	C		Damp cloth
Feed Rollers	C	C	C		
Reverse Transport Roller	C	C	C		
Reverse Feed Roller	C	C	C		
Inverter Feed Rollers	C	C	C		
Inverter Transport Rollers	C	C	C		
Entrance Sensor	C	C	C		Blower brush
Anti-Static Brush	I	I	I		
Duplex Inverter Sensor	C	C	C		Blower brush, inspect feeler movement.
Duplex Transport Sensor	C	C	C		Blower brush
Horizontal Transport Feed Roller (Resin Roller)	C	C	C		Damp cloth

GW CONTROLLER					
Controller Filter	C	C	C		Blower brush

NOTE: Paper dust on the duplex transport sensors and the duplex inverter sensor can cause paper jams. Therefore, these sensors should be cleaned with a blower brush at every PM visit.

2.1.2 ADF

	80K	160K	240K	Note
The PM interval is for the number of sheets that have been fed.				
Transport belt	R	R	R	
Feed belt	R	R	R	
Separation roller	R	R	R	
Pick-up roller	R	R	R	
Sensors	I	I	I	
Drive gears	I	I	I	

2.1.3 3000 SHEET BOOKLET FINISHER B468

	EM	300K	450K	600K	Note
Driver Rollers		C	C	C	Dry cloth
Idle Rollers		C	C	C	
Discharge Brush		C	C	C	
Bushings	L				Lubricate with silicone oil if noisy.
Sensors		C	C	C	Blower brush.
Jogger Fences		I	I	I	Make sure screws are tight.

2.1.4 COVER INTERPOSER TRAY B470

	EM	60K	120K	180K	Note
The PM interval is for the number of sheets that have been fed.					
Feed Belt		R	R	R	Replace as a set.
Pick-up Roller		R	R	R	
Separation Roller		R	R	R	
Driver Rollers		C	C	C	Damp clean cloth.
Idle Rollers		C	C	C	
Discharge Brush		C	C	C	
Bushings	L				Lubricate with silicone oil if noisy.
Sensors		C	C	C	Blower brush.

2.1.5 3000-SHEET FINISHER B478

	350K	700K	1050K	Note
Driver rollers	I	I	I	Alcohol
Idle rollers	I	I	I	
Discharge brush	I	I	I	
Bushings	I	I	I	Lubricate with silicone oil if noisy.
Sensors	I	I	I	Blow brush.
Jogger fences	I	I	I	Make sure screws are tight.
Staple waste hopper	C	C	C	Empty staple waste.

2.1.6 LCT B511, BYPASS TRAY B512

	1000K	2000K	3000K	Expected	Note
Paper feed roller	R	R	R		
Pick-up roller	R	R	R		
Separation roller	R	R	R		
Transport guide plate	Inspect at clean at every 350K.				
Grip roller					

2.1.7 PUNCH UNIT B377, B531, A812

	EM	300K	450K	600K	Note
Punch Waste Hopper		I	I	I	Remove and empty as required.

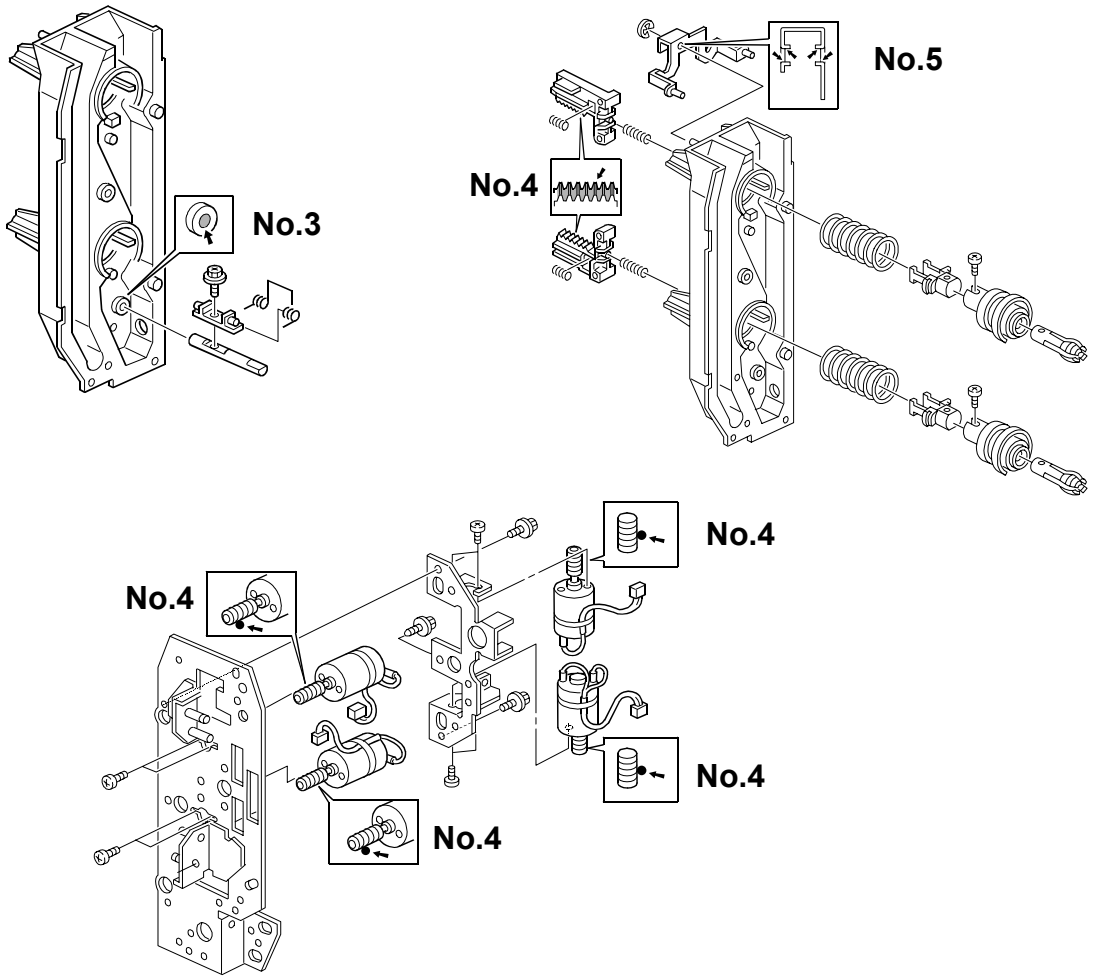
Main Lubrication

Types of Grease

a	Grease 501	**d**	Heat Resisting Grease MT-78
b	Grease Barrierta – JFE 5 5/2	**e**	Launa Oil 40
c	Grease – KS660 – SHIN-ETSU		

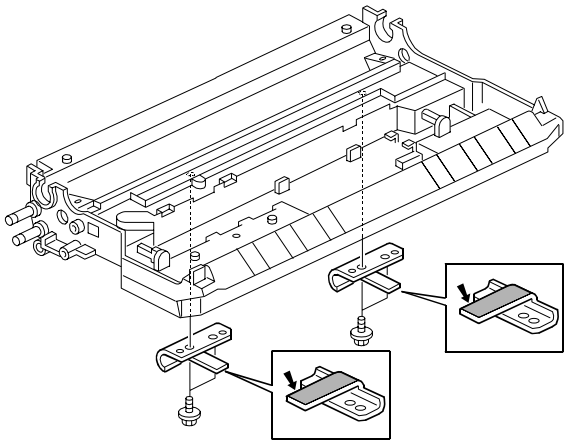
Toner Bank

No.	Lubrication Point	Type of Grease	Note/Remarks
3	Shaft holes of driving case	a	Only when the toner bank is disassembled for servicing.
4	Drive gears for toner chuck	a	
5	Vibrating plate link bracket	d	Only when the toner bank is disassembled for servicing.



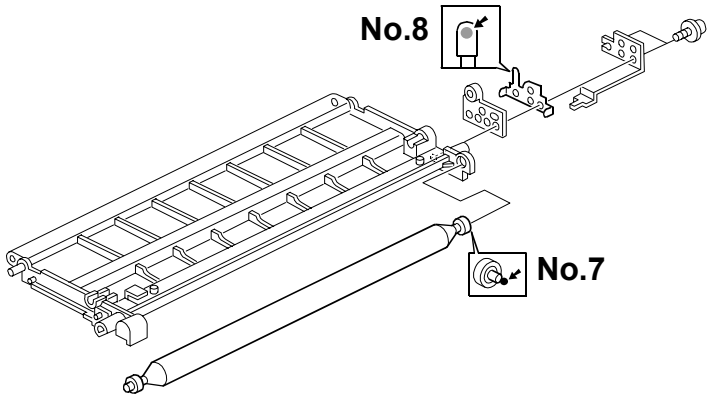
Transfer

No.	Lubrication Point	Type of Grease
5	Spring plate surface of the transfer unit	d
6	Both edges of the transport driven roller. Shaft of the drive roller.	c
7	Upper part of the bias roller terminal	c



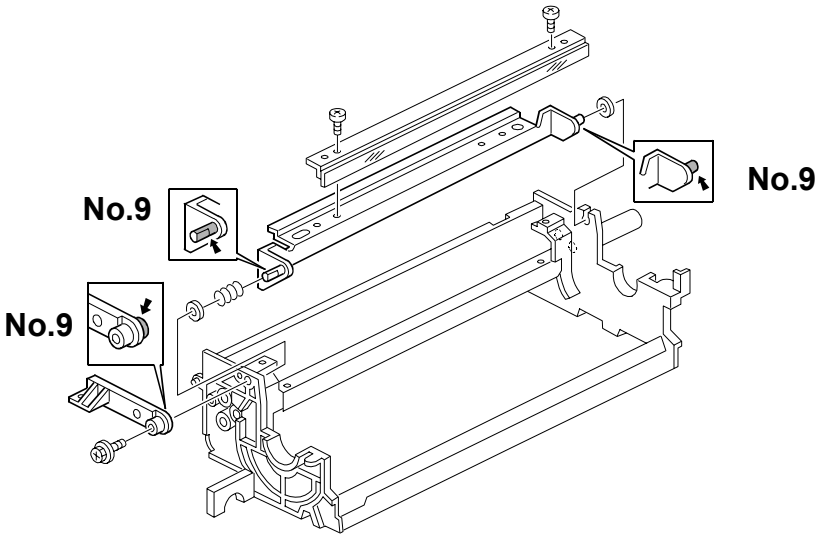
No.6

No.6



PCU

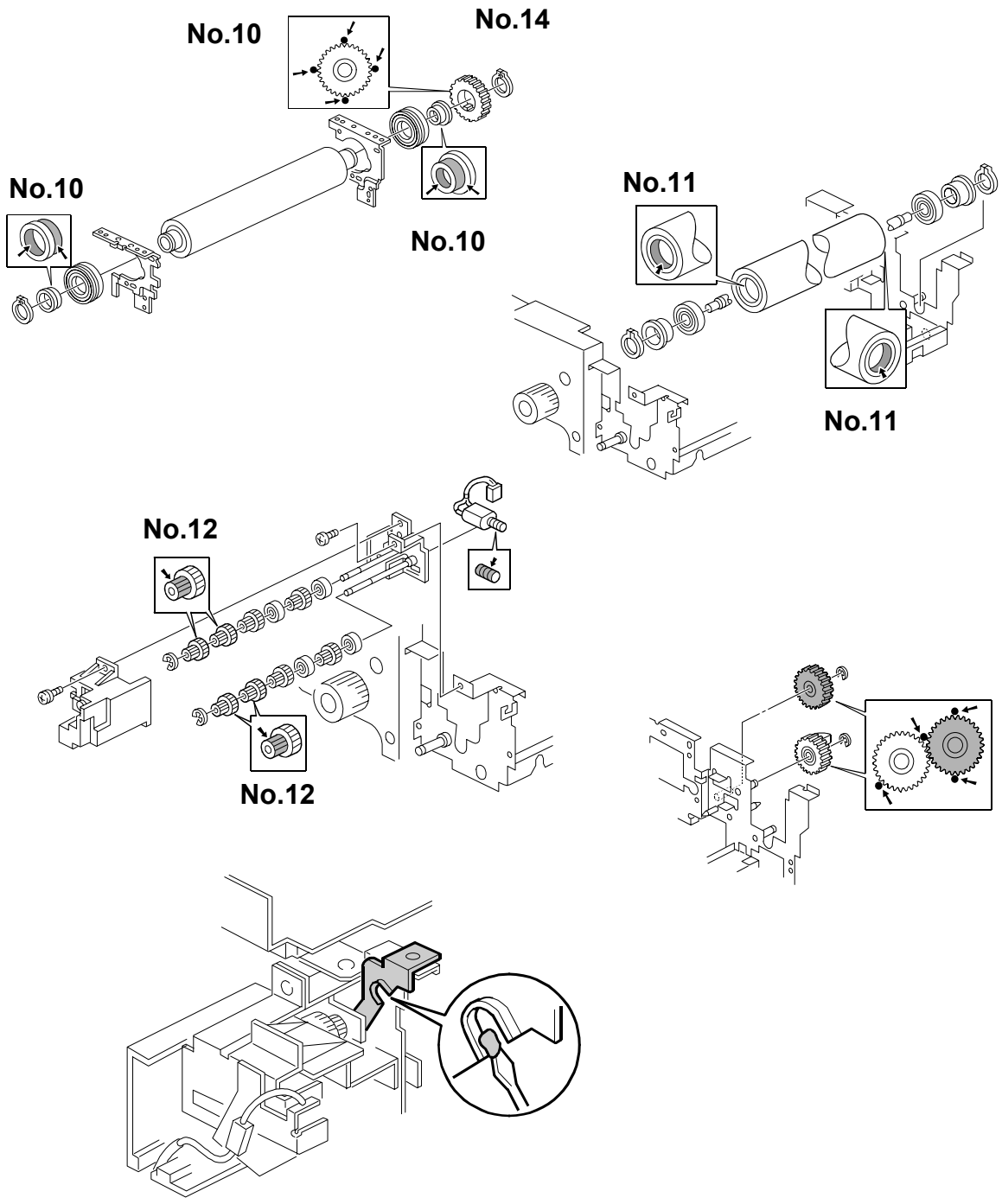
No.	Lubrication Point	Type of Grease
9	Shaft of the Cleaning Blade Bracket	e



No.12

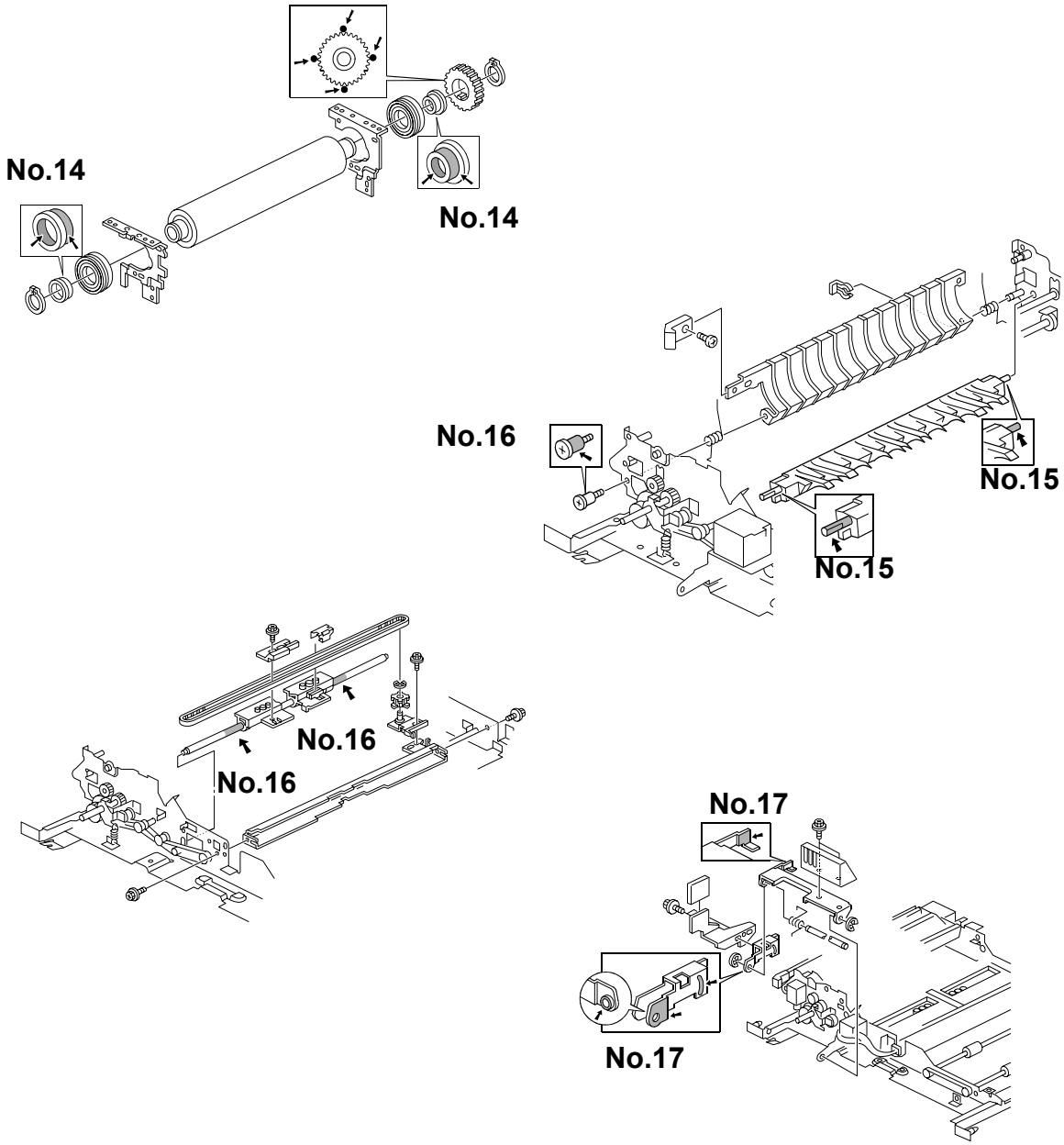
Fusing

No.	Lubrication Point	Type of Grease
10	Outer, inner surface of bushings, gears	b
11	Inner surface of pressure roller where contacts the ball bearing	b
12	Web drive gears	b
13	Fusing unit drive gears	b
14	Between shaft, web bracket	b



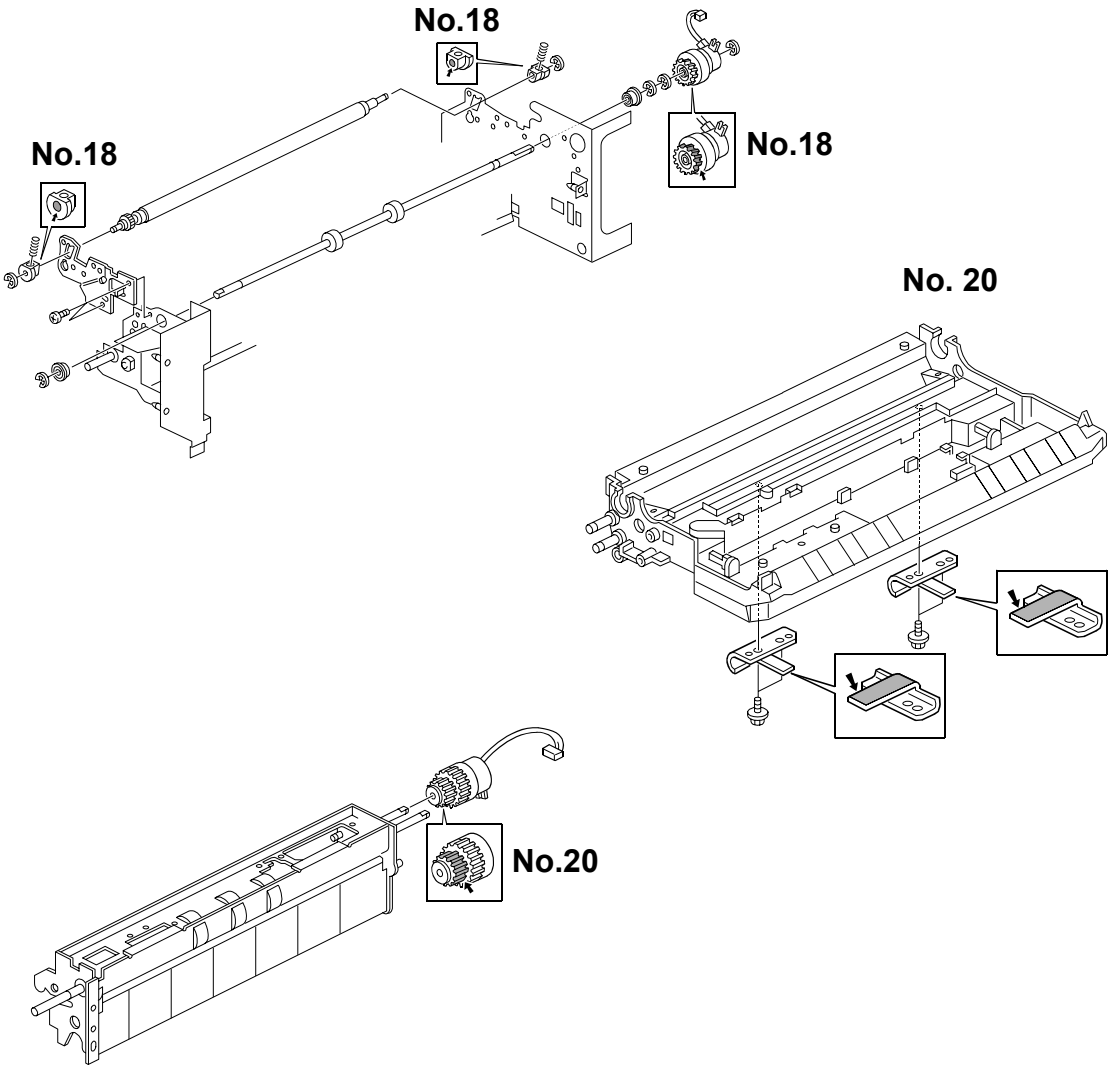
Duplex

No.	Lubrication Point	Type of Grease
14	Shaft of Entrance Guide	a
15	Shaft of Duplex Junction Gate	a
16	Jogger Guide Rod & Inverter Exit Guide Screw	d
17	Lock Arm and Release Bracket	



Paper Feed

No.	Lubrication Point	Type of Grease
17	Registration roller bushings	d
18	Paper feed drive gears	a
19	Paper feed/transport drive gears	a



REPLACEMENT AND ADJUSTMENT

3. REPLACEMENT AND ADJUSTMENT

3.1 GENERAL CAUTIONS

Do not turn off either of the power switches while any of the electrical components are active. Doing so might cause damage to units such as the transfer belt, drum, and development unit when they are pulled out of or put back into the copier.

3.1.1 DRUM

An organic photoconductor (OPC) drum is more sensitive to light and ammonia gas than a selenium drum. Follow the cautions below when handling an OPC drum.

1. Never expose the drum to direct sunlight.
2. Never expose the drum to direct light of more than 1,000 Lux for more than a minute.
3. Never touch the drum surface with bare hands. When the drum surface is touched with a finger or becomes dirty, wipe it with a dry cloth or clean it with wet cotton. Wipe with a dry cloth after cleaning with wet cotton.
4. Never use alcohol to clean the drum; alcohol dissolves the drum surface.
5. Store the drum in a cool, dry place away from heat.
6. Take care not to scratch the drum as the drum layer is thin and is easily damaged.
7. Never expose the drum to corrosive gases such as ammonia gas.
8. Always keep the drum in the protective sheet when keeping the drum unit, or the drum itself, out of the copier. Doing so avoids exposing it to bright light or direct sunlight, and will protect it from light fatigue.
9. Dispose of used drums in accordance with local regulations.
10. When installing a new drum, execute SP2962 (Auto Process Control Execution).

3.1.2 DRUM UNIT

1. Before pulling out the drum unit, place a sheet of paper under the drum unit to catch any spilt toner.
2. Make sure that the drum unit is set in position and the drum stay is secured with a screw before the main switch is turned on. If the drum unit is loose, poor contact of the drum connectors may cause electrical noise, resulting in unexpected malfunctions (RAM data change is the worst case).
3. To prevent drum scratches, remove the development unit before removing the drum unit.

3.1.3 TRANSFER BELT UNIT

1. Never touch the transfer belt surface with bare hands.
2. Take care not to scratch the transfer belt, as the surface is easily damaged.
3. Before installing the new transfer belt, clean all the rollers and the inner part of the transfer belt with a dry cloth to prevent the belt from slipping.

3.1.4 SCANNER UNIT

1. When installing the exposure glass, make sure that the white paint is at the rear left corner.
2. Clean the exposure glass with alcohol or glass cleaner to reduce the amount of static electricity on the glass surface.
3. Use a cotton pad or optical cloth to clean the mirrors and lens.
4. Do not bend or crease the exposure lamp flat cable.
5. Do not disassemble the lens unit. Doing so will throw the lens and the copy image out of focus.
6. Do not turn any of the CCD positioning screws. Doing so will throw the CCD out of position.

3.1.5 LASER UNIT

1. Do not loosen the screws that secure the LD drive board to the laser diode casing. Doing so would throw the LD unit out of adjustment.
2. Do not adjust the variable resistors on the LD unit, as they are adjusted in the factory.
3. The polygon mirror and F-theta lenses are very sensitive to dust. Do not open the optical housing unit.
4. Do not touch the glass surface of the polygon mirror motor unit with bare hands.
5. After replacing the LD unit, do the laser beam pitch adjustment. Otherwise, an SC condition will be generated.

3.1.6 CHARGE CORONA

1. Clean the corona wires with a dry cloth. Do not use sandpaper or solvent.
2. Clean the charge corona casing with water first to remove NOx based compounds. Then clean it with alcohol if any toner still remains on the casing.
3. Clean the end block with a blower brush first to remove toner and paper dust. Then clean with alcohol if any toner still remains.
4. Do not touch the corona wires with bare hands. Oil stains from fingers may cause uneven image density on copies.
5. Make sure that the wires are correctly between the cleaner pads and that there is no foreign material (iron filings, etc.) on the casing.
6. When installing new corona wires, do not bend or scratch the wire surface. Doing so may cause uneven charge. Also be sure that the corona wires are correctly positioned in the end blocks.
7. Clean the grid plate with a blower brush (not with a dry cloth).
8. Do not touch the charge grid plate with bare hands. Also, do not bend the charge grid plate or make any dent in it. Doing so may cause uneven charge.

3.1.7 DEVELOPMENT

1. Be careful not to nick or scratch the development roller.
2. Place the development unit on a sheet of paper after removing it from the copier.
3. Never disassemble the development roller assembly. The position of the doctor plate is set with special tools and instruments at the factory to ensure the proper gap between the doctor blade and the development roller.
4. Clean the drive gears after removing used developer.
5. Dispose of used developer in accordance with local regulations.
6. Never load types of developer and toner into the development unit other than specified for this model. Doing so will cause poor copy quality and toner scattering.
7. Immediately after installing new developer, the TD sensor initial setting procedure should be performed with SP2801 (TD Sensor Initialization) to avoid damage to the copier. Do not perform the TD sensor initial setting with used developer. Do not make any copies before doing the TD sensor initial setting.
8. When using a vacuum cleaner to clean the development unit casing, always ground the casing with your fingers to avoid damaging the toner density sensor with static electricity.
9. When replacing the TD sensor, replace the developer, then execute SP2801 (TD Sensor Initialization) and SP2962 (Auto Process Control Execution).

3.1.8 CLEANING

1. When servicing the cleaning section, be careful not to damage the edge of the cleaning blade.
2. Do not touch the cleaning blade with bare hands.
3. Before disassembling the cleaning section, place a sheet of paper under it to catch any toner falling from it.

3.1.9 FUSING UNIT

1. After installing the fusing thermistor, make sure that it is in contact with the hot roller and that it is movable.
2. Be careful not to damage the edges of the hot roller strippers or their tension springs.
3. Do not touch the fusing lamp and rollers with bare hands.
4. Make sure that the fusing lamp is positioned correctly and that it does not touch the inner surface of the hot roller.

3.1.10 PAPER FEED

1. Do not touch the surface of the pick-up, feed, and separation rollers.
2. To avoid paper misfeeds, the side fences and end fence of the paper tray must be positioned correctly to align with the actual paper size.

3.1.11 USED TONER

1. We recommend checking the amount of used toner at every EM.
2. Dispose of used toner in accordance with local regulations. Never throw toner into an open flame, for toner dust may ignite.

3.2 SPECIAL TOOLS AND LUBRICANTS

3.2.1 SPECIAL TOOLS

Part No.	Description
A0069104	Scanner Positioning Pin (4 pcs./set)
A2929500	Test Chart – S5S (10 pcs./set)
A0299387	Digital Multimeter – FLUKE 87
B6455010	SD (Secure Digital) Card – 64 MB
G0219350	Loop Back Connector

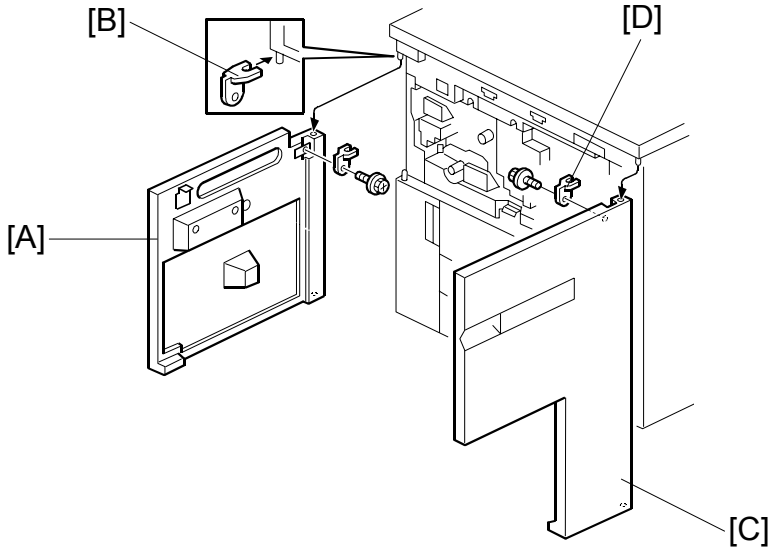
3.2.2 LUBRICANTS

Part No.	Description
A2579300	Grease Barrierta – JFE 5 5/2
52039502	Silicon Grease G-501

⚠CAUTION
Turn off the main power switch and unplug the machine before attempting any procedure in this section.

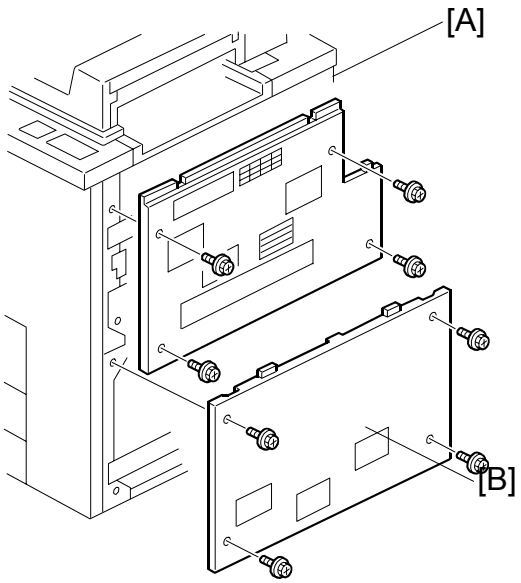
3.3 DOORS AND COVERS

3.3.1 FRONT DOORS



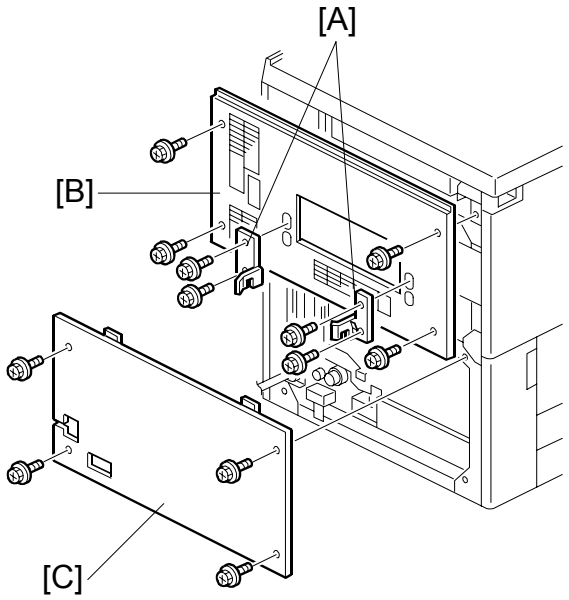
1. Open the left door [A].
2. Bracket [B] (🔩 x 1).
3. Lift up the left door and remove it.
4. Open the right door [C].
5. Bracket [D] (🔩x 1).
6. Lift up the right door and remove it.

3.3.2 RIGHT COVERS



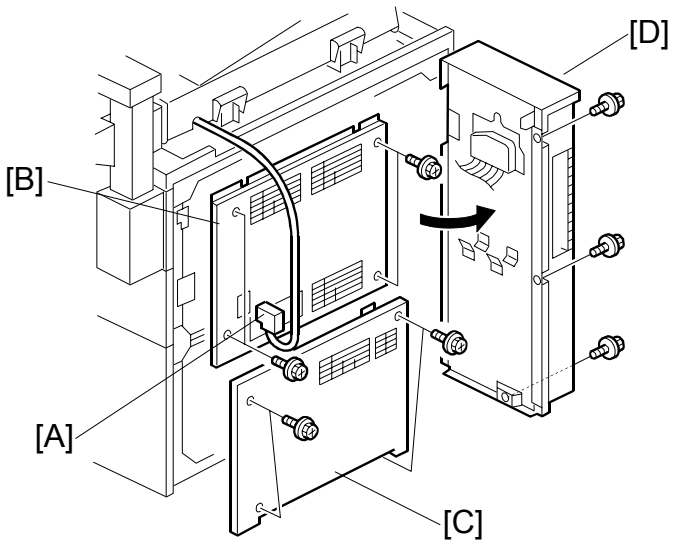
1. Right upper cover [A] (☞ x 4).
2. Right lower cover [B] (☞ x 4).

3.3.3 LEFT COVERS



1. Disconnect the optional finisher, if it is installed.
2. Remove the front and rear joint brackets [A] (☞ x 2 each), if the optional finisher was installed.
3. Left upper cover [B] (☞ x 4)
4. Left lower cover [C] (☞ x 4).

3.3.4 REAR COVERS AND CONTROLLER BOX DOOR



Rear Covers

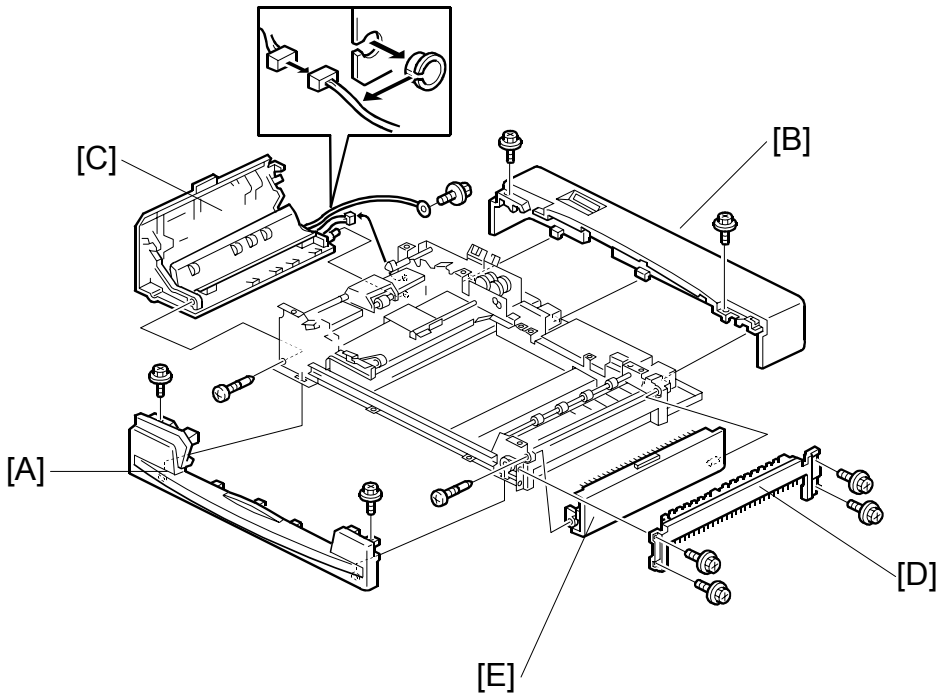
1. Disconnect the ADF connector [A].
2. Rear upper cover [B] (☞ x 4).
3. Rear lower cover [C] (☞ x 4).

Opening the Controller Box

1. Remove the screws on the left [D] (☞ x 3).
2. Swing open the controller box.
   NOTE: To close the controller box door, fasten the top screw first to ensure that the holes for the other two screws are aligned correctly with the holes of the machine frame, then fasten the other two screws.

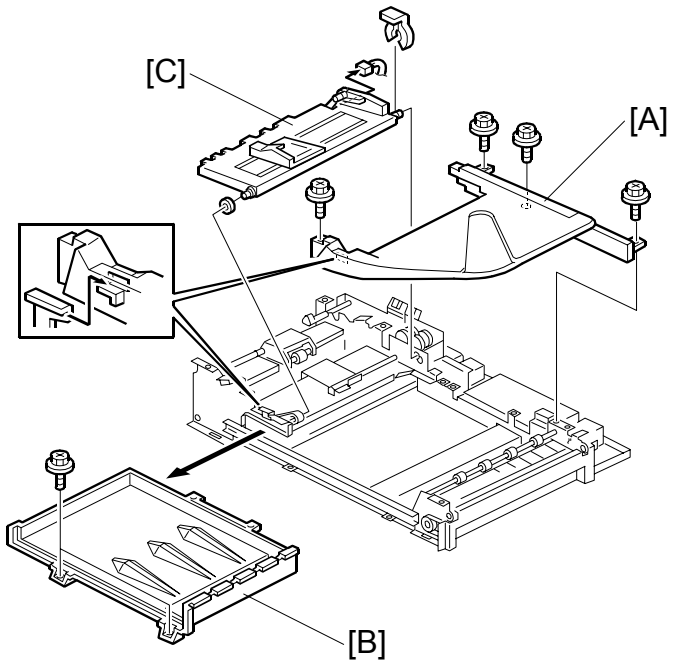
3.4 DOCUMENT FEEDER

3.4.1 ADF COVERS



1. Front cover [A] (x 2).
2. Rear cover [B] (x 2).
3. Left cover [C] (x 2, x 2).
4. Original exit tray. (☛3.5.5)
5. Right cover [D] (x 4, x 2).
6. Upper exit cover [E] (x 1).

3.4.2 ADF ORIGINAL TRAY



Original Tray

1. Remove the front and rear covers.
2. Original tray [A] (☞ x 4).

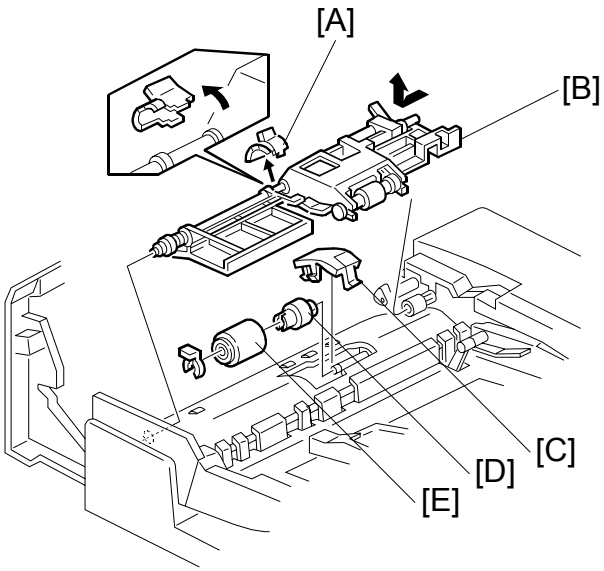
Original Table Cover

1. Remove the ADF front and rear covers. (☛3.4.1)
2. Remove the original tray [A].
3. Original table cover [B] (☞ x 2).

Bottom Plate

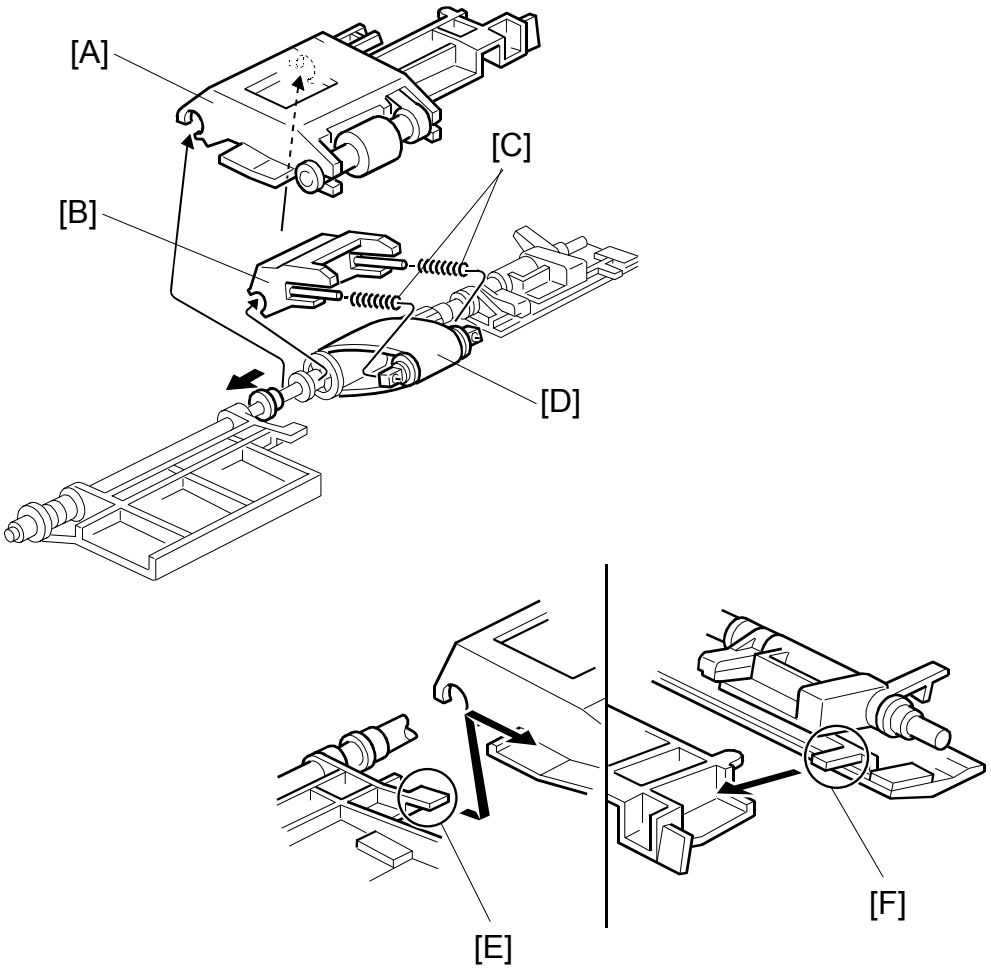
1. Remove the ADF front and rear covers. (☛3.4.1)
2. Remove the original tray [A].
3. Bottom plate [C] (⛑ x 1, ✋ x 1).

3.4.3 FEED UNIT AND SEPARATION ROLLER



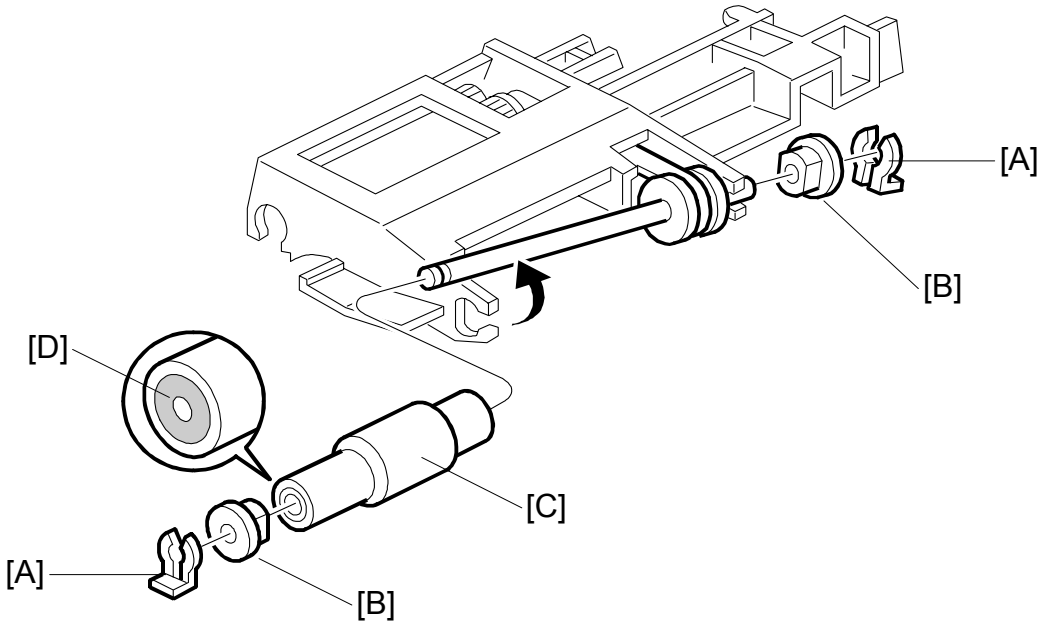
1. Open the left cover.
2. Clip [A].
3. Remove the feed unit [B]. Pull the feed unit to the front, release the shaft at the rear, and release the front bushing.
4. Separation roller cover [C].
5. Torque limiter [D] and separation roller [E] (x 1).

3.4.4 FEED BELT



1. Feed unit. (☛3.4.3)
2. Pick-up roller unit [A].
3. Feed belt holder [B].
   NOTE: The springs [C] come off the feed belt cover easily.
4. Feed belt [D].
   NOTE: When reinstalling the pick-up roller unit, make sure that levers [E] and [F] on the front and rear original guides are resting on the pick-up roller unit cover.

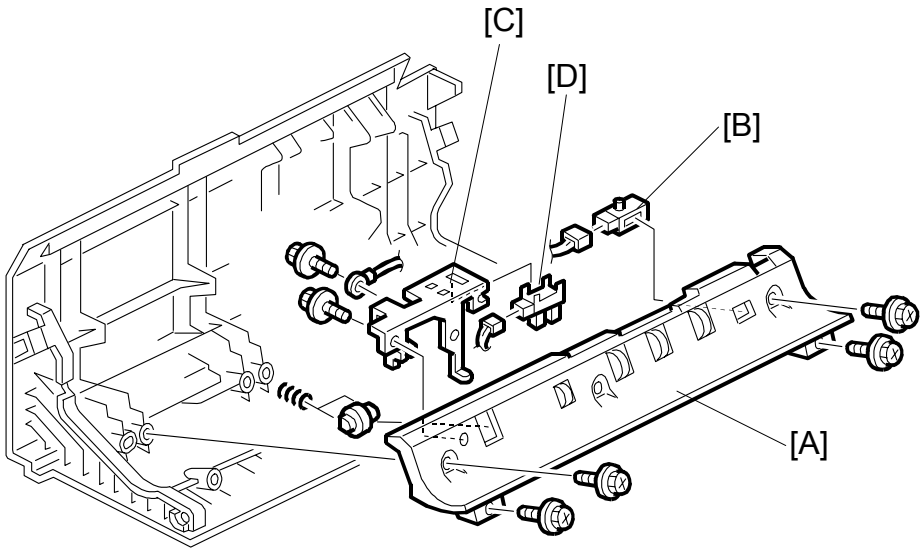
3.4.5 PICK-UP ROLLER



1. Open the left cover.
2. Feed unit (☛3.4.3)
3. Snap rings [A] (Ⓢ x 2).
4. Two bushings [B].
5. Pick-up roller [C].
   NOTE: When reinstalling the pick-up roller, make sure that the one-way clutch [D] is not on the gear side.

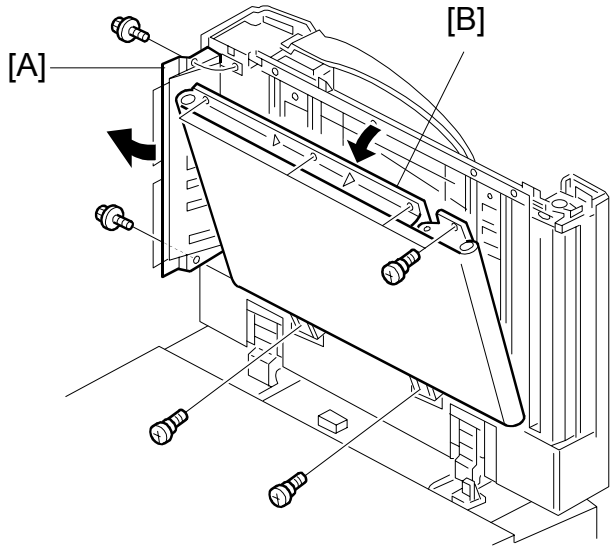
3.4.6 ADF SENSORS

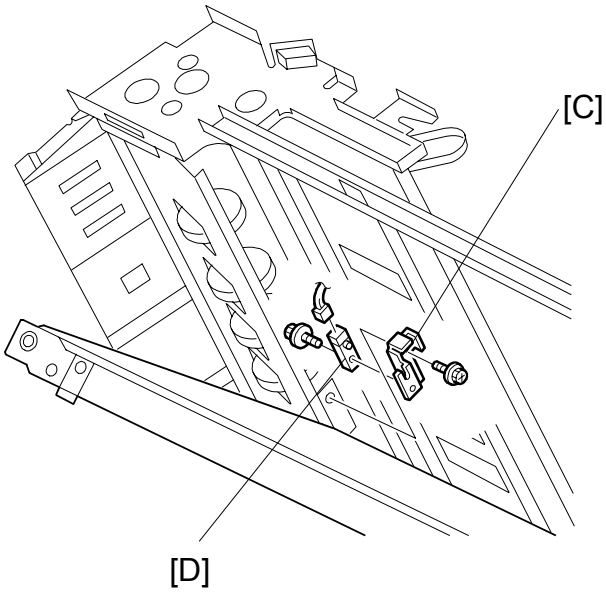
Entrance Sensor and Length Sensor



1. Left cover.
2. Guide plate [A] (☞ x 5).
3. Entrance sensor [B] (☞ x 1).
4. Length sensor bracket [C] (☞ x 2).
5. Length sensor [D] (☞ x 1).

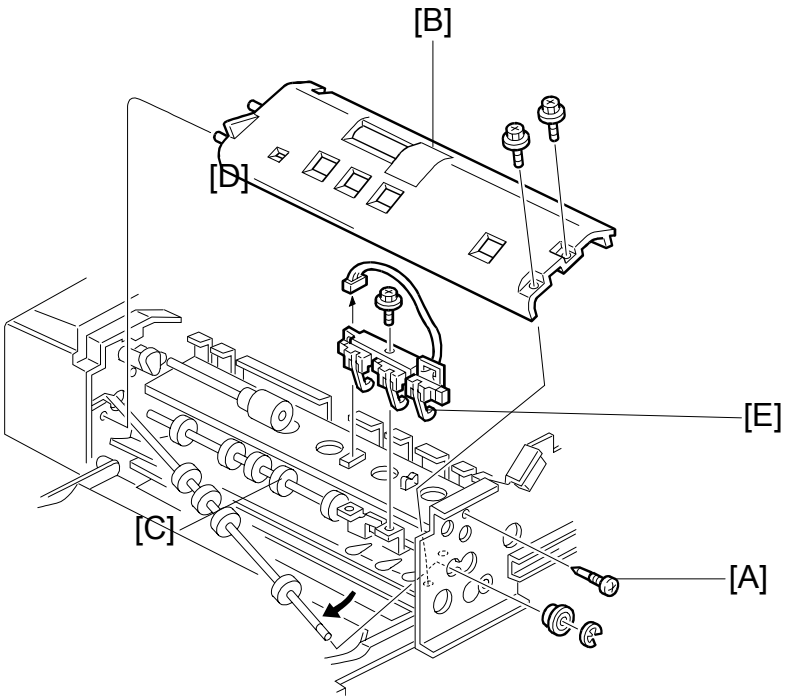
Registration Sensor





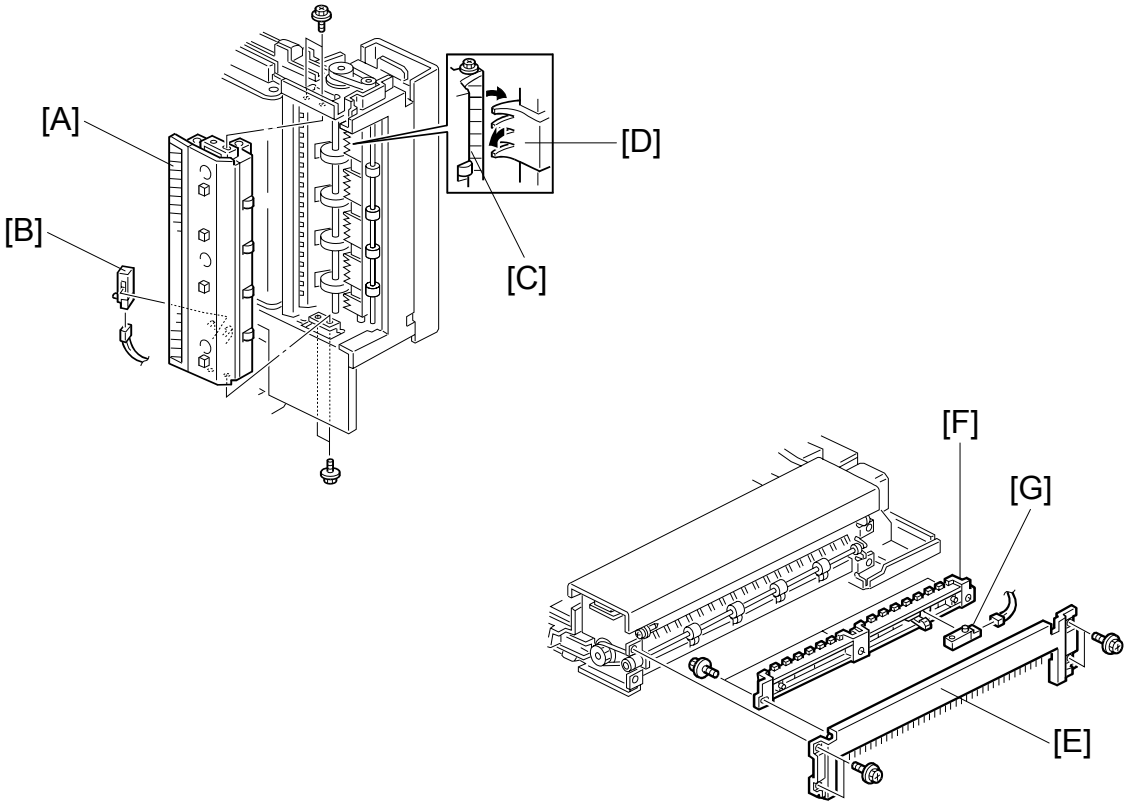
1. ADF front cover. (☛3.4.1)
2. ADF left cover. (☛3.4.1)
3. Release entrance guide [A] (🔩 x 2).
4. Release transport belt unit [B] (🔩 x 3).
5. Sensor bracket [C] (🔩 x 1).
6. Registration sensor [D] (🖐 x 1, 🔩 x 1).

Width Sensors



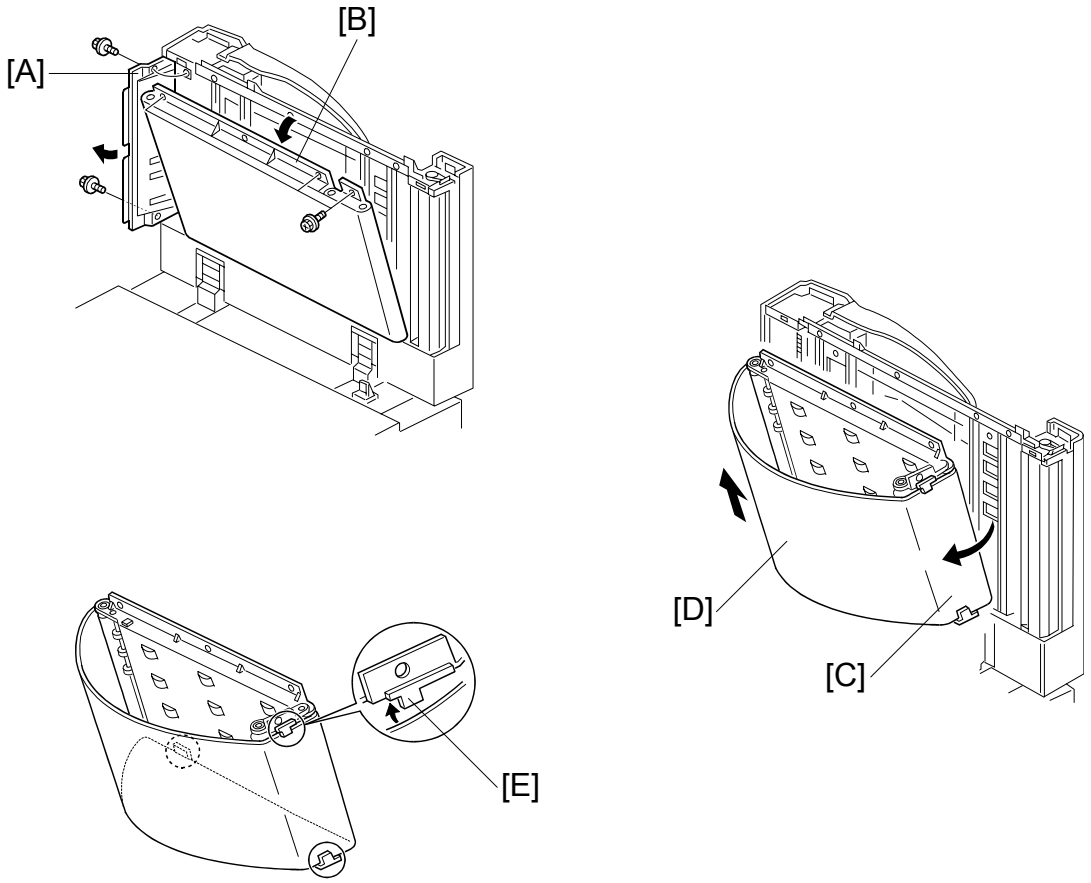
1. ADF front cover. (☛3.4.1)
2. Feed unit. (☛3.4.3)
3. Stopper screw [A].
4. Guide plate [B] (☞ x 2).
5. Release the front end of the upper transport roller [C] (bushing x 1, ℂ x 1).
6. Sensor bracket [D] (☞ x 1).
7. Width sensors [E] (✍ x 1 each).

Exit Sensor, Inverter Sensor



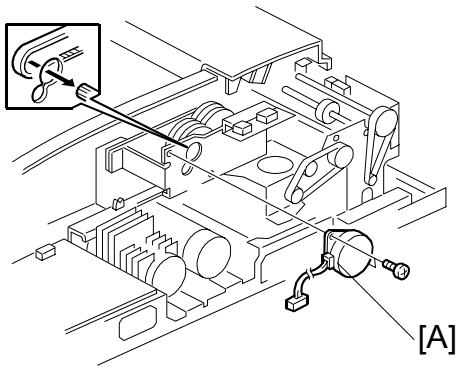
1. Front and rear covers. (☛3.4.1)
2. Original paper tray. (☛3.5.5)
3. Exit guide unit [A] (🔩 x 5, 🖐 x 1).
4. Exit sensor [B] (🖐 x 1).
   NOTE: When reinstalling the exit guide unit, make sure that the guide plate [C] on the exit unit is over the exit gate [D].
5. Right cover [E]. (☛3.4.1)
6. Guide plate [F] (🔩 x 3).
7. Inverter sensor [G] (🖐 x 1).

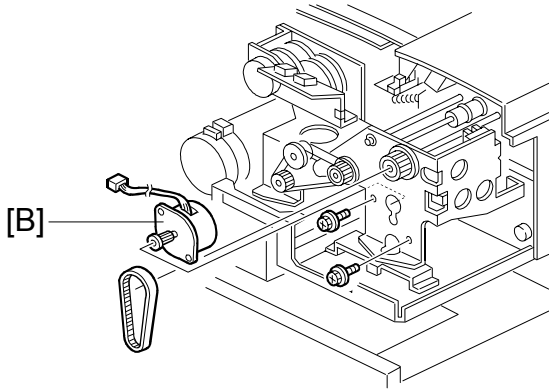
3.4.7 TRANSPORT BELT



1. Front cover. (☛3.4.1)
2. Release entrance guide [A] (☞ x 2).
3. Release transport belt unit [B] (☞ x 3).
4. Fold the transport belt assembly extension [C].
5. Transport belt [D] and replace it.
   NOTE: When installing the transport belt, make sure that the belt passes under the upper and lower belt guide spacers [E].
6. Execute SP6009 (DF Free Run) to do an ADF free run for 3 minutes. After the free run is finished, clean off any dust on the exposure glass.

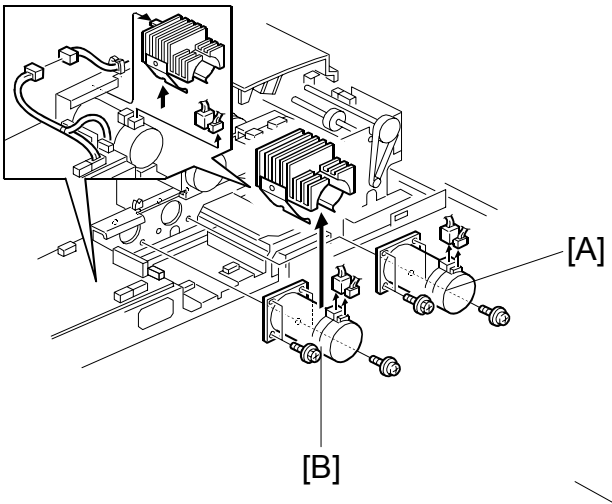
3.4.8 ADF MOTORS

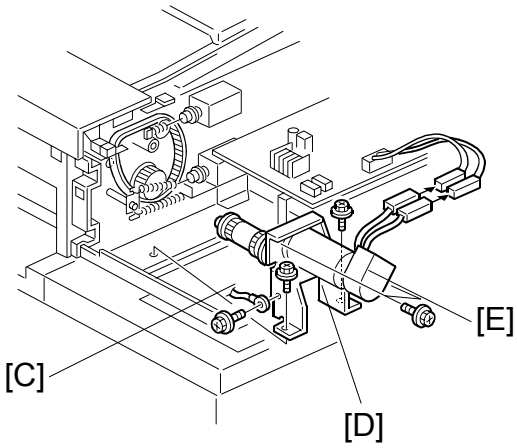




Bottom Plate Motor, Pick-up Motor

1. Rear cover. (☛3.4.1)
2. Bottom plate motor [A] (🔩 x 2, ✋ x 1).
3. Pick-up motor [B] (🔩 x 2, ✋ x 1).

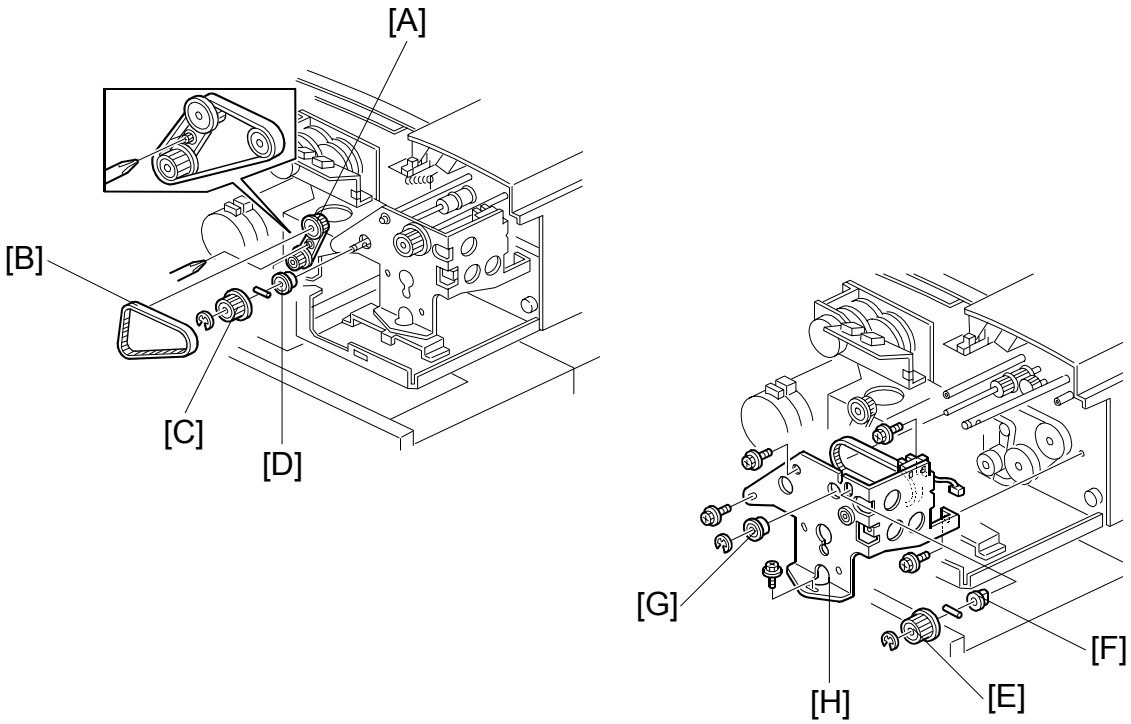




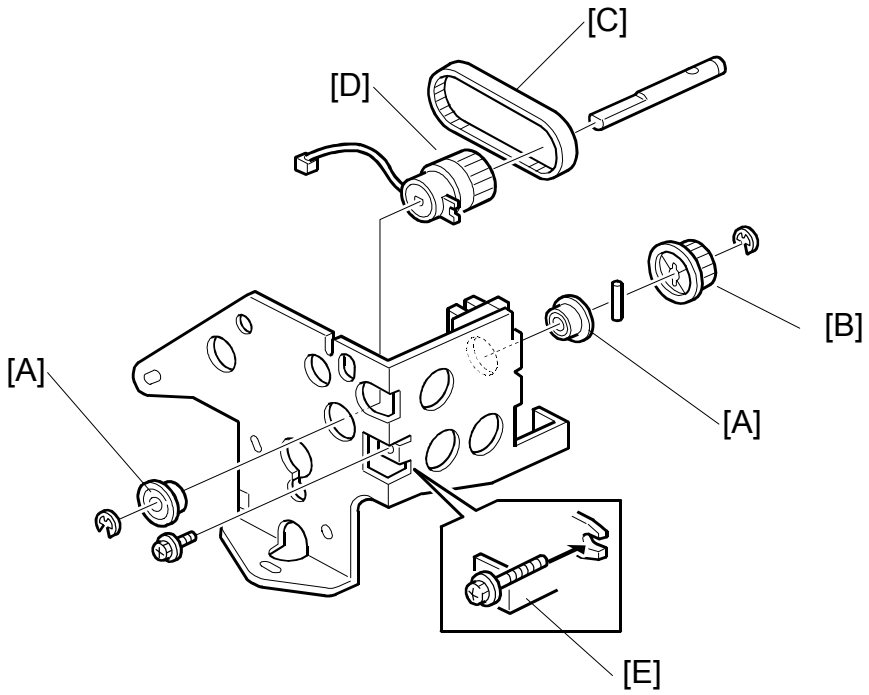
Feed-in, Transport, Feed-out Motors

1. Rear cover. (☛3.4.1)
2. Feed-in motor [A] (☞ x 4, ☞ x 2).
2. Transport motor [B] (☞ x 4, ☞ x 2).
2. Grounding wire [C] (☞ x 1).
3. Feed-out motor assembly [D] (☞ x 2, ☞ x 2).
4. Feed-out motor [E] (☞ x 2).

3.4.9 FEED-IN CLUTCH



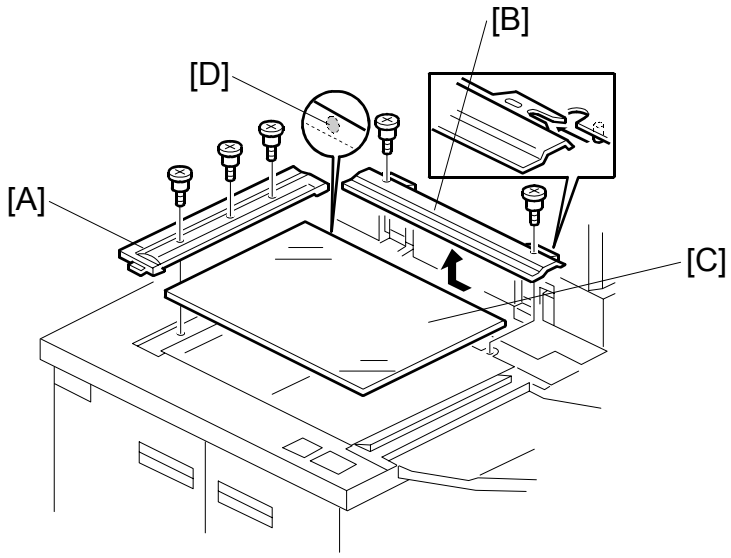
1. Rear cover. (☛3.4.1)
2. Remove a screw from the band [A].
3. Timing belt [B].
4. Pulley [C] and bearing [D] from the feed-in drive shaft (ℂ x 1, pin x 1).
5. Pulley [E] and bushing [F] from the pick-up roller cam shaft (ℂ x 1, pin x 1)
6. Bearings [G] from the feed belt drive shaft (ℂ x 1).
7. Feed-in clutch assembly [H] (x 5, x 1).



8. Two bearings [A] from the feed-in clutch shaft (ℂ x 1 each).
9. Pulley [B] (ℂ x 1), pin and timing belt [C].
10. Feed-in clutch [D].
    NOTE: When re-installing the feed-in clutch, put the stopper screw [E] in the clutch hook.

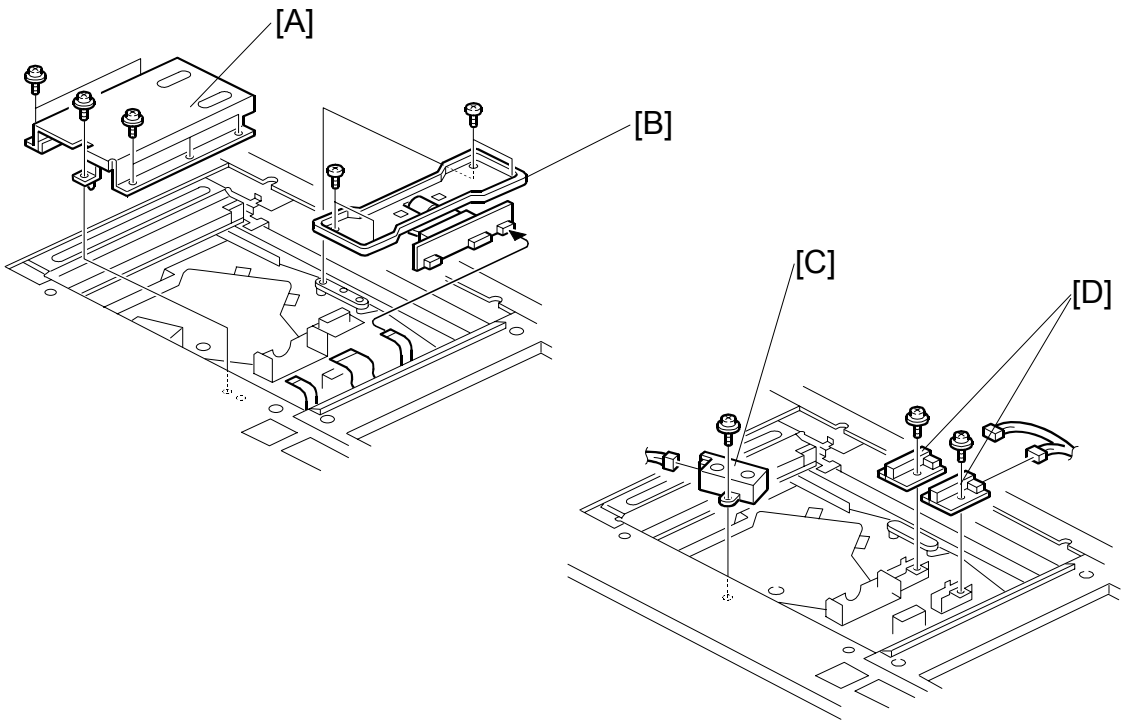
3.5 SCANNER UNIT

3.5.1 EXPOSURE GLASS



1. Left scale [A] (🔩 x 3).
2. Rear scale [B] (🔩 x 2). Slide in the direction of the arrow to remove.
3. Exposure glass [C].
   NOTE: When positioning the exposure glass for re-installation, make sure that the white dot [D] is at the rear left corner.

3.5.2 ORIGINAL SIZE SENSORS

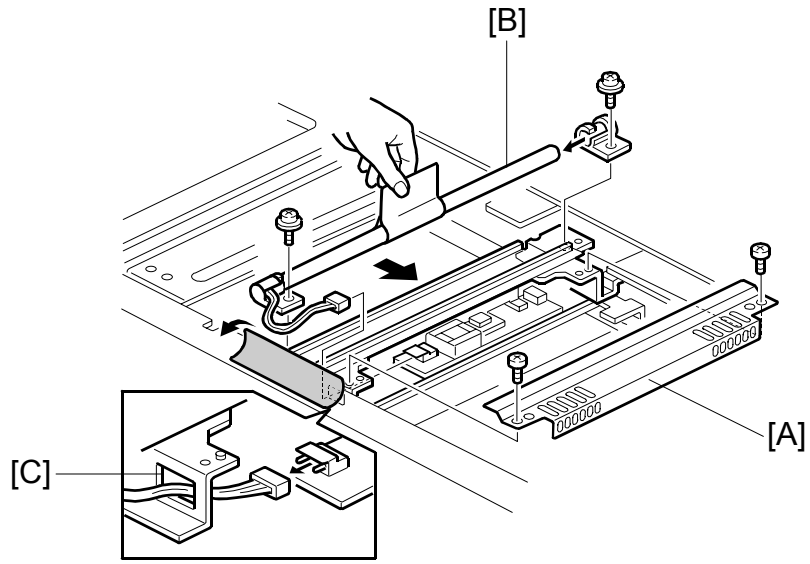


⚠CAUTION

Turn off the main switch and unplug the machine before performing this procedure. Laser beams can seriously damage the eyes.

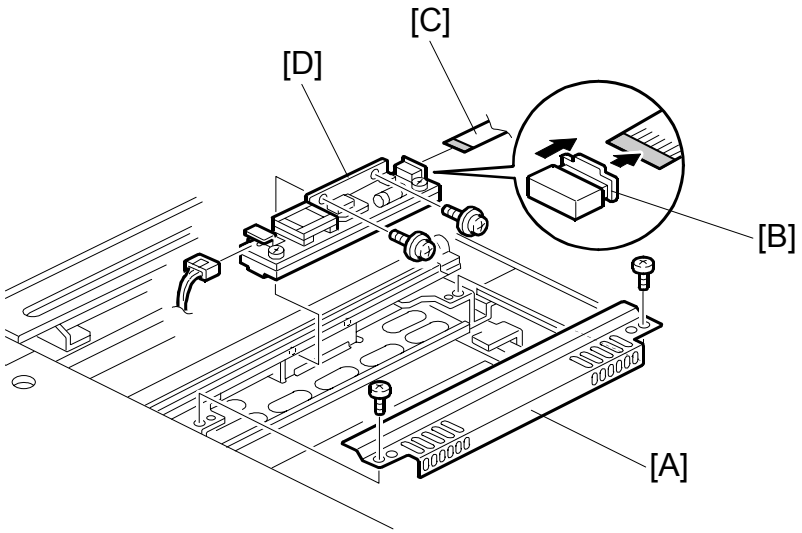
1. Exposure glass (☛3.5.1).
2. Lens cover [A] (☞ x 6).
3. Lens block [B] (☞ x 4, ☞ x 3).
4. Original width sensor [C] (☞ x 1, ☞ x 1).
5. Original length sensors [D] (☞ x 1 each, ☞ x 1 each).
6. After re-assembly, do the scanner and printer copy adjustment. (☛3.15)

3.5.3 EXPOSURE LAMP



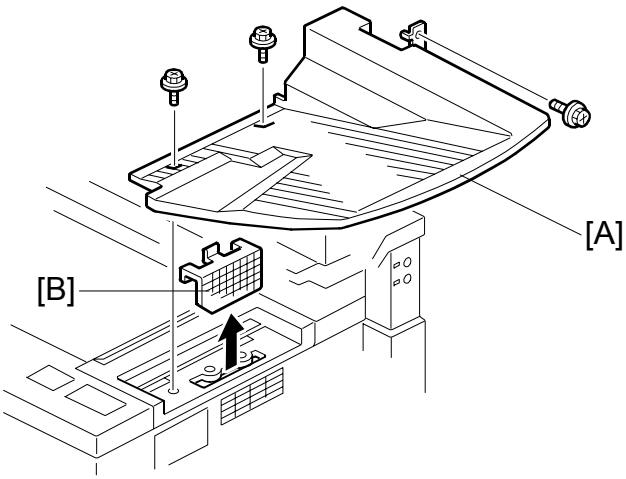
1. Exposure glass. (☛3.5.1).
2. Open the front door, then remove the front upper cover (🔩 x 7, 🖐 x 1). (☛3.5.7)
3. Lamp regulator cover [A] (🔩 x 2).
4. Exposure lamp [B] (🔩 x 2, 🖐 x 1).
   NOTE: When reinstalling the exposure lamp, pass the cable through the opening [C] in the bracket.

3.5.4 LAMP REGULATOR



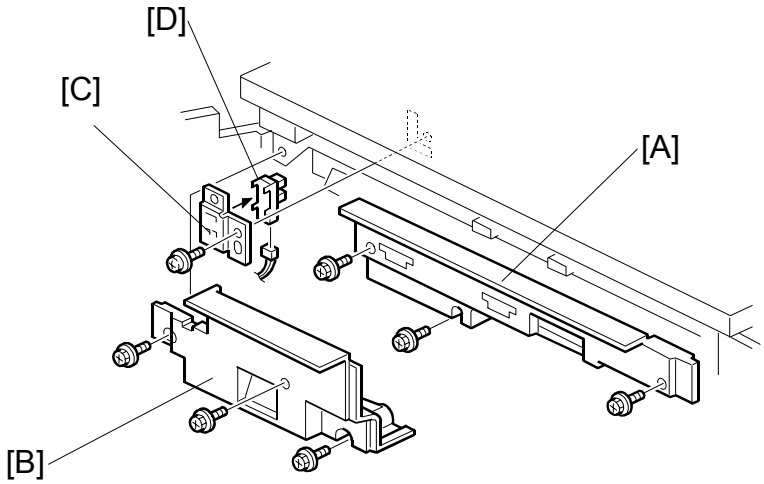
1. Exposure glass. (☛3.5.1)
2. Lamp regulator cover [A] (☞ x 2).
3. Slide the holder [B] in the direction of the arrow. Then disconnect the flat cable [C].
4. Lamp regulator [D] (☞ x 2, ☜ x 1).

3.5.5 OPTICS DUST FILTER



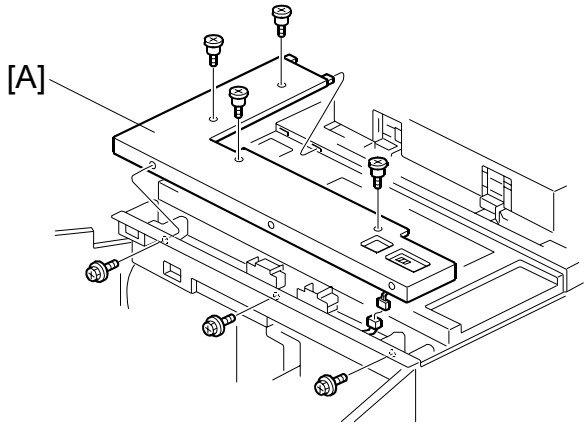
1. Original exit tray [A] (🔩 x 3).
2. Optics dust filter [B].

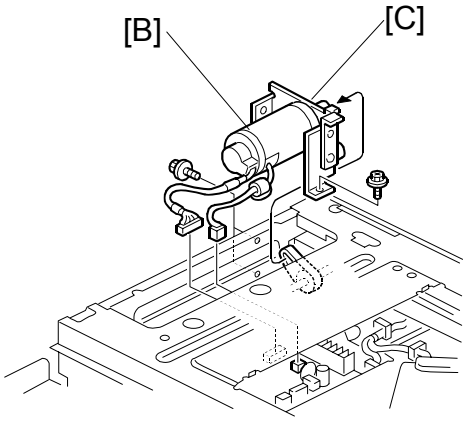
3.5.6 SCANNER H.P. SENSOR



1. Front upper cover. (☛3.5.7)
2. Upper right, inner cover [A] (☞ x 4).
3. Upper left inner cover [B] (☞ x 3).
4. Scanner HP sensor bracket [C] (☞ x 1).
5. Scanner HP sensor [D] (☜ x 1).

3.5.7 SCANNER MOTOR

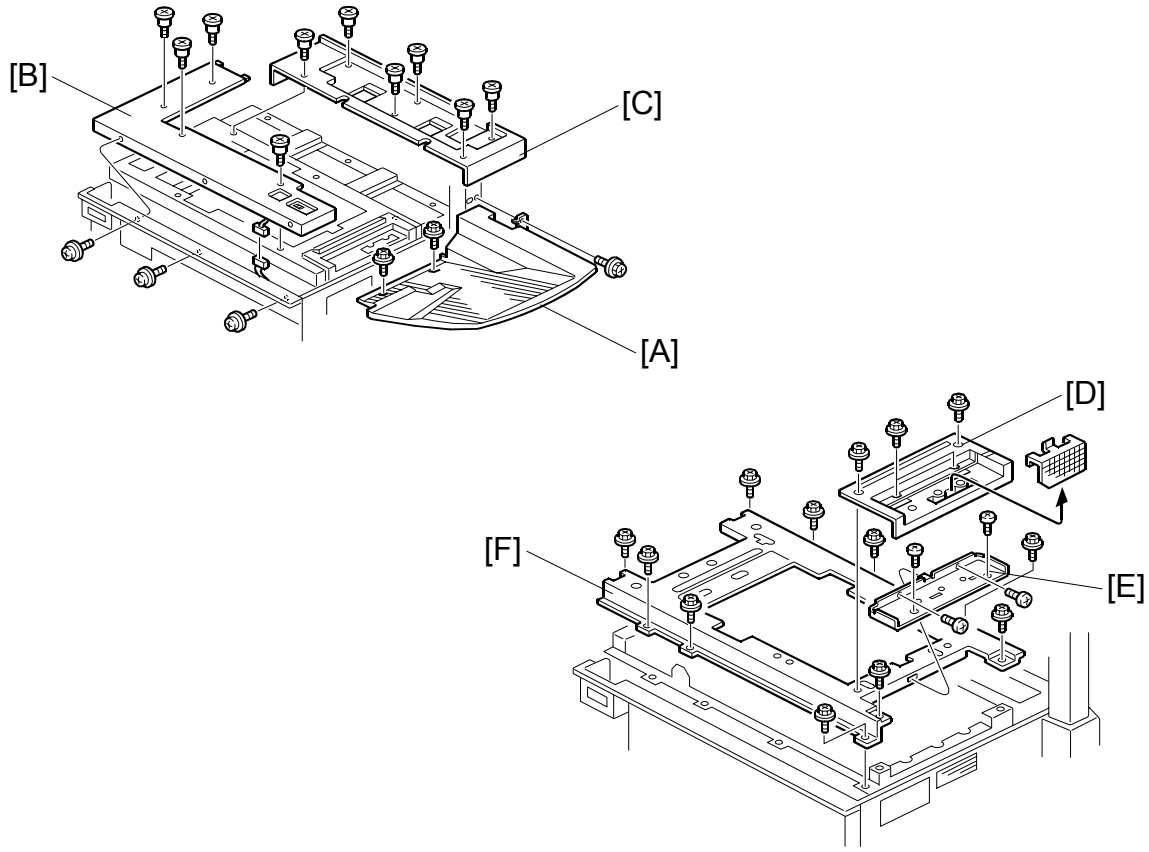




1. Exposure glass. (☛3.5.1).
2. Left upper cover. (☛3.3.3).
3. Front upper cover [A] (🔩 x 7, 🖐 x 1).
4. Scanner motor assembly [B] (🖐 x 2, 🔩 x 3).
5. Scanner motor from the bracket [C] (🔩 x 3).
6. After reassembly, do the copy image adjustments. (☛ 3.15)

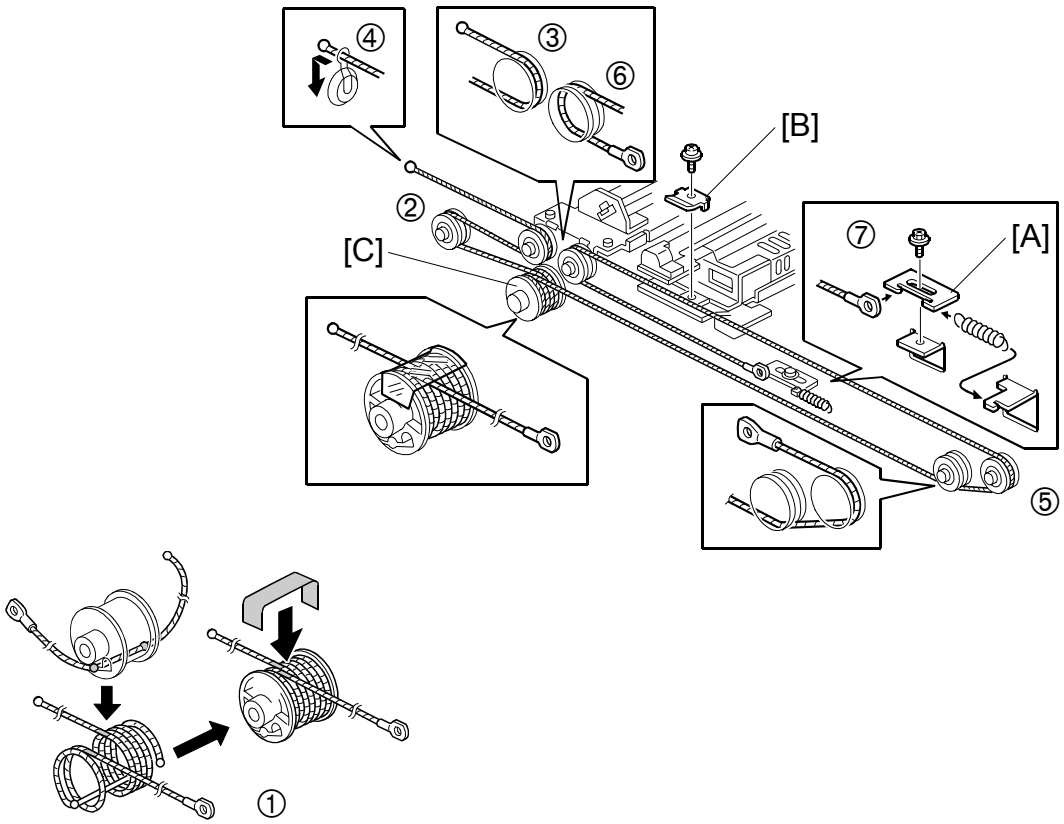
3.5.8 SCANNER DRIVE WIRES

Preparation



1. Remove the ADF.
2. Original exit tray [A] (x 3).
3. Scanner front cover [B] (x 7, x 1).
4. Rear upper cover [C] (x 6).
5. Scanner right cover [D] (x 4).
6. Bracket [E] (x 4).
7. Scanner frame [F] (x 10).

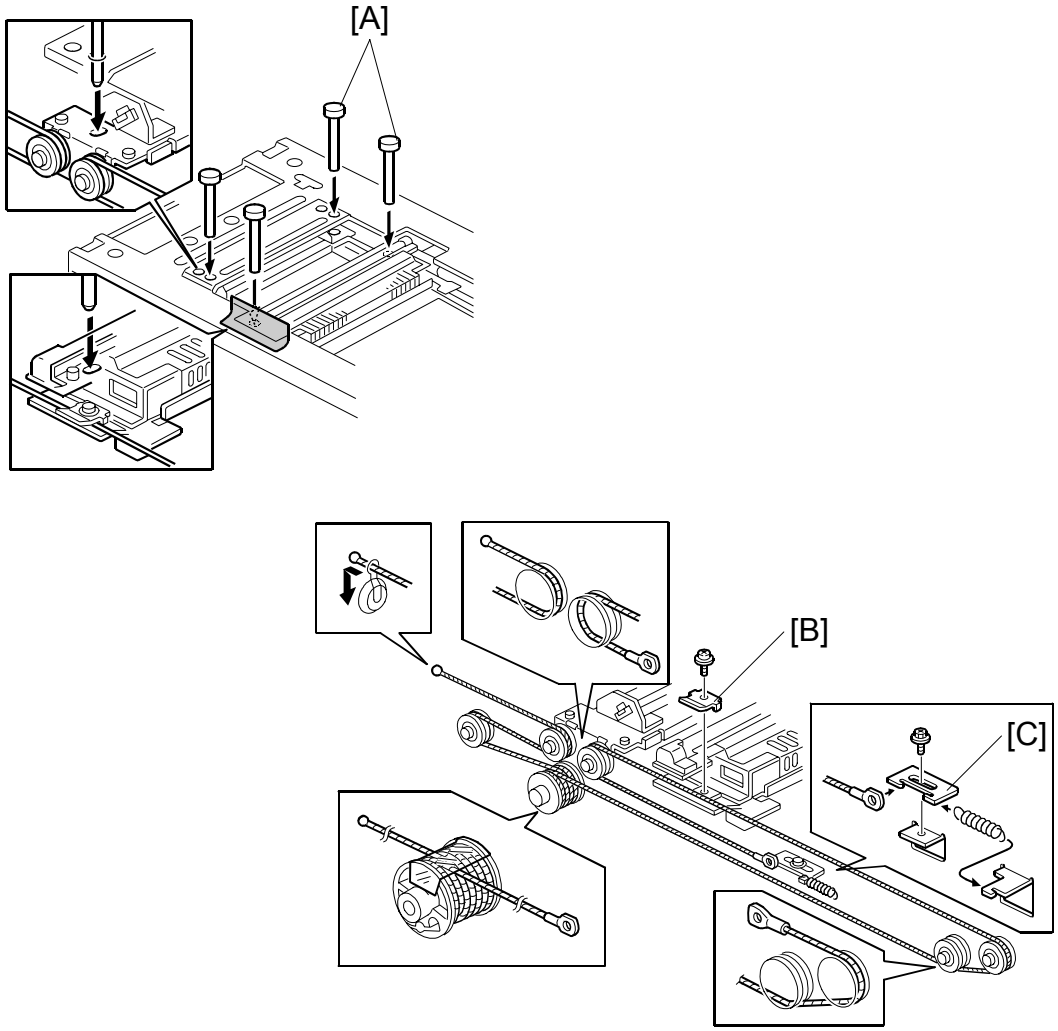
Front, Rear Scanner Drive Wires



1. Wire tension bracket [A] (☞ x 1).
2. Front scanner wire bracket [B].
3. Front scanner wire.

Reinstallation

1. Scanner wire pulley [C] (☞ x 1).
2. While making sure of the direction, place the beads on the middle of the wire on the pulley openings. Then wind the wire (ball side) 3 times and the other side (ring side) once as shown ①. Secure the pulley with tape to keep this condition.
3. Install the pulley on the scanner drive shaft (☞ x 1).
4. Wind the end of the wire with the ball as shown (②,③,④).
5. Wind the end of the wire with the ring as shown (⑤,⑥,⑦).
6. Install the tension spring on the tension bracket, and slightly tighten the tension bracket (☞ x 1).



7. Install the 1st scanner and adjust the position with the positioning tools [A].
8. Secure the 1st scanner with the scanner wire bracket [B] (☞ x 1).
9. Tighten the tension bracket [C] and remove the tape.
10. Remove the positioning tools. After sliding the scanner to the right and left several times, set the positioning tools to check the scanner wire bracket and the tension bracket again.
11. Reassemble the scanner and do the scanner and copy adjustments (☛3.15)

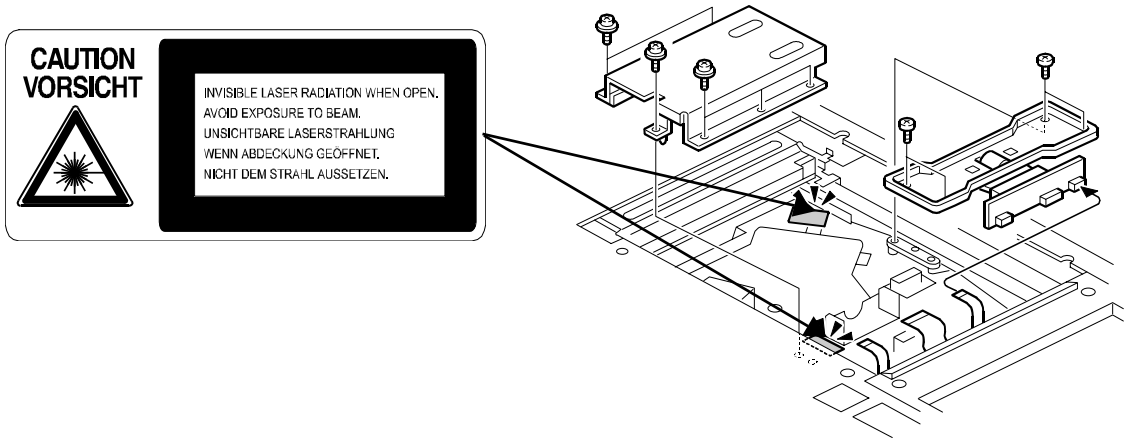
3.6 LASER UNIT

⚠WARNING

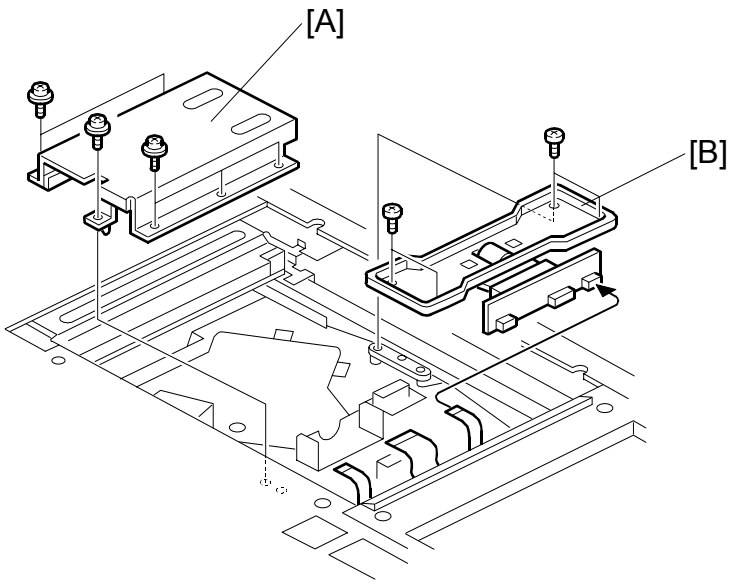
- **Direct exposure to the eyes can seriously damage the eyes and cause permanent blindness. Always turn off the main power switch and unplug the machine before attempting any of the procedures described below.**
- **Allow enough time for the machine to cool and for the polygon motor to stop rotating. The polygon motor continues to rotate for about one to three minutes after the machine is switched off.**
- **Never power on the machine with any of these components removed: 1) LD unit, 2) polygon motor cover, 3) synchronization detector.**

3.6.1 CAUTION DECALS

Two caution decals are provided for the laser section.



3.6.2 LENS BLOCK



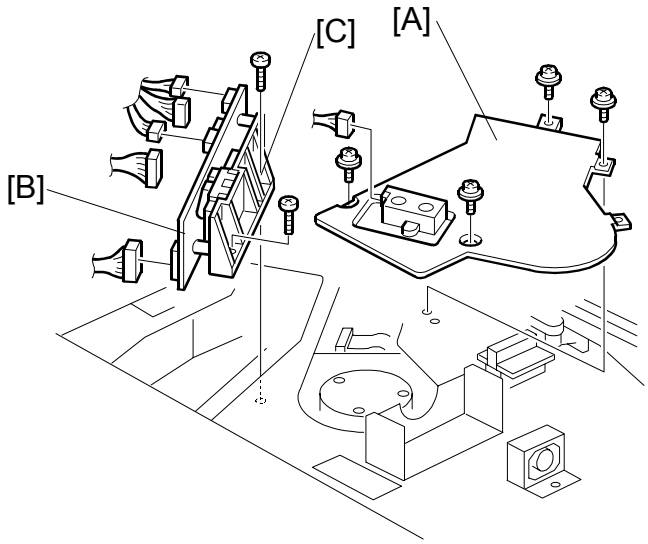
⚠WARNING

Turn off the main power switch and unplug the machine before performing this procedure. Laser beams can seriously damage the eyes.

1. Exposure glass (☛3.5.1).
2. Lens cover [A] (🔩 x 6).
3. Lens block [B] (🔩 x 4, ✋ x 3).
4. After reassembly, do the scanner and printer copy adjustment. (☛3.15)

NOTE: There are no field adjustments for the lens block.

3.6.3 LD UNIT



⚠WARNING

Turn off the main power switch and unplug the machine before attempting this procedure. Laser beams can seriously damage the eyes.

NOTE: To avoid damaging the board with static electricity, never touch the printed circuit board.

1. Exposure glass (☛3.5.1)
2. LD cover [A] (x 4, x 1).
3. LD unit [B] (x 2, x 5).
   - Before removal, note how the LD unit is inserted into the 4 seams of the optical housing (the thickness is different according to color). This positioning is used for fine adjustment of the LD unit position. Make sure that you install the LD at the same position.
   - Be sure to remove the mylar from the underside of the old LD unit and attach it to the new one.

4. After installing the LD unit, execute SP2115 001~006 to input the pitch settings for the main scan beams.
   NOTE: The correct settings for these SP codes are printed on a decal attached to the mounting bracket [C] of the LD unit.

```
<LD Unit Lot No.>
SP2115 001/SP2115 002/SP2115 003
PS2115 004/SP2115 005/SP2115 006
```

   The 6 numbers printed on the label correspond to the correct settings of the SP codes shown in the diagram above.

   Here is an example:

```
-10/-2/+10
-100/+0/+100
```

   To enter these numbers, you would execute:

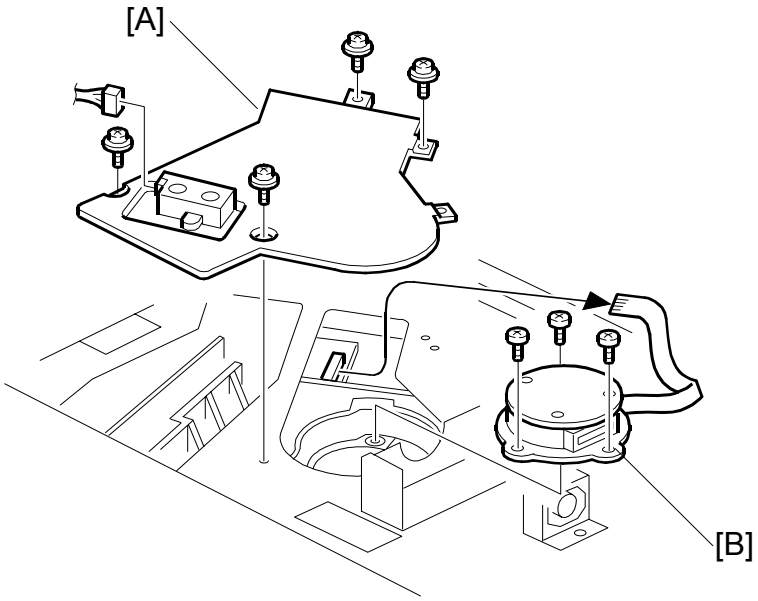
SP2115 001	✻ 1 0 #
SP2115 002	✻ 2 #
SP2115 003	1 0 #
SP2115 004	✻ 1 0 0 #
SP2115 005	0 #
SP2115 006	1 0 0 #

- Press ✻ to enter the minus sign.
- Press # after each entry.
- A key press is not required for the plus sign.

   CAUTION: This example is for instructional purposes only. When you do this adjustment, you must enter the numbers printed on the label attached to the LD unit.

5. Do SP2962 (Auto Process Control Execution).
6. Make some test copies and check that the magnification is correct. If not correct, please do the printer copy adjustment. (☛3.15)

3.6.4 POLYGON MIRROR MOTOR

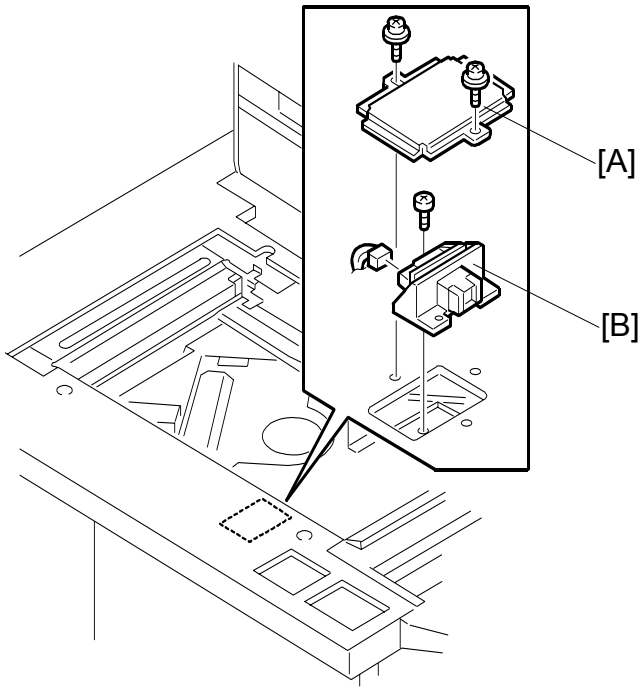


NOTE: To avoid damaging the polygon motor, switch the machine off and wait 3 minutes to allow the motor to stop rotating before removing it.

1. Turn off the main power switch and unplug the machine.
2. Exposure glass (☛3.5.1)
3. Lens block cover and lens block. (☛3.6.2)
   NOTE: You do not need to remove the lens block completely. Lift it gently and move it to the right.
4. LD cover [A] (x 4, x 1).
5. Polygon mirror motor [B] (x 3, x 1).
   NOTE: 1) When reinstalling, make sure that the polygon mirror opening faces the right.
   2) Never touch the glass surface of the polygon mirror motor with bare hands.

7. After reassembly, do the scanner and printer copy adjustments. (☛3.15)

3.6.5 LASER SYNCHRONIZATION DETECTOR

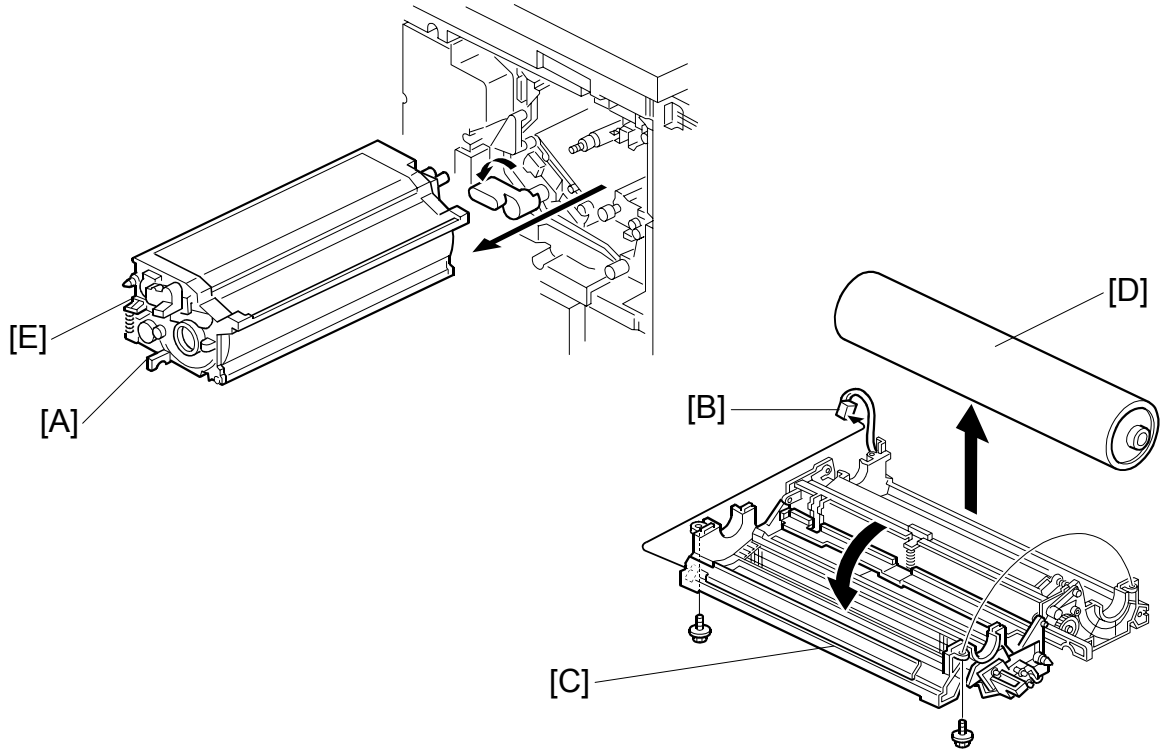


1. Turn off the main power switch and unplug the machine.
2. Exposure glass (☛3.5.1)
3. Lens block cover and lens block. (☛3.6.2)
   NOTE: You do no need to remove the lens block completely. Lift it gently and move it to the right.
4. Detector cover [A] (🔩 x 2).
5. Laser synchronization detector [B] (🔩 x 1, 🖐 x 1).

3.7 DRUM UNIT

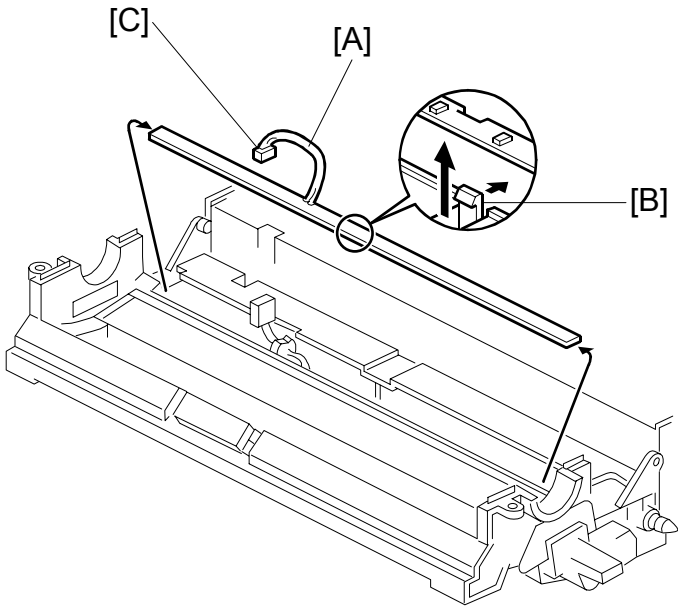
3.7.1 DRUM UNIT

Drum Removal



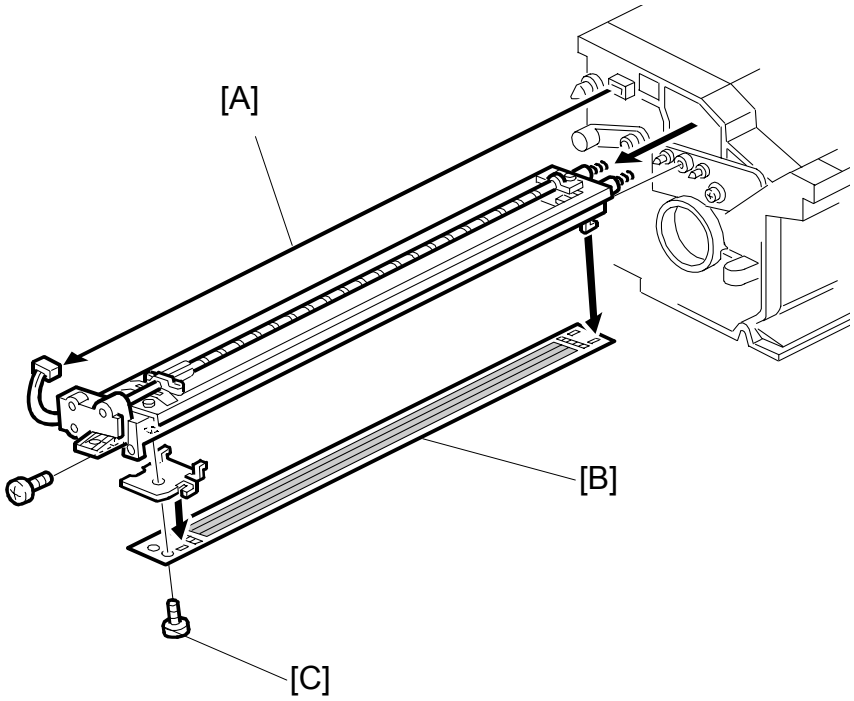
1. Remove the development unit. (☛3.8.1)
2. Lower the transfer belt unit lever
3. Grip the drum unit by the handle [A] then remove it.
   NOTE: 1) Keep the drum unit covered with a sheet of paper while it is out of the machine.
   2) Never touch the drum surface with bare hands.
   3) If it is difficult to re-insert the drum into the machine because the gear is disengaged, push in the drum unit while holding down the cleaning blade release lever [E].
4. Disconnect the drum potential sensor connector [B] (x 1).
5. Open the upper drum unit [C] (x 2).

3.7.2 QUENCHING LAMP



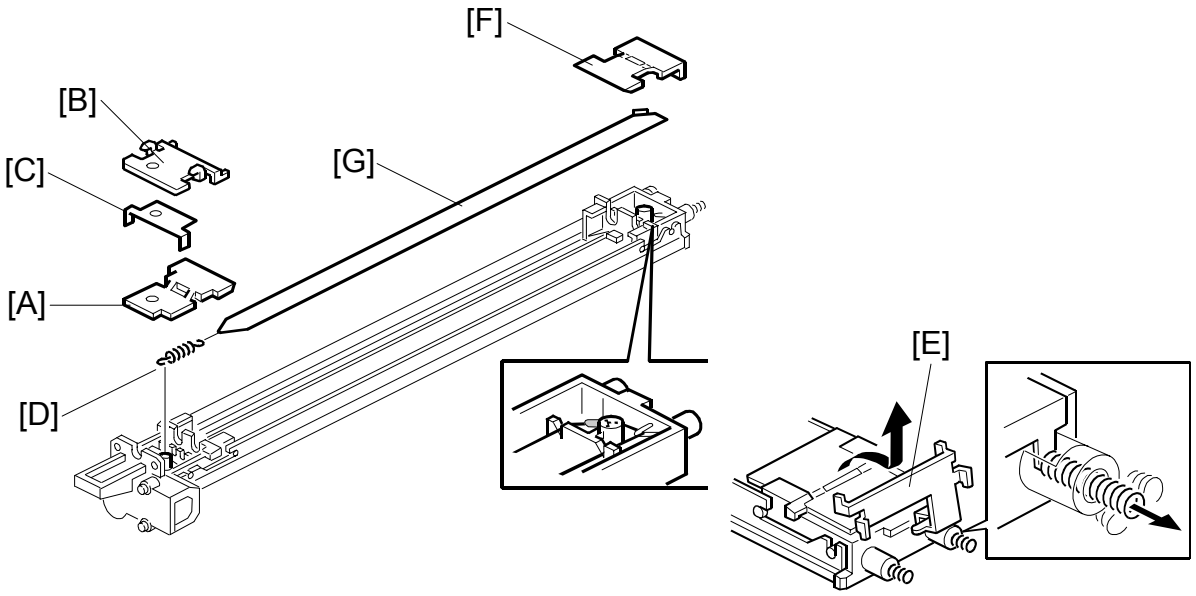
1. Remove the drum. (☛3.7.1)
   NOTE: Wrap a protective sheet or a few sheets of paper around the drum to protect it from light.
2. Pull up the quenching lamp connector cable [A] slightly, then release the hook [B] at the center of the quenching lamp.
   NOTE: Do not pull the wire too strongly.
3. Disconnect [C].

3.7.3 GRID PLATE, CHARGE CORONA WIRE, WIRE CLEANER

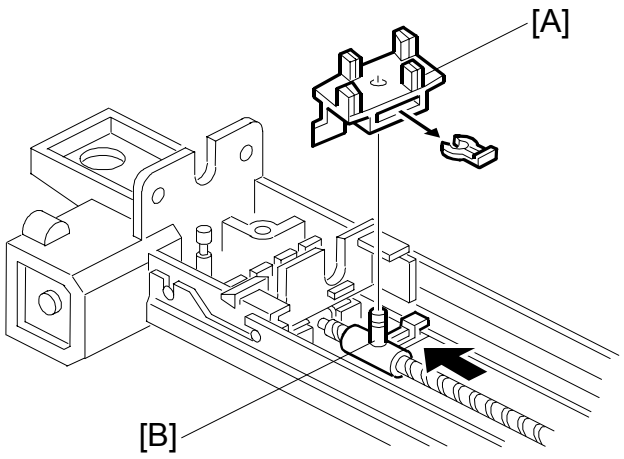


1. Charge corona unit [A] (x 1, x 1).
2. Grid plate [B] (x 1, hooks x 4).

- When installing the grid plate, do not over tighten the plastic screw [C].
- Never touch the corona wire and grid plate with bare hands.

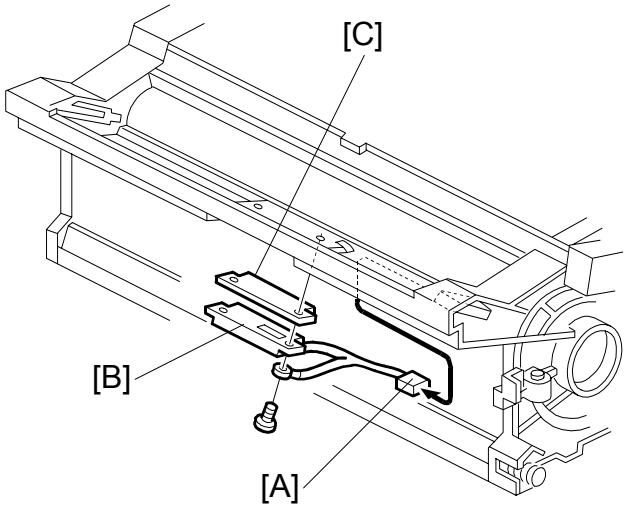


3. Remove the front grid terminal [A], then the front block cover [B].
4. Plate [C].
5. Terminal spring [D].
6. Slide the rear grid terminal [E] to the rear and remove it, then remove the rear end block cover [F].
7. Charge corona wire [G].



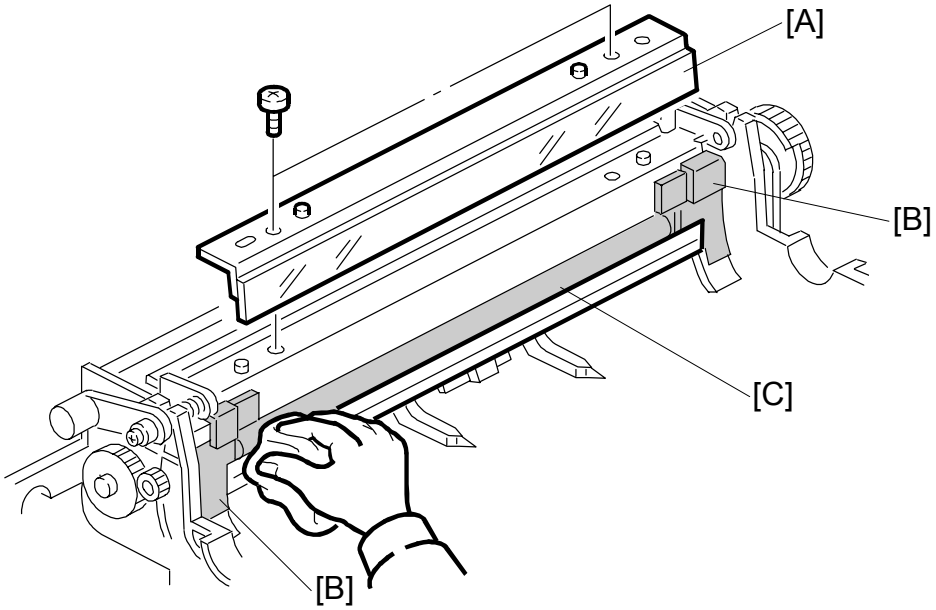
8. Wire cleaner [A] (⟲ x 1).
9. Install the wire cleaner and the charge corona wire.
   NOTE: Put the joint part [B] of the wire in the rear end block.
10. After installing new wires, reset SP codes SP2001 001 to 2001 006 (Corona Voltage and Current) to their defaults.
11. Execute SP2962 (Auto Process Control Execution).

3.7.4 DRUM POTENTIAL SENSOR

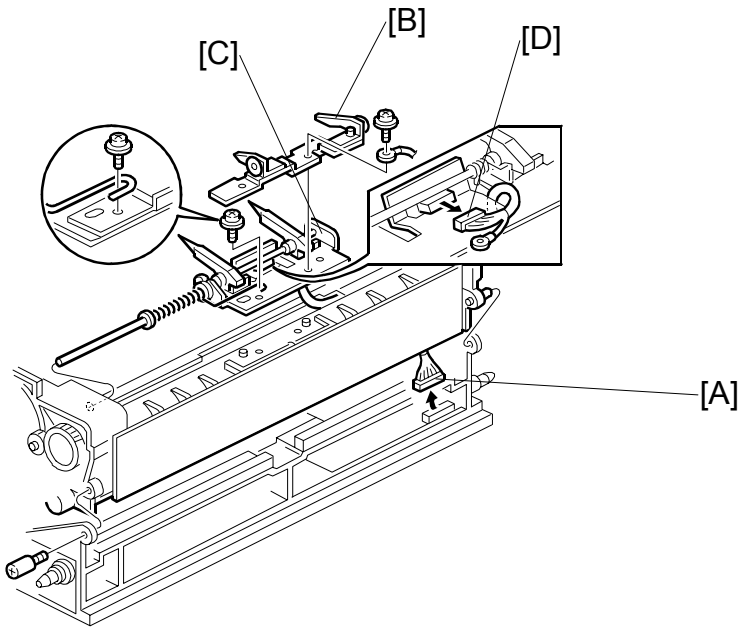


1. Remove the drum unit. (☛3.7.1)
   NOTE: Before removing the drum potential sensor, put a few sheets of paper between the sensor and the drum to protect the drum surface.
2. Drum potential sensor [B] and the grounding plate [C] (x 2, x 1).
3. Execute SP2962 (Auto Process Control Execution).
   NOTE: After replacing the drum potential sensor, you must always execute SP 2962.

3.7.5 DRUM CLEANING BLADE, ID SENSOR



1. Remove the drum unit. (☛3.7.1)
2. Cleaning blade [A] (🔩 x 2).
3. Clean the side seals [B] and cleaning brush [C]. (See 'Vacuum Cleaning' on the next page.)



4. Install the new cleaning blade.

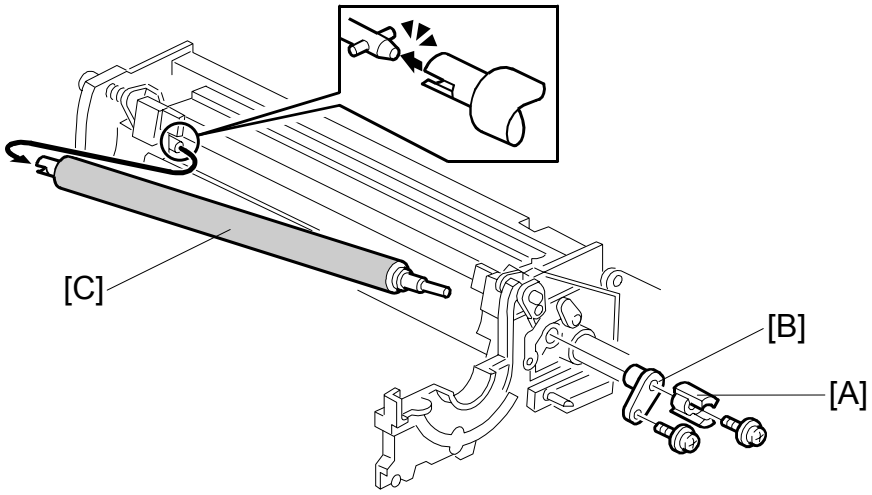
NOTE: 1) To avoid damaging the edge of the blade and causing black lines on copies, never clean the blade with a cloth.
2) Never touch the edge of a new cleaning blade.
3) If setting powder or toner on the blade edge is removed at any point, re-apply toner or setting powder at that point. When installing the cleaning blade, do not pinch the side seals.

Vacuum Cleaning

To protect the electrical parts from static electricity, disconnect the connector on the charge power pack and remove the ID sensor.

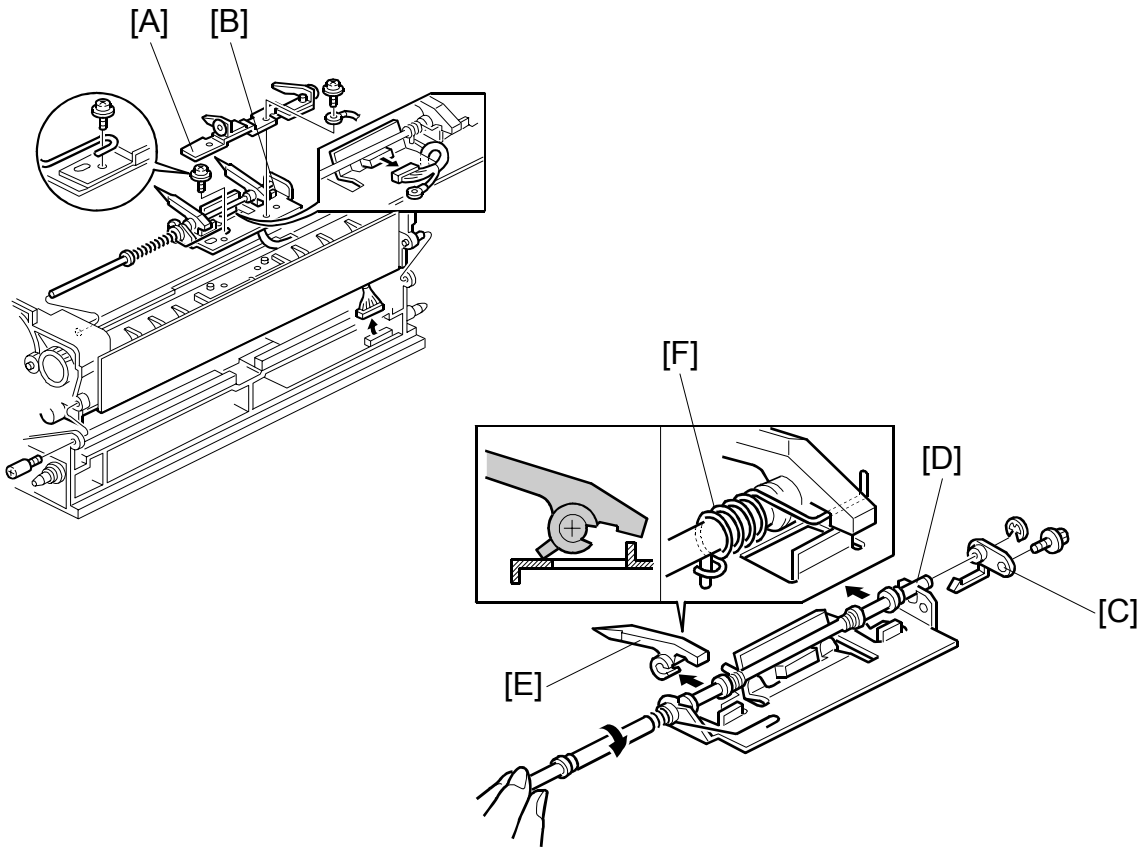
1. Disconnect the 12-pin connector [A].
2. Separate the upper and lower drum units.
3. Remove the spur bracket [B] and pick-off pawl bracket [C] (☞ x 2).
4. Disconnect the connector [D].
5. Slide the pick-off pawl bracket to the rear, while turning it counterclockwise (as seen from the front). The ID sensor is on this bracket.
6. After installing a new ID sensor, do SP3001 002 (ID Sensor Settings – ID Sensor Initialization).

3.7.6 CLEANING BRUSH



1. Cleaning blade. (☛3.7.5)
2. Coupling gear [A] (☞ x 1).
3. Bushing [B] (☞ x 1).
4. Pull the cleaning brush shaft to the rear to release the cleaning brush [C], then remove the cleaning brush.
   NOTE: Never touch the cleaning brush with bare hands.
5. After replacement, clean the ID sensor surface.
6. Execute SP3001 002 (ID Sensor Initial Settings – ID Sensor Initialization) to initialize the sensor.

3.7.7 PICK-OFF PAWLS

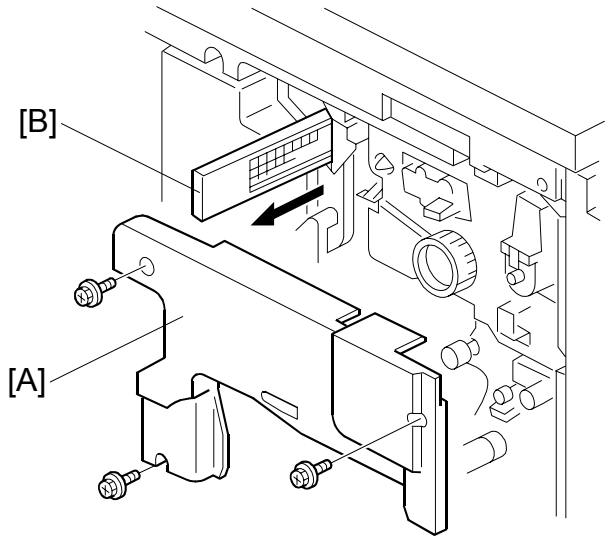


1. Remove the drum unit. (☛3.7.1)
2. Spur bracket [A] and pick-off pawl bracket [B] (☞ x 2).
3. Bushing [C] (☞ x 1, ℂ x 1).
4. While pulling the shaft [D] to the rear, turn the pick-off pawl shaft about 45 degrees clockwise (viewed from the front) to move up the pick-off pawl.
5. Pick-off pawl [E].

Replacement

1. Do not forget to hook the tension spring [F].
2. After replacement, make sure the pick-off pawl moves smoothly.
3. Never touch the edge of the pick-off pawl.

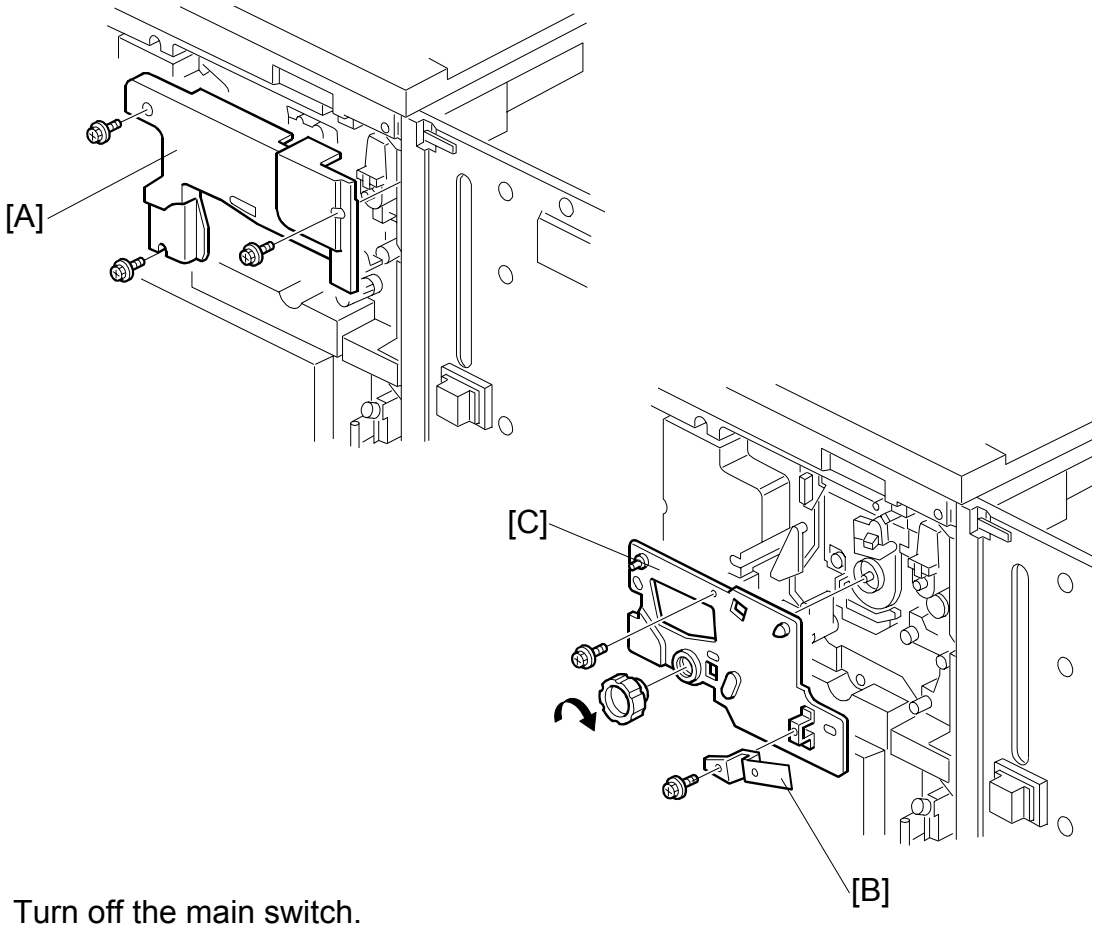
3.7.8 DRUM FILTER



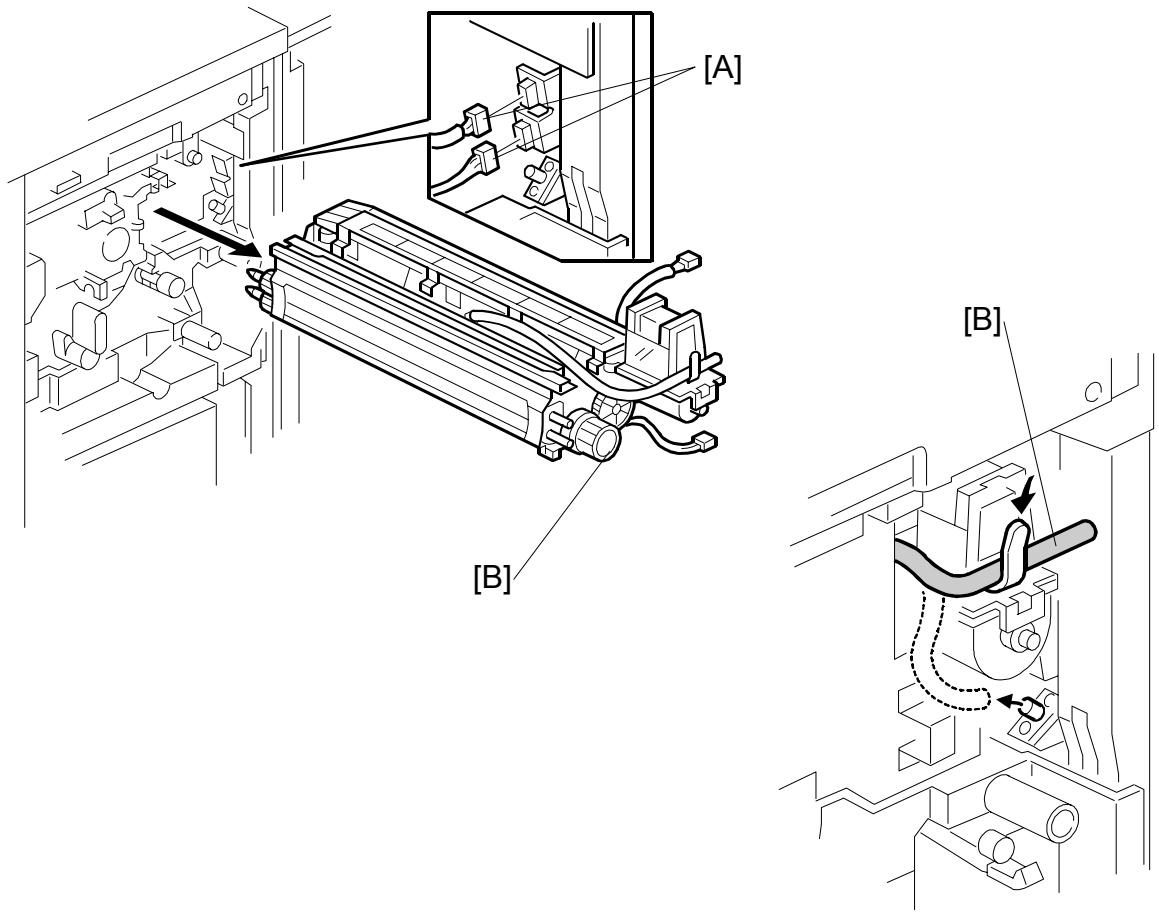
1. Open the front doors.
2. Right inner cover [A] (x 3).
3. Drum filter [B].

3.8 DEVELOPMENT AND TONER SUPPLY

3.8.1 DEVELOPMENT UNIT REMOVAL



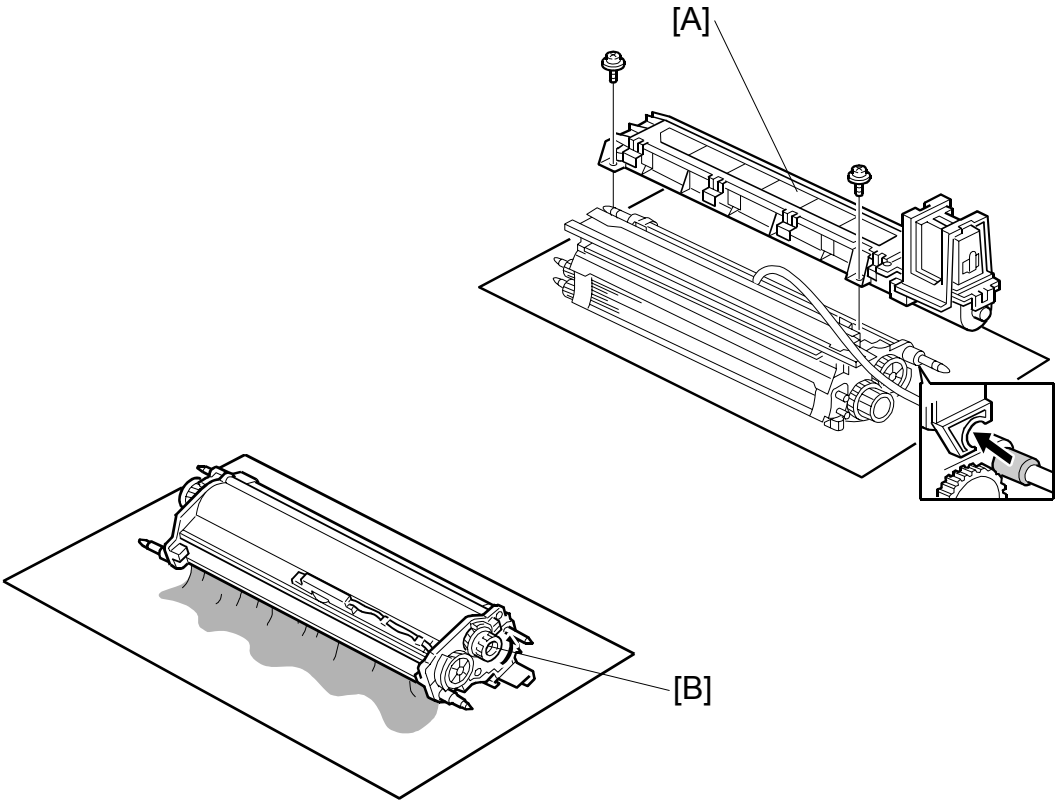
1. Turn off the main switch.
2. Open the right door.
3. Right inner cover [A] (☞ x 3).
4. Development support plate [B] (☞ x 1).
5. Drum stay [C] (☞ x 1, knob x 1)



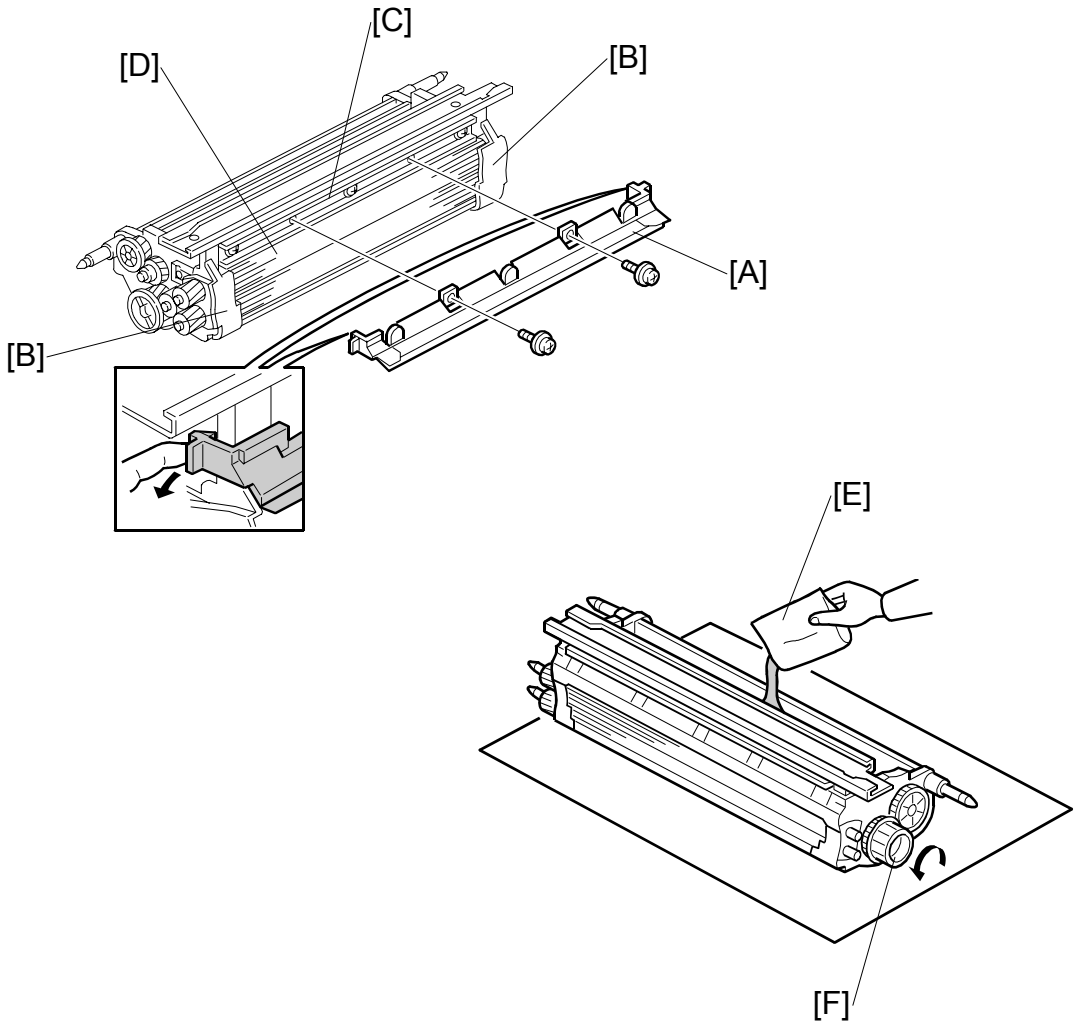
6. Disconnect the connectors [A].
7. Disconnect the toner suction hose [B] and set it on the hook provided to keep the hose elevated so it does not leak toner.
8. Grasp the knob [C] of the development unit and pull it out of the machine.

NOTE: 1) To prevent scratches on the drum, press the development unit to the right while pulling it out.
2) After installing the development unit, be sure to re-connect the connectors (x2) and suction hose.
3) When cleaning the unit with a vacuum cleaner, keep the development unit connector as far as possible away from the development unit.

3.8.2 DEVELOPER REPLACEMENT



1. Take out the development unit. (☛3.8.1)
2. Place the development unit on a sheet of paper.
3. Toner hopper [A] (☞ x 2).
4. Turn over the development unit. Then turn the paddle roller knob [B] counterclockwise to empty the remaining developer onto the sheet
   NOTE: Dispose of used developer in accordance with local regulations. Make sure that no developer remains on the development rollers or in the development unit.



5. Remove the entrance seal [A] (☞ x 2).
6. Clean the side seals [B].
7. Clean the development sleeve [C].
8. Cover the sleeve rollers [D] with a sheet of paper to prevent the new developer from being attracted to the sleeve rollers.
9. If you are installing a new development unit, go to the next step.

   -or-

   If you are only replacing the developer, clean the doctor blade before you pour in the developer: (☛ 3-55)
10. Pour in one pack of developer [E] evenly across the width of the development unit, while turning the knob [F].

11. Re-install the toner hopper, then re-assemble the machine.
12. Tilt the toner hopper so that there is toner near the toner hopper sensor.
13. Be sure to connect the connectors after installing the development unit in the machine.
14. Turn on the main switch, then execute SP2801 (TD Sensor Initial Setting).
    - Use the keys on the screen to enter the Developer Lot No, then press #. (The Lot No. is embossed on the top edge of the developer packet.)
    - Press "Execute" on the LCD.

    This executes the TD initial setting. After about 1 minute, "Completed" is displayed on the screen, and the execution stops automatically.

    NOTE: Do not make copies with new developer until after executing SP2801; otherwise, toner density control will be abnormal.
15. If the developer initial setting did not complete correctly, you cannot exit the SP mode by pressing the "Quit" key. If this problem occurs, turn the main switch off and on, then perform the initial setting again. If the result is the same, see "SC342" (TD Sensor Error 3) (☛ "4.Troubleshooting").

3.8.3 DOCTOR BLADE CLEANING

The doctor blade must be cleaned:

- At every PM visit.
- When replacing developer.

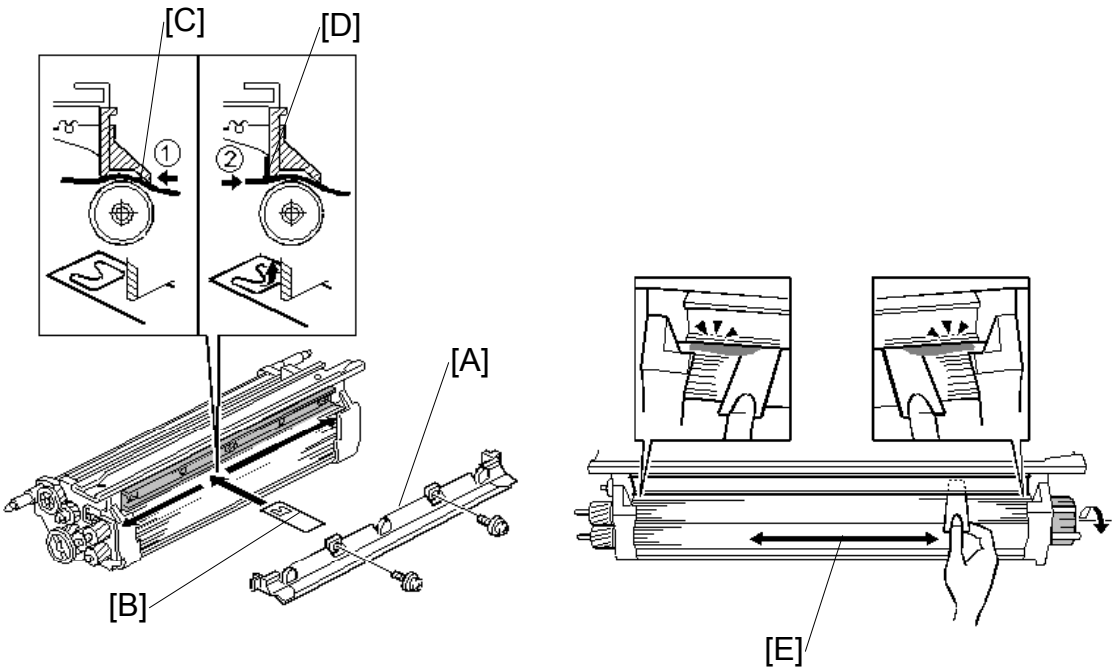
This procedure may need to be done more often if the customer is using paper that contains a large amount of paper dust. The dust tends to collect at the front and on the back side of the blade, causing the doctor gap to become narrower. Cleaning is required when:

- There is toner scatter from both ends of the development unit.
- White lines appear on copies.
- Faint reproduction of the image around the edges of the paper.

To do this procedure, you need a special tool.

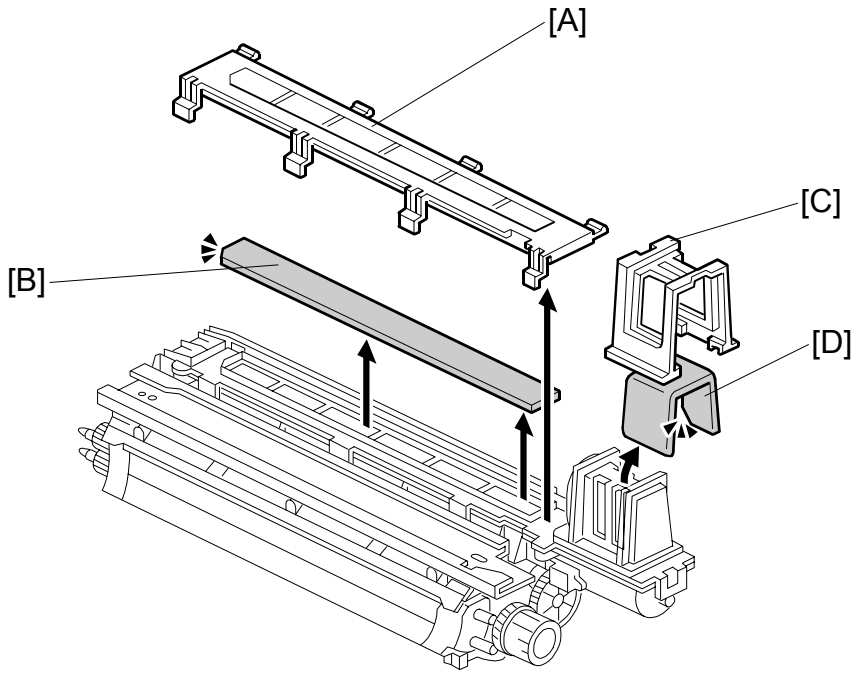
Part Number	Description
A2949560	Paper Dust Cleaner - 5pcs/set

NOTE: The tool is made of flexible plastic and can be re-used. However, before you use it, make sure that it is perfectly flat.



1. Remove the development unit from the machine.
2. Pour out the developer.
3. Remove the entrance seal [A] (x 2).
4. Flatten the paper dust cleaner [B] before you insert it.
5. Insert the tool into the gap [C] until you cannot see the leaf cutout.
6. Pull the tool back gently so that the leaf [D] hooks on the back of the blade.
   NOTE: To avoid bending the leaf, making it difficult to remove, do not pull it toward you with too much force.
7. While maintaining a steady, even pressure, slide the tool [E] all the way to the left and right ends of the gap several times.
8. Turn the tool about 45 degrees to either side then remove it.
9. Rotate the development roller about 10 mm (about ½") toward you, then vacuum away any paper dust or developer that falls away from the roller.
   NOTE: Be sure to collect all the dust and developer, and do not allow it to touch the development roller surface again.
10. Repeat steps 4 to 8 about 5 times.
11. Hold the development unit upside-down, gently shake the unit to remove any remaining paper dust, then vacuum clean the work area.
12. To complete the procedure, return to Step 10 on page 3-58.
    NOTE: Be sure to clean the development sleeve before you proceed.

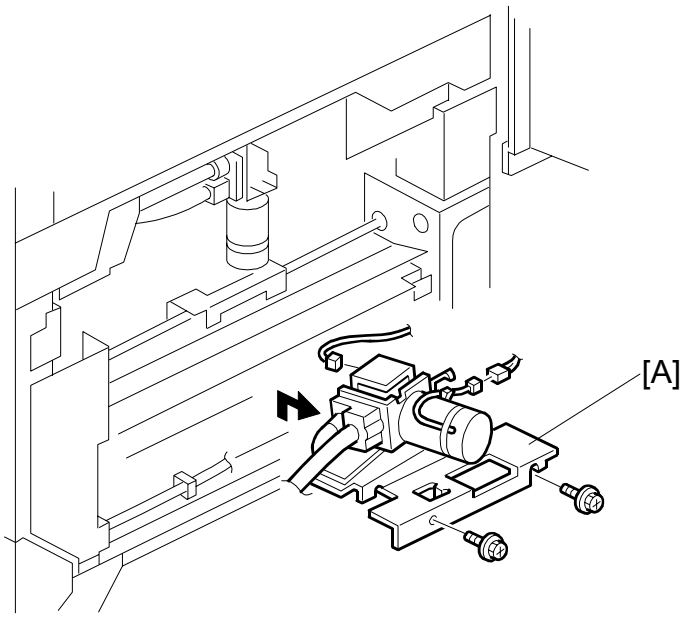
3.8.4 DEVELOPMENT UNIT FILTERS



1. Development unit. (☛3.8.1)
2. Dust filter cover [A] (hooks x 4).
3. Center development filter [B].
4. Spread the base of the front dust filter cover [C] and remove it.
5. Front dust filter [D].

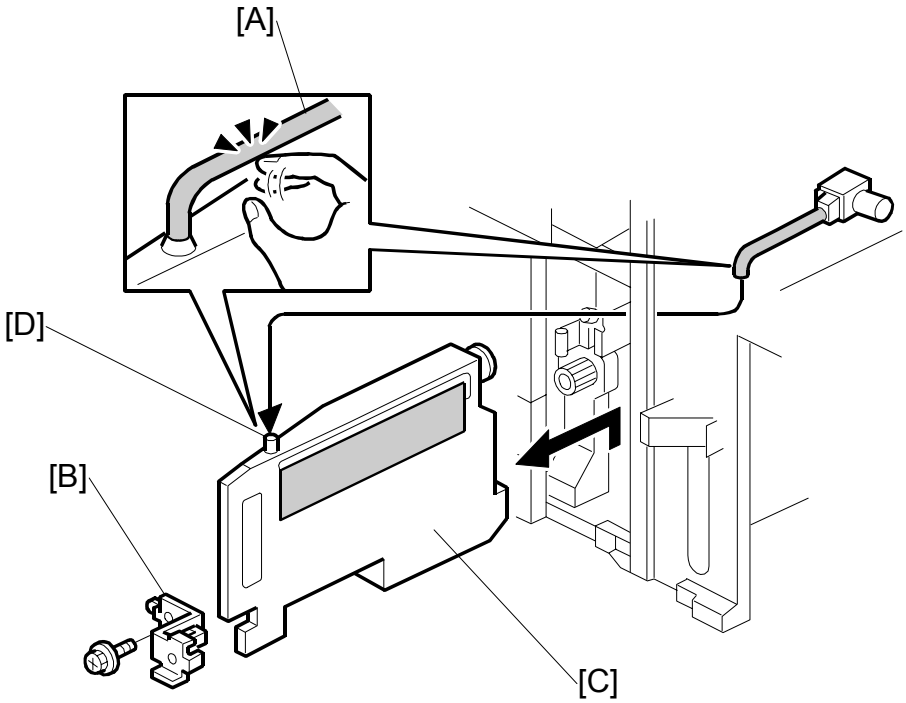
NOTE: Make sure that the beveled corner of each dust filter fits into the beveled corner of the holder below.

3.8.5 DEVELOPMENT UNIT TONER SUCTION PUMP



1. Right upper cover (x 4).
2. Toner suction pump assembly [A] (x 2, hoses x 2, x 2)

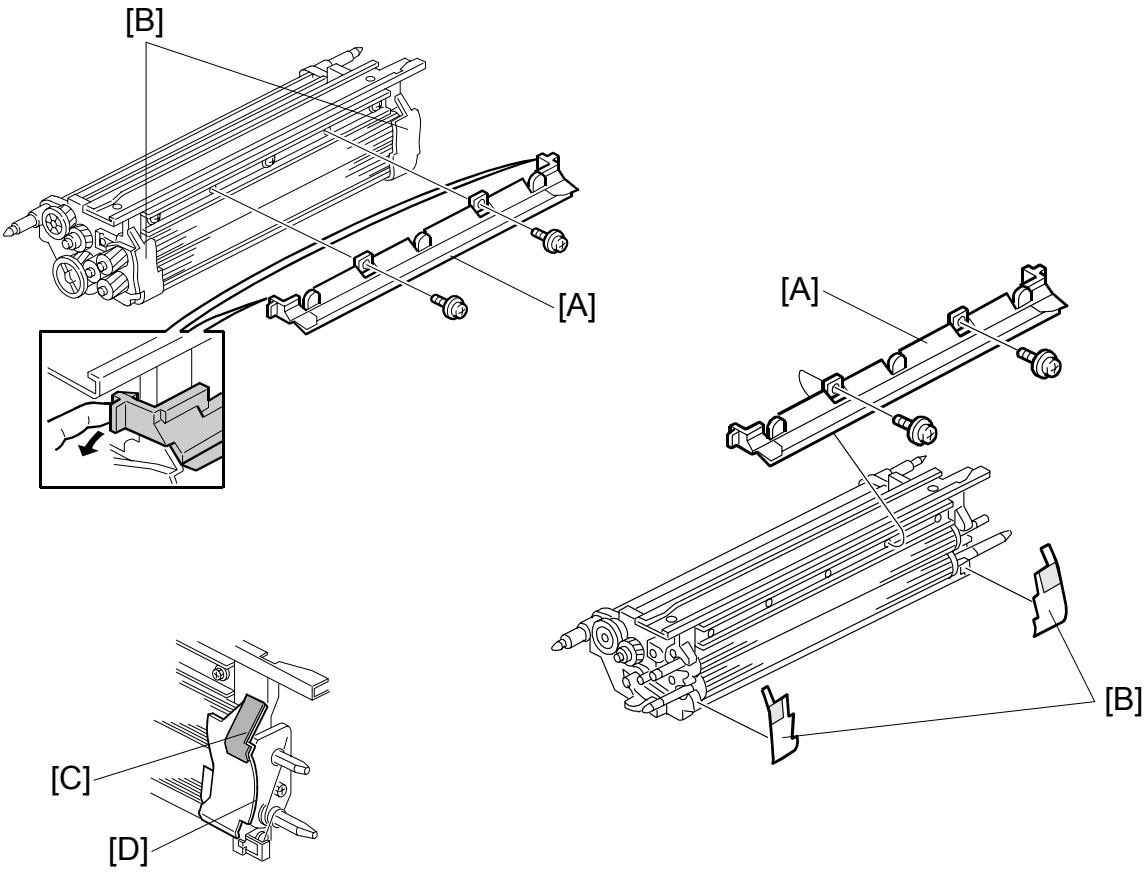
3.8.6 DEVELOPMENT UNIT WASTE TONER BOTTLE



1. Open the front right door.
2. Tap the hose [A] to clear toner from the opening of the hose.
3. Bracket [B] (🔩 x 1).
4. Waste toner bottle [C] (hose x 1).

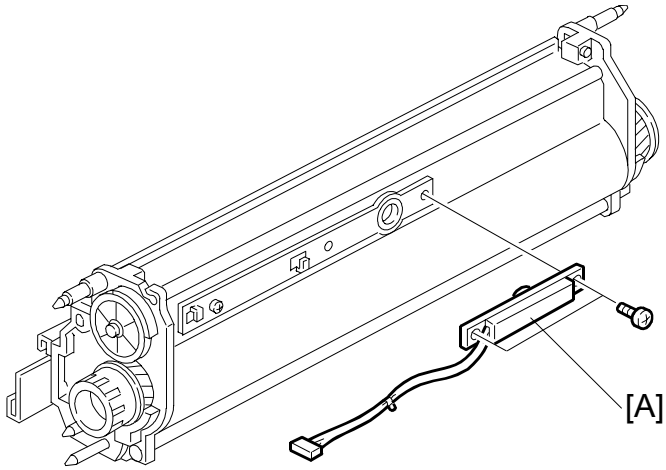
NOTE: During transport and disposal of the used bottle, make sure that toner does not spill from top opening [D].

3.8.7 DEVELOPMENT ENTRANCE, FRONT, AND REAR SIDE SEALS



1. Remove the developer and save it.
2. Replace the developer entrance seal [A] (x 2, hooks x 2).
3. Replace the front and rear side seals [B].
   NOTE: When re-assembling the development unit, align the edges of the new side seals [C] with the edges [D].

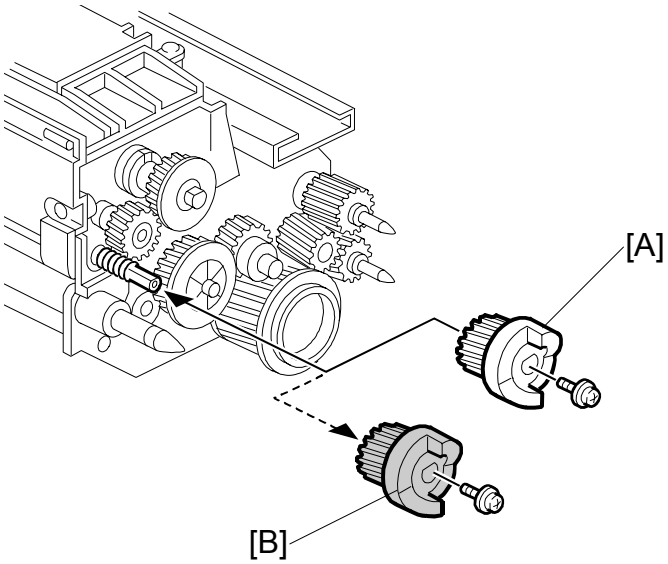
3.8.8 TONER DENSITY SENSOR



1. Remove the developer. (☛3.8.2)
2. Remove the TD sensor [A] (☞ x 2).
3. Thoroughly clean the development unit, so no carrier particles remain in the gap between the TD sensor and the development unit casing.
4. Install the new TD sensor
5. Install new developer and reassemble the development unit. (☛3.8.2)
6. Execute SP2801 (TD Sensor Initial Setting). (☛3.8.2)
7. Execute SP2962 (Auto Process Control Execution).

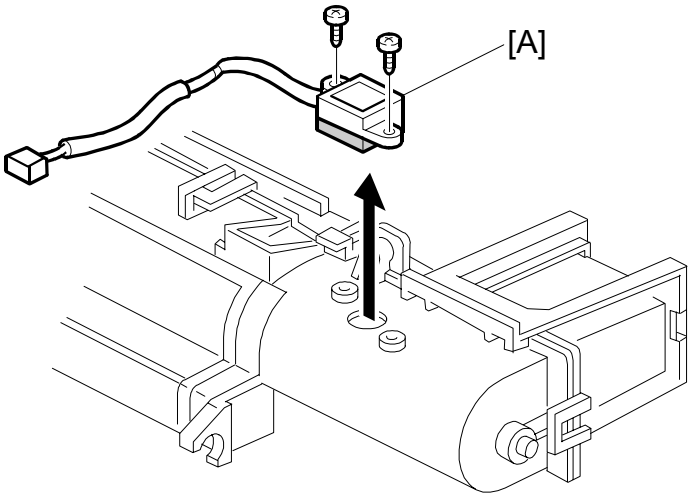
   NOTE: Do not make any copies until you have executed SP2801 (TD Sensor Initial Setting).

3.8.9 TONER HOPPER



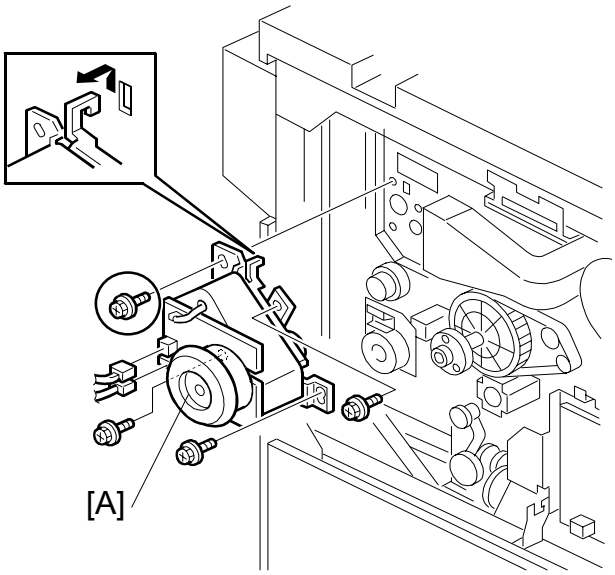
1. Take out the development unit. (☛3.8.1)
2. Replace the toner hopper (🔩 x 2).
   NOTE: The new toner hopper has a red gear. This red gear is used for Step 3 only.
3. Execute SP2207 002 (Toner Bank Toner Setup).
   NOTE: Occasionally, SP2207 002 finishes within a few seconds. If this occurs, execute SP2207 002 again. This operation normally continues for about 5 minutes.
4. Remove the white gear [A] from the old toner hopper.
5. Remove the red gear [B] from the new hopper and replace it with the white gear from the old toner hopper.
   NOTE: The white gear is used for machine operation.

3.8.10 TONER HOPPER SENSOR



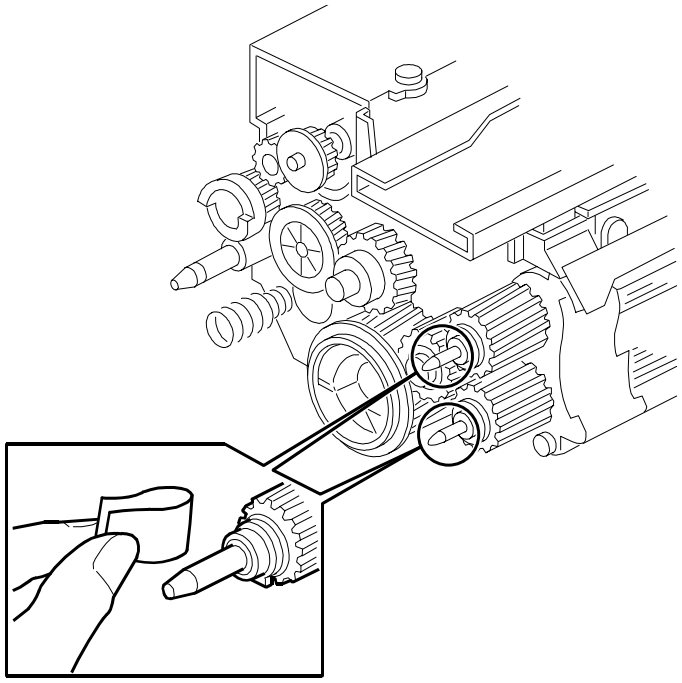
1. Take out the toner hopper. (☛3.8.2)
2. Toner hopper sensor [A] (☞ x 2).

3.8.11 DEVELOPMENT MOTOR



1. Turn off the main switch.
2. Rear upper cover (x 4). (☛3.3.4)
3. Flywheel (x 3).
4. Development motor unit [A] (x 4, x 2, hooks x 1).

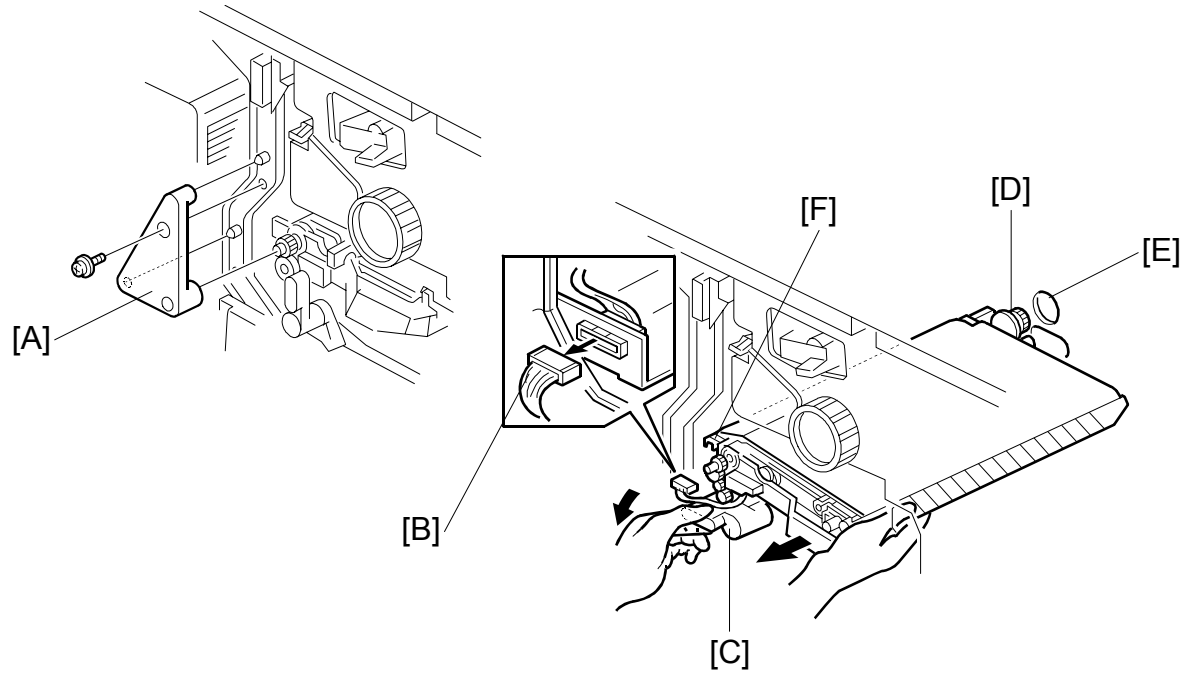
3.8.12 DEVELOPMENT ROLLER SHAFT CLEANING



1. Remove the development unit. (☛3.8.1)
2. Use Teflon tape to remove toner and developer from the development roller shafts.

3.9 TRANSFER BELT UNIT

3.9.1 TRANSFER BELT UNIT REMOVAL

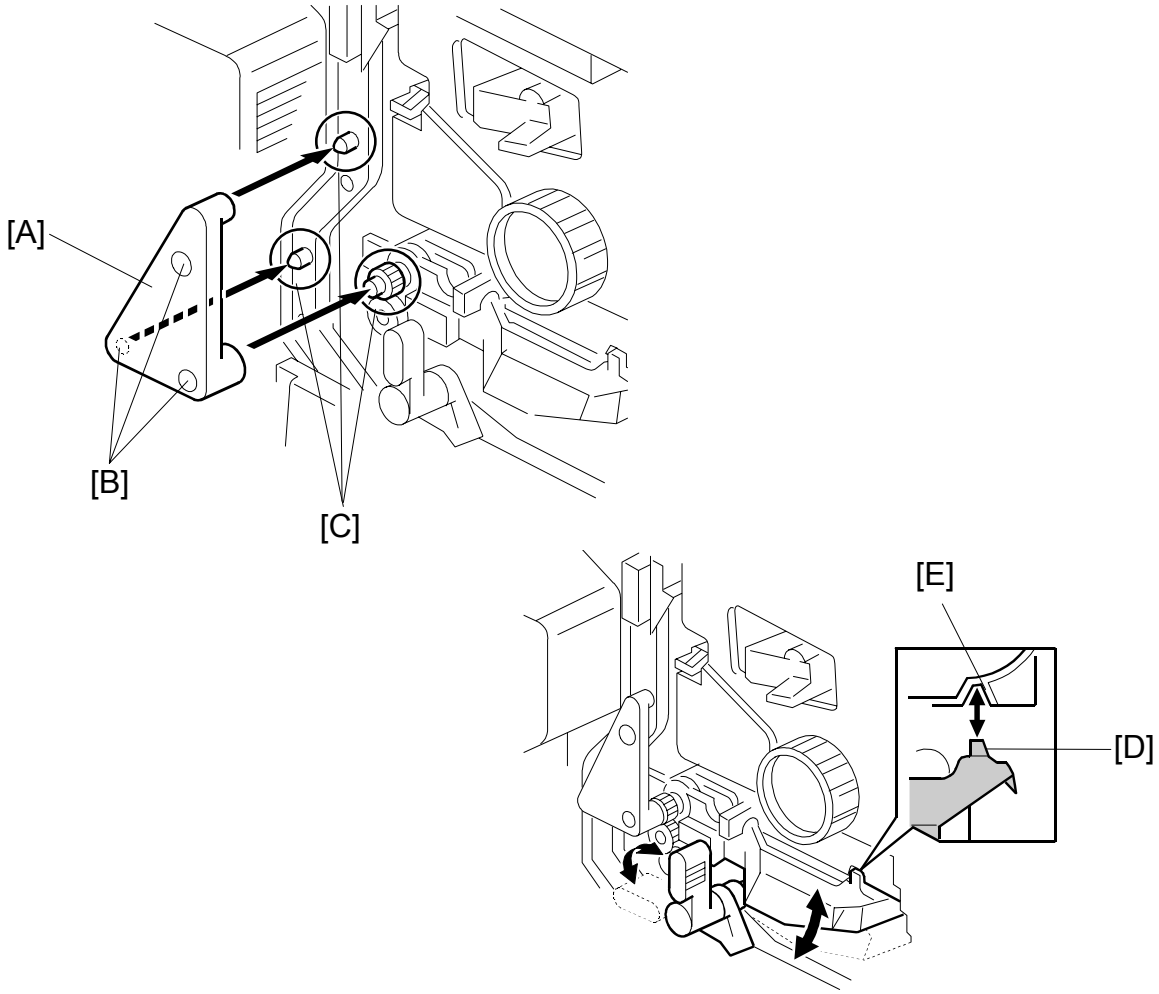


1. Turn off the main switch.
2. Remove the right inner cover. (☛3.8.1)
3. Remove the transfer belt unit holder [A] (☞ x 1).
4. Connector [B] (✍ x 1).
5. While turning the lever [C] counterclockwise, take out the transfer belt unit.

NOTE: 1) Never touch the transfer belt with bare hands.
2) Work carefully to avoid scratching the drum with the transfer belt unit.

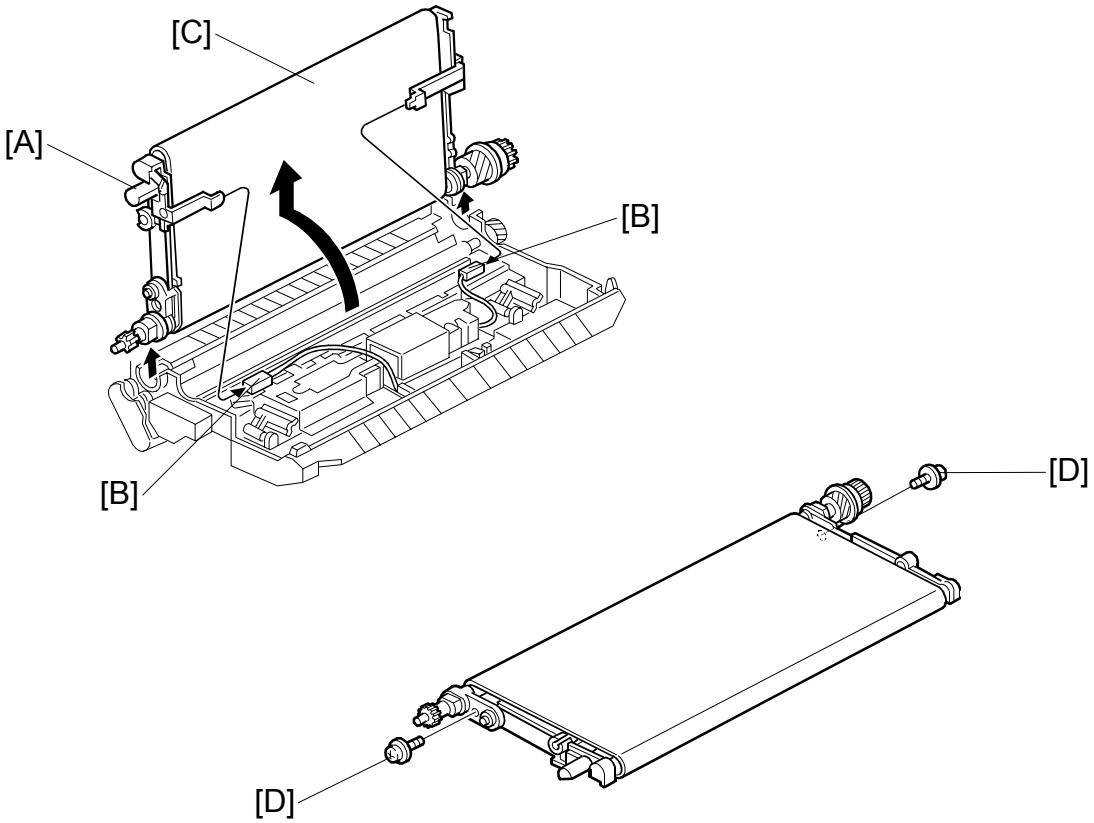
Reassembly:

1. Rotate the lever [C] fully counterclockwise, then install the transfer belt unit.
2. Insert the gear [D] into the opening [E] in the rear frame.
3. Place the slot [F] in the transfer belt unit on the rail.
4. Connect the connector [B] (✍ x 1).

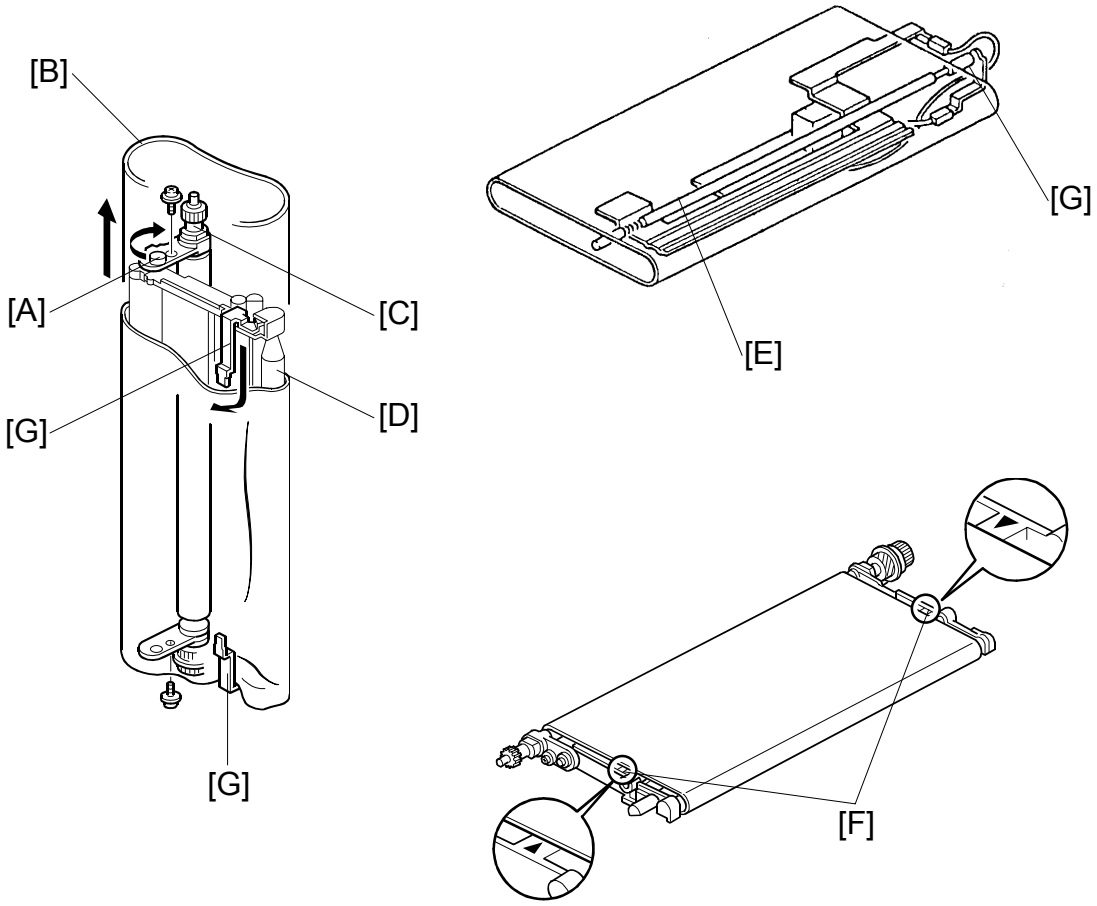


5. Attach the transfer belt unit holder [A] (☞ x 1).
   NOTE: Align the three holes [B] with the three projections [C].
6. After installation, check the following points:
   - The transfer belt unit must move up and down smoothly.
   - Part [D] of the transfer belt unit must be behind the drum stay.
   - Part [D] of the transfer belt unit must be set in the indent [E] in the drum unit casing.

3.9.2 TRANSFER BELT



1. Remove the transfer belt unit. (☛3.9.1)
2. Raise knob [A], then disconnect the connectors [B] (☞ x 2).
3. Turn the transfer belt upper unit [C] 90 degrees counterclockwise, then raise and remove it.
4. Remove the screws [D] (☞ x 2).



5. Turn the belt drive roller holder [A] clockwise (front view) and remove the transfer belt [B].
6. Clean both sides of the transfer belt with a dry cloth.
   CAUTION: Do not use alcohol.

Before Installing or Replacing the Transfer Belt

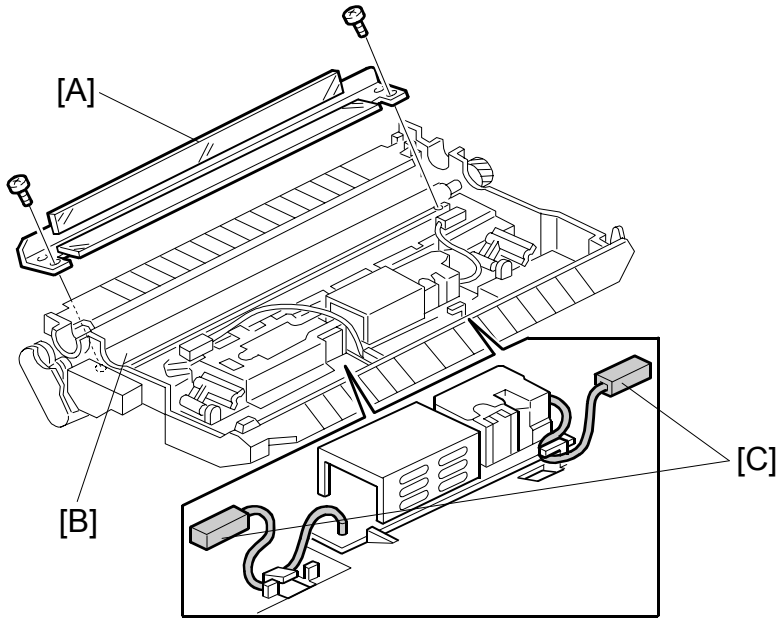
Clean the following items with alcohol:

- Belt drive roller [C]
- Belt roller [D]
- Bias roller [E]

Installing the Transfer Belt

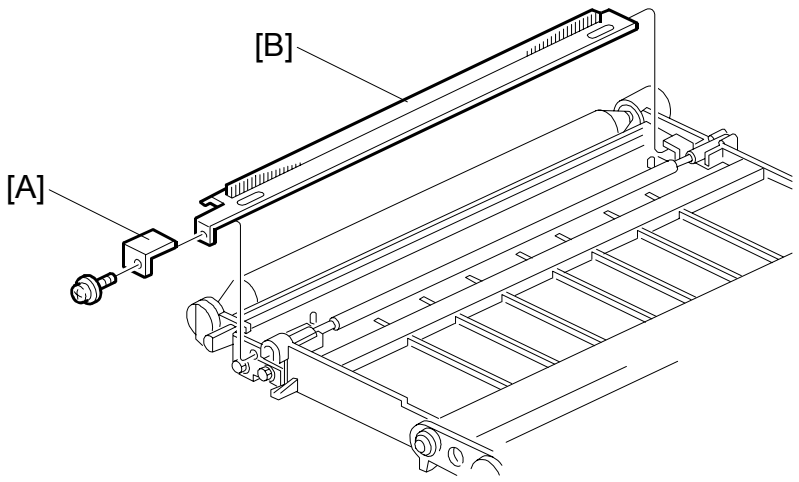
1. Position the transfer belt at the center of the belt roller [D] so both marks [F] are visible.
2. Position the transfer belt under the bias terminals [G] (see the previous page).

3.9.3 TRANSFER BELT CLEANING BLADE



1. Remove the transfer belt unit. (☛3.9.1)
2. Transfer belt cleaning blade [A] (☞ x 2).
3. Clean the cleaning bias roller [B].
   NOTE: Before vacuuming, remove the power pack connectors [C] to protect the transfer power pack from static electricity.
4. Install the new cleaning blade.
   NOTE: Never touch the edge of the cleaning blade. If the setting powder on the blade edge is accidentally removed at some point, apply setting powder or toner at that point before installation.

3.9.4 TRANSFER BELT BIAS BRUSH

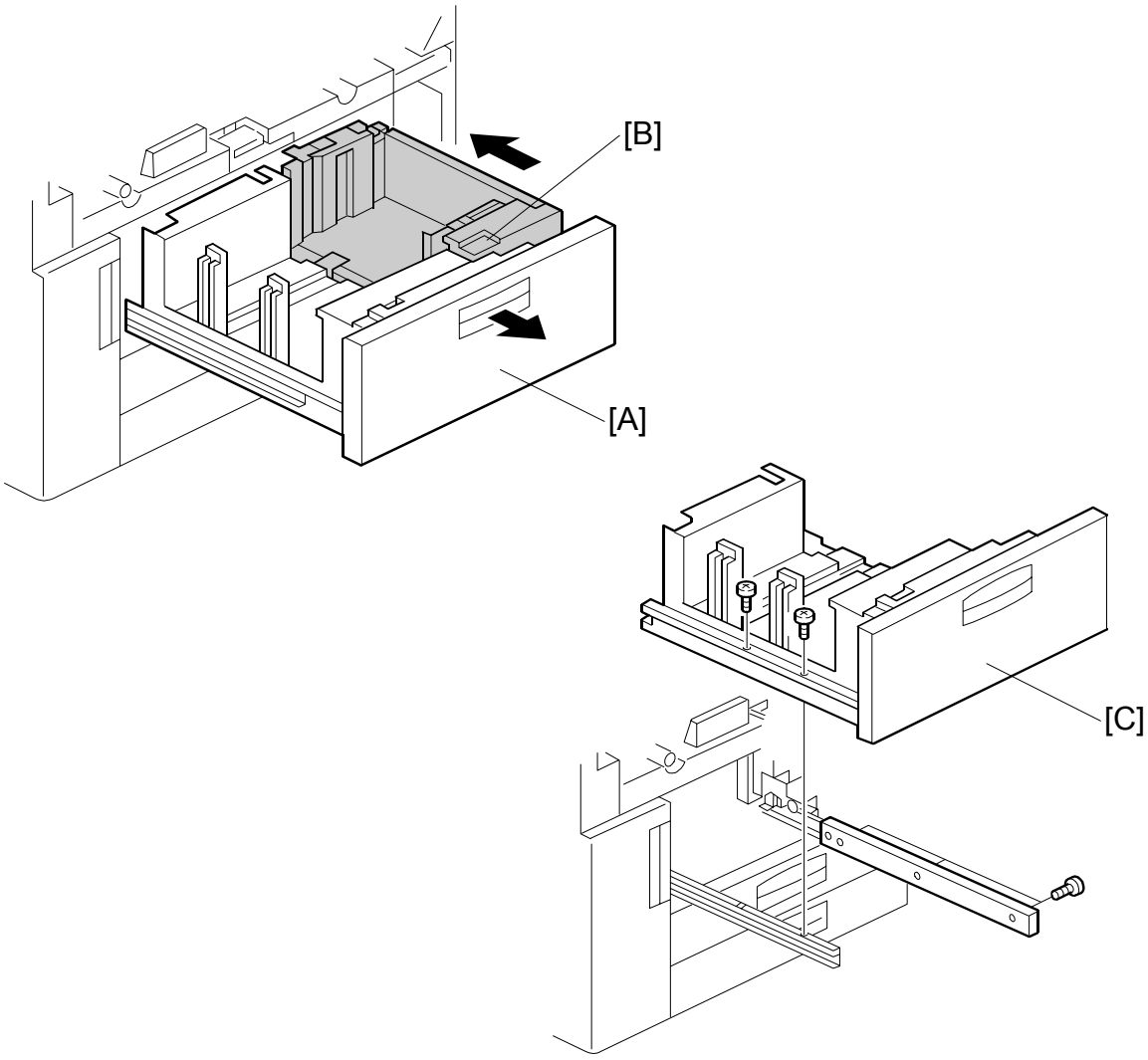


1. Transfer belt. (☛3.9.2)
2. Transfer belt bias brush holder [A] (🔩 x 1).
3. Transfer belt bias brush [B].

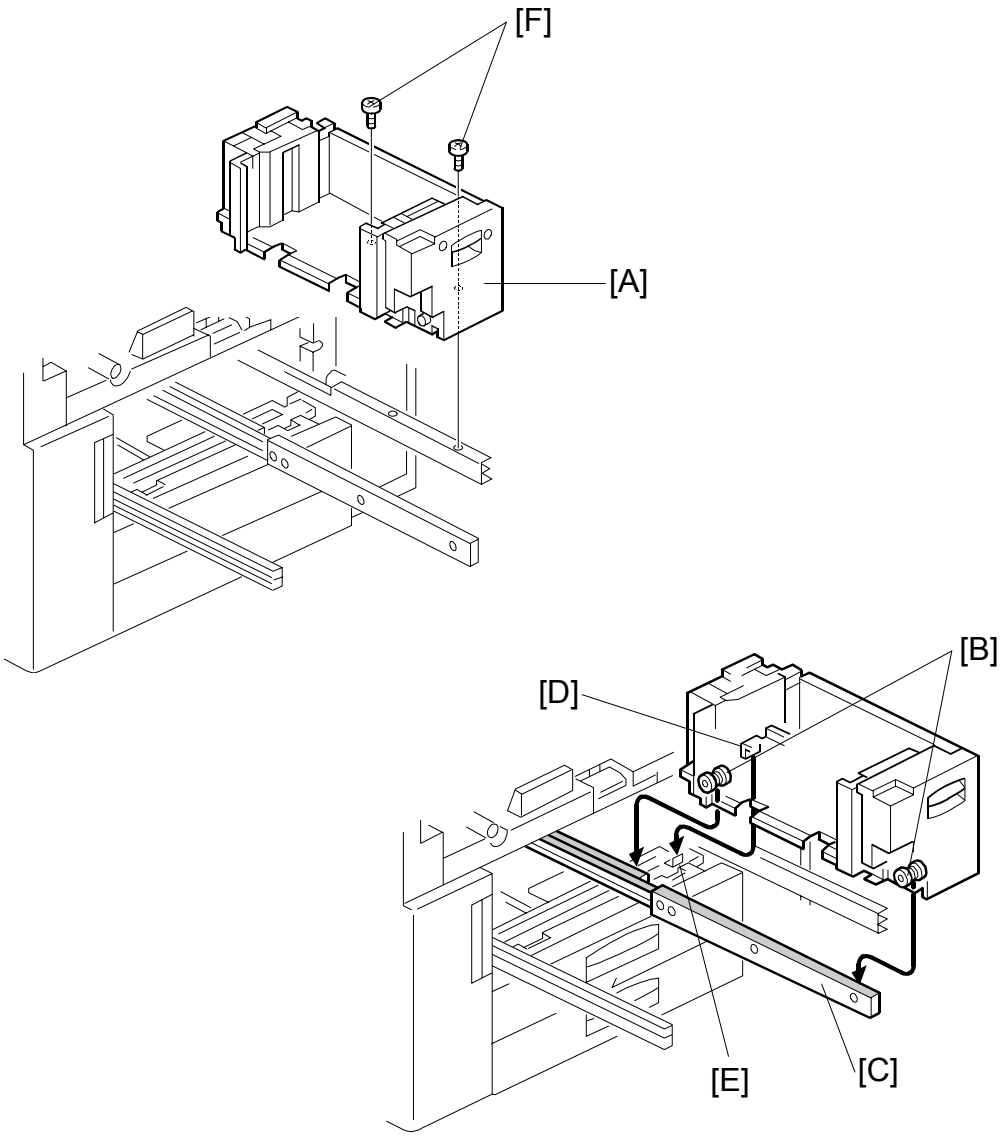
3.10 PAPER FEED

3.10.1 PAPER TRAYS

Tandem Tray



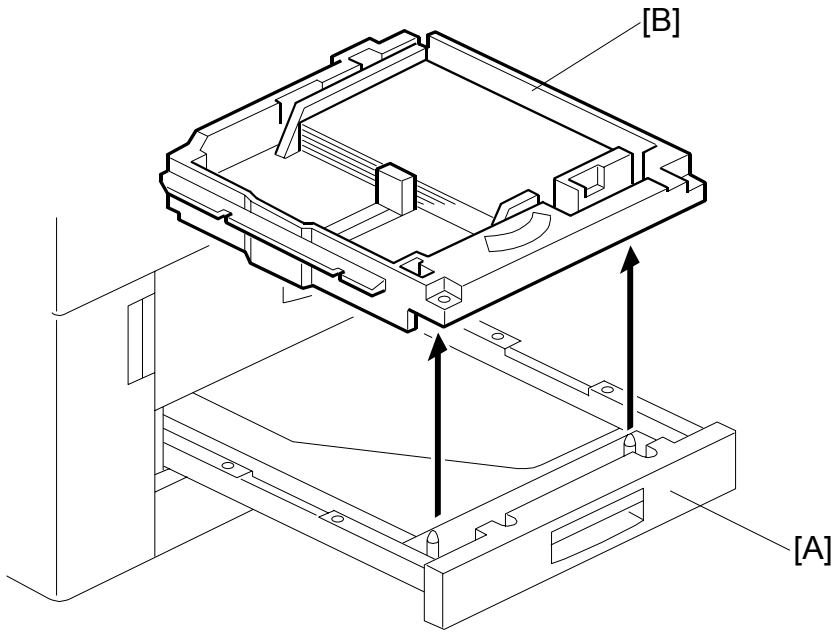
1. Open the front doors.
2. Open the tandem feed tray [A] so the right tandem tray [B] fully separates from the left tray.
3. Push in the right tandem tray.
4. Left tandem tray [C] (🖉 x 5).



5. Right tandem tray [A] (☞ x 2).

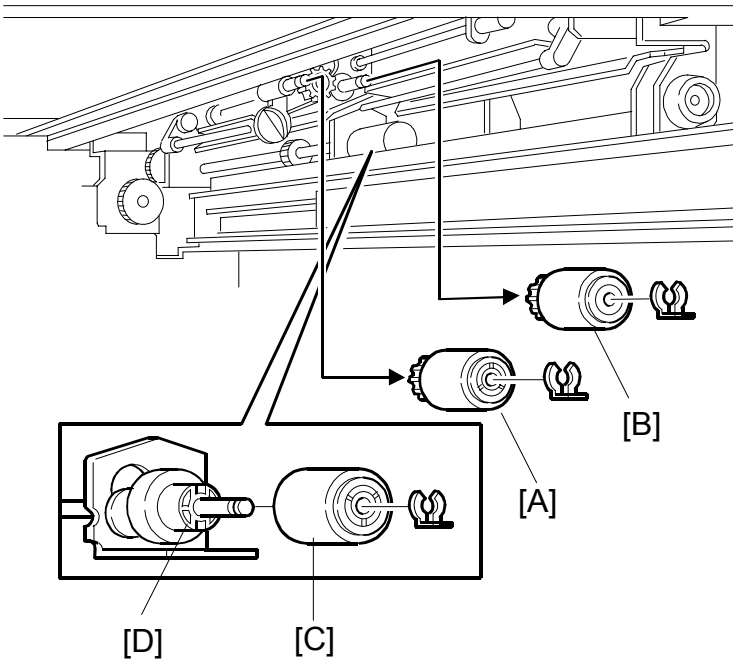
NOTE: 1) When re-installing the right tandem tray, make sure that the wheels [B] ride on the slide rail [C].
2) When re-installing the right tandem tray, make sure that the tandem tray stopper [D] is set behind the stopper [E] on the copier frame.
3) Use M4 x 4 screws [F] to secure the right tandem tray. Screws longer than 4 mm will prevent the right tandem tray from sliding out and in smoothly.

Universal Tray



1. Pull open tray 2 or tray 3 [A].
2. Lift the tray [B] out of the drawer.

3.10.2 PAPER FEED ROLLERS

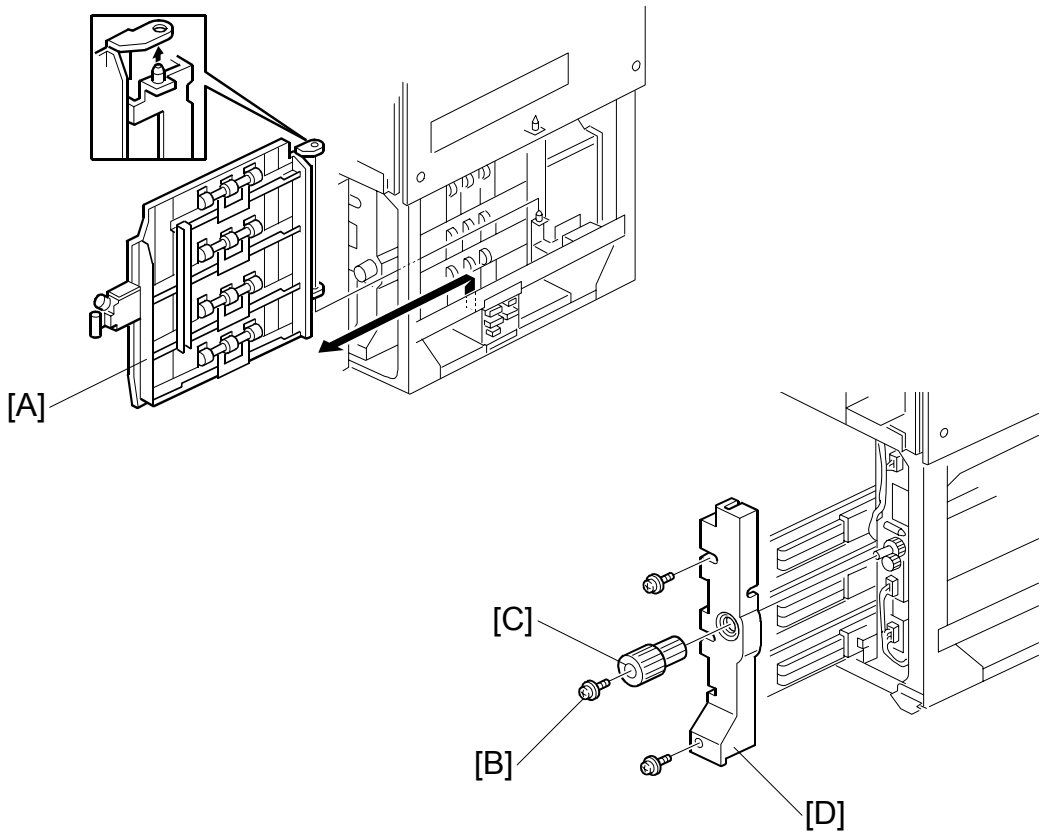


1. Turn off the main switch.
2. Paper tray for the appropriate feed unit. (☛3.10.1)
3. Pick-up roller [A] (🔩 x 1).
4. Feed roller [B] (🔩 x 1).
5. Remove separation roller [C] from the torque limiter [D] (🔩 x 1).

NOTE: 1) The feed rollers of the main machine and the LCT are not interchangeable because they turn in different directions. After replacing a feed roller in the main machine, always make sure that it turns counterclockwise in the direction of paper feed.
2) Do not touch the surface of the rollers with your bare hands.

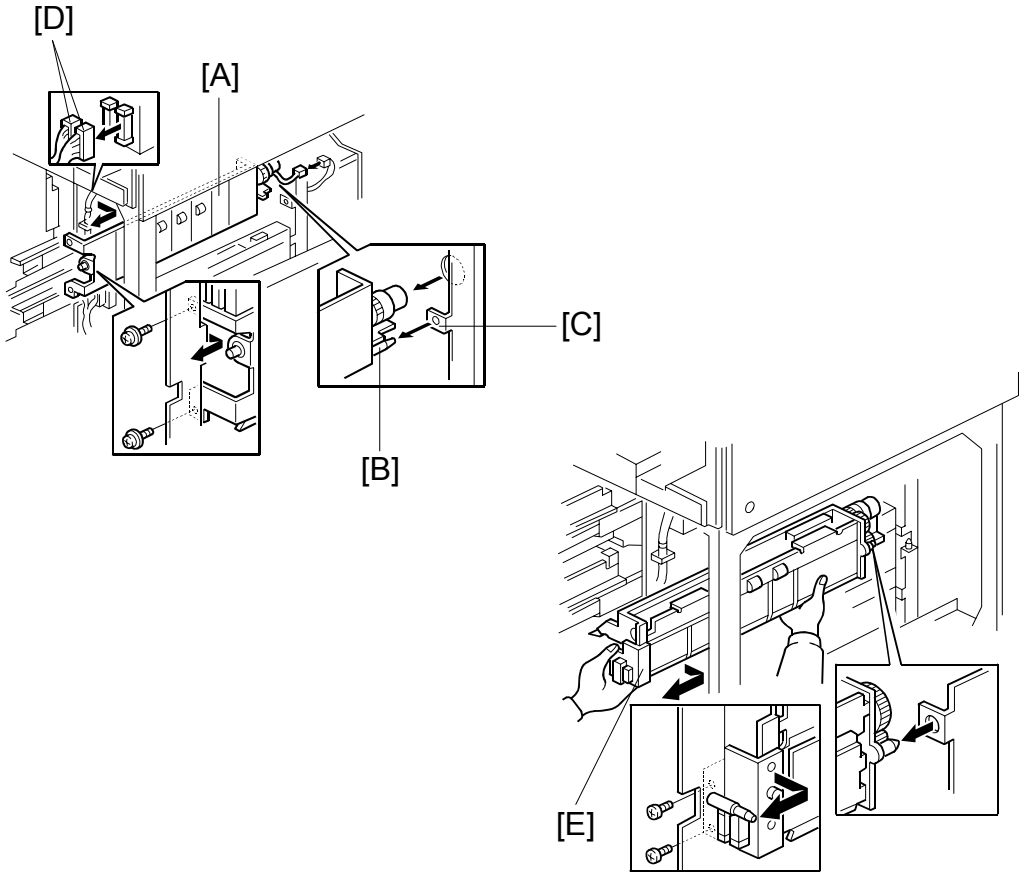
6. Reset the appropriate counter after installing the new rollers. ☛ 4. Service Tables - SP7816 (Print Counter Reset – Paper Trays).

3.10.3 PAPER FEED AND VERTICAL TRANSPORT CLUTCHES, TRAY LIFT AND PAPER FEED SENSORS

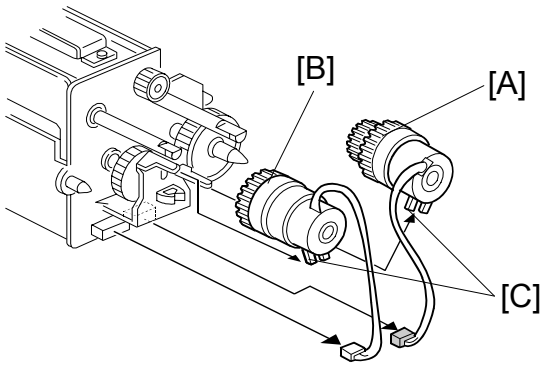


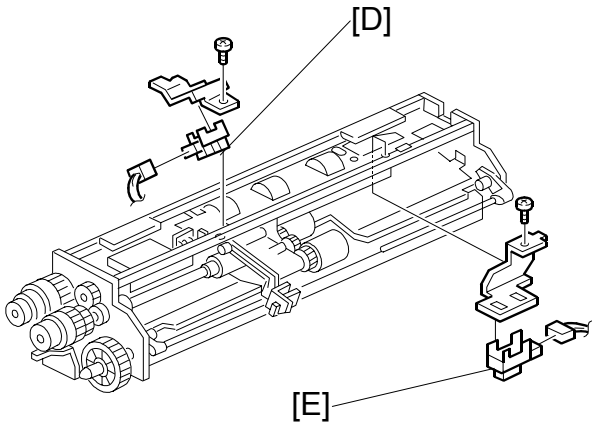
NOTE: This procedure uses the 1st feed unit as an example. The procedures for the 2nd and 3rd trays are almost identical.

1. Turn off the main switch.
2. Right front door. (☛3.1.1)
3. Right lower cover. (☛3.1.2)
   NOTE: If the LCT is installed, disconnect it.
4. Toner collection bottle (☛3.6.5)
5. Lift the vertical transport guide [A] and remove it.
6. Screw [B] and knob [C].
7. Pull out the 1st tray (tandem tray), then remove the paper tray unit inner cover [D] (🔩 x 2).



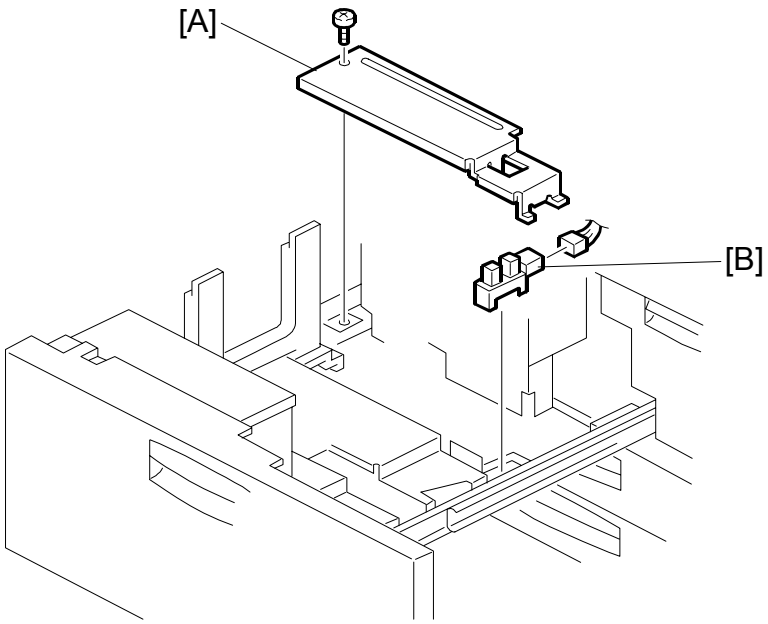
8. Inner vertical transport guide [A] (x 2, x 1).
   NOTE: When re-installing the inner vertical transport guide, set the pin [B] of the inner vertical transport guide into the slot [C] on the main body.
9. Disconnect [D] (x 2).
10. Paper feed unit [E] (x 2).
    NOTE: Before removing any paper feed unit, remove the inner vertical transport guide [A]. Otherwise, the paper feed unit may be damaged.





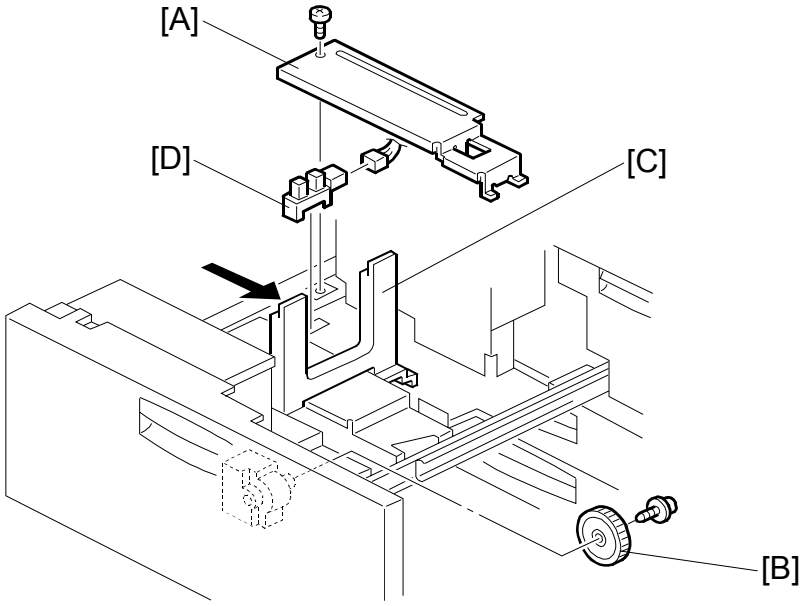
11. Paper feed clutch [A] (☞ x 1).
12. Vertical transport clutch [B] (☞ x 1).
13. When re-installing the clutches, put the stopper [C] of each clutch on the correct hook on the bracket.
14. Paper lift sensor [D] (☞ x 1, ☞ x 1).
15. Paper feed sensor [E] (☞ x 1, ☞ x 1).

3.10.4 REAR FENCE RETURN SENSOR



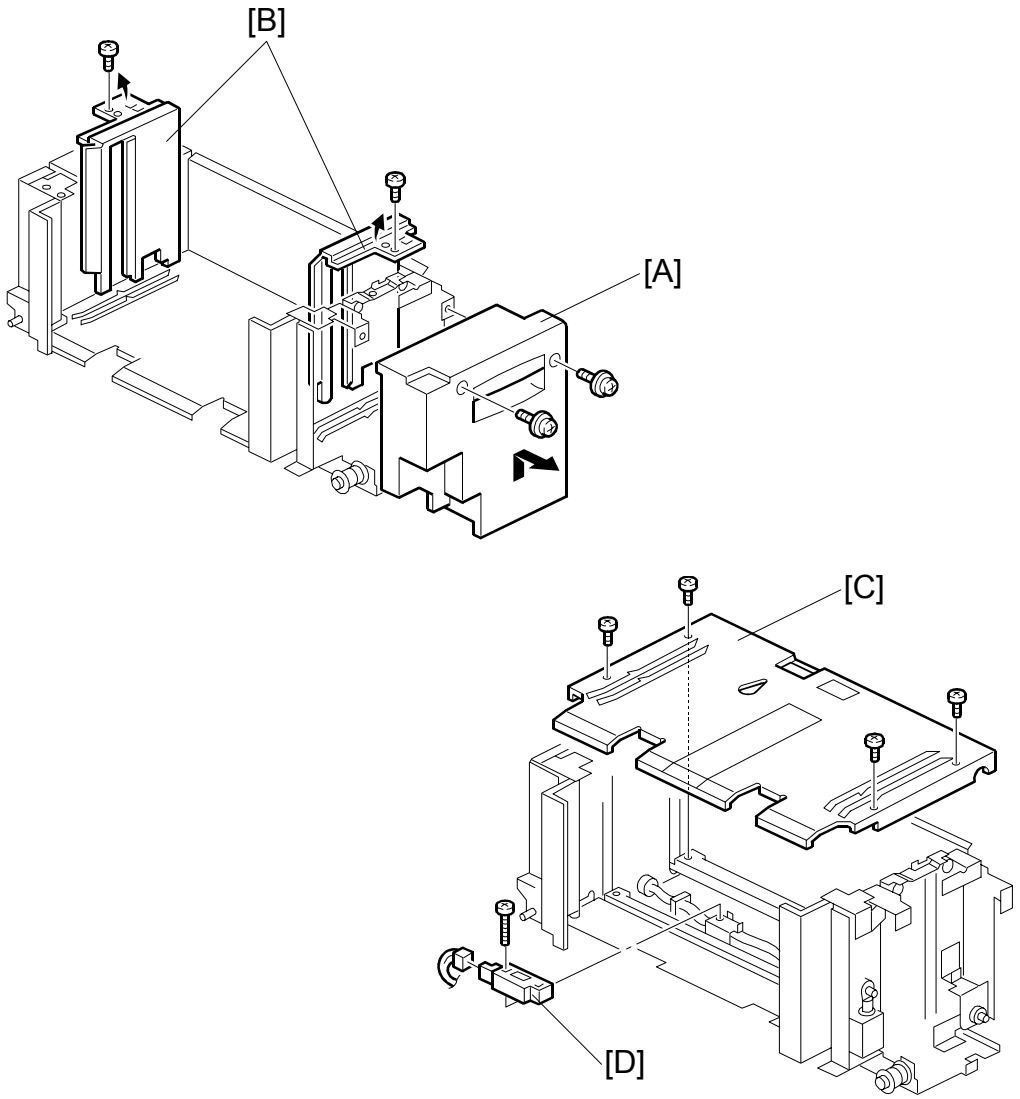
1. Turn off the main switch.
2. Pull out the left tandem tray.
3. Rear bottom plate [A] (☞ x 1).
4. Rear fence return sensor [B] (☞ x 1).

3.10.5 REAR FENCE HP SENSOR



1. Turn off the main switch.
2. Pull out the left tandem tray.
3. Rear bottom plate [A] (☞ x 1).
4. Rear fence transport gear [B] (☞ x 1).
5. Move the rear fence [C] to the right.
6. Rear fence HP sensor [D] (✋ x 1).

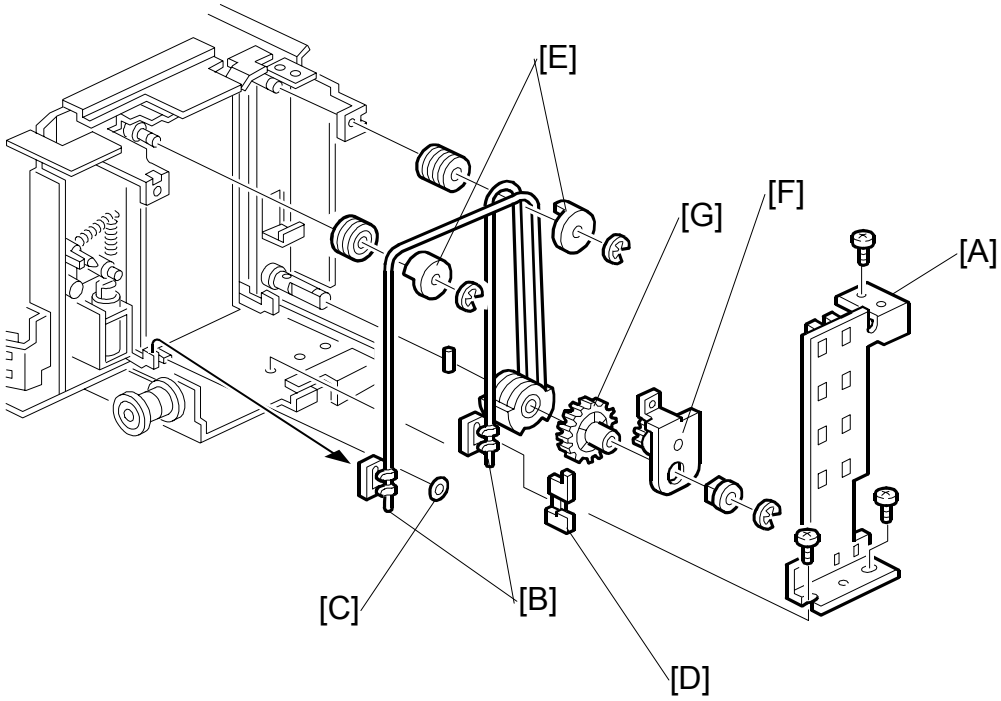
3.10.6 1ST TRAY RIGHT PAPER SENSOR



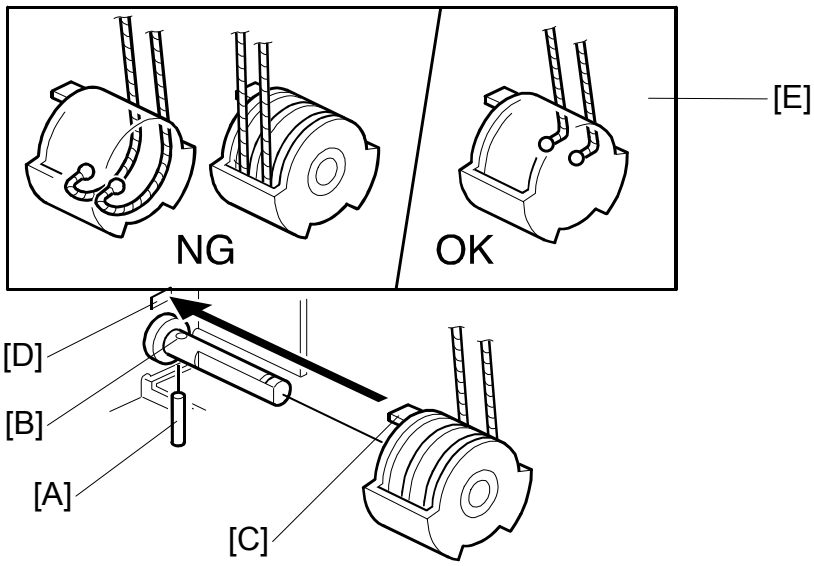
1. Turn off the main switch.
2. Right tandem tray. (☛3.10.1)
3. Inner cover [A] (☞ x 2).
4. Side fences [B] (☞ x 1 each).
   NOTE: When re-installing the side fences, make sure that the position of the side fences is correct.
   A4: Outer, LT: Inner
5. Bottom plate [C] (☞ x 4).
6. Right 1st tray paper sensor [D] (☞ x 1, ☜ x 1).

3.10.7 BOTTOM PLATE LIFT WIRE

NOTE: Before replacing the rear bottom plate lift wire, remove the front bottom plate lift wire. The procedure for the two wires is the same.



1. Right tandem tray. (☛3.10.1)
2. Inner cover (☞ x 2). (☛3.10.6)
3. Sensor bracket [A] (☞ x 3).
4. Slightly lift the front bottom plate and unhook the wire stoppers [B], remove stopper [C] and actuator [D].
5. Wire covers [E] (ℂ x 1 each).
6. Bracket [F] (☞ x 1, ℂ x 1, bushing x 1).
7. Gear [G].
8. Bottom plate lift wire [I].

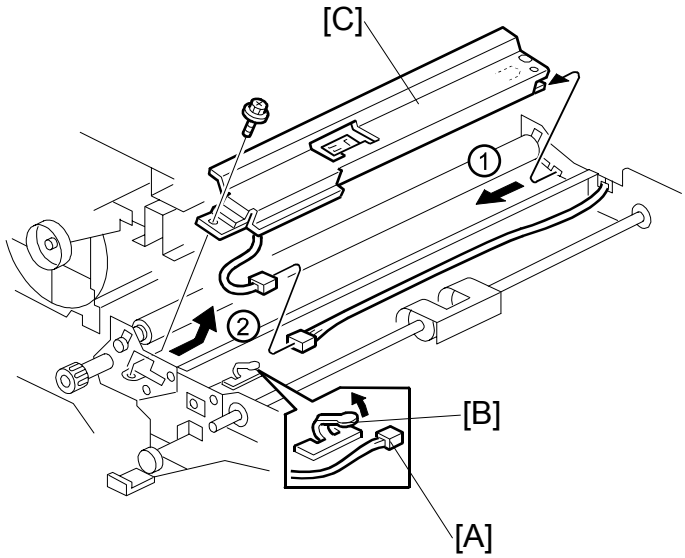


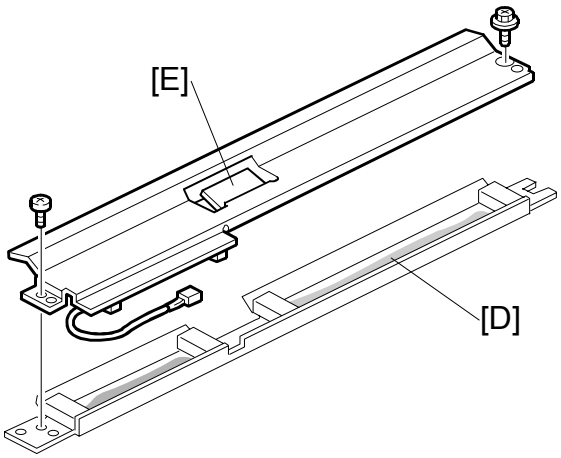
Re-installation

When re-installing the bottom plate lift wire:

1. Set the positioning pin [A] in the hole [B].
2. Set the projection [C] in the hole [D].
3. Position the wire as shown [E].
   NOTE: Do not cross the wires.

3.10.8 PAPER DUST TRAY, REGISTRATION SENSOR CLEANING





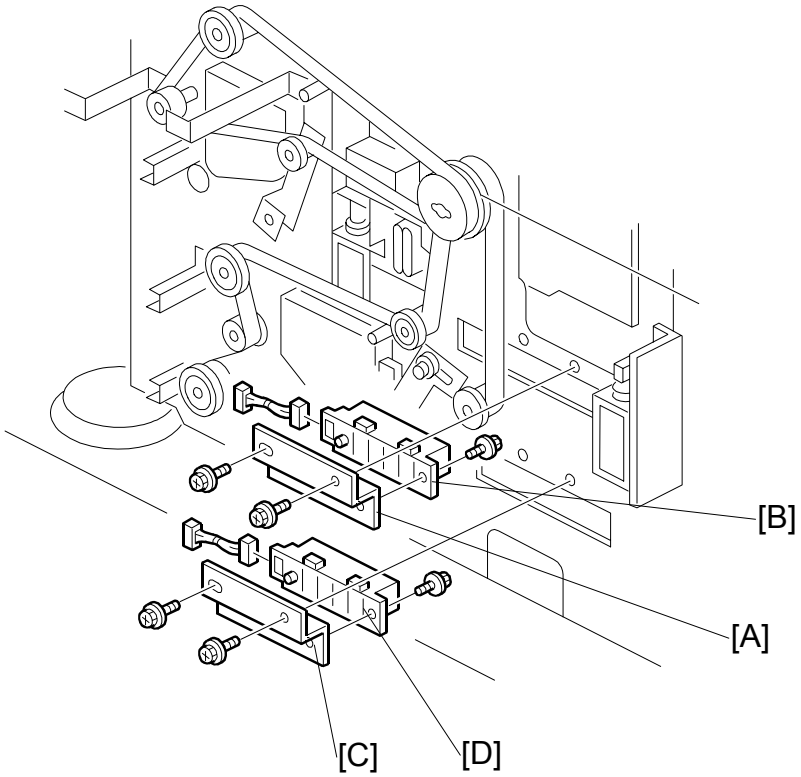
Paper Dust Tray Cleaning

1. Development unit. (☛3.6.1)
2. Disconnect [A] (🖑 x 1).
3. Release clamp [B].
4. Guide plate [C] (🔩 x 2)
5. Use a clean dry cloth to remove the paper dust in the tray [D].

Registration Sensor Cleaning

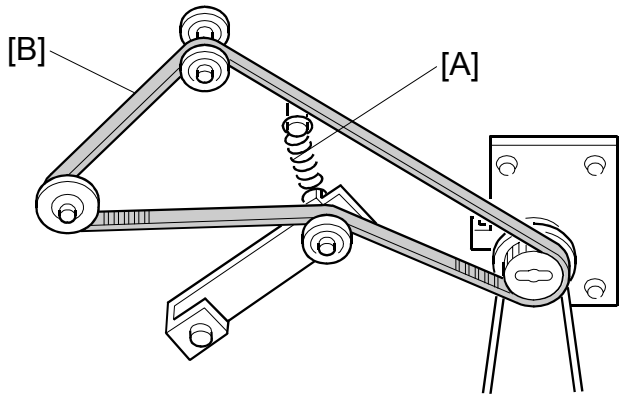
Use a blower brush to clean the registration sensor [E] on the guide plate.

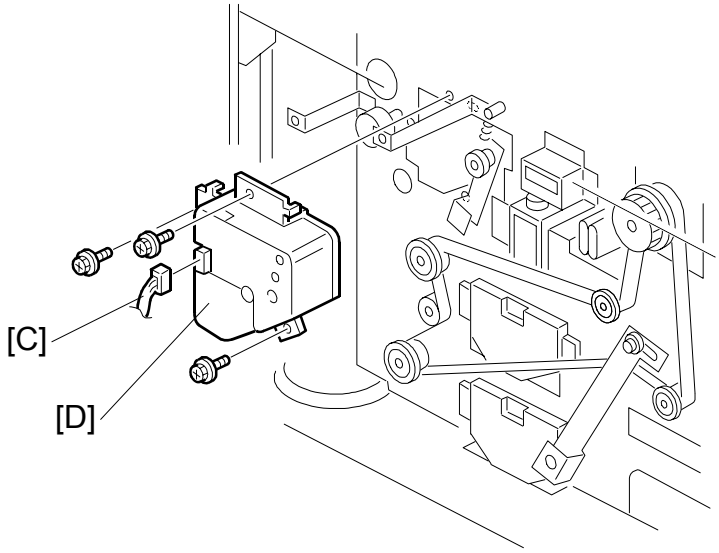
3.10.9 2ND AND 3RD TRAY SIZE SWITCHES



1. Rear lower cover. (☛3.1.4)
2. Open the controller box (☞ x 2)
3. PSU-E (☞ x 4, ☜ x all). (☛3.14.4)
4. 2nd tray size switch bracket [A] (☞ x 2)
5. 2nd tray size switch [B] (☜ x 1, ☞ x 1)
6. 3rd tray size switch bracket [C] (☞ x 2)
7. 3rd tray size switch [D] (☜ x 1, ☞ x 1).

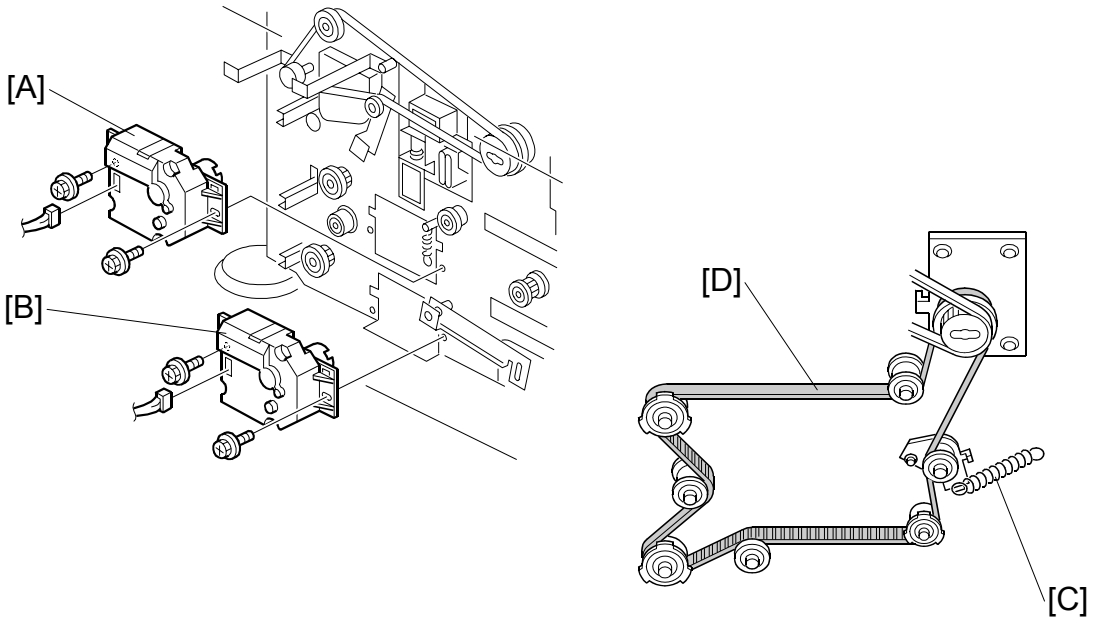
3.10.10 ST TRAY LIFT MOTOR





1. Rear lower cover. (☛3.1.6)
2. PSU-E. (☛3.14.4)
3. IOB board and bracket. (x 4) (☛3.14.3)
4. Tension spring [A].
5. Upper timing belt [B].
6. Connector [C] (x 1)
7. 1st tray lift motor [D] (x 3).

3.10.11 2ND, 3RD TRAY LIFT MOTORS, LOWER TIMING BELT



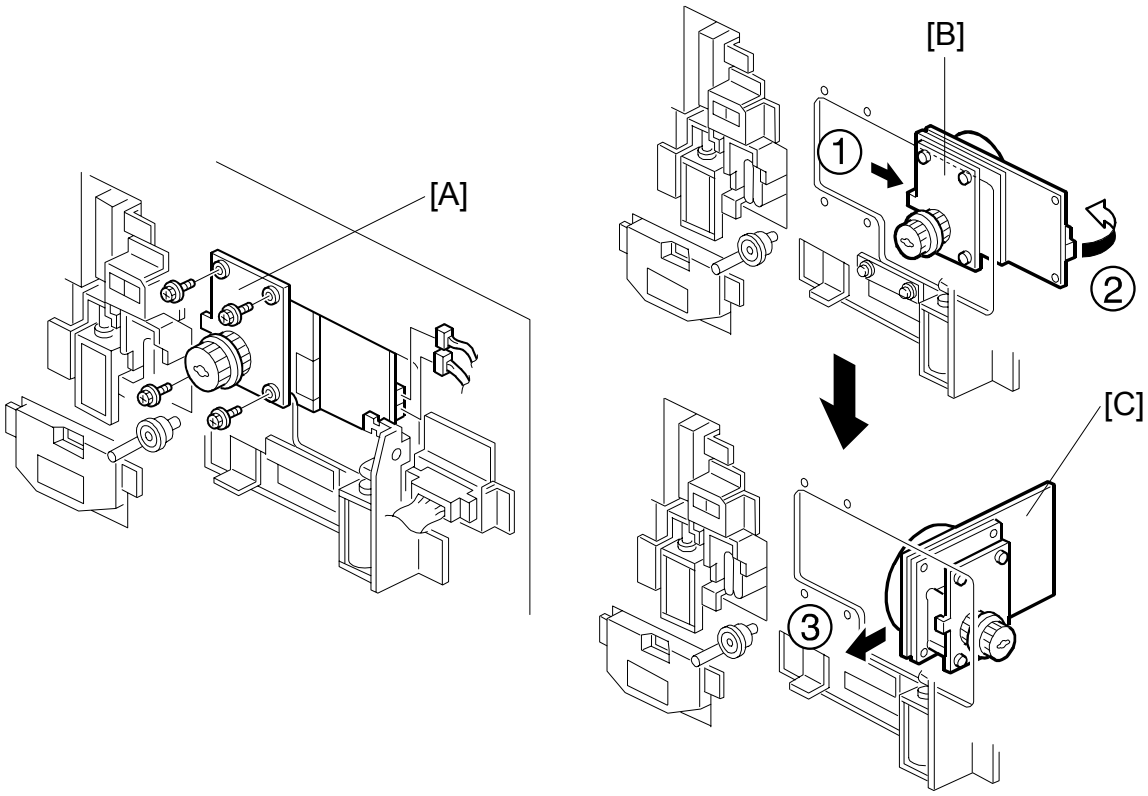
2nd, 3rd Tray Lift Motors

1. Turn off the main switch.
2. Lower rear cover. (☛(3.1.4)
3. Open the control box door. (☛3.1.4)
4. IOB with bracket. (☛3.14.3)
5. PSU-E. (☛3.14.4)
6. 2nd tray lift motor [A] (x 1, x 2).
7. 3rd tray lift motor [B] (x 1, x 2).

Lower Timing Belt

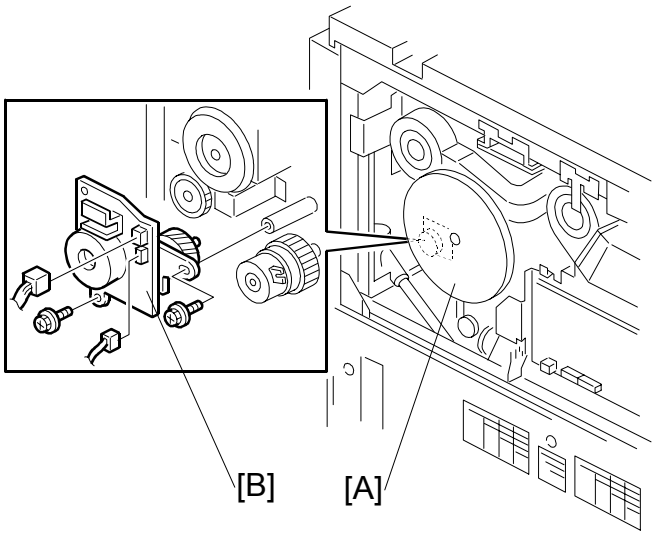
1. Upper timing belt. (☛3.10.10)
2. Tension spring [C].
3. Lower timing belt [D].

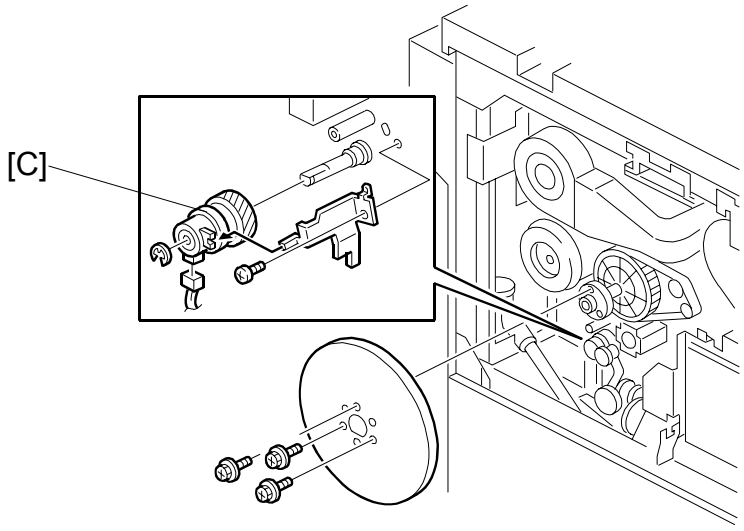
3.10.12 PAPER FEED MOTOR



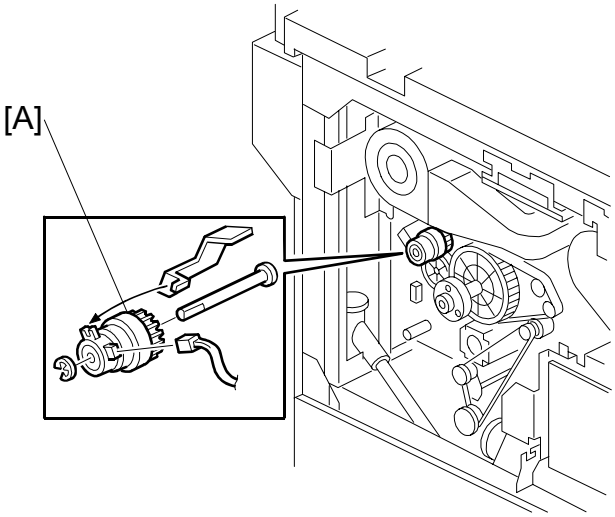
1. Upper and lower timing belts. (☛3.10.10, 3.10.11)
2. Unfasten the paper feed motor [A] (🔩 x 4, 🖐 x 2).
3. Slide the motor [B] to the left ① then turn it ②.
4. Slide the motor [C] to the front ③ to remove it.

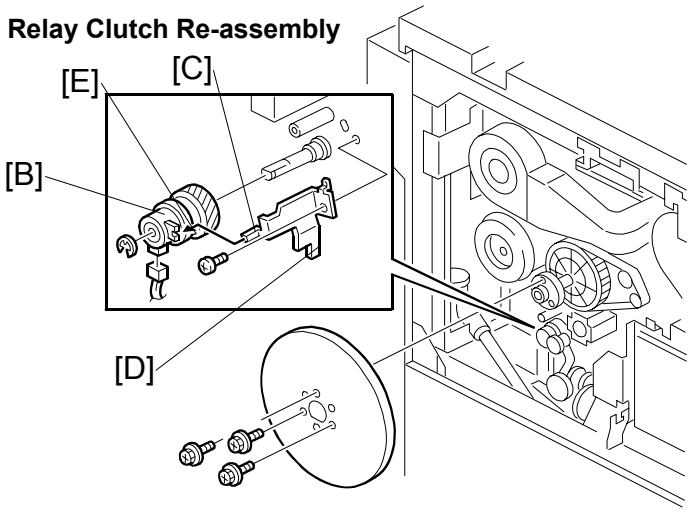
3.10.13 RELAY MOTOR, UPPER RELAY CLUTCH, LCT RELAY CLUTCH





1. Rear upper cover. (☛3.1.4)
2. Flywheel [A] (☞ x 3).
3. Relay motor [B] (☞ x 2, ☞ x 2).
4. Upper relay clutch [C] (☞ x 1, ☞ x 1).



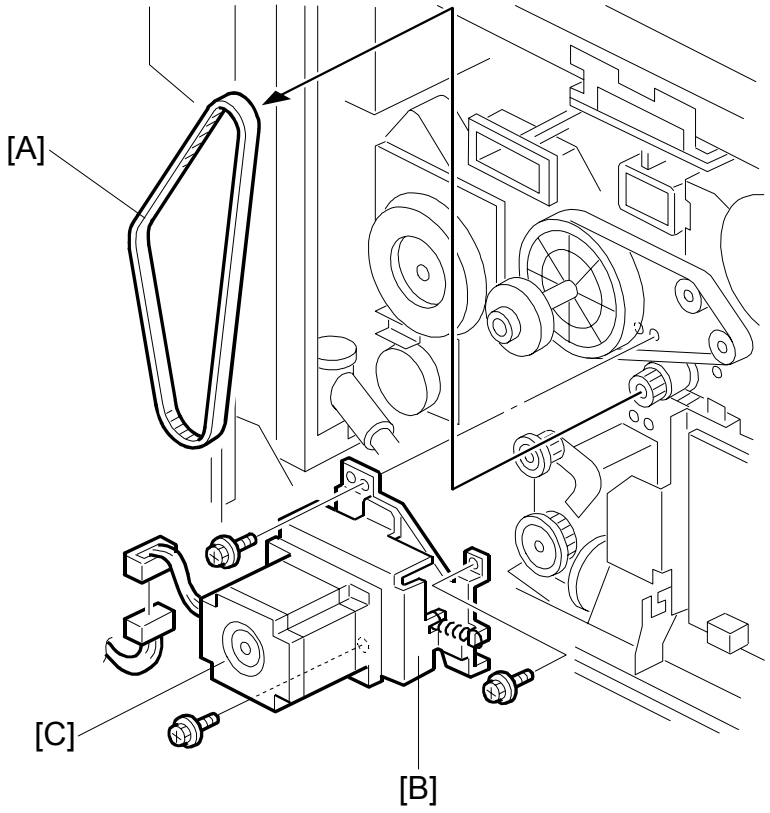


5. LCT relay clutch [A] (ℂ x 1, x 1).

Re-assembly

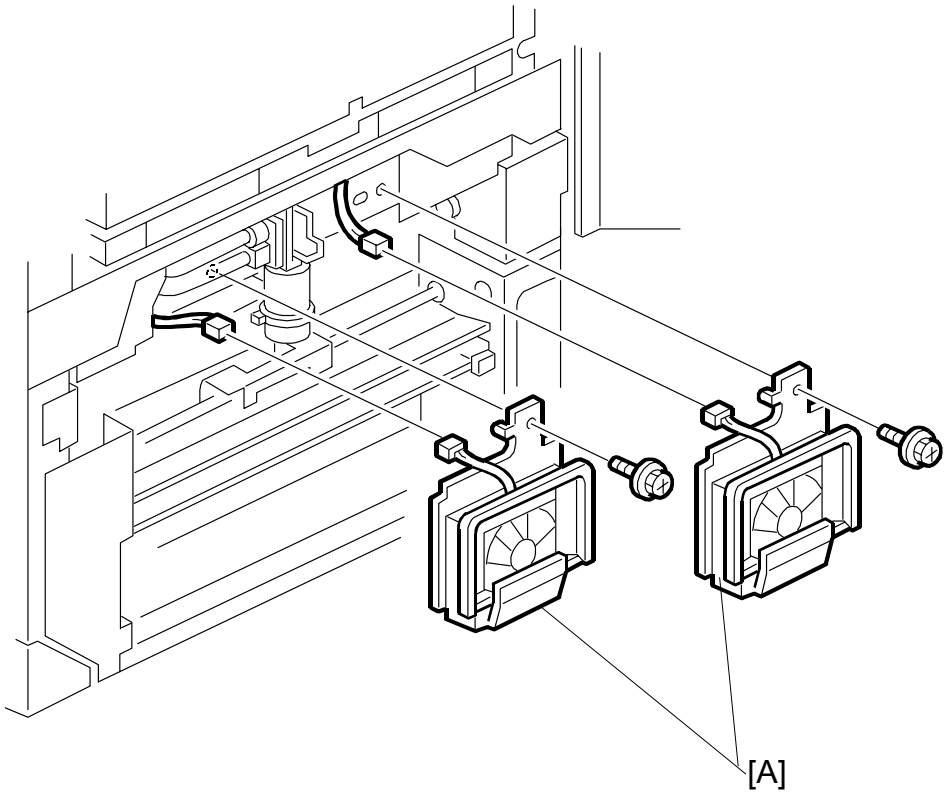
1. To re-install the LCT relay clutch [A], insert the pin of the clutch stopper into the cutout of the clutch.
2. To re-install the relay clutch [B], insert the pin [C] of the of the clutch stopper [D] into the cutout [E] of the clutch.

3.10.14 REGISTRATION MOTOR

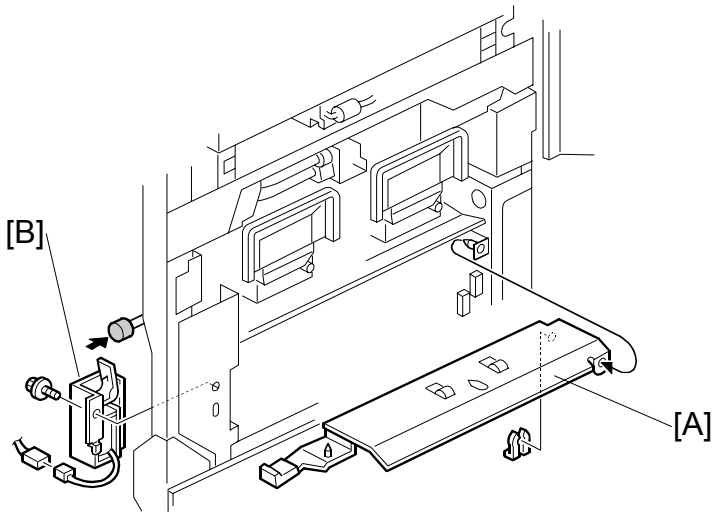


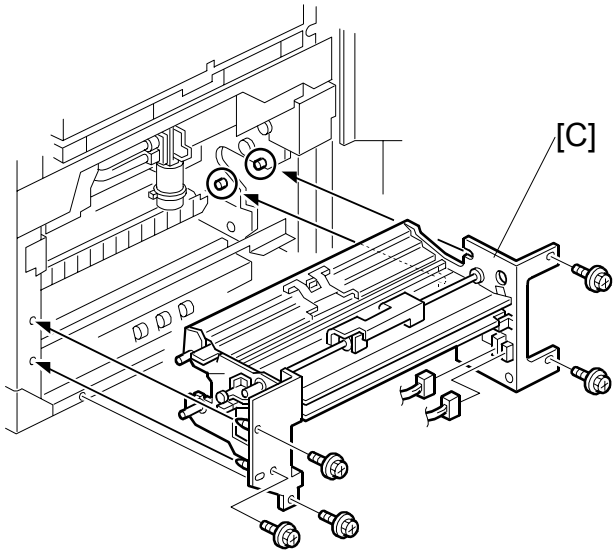
1. Rear upper cover. (☛3.1.4)
2. Flywheel (☞ x 3).
3. Timing belt [A].
4. Bracket [B] and motor (☞ x 3, ☞ x 1).
5. Registration motor [C] (☞ x 3, timing belt x 1, spring x 1).

3.10.15 DEVELOPMENT FAN MOTORS, COPIER FEED UNIT



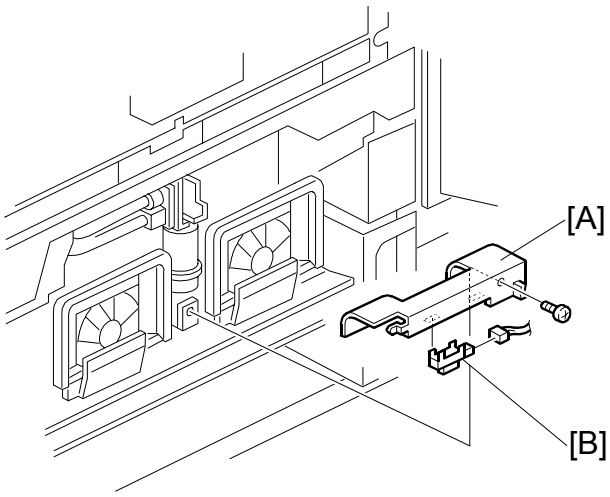
1. Right upper inner cover. (☛3.1.2)
2. Two fan motors [A] (🔩 x 1, ✋ x 1 each).

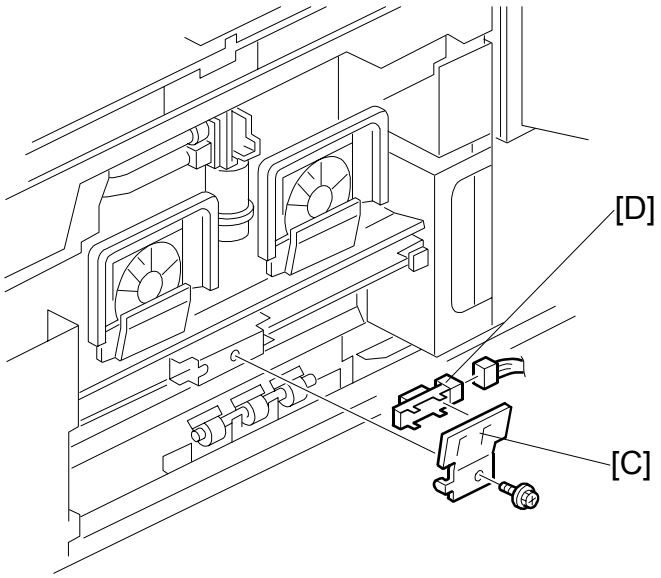




3. LCT guide plate [A] (B5 knob). (x 1)
4. Draw out the duplex unit about 10 cm.
5. Relay motor. (☛3.10.13)
6. LCT guide plate solenoid [B]. (x 1, x 1)
7. Right upper cover. (☛3.1.2)
8. Toner suction pump assembly. (☛3.6.4)
   NOTE: When re-installing, make sure that the hose is not pinched.
9. Copier feed unit [C] (x 5, x 2).

3.10.16 LCT RELAY SENSOR AND RELAY SENSOR

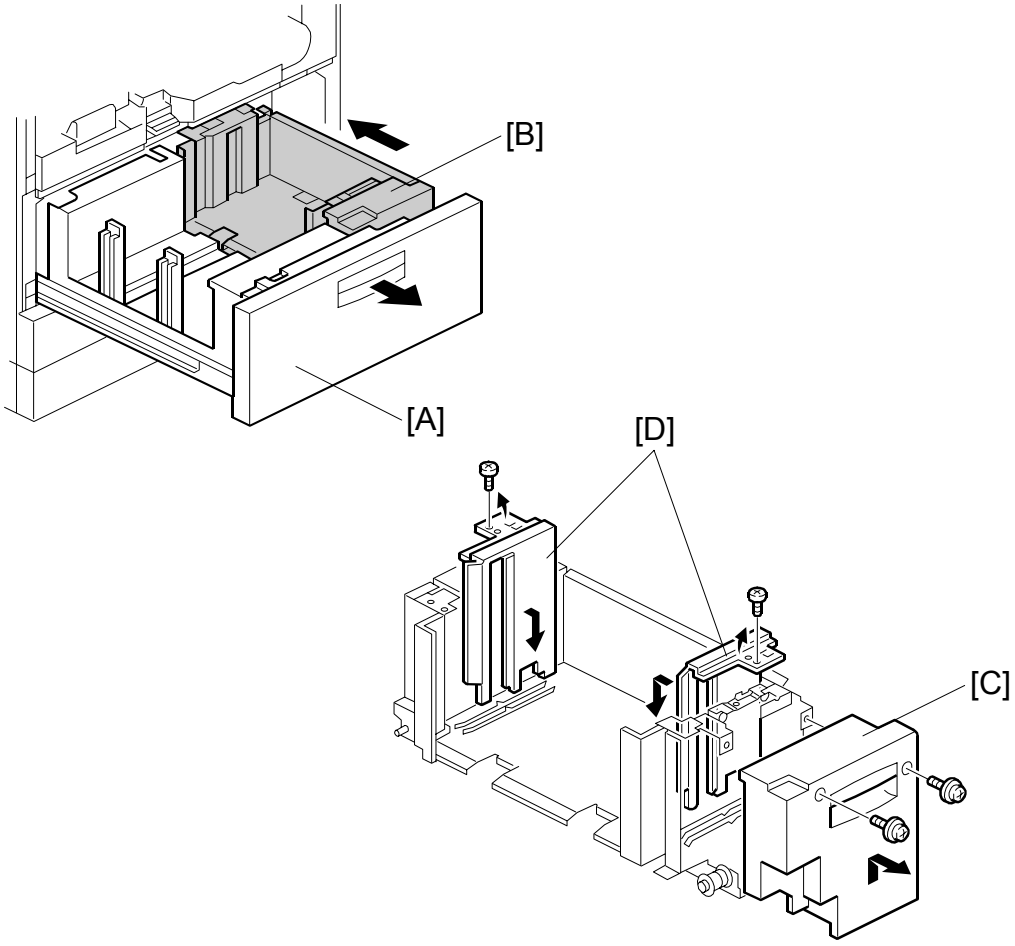




1. Right upper cover (☞ x 4).
2. LCT relay sensor bracket [A] (☞ x 1, ☞ x 1).
3. LCT relay sensor [B].
4. Relay sensor bracket [C] (☞ x 1, ☞ x 1).
5. Relay sensor [D].

3.10.17 TANDEM FEED TRAY PAPER SIZE CHANGE

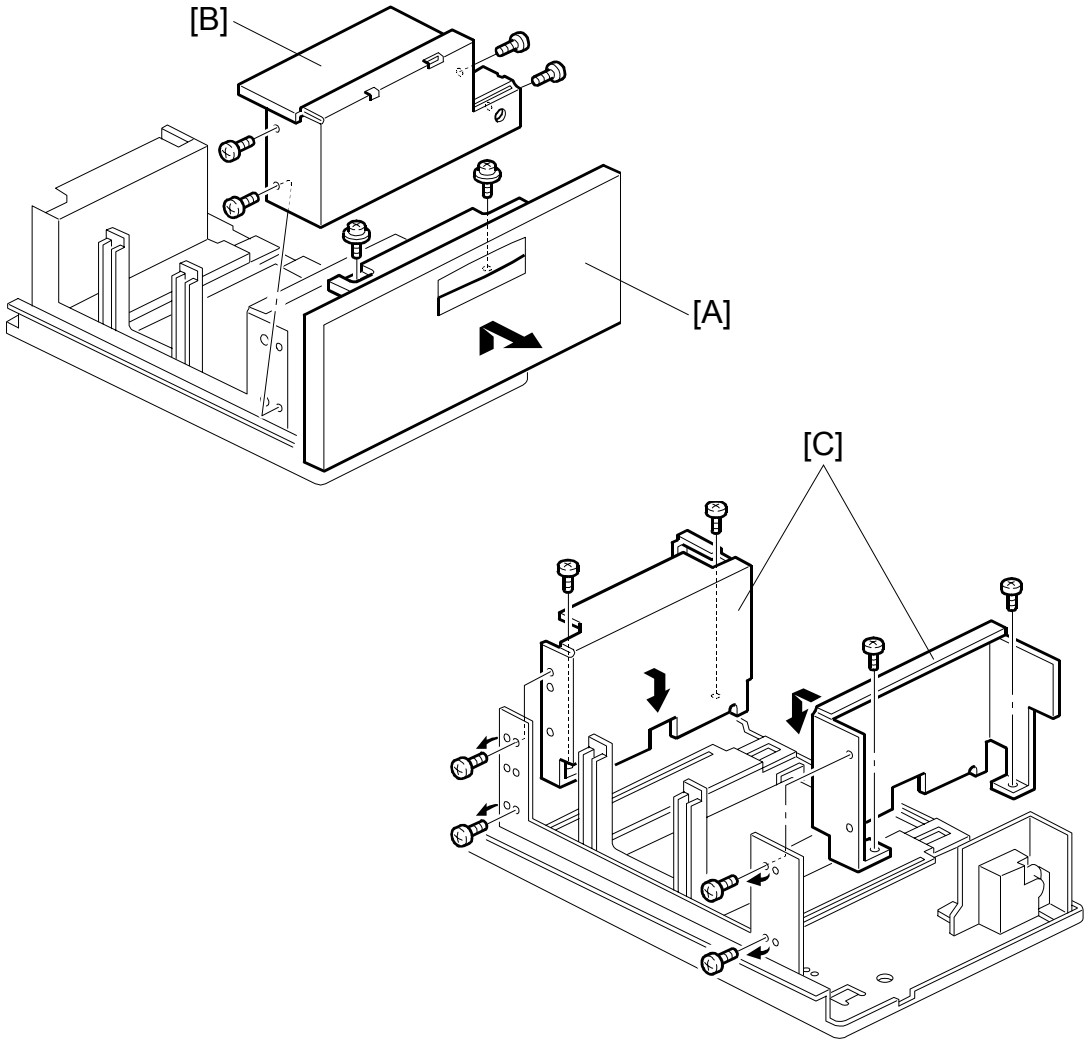
NOTE: At the factory, this tray is set up for A4 or LT LEF. Only A4 or LT LEF paper can be used for tandem feed.



1. Open the front cover.
2. Pull out the tandem feed tray [A] and remove the left and right tandem trays. (☛3.10.1)

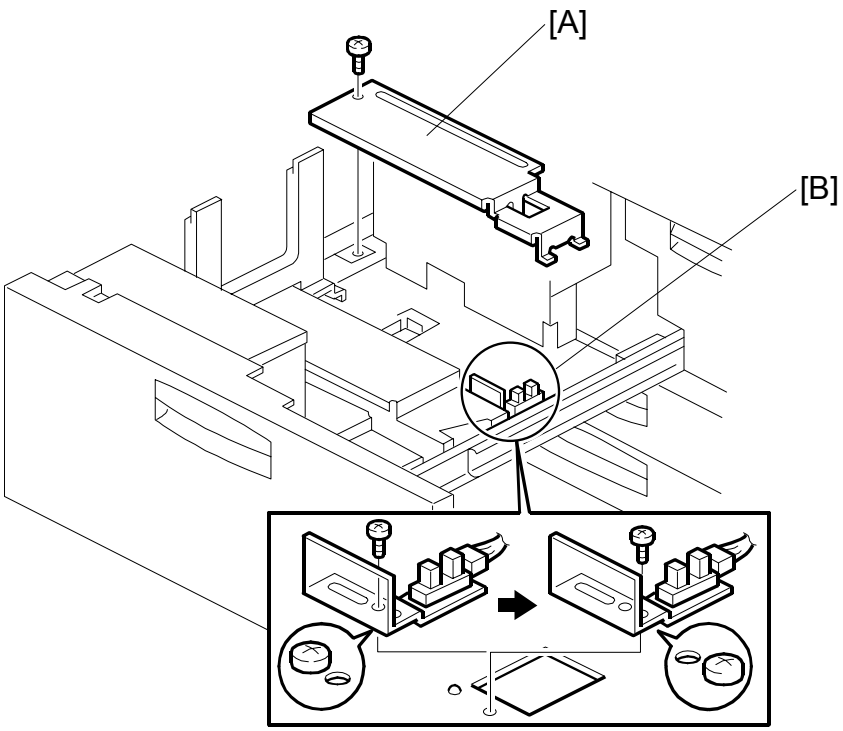
Setting the Paper Size for the Right Tandem Tray

1. Right tandem inner cover [C]. (☞ x 2)
2. Re-position the side fences [D] (☞ x 1 each).
   NOTE: Outer: A4, Inner: LT.
3. Re-install the right tandem inner cover [C].



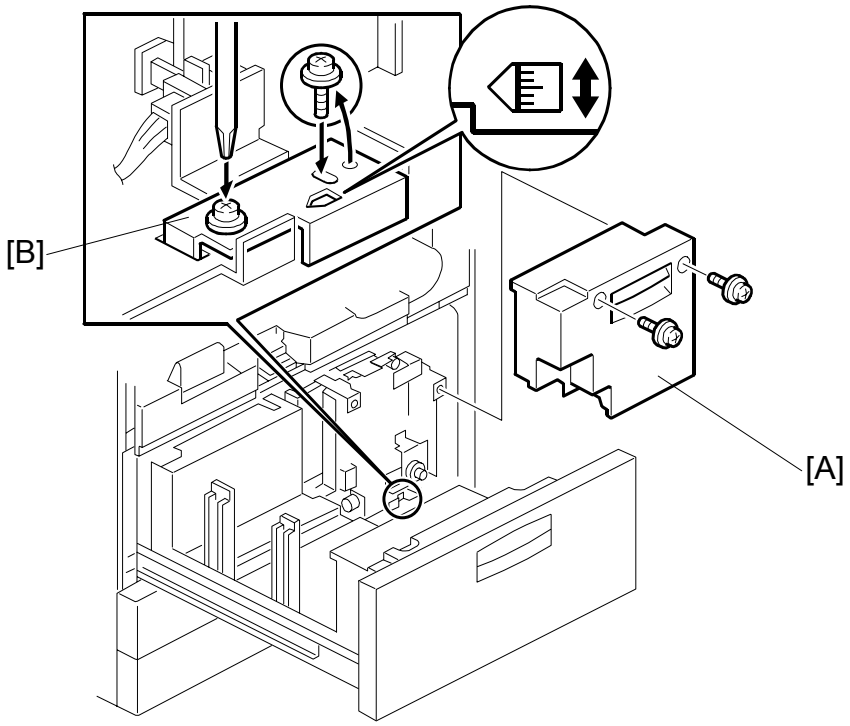
Setting the Paper Size for the Left Tandem Tray

1. Tray cover [A] (x 2).
2. Motor cover [B] (x 5).
3. Re-position the side fences [C] (x 4 each).
   NOTE: Outer: A4, Inner: LT.
4. Re-install the motor cover and the tray cover.



5. Rear bottom plate [A] (☞ x 1).
6. Re-position the return position sensor bracket [B] (☞ x 1). To use the paper tray for A4 size, put the screw in the left hole.
   NOTE: For LT size, the screw should be placed on the right.
7. Re-install the rear bottom plate.
8. Change the paper size for the 1st Tray (Tandem Tray) with SP5019 002.

3.10.18 TANDEM TRAY SIDE REGISTRATION



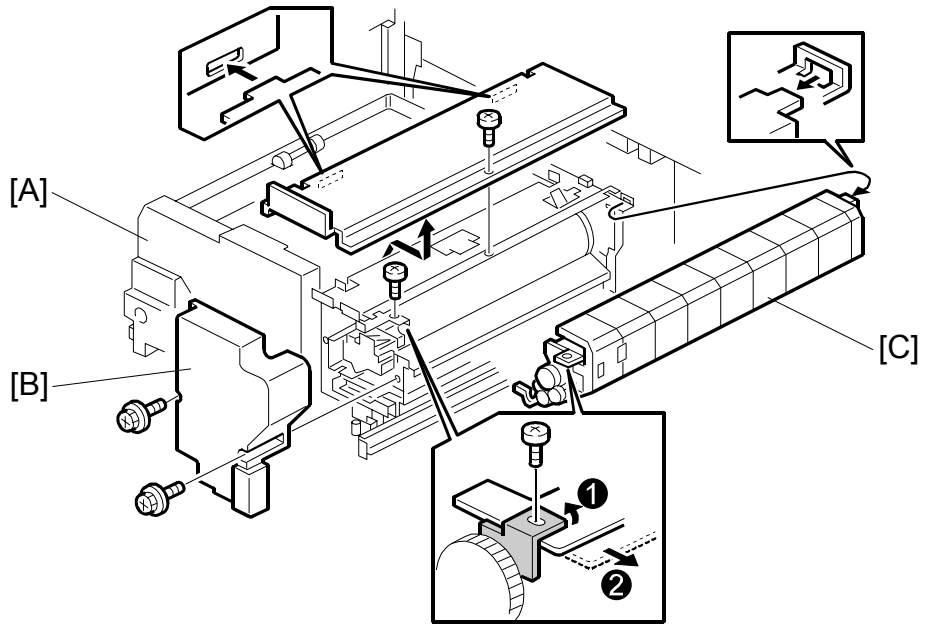
Normally the side registration of the image can be adjusted in the SP mode.

If the punch hole positions are not aligned from a particular feed station, however, you can manually adjust the side registration by changing the tray cover position for that tray, and then adjust the side registration of the image with SP1002 001 Side-to-side Registration - 1st Tray (Copier Tandem Tray).

1. Pull out the tray and remove the right inner cover [A].
2. Loosen the screws and adjust the position of the plate [B].
   Adjustment range: 0 ± 2.0 mm adjustment step: 1.0 mm/step

3.11 FUSING UNIT

3.11.1 OIL SUPPLY AND CLEANING WEB UNIT REMOVAL



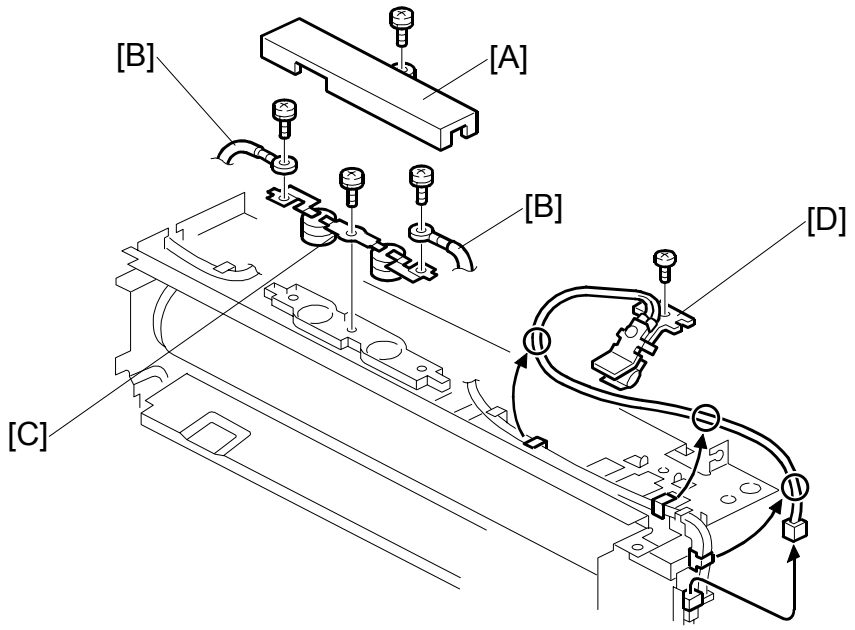
1. Turn off the machine and wait for the oil supply and web cleaning unit to cool.

⚠CAUTION
To avoid minor burns, allow sufficient time for fusing unit to cool.

2. Open the front doors and pull out the fusing and exit unit [A].
3. Fusing unit inner cover [B] (🔩 x 2).
4. Oil supply and cleaning web unit [C] (🔩 x 1).
   NOTE: After re-installing the oil supply and cleaning web unit, confirm that the web take-up roller gear is engaged with the gears of the fusing unit.

SP1902 001 (Web Motor Control – Web Consumption) should be set to “0” every time the oil supply/cleaning web is replaced. This setting will not take effect until the machine is cycled off/on.

3.11.2 FUSING UNIT THERMOSTATS AND THERMISTOR

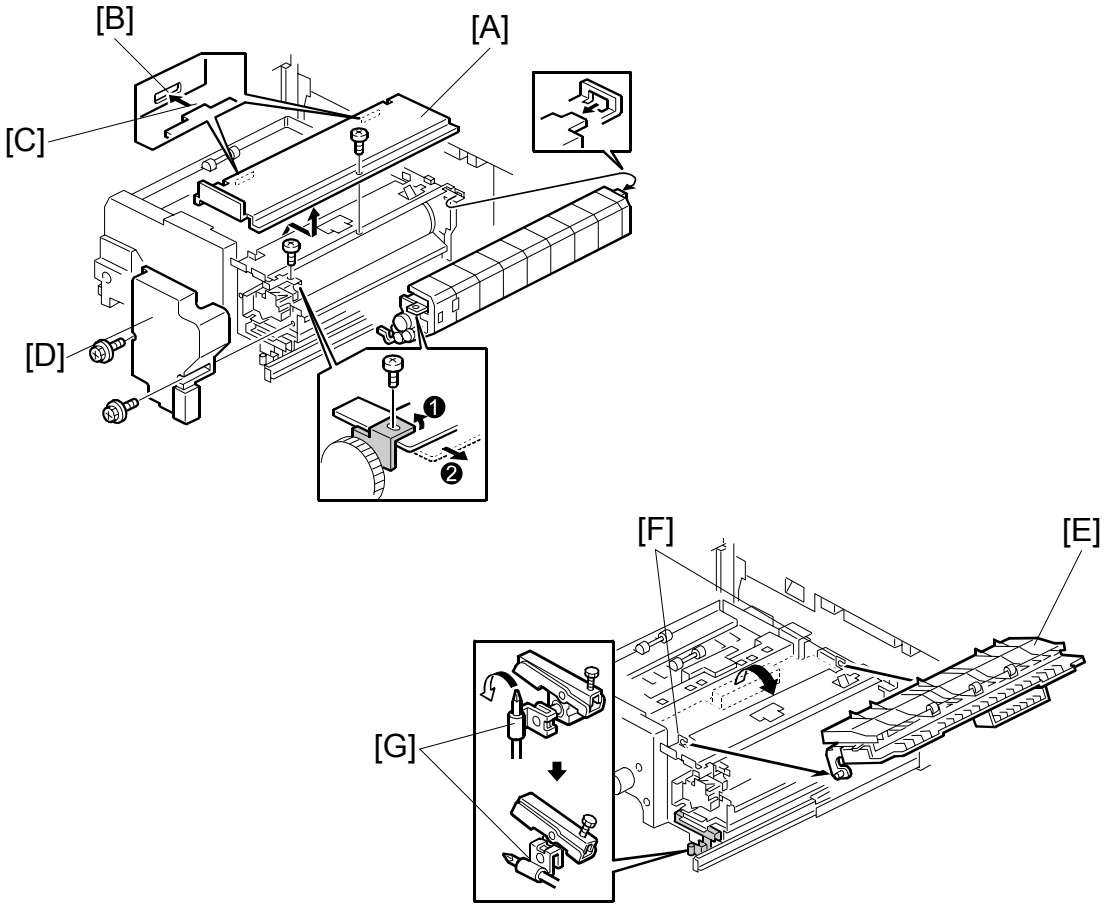


1. Switch off the machine and wait for the fusing unit to cool.
2. Open both front doors and pull out the fusing unit.

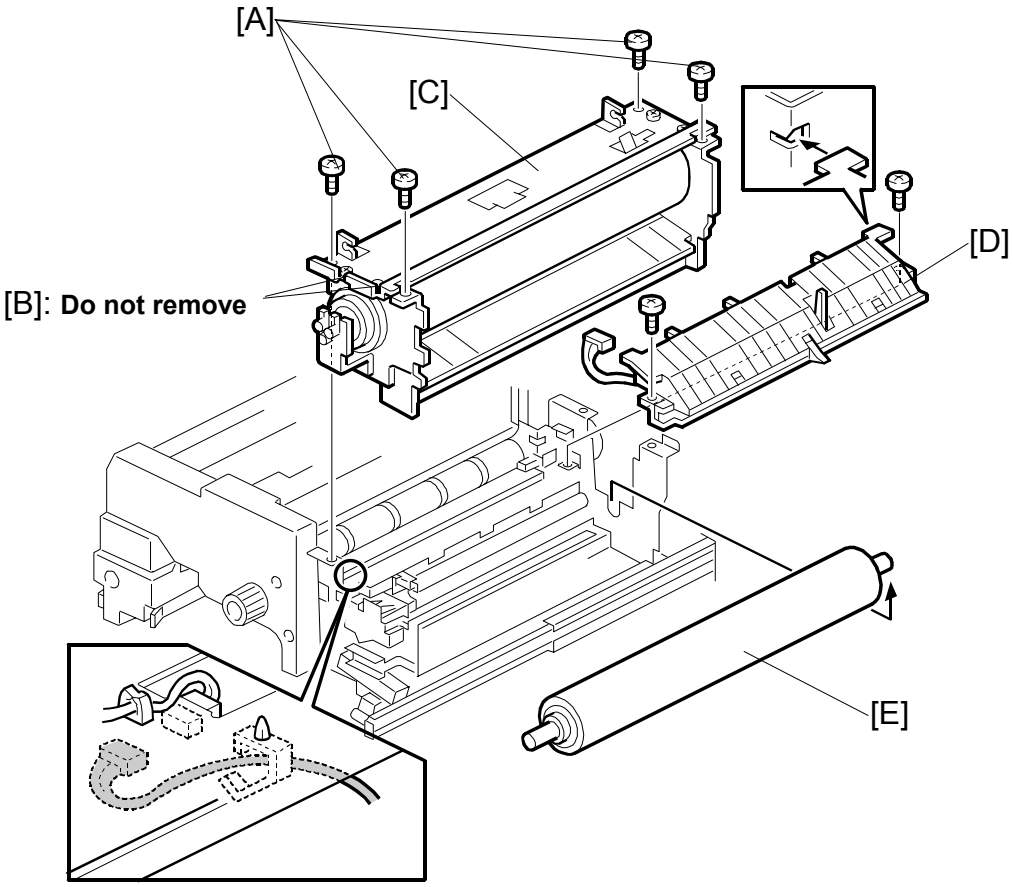
> **⚠CAUTION**
> **To avoid minor burns, allow sufficient time for the fusing unit to cool.**

3. Fusing unit inner cover. (☛3.9.1)
4. Fusing unit top cover (🔩 x 1). (☛3.9.1)
5. Thermostat cover [A] (🔩 x 1).
6. Thermostat leads [B] (🔩 x 2).
7. Thermostats [C] (🔩 x 1).
8. Thermistor [D] (🔩 x 1, 🔌 x 1, clamps x 3).

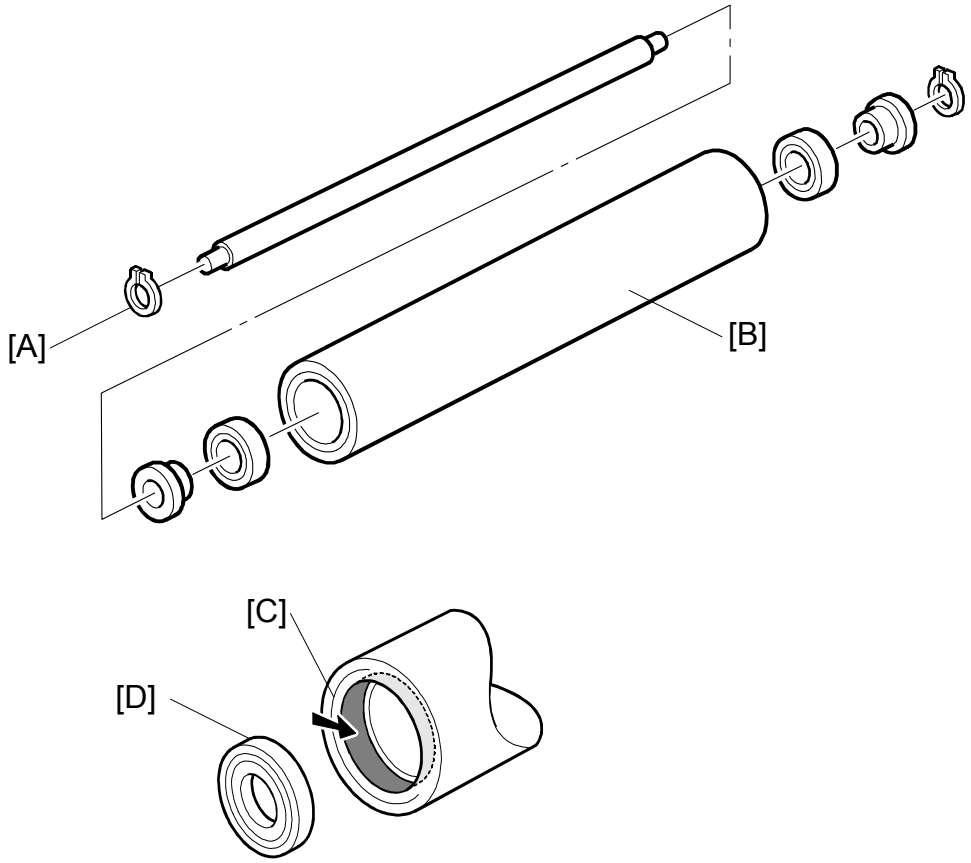
3.11.3 HOT ROLLER UNIT, PRESSURE ROLLER



1. Remove the oil supply and cleaning web unit. (☛3.11.1)
2. Top cover [A] of the fusing unit (☞ x 1).
   NOTE: When re-installing this cover, align the cutouts [B] and projections [C] and slide the cover to the right. Make sure that the cover does not pinch the thermistor and thermostat cables against the stay.
3. Fusing unit inner cover [D] (☞ x 2).
4. Turn the upper exit guide plate assembly [E] clockwise about 160° and slide the pivot shaft out of the cutout [F].
5. Release the fusing pressure by turning the pressure lever [G] 1/4 of a turn counterclockwise with a screwdriver.
   CAUTION: Be sure to lock the pressure roller lever [G] before re-attaching inner cover [D]. The inner cover cannot be re-attached if the pressure roller lever is not locked.

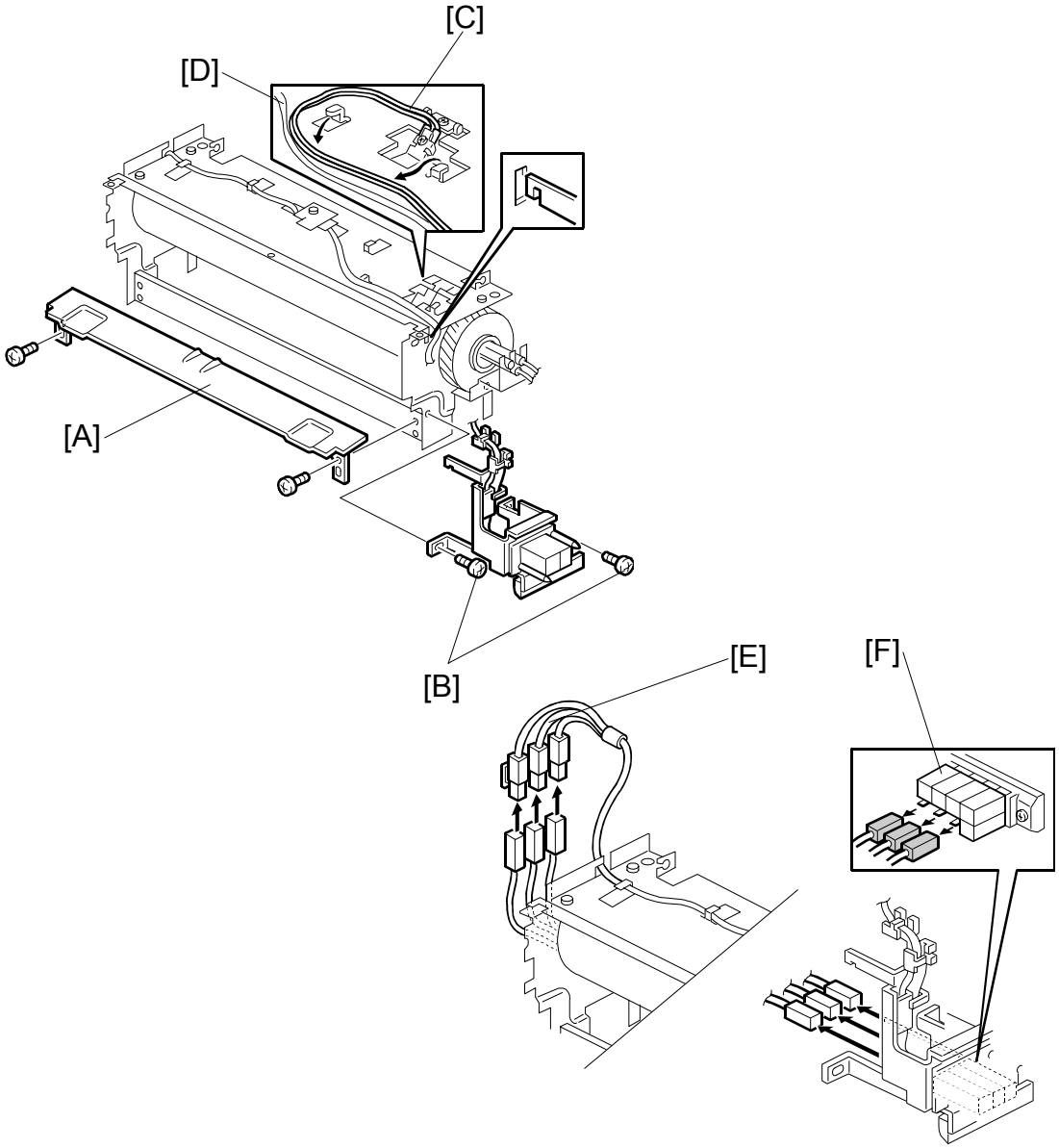


6. On both sides remove the outer pairs of M5 pan head screws [A]. (x 4)
   NOTE: On both sides of the fusing unit, do not remove the inner pair of M4 bind screws [B].
7. Hot Roller unit [C].
   NOTE: When re-installing, secure the screws [A] in the following order: rear-left, front-right, rear-right, front-left.
8. Lower exit guide plate assembly [D] (x 2, x 1, clamp x 1).
   NOTE: Avoid touching the surface of the pressure roller.
9. Pressure roller assembly [E].

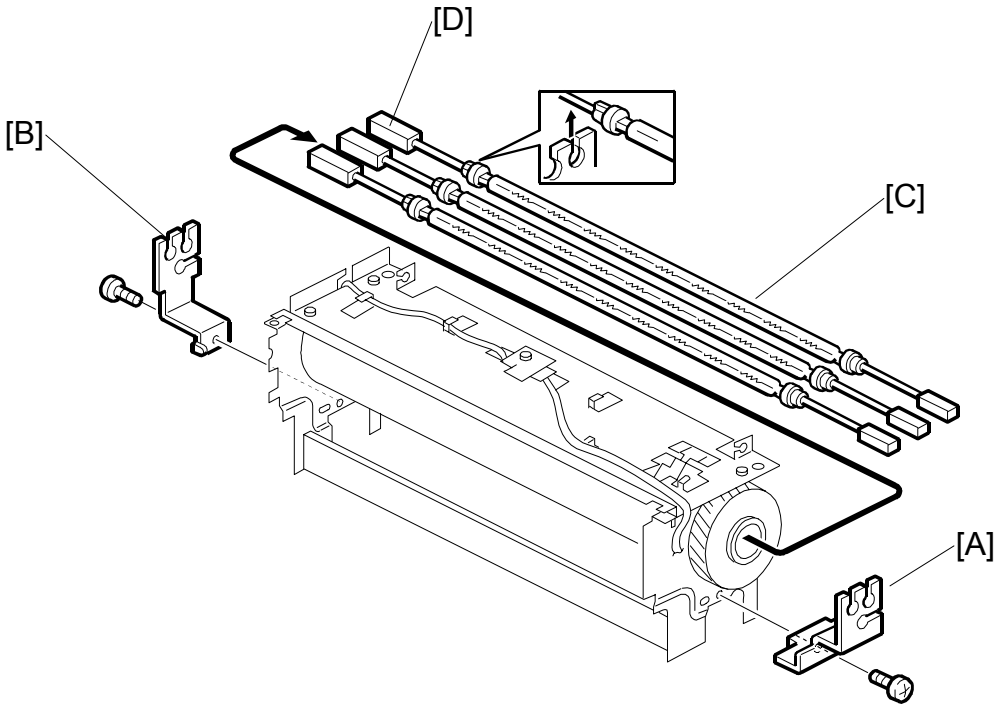


6. Shaft [A] (C-ring x 1)
7. Replace the pressure roller, bearings, and bushings [B].
   NOTE: Handle the pressure roller carefully to avoid damaging it.
8. Lubricate the inner surface of the new pressure roller [C] and the outer surfaces of the bearings [D] with BARRIERTA L55/2 grease.

3.11.4 HOT ROLLER



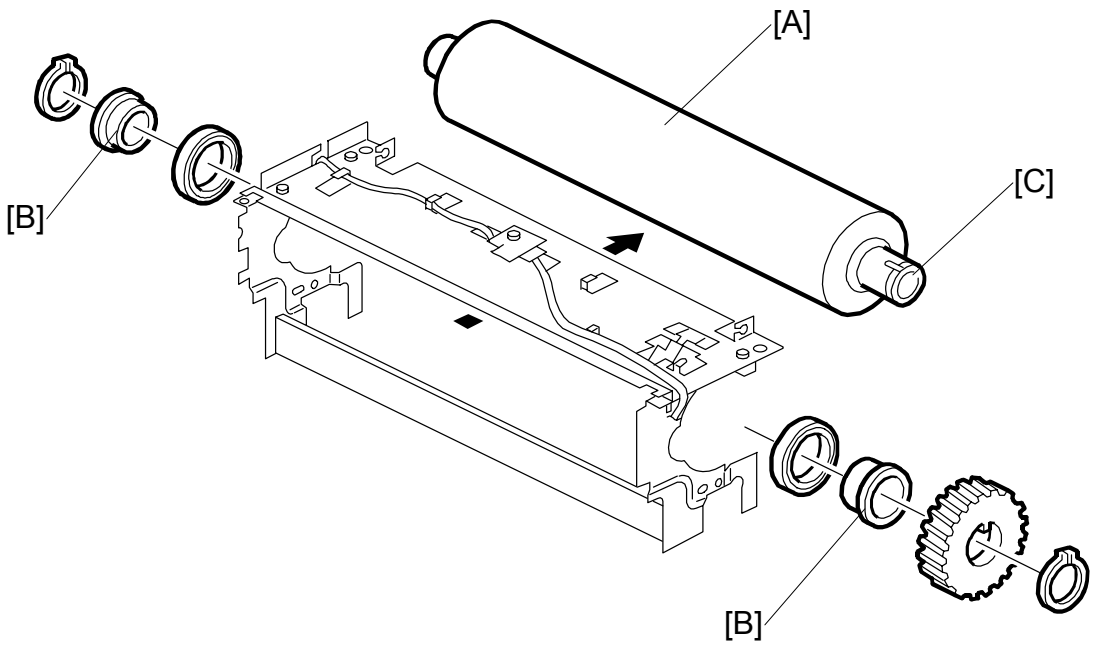
1. Hot roller unit. (☛3.11.3 Steps 1 to 6)
2. Fusing entrance guide plate [A] (☞ x 2).
3. Two screws [B] securing the harness terminal bracket, and unhook the bracket.
   NOTE: Unhook the thermistor cable [C] and thermostat cable [D] to avoid damaging them.
4. Disconnect the fusing lamp cables [E] from the terminals at the rear (✋ x 3).
5. Disconnect the fusing lamp connectors [F] at the front side (✋ x 3).
   NOTE: At the front, there is no color coding for the cables. They can be connected in any order.



6. Front lamp holder [A] (☞ x 1).
7. Rear lamp holder [B] (☞ x 1).
8. Three fusing lamps [C] one-by-one.
   When re-installing the three fusing lamps, check the following points:
   - While aligning the three lamps with the cutouts in the front lamp holder, re-install the front and rear lamp holders.
   - The fusing lamp connectors at the front can be connected in any order. However, in order to ensure correct fusing temperature control, the connectors at the back [D] must be connected correctly by matching the color of the connectors of the fusing unit with the colors of the connection points on each lamp.

NA	EUR/A	Connection
800 W	730 W	Red ←→ Red
560 W	540 W	Blue ←→ Blue
530 W	530 W	Green ←→ Green

   - Route the thermistor cable and thermostat cable correctly. (☛3.11.4)
   - Make sure that the cables are not pinched and do not contact the gears.



9. Hot roller [A] (gear x 1, ⌀ x 2, bushings x 2, bearings x 2).

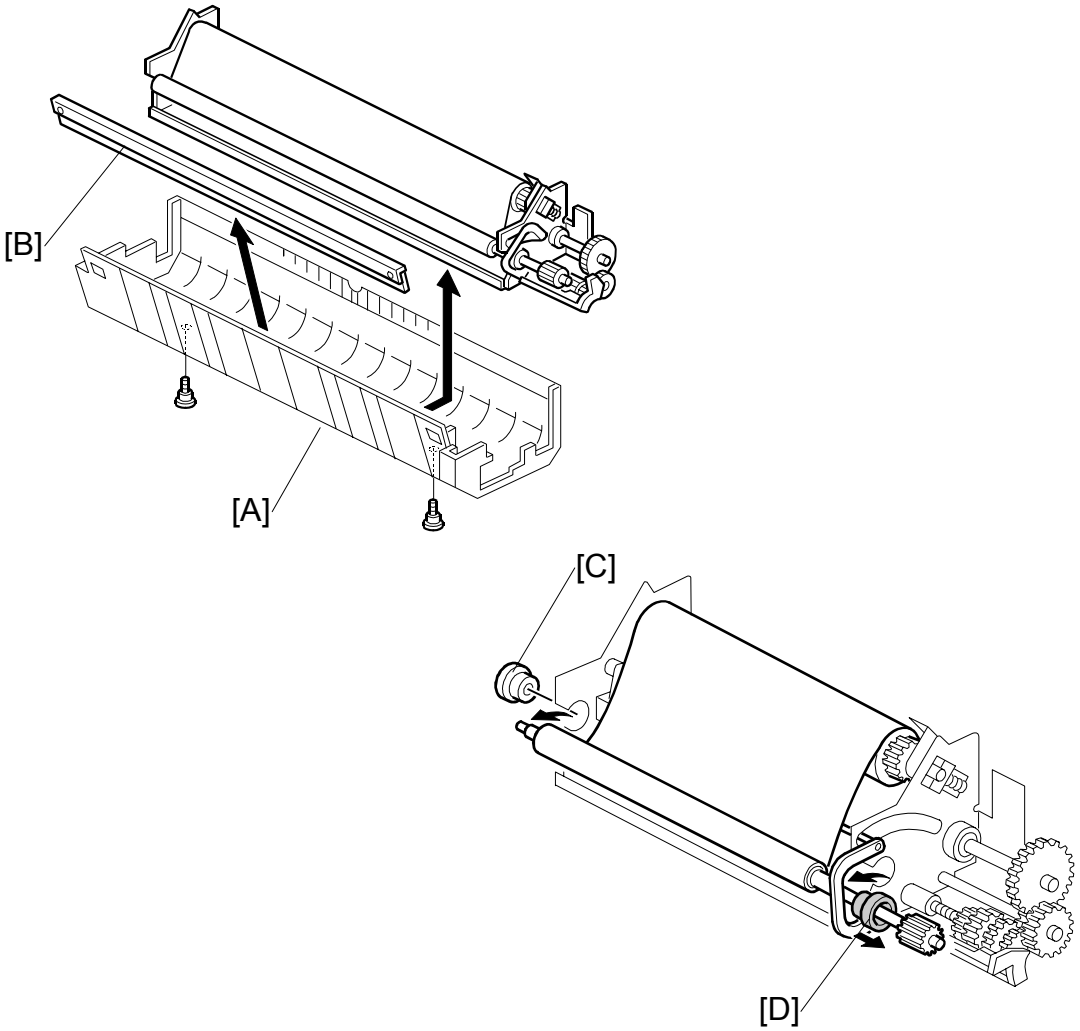
   CAUTION: Handle the hot roller carefully to avoid damaging its soft surface.

10. Lubricate the inner and outer surfaces of the bushings [B] with BARRIERTA L55/2 grease before re-installing the hot roller.

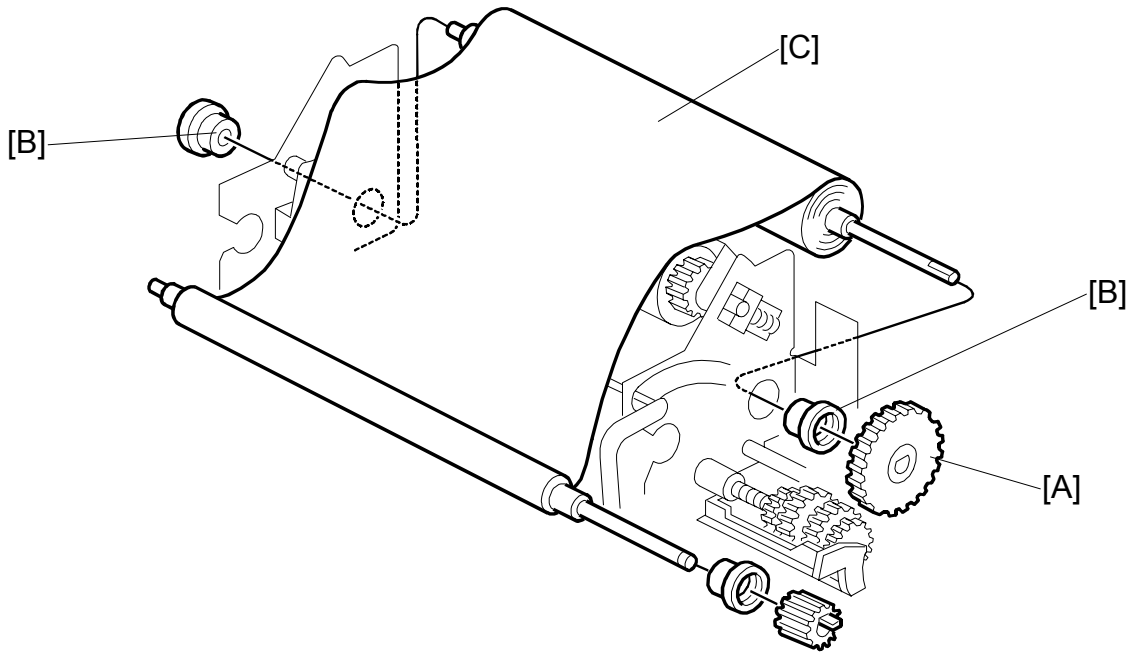
Re-assembly

- Before re-installing the hot roller, make sure that the end with long part of the shaft [C] is at the rear on the gear side.
- When re-installing bearings and bushings, make sure that the flanges for the bearings and bushings are placed on the outside.

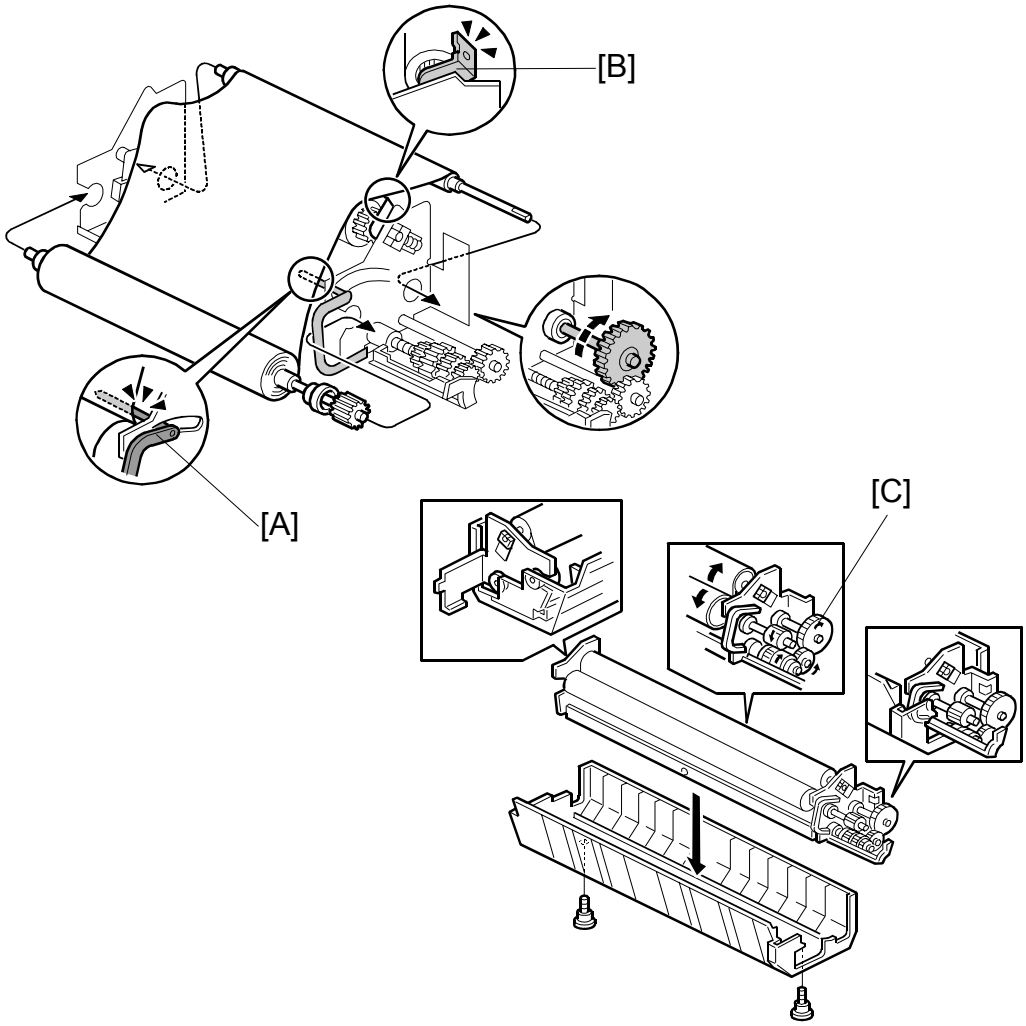
3.11.5 WEB ROLLER AND FILTER



1. Remove the oil supply and cleaning web unit. (☛3.11.1)
2. Place the unit on a flat surface as shown.
3. Cover [A] (☞ x 2).
4. Note the positions of the blue shaft bushings at the rear and front.
   - No e-rings or clips are used to hold these bushings in place.
   - The rear side of the cover holds the two rear bushings in place.
   - The bushings at the front are held in place by two tabs at the front.
5. Filter [B].
6. Bushing of the web supply roller shaft [C].
7. Oil supply and cleaning web shaft [D] (gear x 1, bushing x 1).
   NOTE: Raise the small tab on the gear to release it.

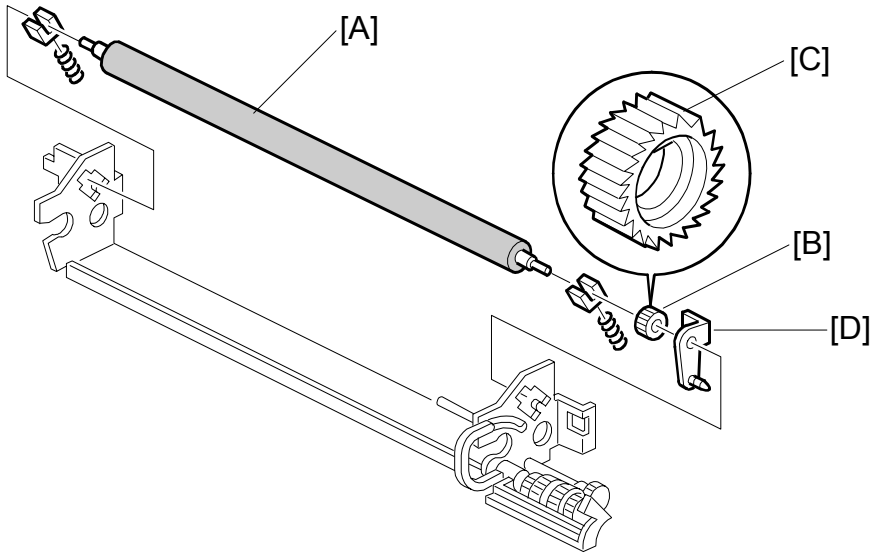


8. Web take-up roller gear [A]
9. Bushings [B]
10. Web take-up roller [C]



11. Make sure that the feeler [A] for the web end sensor is below the bracket. Otherwise, after turning on the main switch, SC550 (Web End) will be displayed.
12. Make sure the bracket [B] is on top of the web of the take-up roller.
13. If the web is buckled between the web supply roll and web collecting roll, turn the web take-up roller gear [C] clockwise to remove the buckle.
14. Reassemble the fusing unit.
    NOTE: After re-attaching the oil supply and cleaning web unit, make sure that the web take-up roller gear engages the gears on the fusing unit exit unit.
15. If a new web is installed, execute SP1902 001 (Web Motor Control – Web Consumption), and set the value to 0. Switch the machine off/on after changing the setting.

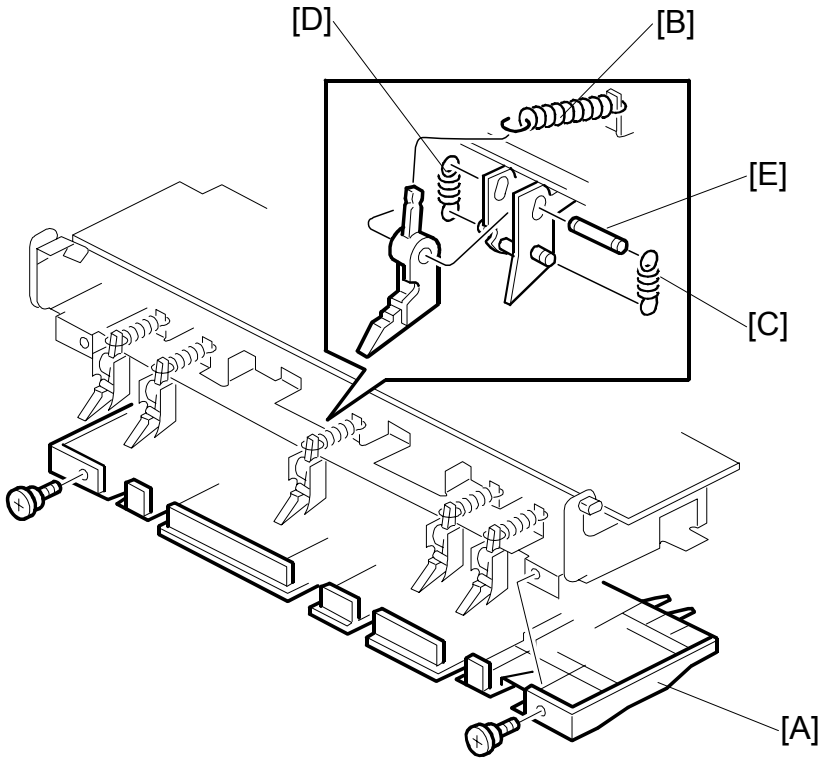
3.11.6 WEB CLEANING ROLLER



1. Remove the oil supply and cleaning web.
2. Replace the web cleaning roller [A] (gear x 1, bracket x 1, bushings x 2, springs x 2).

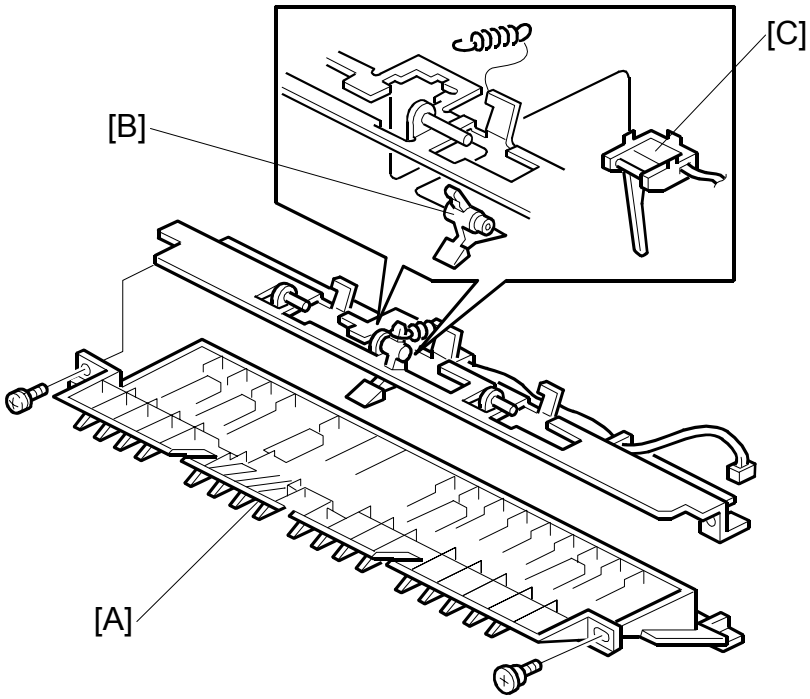
NOTE: When re-installing the gear [B], the D-shaped opening in this gear should face the roller shaft side. The circular-shaped opening [C] in the gear should face the bracket side [D].

3.11.7 HOT ROLLER STRIPPERS



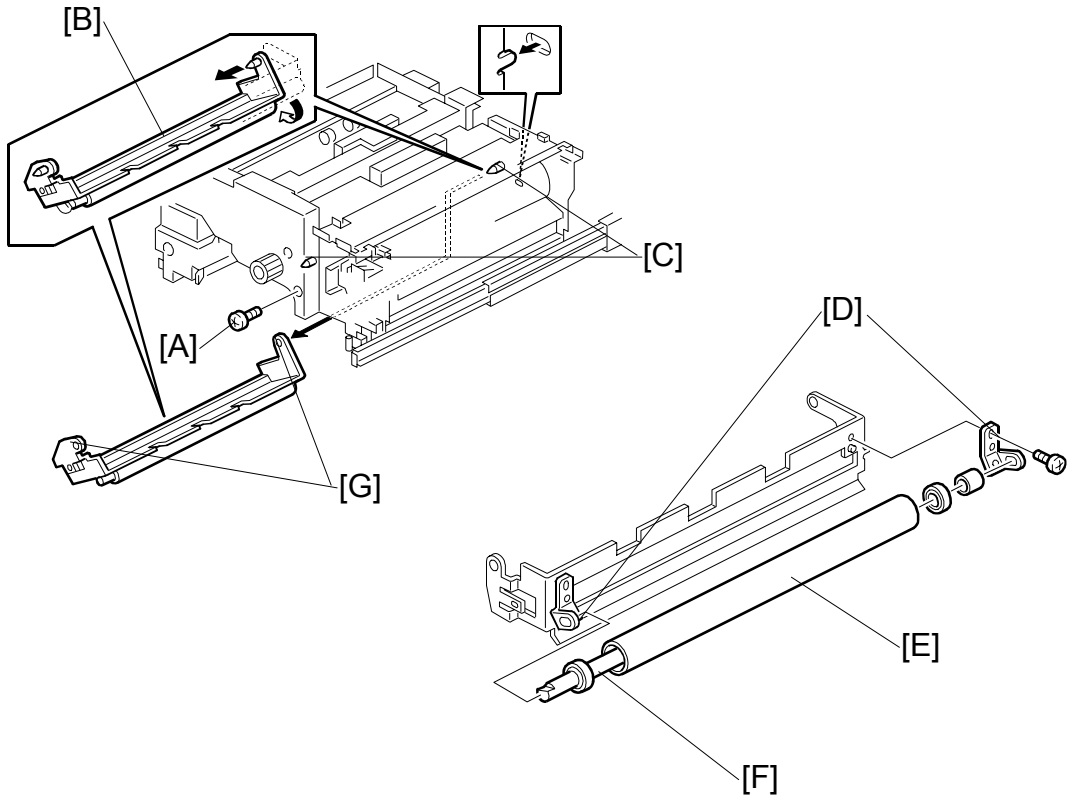
1. Fusing unit top cover (☞ x 1). (☛3.11.2)
2. Raise the upper exit guide plate assembly and rotate it clockwise 160 degrees, disconnect the pegs from the cut outs on both sides, then remove the unit. (☛3.11.3)
3. Upper exit guide plate [A] (☞ x 2).
4. Spring [B].
5. Springs [C], [D] hooked to the sides of the stripper.
6. Shaft [E].

3.11.8 PRESSURE ROLLER STRIPPER, FUSING EXIT SENSOR



1. Lower exit guide plate assembly. (☛3.11.3)
2. Lower exit guide plate [A] (🔩 x 2).
3. Pressure roller stripper [B] (spring x 1).
4. Fusing exit sensor [C].

3.11.9 PRESSURE ROLLER CLEANING ROLLER

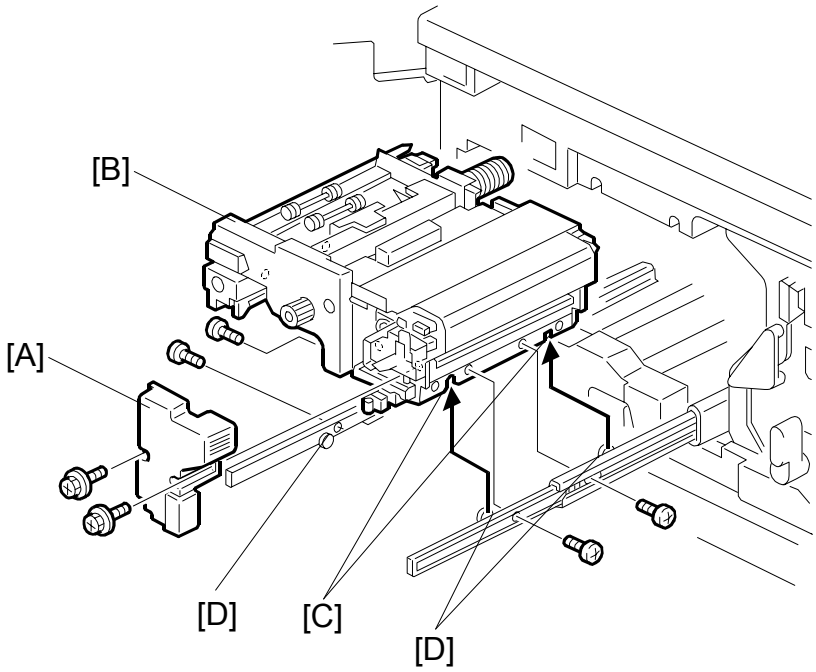


1. Open both front doors and pull out the fusing unit.
2. Screw [A].
3. Pull out the pressure roller cleaning roller assembly [B] to dislodge it from the pins [C].
4. Two spring plates [D] (🔩 x 1 each).
5. Replace the pressure roller cleaning roller [E] and shaft [F] (bearings x 1, spacer x 1).

Re-assembly

- Fit the holes [G] (rear then front) of the pressure roller cleaning roller unit bracket onto the pins [C].
- While turning the pressure roller cleaning roller assembly counterclockwise, push the pressure roller cleaning roller assembly to the rear until it locks in place, then secure it with the screw [A].

3.11.10 FUSING AND EXIT UNIT



⚠CAUTION

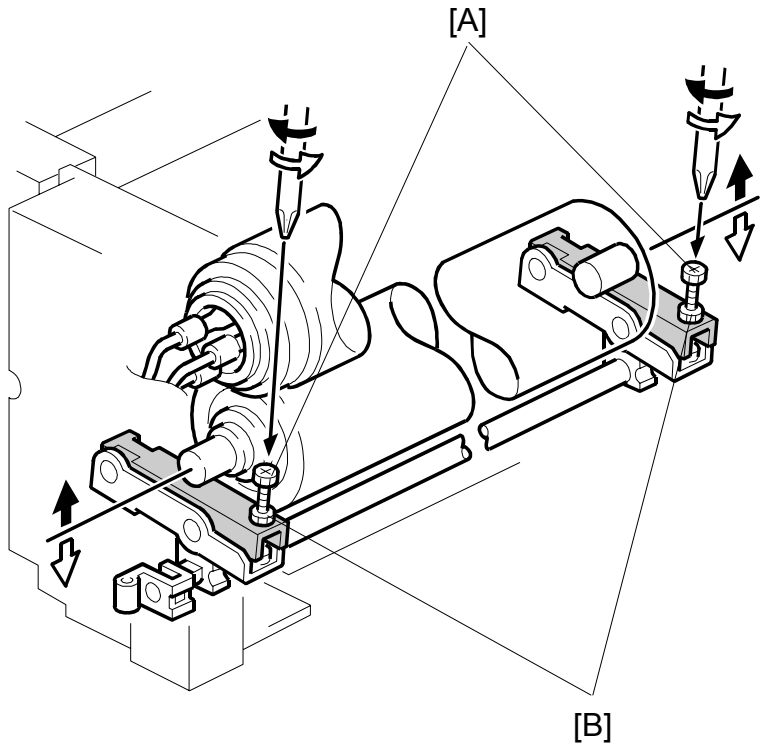
The fusing and exit unit is heavy. Handle it carefully to avoid dropping the fusing and exit unit when removing and installing it.

1. Fusing unit inner cover [A] (🔩 x 2).
2. Fusing and exit unit [B] (🔩 x 4).

Re-assembly

Hook the cutouts [C] onto the projections [D] of the right and left slide rails.

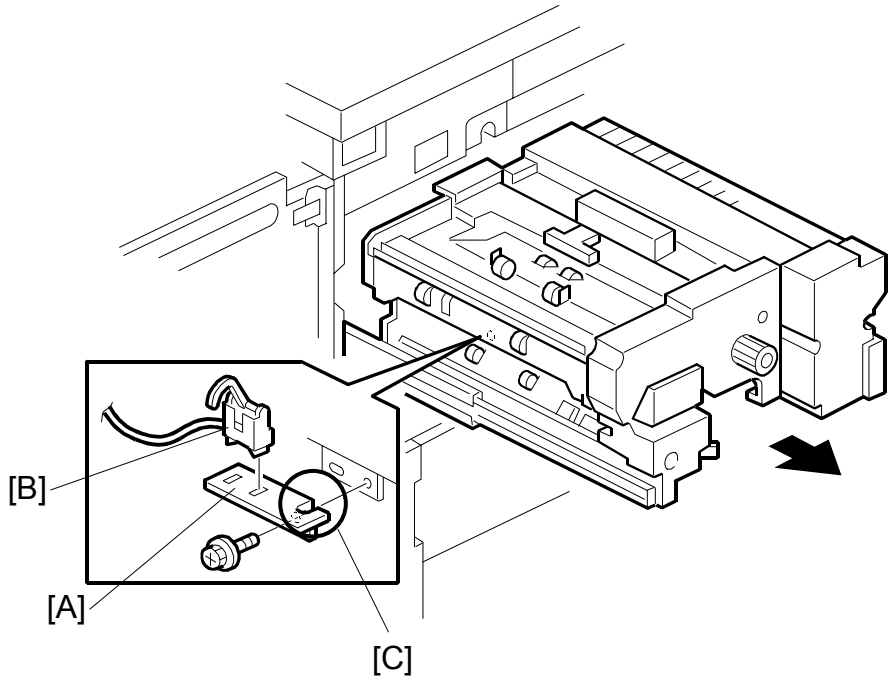
3.11.11 FUSING PRESSURE ADJUSTMENT



NOTE: The nip width 11.5 ± 0.5 mm (the difference between front and rear measurements should be less than 0.5 mm).

1. Execute SP1109 (Fusing Nip Band Check) to enter the fusing nip band check mode.
2. Make a copy using an A4/LT OHP sheet. Copying will start. It will stop in the fusing unit for 30 seconds and then will exit.
   NOTE: If an OHP sheet is not available, use a solid black copy on plain paper (make the copy with the ADF open – the copy will be all black).
3. Measure the nip band width (the shiny band) at both ends.
4. It the nip band width is not within specifications at both ends, release the fusing pressure and adjust it using the adjustment screw [A] (clockwise increases the pressure, counterclockwise decreases the pressure).
   NOTE: Loosen the lock nuts [B] before turning the pressure adjustment screw. Re-tighten the nuts after adjusting.
5. Repeat steps 1 to 4 to check the nip band width.

3.11.12 EXIT SENSOR

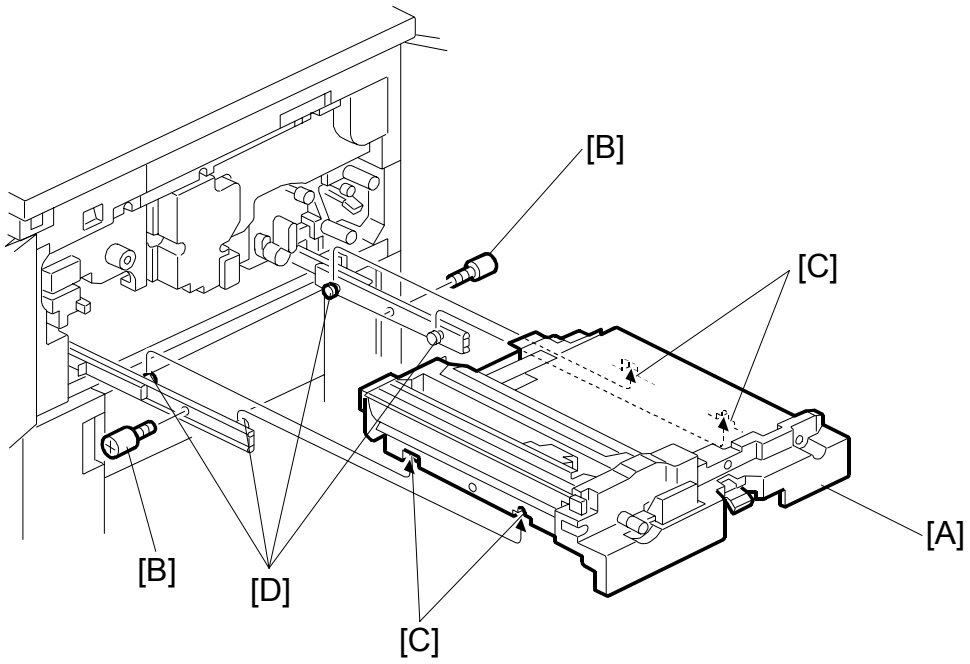


1. Pull out the fusing and exit unit.
2. Sensor bracket [A] with the sensor (x 1, x 1, clamps x 2).
3. Exit sensor [B].

NOTE: When re-installing the sensor bracket, run the cable through the cutout [C] to slacken the cable.

3.12 DUPLEX UNIT

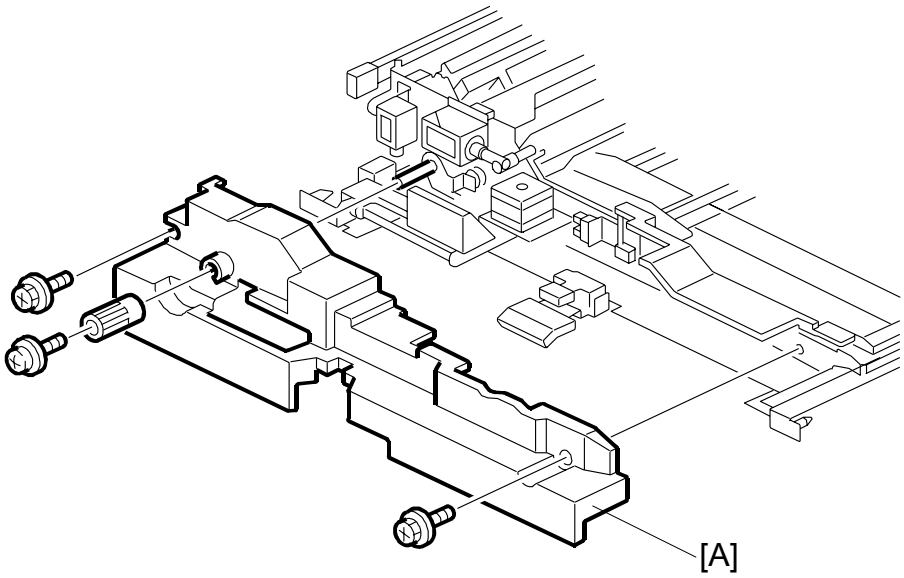
3.12.1 DUPLEX UNIT



1. Open the left and right front doors and pull out the duplex unit [A].
2. Remove the shoulder screws [B] (x 2).
3. Lift up the duplex unit.

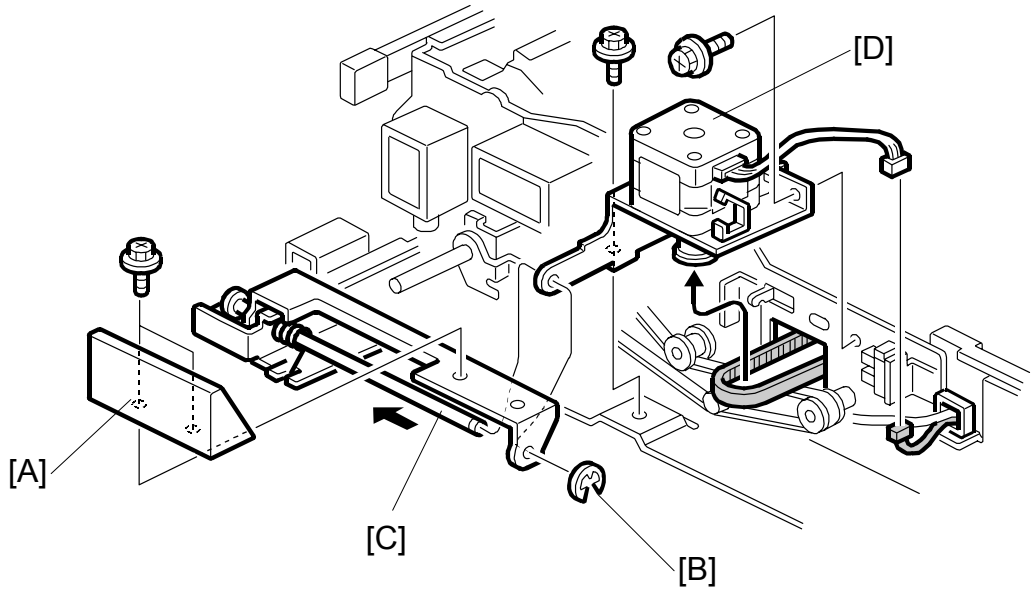
NOTE: When re-installing the duplex unit, align the cutouts [C] with the slide rail projections [D].

3.12.2 DUPLEX UNIT INNER COVER



1. Open both front doors.
2. Pull out the duplex unit.
3. Duplex unit inner cover [A] (🔩 x 3, knob x 1).

3.12.3 JOGGER MOTOR

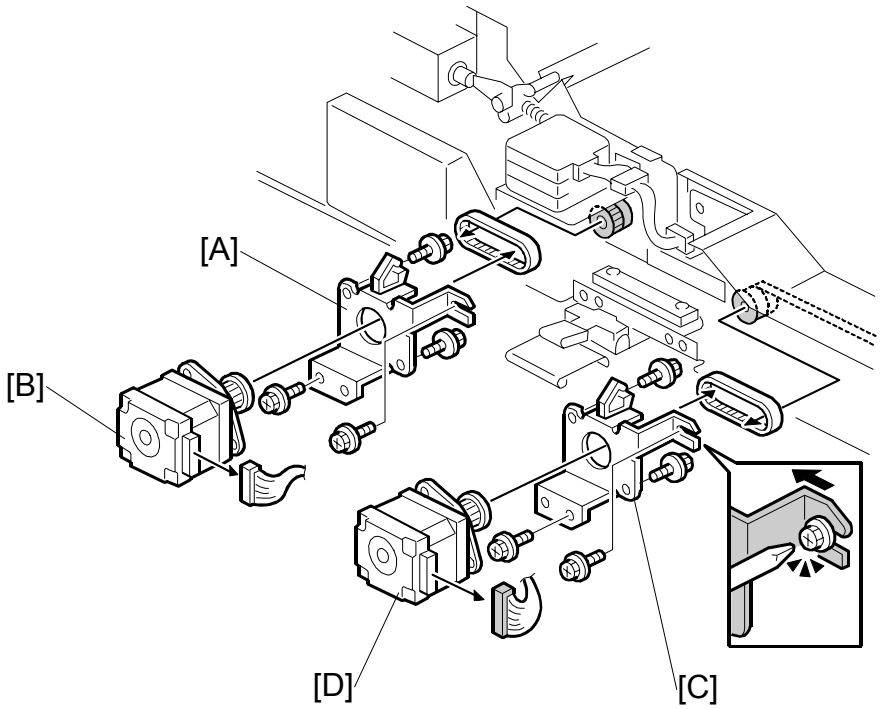


1. Duplex inner cover. (☛3.12.2)
2. Duplex grip [A] (☞ x 2).
3. E-ring [B] and slide the duplex grip shaft [C] to the left.
4. Jogger motor assembly [D] (☞ x 2, ☞ x 1, clamps x 1).

Re-assembly

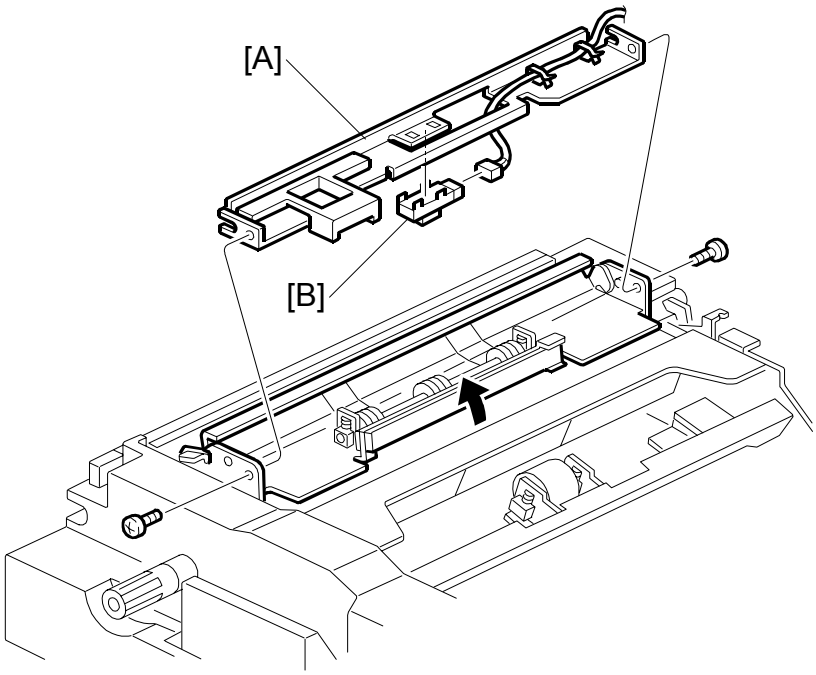
1. Re-install the duplex grip shaft and E-ring first.
2. Next, tighten the screws for the jogger motor assembly.

3.12.4 DUPLEX TRANSPORT MOTORS



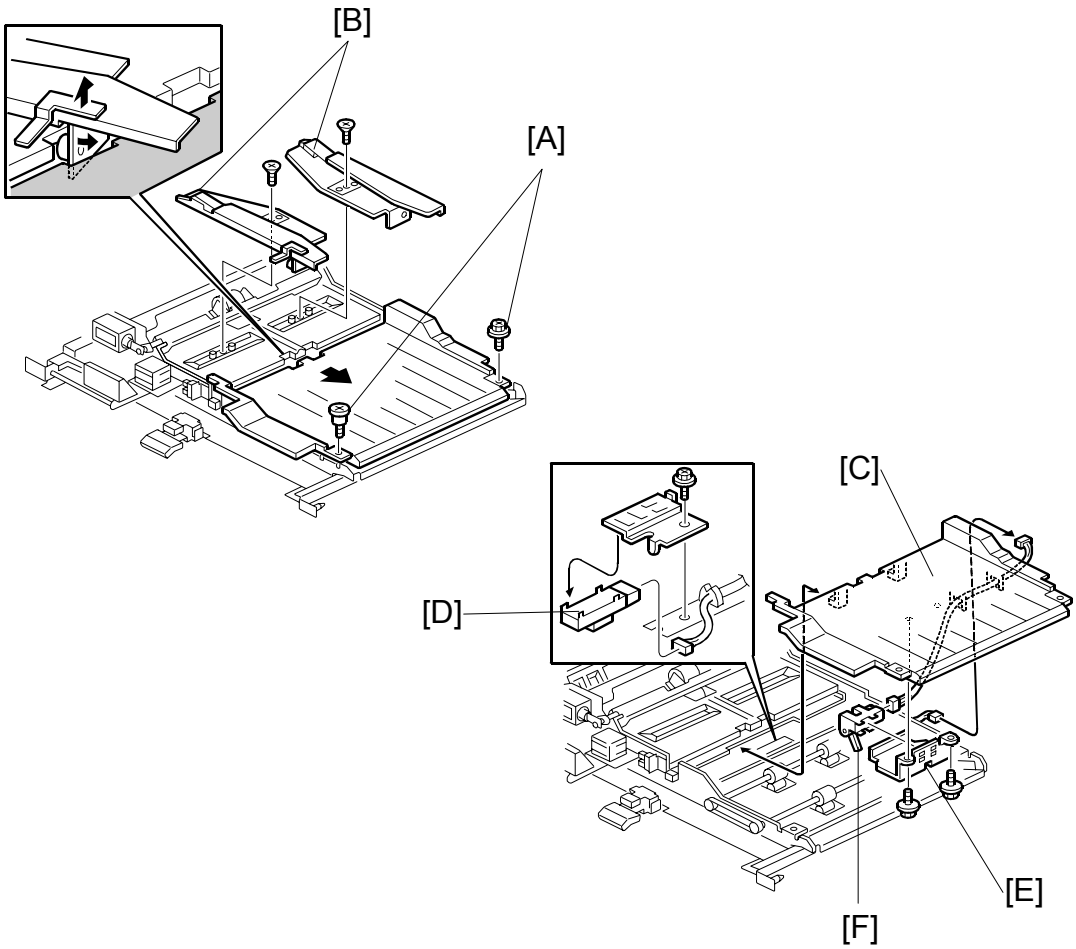
1. Open both doors and pull out the duplex unit.
2. Duplex unit inner cover (☛3.12.2)
3. Transport motor 1 assembly [A] (x 2, x 1, clamp x 1, timing belt x 1).
4. Transport motor 1 [B] (x 2)
5. Transport motor 2 assembly [C] (x 2, x 1, clamp x 1, timing belt x 1).
6. Transport motor 2 [D] (x 2).

3.12.5 DUPLEX ENTRANCE SENSOR



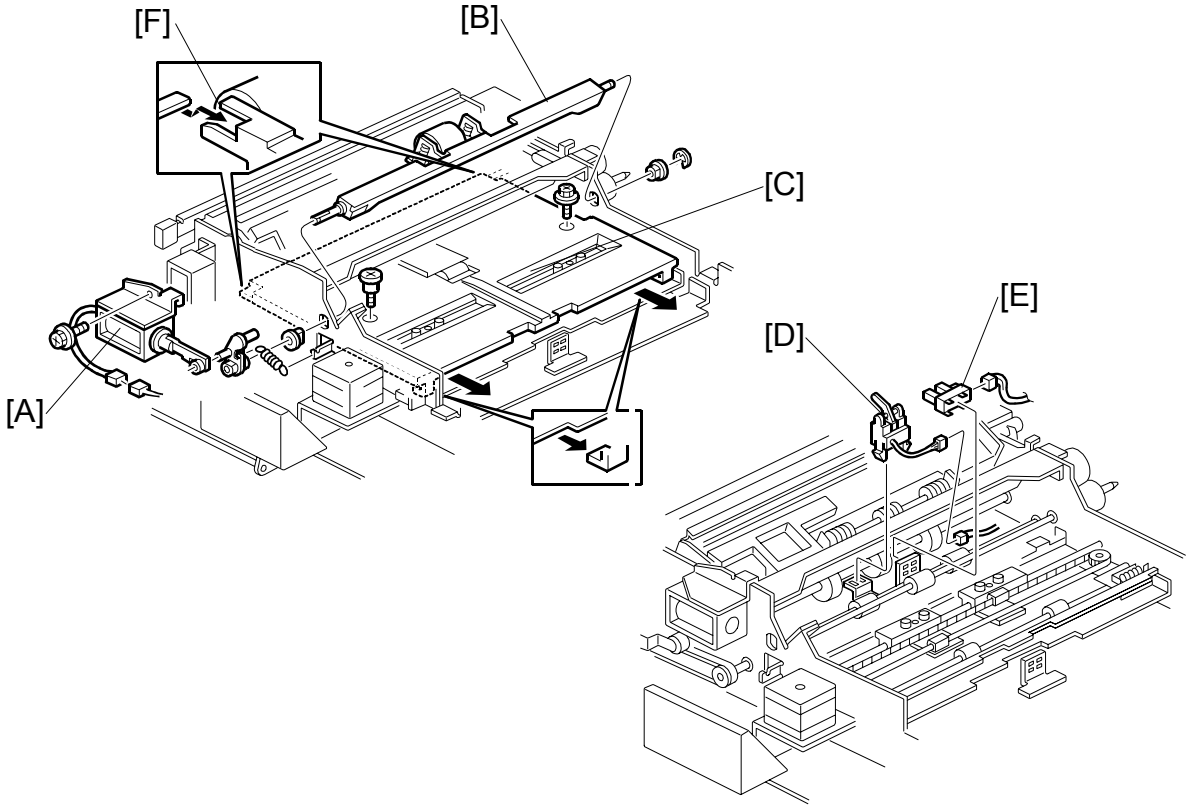
1. Pull out the duplex unit.
2. Entrance sensor bracket [A] (☞ x 2).
3. Duplex entrance sensor [B] (☞ x 1).

3.12.6 DUPLEX TRANSPORT SENSORS 2, 3



1. Open both front doors and pull out the duplex unit.
2. Remove the upper duplex cover screws [A] (x 2) then slide the cover to the right.
   NOTE: The front screw is a shoulder screw.
3. Slide the jogger fences to the center, then remove both jogger fences [B] (x 2 each).
4. Right upper duplex cover [C] (x 1).
5. Duplex transport sensor 2 [D] (x 1, x 1).
6. Duplex transport sensor bracket [E] (x 2).
7. Duplex transport sensor 3 [F] (x 1, x 1).

3.12.7 DUPLEX TRANSPORT SENSOR 1/DUPLEX INVERTER SENSOR



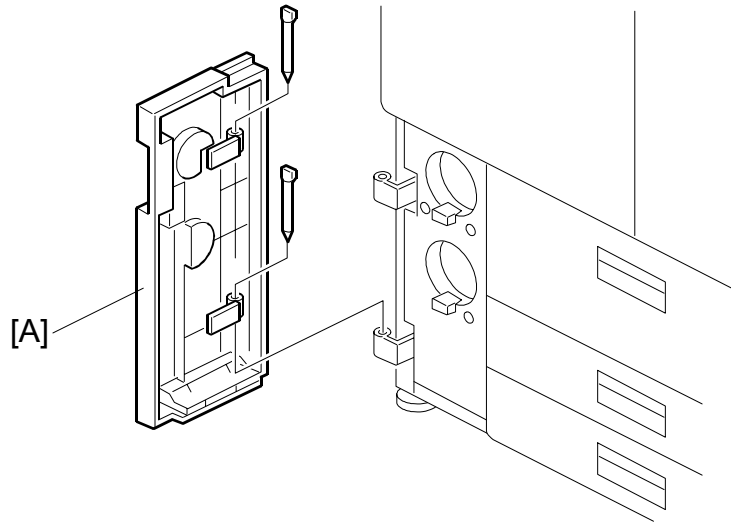
1. Open both front doors and pull out the duplex unit.
2. Both jogger fences (x 2). (☛3.12.6)
3. Right upper duplex cover (☛3.12.6).
4. Reverse roller solenoid [A] (x 1, x 1, link x 1, spring x 1).
5. Reverse trigger roller assembly [B] (x 1, bushings x 2, x 1, links x 1).
6. Left upper cover [C] (x 2). Slide the left upper cover to the right and remove it. (The front screw is a shoulder screw.)
7. Duplex inverter sensor [D] (x 1)
8. Transport sensor 1 [E] (x 1, x 1).

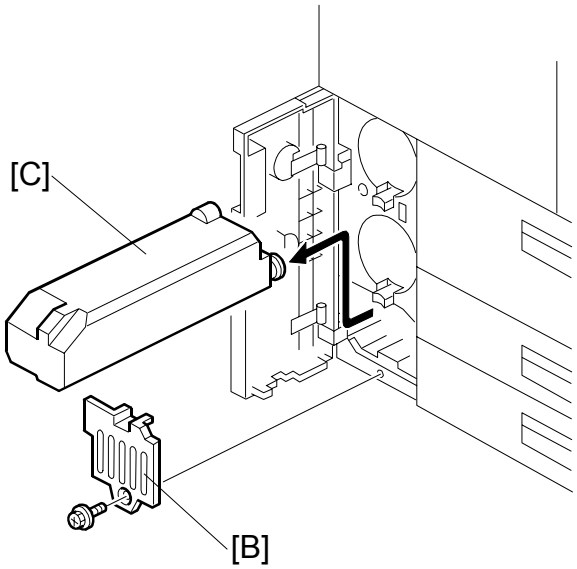
Re-assembly

Make sure that the cutouts [F] catch the duplex side plate projections and the hooks are below the bracket plate.

3.13 TONER BANK

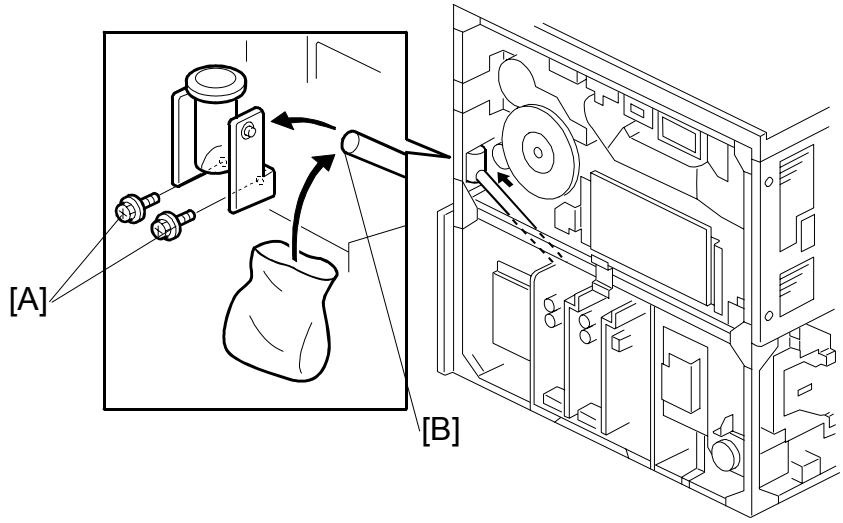
3.13.1 WASTE TONER BOTTLE





1. Toner bank door [A] (pins x 2).
2. Waste toner bottle cover [B] (☞ x 1).
3. Waste toner bottle [C].

3.13.2 TONER BANK UNIT

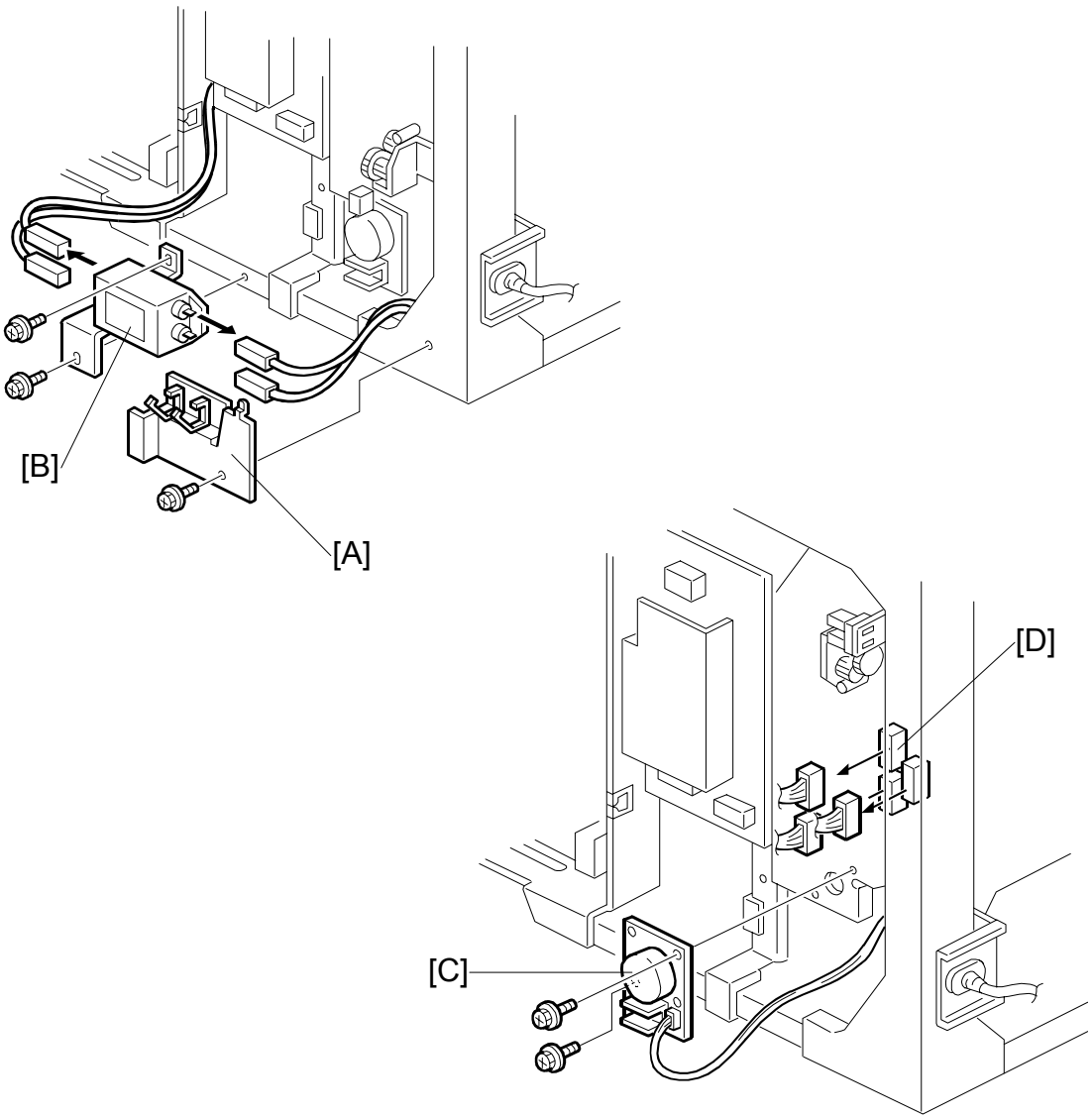


NOTE: Work carefully to avoid spilling toner during removal.

1. Execute SP5804 097 (upper bottle) and 098 (lower bottle) to close the caps, then remove the toner bottles from the bank.
2. Upper rear and lower rear covers (☛3.1.4).
3. Open the controller box door (🔩 x 3) (☛3.1.4)
4. Left lower cover, right upper cover (☛3.1.2, 3.1.3).
5. Two screws [A] of the toner supply cylinder. (🔩 x 2, tubes x 3)
   NOTE: Work carefully to avoid spilling toner.
6. Cover the end of the toner transport coil tube [B] with a plastic bag.
   NOTE: Do not to bend the toner transport coil tube [B]. If it is bent, this can cause the coil inside to be overloaded, locked, or damaged. SC592 will be displayed, and the coil (screw) inside should be replaced.

⟹ 7. Switch on the machine and execute SP2226 to discharge toner from the toner bank.

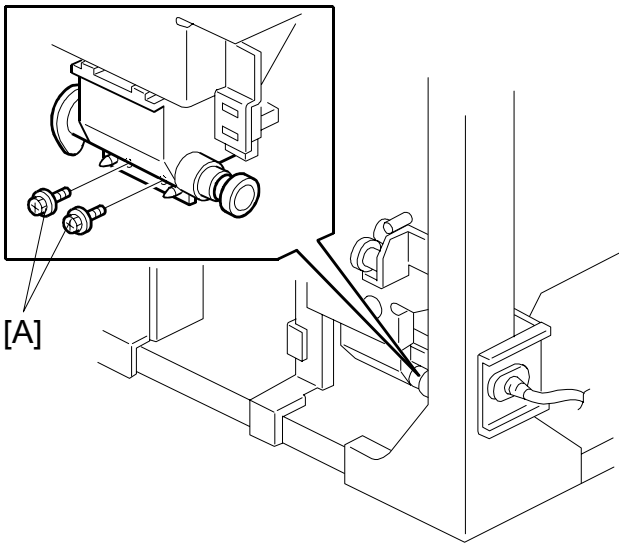
8. Turn off the main switch and unplug the power cord.
9. Toner waste bottle. (☛3.13.1)

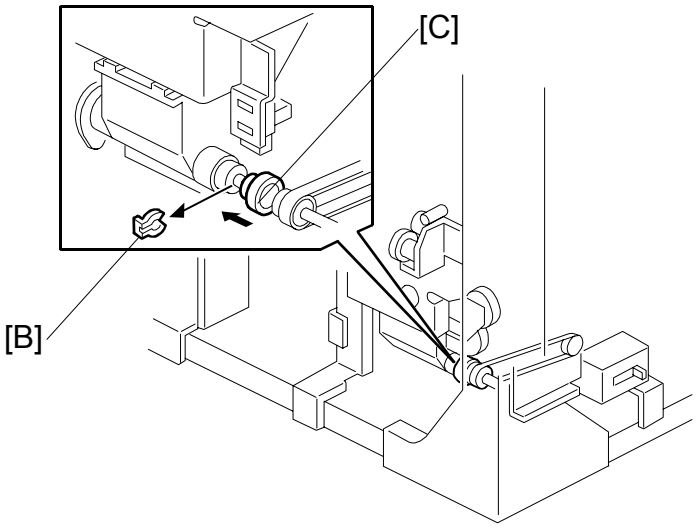


⚠CAUTION

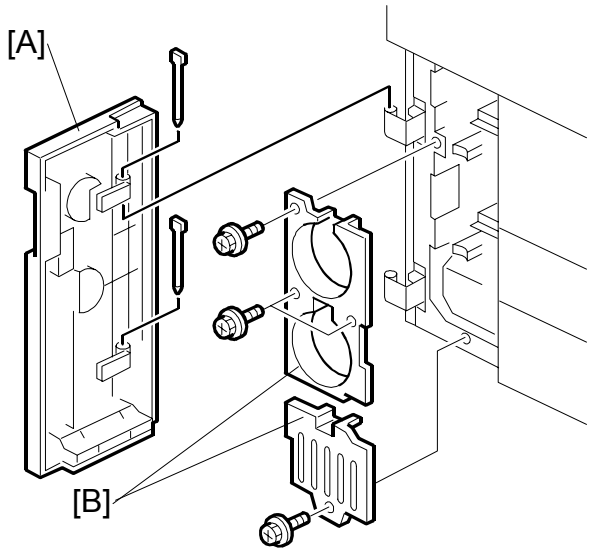
Make sure that the power cord is unplugged before removing the noise filter in the next step.

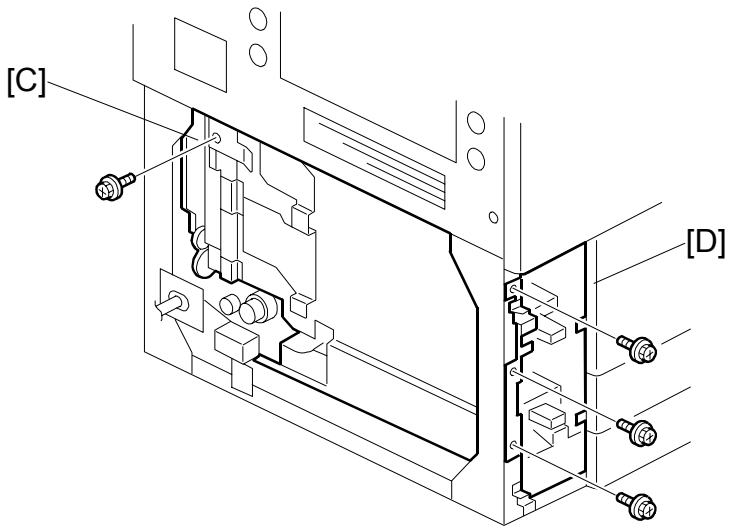
10. Harness clamp bracket [A] (☞ x 1, clamps x 2).
11. Remove the noise filter [B] (☞ x 2, ☞ x 4).
    NOTE: The top connectors are white, and the bottom connectors are yellow.
12. Toner bank motor [C] (☞ x 2, ☞ x 1)
13. Connectors [D] (☞ x 3).



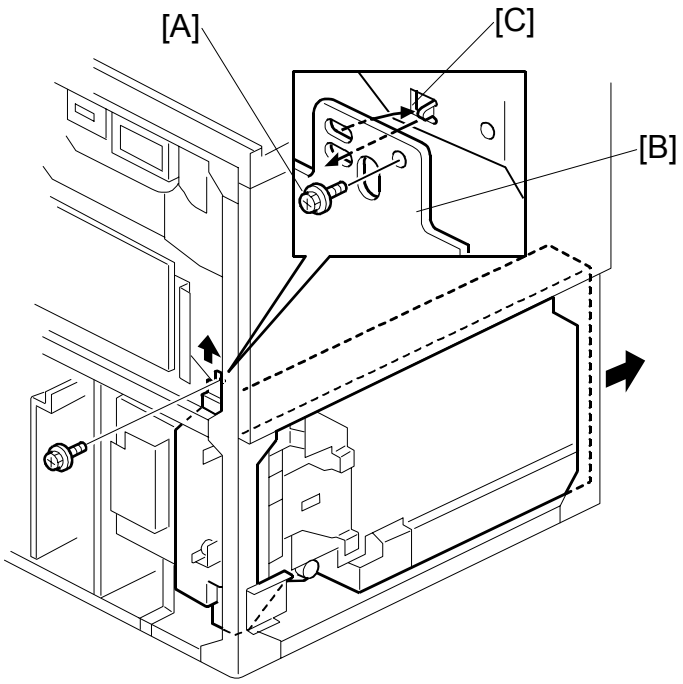


14. Toner transport coil casing [A] (☞ x 2).
15. Snap ring [B]
16. Slide coupling [C] to the left.





17. Toner bank door [A] (pins x 2).
18. Toner bank inner covers [B] (🔩 x 3).
19. Screw on the left [C] (🔩 x 1) and screws on the front [D] (🔩 x 3) securing the toner bank unit.



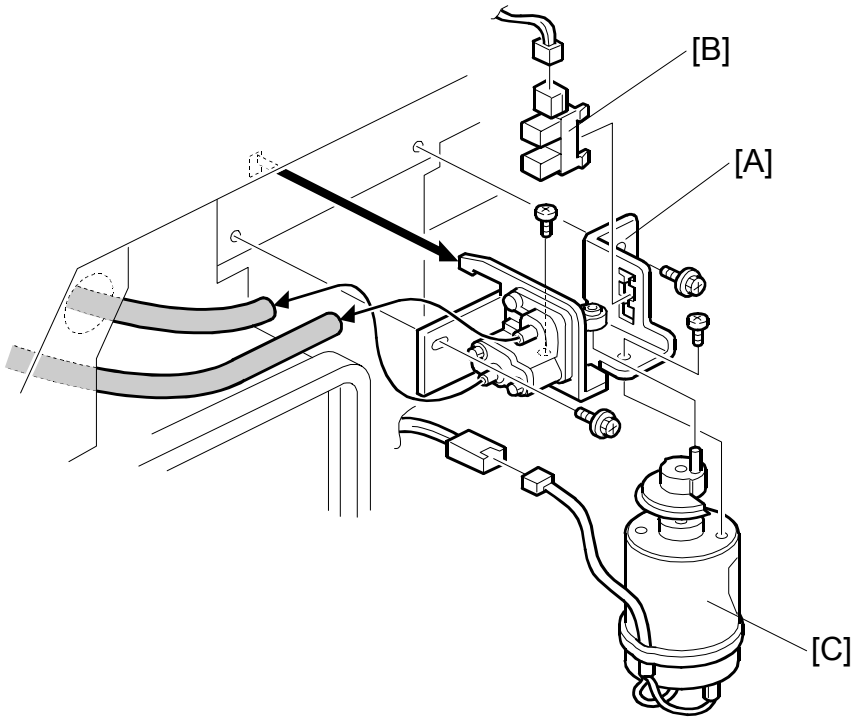
20. Screw [A] securing the toner recycling and collection casing [B].
21. Lift the toner recycling and collection casing [B], pull out the pin [C] from the hole under the case, then pull out the toner bank unit.
    NOTE: When pulling out the toner bank unit, toner may leak out of the junction between the tube and toner bank. Place a cloth on the machine bottom plate so that the plate does not become dirty.

After Re-installing the Toner Bank Unit

1. Remove the plastic bag from the toner transport coil tube. Re-connect the toner supply cylinder to the toner transport coil tube (🔩 x 2, tubes x 3).
2. Load the toner bottles into the toner bank.
3. Open the cylinder top cover and clean the inner surface of the cylinder with a cloth, then close the cylinder top cover.
4. Execute SP5804 070 to energize the toner bank motor.
5. Execute SP5804 068, 069 to energize the toner bottle motors for 5 to 6 seconds.
6. Execute SP5804 071 to energize the toner supply coil clutch.
7. About 50 to 60 seconds later, toner is supplied to the toner supply cylinder. Make sure that toner is properly supplied to the cylinder.
8. Turn off the toner supply coil clutch and then the toner bank motor.

NOTE: To prevent overflow at the toner entrance tank, do not energize the toner bottle motors for a long time.

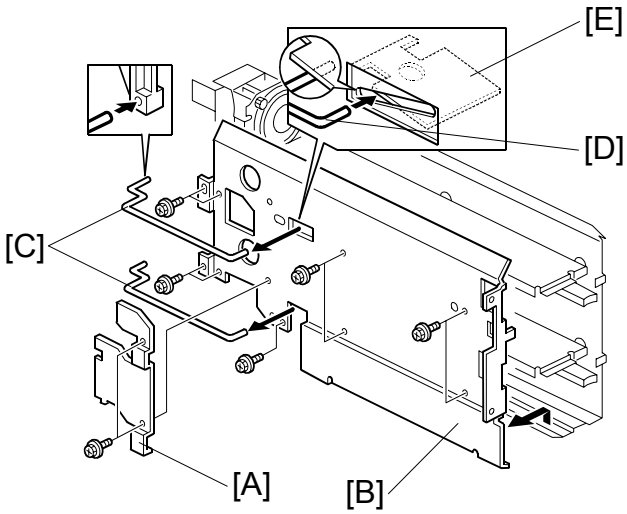
3.13.3 TONER SUPPLY PUMP MOTOR, TONER SUPPLY MOTOR SENSOR

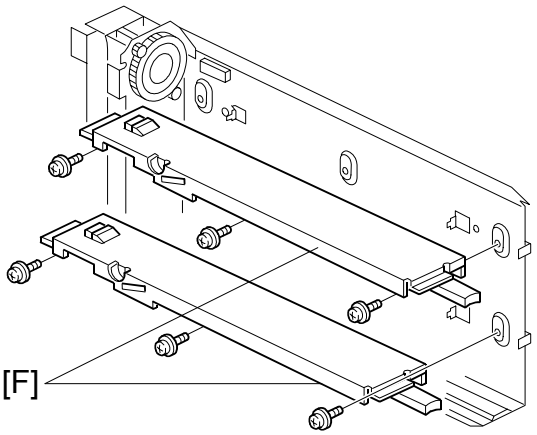


1. Right upper cover (x 4) (☛3.1.2).
2. Bracket [A] with the toner supply pump motor (x 2, x 2, tubes x 2).
3. Toner supply pump motor sensor [B].
4. Toner supply pump motor [C] (x 2).

NOTE: When re-installing the parts, make sure that the hoses are connected at the correct positions, as shown.

3.13.4 ACCESS TO INSIDE THE TONER BANK



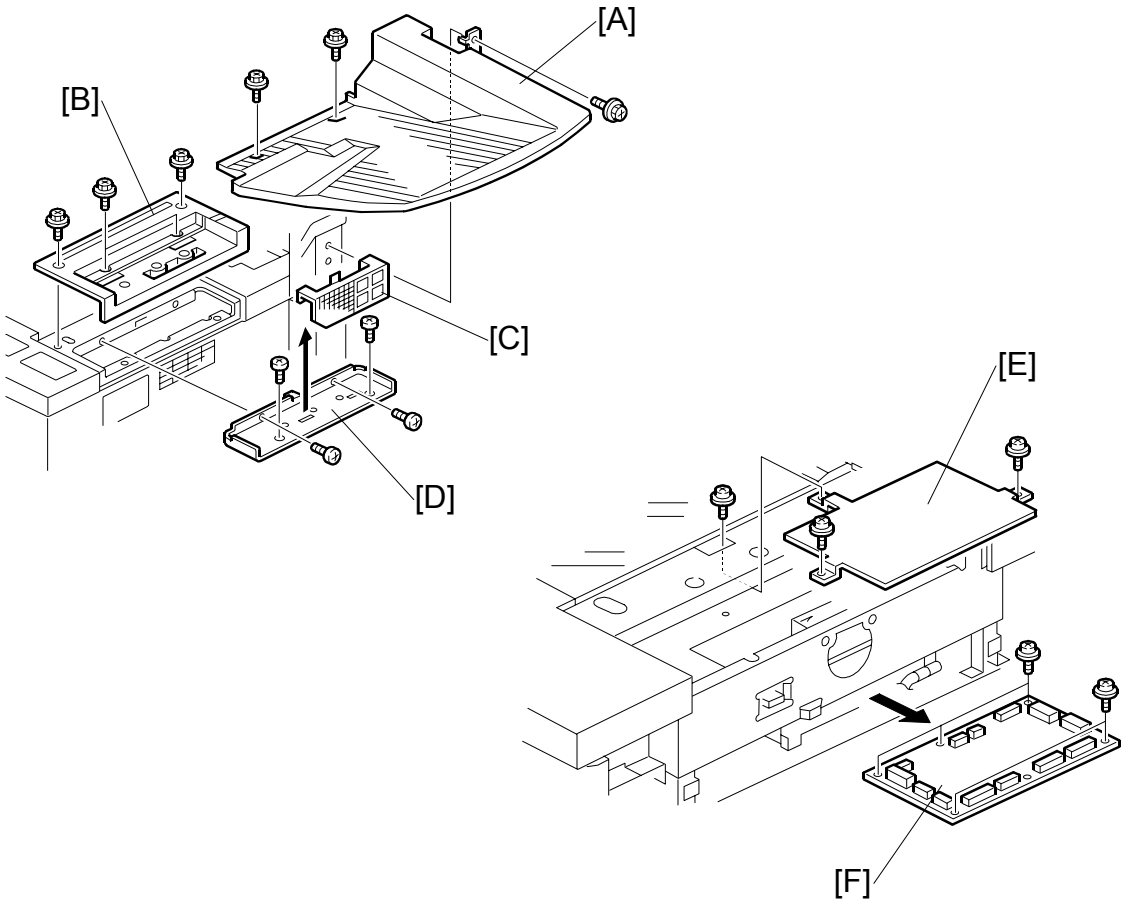


NOTE: The toner bottle sensors and toner collection bottle sensor are inside the toner bank.

1. Toner bank. (☛3.13.2)
2. Toner release link bracket [A] (☞ x 2).
3. Left side plate [B] (☞ x 9, 2 links [C]).
   NOTE: When re-attaching the links [C], place the front pin [D] under the lock plate [E].
4. Toner bottle bottom plates [F] (☞ x 3 each).

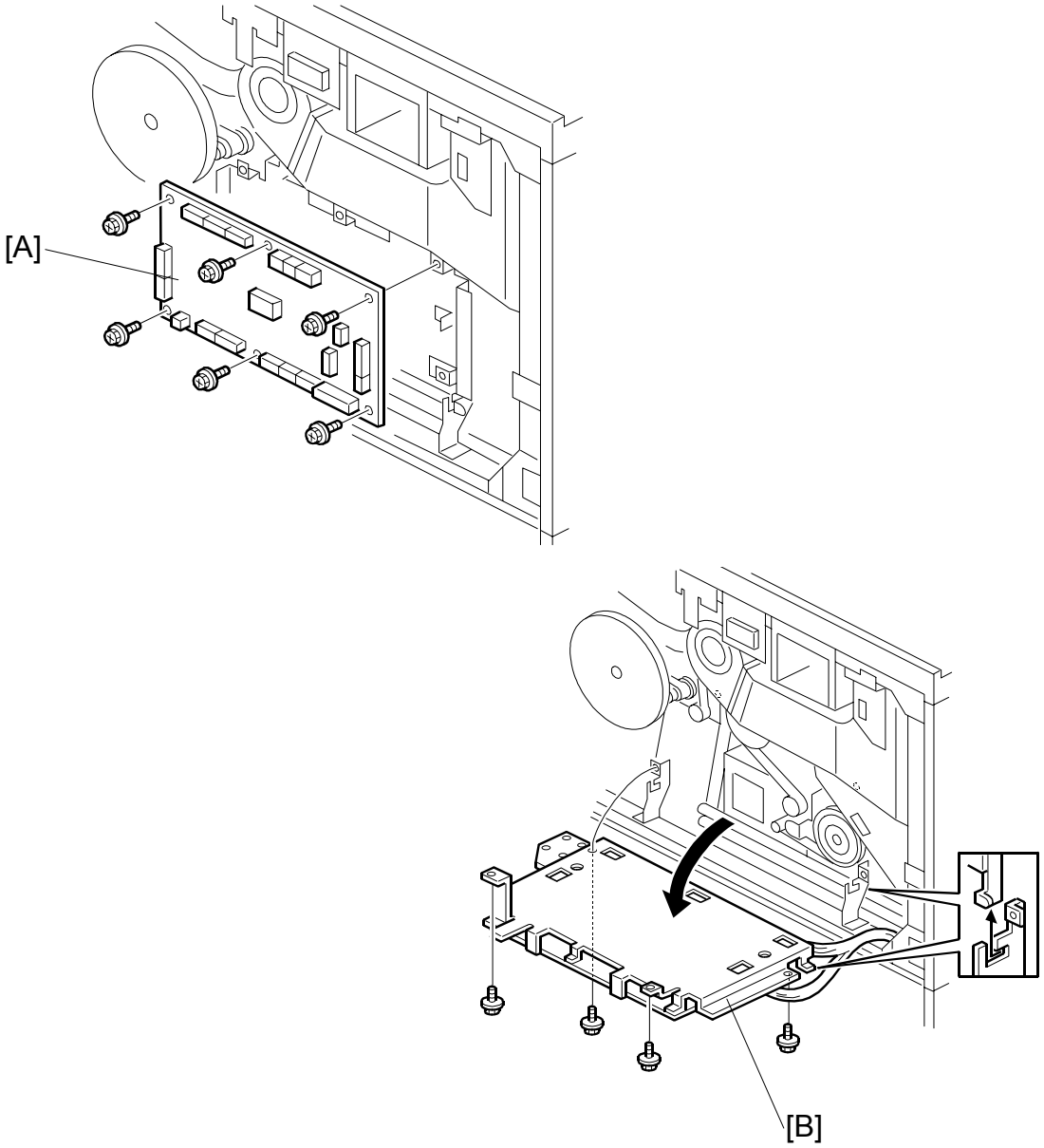
3.14 MAIN BOARDS

3.14.1 LCDC (LCD CONTROLLER)



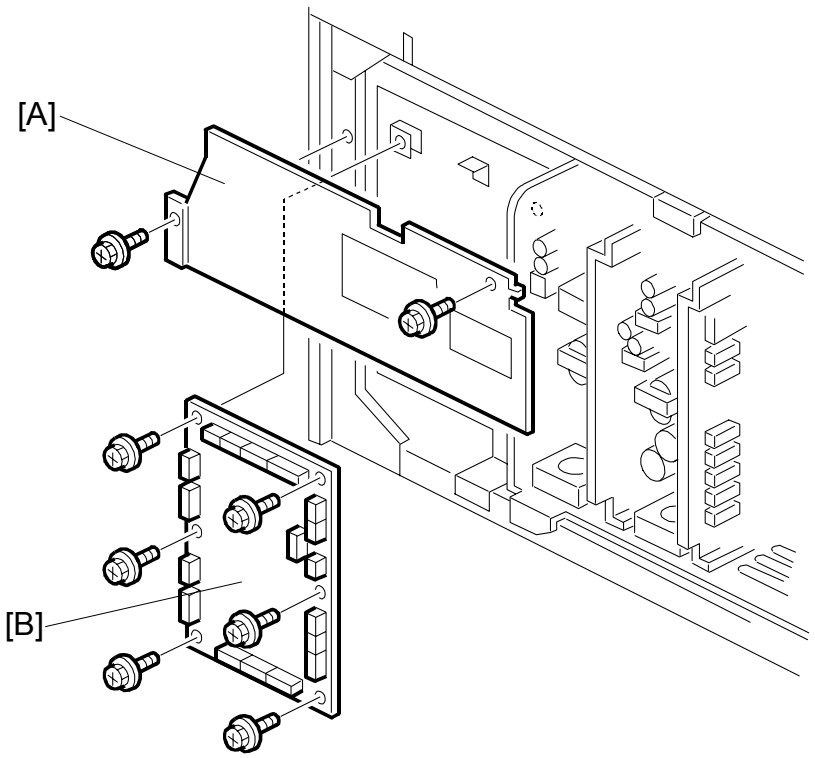
1. Original exit tray [A] (☞ x 3).
2. Scanner right cover [B] (☞ x 4).
3. Optics dust filter [C].
4. Cover [D] (☞ x 4).
5. LCDC cover bracket [E] (☞ x 3).
6. LCDC board [F] (☞ x 5, 🖳 x 9, ribbon connectors x 3).

3.14.2 BCU BOARD



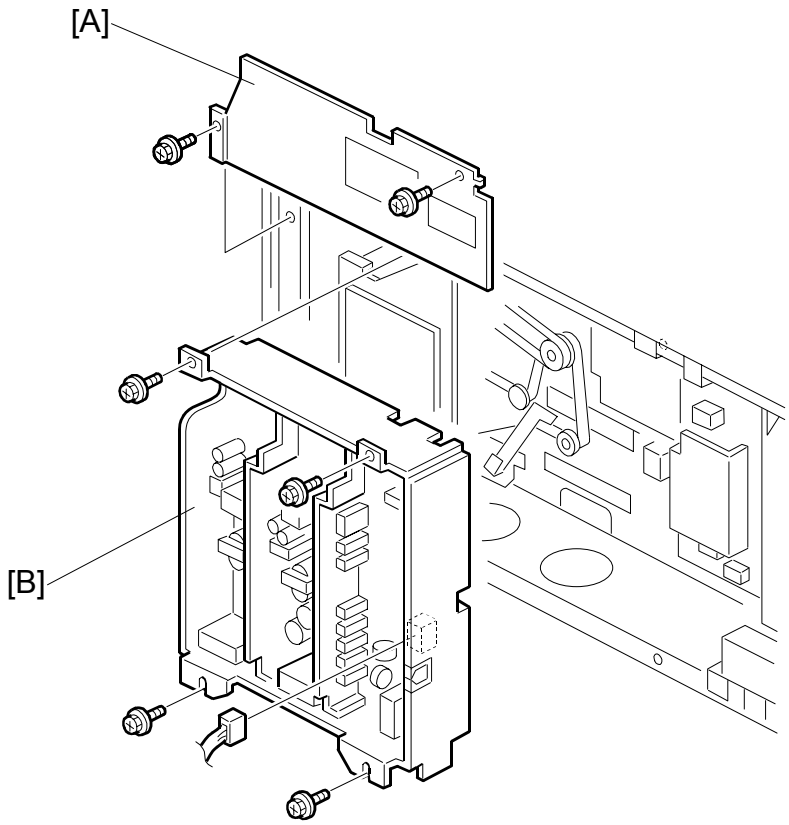
1. Rear upper cover (x 4) (☛3.1.4).
2. Open the controller box. (☛3.1.4)
3. BCU board [A] (x 6, x 19).
   NOTE: If the 4 screws shown in the diagram are removed, the BCU board [B] swings down. If all 6 screws are removed, the BCU comes off.

3.14.3 IOB



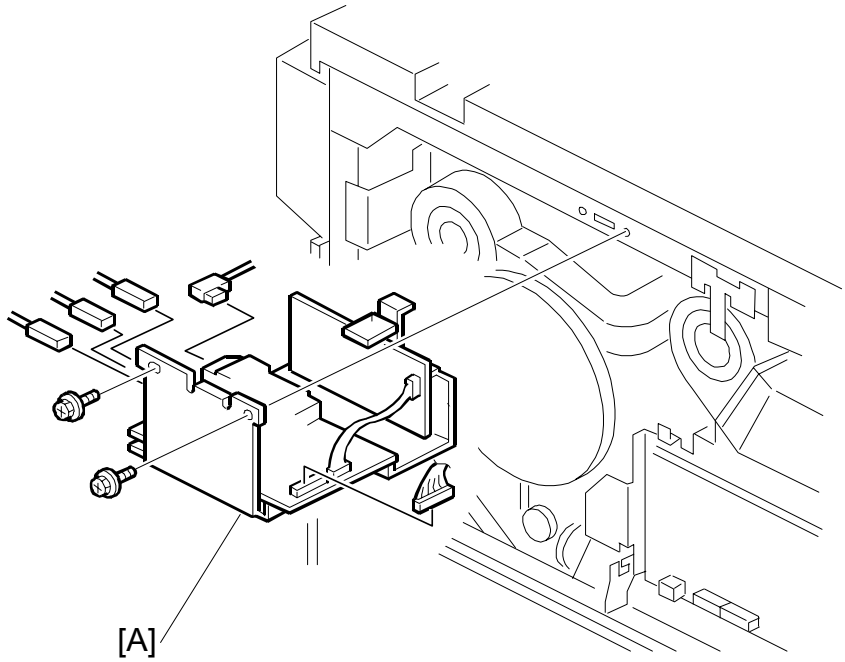
1. Rear lower cover (x 4) (☛3.1.4).
2. PSU cover (x 2).
3. IOB [A] (x 19, x 6).

3.14.4 PSU-E (POWER SUPPLY UNIT-ENGINE)



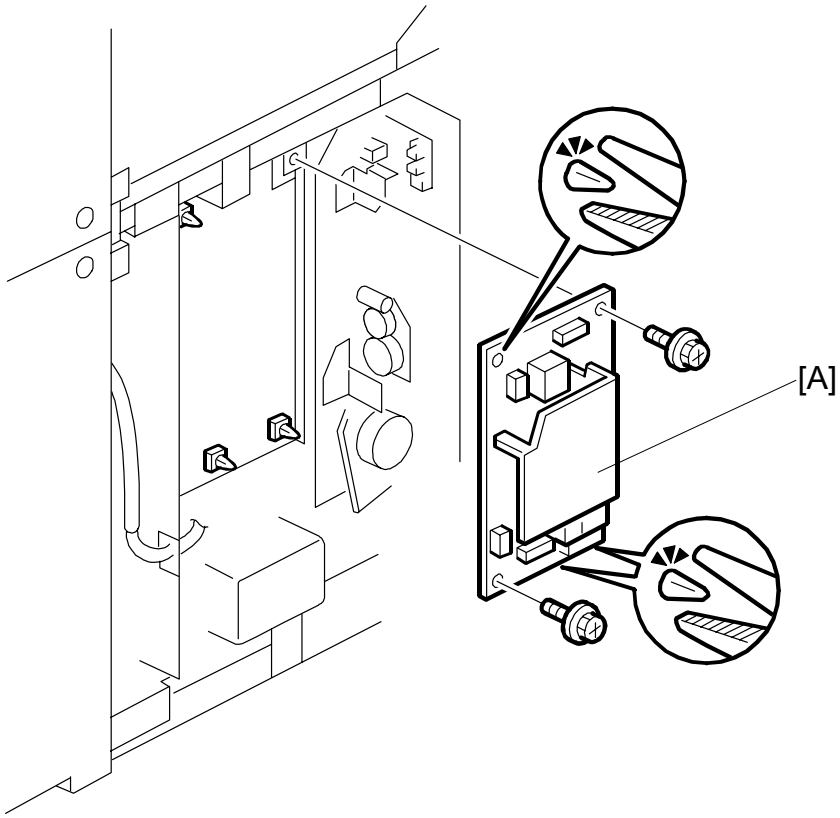
1. Remove the rear lower cover (x 4). (☛3.1.4)
2. Open the controller box door. (☛3.1.4)
3. PSU cover [A] (x 2).
4. PSU-E [B] (x 4, x 11).

3.14.5 CBG POWER PACK



1. Remove the rear upper cover (x 4). (☛3.1.4)
2. CBG power pack [A] (x 2, x 5).
3. When re-installing, be sure to connect the connectors at the correct points:
   - CN753: Orange
   - CN755: Green
   - CN754: Blue

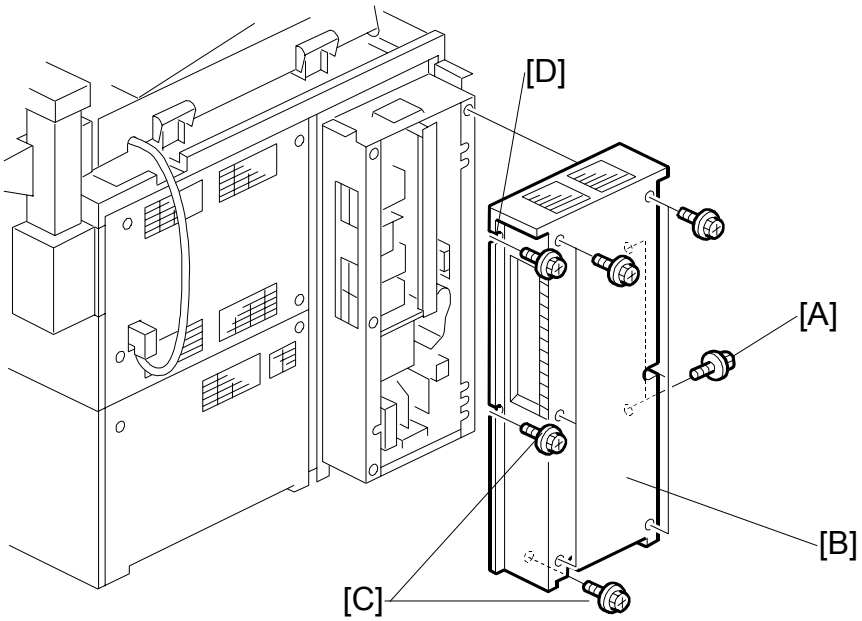
3.14.6 AC DRIVE BOARD



1. Open the controller box door. (☛3.1.4)
2. AC drive board [A] (☞ x 2, Standoffs x 2)

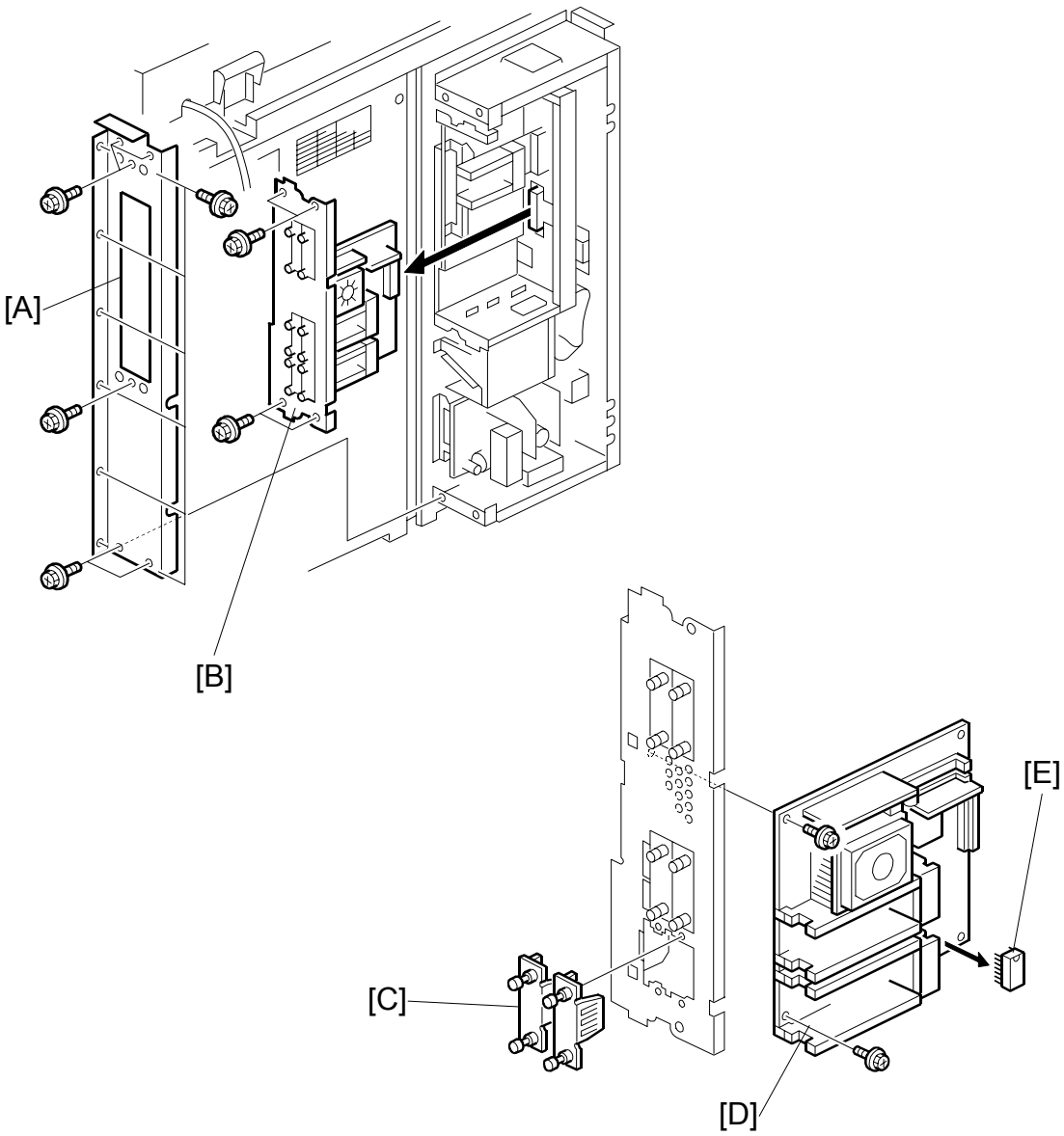
3.15 CONTROLLER BOARDS, HDD

3.15.1 CONTROLLER BOX COVER



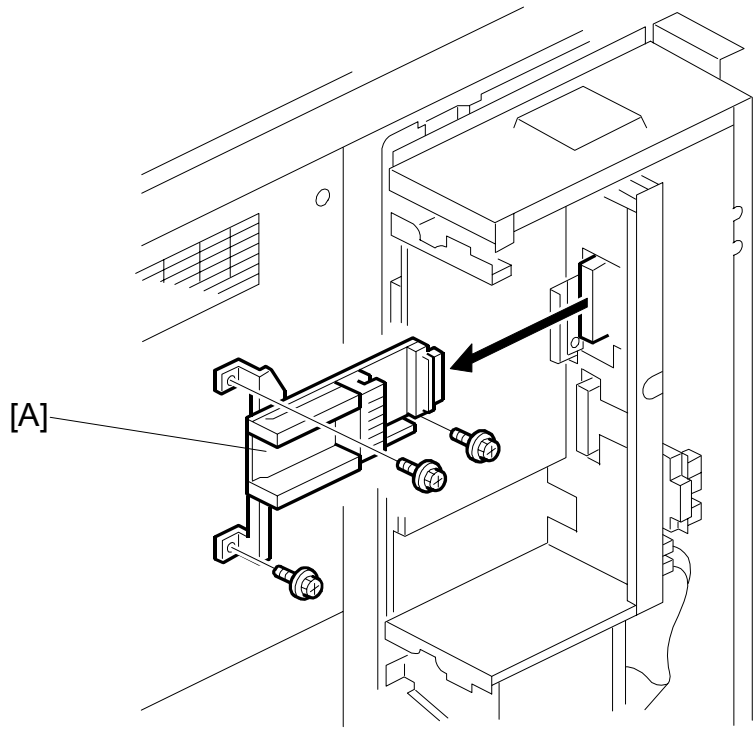
1. Side screws [A] (🔩 x 2).
2. Rear panel screws [B] (🔩 x 6).
3. Bottom and left side screws [C] (🔩 x 2)
4. Top lock screw [D] (🔩 x 1)
   NOTE: When you re-install the control box cover, fasten screw [D] first to ensure that the bottom and left side screw holes align correctly with their holes.

3.15.2 CONTROLLER BOARD, NVRAM



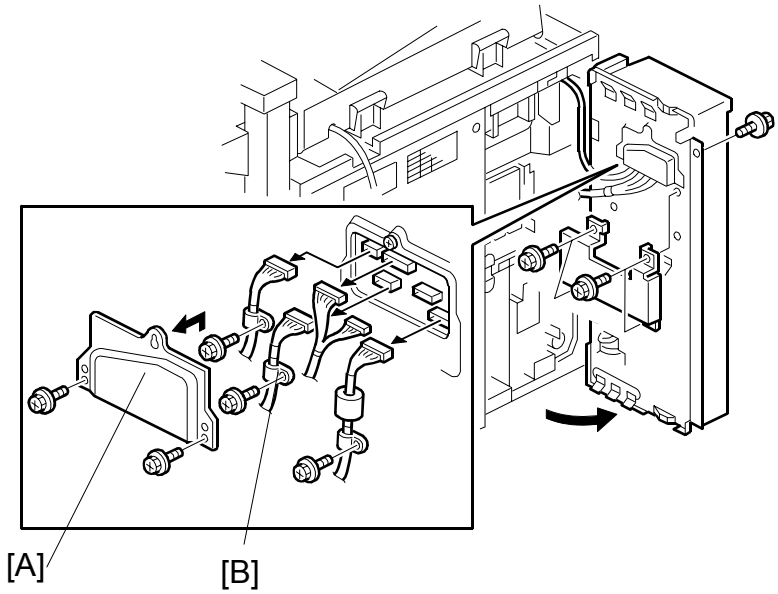
1. Controller box cover. (☛3.15.1)
2. Left bracket [A] (☞ x 12)
3. Slot cover bracket [B] (☞ x 4)
   NOTE: When re-installing, make sure that board is between the ground plates.
4. Bottom slot covers [C] (☞ x 4)
5. Controller board [D] (☞x2)
6. NVRAM [E].
   NOTE: When installing a new controller board, be sure to remove the NVRAM from the old board and attach it to the new board.

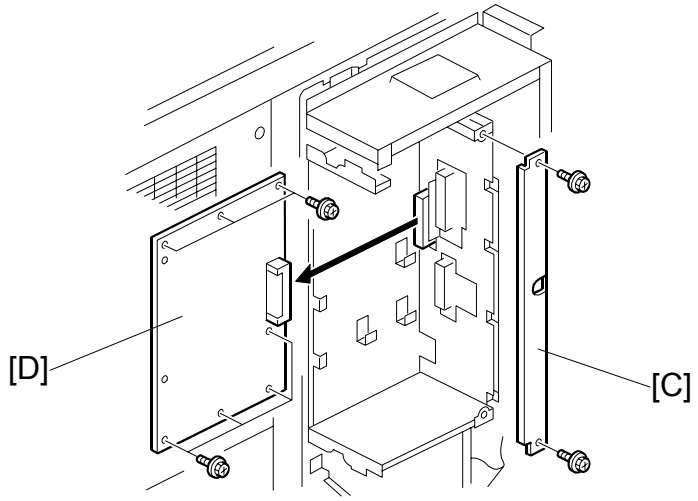
3.15.3 INTERFACE BOARD



1. Controller box cover. (☛3.15.1)
2. Slot cover bracket. (☛3.15.2)
3. Interface board (🔩 x 3)

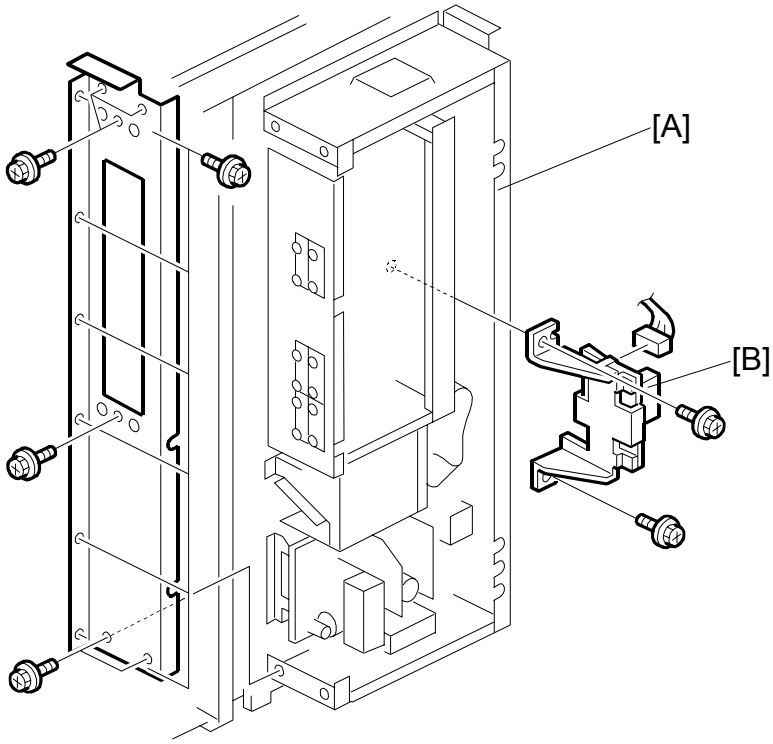
3.15.4 IPU (IMAGE PROCESSING UNIT)





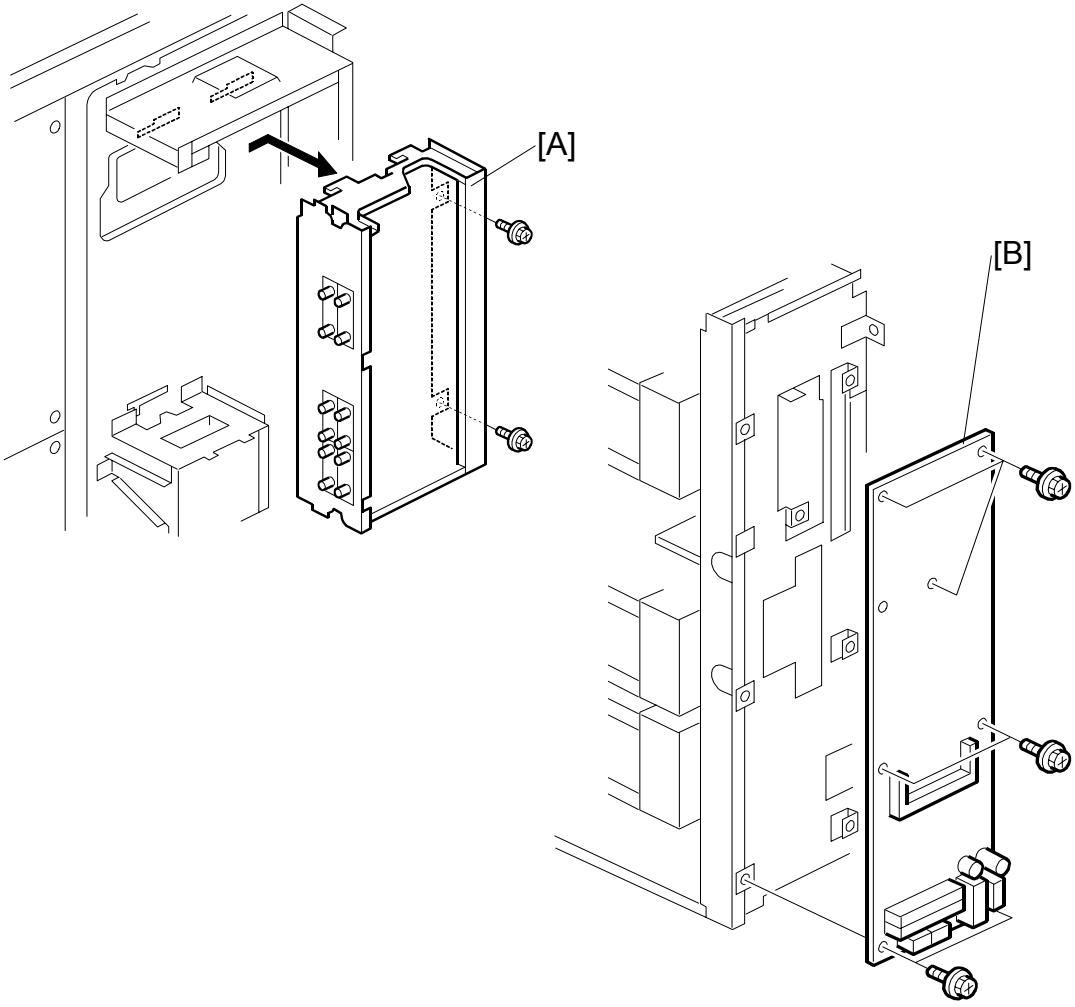
1. Controller box cover. (☛3.15.1)
2. Controller board. (☛3.15.2)
3. Interface board. (☛3.15.3)
4. Connector cover [A] (🖉 x 2).
5. Behind the IPU board, disconnect the connectors [B] (🖑 x 6).
6. Vertical bracket [C] (🖉 x 2).
7. IPU [D] (🖉 x 7).

3.15.5 CSS UNIT



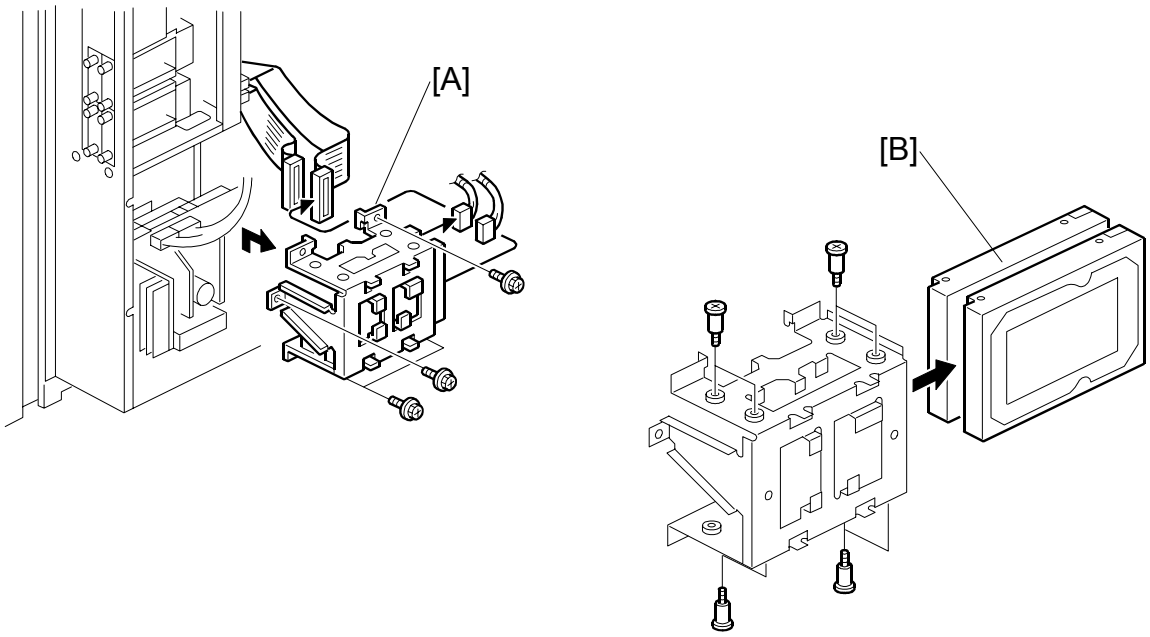
1. Remove the controller box cover. (☛3.15.1)
2. CSS unit (x 2, x 2).

3.15.6 MB (MOTHER BOARD)



1. Controller box cover. (☛3.15.1)
2. Controller board. (☛3.15.2)
3. Interface board. (☛3.15.3)
4. IPU (☛3.15.4)
5. SD card slot board (☛3.15.5)
6. Box [A] (x 2)
   NOTE: Slide to the right to remove. When re-installing, make sure that the hooks are seated correctly in the grooves. If they are not, you will not be able to close the controller box and re-attach the screws.
7. Mother board [B] (x 7, x 9).

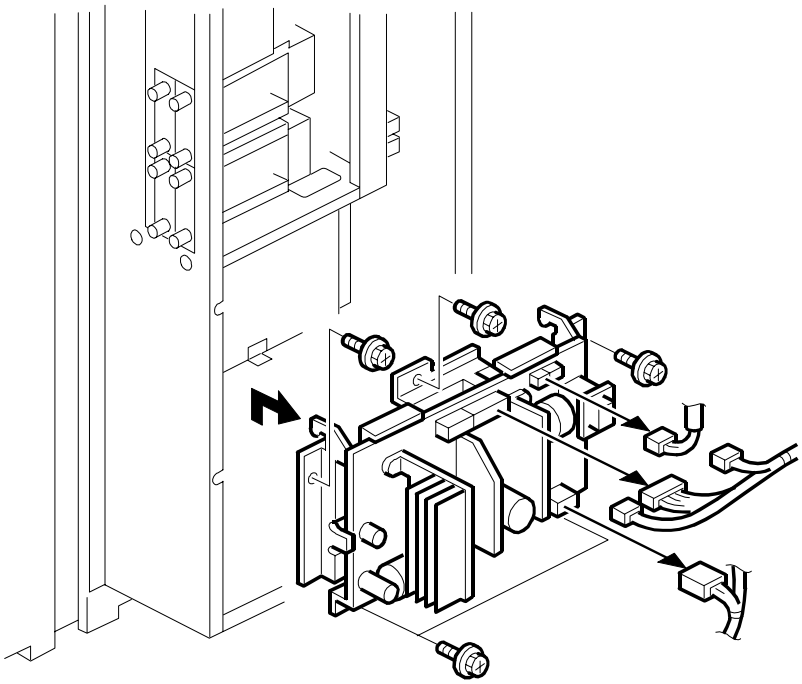
3.15.7 HARD DISKS



NOTE: The controller recognizes both disks as one disk unit; therefore, both disks must always be replaced together, or there will be errors.

1. Remove the controller box cover. (☛3.15.1)
2. HDD bracket [A] (x 5, x 4).
3. Hard disks [B] (x 8).
4. If you intend to re-install the same disks in the machine, confirm the correct connections before disconnecting. After the disks have been formatted, they are not identical, and each disk must be connected to the correct connector.
   NOTE: The external terminal connections of HDD_A and HDD_B are, respectively, IDE1 and IDE2. In the Point-to-Point diagram, CN135 is the connection point for IDE1 and CN136 is the connection point for IDE2.
5. Install the new disks.
   NOTE: If the disks are new and unformatted, they are both identical, and can be connected in either position.
6. Turn the main switch on and execute 5832 001 (HDD Formatting – All) to format the new disks.
7. Install the stamp data using SP5853. (☛"Stamp Data Installation", 5. Service Tables.)

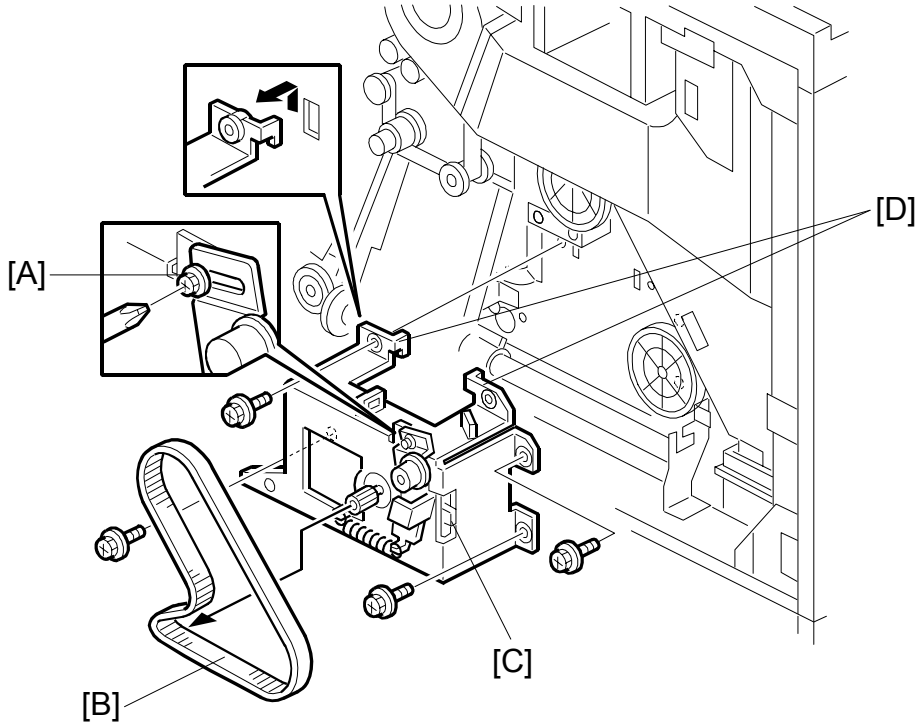
3.15.8 PSU-C (POWER SUPPLY UNIT-CONTROLLER)



1. Controller box cover. (☛3.15.1)
2. PSU-C bracket (🔩 x 5).
3. PSU-C (🔩 x 6, ✋ x 5).
   NOTE: Please note that the screw that fastens the ground wire is different. Use the same screw to re-fasten the ground wire.

3.16 MOTORS

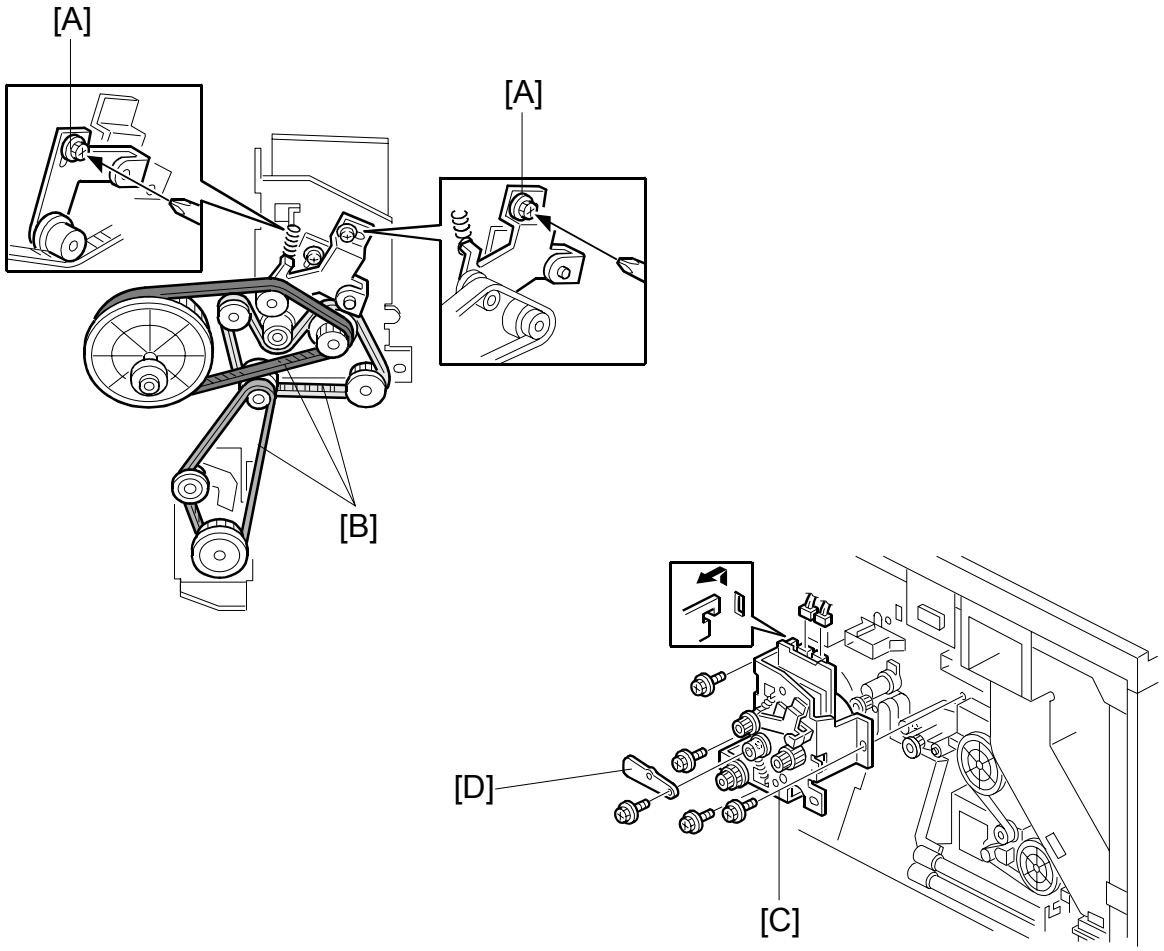
3.16.1 FUSING/EXIT MOTOR REPLACEMENT



1. Upper rear cover. (☛3.1.4)
2. Open the controller box. (☛3.1.4)
3. Swing down the BCU board. (☛3.14.2)
4. Loosen screw [A] to release the belt tension.
5. Timing belt [B].
6. Fusing/exit motor [C] (x 5, x 2, clamps x 2)
   NOTE: Disengage the hooks (x 2) [D] to remove.

NOTE: When re-installing the parts, hook up the tension spring (this automatically gives the belt the correct tension), then tighten screw [A].

3.16.2 DRUM MOTOR



1. Rear upper cover. (☛3.1.4)
2. Open the controller box. (☛3.1.4)
3. Flywheel (☞ x 3).
4. Swing down the BCU board. (☛3.14.2)
5. Loosen the screws [A] to loosen the belts, and remove the three timing belts [B].
6. Drum motor assembly [C] (☞ x 5, ☞ x 2, hooks x1, and stopper x1 [D]).

Re-assembly

To place tension on the belt before tightening the screws [A], attach the tension spring.

3.17 COPY IMAGE ADJUSTMENT: PRINTING/SCANNING

NOTE: 1) You need to perform these adjustment(s) after replacing any of the following parts:
- Scanner Wires
- Lens Block
- Scanner Motor
- Polygon Mirror Motor
- Paper Side Fences
- Memory All Clear

2) For more details about accessing SP modes, refer to section 4.

3.17.1 PRINTING

NOTE: 1) Make sure the paper is installed correctly in each paper tray before you start these adjustments.
2) Use the Trimming Area Pattern (SP2902 003, No. 27) to print the test pattern for the following procedures.
3) Set SP2902 003 to 0 again after completing these printing adjustments.

Registration – Leading Edge

1. Check the leading edge registration using the Trimming Area Pattern, and adjust it using SP1001 if necessary. The specification is: 4 $\pm$ 2 mm.

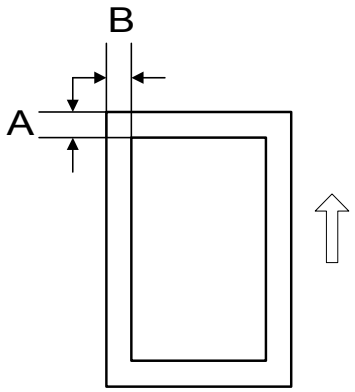
Registration – Side-to-Side

Do the parallel image adjustment after the side-to-side registration adjustment.

Using SP Mode

1. Check the side-to-side registration for each paper feed station using the Trimming Area Pattern, and adjust them using the following SP modes if necessary.

	SP mode	Specification
1st paper feed	SP1002 1	2 ± 1.5 mm
2nd paper feed	SP1002 2	
3rd paper feed (Optional PFU tray 1)	SP1002 3	
4th paper feed (LCT)	SP1002 4	
5th paper feed (LCT)	SP1002 5	
6th paper feed (LCT)	SP1002 6	
7th Tray (Bypass)	SP1002 7	
Duplex	SP1002 8	



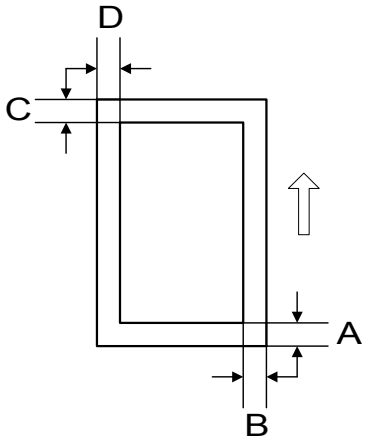
A: Leading Edge Registration
B: Side-to-side Registration

Blank Margin

NOTE: If the leading edge/side-to-side registration cannot be adjusted within the specifications, adjust the leading/left side edge blank margin.

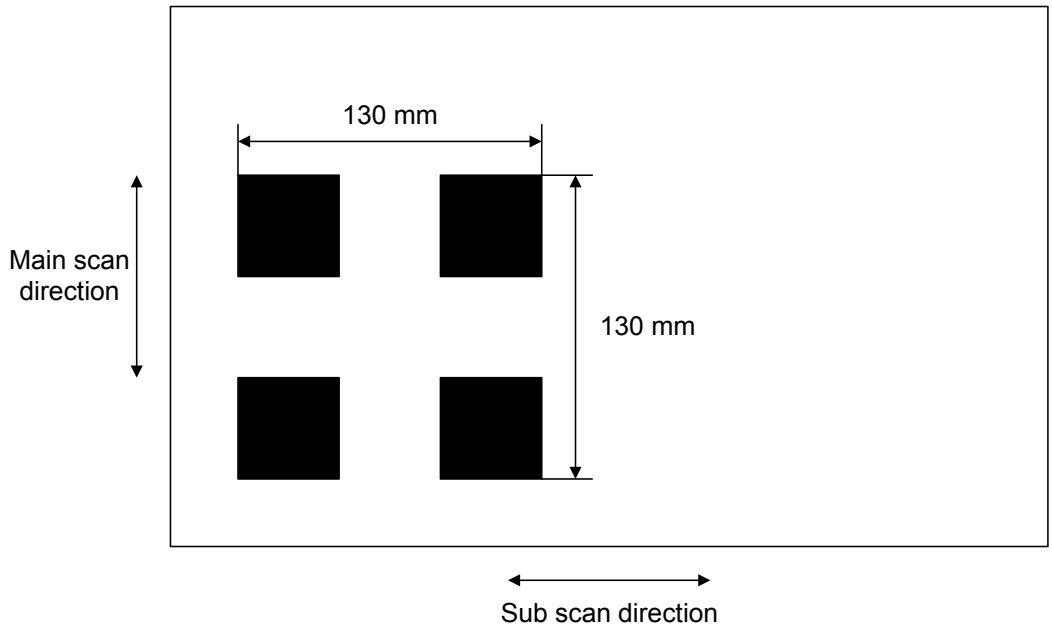
1. Check the trailing edge and right side edge blank margins using the Trimming Area Pattern, and adjust them using the following SP modes if necessary.

	SP mode	Specification
Trailing edge	SP2101 2	3 ± 2 mm
Right edge	SP2101 4	More than 0.5 mm
Leading edge	SP2101 1	4 ± 2 mm
Left edge	SP2101 3	2 ± 1.5 mm



A: Trailing Edge Blank Margin
B: Right Edge Blank Margin
C: Leading Edge Blank Margin
D: Left Edge Blank Margin

Magnification Adjustment



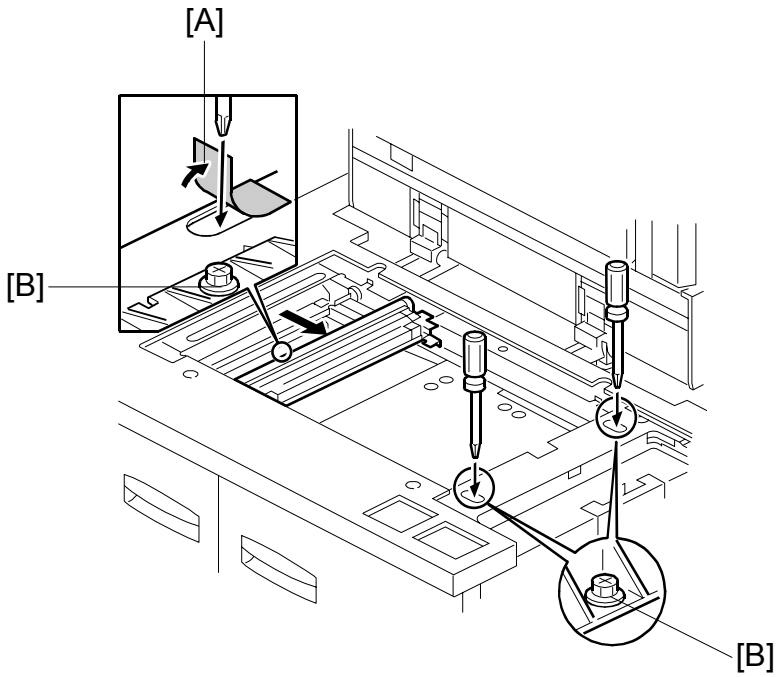
1. Enter SP mode and access SP2902 003.
2. Select pattern 4 (Alternating Dot pattern – 2048 dots) and make a print using A3 (DLT) paper.
3. Check the length between the edges of the black squares. The length should be 130 mm in the sub scan direction.
   1) If the magnification in the main scan direction is not within 100 ± 0.5%, adjust using SP2910.
   2) After sub scan adjustment, use SP2909 (Main Scan Magnification) 001 (Copy), 002 (Printer) to adjust main scan magnification for the copy and print images.
   3) Next, use SP4008 (Scanner Sub Scan Magnification) to adjust magnification in the sub scan direction.
   4) If the magnification in the main scan direction is not within 100 ± 0.5%, adjust using SP2910.

NOTE: Check the magnification after the paper cools.

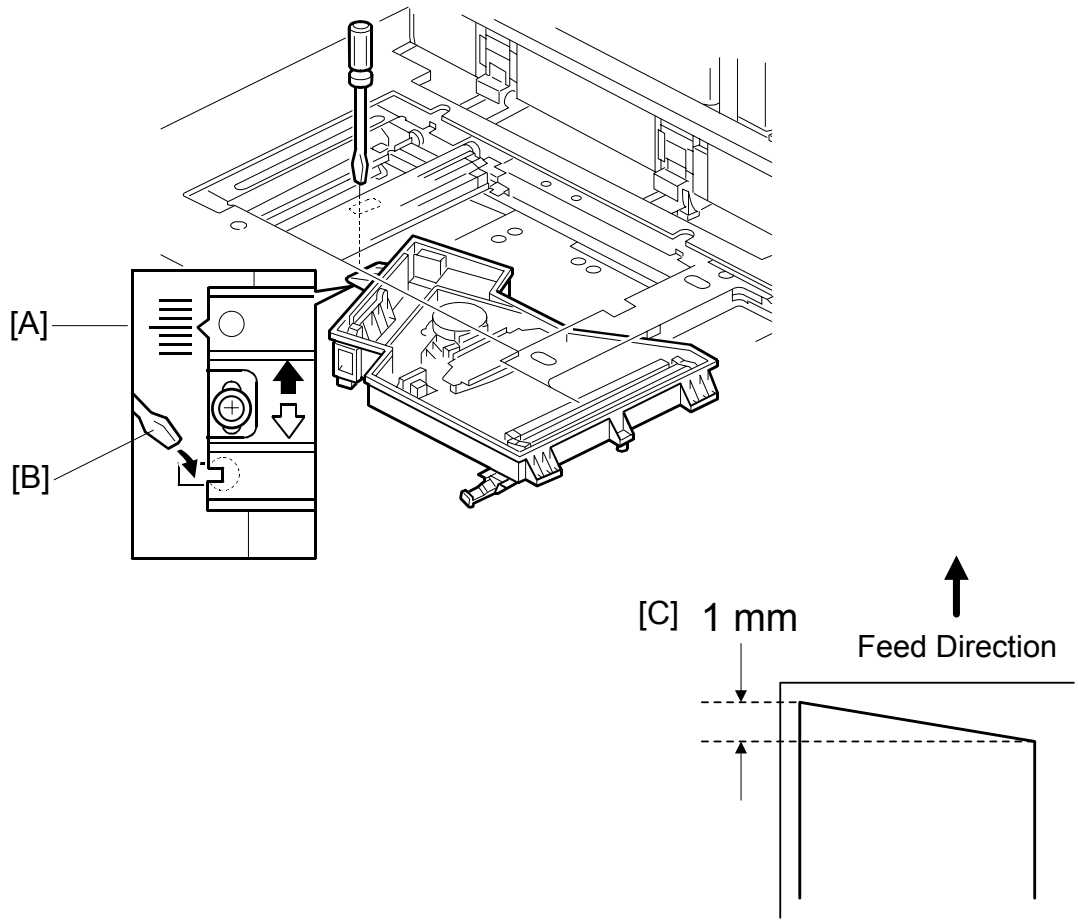
3.17.2 PARALLELOGRAM IMAGE ADJUSTMENT

If a parallelogram type image is printed while using a trimming area pattern, do the following to adjust the printing registration or the printing margin.

NOTE: 1) The following procedure should be done after adjusting the side-to-side registration for each paper tray.
2) This adjustment is only effective for a parallelogram image caused by the printer. It should not be applied if the skew is caused by the scanner.



1. Check whether a parallelogram image appears as shown on the next page when printing a trimming area pattern (SP2902 003, No. 27). If it appears, do the following.
2. Remove the exposure glass (see Replacement and Adjustment – Exposure Glass Removal).
3. Remove the original exit tray and the scanner right cover. (See Replacement and Adjustment – Scanner Drive Wires)
4. Peel away the mylar [A] covering the opening in the frame.
5. Loosen the three screws [B] that hold the laser unit.



6. Make a note of the position of the laser unit using the scale [A].
7. Adjust the laser unit position using a flat screwdriver [B] as shown.
   If the right side of the trimming area pattern is down by about 1 mm as shown [C], the laser unit should be rotated about one graduation in the direction of the black arrow. If the opposite side is down, adjust in the opposite direction.
8. Tighten the three screws to secure the laser unit.
9. Print the trimming area pattern to check the image. If it is still the same, repeat steps 2 to 7.

3.17.3 SCANNING

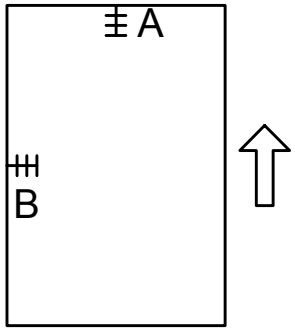
NOTE: 1) Before doing the following scanner adjustments, check the printing registration/side-to-side adjustment and the blank margin adjustment.
2) Use an OS-A3 test chart to perform the following adjustments.

Registration: Platen Mode

1. Place the test chart on the exposure glass and make a copy from one of the feed stations.
2. Check the leading edge and side-to-side registration, and adjust them using the following SP modes if necessary.

	SP mode
Leading Edge	SP4010
Side-to-side	SP4011

A: Leading Edge Registration
B: Side-to-side Registration



Magnification

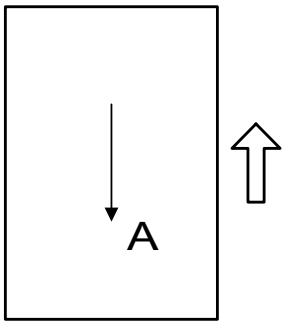
NOTE: Use an OS-A3 test chart to perform the following adjustment.

Scanner Sub Scan Magnification

1. Place the test chart on the exposure glass and make a copy from one of the feed stations.
2. Check the magnification ratio, and adjust it using the following SP mode if necessary. The specification is within ±1%.

	SP mode
Scanner Sub Scan Magnification	SP4008

A: Sub Scan Magnification



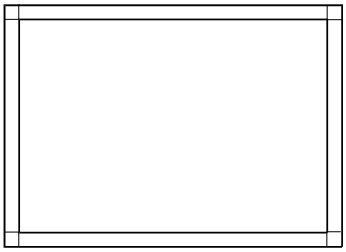
3.17.4 ADF IMAGE ADJUSTMENT

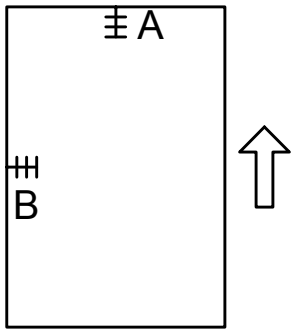
Registration

NOTE: Make a temporary test chart as shown below left, using A3/DLT paper.

1. Place the temporary test chart on the ADF and make a copy from one of the feed stations.
2. Check the registration, and adjust using the following SP modes if necessary.

	SP mode
Side-to-side Registration	SP6006 1
Leading Edge Registration (Thin original mode)	SP6006 2
Leading Edge Registration (Single-sided/Duplex: front)	SP6006 3
Leading Edge Registration (Duplex: rear)	SP6006 4





A: Leading Edge Registration
B: Side-to-side Registration

3.17.5 ADJUSTING THE LD UNIT CHANNELS

Small pitch banding could occur with this machine due to:

- Characteristics of the drum
- Variations that occur over time in the amount of light emitted by each channel

The quantity of light emitted from each channel of the LD unit is adjusted at the factory. However, SP codes are provided so you can test and adjust the quantity of light emitted from each channel. Patterns No.4~8 generated with SP2902 002 (Test Pattern – IPU Printing Test Pattern) allow you to visually compare channel output, and SP2105 003~010 (LD Power Correction) allows you to do the adjustments.

Test Patterns and Adjustment

Print the test pattern with SP2902 002, No.5.

The test pattern is a “caterpillar” pattern printed for every channel on one sheet for A3 paper. The sample on the next page shows a test. Pattern 8 is a pattern for each of the eight channels (0~7). Patterns 1~7 compare each pattern with Ch0.

In the sample pattern on the next page, note the darker appearance of Ch4 in both Pattern 4 and Pattern 8, compared with the uniform appearance in the patterns for the other channel. This indicates that Ch4 requires adjustment.

Light Quantity Adjustment

Adjust with SP2105 (LD Power Correction) 003 ~ 010. Then print the test pattern again to check the effects of the new settings.

If a pattern is darker or lighter than the others, the quantity of light on that channel should be reduced or increased.

While visually checking, Pattern 8 in the sample is sufficient to detect a difference in the density of the patterns; the other patterns (1~7) allow more detailed comparison with Ch0.

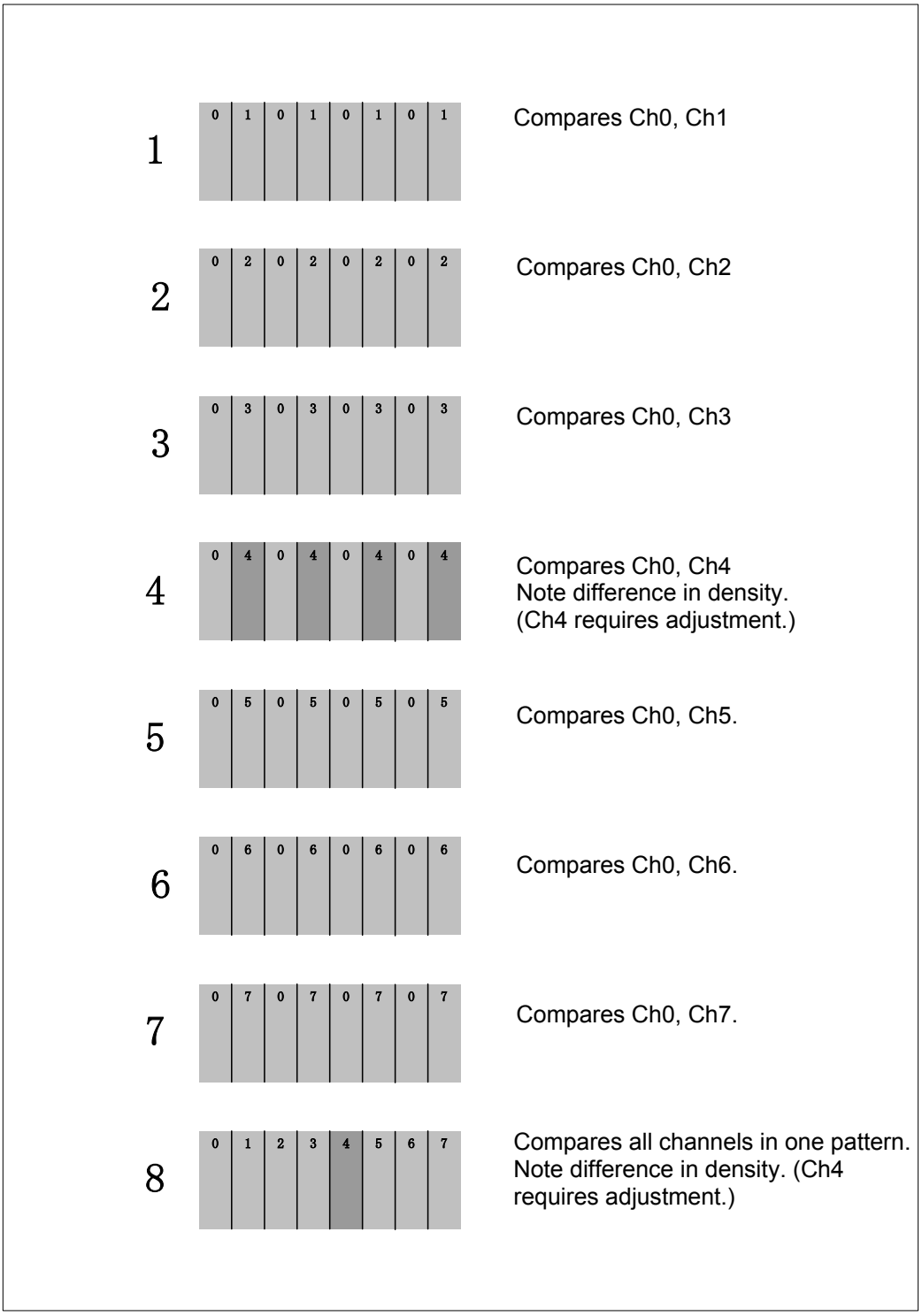
To perform adjustment for the channels, use SP2105 (LD Power Correction) 003 ~ 010.

In the case of the sample print on the next page, we can see that Ch4 requires correction because it is too dark; therefore, the value of SP2105 007 (the SP code for Ch4 adjustment) must be lowered.

Generally, the amount of adjustment required can be determined by increasing or decreasing the SP setting (in this case, reducing the setting for SP2105 007) and then printing the text pattern again to confirm the results of the adjustment. The adjustment should be done until the dark (or light) pattern matches the other patterns.

Sample: **SP2902 002 Test Pattern – IPU Printing Test Pattern, Pattern 5**

The numbers in the vertical blocks of the caterpillar patterns indicate the number of the channels compared.

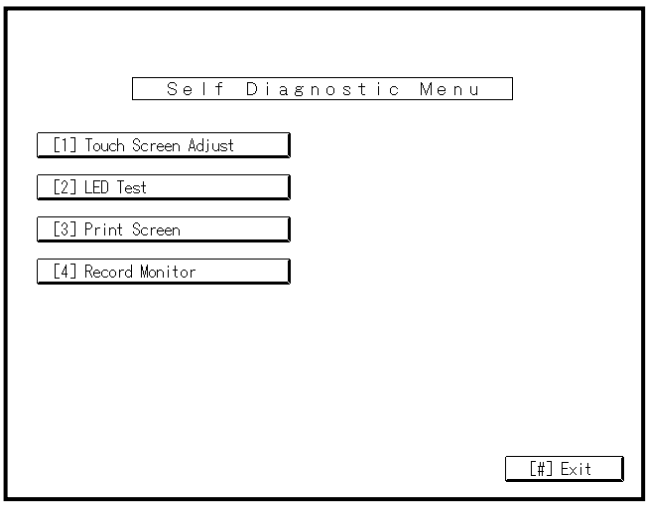


3.18 TOUCH SCREEN CALIBRATION

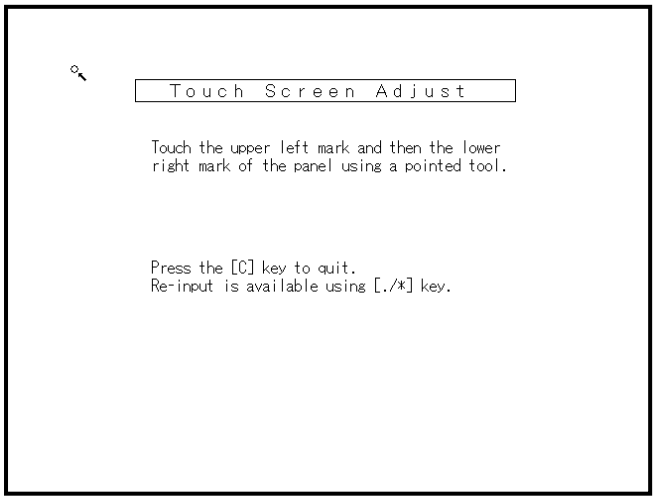
When the touch panel detection mechanism is not working properly, calibrate the touch screen as follows:

1. Press the following keys in sequence to enter operation panel self diagnostic mode.

   [1] → [9] → [9] → [3] → [C/⊘] Press and hold 5 sec.



2. Select "[1] Touch Screen Adjust".
   NOTE: [2] tests the LEDs on the operation unit, not the machine's main operation panel. Keys [3] [4] [5] [6] [7] are for factory use only. Do not use unless directed by senior technical staff.



3. The “Touch Screen Adjustment” calibration screen will appear. Touch the center of the circle in the upper left corner then the lower right corner of the panel using a pointer (but not sharp!) tool.
4. Touch a few spots on the LED touch panel, and confirm that the marker appears on the screen at exactly the same location as where it is touched. If it does not, touch “Re-input” (or press the ⊙/⊗ key) and repeat the calibration procedure.
5. Touch “OK” on the adjustment screen.`
6. Touch “Exit” to exit the self diagnostic mode.

TROUBLESHOOTING

4. TROUBLESHOOTING

4.1 SERVICE CALL CONDITIONS

4.1.1 SUMMARY

There are 4 levels of service call conditions.

Level	Definition	Reset Procedure
A	Fusing SCs displayed on the operation panel. The machine is disabled. The user cannot reset the SC.	Enter SP mode, then turn the main power switch off/on.
B	SCs that disable only the features that use the defective item. Although these SCs are not shown to the user under normal conditions, they are displayed on the operation panel only when the defective feature is selected.	Turn power off/on.
C	SCs that are not shown on the operation panel. They are internally logged.	Logging only.
D	Turning the operation switch or main power switch off then on resets SCs. Displayed on the operation panel. These are re-displayed if the error occurs again.	Turn the operation switch or main power switch off and on.

NOTE: 1) If the problem concerns electrical circuit boards, first disconnect then reconnect the connectors before replacing the PCBs.
2) If the problem concerns a motor lock, first check the mechanical load before replacing motors or sensors.
3) When a Level A or B SC occurs while in an SP mode, the display does not indicate the SC number. If this occurs, check the SC number after leaving the SP mode. This does not apply to Level B' codes.

4.1.2 SC CODE DESCRIPTIONS

SC101: Exposure Lamp Error

Definition [B]

The standard white level was not detected properly when scanning the white plate.

Possible Causes
- Exposure lamp defective
- Lamp stabilizer defective
- Exposure lamp connector defective
- Scanner motor control unit (MCU board) defective
- SBU board defective
- Dirty standard white plate
- Dirty scanner mirror or scanner mirror or lens block out of position

SC120: Scanner Home Position Error 1

Definition [B]

The scanner home position sensor does not detect the on condition during initialization or copying.

Possible Causes
- Scanner home position sensor defective
- Poor connection between HP sensor and MCU board
- Scanner motor control unit (MCU board) defective
- Scanner wire, timing belt, pulleys, or carriage out of position
- Scanner motor defective
- Poor connection or defective harness between MCU board and scanner motor

SC121: Scanner Home Position Error 2

Definition [B]

Scanner home position sensor OFF not detected.

Possible Causes
- Scanner home position sensor defective
- Poor connection between MCU board and scanner home position sensor
- Harness between MCU board and sensor defective
- MCU board defective
- Scanner wire, timing belt, pulleys, or carriage out of position
- Scanner drive motor defective
- Harness between MCU board and scanner motor disconnected

SC124: Encoder Signal Error

Definition [B]

The scanner motor encoder connector is not set correctly, or the encoder signal was not input. When the scanner motor encoder connector is not set correctly, or occasionally even if set correctly, this error is detected if there is no input 4 ms after scanning begins.

Possible Causes

- Scanner motor encoder connector disconnected
- Scanner motor lead connector disconnected
- Scanner motor defective
- MCU board defective (scanner motor control unit)
- Scanner wire, timing belt, pulleys, or carriage installation incorrect
- Power supply connector disconnected (+38V ±12V)
- Power supply unit (PSU-E board) defective

SC125: Scanner Motor Error 2

Definition [B]

Scanner motor stopped before feedback from scanner HP sensor detected, or motor speed too slow when detected at scanner HP sensor.

Possible Causes

- Scanner motor defective (high torque)
- Overload on scanner drive mechanism
- MCU board defective (scanner motor unit control)

SC126: Scanner Motor Error 3

Definition [B]

The scanner motor does not stop within 15 mm after the scanner home position sensor turns on when the scanner returns.

Possible Causes

- Scanner motor defective (low torque)
- Overload on scanner drive mechanism
- MCU board defective (scanner motor control unit)

SC127: Scanner Motor Error 4

Definition [B]

The scanner motor rotates in the opposite direction to the signal from the MCU board.

Possible Causes

- Scanner motor defective (motor lead connected incorrectly)
- MCU board defective (scanner motor control unit)

SC128: Scanner Motor Error 5

Definition [B]

The scanner motor speed does not reach the target speed by the time the scanning start point is reached.

Possible Causes

- Scanner motor defective
- Overload on scanner mechanism\
- PSU-E board defective
- MCU board defective (scanner motor control unit)

SC129: Scanner Motor Error 6

Definition [B]

The scanner motor speed is abnormal.

NOTE: The machine will not stop scanning even after the machine detects that motor speed is abnormal.

Possible Causes

- Scanner motor defective
- Scanner drive mechanism defective
- PSU-E board defective
- MCU board defective (scanner motor control unit)

SC143: SBU (Sensor Board Unit) Error 1

Definition [B]

At power on, the SBU white level adjustment, black level check, and final SBU white level check did not execute.

Possible Causes
- SBU defective
- IPU defective
- BCU defective
- Harness between the SBU and IPU defective
- Standard white plate not installed correctly, or is dirty
- Scanner mirrors and/or lenses are dirty or installed incorrectly

SC144: SBU (Sensor Board Unit) Error 2

Definition [B]

At power on, the specified SBU ID (GASBUP and LM98513) could not be read after 3 tries

Possible Causes
- SBU defective
- IPU defective
- BCU defective
- Harness between SBU and IPU defective

SC300: Charge Corona Output Error 1 (Charge Leakage)

Definition [B]

A high feedback voltage for the charge corona (more than 4.5 V) was detected from the CBG (charge, bias, grid) power pack 9 times within 60 ms.

Possible Causes
- CBG power pack defective
- Poor charge corona unit connection
- Charge corona unit connector defective

SC301: Charge Corona Output Error 2 (Circuit Open)

Definition [B]

A low feedback voltage for the charge corona (less than 1.5 V) was detected from the CBG power pack 9 times for 60 ms.

Possible Causes
- Charge/bias/grid power pack defective
- Poor charge corona unit connection
- Charge corona unit connector defective

SC303: Charge Grid Output Error 1 (Grid Leakage)

Definition [B]

A high feedback voltage for the grid (more than 4.5 V) was detected from the CBG power pack 9 times consecutively for 60 ms.

Possible Causes
- Charge/bias/grid power pack defective
- Poor charge corona unit connection
- Charge corona unit connector defective

SC304: Charge Grid Output Error 2 (Grip Open)

Definition [B]

A low feedback voltage for the grid (less than 1.0 V) was detected from the CBG power pack 9 times for 60 ms.

Possible Causes
- Charge/bias/grid power pack defective
- Poor charge corona unit connection
- Charge corona unit connector defective

SC305: Charge Corona Wire Cleaner Error 1

Definition [D]

The charge corona wire cleaner does not return to its home position, and there is no stop signal 30 s after cleaning starts.

Possible Causes
- Charge corona wire cleaner lock defective
- Charge corona wire cleaner motor defective
- BCU defective

SC310: Drum Potential Sensor Error 1

Definition [D]

During drum potential sensor calibration, the output voltages from the drum potential sensor are not within specifications while –200V then –700V are applied to the drum.

NOTE: After this SC is issued, the grid voltage changes to the value set with SP2001-001 (Charge Corona Bias Adjustment) and LD power changes to the value set with SP2103 (LD Power Adjustment).

Possible Causes

- Drum potential sensor defective
- Poor connection between the drum potential sensor and the BCU
- Drum potential sensor defective
- IOB defective
- Poor drum ground connection
- CBG power pack defective

SC311: Drum Potential Sensor Error 2

Definition [D]

When calibrating the drum potential sensor during process control initialization, the rate of change of drum potential sensor output with voltage on the drum is out of specification.

NOTE: After this SC is issued, the grid voltage changes to the value set with SP2001-001 (Charge Corona Bias Adjustment) and LD power changes to the value set with SP2103 (LD Power Adjustment).

Possible Causes

- Drum potential sensor defective
- Poor connection between the drum potential sensor and the BCU
- Drum potential sensor defective
- IOB defective
- Poor drum ground connection
- CBG power pack defective

SC312: Drum Potential Sensor Error 3 (Vd Abnormal)

Definition- [D]

When Vd on the surface of the unexposed drum is adjusted during process control initialization, -900 V is applied to the charge grid but Vd is more than -900.

NOTE: After this SC is issued, the grid voltage changes to the value set with SP2001-001 (Charge Corona Bias Adjustment) and LD power changes to the value set with SP2103 (LD Power Adjustment).

Possible Causes

- Drum potential sensor defective
- Poor drum potential sensor harness connection
- Drum potential sensor connector defective
- IOB defective
- Poor drum ground connection
- Drum disconnected
- Quenching lamp defective
- CBG power pack defective
- Charge corona wire dirty or defective

SC313: Drum Potential Sensor Error 4 (Vd > Vg)

Definition [D]

When adjusting the drum potential (Vd) during process control initialization, the drum potential sensor detects that Vd is more than Vg (grid voltage).

NOTE: After this SC is issued, the grid voltage changes to the value set with SP2001-001 (Charge Corona Bias Adjustment) and LD power changes to the value set with SP2103 (LD Power Adjustment).

Possible Causes

- Drum potential sensor defective
- Drum potential sensor harness defective
- Drum potential sensor connector defective
- IOB defective
- Poor contact at the drum connection
- CBG power pack defective
- Charge corona wire dirty or defective

SC314: Drum Potential Sensor Error 5 (Vh Abnormal)

Definition [D]

When adjusting the drum potential (Vh) for LD power adjustment during process control initial setting, the first time the Vh pattern is made, the drum potential sensor detects that Vh is more than 600 V.

NOTE: After this SC is issued, the grid voltage changes to the value set with SP2001-001 (Charge Corona Bias Adjustment) and LD power changes to the value set with SP2103 (LD Power Adjustment).

Possible Causes

- Drum worn
- Drum potential sensor defective
- Poor drum potential sensor connection
- Drum potential sensor connector defective
- LD unit requires cleaning
- IOB defective
- Drum unit connector defective
- LDB board defective

SC315: Drum Potential Sensor Error 6 (Vd Abnormal)

Definition [D]

When adjusting Vd for the unexposed drum during process control initialization, Vd does not reach the voltage set for SP2001 007 ± 20 V even if Vg has been adjusted 5 times.

SP2001 007 (Charge Corona Bias Adjustment – Vd) adjusts the target Vd voltage for process control. Range/Default/Step: [700~1000 / 800 / 5 V].

NOTE: If the Vd adjustment fails, the machine uses the charge grid voltage Vg for the previous adjustment. In this condition, normal ID sensor pattern detection is done.

Possible Causes

- Drum potential sensor defective
- Drum potential sensor harness defective
- Drum potential sensor connector defective
- IOB defective
- Drum unit connector defective
- CBG power pack defective

SC316: Drum Potential Sensor Error 7 (Vh abnormal

Definition [D]

One of the following occurred:

- When adjusting the drum potential (Vh) for the process control initial setting, the drum potential sensor detects Vh is not within the range –260 + ΔVlref ±20V. In this case, the auto process control value is used.
- During retries for LD power modulation to adjust the amount of light, the adjustment was out of range (-70 to +185). In this case, the value of the setting is used.

Possible Causes

- Drum potential sensor defective
- IOB defective
- Drum unit connector defective
- LDB board defective
- Poor drum ground connection
- Drum worn
- Laser optics need cleaning

SC317: Drum Potential Sensor Error 8

Definition [B]

At auto process control initialization, the VL detected after creation of the ID sensor pattern is greater than 300.

Possible Causes

- Drum worn
- LD unit dirty
- Poor drum ground connection

SC322: Laser Synchronization Error

Definition [B]

The laser synchronization signal (DETP) cannot be detected by the synchronization detector even if the laser diodes are activated and the polygon mirror motor is rotating normally.

Possible Causes

- Laser synchronization detector harness disconnected or defective
- Laser synchronization detector is installed incorrectly out of position
- LDB board, Polygonal mirror motor control PCB defective. After the CPU issues the LD ON command, the LD OFF signal remains HIGH and the laser diodes do not fire
- LDB board, Polygonal mirror motor control PCB defective. After the CPU issues the LD ON command, the LD OFF signal goes low, but the laser diodes still do not fire

SC323: Excessive LD Drive Current

Definition [B]

The value of the LD driver offset current is over the allowed current (about 90 mA).

Possible Causes

- Poor LDB board harness connection
- LDB defective
- LD unit defective

SC335: Polygonal Mirror Motor Error 1

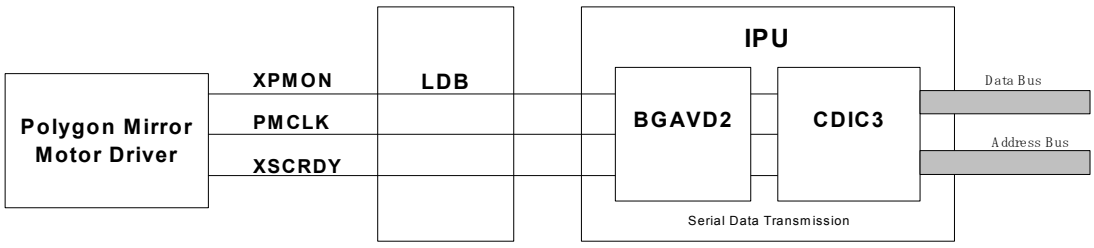
Definition [B]

The polygonal mirror motor does not reach its operating speed within 20 s after the polygonal mirror motor turns on, or the polygonal mirror motor speed is changed. (The XSCRDY signal does not go LOW for active.)

Possible Causes

- Poor connection between polygonal mirror motor and I/F harness
- Polygonal mirror motor, LDB, or polygon mirror motor control PCB defective
- IPU defective

Hardware Layout



Polygon mirror motor driver: Polygon mirror motor control PCB

XPMON:	Command that switches polygon mirror motor on/off. BCU→ IPU→ LDB→ Polygon mirror motor control PCB
PMCLK:	Polygon mirror motor drive clock. BCU→ IPU→ LDB→ Polygon mirror motor control PCB
XSCRDY:	Polygon mirror motor ready signal. Polygon mirror motor control PCB→ LDB→ IPU→ BCU

SC336: Polygonal Mirror Motor Error 2

Definition [B]

The XSCRDY signal (polygon mirror motor ready signal) does not go HIGH (inactive) within 20 s after the polygonal mirror motor switches off.

NOTE: For details, see the illustration for SC335.

Possible Causes

- Poor connection between the polygon mirror motor control PCB and I/F harness
- Polygonal mirror motor, polygon mirror motor control PCB, or LDB board defective
- IPU defective

SC337: Polygonal Mirror Motor Error 3 (SCRDY Signal Error)

Definition [B]

While the polygonal mirror motor is rotating normally, the lock signal (XSCRDY or polygon mirror motor ready signal) is detected HIGH (inactive) even though the motor has not been switched off nor has the motor rotation been changed.

NOTE: For details, see the illustration for SC335.

Possible Causes

- Electrical noise interfering with the lock signal (XSCRDY)
- Poor connection between polygonal mirror motor control PCB and I/F harness
- Polygonal mirror motor or LDB defective

SC338: Polygonal Mirror Motor Error 4

Definition [B]

The XSCRDY signal (polygon mirror motor ready signal) does not stabilize within 20 s when:

- The motor is switched ON or OFF
- After the rotation of the motor has been changed

NOTE: For details, see the illustration for SC335.

Possible Causes

- Poor connection between the polygonal mirror motor control PCB and the I/F harness
- Polygonal mirror motor or LDB defective

SC340: TD Sensor Error 1 (Vt Measurement Error)

Definition [B]

The TD sensor output voltage is detected less than 0.5 V or more than 4.0 V for 10 continuous copies.

Possible Causes

- TD sensor defective
- TD sensor harness defective
- TD sensor connector defective
- IOB defective
- Toner supply defective; check the toner supply path from the toner bank through to the hopper
- BCU defective

SC341: TD Sensor Error 2 (TD Sensor Control Voltage Abnormal)

Definition [B]

One of the following TD sensor output voltages is detected during TD sensor initial setting.

- Less than 2.5 V when the maximum PWM (255) is applied to the TD sensor.
- 2.5 V or more when minimum PWM (0) is applied to the TD sensor.

NOTE: When an abnormal condition is detected, “0” is displayed for SP2906 (Vcont Manual Setting).

Possible Causes

- TD sensor defective
- TD sensor harness defective
- TD sensor connector defective
- IOB defective
- Toner supply defective; check the toner supply path from the toner bank through to the hopper
- BCU defective

SC342: TD Sensor Error 3 (TD Sensor Adjustment Error)

Definition [B]

The TD sensor output voltage is not adjusted to 2.5 ± 0.1 V within 20 s during automatic TD sensor initial setting.

NOTE: When an abnormal condition is detected, “0” is displayed for SP2906 (Vcont Manual Setting).

Possible Causes

- TD sensor defective
- TD sensor harness defective
- TD sensor connector defective
- IOB defective
- Toner supply defective; check the toner supply path from the toner bank through to the hopper
- BCU defective

SC345: Development Bias Leak

Definition [B]

Maximum PWM for the development bias signal was applied 10 times for 60 ms.

Possible Causes

- CBG power pack defective
- Defective or disconnected harness between CBG power pack and development unit
- Defective harness connector

SC350: ID Sensor Error 1

Definition [D]

One of the following ID sensor output voltages was detected when checking the ID sensor pattern.

- Vsp $\geq$ 2.5 V
- Vsp = 0 V

NOTE: 1) Vsp is the ID sensor output after checking the ID sensor pattern image.
2) The SC code is not displayed; only the logging data is incremented.
3) Regarding toner supply, if an abnormal condition is detected, then only the toner density sensor output is used, without an updated Vref setting.
4) After an abnormal condition is detected, SP3103 (ID Sensor Output Display) shows Vsp = Vsg (or 5.0V).

Possible Causes

- ID sensor defective
- ID sensor harness defective
- ID sensor connector defective
- IOB board defective
- LD unit defective
- BCU defective
- CBG power pack defective
- Dirty ID sensor

SC351: ID Sensor Error 2

Definition [D]

One of the following conditions were detected when checking the ID sensor pattern:

1) Vsg ≤ 2.5 V
2) Vsg= 0 V
3) The ID sensor output voltage = 5.0 V and PWM signal input to ID sensor = 0

Vsg is the ID sensor output after checking the erased drum surface

NOTE: 1) Vsp is the ID sensor output after checking the ID sensor pattern image.
2) The SC code is not displayed; only the logging data is incremented.
5) Regarding toner supply, if an abnormal condition is detected, then only the toner density sensor output is used, without an updated Vref setting.
6) After an abnormal condition is detected, SP3103 (ID Sensor Output Display) shows Vsp = Vsg (or 5.0V).

Possible Causes

- ID sensor defective
- ID sensor harness defective
- ID sensor connector defective
- IOB defective
- LD unit defective
- BCU defective
- CBG power pack defective
- Dirty ID sensor

SC352: ID Sensor Error 3

Definition [D]

At the ID sensor pattern check, the ID sensor pattern edge voltage is not detected at 2.5 V for 1.5 seconds.

NOTE: 1) Vsp is the ID sensor output after checking the ID sensor pattern image.
2) The SC code is not displayed; only the logging data is incremented.
3) Regarding toner supply, if an abnormal condition is detected, then only the toner density sensor output is used, without an updated Vref setting.
4) After an abnormal condition is detected, SP3103 (ID Sensor Output Display) shows Vsp = Vsg (or 5.0V).

Possible Causes
- ID sensor defective
- ID sensor harness defective
- ID sensor connector defective
- IOB defective
- LD unit defective
- BCU defective
- CBG power pack defective
- Dirty ID sensor

SC353: ID Sensor Error 4 (Adjustment Error)

Definition [D]

One of the following ID sensor output voltages is detected at ID sensor initialization.

- VSG < 4.0 V when the maximum PWM input (255) is applied to the ID sensor.
- VSG ≥ 4.0 V when the minimum PWM input (0) is applied to the ID sensor.

NOTE: 1) The most recent PWM value is used for control.
2) The values displayed with SP3103 (ID Sensor Output Display) are the actual values.

Possible Causes
- ID sensor defective
- ID sensor harness defective
- ID sensor connector defective
- IOB defective
- LD unit defective
- BCU defective
- CBG power pack defective
- Dirty ID sensor

SC354: ID Sensor Error 5

Definition [D]

Vsg is not adjusted to target (4.0 ± 0.2 V) within 20 s during VSG checking.

NOTE: 1) The most recent PWM value is used for control.
2) The values displayed with SP3103 (ID Sensor Output Display) are the actual values.

Possible Causes
- ID sensor defective
- ID sensor connector defective
- Poor ID sensor connector connection
- IOB defective
- LD unit defective
- BCU defective
- CBG power pack defective
- Dirty ID sensor

SC355: ID Sensor Voltage Error

Definition [B]
The ID sensor voltage (Vp) exceeds 800 V for 10 continuous counts.

Possible Causes
- Drum potential sensor defective
- IOB defective
- Poor drum unit connection or connectors defective
- Poor drum ground connection
- LD defective
- Poor drum cleaning ground connection
- Drum worn
- Dirty laser optics

SC400: Transfer Bias Roller Leak

Definition [B]

After the transfer current begins, the value of the transfer current set with SP2301 (Transfer Current Adjustment) exceeds the specified setting, and feedback voltage lower than 0.75V is detected for 16 counts (about 100 ms).

Possible Causes
- CBG power pack defective
- Poor connection between the transfer current terminal and the transfer power pack.

SC401: Transfer roller open error

Definition [B]

When transfer bias is applied to the bias roller while the main motor is operating, after bias output has started, one of the following conditions exists:

- Input connector is defective
- Output connector is defective

Possible Causes

- Transfer power pack defective
- Poor connection between the transfer current terminal and the transfer power pack.

SC430: Quenching Lamp Error

Definition [D]

When finishing the process control initial setting at the end of a job and the drum motor has stopped, the drum potential detected by the drum potential sensor is beyond the normal range.

Possible Causes

- Quenching lamp defective
- Quenching lamp connector defective
- Poor connection between quenching lamp and CBG power pack

SC440: Drum Motor Lock

Definition [B]

The drum motor lock signal is longer than 2 s while the drum motor is on.

Possible Causes

- Motor lock due to overload
- BCU defective

SC441: Development Motor Lock

Definition [B]

While the motor is operating, the motor lock signal remains LOW for 2 s.

Possible Causes

- Motor lock due to overload
- BCU defective

SC491: Polygonal Mirror Motor Cooling Fan Motor Lock

Definition [B]

The polygonal mirror motor cooling fan motor lock signal remains HIGH for 5s while the polygonal mirror motor cooling fan motor is on.

Possible Causes

- Drive mechanism overload
- Obstruction has stopped the fan
- Fan connector loose

SC492: Development Unit Suction Motor

Definition [B]

While the development unit toner suction motor is operating, the lock sensor output does not change for 1 s.

Possible Causes

- Motor lock due to overload
- BCU defective

SC495: Toner Bottle Unit Error

Definition [B]

The toner hopper sensor cannot detect toner even after the toner supply coil clutch turns on 10 times within 2 s during toner supply during copying.

Possible Causes

- Toner supply pump motor defective
- Toner supply pump motor connector loose
- Toner supply coil clutch defective
- Toner supply coil clutch connector defective
- Toner near-end sensor (in the toner bank) defective
- Toner near-end sensor (in the toner bank) spring defective
- Toner blockage in the toner supply pump or toner supply path
- Toner hopper sensor defective

SC496: Toner Collection Bottle Error

Definition [B]

The toner collection bottle sensor or development unit toner suction bottle set sensor remains off for 3 s.

Possible Causes

- Used toner collection bottle or development unit waste toner suction collection bottle is incorrectly set
- Used toner collection bottle or development unit waste toner suction collection bottle connector is loose or sensor defective

SC497: Development Unit Toner Suction Bottle Error

Definition [B]

During machine operation, the development unit toner suction bottle set sensor goes off for 3 s.

Possible Causes

- Bottle is not installed
- Toner suction bottle set sensor connector is loose

SC501: 1st Tray Lift Malfunction

Definition [C]

One of the following conditions is detected in the 1st tray (tandem tray) of the main machine:

- The 1st tray lift sensor is not activated for 10 s after the 1st tray lift motor turned on.
- Upper limit is not detected within 10 s while the paper tray is lifting during paper feed.
- The 1st tray lift sensor is already activated when the 1st tray is placed in the machine.

Possible Causes

- Poor 1st tray lift motor connection
- Remaining paper or another obstruction has stopped the tray and motor
- 1st pick-up solenoid connector is loose
- 1st pick-up solenoid is blocked by an obstruction

SC502: 2nd Tray Lift Malfunction

Definition [C]

One of the following conditions is detected in the 2nd tray of the main machine:

- The 2nd tray lift sensor is not activated for 10 s after the 2nd tray lift motor turned on.
- Upper limit is not detected within 10 s while the paper tray is lifting during paper feed.
- The 2nd tray lift sensor is already activated when the 2nd tray is placed in the machine.

Possible Causes

- Poor 2nd tray lift motor connection
- Remaining paper or another obstruction has stopped the tray and motor
- 2nd pick-up solenoid connector is loose
- 2nd pick-up solenoid is blocked by an obstruction

SC503: 3rd Tray Lift Malfunction

Definition [C]

One of the following conditions is detected in the 3rd tray of the main machine:

- The 3rd tray lift sensor is not activated for 10 s after the 3rd tray lift motor turned on.
- Upper limit is not detected within 10 s while the paper tray is lifting during paper feed.
- The 3rd tray lift sensor is already activated when the 3rd tray is placed in the machine.

Possible Causes

- Poor 3rd tray lift motor connection
- Remaining paper or another obstruction has stopped the tray and motor
- 3rd pick-up solenoid connector is loose
- 3rd pick-up solenoid is blocked by an obstruction

SC504: 4th Tray (LCT 1st Tray) Lift Malfunction

Definition [C]

One of the following conditions is detected in the 4^{th} tray:

- The LCT 1st lift sensor is not activated for 10 s after the LCT 1st tray lift motor turned on.
- Upper limit is not detected within 10 s while the paper tray is lifting during paper feed.
- The LCT 1st lift sensor is already activated when the LCT 1st tray is placed in the machine.

Possible Causes
- Poor LCT 1st tray lift motor connection
- Remaining paper or another obstruction has stopped the tray and motor
- LCT 1st pick-up solenoid connector is loose
- LCT 1st pick-up solenoid is blocked by an obstruction

SC505: 5th Tray (LCT 2nd Tray) Lift Malfunction

Definition [C]

One of the following conditions is detected in the 5th tray:
- The LCT 2nd lift sensor is not activated for 10 s after the LCT 2nd tray lift motor turned on.
- Upper limit is not detected within 10 s while the paper tray is lifting during paper feed.
- The LCT 2nd lift sensor is already activated when the LCT 2nd tray is placed in the machine.

Possible Causes
- Poor LCT 2nd tray lift motor connection
- Remaining paper or another obstruction has stopped the tray and motor
- LCT 2nd pick-up solenoid connector is loose
- LCT 2nd pick-up solenoid is blocked by an obstruction

SC506: 6th Tray (LCT 3rd Tray) Lift Malfunction

Definition [C]

One of the following conditions is detected in the 6th tray.
- The LCT 3rd lift sensor is not activated for 20 s after the LCT 3rd tray lift motor turned on.
- Upper limit is not detected within 20 s while the paper tray is lifting during paper feed.
- The LCT 3rd lift sensor is already activated when the LCT 3rd tray is placed in the machine.

Possible Causes
- Poor LCT 3rd tray lift motor connection
- Remaining paper or another obstruction has stopped the tray and motor
- LCT 3rd pick-up solenoid connector is loose
- LCT 3rd pick-up solenoid is blocked by an obstruction

SC507: 7th Tray (Bypass Tray) Lift Mechanism

Definition [C]

One of the following conditions is detected in the optional bypass tray.

- The bypass tray lift sensor is not activated for 10 s after the tray lift motor turned on.
- Upper limit is not detected within 10 s while the paper tray is lifting during paper feed.
- The bypass tray lift sensor is already activated paper is placed in the 7th tray.

Possible Causes

- Poor bypass tray lift motor connection
- Remaining paper or another obstruction has stopped the tray and motor
- Bypass tray pick-up solenoid connector is loose
- Bypass tray pick-up solenoid is blocked by an obstruction

SC510: Paper Feed Motor Lock

Definition [B]

An abnormal signal is sent from the paper feed motor.

Possible Causes

- Paper feed motor defective
- Poor paper feed motor connector connection
- Too much load on the drive mechanism

SC511: LCT Motor Error 1

Definition [B]

The motor overload lock signal for the LCT motor is detected HIGH for more than 500 ms during rotation.

Possible Causes

- LCT motor defective
- Too much load on the drive mechanism

SC512: Bypass Tray Error 1

Definition [B]

The motor overload lock signal for the optional bypass tray motor is detected HIGH for more than 400 ms during rotation.

Possible Causes

- Bypass tray motor defective
- Too much load on the drive mechanism

SC520: Duplex Jogger Motor Error 1

Definition [C]

When the jogger fence moves to the home position, the duplex jogger HP sensor does not turn on even if the jogger motor has moved the jogger fence more than 153.5 mm.

Possible Causes

- Remaining paper or another obstruction is blocking the side fence
- Jogger motor connection is loose

SC521: Duplex Jogger Motor Error 2

Definition [C]

When the jogger fence moves from the home position, the duplex jogger fence HP sensor does not turn off even if the jogger motor has moved the jogger fence more than 153.5 mm.

Possible Causes

- Remaining paper or another obstruction is blocking the side fence
- Jogger motor connection is loose

SC531: Fusing/Exit Motor Lock

Definition [B]

A fusing/exit motor lock signal is detected for more than 2 s during operation.

Possible Causes

- Motor lock due to overload
- Motor driver board defective

SC532: Paper Feed Motor Lock

Definition [C]

Paper feed motor lock signal is detected for more than 2 s during operation.

Possible Causes

- Motor lock due to overload
- Motor driver board defective

SC541: Fusing Thermistor Open

Definition [A]

The fusing temperature detected by the thermistor was below 7°C for 15 s.

Possible Causes

- Fusing thermistor defective or out of position
- Poor thermistor terminal connection

SC542: Fusing Temperature Warm-up Error

Definition [A]

One of the following occurred:

- Hot roller did not reach target operation temperature within 6 minutes after the machine was powered or 6 minutes after the doors were closed.
- Fusing temperature rose only 5°C toward the fusing temperature within 20 s after the machine was powered on, or after the doors were closed.
- Fusing temperature rose only 5°C toward the fusing temperature within 25 s of the start of hot roller rotation.

Possible Causes

- Fusing lamp(s) disconnected
- Thermistor out of position

SC543: Fusing Overheat Error 1: Software

Definition [A]

A fusing temperature of over 210°C is detected for 5 s by the fusing thermistor. This prevents the fusing lamps from switching on without a fusing lamp trigger signal.

Possible Causes

- AC drive board defective
- BCU defective
- Reload the BCU firmware

SC544: Fusing Overheat Error 2: Hardware

Definition [A]

The fusing temperature monitoring circuit detects abnormal fusing temperature.

Possible Causes

- AC drive board defective
- BCU defective
- Reload the BCU firmware

SC545: Fusing Overheat Error 3: Continuous Lamp On

Definition [A]

After warm-up and while the hot roller is not rotating, the fusing lamps remain on at full power for 90 s.

Possible Causes
- Fusing thermistor out of position
- One or more fusing lamp is disconnected

SC546: Fusing Temperature Unstable

Definition [A]

The fusing temperature continues to fluctuate rapidly.

Possible Causes
- Poor thermistor connector connection
- Poor fusing unit connection

SC547: Zero Cross Signal Malfunction

Definition [A]

The applied bandwidth is detected above 66 Hz or below 45 Hz, and no zero-cross signal detected for 5 s with the power relay ON.

Possible Causes
- Noise on the ac power line

SC550: Oil Supply/Cleaning Web End

Definition [A]

The oil supply/cleaning web end sensor stays on longer than the specified time after the web motor remains ON for 40 s.

Possible Causes
- Oil supply/cleaning web end (web on supply roller used up)
- Oil supply/cleaning web motor defective

NOTE: SP1902 001 (Web Motor Control – Web Consumption) should be set to “0” every time the oil supply/cleaning web is replaced. This setting will not take effect until the machine is cycled off/on.

SC591: Toner Supply Pump Motor Error

Definition [B]

The toner supply pump motor lock signal did not change within 1 s while the motor is operating.

Possible Causes

- Motor lock due to overload
- BCU defective

SC592: Toner Bank Motor Error

Definition [B]

An abnormal signal was received from the toner bank motor.

Possible Causes

- Toner bank motor defective
- Bank motor connector loose
- Too much load on the drive mechanism

⇒ *SC593: Toner Suction Motor Replace*

Definition [B]

The operation time of the motor is over 600 hours.

Possible Cause

- Service life of the toner suction motor is finished.

Note: A near-end message is displayed in the LCD when the operation time exceeds 570 hours.

SC601: Communication Error Between BCU and MCU

Definition [B]

One or more of the following occurred:

- The BCU cannot communicate with the MCU within 0.8 s after power on.
- A BREAK signal was detected after connection between the BCU and MCU.
- After a communication error, three tries to communicate with the MCU failed.

Possible Causes

- Poor connection between BCU and MCU
- BCU defective
- MCU defective

SC620: Communication Error between BCU and ADF 1

Definition [B']
The TXD and RXD signals between BCU and ADF main board do not stabilize.

Possible Causes
- Poor connection between the BCU board and the ADF main board
- Noise on interface cable

SC621: Communication Error between BCU and ADF 2

Definition [B']
The TXD and RXD signals between BCU and ADF main board do not stabilize.

Possible Causes
- Poor connection between the BCU board and the ADF main board
- ADF main board defective
- BCU board defective

SC622: Communication Error between BCU and ADF 3

Definition- [B']
Software error after abnormal user operation.

Possible Causes
- Software error; switch the machine off/on

SC625, 626: Communication Error between BCU and Finisher

Definition [B]
The BCU cannot communicate with the finisher properly.

Possible Causes
- Poor connection between the BCU board and the finisher main board
- Finisher main board defective
- BCU board defective
- Noise on the interface cable

SC630: CSS (RSS) Communication

Definition [B] **Japan only**

SC632: Charge Unit Device Error 1

Definition [B] **Japan Only**

SC633: Charge Unit Device Error 2

Definition [B] **Japan Only**

SC670: Engine Startup Error

Definition [B]

Several possible causes for this error:

At power on or after the machine leaves the energy conservation mode:

- /ENGRDY signal does not assert
- IPURDY signal does not assert

After power on and the prescribed time has elapsed:

- No EC response from the engine
- No PC response from the engine
- No SC response from the engine

During machine operation mode:

- Write to Rapi drive failure (could not locate destination on the PCI)
- After the /ENGRDY signal asserts with no effect.

Possible Causes

- BCU ←→ Controller Board disconnected
- BCU board defective
- Controller board defective
- Mother board defective
- Software error; switch off/on, if that fails, change the engine firmware
- PSU-E or PSU-C defective

SC672: Controller Startup Error

Definition [B]

The line between the controller board and the operation panel does not open correctly when the machine is powered on, or after the machine was powered on communication between the controller and operation panel is suspended.

The controller board and operation panel could not exchange the handshake (FDH) and acknowledge (FEH) signals within 15 s of the operation panel reset after power on, or after 2 retries there was no response to the transmission line confirmation command issued every 30 s from the operation panel to the controller board.

Possible Causes

- Controller board defective
- Controller board installed incorrectly
- Operation panel harness connection loose or incorrect

SC701: ADF Pick-up Roller Release Malfunction

Definition [B]

The pick-up roller HP sensor does not activate or de-activate when the pick-up motor turns on.

Possible Causes
- Pick-up roller HP sensor defective
- Pick-up motor defective
- ADF main control board defective

SC702: ADF Feed-in Motor Error

Definition [B]

While the feed motor is operating, the encoder pulse signal is not received within the specified time, or the paper size length encoder signal cannot be detected within the specified time (the encoder is built into the feed-in motor).

Possible Causes
- Feed-in motor defective
- Paper length sensor
- ADF main control board defective
- Poor connection between the feed-in motor and ADF main board

SC703: ADF Transport Belt Motor Error

Definition [B]

While the motor is operating, the encoder pulse signal is not received within the specified time and the transport belt motor does not turn properly.

Possible Causes
- Transport belt motor defective
- Poor connection between the transport motor and ADF main board
- ADF main board defective

SC704: ADF Feed-out Motor Error

Definition [B]

While the feed-out motor is operating, the encoder pulse signal is not received within the specified time, and the feed-out motor does not turn properly

Possible Causes
- Feed-out motor defective
- Poor connection between the feed-out motor and ADF main board
- ADF main control board defective

SC705: ADF Original Table Lift Malfunction

Definition [B]

One of the following conditions was detected.

- The bottom plate position sensor does not activate when the bottom plate motor lifts the original table.
- The bottom plate HP sensor does not activate when the bottom plate motor lowers the original table.

Possible Causes

- Bottom plate position sensor defective
- Bottom plate HP sensor defective
- Bottom plate motor defective
- ADF main control board defective

SC720: Finisher Lower Transport Motor Error

Definition [B]
The encoder pulse signal of the lower transport motor (B478) or stapler transport motor (B468) does not change within the specified time, and the lower transport motor does not turn properly

Possible Causes

- Lower transport motor/stapler transport motor defective
- Poor connection between the lower transport motor (or stapler transport motor) and finisher main board
- Finisher main control board defective
- Motor overload

SC722: Finisher Jogger Motor Error

Definition [D]

The jogger fences move out of the home position but the HP sensor output does not change within the specified number of pulses.

Possible Causes

- Jogger HP sensor (B478)/ jogger fence HP sensor (B468) defective
- Overload on the jogger mechanism
- Jogger motor (B478)/jogger fence motor (B468) defective (not rotating)
- Finisher main control board defective
- Poor connection between the jogger motor and finisher main board

SC724: Finisher Staple Hammer Motor Error

Definition [B]

Stapling does not finish within the specified time (450 ms) after the staple hammer motor turned on.

Possible Causes

- Staple jam
- Overload because number of sheets exceeds the limit
- Staple hammer motor (B478)/stapler motor (B468) defective
- Poor motor cable connection

SC725: Finisher Stack Feed-out Motor Error

Definition [D]

The stack feed-out belt HP sensor does not activate within the specified time after the stack feed-out belt motor turned on.

Possible Causes

- Stack feed-out HP sensor defective
- Poor stack feed-out belt motor cable connection
- Stack feed-out belt motor defective
- Finisher main control board
- Motor overload

SC726: Finisher Shift Motor Error (B478 only)

Definition [D]

The shift tray half-turn sensor status does not change within 1 second after the shift motor turns on.

Possible Causes

- Shift tray half-turn sensor defective
- Poor shift tray half-turn sensor connection or defective harness
- Shift motor defective
- Finisher main control board defective
- Motor overload

SC727: Finisher Stapler Rotation Motor Error

Definition [D]

The stapler does not return to its home position within the specified time after stapling finished.

Possible Causes

- Staple rotation HP sensor defective
- Poor stapler rotation motor connection
- Stapler rotation motor defective
- Finisher main board defective
- Motor overload

SC729: Finisher Punch Motor Error

Definition [B]

The punch HP sensor is not activated within the specified time after the punch motor turned on.

Possible Causes

- Punch HP sensor defective
- Poor punch motor connection
- Punch motor defective
- Finisher main board defective
- Motor overload

SC730: Finisher Stapler Motor Error

Definition [D]

The stapler HP sensor is not activated within the specified time after the stapler motor turned on.

Possible Causes

- Stapler HP sensor defective
- Poor stapler motor (B478)/stapler movement motor (B468) connection
- Stapler motor (B478)/stapler movement motor (B468) defective
- Finisher main board defective
- Motor overload

SC731: Finisher Positioning Roller Error (B478 only)

Definition [B]

The positioning roller HP sensor in the finisher is not activated within the prescribed length of time (340 pulses) for two counts.

Possible Causes

If powering the machine off/on does not solve the problem:

- Positioning roller HP sensor defective or disconnected
- Stapler transport motor or positioning roller solenoid defective
- Finisher main control board defective
- Finisher control board defective
- Jam

NOTE: 1) If the motor operates, then check the positioning roller HP sensor.
2) If the motor does not operate, then check the motor and the finisher control board.
3) If the harness connections are secure, the motor may be defective.

SC732: Finisher Jogger Motor Error

Definition [B]

The jogger HP sensor is not activated within the prescribed length of time.

Possible Causes

- Jogger HP sensor (B478)/jogger fence HP sensor (B468)/shift jogger HP sensor (optional jogger unit) disconnected or defective
- Jogger motor (B478)/jogger fence motor (B468)/shift jogger motor (optional jogger unit) disconnected or defective
- Finisher main control board defective
- Overload

NOTE: 1) If cycling the machine off/on does not solve the problem, then the HP sensor may be defective.
2) Be sure to check all harness connections.
3) If the motor operates, then the HP sensor is defective.
4) If the motor does not operate, then the motor or the finisher main control board is defective.
5) Make sure that the jogger unit is not overloaded.

SC735: Finisher Paper Stack Plate Motor Error (B478)

Definition [D]

One of the stack plate HP sensors (front, center, or rear) does not turn on within the prescribed time after the stack plate motor turned on.

Possible Causes

- One of the stack plate HP sensors is defective
- Poor stack plate motor connection
- One of the stack plate motors is defective
- Finisher main control board defective
- Motor overload

SC736: Finisher Exit Guide Motor Error (B478 only)

Definition [D]

The exit guide open sensor does not change within the specified time after the exit guide motor is energized.

Possible Causes

- Exit guide open sensor defective
- Poor exit guide motor connection
- Exit guide motor defective
- Finisher main control board defective
- Motor overload

SC737: Full Finisher Staple Waste Hopper (B478)

Definition [D]

The staple waste hopper is full.

Possible Causes

- Staple waste hopper is full (remove hopper and empty it)

SC738: Finisher Shift Tray Lift Motor Error (B478)

Definition [B]

The staple mode HP or shift mode HP sensor does not activate within the specified time after the tray lift motor turned on.

Possible Causes

- Staple mode HP or shift mode HP sensor defective
- Staple mode HP or shift mode HP sensor connection loose or broken
- Tray lift motor defective
- Finisher main control board defective
- Motor overload

SC740: Finisher Upper Tray Lift Motor Error (B468)

Definition [D]

The upper tray paper height sensor does not change its status with the specified time after the tray raises or lowers.

Possible Causes

- Upper tray paper height sensor defective
- Upper tray paper height sensor connection loose or broken
- Tray lift motor defective
- Finisher main control board defective
- Motor overload

SC741: Finisher Lower Tray Lift Motor Error (B468)

Definition [D]

The lower tray paper height sensor does not change its status with the specified time after the tray raises or lowers.

Possible Causes

- Lower tray paper height sensor defective
- Lower tray paper height sensor connection loose or broken
- Tray lift motor defective
- Finisher main control board defective
- Motor overload

SC742: Finisher Shift Motor Error (B468)

Definition [D]

Shift motor not detected at the home position within the specified time.

Possible Causes

- Shift roller HP sensor defective
- Shift roller HP sensor connection loose or broken
- Shift motor defective
- Finisher main control board defective
- Motor overload

SC743: Finisher Pressure Plate Motor Error (B468)

Definition [D]

Pressure plate motor operating but the plate is not detected at the home position within the specified time.

Possible Causes

- Pressure plate HP sensor defective
- Pressure plate HP sensor connection loose or broken
- Pressure plate motor defective
- Finisher main control board defective
- Motor overload

SC744: Finisher Exit Guide Motor Error (B468)

Definition [B]

After moving away from the guide plate position sensor, the exit guide is not detected at the home position within the specified time (800 ms)

Possible Causes

- Guide plate motor overload
- Motor defective
- Motor harness defective
- Motor connector loose

SC745: Finisher Folder Plate Motor Error (B468)

Definition [D]

The folder plate moves but is not detected at the home position within the specified time.

Possible Causes

- Folder plate HP sensor defective
- Folder plate HP sensor harness broken or poor connection
- Folder plate motor defective
- Finisher main control board defective
- Motor overload

SC746: Stapler Unit Saddle Stitch Motor Error 1

Definition [D]

The front stapler unit saddle-stitch motor does not start operation within the specified time (450 ms).

Possible Causes

- Motor harness defective or connection loose
- Motor defective
- Finisher main controller board defective
- Motor overload

SC747: Stapler Unit Saddle Stitch Motor Error 2

Definition [D]

The rear stapler unit saddle-stitch motor does not start operation within the specified time (450 ms).

Possible Causes

- Motor harness defective or connection loose
- Motor defective
- Finisher main controller board defective
- Motor overload

SC750: Cover Interposer Tray Bottom Plate Motor Error

Definition [D]

One of the following events occurred:

- After the motor starts to raise the bottom plate, the bottom plate position sensor does not detect the plate at the specified time (3 s).
- After the motor starts to lower the bottom plate, the bottom plate HP sensor does not detect the bottom plate.

Possible Causes

- Bottom plate position sensor defective
- Bottom plate HP sensor defective
- Bottom plate lift motor defective
- Cover interposer tray main board defective
- Motor connectors loose or harness defective

SC800: Video Output Transmission End Error

Definition [B]

A video signal is sent to the engine but no command is received within the prescribed time from the engine to signal the end of transfer – output all black.

Possible Causes

- Controller defective

SC804: Video Input End Error

Definition [B]

Video transfer is requested from the scanner, but no command is received within the prescribed time from the scanner to signal a response, and output is all black.

Possible Causes

- Controller board defective

SC817 Monitor Error

Definition [B]

This is a file detection and electronic file signature check error when the boot loader attempts to read the self-diagnostic module, system kernel, or root system files from the OS Flash ROM, or the items on the SD card in the controller slot are false or corrupted.

Error Codes

Code	Meaning
0x0000 0000	BIOS boot error
0x0000 0001	Primary boot start load error
0x0000 0002	Secondary boot load error (Boot3.Elf)
0x0000 0003	Self-diagnostic module error (Diag.Elf
0x0000 0004	Kernel start error (Netbsd)
0x0000 0005	Root file system file read error (Rootfs)
0xffff ffff	Other error

Possible Causes

- OS Flash ROM data defective; change the controller firmware
- SD card data defective; use another SD card
  - For example:
    Data in the self-diagnostic module, system kernel, or root system files are corrupted or do not exist in OS flash ROM or on the SD card
    Files in the self-diagnostic module, kernel, or root file system on the SD card have been falsified or altered

NOTE: 1) Before discarding the SD card, try to update the data on the card. If the error occurs again, the card may be defective.
2) Be sure to use an SD card that contains the correct electronic signature.

SC818 Watch Dog Error

Definition [B]

While the system program is running, a bus hold or interrupt program goes into an endless loop, preventing any other programs from executing.

Possible Causes

- System program defective; switch off/on, or change the controller firmware if the problem cannot be solved
- Controller board defective
- Controller option malfunction

SC819 Fatal kernel error

Definition [B]

RAM overflow occurs during system processing. One of the following messages is displayed on the operation panel.

NOTE: For more details about this SC code error, execute SP5990 to print an SMC report so you can read the error code. The error code is not displayed on the operation panel.

SMC Report Error Code: 0x696e

```
init died
```

SMC Report Error Code: 0x766d

```
vm_pageout: VM is full
```

Possible Causes

- Controller board defective
- Software defective; change the controller firmware

SC821: Self-Diagnostic Error 1: ASIC Not Detected

NOTE: For more details about this SC code error, execute SP5990 to print an SMC report so you can read the error code. The error code is not displayed on the operation panel.

SMC Report Error Code: 0B00

Definition [B]

Error code 0xffff ffff is returned when the register Write & Verify check is executed on the ASIC mounted on the controller board. The ASIC controls the ROM and buses for other devices.

Possible Causes

- ASIC (Bassoon) defective

NOTE: Replace the controller board.

SMC Report Error Code: 0B06

Definition [B]

ASIC not detected.

Possible Causes

- ASIC (Bassoon) defective
- Poor connection between North Bridge and PCI I/F

NOTE: Replace the controller board.

SMC Report Error Code: 0B10

Definition [B]

Failed to initialize or could not read connection bus. Data in SHM register incorrect.

Possible Causes

- Connection bus defective
- SHM defective

NOTE: Replace the controller board.

SC822: Self-Diagnostic Error 2: HDD

NOTE: For more details about this SC code error, execute SP5990 to print an SMC report so you can read the error code. The error code is not displayed on the operation panel.

SMC Report Error Code: 3004

Definition [B]

No response to the self-diagnostic command from the ASIC to the HDDs.

Possible Causes

- One or both HDDs defective

SMC Report Error Code: 3013

Definition [B]

Mandolin does not respond, the HDD device remains BUSY for more than 31 s, or the BUSY signal does not drop within 6 s after the diagnostic command is issued to the HDDs.

Possible Causes

- One or both HDDs defective
- HDD connector loose or defective
- Controller defective

SMC Report Error Code: 3014

Definition [B]

Error returned from HDD in response to the self-diagnostic command, Mandolin could not be located due to a read/write error at the HDD register.

Possible Causes

- One or both HDDs defective

SMC Report Error Code: 3023

Definition [B]

Mandolin does not respond, the HDD device remains BUSY for more than 31 s, or the BUSY signal does not drop within 6 s after the diagnostic command is issued to the HDDs.

Possible Causes

- One or both HDDs defective
- HDD connector loose or defective
- Controller defective

SMC Report Error Code: 3024

Definition [B]

Error returned from HDD in response to the self-diagnostic command, Mandolin could not be located due to a read/write error at the HDD register.

Possible Causes

- One or both HDDs defective

SC824 Self-Diagnostic Error 3: NVRAM

Definition [B]

The NVRAM is not installed or is damaged.

Possible Causes

- NVRAM not installed
- NVRAM defective
- Controller board defective
- Backup battery has discharged

SC826: Self-Diagnostic Error 4: RTC Backup Battery Error

Definition [B]

The RTC backup battery has discharged or the voltage of the installed battery is not within the specified range.

Possible Causes

- NVRAM installed incorrectly
- RTC backup battery defective
- Controller board defective
- NVRAM defective

SC828 Self-Diagnostic Error 5: ROM Error

Definition [B]

Measuring the CRC for the boot monitor and operating system program results in an error. This check is not executed when booting the machine from an SD card.

Possible Causes

- SD card defective
- Controller board defective

SC829 Self-Diagnostic Error 6: Optional RAM

Definition [B]

A check of the optional RAM installed in Slot 0 on the controller board returned an error.

Possible Causes

- RAM DIMM installed incorrectly
- RAM DIMM defective
- RAM DIMM slot damaged or defective; replace the controller board

SC833: Self-Diagnostic Error 7: Engine I/F ASIC

NOTE: For more details about this SC code error, execute SP5990 to print an SMC report so you can read the error code. The error code is not displayed on the operation panel.

SMC Report Error Code: 0F30, 0F31

Definition [B]

ASIC (Mandolin) for system control could not be detected. After the PCI is configured, the device ID for the ASIC could not be confirmed.

Possible Causes

- The ASIC (Mandolin) for system control is defective
- I/F between North Bridge and AGPI is defective

NOTE: Replace the Mother Board.

SMC Report Error Code: 0F41

Definition [B]

The read/write check conducted for resident RAM mounted on the Mother Board failed.

Possible Causes

- Memory device defective

NOTE: Replace the Mother Board.

SMC Report Error Code: 50B1

Definition [B]

Failed to initialize or read the bus connection.

Possible Causes

- Bus connection defective or loose
- SSCG defective

NOTE: Replace the Mother Board.

SMC Report Error Code: 50B2

Definition [B]

Value of the SSCG register is incorrect.

Possible Causes

- Bus connection defective or loose
- SSCG defective
- Replace the Mother Board.

SC834: Self-Diagnostic Error 8: Optional Memory RAM DIMM

Definition [B]

The write/verify check for the optional RAM chip on the engine I/F board (mother board) returned an error

Possible Causes

- Controller board defective
- Mother board defective

SC838 Self-Diagnostic Error 9: Clock Generator

Definition [B]

Setup data is read from the clock generator via the I2C bus but differs from the prescribed value due to defects in the clock generator, in the I2C bus, or the I2C bus port for the PCU.

Possible Causes

- Controller board defective

SC850: Network I/F Error

Definition [D]

One of the following conditions exists:

- Duplicate IP addresses
- Illegal IP address
- Driver unstable and cannot be used on the network.

Possible Causes

- IP address setting incorrect
- NIB (PHY) defective
- Controller board defective

SC851: IEEE 1394 I/F Error

Definition [D]

Driver setting incorrect and cannot be used by the 1394 I/F.

Possible Causes

- NIB (PHY), LINK module defective; change the Interface Board
- Controller board defective

SC853: Wireless LAN Error 1

Definition [D]

The board that holds the wireless LAN card can be accessed, but the wireless LAN card (802.11b/Bluetooth) itself could not be accessed while the machine was starting up.

Possible Causes
- Wireless LAN card has been removed

SC854: Wireless LAN Error 2

Definition [D]

The board that holds the wireless LAN card can be accessed, but the wireless LAN card (802.11b/Bluetooth) itself cannot be could not be accessed while the machine was operating.

Possible Causes
- Wireless LAN card has been removed

SC855: Wireless LAN Error 3

Definition [D]

An error is detected for the wireless LAN card (802.11b or Bluetooth).

Possible Causes
- Wireless LAN card defective
- Wireless card connection not tight

SC856: Wireless LAN Error 4

Definition [D]

An error is detected for the wireless LAN board (802.11b or Bluetooth).

Possible Causes
- Wireless LAN card board defective
- PCI connector loose (External controller interface board)

SC857: USB I/F Error 1

Definition [D]

The USB driver is unstable and generated an error. The USB I/F cannot be used.

Possible Causes
- USB board or controller board defective

SC860: HDD Error 1

Definition [D]

One of the following occurred:

- The HDD is connected, but the driver detected one of the following errors:

SS_NOT_READY	One or both HDDs are not ready.
SS_BAD_LABEL	Partition types are different
SS_READ_ERROR	Error returned during label read or label check
SS_WRITE_ERROR	Error returned during label write or label check
SS_FS_ERROR	File system repair failed
SS_MOUNT_ERROR	File system mount failed
SS_COMMAND_ERROR	Drive does not answer the command
SS_KERNEL_ERROR	Kernel internal error
SS_SIZE_ERROR	Driver size is too small
SS_NO_PARTITION	Specified partition does not exist
SS_NO_FILE	Device files do not exist

- The driver could not acquire the status of the hard disks within 30 s.

Possible Causes

- Hard disks are not formatted
- Hard disk corrupted; reformat the disks with SP mode

SC861: HDD Error 2: HDD Startup

Definition [B]

The hard disks were detected at power on, but the disks were not detected within 30 s after recovery from the energy conservation mode.

Possible Causes

- Cable between the hard disks and controller board disconnected or loose
- Hard disk power connector loose
- One of the hard disks is defective
- Controller or mother board defective

SC862 HDD Error 3: Bad Sectors

Definition [A]

The number of bad sectors on the HDD in the area for storing images exceeds 101.

Possible Causes

- Too many bad sectors accumulated on the HDDs.

NOTE: 1) Execute SP5832 002 (HDD Formatting – IMH) to format the HDD and replace the bad sectors; copy the stamp data after doing this (use SP 5853).
2) HDD replacement is recommended because an HDD unit that generates bad sectors is probably of poor quality and performs poorly.

SC863: HDD Error 4: HDD Read Error

Definition [B]

The system cannot read the data written on the hard disks.

Possible Causes

- Sectors on the disks have become corrupted during operation; replace the hard disks

SC864: HDD Error 5: Data CRC Error

Definition [B]

During HDD operation, the HDD could not respond to a CRC error query.

Possible Causes

- Mother board defective

SC865: HDD Error 6: Access Error

Definition [B]

HDD responded to an error during operation for a condition other than those for SC863, 864.

Possible Causes

- HDD defective

SC866: SD Card Error 1: Confirmation

Definition [B]

The machine detects an electronic license error in the application on the SD card inserted in the controller slot when the machine is powered on.

The program stored on the SD card contains electronic confirmation license data. If the program does not contain this license data, or if the result of the check reveals the license data in the program on the SD card is incorrect, then the checked program cannot execute and this SC code is displayed.

Possible Causes

- Required program missing or incorrect

NOTE: Download the correct program for this machine onto the SD card.

SC867 SD Card Error 2: SD Card Removed

Definition [B]

The SD card inserted in the boot slot when the machine was powered on was removed while the machine was still switched on.

Possible Causes

- SD card removed from boot slot on the controller
- Cycle the machine off/on

SC868 SD Card Error 3: SD Card Access

Definition [B]

An error is returned during an operation using an SD card. Debug console acquires more detailed information about the error.

Possible Causes

- SD card not inserted completely
- SD card defective
- Controller board defective

NOTE: If this SC code is displayed again after cycling the machine off and on, use another SD card. If this does not solve the problem, replace the controller board.

SC870: Address Book Data Error

Definition [B]

Address book data stored on the hard disk was detected as abnormal when it was accessed from either the operation panel or the network.

The address book data cannot be read from the HDD or SD card where it is stored, or the data read from the media is defective.

Possible Causes

- Software defective; switch off/on, and change the controller firmware if the problem is not solved
- HDD defective

Recovery

- Execute SP5846 050 (UCS Settings – Initialize all Directory Info.) to initialize all address book data.
- Initialize the user information with SP5832 006 (HDD Formatting– User Information 1) and SP5832 007 (HDD Formatting – User Information 2).
- Replace the HDDs.
- Boot the machine from the SD card.

SC880: Media Link Board Error

Definition [B]

A request for access to the Media Link Board was not answered within the specified time.

Possible Causes

- Media Link Board defective

SC900: Electrical Total Counter Error

Definition [A]

The total counter contains data that is not a number.

Possible Causes

- NVRAM disturbed unexpectedly
- NVRAM defective
- NVRAM data corrupted

SC901: Mechanical Total Counter Error

Definition [B]
The mechanical total counter is disconnected.

Possible Causes

- User removed the counter while it was operating
- Poor connection
- Mechanical total counter defective

SC910: External Controller Error 1

Definition [D]

Not used.

SC911: External Controller Error 2

Definition [D]

Not used.

SC912: External Controller Error 3

Definition [D]

Not used.

SC913: External Controller Error 4

Definition [D]

Not used.

SC914: External Controller Error 5

Definition [D]

Not used.

SC919: External Controller Error 6

Definition [B]

While EAC (External Application Converter), the conversion module, was operating normally, the receipt of a power line interrupt signal from the FLUTE serial driver was detected, or BREAK signal from the other station was detected.

Possible Causes

- Power outage at the EFI controller
- EFI controller was rebooted
- Connection to EFI controller loose

SC920: Printer Error 1

Definition [D]

An internal application error was detected and operation cannot continue.

Possible Causes

- Software defective; switch off/on, or change the controller firmware if the problem is not solved
- Insufficient memory

SC921: Printer Error 2

Definition [D]

When the printer application started, the font to use could not be found on the SD card.

Possible Causes

- The font is not on the SD card

SC925 NetFile Function Error

Definition [B]

The NetFile file management on the HDD cannot be used, or a NetFile management file is corrupted and operation cannot continue.

The HDDs are defective and they cannot be debugged or partitioned, so the Scan Router functions (delivery of received faxes, document capture, etc.), Web services, and other network functions cannot be used.

HDD status codes displayed on the debug console:

Display	Meaning
(-1)	HDD not connected
(-2)	HDD not ready
(-3)	No level
(-4)	Partition type incorrect
(-5)	Error returned during level read or check
(-6)	Error returned during level read or check
(-7)	“filesystem” repair failed
(-8)	“filesystem” mount failed
(-9)	Drive does not answer command
(-10)	Internal kernel error
(-11)	Size of drive is too small
(-12)	Specified partition does not exist
(-13)	Device file does not exist

Possible Causes

- HDD defective
- Power supply to machine cut occurred while writing data to HDD
- Software error

Recovery

Procedure 1

If the machine returns SC codes for HDD errors (SC860 ~ SC865), please follow the recovery procedures described for these SC codes.

Procedure 2

If the machine does not return one of the five HDD errors (SC860 ~ SC865), cycle the machine off and on. If this does not solve the problem, then initialize the NetFile partition on the HDD with SP5832 011 (HDD Formatting – Ridoc I/F).

NetFiles: Jobs printed from the document server using a PC and DeskTopBinder

- Before initializing the NetFile partition on the HDD please inform the client that:
  - Received faxes on the delivery server will be lost
  - All captured documents will be lost
  - DeskTopBinder/Print Job Manager/Desk Top Editor job history will be cleared

- Documents stored on the document server, included scanned documents, will not be lost.
- The first time the network accesses the machine, the management information must be reconfigured (this will require a significant amount of time).

Before initializing the Netfile partition with SP5823 011, do the following:

1. Enter the User Tools mode and execute “Delivery Settings” to print all received fax documents scheduled for delivery and delete them.
2. In the User Tools mode, execute Document Management> Batch Delete Transfer Documents.
3. Execute SP5832 011 then cycle the machine off and on.

Procedure 3

If “Procedure 2” does not solve the problem, execute SP5832 001 (HDD Formatting – All), then cycle the machine off and on.

Executing SP5832 001 erases all document and address book data stored on the hard disks. Be sure to consult with the customer before executing this SP code.

Procedure 4

If “Procedure 4” fails to correct the problem, replace the HDDs.

SC951: F-GATE Signal Error

Definition [B]

When the IPU has already received the F-GATE signal (laser writing start trigger signal), the IPU receives another F-GATE signal.

Possible Causes

- Software defective; switch off/on, or change the BCU firmware if this does not solve the problem
- BCU defective

SC953: Scanner Image Setting Error

Definition [B]

The settings required for image processing using the scanner are not sent from the IPU.

Possible Causes

- Check the connections between the MCU and LCDC and BCU
- Replace the MCU, BCU, or IPU
- Change the BCU or MCU firmware

SC954: Printer Image Setting Error

Definition [B]

The settings that are required for image processing using the printer controller are not sent from the IPU.

Possible Causes

- Check the connections between the IPU and the LDB, and from the LDB to the polygon mirror motor control PCB.
- Change the IPU or LDB
- Change the polygon mirror motor or the polygon mirror motor control PCB
- Change the BCU firmware

SC955: Memory Setting Error

Definition [B]

The settings that are required for image processing using the memory are not sent from the IPU.

Possible Causes

- Format the hard disks
- Change the hard disks
- Controller defective
- Change the mother board or IPU
- Change the controller firmware or the BCU firmware

SC964: Scanner Start Error

Definition [B]

During scanned image processing, another command to start scanning was received.

Possible Causes

- Change the BCU firmware

SC965: Print Start Error

Definition [B]

During print processing, another command to start printing was received.

Possible Causes

- Change the BCU firmware

SC966: Polygon Mirror Motor Ready Error

Definition [B]

The polygon mirror motor does not reach ready status within 15 s after the copy paper is detected by the registration sensor. (15 s after the write request was issued for the IPU, the F-GATE signal remained LOW.)

Possible Causes:

- Polygon mirror motor defective
- Poor connection between polygon mirror motor drive board and BCU
- Polygon mirror motor drive board defective
- BCU defective

SC970: Scanner Ready Error

Definition [B]
The scan ready signal is not generated by the MCU for more than 10 s after the read start signal is sent to the MCU.

Possible Causes

- Serial data transfer between MCU and BCU (through the LCDC)
- Change the MCU firmware

SC990: Software Performance Error 1

Definition [B]

An unexpected operation was encountered by the software.

Possible Causes

- Software crash; reboot the machine

Procedure 1

If the HDDs have just been replaced, be sure to download the stamp data (SP 5853).

Procedure 2

With SP5990 004 (SMC Report – Logging Data), print the most recent information for SC990. The SC990 information displays the file name, line number, and value. Report this information to your technical supervisor. For example:

```
Function.c LINE: 123 VAL:0
```

SC991: Software Error 2

Definition [D]

Software attempted to execute an unexpected operation. However, unlike SC990, operation can be recovered.

Possible Causes

- Software crash; reboot the machine

Recovery

After SC991 has been issued, the machine cannot be used until it is cycled off an on.

Procedure 1

Cycle the machine off and on.

Procedure 2

Enter the SP mode and execute SP5990 to print an SMC report, or execute SP7403 to review the “SC History”.

-or-

With SP5990 004 (SMC Report – Logging Data), print the most recent information for SC9901. The SC991 information displays the file name, line number, and value. Report this information to your technical supervisor. For example:

```
Function.c LINE: 123 VAL:0
```

SC992: Software Error 4: Undefined Error

Definition [B]

Software encountered an unexpected operation. This error is issued if the error cannot be covered by SC990.

Possible Causes

- Software defective
- An error undetectable by any other SC code occurred

Recovery

- The machine cannot be used until this error is cleared. Cycle the machine off and on.

SC997: Application Selection Error

Definition [D]

An application did not start after pressing the appropriate key on the operation panel.

Possible Causes

- Software bug; change the firmware for the application that failed
- A RAM or DIMM option required by the application is not installed or not installed correctly.

SC998: Application Start Error

Definition [B]

Register processing does not execute for any application within 60 s after the machine is powered on. No application starts correctly, and all end abnormally.

Possible Causes

- Software defective; change the firmware for the application that failed
- A RAM or DIMM option required by the application is not installed or not installed correctly.

SC999: Program Download Error

Definition [B]

The program download from the SD card does not execute normally. This SC is not logged.

Possible Causes

- Card installed incorrectly
- BCU defective
- SD card defective
- Controller board defective
- Power down during program downloading
- Wrong type of card inserted (see Section 5 “Service Tables” for downloading procedures)

SERVICE TABLES

5. SERVICE TABLES

5.1 SERVICE PROGRAM MODE OPERATION

The service program (SP) mode is used to check electrical data, change modes, and adjust values.

⚠CAUTION

Never turn off the main power switch when the power LED is lit or flashing. To avoid damaging the hard disk or memory, press the operation power switch to switch the power off, wait for the power LED to go off, and then switch the main power switch off.

To Enter and Exit the SP Mode

1. Press Clear Modes key ⌧.
2. On the operation panel keypad, press ①⓪⑦.
3. Hold down Clear key Clear C more than 3 seconds.
   The Copy SP or PM Counter items are displayed. If the printer or scanner/printer option is installed, the Printer SP and Scanner SP items are also available.
4. Press Copy SP.
5. To exit the SP mode, just press Exit in the upper right corner of the SP mode screen.

To Switch to the Copy Window for Test Printing

1. In the SP mode display, press Copy Window to switch to the copy operation screen when you need to select paper for a test print.
2. Use the copy window (copier mode) to select the appropriate settings (paper size, etc.) for the test print.
3. Press Start key ⓓ to execute the test print.
4. Press SP Mode (highlighted) to return to the SP mode screen and repeat from step 1.

Using the SP Mode

SP command numbers can be entered directly (if you know the entire number) or the command can be selected from the menus.

Direct Entry

If you know all seven digits of the SP code, enter the seven numbers and press Enter key #.

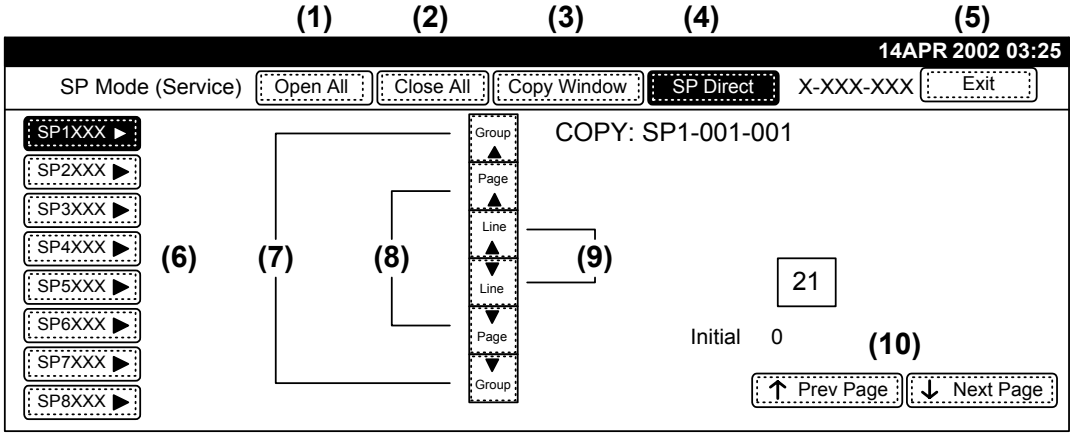
However, if you do not know all the numbers, enter only the first four numbers of the seven-digit SP and press Enter key #. The display goes immediately to the first SP of that group. Then you can use the buttons to browse to the desired selection.

Button Selection Entry

1. Refer to the SP Mode Tables at the end of this section to find the SP that you want to adjust.
2. Press the Group number on the left side SP Mode window that contains the SP that you want to adjust.
3. Use the scrolling buttons in the center of the SP mode window to display the SP number that you want to open, then, press that number to expand the list.
4. Use the center touch-panel buttons to scroll to the number and title of the item that you want to set, and press Enter key #. The small entry box on the right is activated and displays the default or the current setting below.
5. To enter a setting
   - Press •/* key to enter a minus sign. Then use the keypad to enter the appropriate number. The number you enter will write over the previous setting.
   - Press # to enter the setting. (If you enter a number that is out of range, the key press is ignored.)
   - Press Clear key C to cancel the data.
6. If you need to perform a test print, press Copy Window to open the copy window and select the settings for the test print. Press Start ◇ key.
7. Press SP Mode (highlighted) in the copy window to return to the SP mode display.
8. When you are finished, press Exit twice to return to the copy window.

SP Mode Button Summary

Here is a short summary of the touch-panel buttons.



(1)	**Open All**. Opens all SP groups and sublevels.
(2)	**Close All**. Closes all open groups and sublevels and restores the initial SP mode display.
(3)	**Copy Window**. Opens the copy window (copy mode) so you can make test copies. To return to the SP mode screen, press SP Mode (highlighted) in the copy window.
(4)	**SP Direct**. Enter the SP code directly with the number keys if you know the SP number, then press Enter key ⊕. (SP Direct must be highlighted before you can enter the number. Just press SP Direct if it is not highlighted.)
(5)	**Exit**. Press twice to leave the SP mode and return to the copy window to resume normal operation.
(6)	**SPnxxx**. Press any group number to open a list of SP codes and titles for that group. For example, to open the SP code list for SP1-nnn, press SP1XXX. If an SP has sublevels, it is marked with a right pointing triangle.
(7)	**Group**. Press to scroll the display to the previous or next group.
(8)	**Page**. Press to scroll to the previous or next display in segments the size of the screen display (page).
(9)	**Line**. Press to scroll the display to the previous or next line, line by line.
(10)	**Prev Page** or **Next Page**. Press to move the highlight on the left to the previous or next selection in the list.

5.2 SERVICE PROGRAM MODE TABLES

NOTE: The Service Program Mode is for use only by customer engineers so that they can properly maintain product quality. If this mode is used by anyone other than a customer engineer for any reason, data might be deleted or settings might be changed. In such a case image quality can no longer be guaranteed.

Service Table Key

Notation	What it means
[range / **default** / step]	[–9~+9 / **+3.0** / 0.1 mm] The default setting +3.0 can be adjusted in 0.1mm steps in the range ±9.
Italics	Comments added for reference.
*	An asterisk marks the SP's that are reset to their factory default settings after an NVRAM reset.
DFU	Denotes "Design or Factory Use". Do not change this value.
Japan only	The feature or item is for Japan only. Do not change this value.
SEF	Short Edge Feed
LEF	Long Edge Feed

5.2.1 COPIER SERVICE PROGRAM MODE TABLES

SP1-nnn Feed

SP	Number/Name		Function/[Setting]
1001	Leading Edge Registration		Adjusts the printing leading edge registration for feeding from the trays and duplex tray using the trimming area pattern (SP2-902-3, No.15).] *Use the "• / *key to enter the minus (–) before entering the value.* *The specification is 4± 2 mm. (☛3-17)*
	001	Copier/LCT Paper Tray	B070: [-9.0~+9.0 **/-2.6** / 0.1 mm] B071: [-9.0~+9.0 / **-4.0** / 0.1 mm]
	002	Duplex Tray	B070: [-9.0~+9.0 / **-0.3**/ 0.1 mm] B071: [-9.0~+9.0 / **-0.4** / 0.1 mm])
	003	Copier//LCT Paper Tray (Low Speed)	B070: [-9.0~+9.0 / **-3.0** / 0.1 mm] B071: [-9.0~+9.0 / **-2.0** / 0.1 mm]
	004	Duplex Tray (Low Speed)	[-9.0~+9.0 / **0** / 0.1 mm]
1002	Side-to-side Registration		Adjusts the printing side-to-side registration from the 1st paper feed station using the trimming area pattern (SP2-902-3, No.15). *Use the "• / *key to enter the minus (–) before entering the value.* *Specification: 0 ± 2.0 mm. (☛3-17)*
	001	1st Tray (Copier Tandem Tray)	[-9.0~+9.0 **/ -0.1** / 0.1 mm]
	002	2nd Tray (Copier)	[-9.0~+9.0 **/ -0.6**/ 0.1 mm]
	003	3rd Tray (Copier)	[-9.0~+9.0 **/ -0.3** / 0.1 mm]
	004	4th Tray (LCT Tray 1)	[-9.0~+9.0 **/ -0.8** / 0.1 mm]

SP	Number/Name		Function/[Setting]
1002	005	5th Tray (LCT Tray 2)	[-9.0~+9.0 **/ -0.8**/ 0.1 mm]
	006	6th Tray (LCT Tray 3)	[-9.0~+9.0 **/ +0.3** / 0.1 mm]
	007	7th Tray (Bypass Tray)	[-9.0~+9.0 **/ -0.3** / 0.1 mm]
	008	Duplex Tray (Copier)	[-9.0~+9.0 **/ 0** / 0.1 mm]
1003	Paper Buckle Adjustment (Registration)		Adjusts the relay clutch timing at registration. The relay clutch timing determines the amount of paper buckle at registration. (A plus or minus setting increases or decreases the amount of buckle.)
	001	Copier Paper Tray	[-9~+9 / +**4** / 1 mm]
	002	LCT	[-9~+9 / +**4** / 1 mm]
	003	Duplex Tray	[-9~+9 / +**4** / 1 mm]
1008		Duplex Fence Adjustment	Adjusts the distance between the front and rear duplex fences. [-2.0~+2.0 / **0** / 0.5 mm]
1103		Fusing Idling After Energy Saving	Selects whether fusing idling is done or not when recovering from the Energy Saving [0~1 / **0** / 1] 0: Not Done 1: Done
1105	Fusing Temperature Adjustment		
	001	Fusing Temperature in Waiting Condition	Adjusts the fusing temperature for stand-by. B070: [168~178/ **168**/ 1 deg] B071: [168~178 / **173** / 1 deg]
	002	Fusing Temperature Lower Limit	Adjusts the fusing temperature lower limit. When the fusing unit falls below this temperature, the machine stops copying. Copying automatically restarts when the fusing temperature recovers. **DFU** B070: [148~158 / **148** / 1 deg] B071: [148~158 / **153**/ 1 deg]
	003	Fusing Temperature Correction (< A4 / LT)	Specifies the amount to raise the fusing temperature from standby mode to print on paper smaller than A4/LT LEF. B070: [0~10 / **7** / 1 deg] B071: [0~10 / **10** / 1 deg]
	004	Fusing Temperature Correction (>A4 / LT)	Specifies the amount to raise the fusing temperature from standby mode to print on paper of A4/LT width LEF or wider. B070: [0~10 / **2** / 1 deg] (B070) B071: [0~10 / **5** / 1 deg] (B071) **Note**: The threshold paper width used for SP1105 003 and 004 depends on SP1105 010.
	005	Fusing Temperature Correction (Transparencies)	Specifies the amount to raise or lower fusing temperature from standby mode to print on OHP Transparencies. B070: [-10~+5 / **+2** / 1 deg] (B070) B071: [-10~+5 / **+5** / 1 deg] (B071)

SP	Number/Name		Function/[Setting]
1105	006	Fusing Temperature Correction (Translucent Sheets)	Specifies the amount to raise or lower fusing temperature from standby mode to print on Translucent Sheets (tracing paper). B070: [-10~+5 / **+2** / 1 deg] B071: [-10~+5 / **+5** / 1 deg]
	007	Fusing Lamp Switching at Warm-up	Specifies the fusing temperature when switching from 3 fusing lamps on to 2 fusing lamps on to stabilize the fusing temperature from warm-up. (The fusing lamp that heats the center of the hot roller is turned off.) [20~140 / **40** / 1°C]
	008	Fusing Temperature Adjustment in Lower Power Mode	Sets the target temperature for the hot roller when the machine enters low power mode. B070: [101~178/ **143** / 1°C] B071: [101~178/ **150** / 1°C]
	009	Fusing Idling Start Temperature	Sets the start temperature for fusing idling. [100~160 / **150** / 1°C]
	010	Paper Size Selection for Temperature Correction	Determines which threshold paper width is used for SP1105 003 and SP1105 004. [0~1 / **0** / 1] 0: LT/A4 LEF 1: 257 mm wide (B5 SEF).
	011	Fusing Lamp Switching after Low Power Mode	Specifies the fusing temperature to switch from 3 fusing lamps on to 2 fusing lamps on when the machine returns from low power mode: SP1105-1 – SP1105 011 = Actual Temp. [5~20 / **10** / 1°C] *The third lamp is not switched on to prevent overshooting the target temperature.*
1106		Fusing Temperature Display	Displays the fusing temperature.
1107		Fusing Idling Time Setting	Sets the fusing idling time. [0~60 / **10** / 1 s]
1108	Fusing Adjustment before Ready Condition		

SP	Number/Name		Function/[Setting]
	001	Waiting Condition Time Setting	Specifies the length of time to elapse after the target temperature has been reached in order to apply even heat across the length of the hot roller. Only applies when fusing idling is used. [0~180 / **80** / 1s] *This SP attempts to reduce the amount of paper wrinkling, especially if the first job is on A3 paper after the machine is started up at the beginning of the workday.*
1108	002	Temperature Correction	Corrects the fusing temperature before reaching standby temperature in order to prevent overshooting standby temperature. **DFU** [-10~-5 / **-8** / 1°C]
1109	Fusing Nip Band Check		Use OHP to execute this SP and feed 1 sheet between the hot roller and pressure roller where it remains for 30 s and is then fed out so you can measure the nip band width. [**OFF**, ON]
1902	Web Motor Control		
	001	Web Consumption	Displays how much of the web has been used, expressed as a percentage of the roll consumed. Switch the machine off/on after changing this setting. [0~107 / **0** / 1%] *When you install a partially used roll from another machine, read this SP before removal, then input that value with this SP on the next machine. Otherwise, the machine has no way of knowing how much of the partially used roll has been consumed.*
	002	Web Motor Drive Interval	Determines how often the web motor turns on. B070 EUR/A: [3~130 / **12.6** / 0.1 sec] NA: [3~130 / **20.7** / 0.1 sec] B071 EUR/A: [3~130 / **10.4** / 0.1 sec] NA: [3~130 / **17.0** / 0.1 sec]
	003	Web Motor Drive Time	Changes the time that the web motor is driven. [0.3~3.5 / **2.8** / 0.1 s]
	004	Web Near End Setting	Changes the web consumption ratio at which web near end is displayed. EUR/A: [0~100 / **86** / 1%] NA: [0~100 / **90** / 1%]

SP	Number/Name		Function/[Setting]
	005	Web Motor Drive Interval (Low Speed)	Determines how often the web motor turns on in Low Speed mode. EUR/A: [3~130 / 15.4 / 0.1 s] NA: [3~130 / 25.3 / 0.1 s]
1903	Web Drive Time		
	001	Web Total Time Display (x 200ms)	Displays the total amount of time (seconds) elapsed during web roll feed.
	002	Web Actual Time Display (x 100ms)	Displays the total amount of web roll motor operation time (seconds) for feeding the current web roll.
1906	001	Duplex Stop Position - Right	Changes the paper stop position in the duplex unit after passing duplex transport sensor 2. **DFU** [-10~+10 / 0 / 2 mm]
1907	Paper Feed Timing Adjustment		Specifies when to stop the feed clutch once a sheet of paper reaches the feed sensor and switches it on. [0~1000 / **0** / 100 ms] *This SP mode is used as a multi-feed countermeasure. However, copy (print) speed is slightly reduced.*
	001	Tray 1	
	002	Tray 2	
	003	Tray 3	
	004	Tray 4 (LCT Tray 1)	
	005	Tray 5 (LCT Tray 2)	
	006	Tray 6 (LCT Tray 3)	
	007	Tray 7 (Bypass Tray)	
	008	Translucent Sheets	

SP2-nnn Drum

SP	Number/Name		Function/[Setting]
2001	Charge Corona Bias Adjustment		
	001	Grid Voltage in Imaging Area (Auto Process Control OFF)	Adjusts the voltage applied to the grid plate during copying when auto process control is **off**. [-600~-1300 / -**900** / 10 V] *Normally, there is no need to adjust this. However, if there is an ID or TD sensor problem, the machine goes into fixed toner supply mode. After replacing the drum or charge corona wire, reset this value to the default.*
	002	Grid Voltage in ID Sensor Pattern(Auto Process Control OFF)	Adjusts the voltage applied to the grid plate when making the ID sensor pattern, when auto process control is switched **off**. [-600~-1300 / **-770** / 10 V] *Normally, there is no need to adjust this. If the user wants high-density copies, the sensor pattern must be lighter, so this voltage must be a higher negative voltage.*
	003	Grid Voltage in Imaging Area (Auto Process Control ON)	Adjusts the voltage applied to the grid plate during copying when auto process control is switched **on**. [-600~-1300 / -**1000** / 10 V] *This voltage changes every time auto process control starts up (every time the machine is switched on)*
	004	Grid Voltage for Transparencies	Adjusts the voltage applied to the grid plate when Transparency mode is selected. [-600~-1300 / -**770** / 10 V] *Use this if there is a copy quality problem when making copies on Transparencies. Normally there is no need to adjust this SP.*
	005	Total Corona Current	Adjusts the current applied to the charge corona wire except in Photo mode. [-1000~-2800 / -**1400** / 10 uA]
	006	Total Corona Current (Photo Mode)	Adjusts the current applied to the charge corona wire for Photo mode. [-1000~-2800 / -**1600** / 10 uA]
	007	Vd (Auto Process Control)	Adjusts the target VD voltage for Process Control Initial Setting. [-700~-1000 / -**800** / 5 V]
	008	Grid Voltage in Imaging Area (Auto Process Control off/Low Speed)	Adjusts the voltage applied to the grid plate during copying when auto process control is switched **off** and the machine is in the low speed mode. [-600~-1300 / -**850**/ 10 V]

SP	Number/Name		Function/[Setting]
2001	009	Grid Voltage in ID Sensor Pattern (Auto Process Control off/Low Speed)	Adjusts the voltage applied to the grid plate when making the ID sensor pattern, when auto process control is switched **off** and the machine is in the low speed mode. [-600~-1300 / **-710** / 10 V]
	010	Grid Voltage Correction in Auto Process Control (Low Speed)	Adjusts the voltage applied to the grid plate when auto process control is on and the machine is in the low speed mode. [0~300 / **110** / 10 V] (B070) [0~300 / **160** / 10 V] (B071) In low speed mode, this value is subtracted from the setting of *SP2001 003. For example, if SP2001 003 is set at 1000 and this SP is set at 90, then the value is set at 910 (1000 – 90 = 910).*
	011	Grid Voltage for Transparencies (Low Speed)	Adjusts the voltage applied to the grid plate when Transparency mode is selected and the machine is in the low speed mode. [-600~-1300 / -**710** / 10 V]
	012	Total Corona Current (Low Speed)	Adjusts the current applied to the charge corona wire when the machine is in the low speed mode (but not the Photo Mode). [-1000~-2800 / -**1400** / 10 uA]
	013	Total Corona Current for Photo Mode (Low Speed)	Adjusts the current applied to the charge corona wire for Photo mode and low speed mode. [-1000~-2800 / -**1600** / 10 uA]
2101	Printing Erase Margin		(☛3-17)
	001	Leading Edge	Adjusts the leading edge erase margin. [0~9.0/ **3.5** / 0.1 mm]
	002	Trailing Edge	Adjusts the trailing edge erase margin. [0~9.0/ **2.5** / 0.1 mm]
	003	Left edge	Adjusts the left side erase margin. [0~9.0/ **2.0** / 0.1 mm]
	004	Right edge	Adjusts the right side erase margin. [0~9.0/ **2.0** / 0.1 mm]
2103	LD Power Adjustment		DFU
2104	LD Power Adjustment (for ID Sensor Pattern)		Selects the LD power for making the ID pattern when auto process control is switched on.
	001	Normal Speed	**DFU** [0~15 / **4** / 1]
	002	Low Speed	**DFU** [0~15 / **3** / 1]
2105	LD Power Correction		This SP mode corrects the banding caused by: 1) changes in drum characteristics over time, and 2) LD power fluctuations. (☛3-17)

SP	Number/Name		Function/[Setting]
2105	001	Correction in Printer Mode	If switched ON, this allows each channel to be adjusted for 1200 dpi print output with the SP settings below (LD0 ~ LD7). [0~1 / **1** / 1] 0: OFF, 1: ON
	002	Correction in Copy Mode	If switched ON, this allows each channel to be adjusted for copy output with the SP settings below (LD0 ~ LD7). [0~1 / **0** / 1] 0: OFF, 1: ON
	003	LD0 Power Correction	Correct the power of LD0 after either SP2105-001 or -002 is switched on. [-40~+40 / **-2** /1]
	004	LD1 Power Correction	Corrects the power of LD1 after either SP2105-001 or -002 is switched on. [-40~+40 / **-2** /1]
	005	LD2 Power Correction	Corrects the power of LD2 after either SP2105-001 or -002 is switched on. [-40~+40 / +**2** /1]
	006	LD3 Power Correction	Corrects the power of LD3 after either SP2105-001 or -002 is switched on. [-40~+40 / +**2** /1]
	007	LD4 Power Correction	Corrects the power of LD4 after either SP2105-001 or -002 is switched on. [-40~+40 / +**2** /1]
	008	LD5 Power Correction	Corrects the power of LD5 after either SP2105-001 or -002 is switched on. [-40~+40 / +**2** /1]
	009	LD6 Power Correction	Corrects the power of LD6 after either SP2105-001 or -002 is switched on. [-40~+40 / -**2** /1]
	010	LD7 Power Correction	Corrects the power of LD7 after either SP2105-001 or -002 is switched on. [-40~+40 / -**2** /1]
2111	FCI Shade Detection		Allows shading detection if FCI (Fine Character Adjustment) smoothing is on. With this SP switched on, photos and painted areas are detected, and FCI is not applied in these areas. FCI is used for printer mode output only.
	001	Matrix Size (600 dpi)	[0~128 / **18** / 1] 0: OFF
	002	Threshold Value (600 dpi)	[0~128 / **4** / 1] 0: OFF
	003	Matrix Size (400 dpi)	[0~128 / **18** / 1] 0: OFF
	004	Threshold Value (400 dpi)	[0~128 / **4** / 1] 0: OFF

SP	Number/Name		Function/[Setting]
2114	Printer Dot Edge Parameter Setting		Allows setting a parameter for binary edge processing for the printer application with FCI switched off. This SP allows adjustment of image quality if the desired effect cannot be achieved with the default settings for edge processing. In general, increasing the values produces thicker lines and decreasing them produces thinner lines. However, some settings could cause defective images on white paper.
	001	Leading Dot Level Setting (1200 dpi)	[2~8 / **5**/ 1]
	002	Trailing Dot Level Setting (1200 dpi)	[2~8 / **5**/ 1]
	003	Multiple Dot Level Setting (1200 dpi)	[2~8 / **8** / 1]
	004	Independent Dot Level Setting (1200 dpi)	[2~8 / **6**/ 1]
	005	Leading Dot Level Setting (600 dpi)	[2~16 / **12**/ 1]
	006	Trailing Dot Level Setting (600 dpi)	[2~16 / **12**/ 1]
	007	Multiple Dot Level Setting (600 dpi)	[2~16 / **16**/ 1]
	008	Independent Dot Level Setting (600 dpi)	[2~16 / **12**/ 1]
2115	Main Scan Beam Pitch Adjustment		A label attached to the LD unit service part lists the correct settings.
	001	Pitch Adjustment Between LD0 and LD2 (LD0)	[-100~100 / **0** / 1 μm]
	002	Pitch Adjustment Between LD0 and LD4 (LD0)	[-100~100 / **0** / 1 μm]
	003	Pitch Adjustment Between LD0 and LD6 (LD0)	[-100~100 / **0** / 1 μm]
	004	Pitch Adjustment Between LD1 and LD3 (LD1)	[-100~100 / **0** / 1 μm]
	005	Pitch Adjustment Between LD1 and LD5 (LD1)	[-100~100 / **0** / 1 μm]
	006	Pitch Adjustment Between LD1 and LD7 (LD1)	[-100~100 / **0** / 1 μm]
2201	Development Bias Adjustment		
	001	Image Area	Adjusts the development bias for copying. [-200~-800 / -**550** / 10 V] *This can be adjusted as a temporary measure if faint copies appear due to an aging drum.*
	002	ID Sensor Pattern (Auto Process Control OFF)	Adjusts the development bias for making the ID sensor pattern for VSP measurement when the auto process control is set to off. [-200~-800 / -**400** / 10 V] *This should not be used in the field, because it affects ID sensor pattern density, which affects toner supply.*

SP	Number/Name		Function/[Setting]
2201	003	Transparencies	Adjusts the development bias for copying on Transparencies. [-200~-800 / **-400** / 10 V]
	004	ID Sensor Development Potential	Adjusts the development potential for making the ID sensor pattern for VSP measurement when the auto process control is set on. [140~380 / **240** / 10 V]
	005	Image Area (Low Speed)	Adjusts the development bias for copying in low speed mode. B070: [-200~800 / -**480** / 10 V] B071: [-200~800 / -**450** / 10 V]
	006	ID Sensor Pattern (Auto Process Control OFF/Low Speed)	Adjusts the development bias for making the ID sensor pattern for VSP measurement when the auto process control is set to off and the machine is in low speed mode. B070: [-200~800 / **-370** / 10 V] B071: [-200~800 / **-350** / 10 V]
	007	Transparencies (Low Speed)	Adjusts the development bias for copying onto Transparencies in low speed mode. B070: [-200~800 / **-370** / 10 V] B071: [-200~800 / **-350** / 10 V]
	008	ID Sensor Development Potential (Low Speed)	Adjusts the development potential for making the ID sensor pattern for VSP measurement when the auto process control is set on and the machine is in the low speed mode. B070: [0~200 / **30** / 10 V] B071: [0~200 / **50** / 10 V] *This value is subtracted from the setting of SP2201 004. For example, if 004 is set at 240 and 008 set at 60, then the value is adjusted to 180 (240 – 60 = 180).*
2207	Toner Supply		
	001	Forced Toner Supply	Forces toner supply for 10 seconds from the toner bank through the toner hopper to the development unit. Press Start to force toner supply. *This mode finishes automatically after the toner supplied 10 times. Use to determine if toner supply is operating correctly. If forcing toner supply with this SP does not darken the image, then toner supply is not operating correctly.*

SP	Number/Name		Function/[Setting]
2207	002	Toner Bank Toner Setup	Turns on the drum motor, development motor, development bias, toner supply motor and charge corona. Then turns on the toner supply coil clutch to supply toner to the toner hopper, but not to the development unit. Requires about 7 minutes. Remove the white gear from the toner hopper and install the red gear. Press Start. Install the white gear again after finishing with this SP mode. *Use this SP to fill the toner transport path with toner after cleaning the toner supply unit, or at installation.*
2208	Toner Supply Mode		Selects the toner supply mode: Sensor Control or Image Pixel Count. [0~1 / **0** / 1] 0: Sensor Control 1: Pixel Count *Select Image Pixel Count only if the TD sensor has failed and cannot be replaced immediately, so that the customer can use the machine. Return the setting to Sensor Control after replacing the sensor.*
2209	Toner Supply Rate		
	001	Normal Speed	Adjust the toner supply amount from the hopper for the normal operation. B070: [100~2000 / **850** / 10 mg/s] B071: [100~2000 / **1000** / 10 mg/s] *Increasing this value reduces the toner supply roller clutch on time. Use a lower value if the user tends to make lots of copies that have a high proportion of black.*
	002	Low Speed	Allows adjustment of the toner supply amount from the hopper for low speed mode. B070: [100~2000 / **850** / 10 mg/s] B071: [100~2000 / **1000** / 10 mg/s]
2210	ID Sensor Pattern Interval		Changes the interval for making the ID sensor pattern (VSP/VSG detection). [1~500 / **10** / 1 copy] *If the user normally makes copies with a high proportion of black, reduce the interval.*

SP	Number/Name		Function/[Setting]
2220	Vref Manual Setting		Adjusts the TD sensor reference voltage (Vref) manually. [0~5.0 / **2.5** / 0.01 V] Change this value after replacing the development unit with another one that already contains toner. To use a development unit from another machine for test purposes: 1) Check the value of SP2220 and SP2906 in both the machine containing the test unit and the machine that you are going to move it to. 2) Install the test development unit, then input the VREF for this unit into SP2220 and the Vcont for this unit into SP2906. 3) After the test, put back the old development unit, and change SP2220 and SP2906 back to the original value.
2223	Vt Display		Displays the current TD sensor output voltage. [0~5.0 / **2.5** / 0.01 V]
2226	Toner Bank Toner Discharge		This SP removes toner from the toner bank and sends it to the toner hopper. After turning the toner supply motor and the toner bank motor on, the toner supply coil clutch turns on and off at 2 second intervals. The motors and clutch stop when the toner near-end sensor (in the toner bank unit) detects no toner. Even if the sensor continues to detect toner, this operation stops when the clutch has been turned on and off 10 times, so this SP may have to be repeated to clean out the system completely.
2227	Toner Supply Mode Display		Displays the toner supply mode used for the last copy. 1: ID Sensor and TD Sensor (from the 11th copy, using VT – VREF) 2: ID Sensor and TD Sensor (using VSP/VSG) – before the 10th copy of a job 3: TD Sensor – temporary mode when ID sensor output is abnormal 4: Image Pixel Count
2301	Transfer Current Adjustment		Adjusts the current applied to the transfer belt during copying, depending on the side, media type, and operation mode (normal or low speed).
	001	1st Copy Side	B070: [10~200 / **110**/ 1 μA] B071: [10~200 / **120** / 1 μA]
	002	Thick Paper	B070: [10~200 / **110**/ 1 μA] B071: [10~200 / **120** / 1 μA]

SP	Number/Name		Function/[Setting]
2301	003	Transparencies	[10~200 / **140** / 1 μA]
	004	Translucent Sheets	B070: [10~200 / **110**/ 1 μA] B071: [10~200 / **120** / 1 μA]
	005	2nd Copy Side	B070: [10~200 / **110**/ 1 μA] B071: [10~200 / **120** / 1 μA]
	006	Between Papers	[10~200 / **20** / 1 μA]
	007	1st Copy Side (Low Speed)	[10~200 / **80** / 1 μA]
	008	Thick Paper (Low Speed)	[10~200 / **80** / 1 μA]
	009	Transparencies (Low Speed)	[10~200 / **90** / 1 μA]
	010	Translucent Sheets (Low Speed)	[10~200 / **80** / 1 μA]
	011	2nd Copy Side (Low Speed)	[10~200 / **80** / 1 μA]
	012	Between Papers (Low Speed)	[10~200 / **20** / 1 μA]
2506	Cleaning Interval-Multiple Copy		
	001	On / Off	Selects whether multiple jobs are stopped at regular intervals in order to 1) reverse the drum to clean the cleaning blade edge, or 2) create an ID sensor pattern to correct toner density control. This SP switches this feature on and off. SP2506 002 sets the interval. [0~1 / **1**/1] 0: OFF, 1: ON *Use if the drum gets dirty or images get too pale or too dark during long copy jobs.*
	002	Interval	Selects the interval at which multi copy jobs are stopped for blade cleaning. [1~100 / **30**/ 1 min] *Reduce the value if a large amount of paper dust is causing black lines on the copy*.
2801	TD Sensor Initial Setting		Performs the TD sensor initial setting. This SP mode controls the voltage applied to the TD sensor to make the TD sensor output about 2.5 V. After finishing this, the TD sensor output voltage is displayed. Press Start to execute. You must enter the developer lot number. (The lot number is stenciled on the top edge of the developer package.) *Use this mode only after changing the TD sensor or the developer.*
2803	Charge Corona Cleaner On		Turns on the corona wire cleaner manually. Press Start to execute. *When copy density across the paper is uneven, clean the wire with this SP.*

SP	Number/Name		Function/[Setting]
2804	Charge Corona Cleaner Setting		
	001	Corona Wire Cleaner Operation Setting	Selects when automatic corona wire cleaning is done. [0~2 / **2** / 1] 0: OFF 1: With process control and at intervals selected with SP2804 002 2: At intervals selected with SP2804 002.
	002	Corona Wire Cleaner Interval	Selects the interval for automatic corona wire cleaning. [100~10000 / **5000** / 100 copies]
2902	Test Pattern		
	001	IPU Scanning Test Pattern	Prints the scan test patterns for the IPU chip. [0~17 / **0** / 1]
	002	IPU Printing Test Pattern	Prints the print test pattern for the IPU chip. [0~8 / **0** / 1]
2902	003	Printing Test Pattern	Prints the printer test patterns. [0~38 / **0** / 1]
2906	001	Vcont Manual Setting	Adjusts the TD sensor control voltage (Vcont) manually. [4.0~24.0 / **9.7** / 0.1 V] *Change this value after replacing the development unit with another one that already contains toner. For example, when using a development unit from another machine for test purposes.(See SP2220.)*
2909	Main Scan Magnification		
	001	Copy	Adjusts the magnification in the main scan direction for copy mode. (☛3-17) [-2.0~+2.0 / **0** / 0.1%] *Use the "• / *key to enter the minus (–) before entering the value.*
	002	Printer	Adjusts the magnification in the main scan direction for printing mode. (☛3-17) [-2.0~+2.0 / **0** / 0.1%] *Use the "• / *key to enter the minus (–) before entering the value.*
2910	Writing Sub Scan Magnification		Adjusts the magnification in the sub scan direction. (☛3-17) [-1.0~+1.0 / **0** / 0.1%] *Use the "• / *key to enter the minus (–) before entering the value.*
2911	Transfer Current On / Off Timing		
	001	La (ON)	Adjusts the transfer current on timing at the leading edge. [-30~+30 / **0** / 1 mm]
	002	Lb (Switch)	Adjusts the transfer current on/off exchange timing. [0~60 / **45** / 1 mm]

SP	Number/Name		Function/[Setting]
2911	003	Lc (OFF)	Adjusts the transfer current off timing (for example: –5 mm is 5 mm after the trailing edge). [-30~+30 / **0** / 1 mm]
2912	Drum Reverse Rotation Interval		
	001	1st Reverse Rotation	Sets the length of time the drum is reversed to clean the drum cleaning blade. [0~7 / **2** / 20 ms]
	002	Forward Rotation After 1st Reverse Rotation	Sets the length of time the drum is rotated forward after the 1st reverse rotation. [0~7 / **0** / 20 ms]
	003	2nd Reverse Rotation	Sets the length of time the drum is reversed for the 2nd reverse rotation to clean the drum cleaning blade again. [0~7 / **0**/ 20 ms]
2915	Drum Heater Adjustment		SP 2915 is currently not being used. Do not change the settings.
	001	ON Time at Power On （＜100°C）	[0~10 / **0** / 1 min.] **DFU**
2915	002	ON Time at Power On (＜140°C)	[0~10 / **0** / 1 min.] **DFU**
	003	Drum Temperature	**DFU**
	004	Sensor Output Value (Direct)	**DFU**
	005	Sensor Output Value (Atmosphere)	**DFU**
	006	Forced Heater ON	**DFU**
2920	LD Off Check		Checks whether the LD turns off or on when the front door is opened. **DFU** [0~1 / **0** / 0] 0: ON 1: OFF
2940	Leading Edge Transfer Current		Adjusts the leading edge transfer current for each paper feed station at normal and low speed.
	001	Tray 1	Tandem Tray – Copier, Normal Speed B070: [10~200 / **110**/ 1 μA] B071: [10~200 / **120**/ 1 μA]
	002	Tray 2	Universal Tray – Copier, Normal Speed B070: [10~200 / **110**/ 1 μA] B071: [10~200 / **120**/ 1 μA]
	003	Tray 3	Universal Tray – Copier, Normal Speed B070: [10~200 / **110**/ 1 μA] B071: [10~200 / **120**/ 1 μA]
	004	Tray 4	LCT 1st Tray, Normal Speed B070: [10~200 / **110**/ 1 μA] B071: [10~200 / **120**/ 1 μA]
	005	Tray 5	LCT 2nd Tray, Normal Speed B070: [10~200 / **110**/ 1 μA] B071: [10~200 / **120**/ 1 μA]

SP	Number/Name		Function/[Setting]
2940	006	Tray 6	LCT 3rd Tray, Normal Speed B070: [10~200 / **110**/ 1 μA] B071: [10~200 / **120**/ 1 μA]
	007	Tray 7 (Bypass Tray)	Bypass Tray, Normal Speed B070: [10~200 / **110**/ 1 μA] B071: [10~200 / **120**/ 1 μA]
	008	Duplex Tray	Duplex Tray – Copier, Normal Speed B070: [10~200 / **110**/ 1 μA] B071: [10~200 / **120**/ 1 μA]
	009	Tray 1 (Low Speed)	Tandem Tray – Copier, Low Speed [10~200 / **80** / 1 μA]
	010	Tray 2 (Low Speed)	Universal Tray – Copier, Low Speed [10~200 / **80** / 1 μA]
	011	Tray 3 (Low Speed)	Universal Tray – Copier, Low Speed [10~200 / **80** / 1 μA]
	012	Tray 4 (Low Speed)	LCT 1st Tray, Low Speed [10~200 / **80** / 1 μA]
	013	Tray 5 (Low Speed)	LCT 2nd Tray, Low Speed [10~200 / **80** / 1 μA]
	014	Tray 6 (Low Speed)	LCT 3rd Tray, Low Speed [10~200 / **80** / 1 μA]
2940	015	Tray 7 (Low Speed)	Bypass Tray, Low Speed [10~200 / **80** / 1 μA]
	016	Duplex Tray (Low Speed)	Duplex Tray –Copier, Low Speed [10~200 / **80** / 1 μA]
2941	Recycled Paper Transfer Control		Determines whether recycled paper is handled as plain paper or thick paper. [0~1 / **0** / 1] 0: Plain paper 1: Thick paper Setting this mode to 1 is effective when the image at the leading edge is not good. To use this SP, “Recycled Paper” should be selected in the Tray Paper Settings screen. *Selecting “Thick paper” in the Tray paper Settings screen has the same effect as this SP, but the “Thick Paper” selection does not allow duplexing or punching.*
2961	Developer Initialization (Factory)		**DFU**

SP	Number/Name	Function/[Setting]
2962	Auto Process Control Execution	Press Start to execute and automatically adjust the following: 1. Drum potential sensor 2. ID sensor 3. Charge grid voltage Vg (by changing Vd) 4. LD power (by changing Vh) 5. VL detection. *Before using this SP, auto process control should be on (SP3-901). After changing the drum, ID sensor, drum potential sensor, LD unit, charge corona wires, or toner density sensor, this SP should be executed.*
2966	Periodical Auto Process Control	Selects whether auto process control is done after 24 hours have elapsed after the last copy job. [0~1 / **0**/ 1] 0: OFF 1: ON *This setting is required for a customer who keeps the main switch on all day.*
2967	Auto Image Density Adjustment	Selects whether auto image density adjustment is done during machine warm up. This mode is to counter dirty background that occurs when a machine is used in an area that contains ammonia. [0~1 / **0**/ 1] 0: OFF 1: ON *If Periodical Auto Process Control (SP2-966) is used, this adjustment is done also after the auto process control is finished.*
2968	Toner Density Correction	To prevent the image density dropping during continuous copying after a long interval (this is caused by a sudden increase of Q/M), VREF is changed by –0.06 V every (100 X [SP2-974 value + 1]) prints. This correction is applied from when the auto process control is done, until "(the number of prints set in this SP mode) X (SP2-974 value +1)" has been made. [0~20 / **0** / 1K copies]
2969	ID Sensor Pattern Interval-Multiple Copy	Twenty ID patterns are made in an interval of about 1 minute during a continuous copy process just after process control is completed. Image density will be stabilized. However, printing productivity will be reduced. [0~1 / **0**/ 1] 0: OFF 1: ON

SP	Number/Name		Function/[Setting]
2972	Toner Suction Collection Bottle Operation Time		Displays the total operation time of the development unit toner collection bottle. [0~600 / **0** / 1 hour] Need to replace soon: 580 hours Need to replace now: 600 hours *After the bottle is replaced, reset the value to 0 (zero) by pressing 0 and # (Enter) keys.*
2973	Toner Suction Motor Operation Time		Displays the total operation time of the development toner suction motor. [0~600 / **0** / 1 hour] Need to replace soon: 570 hours Need to replace now: 600 hours *After the motor is replaced, reset the value to 0 (zero) by pressing 0 and #.*
2974	Toner Supply Interval		Adjusts how often toner is supplied [0~3 / **0** / 1] 0: 1/1 (every print) 1: 1/2 (every 2 prints) 2: 1/3 (every 3 prints) 3: 1/4 (every 4 prints) *The operation of SP2968 now depends on this SP mode setting. In this machine, the Vref update interval has been changed from "every 100 prints" to "every [100X(SP2-974 value +1)] prints". For example, if set to 1, toner is supplied every 2 prints, and SP 2-974 value + 1 = 3.*
2975	Toner Recycle Cut Counter		
	001	ON Counter	Determines how often all recycled toner is discarded. The purpose of this feature is to periodically remove all recycled toner contaminated with paper dust. [0~999 / **200** / 1 K copies] *This setting determines when the toner separation solenoid closes the shutter and shunts all toner to the waste toner collection bottle. For details, see "Toner Recycling" in Section 6.*
	002	OFF Counter	This setting determines how long all toner is shunted to the waste toner collection bottle (no recycling). [0~255 / **25** / 1 K copies] *This setting determines when the toner separation solenoid opens the shutter and toner recycling starts.*
2980	Toner Consumption Pattern Interval		Use this SP to improve drum cleaning if required. It determines how long the drum turns after the ID sensor pattern is created before the toner consumption pattern is created. [0~30 / **0** / 1 minutes] **DFU** 0: No toner consumption pattern created.

SP3-nnn Processing

SP	Number/Name		Function/[Setting]
3001	ID Sensor Initial Setting		
	001	ID Sensor PWM Setting	This SP mode recovers the machine when an SC condition occurs because ID Sensor Initial Setting is not done after doing an NVRAM Clear or replacing the NVRAM. Reset this SP to the factory setting in this case. [0~255 / **62** / 1] *The PWM data is stored when ID Sensor Initial Setting is done.*
	002	ID Sensor Initialization	Performs the ID sensor initial setting. The ID sensor output for the bare drum (VSG) is adjusted to 4.0 ± 0.2 V. *This SP mode should be performed: 1) After replacing or cleaning the ID sensor, 2) After replacing the NVRAM or doing an NVRAM clear.*
3103	ID Sensor Output Display		
	001	Vsg	Displays the current value of the ID sensor output after checking the bare drum surface.
	002	Vsg Initial	Displays Vsg when the Vsp adjustment is done.
	003	Vsp	Displays the current value of the ID sensor output after checking the ID sensor pattern image.
	004	Vsgp	Displays the value of the ID sensor output immediately after Vsp is output when the charge potential drops. This reading is used to test and determine characteristics for design. **DFU**
3901	Auto Process Control Setting		
	001	Auto Process Control Setting	Determines whether machine checks and corrects drum potential (Vd) and LD power when the fusing temperature is lower than 100°C at power-on. [0~1 / **1**/ 1] 0: OFF 1: ON *This setting attempts to change the Vd setting consistent with the OPC, the charge corona unit, and environment to improve the reliability of the system.*
	002	VL Correction Control Setting	Determines whether VL detection and correction are performed during process control every 1K copies. [0~1 / **0**/ 1] **DFU** 0: OFF 1: ON *Even with this SP switched ON, VL detection and correction will not be performed if SP3901 001 is OFF.*

SP	Number/Name		Function/[Setting]
3902	Process Control Data Display		
	001	Auto Process Control	Displays whether auto process control is switched on or off [0:Off, 1:**On**] When auto process control is on and the potential sensor is calibrated correctly, "ON" appears on the operation panel. *Auto process control is not executed when this SP is switched off.* *After RAM is cleared*, this SP setting goes off.
	002	V D	Displays the drum potential.
	003	V H	Displays the standard halftone drum potential, used for laser power adjustment.
	004	V G	Displays the charge grid voltage resulting from the latest Vd adjustment.
	005	LD Power (Correction)	Displays the LD power correction value as a result of the latest Vh adjustment.
	006	V ID	Displays the latest drum surface voltage measured on the ID sensor pattern.
	007	V M200	Displays the acquired value when the potential sensor is calibrated after application of –200V to the drum.
	008	V M700	Displays the acquired value when the potential sensor is calibrated after application of -700V.
	009	VD Correction	Determines whether VD correction is performed. **DFU** [0~1 / **0**/ 1] 0: No Correction. Correction with value of SP2001 007 only 1: Correction with value of SP2001 007 + 50V
	010	VL (Auto Process Control)	Displays the value of VL at auto process control initialization.
	011	VL Correction (Auto Process Control)	Displays the amount of correction (ΔVLref) according to results of the VL detection at auto process control.
	012	VL	Displays the latest value of VL.
	013	VL Correction	Displays the amount of correction (ΔVLref) according to the latest VL detection results.
	014	VB	Displays the value of the current image development bias output, determined by the results of VL detection.
⇒ 3903	VD Correction Counter		Adjusts the starting point for the VD Correction. Displays whether the VD correction is being performed. The target value for VD correction is "the value of SP2-001-7 + 50". [0~999 / **200** / 1 K copies] *The counter is automatically reset to 0 (zero) when SP2-801 is performed.*

Service Tables

SP4-nnn Scanner

SP	Number/Name		Function/[Setting]
4008	Scanner Sub Scan Magnification		Adjusts the magnification in the sub scan direction for scanning. If this value is changed, the scanner motor speed is changed. (☛3-17) [-0.9~+0.9 / **0** / 0.1 percent] *Use the "• / *key to enter the minus (–) before entering the value.* *Setting a lower value reduces the motor speed and lengthens the image in the sub scan direction (paper direction). Setting a larger value increases the motor speed and shortens the image in the sub scan direction.*
4010	Scanner Leading Edge Registration		Adjusts the leading edge registration for scanning. (☛3-17) [-9.0~+9.0 / **0** / 0.1 mm] *Use the "• / *key to enter the minus (–) before entering the value.* *A minus setting moves in the direction of the leading edge. A larger value shifts the image away from the leading edge, and a smaller value shifts the image toward the leading edge.*
4011	Scanner Side-to-Side Registration		Adjusts the side-to-side registration for scanning. (☛3-17) [-3.0~+3.0 / **0** / 0.1 mm] (–): The image disappears at the left side. (+): The image appears at the left side. *Use the "• / *key to enter the minus (–) before entering the value.*
⇒ 4012	Scanner Erase Margin		Adjusts the erase margin for scanning. The leading, trailing, right and left margins can be set independently. *Do not adjust this unless the user wishes to have a scanner margin that is greater than the printer margin.* [0~9.0 / **0.5** / 0.1 mm]
	001	Leading Edge	
	002	Trailing Edge	
	003	Right	
	004	Left	
⇒ 4013	Scanner Free Run		
	001	Scanner Free Run: Lamp ON	Allows scanner free running with the exposure lamp on.
	002	Scanner Free Run: Lamp OFF	Allows scanner free running with exposure lamp off.

SP	Number/Name		Function/[Setting]
4015	Scanner Speed Adjustment		Displays the value of the scanner speed fine adjustment. [-20~+20 / **0** / 1] *Scanner speed fine adjustment is automatically done when the main switch is turned on, and the current setting is overwritten.*
4301	APS Sensor Output Display		Displays the APS sensor output signals when an original is placed on the exposure glass.
4303	APS A5 / HLT Size Detection		Selects whether or not the machine determines that the original is A5/HLT size when the APS sensor does not detect the size. [0~1 / **0** / 1] 0: Not detected 1: A5 length/51/2" x 81/2" *If 1 is selected, the paper size is determined as A5 length/51/2" X 81/2" even if the paper size is too small to be detected on the exposure glass.*
4600	Read SBU ASIC ID		Displays the SBU ID code confirmed by reading the SBU after the SBU adjusts automatically at power on. **DFU** [0~FFFF / **B550** / 0]
4601	SBU PLL Adjustment		Adjusts the PLL bandwidth. **DFU** [9322~9326 / **9324** / 1]
4605	Scanner Adjustment		
	001	Flag Display	Displays a flag to indicate whether density control adjustment was executed with the standard white board for the CCD. **DFU** [0~1 / **0** / 1] 0: Not executed. 1: Executed
	002	Start	Starts the density adjustment for the CCD using the standard white board. Place 10 sheets of A3 plain paper on the exposure glass, then press Execute. A message is displayed to indicate the success or failure of the adjustment. **DFU**
4610	001	Standard White Level Adjustment	**DFU**
4613	001	Standard White Level Adjustment Normally	**DFU**
4616	001	Standard White Level Adjustment at Factory	**DFU**
4624	Read Offset Data		
	001	FE ch	**DFU**
	002	FO ch	**DFU**

SP	Number/Name		Function/[Setting]
4624	003	LE ch	**DFU**
	004	LO ch	**DFU**
4632	Gain Adjustment		
	001	FE ch	**DFU**
	002	FO ch	**DFU**
	003	LE ch	**DFU**
	004	LO ch	**DFU**
4641	001	White Adjust Loop	**DFU**
4646	001	SBU Adjustment Error Flag	**DFU**
4647	001	SBU Hard Error Flag	**DFU**
4662	Gain Adjustment Normally		
	001	FE ch	**DFU**
	002	FO ch	**DFU**
	003	LE ch	**DFU**
	004	LO ch	**DFU**
4681	Gain Adjustment at Factory		
	001	FE ch	**DFU**
	002	FO ch	**DFU**
	003	LE ch	**DFU**
	004	LO ch	**DFU**
4691	Read Shading Data		
	001	FE ch	**DFU**
	002	FO ch	**DFU**
	003	LE ch	**DFU**
	004	LO ch	**DFU**
4694		Offset Adjustment	
	001	F side	**DFU**
	003	L side	**DFU**
4901	Scan Correction		
	001	Shading Correction: AEREF Setting	Changes the AEREF (Automatic Exposure Reference) value used in shading correction for the image scanned from the front side (SBU). **DFU** [0~63 / **0** / 1]
	002	Shading Correction: Shading Data Output	Changes the AEREF (Automatic Exposure Reference) value used in digital A/E processing. **DFU** [0~1 / **0** / 1] 0: Normal 1: Output
	003	Digital AE: AEREF Setting	Changes the AEREF (Automatic Exposure Reference) value used in digital A/E processing for the image data. **DFU** [-63~+63 / **-12** / 1]

SP	Number/Name		Function/[Setting]
4901	004	Digital AE: Low Limit	Sets the low limit at 120 for the value used in digital A/E processing for the image data. **DFU** [0~1 / **1** / 1] **0**: No low limit 1: Low limit set
	020	Background Erase: Blue Original (Lighter)	Sets the strength of background blue erase when orange original mode is selected. [168~255 / **180** / 1] *A higher setting erases more background and a lower setting less.*
	021	Background Erase: Blue Original (Normal)	Sets the strength of background blue erase when the green original mode is selected. [131~167 / **155** / 1] *A higher setting erases more background and a lower setting less.*
	022	Background Erase: Blue Original (Darker)	Sets the strength of background blue erase when blue original mode is selected [25~130 / **105** / 1] *A higher setting erases more background and a lower setting less.*
4903	Image Quality Adjustment		
	001	Text Mode (25.0-55.0%)	Adjusts the sharpness and texture of images processed in Text mode. [0~10 / **5** / 1] 0: Softest 1: Soft Mode 2: ↑ 3: ↑ 4: ↑ 5: Normal (Default) 6: ↓ 7: ↓ 8: ↓ 9: Sharp Mode 10: Sharpest
	002	Text Mode (55.5-75.0%)	
	003	Text Mode (75.5-160.0%)	
	004	Text Mode (160.5-400.0%)	
	005	Photo Mode Dithering (25.0-55.0%)	Adjusts the sharpness and texture of images processed in Photo mode with dithering [0~6 / **3** / 1] 0: Softest 1: ↑ 2: ↑ 3: Print Original Mode (Default) 4: ↓ 5: ↓ 6: Sharpest
	006	Photo Mode Dithering (55.5-75.0%)	
	007	Photo Mode Dithering (75.5-160.0%)	
	008	Photo Mode Dithering (160.5-400.0%)	
	009	Photo Mode Error Diffusion (25.0-55.0%)	Adjusts the sharpness and texture of images processed in Photo mode with

SP	Number/Name		Function/[Setting]
4903	010	Photo Mode Error Diffusion (55.5-75.0%)	error diffusion. [0~6 / **1** / 1] 0 Softest 1: Normal (Default) 2: ↑ 3: ↑ 4: ↑ 5: Print Original Mode 6: Sharpest
	011	Photo Mode Error Diffusion (75.5-160.0%)	
	012	Photo Mode Error Diffusion (160.5-400.0%)	
	013	Text / Photo Mode (25.0-55.0%)	Adjusts the sharpness and texture of images processed in Text/Photo mode. [0~10 / **5** / 1] 0: Softest 1: Photo Priority 2: ↑ 3: ↑ 4 ↑ 5 Normal (Default) 6 ↓ 7 ↓ 8 ↓ 9 Text Priority 10 Sharpest
	014	Text / Photo Mode (55.5-75.0%)	
	015	Text / Photo Mode (75.5-160.0%)	
	016	Text / Photo Mode (160.5-400.0%)	
	017	Pale Mode (25.0-55.0%)	Adjusts the sharpness and texture of images processed in Pale mode. [0~10 / **5** / 1] 1: Softest 2: Soft Mode↑ 3: ↑ 4: ↑ 5: Normal (Default) 6: ↓ 7: ↓ 8: ↓ 9: Sharp 10: Sharpest
	018	Pale Mode (55.5-75.0%)	
	019	Pale Mode (75.5-160.0%)	
	020	Pale Mode (160.5-400.0%)	
	021	Generation Mode (25.0-55.0%)	Adjusts the sharpness and texture of images processed in Generation mode. [0~10 / **5** / 1] 0: Softest 1: Soft 2: ↑ 3: ↑ 4: ↑ 5: Normal (Default) 6: ↓ 7: ↓ 8: ↓ 9: Sharp 10: Sharpest
	022	Generation Mode (55.5-75.0%)	
	023	Generation Mode (75.5-160.0%)	
	024	Generation Mode (160.5-400.0%)	

SP	Number/Name		Function/[Setting]
4903	060	Independent Dot Erase: Text Mode	Sets the level for independent dot erasure. [0~14 / **8** / 1] 0: Off The higher the setting, the stronger the effect.
	061	Independent Dot Erase: Photo Mode	[0~14 / **0** / 1] 0: Off
	062	Independent Dot Erase: Text / Photo Mode	
	063	Independent Dot Erase: Pale Mode	
	064	Independent Dot Erase: Generation Mode	[0~14 / **8** / 1] 0: Off
	070	Background Erase: Text Mode	Sets the level for background erase. [0~255 / **0** / 1] The higher the setting, the stronger the effect.
	071	Background Erase: Photo Mode	
	072	Background Erase: Text / Photo Mode	
	073	Background Erase: Pale Mode	
	074	Background Erase: Generation Mode	
	080	Line Width Correction: Text Mode Select	Selects the level of line width correction for Text mode. [0~8 / **2** / 1] The higher the setting, the thicker the line.
	081	Line Width Correction: Text Mode (Main Scan)	Switches on line width correction in the main scan direction in text mode. [0~1 / **1** / 1] 0: Line width correction OFF **1**: Line width correction ON
	082	Line Width Correction: Text Mode (Sub Scan)	Switches on line width correction in the sub scan direction in text mode. [0~1 / **1** / 1] 0: Line width correction OFF **1**: Line width correction ON
	083	Line Width Correction: Photo Mode Select	Selects the level of line width correction for photo mode. [0~8 / **4** / 1] The higher the setting, the thicker the line.
	084	Line Width Correction: Photo Mode (Main Scan)	Switches on line width processing for the main scan direction in photo mode. [0~1 / **1** / 1] 0: Line width correction OFF **1**: Line width correction ON

SP	Number/Name		Function/[Setting]
4903	085	Line Width Correction: Photo Mode (Sub Scan)	Switches on line width correction in the sub scan direction in Photo mode. [0~1 / **1** / 1] 0: Line width correction OFF **1**: Line width correction ON
	086	Line Width Correction: Text / Photo Mode Select	Selects the level of line width processing for text/photo mode. [0~8 / **4** / 1] The higher the setting, the thicker the line.
	087	Line Width Correction: Text / Photo Mode (Main Scan)	Switches on line width processing for the main scan direction in text/photo mode. [0~1 / **1** / 1] 0: Line width correction OFF **1**: Line width correction ON
	088	Line Width Correction: Text / Photo Mode (Sub Scan)	Switches on line width processing for the the sub scan direction in text/photo mode. [0~1 / **1** / 1] 0: Line width correction OFF **1**: Line width correction ON
	089	Line Width Correction: Pale Mode Select	Selects the level of line width processing for pale mode. [0~8 / **4** / 1] The higher the setting, the thicker the line.
	090	Line Width Correction: Pale Mode (Main Scan)	Switches on line width processing for the main scan direction in pale mode. [0~1 / **1** / 1] 0: Line width correction OFF **1**: Line width correction ON
	091	Line Width Correction: Pale Mode (Sub Scan)	Switches on line width processing for the sub scan direction in pale mode [0~1 / **1** / 1] 0: Line width correction OFF **1**: Line width correction ON
	092	Line Width Correction: Generation Mode Select	Selects the level of line width processing for generation mode. [0~8 / **1** / 1] The higher the setting, the thicker the line.
	093	Line Width Correction: Generation Mode (Main Scan)	Switches on line width processing for the main scan direction in generation mode. [0~1 / **1** / 1] 0: Line width correction OFF **1**: Line width correction ON

SP	Number/Name		Function/[Setting]
4903	094	Line Width Correction: Generation Mode (Sub Scan)	Switches on line width processing for the sub scan direction in generation mode. [0~1 / **1** / 1] 0: Line width correction OFF **1**: Line width correction ON
4904	Image Quality / Exposure Thin Line		
	002	Image Process Setting: Photo Mode	Selects the image processing mode for Photo Mode. [0~3 / **3** / 1] 0: 106 line dither processing 1: 141 line dither processing 2: 212 line dither processing 3: Error diffusion processing
	020	Text Mode	Selects the line width correction level for Text mode. [0~2 / **0** / 1] 0: No processing 1: Low (thin) 2: High (thick)
	021	Photo Mode	Selects the line width correction level for Photo mode. [0~2 / **0** / 1] 0: No processing 1: Low (thin) 2: High (thick)
	022	Text / Photo Mode	Selects the line width correction level for Text/Photo mode. [0~2 / **0** / 1] 0: No processing 1: Low (thin) 2: High (thick)
	023	Pale Mode	Selects the line width correction level for Pale mode. [0~2 / **0** / 1] 0: No processing 1: Low (thin) 2: High (thick)
	024	Generation Mode	Selects the line width correction level for Generation mode. [0~2 / **0** / 1] 0: No processing 1: Low (thin) 2: High (thick)
4909	Image Processing Through		
	001	IPU Scan Image Module	**DFU** [0~15 / **0** / 1]
	002	IPU Plotter Image Module	**DFU** [0~127 / **0** / 1]

SP5-nnn Mode

SP	Number/Name		Function/[Setting]
5019	Tray Paper Size Selection		
	002	1st Tray	Selects the paper size for the 1st tray. **[LT LEF**: USA version **A4 LEF**: Other versions}
	007	6th Tray	Selects the paper size for the 6th tray. **[LT LEF**: USA version **A4 LEF**: Other versions}
5024	mm / inch Display Selection		Selects the unit of measurement. [0~1 / **0 or 1**/ 1] 0: mm (Default for other versions) 1: inch (Default for USA version) *After selection, turn the main power switch off and on*
5040	Custom Size: Vertical		
	002	Custom Size: Vertical	Adjusts the vertical dimension of custom size paper for Tray 1. 'Custom size' must be selected with SP 5019-2. [210.0~305.0 / 297.0 / 0.1 mm]
5041	Custom Size: Horizontal		
	002	Custom Size: Horizontal	Adjusts the horizontal dimension of custom size paper for Tray 1. 'Custom size' must be selected with SP 5019-2. [210.0~439.0 / 210.0 / 0.1 mm]
5047	Reverse Paper Display		Determines whether the tray loaded with paper printed on one side is displayed. [0~1/**0**/1] 0: Not displayed 1: Displayed
5104	***A3 / DLT Double Count***		Specifies whether the counter is doubled for A3/11"x17" paper. [0~1/**0**/1] 0: No 1: Yes *If "1" is selected, the total counter and the current user code counter count up twice when A3/11"x17" paper is used.*
5106	ID level Setting		
	006	Auto Density Level	Selects the image density levels that are used in ADS mode by assigning a value to the center notch [1~9 / **5** / 1]
5112	Non-Standard Paper Selection		Determines whether a non-standard paper size can be input for the universal cassette trays (Tray 2, Tray 3) [0~1/**0**/1] **0:** No 1: Yes. *If "1" is selected, the customer will be able to input a non-standard paper size using the UP mode*.

SP	Number/Name	Function/[Setting]
5113	Optional Counter Type	Selects the type of key counter: [0~12 / **0** / 1] **0:** None 1: Key card (Japan only) 2: Key card (countdown type) 3: Pre-paid card 4: Not used 5: MF key card 6: Not used 7: Not used 8: Not used 9: Not used 10: Not used 11: Overseas Keycard (Increment) 12 Overseas Keycard (Decrement)
5118	Disable Copying	Temporarily denies access to the machine. **Japan Only** [0~1/**0**/1] 0: Release for normal operation 1: Prohibit access to machine.
5120	Mode Clear Opt. Counter Removal	Do not change. **Japan Only** [0~2/**0**/1] 0: Normal reset 1: Resets before job start/after completion 2: Normally no reset
5121	Counter Up Timing	Determines whether the optional key counter counts up at paper feed-in or at paper exit. [0~1/**0**/1] 0: Paper Feed Count 1: Paper Exit Count *This setting does not affect timing of the copier total counter.*
5127	APS OFF Mode	This SP can be used to switch APS (Auto Paper Select) off. This SP only works when a coin lock or pre-paid key card device is connected to the machine. [0~1/**0**/1] 0: On 1: Off
5131	Paper Size Type Selection	Selects the paper size type (for originals and copy paper). (The default setting depends on the setting of DIP SW 1 and 2 on BCU.) [0~3/**1 or 2 or 3**/1] 0: Japan 1: North America 2: Europe 3. China *After changing the value, turn the main power switch off and on*.

SP	Number/Name		Function/[Setting]
5158	Cover Feeder Size Change		Determines the paper size for the cover interposer tray. Select the desired paper size and press #.
	001	For all versions	[0~1 / **0** / 1] 0: A3 1: 12" x 18"
	002	For Europe and China	[0~2 / **0** / 1] 0: 8 ½ x 13" 1: 8" x 13" 2: 8 ¼ x 13"
	003	For USA	[0~1 / **0** / 1 0: 8 ½" x 14" 1:8 ½" x 13"
	004	For USA	[0~1 / **0** / 1] 0: 11" x 8 ½" (LT LEF) 1: 10 ½" x 7 ½"
	005	For USA	[0~1 / **0**/ 1] 0: 8 ½" x 11" (LT SEF) 1: 8" x 10"
	006	For Europe and China	[0~1 / **0**/ 1] 0: 8-Kai (Taiwan) 1: 11" x 17" (Double Letter)
	007	For Europe and China	[0~1 / **0** / 1] 0: 16-Kai (Taiwan) 1: 8 ½" x 11" (LT SEF)
	008	For Europe and China	[0~1 / **0** / 1] 0: 16-Kai LEF 1: 11" x 8 ½" (LT LEF)
5162	Application Screen Change		Determines whether the application screen is changed with a hard switch (key top) or a soft switch on the LCD. [0~1 / **0** / 1] 0: Soft switch 1: Hard switch
5212	Page Numbering		
	003	Duplex Printout Right / Left Position	Horizontally positions the page numbers printed on both sides during duplexing. [-10~+10 / **0** / 1 mm] 0: Center -: Left +: Right
	004	Duplex Printout High / Low Position	Vertically positions the page numbers printed on both sides during duplexing. [–10~+10/**0**/1 mm] *0 is center, minus is down, + is up.*
5302	Set Time		
	002	Time Difference	Sets the time clock for the local time. [–1440~+1440/**+540**/1 min.]
5404	User Code Count Clear		Clears all user code counters. Press # to execute.

SP	Number/Name		Function/[Setting]
5501	PM Alarm Interval		Sets the count level for the PM alarm. [0~9999 / **0** / 1] 0: Alarm disabled *The PM alarm goes off when the print count reaches this value multiplied by 1,000.*
5504	Jam Alarm Interval		RDS function **Japan Only**
5505	Error Alarm		RDS function **Japan Only**
5507	Supply Alarm		
	001	Paper Supply Alarm	Enables or disables the paper supply call function. **Japan Only** [0~1/**0**/1] 0: No call 1: Call If this SP is enabled, use the settings below to set the supply level to initiate a call for each paper size.
	002	Staple Supply Alarm	Enables or disables the staple supply call function. **Japan Only** [0~1/**0**/1] 0: No call 1: Call A staple supply call is issued for every 1,000 staples consumed.
	003	Toner Supply Alarm	Enables or disables the toner supply call function. **Japan Only** [0~1/**0**/1] 0: No call 1: Call
	128	Interval: Others	Sets the level to initiate a paper supply call for each paper size, if SP 5507 001 is enabled. **Japan Only** [00250~10,000/**1,000**/1]
	132	Interval: A3	
	133	Interval: A4	
	134	Interval: A5	
	141	Interval: B4	
	142	Interval: B5	
	160	Interval: DLT	
	164	Interval: LG	
	166	Interval: LT	
	172	Interval: HLT	

SP	Number/Name		Function/[Setting]
5508	CC Call		**Japan Only**
	001	Jam Remains	Enables/disables initiating a call for an unattended paper jam. [0~1/**1**/1] 0: Disable 1: Enable
	002	Continuous Jam Occurrence	Enables/disables initiating a call for continuous paper jam. [0~1/**1**/1] 0: Disable 1: Enable
	003	Continuous Door Open	Enables/disables initiating a call when the front door remains open. [0~1/**1**/1] 0: Disable 1: Enable
	004	Low Call Mode	Enables/disables the new call specifications designed to reduce the number of calls. [0~1/**1**/1] 0: Normal mode 1: Reduced mode
	011	Jam Detection: Time Length	Sets the length of time a jam must remain before it becomes an 'unattended paper jam'. [03~30/**10**/1] *This setting is enabled only when SP5508 004 is enabled (set to 1*).
	012	Jam Detection: Continuous Count	Sets the number of continuous paper jams required to initiate a call. [02~10/**5**/1] *This setting is enabled only when SP5508 004 is enabled (set to 1).*
	013	Door Open: Time Length	Sets the length of time the door remains open before the machine initiates a call. [03~30/**10**/1] *This setting is enabled only when SP5508 004 is enabled (set to 1).*
	021	Jam Operation: Time Length	Determines what happens when a paper jam is left unattended. [0~1/**1**/1] 0: Automatic Call 1: Audible Warning at Machine *This setting is enabled only when SP5508 004 is enabled (set to 1).*

SP	Number/Name		Function/[Setting]
5508	022	Jam Operation: Continuous Count	Determines what happens when continuous paper jams occur. [0~1/**1**/1] 0: Automatic Call 1: Audible Warning at Machine *This setting is enabled only when SP5508 004 is enabled (set to 1).*
	023	Door Operation: Time Length	Determines what happens if the door remains open. [0~1 / **1** / 1] 0: OFF 1: ON. Displays a warning. Pressing the call button will contact the service center. *This setting is enabled only when SP5508 004 is enabled (set to 1).*
5513	Parts Alarm Level Count		**Japan Only**
	001	Normal	Sets the parts replacement alarm counter to sound for the number of copies. [1~9999 / **350** / 1]
	002	DF	Sets the parts replacement alarm counter to sound for the number of scanned originals. [1~9999 / **350** / 1]
5514	Parts Alarm Level		**Japan Only**
	001	Normal	[0~1 / **1** / 1]
	002	DF	[0~1 / **0** / 1]
5801	Memory Clear		Clears data from NVRAM, either selectively (002~015), or entirely (001). Before executing this SP, print an SMC Report. (☛See 5.6) *After executing this SP, turn the main switch off and on.*
	001	All Clear	Initializes items 002~015.
	002	Engine Clear	For details, see 5.7.
	003	SCS (System Control Service)/SRM	
	004	IMH	
	005	MCS(Memory Control Service)	
	006	Copier application	
	008	Printer application	
	009	Scanner application	
	010	Network application	
	011	NCS (Network Control Service)	
	014	DCS (Clear DCS Setting)	
	015	UCS (Clear UCS Setting)	

SP	Number/Name		Function/[Setting]
5802	Printer Free Run		Makes a base engine free run [0~1/**0**/1] 0: Release free run mode 1: Enable free run mode *Return this setting to off (0) after testing is completed.* *Finisher connectors should be disconnected and duplex mode should be off.*
5803	Input Check		Displays signals received from sensors and switches. (☛5.4.1)
5804	Output Check		Turns on the electrical components individually for testing. (☛5.5.1)
5811	Machine No. Setting		
	001	Code Set	Enters the machine serial number. **DFU**
5812	Service Tel. No. Setting		
	001	Service	Use this to input the telephone number of the CE (displayed when a service call condition occurs.) *Press "・" to input a pause. Press "Clear modes" to delete the telephone number.*
	002	Fax	Use this to input the fax number of the CE printed on the SMC print.
	003	Supply	Displayed on the initial SP screen.
	004	Operation	Allows the service center contact telephone number to be displayed on the initial screen.
5816	CSS Function		Switches the CSS function on/off. Do not change. **Japan Only**. [0~1/**0**/1]
5821	CSS-PI Device Code		Do not change. **Japan Only**. [0~4/**0**/1]
5824	NV-RAM Data Upload		Uploads the NVRAM data to a SD card. (☛5.10.6)
5825	NV-RAM Data Download		Downloads data from the SD card to the NVRAM in the machine. When downloading this SP mode data, the front door must be open. After downloading is completed, remove the card and cycle the machine off and on. (☛5.10.6)
5828	Network Setting		
	012	Device Name/Host Name	
	066	Job Spooling Clear	
	069	Job Spooling Protocol	
	074	Delete Password	Execute to delete network password.
	084	NCS Prints	Prints a list of all NCS related parameters.

SP	Number/Name		Function/[Setting]
5825	090	TELNET	This setting determines whether Telnet D is started or not. [0~1 / **1** / 1] 0: Disabled (Off) 1: Enabled (On) *If not started, the Telnet port is closed*
	091	WEB Network Setting	Determines whether Web is enabled or disabled. [0~1 / **1** / 1] 0: Disabled (Off) 1: Enabled (On)
5831	002	Initial Setting Mode Clear/Copier Up Application	
5832	HDD Formatting		
	001	HDD Formatting (ALL)	Enter the SP number for the partition to initialize, then press #. When execution ends, cycle the machine off and on.
	002	HDD Formatting (IMH)	
	003	HDD Formatting (Thumbnail)	
	004	HDD Formatting (Job Log)	
	005	HDD Formatting (Printer Fonts)	
	006	HDD Formatting (User Info1)	
	007	HDD Formatting (User Info2)	
	008	HDD Formatting (Scanner Mail)	
	009	HDD Formatting (Data for a Design)	
	011	HDD Formatting (Ridoc I / F)	
5833	007	Job Log On/Off	
5836	Capture Setting		
	001	Capture Function	With this function disabled, the settings related to the capture feature cannot be initialized, displayed, or selected. **DFU** [0~1/**0**/1] 0: Disable 1: Enable
	002	Panel Setting	Determines whether each capture related setting can be selected or updated from the initial system screen. [0~1/**0**/1] 0: Disable 1: Enable The setting for SP5836 001 has priority.
	003	Print Back-up Function	Determines whether the print back-up function setting can be changed. [0~1/**0**/1] 0: Disable 1: Enable
	071	Capture Setting: Resolution Conversion for Color	Determines the resolution conversion ratio when a Color image document is sent to the Document Server via the MLB (Media Link Board). [0~2/**0**/1] 0: 1 x 1: ½ x 2: ¼ x

SP	Number/Name		Function/[Setting]
5836	072	Capture Setting: Resolution Conversion for Copy Text	Determines the resolution conversion ratio when a Copy Text image document is sent to the Document Server via the MLB (Media Link Board). [0~2/**0**/1] 0: 1 x 1: ½ x 2: ¼ x
	073	Capture Setting: Resolution Conversion for Copy (Others)	Determines the resolution conversion ratio when a Copy image document other than Text mode is sent to the Document Server via the MLB (Media Link Board). [0~2/**0**/1] 0: 1 x 1: ½ x 2: ¼ x
	~~074~~		
	075	Capture Setting: Resolution Conversion for Binary Print	Determines the resolution conversion ratio when a binary print image document is sent to the Document Server via the MLB (Media Link Board). [0~2/**0**/1] 0: 1 x 1: ½ x 2: ¼ x
	076	Capture Setting: Resolution Conversion for Dither Print (1200 dpi)	Determines the resolution conversion ratio when the Dither print image document is sent to the Document Server via the MLB (Media Link Board).. [1~3/**1**/1] 1: ½ x 2: ¼ x *3: 1/8 x*
	081		
	082	Capture Setting: Format for Copy Text	Determines the image format for Copy Text images sent to the Document Server via the MLB (Media Link Board). [0~3/**1**/1] 0: JFIF/JPEG 1: TIFF/MMR 2: TIFF/MH 3: TIFF/MR

SP	Number/Name		Function/[Setting]
5836	083	Capture Setting: Format for Copy (Others)	Determines the image format for Copy (other than text) images sent to the Document Server via the MLB (Media Link Board). [0~3/**1**/1] 0: JFIF/JPEG 1: TIFF/MMR 2: TIFF/MH 3: TIFF/MR
	084	Format for Printer Color	
	085	Capture Setting: Format for Binary Print	Determines the image format for Binary Print images sent to the Document Server via the MLB (Media Link Board). [0~3/**1**/1] 0: JFIF/JPEG 1: TIFF/MMR 2: TIFF/MH 3: TIFF/MR
	086	Capture Setting: Format for Dither Print (1200dpi)	Determines the image format for Dither Print images sent to the Document Server via the MLB (Media Link Board). [0~3/**1**/1] 0: JFIF/JPEG 1: TIFF/MMR 2: TIFF/MH 3: TIFF/MR
	091	Capture Setting: Default for JPEG (Page Quality)	Determines the quality level of JPEG images sent to the Document Server via the MLB (Media Link Board). [5~95/**50**/1]
5839	IEEE 1394		This SP is displayed only when an IEEE 1394 card is installed.
	004	Device Name	Enter the name of the device used on the network. Example: RNP0000000000
	007	Cycle Master	Enables or disables the cycle master function for the 1394 bus standard. [0~1/**1**/1] 0: Disable (Off) 1: Enable (On)

SP	Number/Name		Function/[Setting]
5839	008	BCR mode	Determines how BCR (Broadcast Channel Register) operates on the 1394 standard bus when the independent node is in any mode other than IRM. (NVRAM: 2-bits) (Range: Binary settings 0~3) 00: Off. Writes from the IRM. 01: Copies BCR of the IRM after no data is written from the IRM after the prescribed time has elapsed. 10: Reserved. Not used. 11: BCR normally enabled.
	009	IRM 1394a Check	Conducts a 1394a check of IRM when the independent node is in any mode other than IRM. [0~1/**0**/1] 0: Checks whether IRM conforms to 1394a 1: After IRM is checked, if IRM does not conform then independent node switches to IRM.
	010	Unique ID	Lists the ID (Node_Unique_ID) assigned to the device by the system administrator. [0~1/**1**/1] 0: Does not list the Node_Unique_ID assigned by the system administrator. Instead, the Source_ ID of the GASP header in the ARP is used. 1: The Node_Unique_ID assigned by the system administrator is used, and the Source_ID of the GASP header in the ARP is ignored. Also, when the serial bus is reset, extra bus transactions are opened for the enumeration.
	011	Logout	Handles the login request of the login initiator for SBP-2. (1-bit) [0~1/**1**/1] 0: Disable (refuse login) Initiator retry during login Login refusal on arrival of login request (standard operation) 1: Enable (force logout) Initiator retry during login Login refusal on arrival of login request, and the initiator forces the login.

SP	Number/Name		Function/[Setting]
5839	012	Login	Enables or disables the exclusive login feature (SBP-2 related). [0~1/**0**/1] 0: Disables. The exclusive login (LOGIN ORB exclusive it) is ignored. 1: Enables. Exclusive login is in effect.
	013	Login MAX	Sets the maximum number of logins from the initiator (6-bits) [0~63/**8**/1] 0: Reserved 63: Reserved
5840	IEEE 802.11b		.
	004	SSID	Enters an unique ID (up to 32 characters long) to identify the device when it is operating in an area with another wireless LAN network.
	006	Channel MAX	Sets the maximum range of the bandwidth for the wireless LAN. This bandwidth setting varies for different countries. NA: [1~11/**11**/1] EUR/A: [1~13/**13**/1]
	007	Channel MIN	Sets the minimum range of the bandwidth for the wireless LAN. This bandwidth setting varies for different countries. NA: [1~11/**1**/1] EUR/A: [1~13/**1**/1]
	011	WEP Key Select	Selects the WEP key. [00~11 / **00** / 1 binary] 00: Key #1 01: Key #2 (Reserved) 10: Key #3 (Reserved 11: Key #4 (Reserved
	020	WEP Mode	
5841	Supply Name Setting		These names appear on the Inquiry list (the user can print this by pressing the Counter key on the operation panel, then touching 'Print Inquiry List' on the screen).
	001	Toner Name Setting: Black	Enter the name of the toner in use.
	005	Staple Standard	Enter the name of the staples in use for normal stapling (not booklet stapling)
	006	Staple Bind	Enter the name of the staples in use for booklet stapling.

SP	Number/Name		Function/[Setting]
5842	Net File Analysis Mode Setting		Selects each debut output mode for NetFile processing NetFiles: Jobs printed from the document server using a PC and DeskTopBinder [8 bits / **0011 1111** / Bit SW] *Bit 8 is reserved. Bit 7 is the debug output switch for each mode.*
5844	USB		
	001	Transfer Rate	Sets the speed for USB data transmission. [0x01~0x04 / **0x04** / 0] 0x01: Full Speed (Fixed) 0x04: High Speed/Full Speed (Automatic change)
	002	Vendor ID	Sets the vendor ID: **DFU** [0x0000~0xFFFF/**0x05CA**/1] Initial Setting: 0x05CA Ricoh Company
	003	Product ID	Sets the product ID. **DFU** [0x0000~0xFFFF/**0x0403**/1]
	004	Device Release Number	Sets the device release number of the BCD (binary coded decimal) display. **DFU** [0000~9999/**0100**/1] *Enter as a decimal number. NCS converts the number to hexadecimal number recognized as the BCD.*
5845	Delivery Server Setting		Provides items for delivery server settings.
	001	FTP Port No.	Sets the FTP port number used when image files to the Scan Router Server. [0~65535 / **3670** / 1]
	002	IP Address	Use this SP to set the Scan Router Server address. The IP address under the transfer tab can be referenced by the initial system setting. [0~0xFFFFFFFF / **0x00**]
	003	Retry Interval	Determines the time interval between retries before the machine returns to standby after an error occurs during an image transfer with the delivery scanner or SMTP server. [60~900 / **300** / 1]
	004	Number of Retries	Determines the number of retries before the machine returns to standby after an error occurs during an image transfer with the delivery or SMTP server. [0~99 / **3** / 1]

SP	Number/Name		Function/[Setting]
5845	005	Capture Server IP Address	Sets the capture server IP address for the capture function. [0~0xFFFFFFFF / **0x00** /] MLB2 is required to use this feature.
	006	Delivery Error Display Time	Use this setting to determine the length of time the prompt message is displayed when a test error occurs during document transfer with the NetFile application and an external device. [0~999 / **300** / 1]
	007	Delivery Options	Connects to the Scan Router server for delivery of scanned documents. [0~1 / **0** / 1] 0: No connection to Scan Router delivery server 1: Connected to Scan Router server for delivery of scanned documents.
5846	UCS Setting		
	001	Machine ID (For Delivery **Server**)	Displays the unique device ID in use by the delivery server directory. The value is only displayed and cannot be changed. This ID is created from the NIC MAC or IEEE 1394 EUR/AI. The ID is displayed as either 6-byle or 8-byte binary. 6-byte: **%02X.%02X.%02X.%02X.%02X.%02X** 8-byte: **%02X.%02X.%02X.%02X.%02X.%02X.%02X.%02X**
	002	Machine IC Clear (For Delivery Server)	Clears the unique ID of the device used as the name in the file transfer directory. Execute this SP if the connection of the device to the delivery server is unstable. After clearing the ID, the ID will be established again automatically by cycling the machine off and on.
	003	Maximum Entries	Changes the maximum number of entries that UCS can handle. [2000~50000/**2000**/1] *If a value smaller than the present value is set, the UCS managed data is cleared, and the data (excluding user code information) is displayed*.
	004	Delivery Server Model	Changes the model of the transfer server registered for the I/O device. [0~4/**0**/1] 0: Not used 1: SG1 Provided 2: SG1 Package 3: SG2 Provided 4: SG2 Package

SP	Number/Name		Function/[Setting]
5846	005	Delivery Server Capability	Changes the capability of the server registered for the I/O device. Bit 7 = 1 Comment information Bit 6 = 1 Address direct entry possible Bit 5 = 1 Mail Rx confirmation possible Bit 4 = 1 Address book auto update [0~255 / 0 / 1]
	006	Delivery Server Retry Timer	Sets the interval for retry attempts when the delivery server fails to acquire the delivery server address book. [0~255/**0**/1]
	007	Delivery Server Retry Times	Sets the number of retry attempts when the delivery server fails to acquire the delivery server address book. [0~255/**0**/1]
	008	Delivery Server Maximum Entries	Sets the maximum number account entries of the delivery server user information managed by UCS. [0~50000 / **2000** / 1]
	050	Initialize All Directory Info.	Clears all directory information managed by UCS, including all user codes.
5847	Net File Resolution Reduction		
	001	Rate for Copy Color	Changes the default settings of image data transferred externally by the DeskTopBinder page reference function via the MLB (Media Link Board). [0~2 / **0** / 1] 0: 1x 1: ½x 2: ¼x
	002	Copy : Text (B&W)	
	003	Copy: Others (B&W)	
	004	Rate for Printer Color	
	005	Rate for Printer B&W	
	006	Rate for Printer B&W HQ	Sets the default for dithered image size sent to the Document Server via the MLB (Media Link Board). [1~3/ **1** / 1] 1: ½ x 2: ¼ x 3: 1/8 x
	021	Netfile Page Quality Default for JPEG	Sets the default for JPEG image quality of image files handled by DeskTopBinder sent via the MLB (Media Link Board). [5~95 / **50** / 1]
5848	Web Service		Sets the 4-bit switch assignment for the access control setting. 0000: No access control 0001: Denies access to Desk Top Binder. Has no effect on access and delivery from Scan Router. *The lower 4 bits are used.*

SP	Number/Name		Function/[Setting]
5848	001	Access Control: Net File (Lower 4 bits only)	Net File: Job printed from the document server from a PC using DeskTopBinder. DocBox: Document Server Repository: Document Management area on the machine's hard disks
	002	Access Control: Repository (Lower 4 bits only)	
	003	Doc Svr Print (Lower 4 bits only)	
	004	User Directory: (Lower 4 bits only)	
	005	Delivery Input (Lower 4 Bits)	
	006	Access Control: Fax Control (Lower 4 bits only)	
	100	Repository: Download Image Max. Size	Sets the maximum size allowed for downloaded images. The default is equal to 1 gigabyte. [1~1024 / **1024** / 1K]
5849	Counter Clear Day Setting		Sets the delivery date for the machine. **DFU**
	001	Display	Display the date.
	002	Switch to Print	Print out the date. [0~1/ **1/** 1] 0: No print 1: Print
5850	Address Book Function		
	001	Switch Module	Selects the module for managing user information. **DFU** [0~1/**1**/1] 0: SCS 1: UCS
5852	SMTP		Simple Mail Transfer Protocol. The protocol for communication between Internet main MTAs (Message Transfer Agents)
	002	Port Number	Sets the port number [1~65535 / **25** / 1]
	003	Authorization	Validates the SMTP function. SMTP (Simple Mail Transfer Protocol) is the protocol for communication between Internet main MTAs (Message Transfer Agents). [ON/OFF] ON : Enables SMTP OFF : Disables SMTP
	004	User Name	Sets the SMTP user name.
	005	Password	Sets the SMTP password.
	006	SMTP Auth. Encryption	Sets encryption method for the transfer password in SMTP validation. [0~2 / 0 / 1] 0: Auto. Allows three methods for encryption in SMTP validation: LOGIN, PLAIN, or CRAM-MD5. 1: Off. Allows two methods for SMTP validation: LOGIN, PLAIN. 2: On. Allows only one method for SMTP validation: CRAM-MD5.

SP	Number/Name		Function/[Setting]
5852	007	POP before SMTP	A flag that determines whether the POP server is connected before connecting to the SMTP server. [0~1 / 0 / 1] POP 0: OFF 1: On Post Office Protocol (POP)servers are computers that receive mail using SMTP. The mail includes a setting to ensure that it is directed to the POP server. POP servers are used when the user is not permanently connected to the Internet.
	008	POP Server Name	Sets the POP server name.
	009	POP Port Number	Sets the POP port number. [1～65535/**110**/1]
	010	POP User Name	Set the POP user name.
	011	POP Password	Set the POP password.
	012	POP Auth. Encryption	Sets the encryption method for the password when 5852 POP Before SMTP is in use. [0~2 / 0 / 1] 0: Auto. Allows two methods for encryption: APOP and normal encryption to match the settings of the POP server. 1: Off. Allows only normal encryption. 2: On. Allows only APOP encryption.
	013	Time out Setting for POP	Sets the wait time after POP validation until the SMTP mail is sent. [0~10000/ **300** /1 ms]
5853	Stamp Data Download		Use this SP to download the fixed stamp data stored in the controller firmware and save it on the HDD. This SP can be executed as many times as required. This SP must be executed after replacing or formatting the hard disks. *This SP can be executed only with the hard disks installed. (☛5.10.5)*
5856	002	Remote ROM Update/Local port	When set to “1” allows reception of firmware data via the local port (IEEE 1284) during a remote ROM update. [0~1 / **0** / 1] 0: Not allowed 1: Allowed *This setting is reset to zero after the machine is cycled off and on*

SP	Number/Name		Function/[Setting]
5857	Save Debug Log		
	001	On/Off (1:ON 0:OFF	Switches on the debug log feature. The debug log cannot be captured until this feature is switched on. [0 ~ 1 / **0** / 1] 0: OFF 1: ON
⇒	002	Target (2: HDD 3: SD Card)	Selects the destination where the debugging information generated by the event selected by SP5858 will be stored if an error is generated [2 ~ 3 / **2** / 1] 2: HDD 3: SD Card
	005	Save to HDD	Specifies the decimal key number of the log to be written to the hard disk. (☛5.16)
	006	Save to SD Card	Specifies the decimal key number of the log to be written to the SD Card. (☛5.16)
	009	HDD to SD Card (Latest 4 MB)	Takes the most recent 4 MB of the log written to the hard disk and copies them to the SD Card. (☛5.16) *A unique file name is generated to avoid overwriting existing file names on the SD Card. Up to 4MB can be copied to an SD Card. 4 MB segments can be copied one by one to each SD Card.*
	010	HDD to SD Card Latest 4 MB Any Key)	Takes the log of the specified key from the log on the hard disk and copies it to the SD Card. (☛5.16) *A unique file name is generated to avoid overwriting existing file names on the SD Card. Up to 4 MB can be copied to an SD Card. 4 MB segments can be copied one by one to each SD Card. This SP does not execute if there is no log on the HDD with no key specified.*
	011	Erase Debug Data From HDD	Erases all debug logs on the HDD
	012	Erase Debug Data From SD Card	Erases all debug logs on the SD Card. If the card contains only debugging files generated by an event specified by SP5858, the files are erased when SP5857 010 or 011 is executed. *To enable this SP, the machine must be cycled off and on.*

SP	Number/Name		Function/[Setting]
5857	013	Free Space on SD Card	Displays the amount of space available on the SD card.
5858	Debug Save When		These SPs select the content of the debugging information to be saved to the destination selected by SP5857 002
	001	Engine SC Error	Stores SC codes generated by copier engine errors
	002	Controller SC Error	Stores SC codes generated by GW controller errors
	003	Any SC Error	Stores one SC specified by number. [0~65535 / **0** / 1] Refer to Section 4 for a list of SC error codes.
	004	Jam	Stores jam errors
5859	Debug Save Key No.		These SPs allow you to set up to 10 keys for log files for functions that use common memory on the controller board. [-9999999~+9999999 / 0 / 1]
	001	Key 1	
	002	Key 2	
	003	Key 3	
	004	Key 4	
	005	Key 5	
	006	Key 6	
	007	Key 7	
	008	Key 8	
	009	Key 9	
	010	Key 10	
5907	Plug & Play Maker/Model Name		Selects the brand name and the production name for Windows Plug & Play. This information is stored in the NVRAM. If the NVRAM is defective, these names should be registered again. After selecting, press the “Original Type” key and “#” key at the same time. When the setting is completed, the beeper sounds five times.
5913	002	Switchover Permission Time/ Print Application	Sets the amount of time to elapse while the machine is in standby mode (and the operation panel keys have not been used) before another application can gain control of the display. [3~30 / **3** / 1 s]
5914	001	Application Counter DIsplay	Printer Counter 0: Off 1: On
	003	Copy Counter	

SP	Number/Name		Function/[Setting]
5915	Mechanical Counter Detection		Displays whether the mechanical counter is installed in the machine. [0~2] 0: Not detected 1: Detected 2: Unknown
5917	GPC Counter Display		Displays the GPC counter. [0~1/**0**/1] **Japan Only** 0: No display 1: Display
5918	A3 / DLT Counter Display		Determines whether pressing the counter key displays count confirmation. [0~1/**0**/1] 0: OFF 1: ON *This SP affects the display only, and has no effect on SP5104 (A3/DLT Double Count).*
5923	Border Removal Area Switching		Selects the standard for edge erase. [0~1 / 0 / 1] 0: The margin is erased from the original data. 1: The margin is erased from the data sent to the laser diode. *The output resulting from each of the settings will be different when reduction/enlargement is used.*
5967	Copy Server: Disable Function		Enables and disables the copier server. [0~1 / **0** / 1] 0: Enables 1: Disables *Turn the main switch off and on after changing this setting*.
5974	Cherry Server		Do not change. **Japan Only**
5990	SP Print Mode		In the SP mode, press Copy mode to move to the copy screen, select the paper size, then press Start. Select A4/LT LEF or larger to ensure that all the information prints. Return to the SP mode, select the desired print, and press Execute.
	001	All (Data List)	
	002	SP (Mode Data List)	
	003	User Program	
	004	Logging Data	
	005	Diagnostic Report	
	006	Non-Default	
	007	NIB Summary	
	008	Net File Log	
	021	Copier User Program	
	022	Scanner SP	
	023	Scanner User Program	

SP6-nnn Peripherals

SP	Number/Name		Function/[Setting]
6006	DF Registration Adjustment		
	001	Side-to-Side	Adjusts the printing side-to-side registration in the ADF mode. [-3~+3 / **0** / 0.1 mm] *Use the "•/*" key to toggle between + and –.*
	002	Leading Edge (Thin Original)	Adjusts the original stop position. [-10~+10 / **0** / 0.13mm] *Use the "•/*" key to toggle between + and –.*
	003	Leading Edge (Duplex 1st)	Adjusts the original stop position against the original left scale in one-sided original mode, and the first side of duplex originals. [-29~+29 / **0** / 0.13mm] *Use the "•" key to toggle between + and –.*
	004	Leading Edge (Duplex-2nd)	Adjusts the original stop position against the original left scale for the second side of duplex originals. [-29~+29 / **0** / 0.13mm] *Use the "•" key to toggle between + and –.*
6007	ADF Input Check		
	001	Group 1	Displays the signals received from sensors and switches of the ADF. (☛5.4.2)
	002	Group 2	Displays the signals received from sensors and switches of the ADF. (☛5.4.2)
	003	Group 3	Displays the signals received from sensors and switches of the ADF. (☛5.4.2)
6008	ADF Output Check		Turns on the ADF electrical components individually for testing. (☛5.5.2)
6009	DF Free Run		Performs an ADF free run in two-sided original mode. Press "1" to start. *This is a general free run controlled from the copier*
6016	ADF Motor Speed Auto Adjustment		After pressing the Start key, the machine automatically adjusts the speeds of the ADF motors in the following order: Feed-in motor → Transport Motor → Feed-out Motor (High) → Feed-out Motor (Low)

SP	Number/Name		Function/[Setting]
6105	Staple Position Adjustment		Adjusts the stapling position in the main scan direction [-3.5~+3.5 / **0** / 0.5 mm] *Use the "●" key to toggle between + and –. A larger value causes the stapling position to shift outward.*
6107	Finisher Free Run		
	001	Staple Mode	The finisher simulates a finisher free run for stapling A4 LEF. [0~1 / **0** / 1] 0: Stop 1: Start
	002	Shift Mode	The finisher simulates a free run for stapling and tray shifting. [0~1 / **0** / 1] 0: Stop 1: Start
	003	Back to the Home Position	Sets the machine in standby mode for shipping. [0~1 / **0** / 1] 0: Stop 1: Start
	004	With Jogger Unit	The finisher simulates a shift mode free run with the optional jogger unit. [0~1 / **0** / 1] 0: Stop 1: Start
6113	Punch Hole Position Adjustment		Adjusts the punch hole position in the sub-scan direction for the punch unit. [-7.5~+7.5 / **0** / 0.5 mm] *Use the "●/*" key to toggle between + and –.* *A larger value shifts the punch holes away from the edge of the paper, a smaller value toward the edge.*
	001	2 Holes	
	002	3 Holes	
6116	Sheet Conversion (Thick Paper)		Divide the normal limit for stapling by this number to determine the staple limit number for thick paper mode. [1~3 / **3** / 1]
6117	Finisher Input Check		Displays the signals received from sensors and switches of the finisher. (☛5.4.3)
	001	INPUT1	
	002	INPUT2	
	003	INPUT3	
	004	INPUT4	
	005	INPUT5	
	006	INPUT6	
6118	Finisher Output Check		Turn on the electrical components of the finisher individually for test purposes. (☛5.5.3)

SP	Number/Name		Function/[Setting]
6119	Punch Function Enabled (Thick Paper)		Determines whether punch mode is enabled in thick paper mode. [0~1 / **0** / 1] 0: Disabled 1: Enabled
6120	Staple Jogger Adjustment		
	001	A3 (Lengthwise)	Adjusts the staple jogger positions for each paper size. The higher the setting, the narrower the jogger span. [-1.5~+1.5 / **0** / 0.5 mm]
	002	B4 (Lengthwise)	
	003	A4 (Lengthwise)	
	004	A4 (Sideways)	
	005	B5 (Lengthwise)	
	006	B5 (Sideways)	
	007	DLT (Lengthwise)	
	008	LG (Lengthwise)	
	009	LT SEF (Lengthwise)	
	010	LT LEF (Sideways)	
	011	Other	
6121	Staple Jogging Repeat Setting		Determines whether jogging is executed once or twice for each sheet. [1~2 / **1** / 1] 1: Once 2: Twice *This SP applies to the B478 finisher only.*
6902	Fold Position Adjustment		Use the 10-key pad to adjust the staple position in center folding. [-3.5~+3.5 / **0** / 0.5 mm] *Use the "●/*" key to toggle between + and –.* *A larger value decreases the length of trailing edges, a smaller value increases the length of trailing edges.*

SP7-nnn Data Logs

SP	Number/Name		Function/[Setting]
7001	Main Motor Operation Time		Displays the total drum rotation time in minutes.
7002	Original Counter		Displays the total number of fed originals for each operation mode
	001	Total	
	002	Copy	
	004	Document Server Application	
	005	Scanner	
	006	Others	
7003	Print Counter		Displays the total number of prints for each operation mode.
	001	Total Count	
	002	Copy	
	004	Printer	
	005	Others	
7006	GPC Counter Display		**Japan Only**
	001	GPC Total	
	002	GPC Copy	
	003	GPC Printer	
7007	Other Counter		
	001	Duplex Counter	Displays the count total for the selected item.
	002	A3 / DLT Counter	
	003	Staple Counter	
	004	Scan Counter	
7009	Rental GPC Counter		**Japan Only**
	001 GPC Total		
	002 GPC Copy		
	003 GPC Printer		
7101	Print Count - Paper Size		
	005	A4 LEF	Displays the number of copies by paper size. Display range: 0~9999999
	006	A5 LEF	
	014	B5 LEF	
	038	LT LEF	
	044	HLT LEF	
	132	A3 SEF	
	133	A4 SEF	
	134	A5 SEF	
	141	B4 SEF	
	142	B5 SEF	
	160	DLT SEF	
	164	LG SEF	
	166	LT SEF	
	172	HLT SEF	
	255	Others	

SP	Number/Name		Function/[Setting]
7105	Paper Type Counter		Displays the total number of prints by paper type. A single-sided print counts as 1 and a two-sided print counts as 2.
	001	Normal	
	002	Recycled	
	003	Special	
	004	Colour1	
	005	Colour2	
	006	Letterhead	
	008	Thick	
	009	OHP	
	010	Used	
	011	Index	
	012	Tracing	
	020	Yellow	
	021	Green	
	022	Blue	
	023	Purple	
	024	Ivory	
	025	Orange	
	026	Pink	
	027	Red	
	028	Gray	
	255	Others	
7201	Total Scan Counter		Displays the total number of scanned originals.
7204	Print Counter - Paper Tray		Displays the total number of sheets fed from each paper tray.
	002	Tray 1	
	003	Tray 2	
	004	Tray 3	
	005	Tray 4	
	006	Tray 5	
	007	Tray 6	
	008	Tray 7	
	009	Inserter	
7205	Total ADF Counter		Displays the total number of originals fed by the ADF.
7206	Staple Counter		Displays the total number of staples used.
	002	Staple Counter (Binding Staple)	
7301	Number of Pages by Magnification Mode		Displays the total number of prints for each reproduction ratio range. SP7848 clears these counters.
	001	Reduce 25%<-->49%	
	002	Reduce 50%<-->99%	
	003	Full Size	
	004	Enlarge 101%<-->200%	
	005	Enlarge 201%<-->400%	
	006	Free Mag.%	
	007	Free Size Mag. mm (in.)	

SP	Number/Name		Function/[Setting]
7301	008	Auto Reduce / Enlarge	
7304	Copy: Number of Copies by Mode		Displays the total number of copies by original type. SP7837 or SP7848 clears this counter.
	001	Text	
	002	Text / Photo	
	003	Photo	
	004	Generation Copy	
	005	Pale	
	006	Punching	
	007	Repeat	
	008	Sort	
	009	Staple	
	010	Series	
	011	Erase	
	012	Duplex	
	013	ADF	
	014	Double Copy	
	015	Duplex Original	
	016	Divided Copy	
	017	Combine 1 Side	
	018	Combine 2 Sides	
	019	Booklet Gathering	
	020	Pamphlet Saddle-Stitching	
	021	Batch	
	022	SADF	
	023	Mixed Sizes	
	024	Stamp	
	025	Cover/Chapter Sheet Switching	
	026	Chapter Page	
7305	Copy: Display Jobs by Continuous Output		
	001	1to1	Displays the total number of multiple print jobs by the size of the sets. SP7838 or SP7848 clears this counter.
	002	1 to 2<-->5	
	003	1 to 6<-->10	
	004	1 to 11<-->20	
	005	1 to 21<-->50	
	006	1 to 51<-->100	
	007	1 to 101<-->300	
	008	1 to 301<-->over	
7306	Copy: Display Jobs by Mode		
	001	Sort	Displays the total number of copy jobs by operation mode (stapling, punching, etc.). SP7839 or SP7848 clears this counter.
	002	Staple	
	003	Punching	
	004	Reserve Copy	
	005	Check Copy	

SP	Number/Name		Function/[Setting]
7320	Doc. Svr – Scanning Counter		Displays the total number of pages stored in the document server. SP7840 or SP7848 clears this counter.
7321	Doc. Svr - Original Size Display		
	004	A3	Displays by paper size the total number of originals stored in the document server. SP7841 or SP7848 clears this counter.
	005	A4	
	006	A5	
	013	B4	
	014	B5	
	032	DLT	
	036	LG	
	038	LT	
	044	HLT	
	128	Others	
7323	Doc. Svr - Print Size Display		
	005	A4 (Sideways)	Displays by paper size the total number of prints stored in the document server. SP7842 or SP7848 clears this counter.
	006	A5 LEF (Sideways)	
	014	B5 LEF (Sideways)	
	038	LT LEF (Sideways)	
	044	HLT LEF (Sideways)	
	128	Other	
	132	A3 (Lengthwise)	
	133	A4 SEF (Lengthwise)	
	134	A5 SEF (Lengthwise)	
	141	B4 (Lengthwise)	
	142	B5 SEF (Lengthwise)	
	160	DLT (Lengthwise)	
	164	LG (Lengthwise)	
	166	LT SEF (Lengthwise)	
	172	HLT SEF (Lengthwise)	
7324	Doc. Svr - Print Job Counter		
	001	Duplex	Displays the total number of jobs executed from the document server. SP7843 or SP7848 clears this counter.
	002	Sort	
	003	Staple	
	004	Punch	
	005	Check Copy	
	006	Print 1st Page	
7325	Doc. Svr - Job Count (Page No)		
	001	Page 1	Displays the number of pages in jobs executed from the document server. SP7844 or SP7848 clears this counter.
	002	Page 2	
	003	Pages 3 to 5	
	004	Pages 6 to 10	
	005	Pages 11 to End	

SP	Number/Name		Function/[Setting]
7326	Doc. Svr - Job Count (File No)		
	001	File 1	Displays the number of files in jobs executed from the document server. SP7845 or SP7848 clears this counter.
	002	Files 1 to 5	
	003	Files 6 to 10	
	004	Files 11 to End	
7327	Doc. Svr - Job Count (Set No)		
	001	1 to 1	Displays the number of sets of multiple page print jobs executed from the document server. SP7846 or SP7848 clears this counter.
	002	1 to 2<-->5	
	003	1 to 6<-->10	
	004	1 to 11<-->20	
	005	1 to 21<-->50	
	006	1 to 51<-->100	
	007	1 to 101<-->300	
	008	1 to 301<-->over	
7328	Doc. Svr - Job Count (Prt Mode)		
	006	Punch	Displays the total number of prints in print mode executed from the document server. SP7847 or SP7848 clears this counter.
	008	Sort	
	009	Staple	
	012	Duplex	
	019	Booklet	
	020	Magazine	
	024	Stamp	
	025	Cover / Chapter Sheet Switching	
	026	Slip Sheet	
7330	Connect Copy – Job Count		Displays the number of jobs processed by the master machine when two copiers are connected.
7331	Connect Copy – Print Count		Displays the number of copies when two copiers are connected. Counts the total for both the master and slave machines.
7334	Connect Copy – Doc. Svr. Print Count		Displays the number of copies printed with the document server when two copiers are connected. Counts the total for both the master and slave machines.
7401	Total SC Counter		Displays the total number of SCs logged. Display Range: 0~9999
7403	SC History		Displays the latest 10 service call codes
	001	Latest	
	002	Latest 1	
	003	Latest 2	
	004	Latest 3	
	005	Latest 4	
	006	Latest 5	
	007	Latest 6	
	008	Latest 7	
	009	Latest 8	
	010	Latest 9	

SP	Number/Name		Function/[Setting]
7502	Total Paper Jam Counter		Displays the total number of copy jams. Display Range: 0~9999
7503	Total Original Jam Counter		Displays the total number of original jams. Display Range: 0~9999
7504	Paper Jam Counter by Jam Location		Displays the list of possible locations where a jam could have occurred. These jams are caused by the failure of a sensor to activate.
	003	1st Paper Tray	These are jams when the paper does not activate the sensor.
	004	2nd Paper Tray	
	005	3rd Paper Tray	
	006	4th Paper Tray	
	007	5th Paper Tray	
	008	6th Paper Tray	
	009	7th Paper Tray	
	010	LCT Relay Sensor	
	011	LCT Exit Sensor	
	012	Relay Sensor	
	013	Registration Sensor	
	015	Fusing Exit Sensor	
	016	Exit Sensor	
	019	Duplex Entrance Sensor	
	020	Duplex Transport Sensor 1	
	021	Duplex Transport Sensor 2	
	022	Duplex Transport Sensor 3	
	023	Inverter Tray Paper Sensor	
	025	Entrance Sensor - Fin.	
	026	Upper Tray Exit Sensor - Fin.	
	027	Shift Tray Exit Sensor - Fin.	
	028	Stapler Tray Entrance Sensor - Fin.	
	029	Stapler Tray Paper Sensor - Fin.	
	030	Entrance Sensor - FIN Staple Tray	
	031	Stapler Tray Paper Sensor - S.S. Fin	
	032	Saddle Stitch Stapler Sensors - S.S. Fin	
	033	Pressure Plate Sensors - S.S. Fin	
	034	Stapler Entrance Sensors - S.S Fin	
	035	Shift Tray Sensors - S.S. Fin	
	036	Jogger Fence HP Sensor - S.S. Fin	
	037	Shift Roller HP Sensor - S.S Fin	

SP	Number/Name		Function/[Setting]
7504	038	Stapler HP Sensors - S.S. Fin	These are jams when the paper does not activate the sensor.
	039	Stapler Unit Sensor - S.S. Fin	
	040	Folder Plate HP Sensor - S.S. Fin	
	041	Feed-out Belt HP Sensor - S.S Fin	
	042	Punch HP Sensor - S.S Fin	
	043	Abnormal Signal - S.S Fin	
	044	Paper Feed Sensor - Cover Interposer	
	045	Transport Sensor - Cover Interposer	
	046	Bottom Plate Position Sensor - Cover Interposer	
	053	1st Paper Tray	
	054	2nd Paper Tray	
	055	3rd Paper Tray	
	056	4th Paper Tray	
	057	5th Paper Tray	
	058	6th Paper Tray	
	059	7th Paper Tray	
	060	LCT Relay Sensor (Stay On)	
	061	LCT Exit Sensor (Stay On)	
	062	Relay Sensor	
	063	Registration Sensor (Stay On)	
	065		
	066	Paper Jam Count by Location Exit Sensor (Stay On)	
	069	Duplex Sensor (Stay On)	
	070	Duplex Transport Sensor 1 (Stay On)	
	071	Duplex Transport Sensor 2 (Stay On)	
	072	Duplex Transport Sensor 3 (Stay On)	
	073	Inverter Tray Paper Sensor (Stay On)	
	100	Paper Jam Count by Location: Biwacko	
7505	Original Jam Counter by Jam Location		Displays the list of possible locations where an original jam could have occurred. These jams are caused by the failure of a sensor to activate.
	003	ADF Feed-in Sensor	
	004	ADF Feed-out Sensor	
7506	Jam Counter by Paper Size		Displays the total number of original jams by paper size.
	005	A4 LEF	
	006	A5 LEF	
	014	B5 LEF	

SP	Number/Name		Function/[Setting]
	038	LT LEF	
	044	HLT LEF	
	132	A3 SEF	
7506	133	A4 SEF	
	134	A5 SEF	
	141	B4 SEF	
	142	B5 SEF	
	160	DLT SEF	
	164	LG SEF	
	166	LT SEF	
	172	HLT SEF	
	255	Others	
7507	Plotter Jam History		Displays the following items for the last 10 copy paper jams: 1) Jam code 2) Paper size 3) Total count when jam occurred 4) Date of jam.
	001	Latest	
	002	Latest 1	
	003	Latest 2	
	004	Latest 3	
	005	Latest 4	
	006	Latest 5	
	007	Latest 6	
	008	Latest 7	
	009	Latest 8	
	010	Latest 9	
7508	Original Jam History		Displays the following items for the Latest 10 original jams: 1) Jam code, 2) Original size, 3) Total count when jam occurred, 4) Date of jam.
	001	Latest	
	002	Latest 1	
	003	Latest 2	
	004	Latest 3	
	005	Latest 4	
	006	Latest 5	
	007	Latest 6	
	008	Latest 7	
	009	Latest 8	
	010	Latest 9	
7617	Parts PM Counter Display		
	001	Copy Paper Standard	**Japan Only**
	002	Original Paper Standard	**Japan Only**
7618	Parts PM Counter Reset		

SP	Number/Name		Function/[Setting]
	001	Copy Paper Standard	Clears the counter of SP7617- 001. **Japan Only**
7618	002	Copy Paper Standard	Clears the counter of SP7617- 002 **Japan Only**
7801	ROM Version		
	001	System/Copy	Displays the ROM versions for these items. (Locate ROM version name within SP 7801-255 in order indicated)
	002	Engine	
	003	LCDC	
	004	PI	
	005	ADF	
	007	Finisher	
	015	Scanner	
	018	NIB	
	020	Cover Interposer	
	022	BIOS	
	100	Language-1	
	101	Language-2	
	150	RPCS	
	151	PS	
	152	RPDL	
	153	R98	
	154	R16	
	155	RPGL	
	156	R55	
	157	RTIFF	
	158	PCL	
	159	PCLXL	
	160	MSIS	
	161	MSIS (Option)	
	180	FONT	
	181	FONT1	
	182	FONT2	
	183	FONT3	
	201	Copy Application	
	202	NetFile Application	
	204	Printer Application	
	205	Scanner Application	
	211	Web System	
	212	WebDocBox	
7803	PM Counter Display		Displays the PM counter since the last PM.
7804	PM Counter Reset		Resets the PM counter.
7807	SC / Jam Counter Reset		Resets the SC and jam counters.

SP	Number/Name		Function/[Setting]
7808	Counter Reset		Press # to reset all counters, with the exception of the following counts: • Total electronic count • Copy count • Print count • Duplex count • Staple count • A3/DLT count • P/O count • C/O count.
7810	Access Code Clear		Press # to clear the key operator code if the customer key operator forgets the code and the machine cannot be used.
7811	Original Counter Clear		Clears the original total display, displayed with SP7-002-***.and SP7205-001
7816	Print Counter Reset by Paper Tray		
	002	Tray 1	Resets the total copy counter by paper tray. These SP modes can be used after replacing the pick-up, feed, and separation rollers in the paper feed stations.
	003	Tray 2	
	004	Tray 3	
	005	Tray 4	
	006	Tray 5	
	007	Tray 6	
	008	Tray 7	
	009	Inserter	
7822	Copy Memory Clear		Resets all counters of SP7-301.
7825	Total Counter Reset		Resets the electrical total counter. *Usually, this SP mode is done at installation. This SP mode works only once when the counter value is negative.*
7826	MF Error Counter		
	001	Error Total	**Japan Only**
	002	Error Staple	**Japan Only**
7827	MF Error Counter Clear		**Japan Only**
7829	Rental GPC Counter Reset		**Japan Only**
7832	Self-Diagnose Result Display		Press # to display a list of error codes. Nothing is displayed if no errors have occurred.
7833	Pixel Coverage Ratio		
	001	Last Pages	Displays the toner coverage ratio (%) for the previous page just output. Example: All black solid: 100%
	002	Average Pages	Displays the average toner coverage ratio (%) for the previous pages just output.
	003	Toner Bottle in Use	Displays the number of toner ends. (Total number of times the toner bottle has been used)

SP	Number/Name		Function/[Setting]
7833	004	Copy Count: Previous Toner Bottle	Display the number of output pages for the last toner bottle. (Toner yield for the last toner bottle)
	005	Copy Count: Toner Bottle Before Previous	Display the number of output pages for the toner bottle before last. (Toner yield for the toner bottle before last)
7834	Clear Pixel Coverage Data		
	001	Last & Average pages	Clears the counters SP7833-001 and -002
	002	Toner Bottle in Use	Clears the counters SP7833-003.
	003	Page Counts (2 Prev. Toner Bottles)	Clears the counters SP7833-004 and -005.
7836	Total Memory Size		Press # to display the contents of the memory on the controller system.
7837	Copy Clear: Pages by Mode		Press execute to clear counters SP7301 (Number of Pages by Magnification Mode) and SP7304 (Copy: Number of Copies by Mode) . If the machine has connect copy function, SP7330 (Connect Copy – Job Count)is also cleared .
7838	Copy Clear: Jobs by Continuous Output		Press Execute to clear counter SP7305 (Copy: Display Jobs by Continuous Output.)
7839	Copy Clear: Jobs by Mode		Press Execute to clear counter SP7306.(Copy: Display Jobs by Mode). If the machine has the connect copy function, SP7331 (Connect Copy – Print Count) is also cleared
7840	LS Clear: Stored Image Logins		Press Execute to clear counter SP7320 (Doc. Svr. – Scan Count).
7841	LS Clear: Originals by Size		Press Execute to clear counter SP7321 (Doc. Svr. – Original Size Display)
7842	LS Clear: Prints by Size		Press Execute to clear counter SP7323 (Doc. Svr – Print Size Display).
7843	LS Clear: Print Job Logins		Press Execute to clear counter SP7324 (Doc. Svr. – Print Job Counter).
7844	LS Clear: Print Job Page Distribution		Press Execute to clear SP7325 (Doc. Svr. – Job Count (Page No.).
7845	LS Clear: Print Job File Distribution		Press Execute to clear SP7326 (Doc. Svr – Job Count (File No.)
7846	LS Clear: Print Job Copies Distribution		Press Execute to clear SP7327 (Doc. Svr. – Job Count (Set No.
7847	LS Clear: Number of Pages by Mode		Press Execute to clear SP7328 (Doc. Svr – Job Count (Print Mode). If the machine has the connect copy function, SP7334 (Connect Copy – Doc. Svr. Print Cou) is also cleared.
7848	Copy/Doc. Svr. Memory Clear		Press Execute to clear the following SP codes: SP7301, SP7304, SP7305, SP7306, SP7320, SP7321, SP7323, SP7324, SP7325, SP7326, SP7327, SP7328.

SP	Number/Name		Function/[Setting]
7901	Assert Info		Displays the following information of SC990. **DFU**
	001	File Name	DFU
	002	Number of Lines	DFU
	003	Location	DFU
7999	Engine Debug Log Switch		

5.2.2 PRINTER SERVICE TABLE

SP	Number/Bit SW		Initial	
1001	Bit Switch			
	001	Bit SW 1	00H	Adjusts the bit switch settings. **Note: These bit switches are currently not being used**
	002	Bit SW 2	00H	
	003	Bit SW 3	00H	
	004	Bit SW 4	00H	
	005	Bit SW 5	00H	
	006	Bit SW 6	00H	
	007	Bit SW 7	00H	
	008	Bit SW 8	00H	
1003	Clear setting			
	001	Initialize Printer System	Initializes the settings in the printer feature settings of UP mode.	
	002	Clear CSS Counter	**DFU**	
	003	Delete Program	**DFU**	
1004	Print Summary		Prints the printer summary sheet.	
1005	Display Version.		Displays the version of the controller firmware.	

5.2.3 SCANNER SERVICE TABLE

SP	Number/Name		Function/[Setting]
1001	System		
	001	Model Name	Displays the model name.
	002	Scanner Firmware Version	Displays the scanner firmware version.
	003	Scanner Firmware Number	Displays the firmware's part number.
	004	Detail Model Name	Displays the detail model name.
1002	Error Log Display		Displays the error log data.
1004	Compression Type		Selects the compression type for binary picture processing. [1-3/**1**/1] 1: MH, 2: MR, 3: MMR
1005	Erase Margin		Creates an erase margin for all edges of the scanned image. *If the machine has scanned the edge of the original, create a margin.* [0 – 5/**0**/1mm]
1006	Auto Reset Timer		Adjusts the auto reset timer for the scanner function. *If this is "0", the auto reset function is disabled.* [0, 10 – 99/**60**/1s]
1007	Store Priority		Selects the default setting of the store priority when the main switch is turned on. [1 – 3/**1**/1] **1: Send only** 2: Store only 3: Send + Store
2002	Text Mode Setting		
	001	MTF Filter Coefficient (Main scan)	Selects the MTF filter coefficient in the main scan direction for Text mode. *Select a higher number for a stronger filter.* *If this is "0", the MTF filter is not applied.* [0~13/**7**/1]
	002	MTF Filter Coefficient (Sub scan)	Selects the MTF filter coefficient in the sub scan direction for Text mode. *Select a higher number for a stronger filter.* *If this is "0", the MTF filter is not applied* [0~13/**7**/1]
	003	MTF Filter Strength (Main scan)	Selects the MTF filter strength in the main scan direction for Text mode. *Select a higher number for a stronger filter.* [0~7/**2**/1]
	004	MTF Filter Strength (Sub scan)	Selects the MTF filter strength in the sub scan direction for Text mode. *Select a higher number for a stronger filter.* [0~7/**2**/1]

SP	Number/Name		Function/[Setting]
2002	005	Smoothing Filter	Selects the smoothing pattern for Text mode. *A larger value is smoother. A smaller value could cause moiré to appear in the image.* [0~7/**0**/1]
	006	Scanner Gamma	Selects the scanner gamma type for Text mode. [0~7,11/**4**/1] 0:Normal, 1:Smooth, 2:Distinct, 3:Sharp, 4:Text, 6:Text/Photo, 7: Photo, 11: Grayscale *4~7 is used for delivery scanner mode*.
	007	Notch 7(Lighter): Brightness	The following SPs adjust the image density (brightness, contrast, and thresholds) for each image density level (from 7 to 1) for Text mode. The settings are reflected in the gamma table. [1~255/**128**/1]
	008	Notch 7(Lighter): Contrast	
	009	Notch 7(Lighter): Threshold	
	010	Notch 6: Brightness	
	011	Notch 6: Contrast	
	012	Notch 6: Threshold	
	013	Notch 5: Brightness	
	014	Notch 5: Contrast	
	015	Notch 5: Threshold	
	016	Notch 4(Middle): Brightness	
	017	Notch 4 (Middle): Contrast	
	018	Notch 4 (Middle): Threshold	
	019	Notch 3: Brightness	
	020	Notch 3: Contrast	
	021	Notch 3: Threshold	
	022	Notch 2: Brightness	
	023	Notch 2: Contrast	
	024	Notch 2: Threshold	
	025	Notch 1(Darker): Brightness	
	026	Notch 1 (Darker): Contrast	
	027	Notch 1(Darker): Threshold	
	028	Independent Dot Erase	Select the independent dot erase type for Text mode. A larger value is stronger erase. [0~7/**0**/1]
	029	Unevenness Correction	Selects the unevenness correction. [0~1/**0**/1] 0: OFF 1: ON
2003	Text/Photo Mode Setting		
	001	MTF Filter Coefficient (Main scan)	Selects the MTF filter coefficient in the main scan direction for Text/Photo mode. *Select a higher number for a stronger filter. If this is "0", the MTF filter is not applied.* [0~13/**6**/1]

SP	Number/Name		Function/[Setting]
2003	002	MTF Filter Coefficient (Sub scan)	Selects the MTF filter coefficient in the sub scan direction for Text/Photo mode. *Select a higher number for a stronger filter. If this is "0", the MTF filter is not applied* [0~13/**6**/1]
	003	MTF Filter Strength (Main scan)	Selects the MTF filter strength in the main scan direction for Text/Photo mode. *Select a higher number for a stronger filter.* [0~7/**2**/1]
	004	MTF Filter Strength (Sub scan)	Selects the MTF filter strength in the sub scan direction for Text/Photo mode. *Select a higher number for a stronger filter.* [0~7/**2**/1]
	005	Smoothing Level	Selects the smoothing pattern for Text/Photo mode. *A larger value is smoother. A smaller value could cause moiré to appear in the image.* [0~7/**0**/1]
	006	Gamma Setting	Selects the scanner gamma type for Text/Photo mode. [0~7,11/**6**/1] 0:Normal, 1:Smooth, 2:Distinct, 3:Sharp, 4:Text, 6:Text/Photo, 7: Photo, 11: Grayscale *4~7 is used for delivery scanner mode*.
	007	Notch 7(Lighter): Brightness	The following SPs adjust the image density (brightness, contrast, and thresholds) for each image density level (from 7 to 1) for Text/Photo mode. The settings are reflected in the gamma table. [1~255/**128**/1]
	008	Notch 7(Lighter): Contrast	
	009	Notch 7(Lighter): Threshold	
	010	Notch 6: Brightness	
	011	Notch 6: Contrast	
	012	Notch 6: Threshold	
	013	Notch 5: Brightness	
	014	Notch 5: Contrast	
	015	Notch 5: Threshold	
	016	Notch 4(Middle): Brightness	
	017	Notch 4 (Middle): Contrast	
	018	Notch 4 (Middle): Threshold	
	019	Notch 3: Brightness	
	020	Notch 3: Contrast	
	021	Notch 3: Threshold	
	022	Notch 2: Brightness	
	023	Notch 2: Contrast	
	024	Notch 2: Threshold	
	025	Notch 1(Darker): Brightness	
	026	Notch 1 (Darker): Contrast	
	027	Notch 1 (Darker): Threshold	

SP	Number/Name		Function/[Setting]
2004	Photo Mode Setting		
	001	MTF Filter Coefficient (Main scan)	Selects the MTF filter coefficient in the main scan direction for Photo mode. *Select a higher number for a stronger filter. If this is "0", the MTF filter is not applied.* [0~13/**0**/1]
	002	MTF Filter Coefficient (Sub scan)	Selects the MTF filter coefficient in the sub scan direction for Photo mode. *Select a higher number for a stronger filter. If this is "0", the MTF filter is not applied* [0~13/**0**/1]
	003	MTF Filter Strength (Main scan)	Selects the MTF filter strength in the main scan direction for Photo mode. *Select a higher number for a stronger filter.* [0~7/**0**/1]
	004	MTF Filter Strength (Sub scan)	Selects the MTF filter strength in the sub scan direction for Photo mode. *Select a higher number for a stronger filter.* [0~7/**0**/1]
	005	Smoothing Level	Selects the smoothing pattern for Photo mode. *A larger value is smoother. A smaller value could cause moiré to appear in the image.* [0~7/**7**/1]
	006	Gamma Setting	Selects the scanner gamma type for Text/Photo mode. [0~7,11/**7**/1] 0:Normal, 1:Smooth, 2:Distinct, 3:Sharp, 4:Text, 6:Text/Photo, 7: Photo, 11: Grayscale *4~7 is used for delivery scanner mode*.
	007	Dither Pattern	Selects the dither pattern. [1~11/**5**/1] 1: 8 x 4 45° 2: 6 x 6 90° 3: 4 x 4 spiral 4: 8 x 8 90°, 5: 70 line 6: 95 line 7: 140 line 8: 180 line 9: 16 x 16 90° 10: 8x8 spiral 11: 106 line
	008	Notch 7(Lighter): Brightness	The following SPs adjust the image density (brightness, contrast, and thresholds) for each image density level (from 7 to 1) for Photo mode. The settings are reflected in the gamma table. [1~255/**128**/1]
	009	Notch 7(Lighter): Contrast	
	010	Notch 7(Lighter): Threshold	
	011	Notch 6: Brightness	
	012	Notch 6: Contrast	
	013	Notch 6: Threshold	

SP	Number/Name		Function/[Setting]
2004	014	Notch 5: Brightness	
	015	Notch 5: Contrast	
	016	Notch 5: Threshold	
	017	Notch 4(Middle): Brightness	
	018	Notch 4 (Middle): Contrast	
	019	Notch 4 (Middle): Threshold	
	020	Notch 3: Brightness	
	021	Notch 3: Contrast	
	022	Notch 3: Threshold	
	023	Notch 2: Brightness	
	024	Notch 2: Contrast	
	025	Notch 2: Threshold	
	026	Notch 1(Darker): Brightness	
	027	Notch 1 (Darker): Contrast	
	028	Notch 1 (Darker): Threshold	
2005	Grayscale Mode Setting		
	001	MTF Filter Coefficient (Main scan)	Selects the MTF filter coefficient in the main scan direction for Grayscale mode. *Select a higher number for a stronger filter. If this is "0", the MTF filter is not applied.* [0~13/**0**/1]
	002	MTF Filter Coefficient (Sub scan)	Selects the MTF filter coefficient in the sub scan direction for Grayscale mode. *Select a higher number for a stronger filter. If this is "0", the MTF filter is not applied* [0~13/**0**/1]
	003	MTF Filter Strength (Main scan)	Selects the MTF filter strength in the main scan direction for Grayscale mode. *Select a higher number for a stronger filter.* [0~7/**0**/1]
	004	MTF Filter Strength (Sub scan)	Selects the MTF filter strength in the sub scan direction for Grayscale mode. *Select a higher number for a stronger filter.* [0~7/**0**/1]
	005	Smoothing Level	Selects the smoothing pattern for Grayscale mode. *A larger value is smoother. A smaller value could cause moiré to appear in the image.* [0~7/**0**/1]
	006	Gamma Setting	Selects the scanner gamma type for Grayscale mode. [0~7,11/**11**/1] 0:Normal, 1:Smooth, 2:Distinct, 3:Sharp, 4:Text, 6:Text/Photo, 7: Photo, 11: Grayscale *4~7 is used for delivery scanner mode*.

SP	Number/Name		Function/[Setting]
2005	007	Notch 7(Lighter): Brightness	The following SPs adjust the image density (brightness, contrast, and thresholds) for each image density level (from 7 to 1) for grayscale mode. The settings are reflected in the gamma table. [1~255/**128**/1]
	008	Notch 7(Lighter): Contrast	
	009	Notch 7(Lighter): Threshold	
	010	Notch 6: Brightness	
	011	Notch 6: Contrast	
	012	Notch 6: Threshold	
	013	Notch 5: Brightness	
	014	Notch 5: Contrast	
	015	Notch 5: Threshold	
	016	Notch 4(Middle): Brightness	
	017	Notch 4 (Middle): Contrast	
	018	Notch 4 (Middle): Threshold	
	019	Notch 3: Brightness	
	020	Notch 3: Contrast	
	021	Notch 3: Threshold	
	022	Notch 2: Brightness	
	023	Notch 2: Contrast	
	024	Notch 2: Threshold	
	025	Notch 1(Darker): Brightness	
	026	Notch 1 (Darker): Contrast	
	027	Notch 1 (Darker): Threshold	
2006	Grayscale Compression		
	001	Standard	Sets the rate of compression when Standard is selected for handling JPEG files. [5~95/**50**/1] 95: Low compression (larger file) 5: High compression (smaller file)
	002	High Quality	Sets the rate of compression when High is selected for handling JPEG files. [5~95/**60**/1] 95: Low compression (larger file) 5: High compression (smaller file)
	003	Low Quality	Sets the rate of compression when Low is selected for handling JPEG files. [5~95/**40**/1] 95: Low compression (larger file) 5: High compression (smaller file)

5.3 PRINTING TEST PATTERNS

NOTE: Do not operate the machine until the test pattern is printed out completely. Otherwise, an SC may occur.

1. Access the SP mode which contains the test pattern you need.
2. Touch the “Copy Window” key on the operation panel to access the copy mode display.
3. Select the paper size.
4. Press the “Start” key to print the test pattern.
5. After checking the test pattern, exit copy mode by touching the “SP Mode” key.
6. Exit the SP mode.

5.3.1 IPU SCANNING TEST PATTERN (SP2-902-001)

No.	Test Pattern
0	OFF
1	Vertical 1-dot Line
2	Vertical 2-dot Line
3	Horizontal 1-dot Line
4	Horizontal 2-dot Line
5	Independent 1-dot
6	Cross Stripes 1-dot Lines
7	Vertical Stripes
8	Horizontal Grayscale
9	Vertical Grayscale
10	16-step Grayscale
11	Cross
12	Slant Cross Stripes
13	256-Color Density Pattern
14	64-Color Density Pattern
15	Trimming Region
16	Vertical Frequency Spec.
17	Horizontal Frequency Spec.

5.3.2 IPU PRINTING TEST PATTERN (SP2-902-002)

No.	Test Pattern
0	OFF
1	1200 Date Image 1
2	1200 Date Image 2
3	Vertical Grayscale
4	Caterpillar
5	LD Channel Adjust 1
6	LD Channel Adjust 2
7	LD Channel Adjust 3
8	LD Channel Adjust 4

5.3.3 PRINTING TEST PATTERN (SP2-902-003)

No.	Test Pattern
0	None
1	Alternating Dot Pattern (1-dot)
2	Alternating Dot Pattern (2-dot)
3	Alternating Dot Pattern (4-dot)
4	Alternating Dot Pattern (1024-dot)
5	Grid Pattern (1-dot): 0ch
6	Grid Pattern (1-dot): 1ch
7	Grid Pattern (1-dot): 2ch
8	Grid Pattern (1-dot): 3ch
9	Grid Pattern (1-dot): 4ch
10	Grid Pattern (1-dot): 5ch
11	Grid Pattern (1-dot): 6ch
12	Grid Pattern (1-dot): 7ch
13	Vertical Line (1-dot)
14	Vertical Line (2-dot)
15	Horizontal Line (1-dot)
16	Horizontal Line (2-dot)
17	Grid Pattern (1-dot pair)
18	Checker Flag
19	Argyle Pattern (1-dot)
20	Argyle Pattern (2-dot)
21	Cross Stitch (Horizontal): 670
22	Cross Stitch (Horizontal): 012
23	Full Dot Pattern
24	Grid Pattern (2-dot)
25	Black Band (Vertical)
26	Black Band (Horizontal)
27	Trimming Line (1-dot)
28	Trimming Line (2-dot)
29	Stair
30	Horizontal Grayscale 20
31	Horizontal Grayscale 40
32	Vertical Grayscale 20
33	Vertical Grayscale 40
34	Grayscale-Horizontal 20 (Without Loop)
35	Blank Image
36	Grid (1-dot): 0ch (With Outside Data)
37	Trimming Line (1-dot) (With Outside Data)
38	Argyle Pattern (With Outside Data)

5.4 INPUT CHECK

5.4.1 MAIN MACHINE INPUT CHECK: SP5803

This procedure allows you to test sensors and other components of the machine. After you select one of the categories below by number, you will see a small 8-bit table with the number of the bit and its current setting (0 or 1). The bits are numbered 0 to 7, reading right to left.

1. Enter the SP mode and select SP5803.
2. Enter the class 3 number for the item that you want to check. A small box will be displayed on the SP mode screen with a series of 0's and 1's.
   The meaning of the display is as follows.

Bit	7 6 5 4 3 2 1 0
Setting	**1 1 0 0 1 0 1 0**

3. Check the status of each item against the corresponding bit numbers listed in the table below.

Class 3 No.	Bit No.	Description	Reading	
			0 (LOW)	1 (HIGH)
1	7	Not Used		
	6	By-pass Tray Paper End Sensor(7th tray)	Not paper end	Paper end
	5	LCT 3rd Paper End Sensor (6th tray)	Not paper end	Paper end
	4	LCT 2nd Paper End Sensor (5th tray)	Not paper end	Paper end
	3	LCT 1st Paper End Sensor (4th tray)	Not paper end	Paper end
	2	3rd Paper End Sensor	Not paper end	Paper end
	1	2nd Paper End Sensor	Not paper end	Paper end
	0	1st Paper End Sensor	Not paper end	Paper end
2	7	Not Used		
	6	By-pass Tray Paper Feed Sensor(7th tray)	Paper detected	No paper
	5	LCT 3rd Paper Feed Sensor (6th tray)	Paper detected	No paper
	4	LCT 2nd Paper Feed Sensor (5th tray)	Paper detected	No paper
	3	LCT 1st Paper Feed Sensor (4th tray)	Paper detected	No paper
	2	3rd Paper Feed Sensor	Paper detected	No paper
	1	2nd Paper Feed Sensor	Paper detected	No paper
	0	1st Paper feed Sensor	Paper detected	No paper

Class 3 No.	Bit No.	Description	Reading	
			0 (LOW)	1 (HIGH)
3	7	Key Card Set	Set	Not set
	6	Duplex Entrance Sensor	Paper detected	No paper
	5	Duplex Jogger H.P.	Not detected	Detected
	4	Duplex Transport 3 Sensor	Paper detected	No paper
	3	Duplex Transport 2 Sensor	Paper detected	No paper
	2	Duplex Transport 1 Sensor	Paper detected	No paper
	1	Duplex Inverter Sensor	Paper detected	No paper
	0	Duplex Connection	Connected	Not connected
4	7	Not Used		
	6	By-pass Tray Lift Sensor (7th tray)	Lifted	No paper
	5	LCT 3rd Lift Sensor (6th tray)	Lifted	No paper
	4	LCT 2nd Lift Sensor (5th tray)	Lifted	No paper
	3	LCT 1st Lift Sensor (4th tray)	Lifted	No paper
	2	3rd Lift Sensor	Lifted	No paper
	1	2nd Lift Sensor	Lifted	No paper
	0	1st Lift Sensor	Lifted	No paper
5	7	Not Used		
	6	Not Used		
	5	Not Used		
	4	Not Used		
	3	Drum Unit set	Set	Not set
	2	Polygon Motor Cooling Fan Lock	No lock	Lock
	1	Toner Hopper Sensor	Toner end	Not toner end
	0	Key Counter Set	Set	Not set
6	7	Drum Motor Lock	Lock	Not lock
	6	Fusing/Exit Motor Lock	Lock	Not lock
	5	Not Used		
	4	Not Used		
	3	Development Motor Lock	Lock	Not lock
	2	Toner Suction Motor Rotation Sensor	Not interrupted	Interrupted
	1	Not Used		
	0	Toner Supply Pump Motor Sensor	Not interrupted	Interrupted
7	7	Left Front Door Safety Switch	Door closed	Door open
	6	Right Front Door Safety Switch	Door closed	Door open
	5	Relay Motor Lock	Lock	Not lock
	4	Guide Plate Position Sensor	In position	Out of position
	3	LCT Relay Sensor	Paper detected	No paper
	2	Relay Sensor	Paper detected	No paper
	1	Not Used		
	0	Registration Sensor	Paper detected	No paper

INPUT CHECK

Class 3 No.	Bit No.	Description	Reading	
			0 (LOW)	1 (HIGH)
8	7	Not Used		
	6	Not Used		
	5	Not Used		
	4	Not Used		
	3	Not Used		
	2	Not Used		
	1	Not Used		
	0	Not Used		
9	7	Total Counter Set	Not set	Set
	6	Fusing Abnormal Signal	Normal	Abnormal
	5	Not Used		
	4	Exit Unit Set	Set	Not set
	3	Web End Sensor	Not end	End
	2	Exit Sensor	Paper detected	No paper
	1	Fusing Exit Sensor	No paper	Paper detected
	0	Fusing Unit Set	Set	Not set
10	7	Dip SW 8	ON	OFF
	6	Dip SW 7	ON	OFF
	5	Dip SW 6	ON	OFF
	4	Dip SW 5	ON	OFF
	3	Dip SW 4	ON	OFF
	2	Dip SW 3	ON	OFF
	1	Dip SW 2	ON	OFF
	0	Dip SW 1	ON	OFF
11	7	Not used		
	6	Not used		
	5	Not used		
	4	2nd Tray Paper Size 5	See Table 1	
	3	2nd Tray Paper Size 4		
	2	2nd Tray Paper Size 3		
	1	2nd Tray Paper Size 2		
	0	2nd Tray Paper Size 1		
12	7	Not used		
	6	Not used		
	5	Not used		
	4	3rd Tray Paper Size 5	See Table 1	
	3	3rd Tray Paper Size 4		
	2	3rd Tray Paper Size 3		
	1	3rd Tray Paper Size 2		
	0	3rd Tray Paper Size 1		
13	7	Not used		
	6	Not used		
	5	Not used		
	4	Rear Fence Return Sensor	Not detected	Return Position
	3	Front Side Fence Closed Sensor	Open	Closed
	2	Front Side Fence Open Sensor	Open	Closed
	1	Rear Side Fence Closed Sensor	Open	Closed

Class 3 No.	Bit No.	Description	Reading	
			0 (LOW)	1 (HIGH)
	0	Rear Side Fence Open Sensor	Open	Closed
14	7	Not used		
	6	Not used		
	5	Not Used		
	4	Rear Fence HP Sensor	Not detected	Home position
	3	Left Tandem Tray Set	Set	Not set
	2	Right Tandem Tray Set	Set	Not set
	1	Left 1st Tray Paper Sensor	Paper detected	No Paper
	0	Right 1st Tray Paper Sensor	No Paper	Paper detected
15	7	Not Used		
	6	Not Used		
	5	Not Used		
	4	Lower Limit Sensor	Not detected	Detected
	3	1st Tray Paper Height 4	See Table 2	
	2	1st Tray Paper Height 3		
	1	1st Tray Paper Height 2		
	0	1st Tray Paper Height 1		
16	7	Not Used		
	6	Not Used		
	5	Not Used		
	4	Paper Feed Motor Lock	Lock	Not lock
	3	Not Used		
	2	Toner Suction Bottle Set Sensor	Set	Not set
	1	2nd Tray Paper Height Sensor 2	See Table 3	
	0	2nd Tray Paper Height Sensor 1		
17	7	Not Used		
	6	Not Used		
	5	Not Used		
	4	Toner Near End Sensor	Toner End	Not toner end
	3	Toner Collection Bottle Sensor	Set	Not set
	2	Toner Bank Motor Lock	Lock	Not lock
	1	3rd Tray Paper Height 2	See Table 3	
	0	3rd Tray Paper Height 1		
18	7	Not Used		
	6	Not Used		
	5	Not Used		
	4	Toner Overflow Sensor	Stays high/low: Toner Overflow Change status: Not overflow	
	3	Lower Bottle Inner Cap Sensor	Cap closed	Cap opened
	2	Upper Bottle Inner Cap Sensor	Cap closed	Cap opened
	1	Lower Toner Bottle Sensor	Bottle set	Bottle not set
	0	Upper Toner Bottle Sensor	Bottle set	Bottle not set

Class 3 No.	Bit No.	Description	Reading	
			0 (LOW)	1 (HIGH)
19	7	Not Used		
	6	Not Used		
	5	Not Used		
	4	By-pass Tray Paper Height Sensor 2 (7th Tray)	See Table 4	
	3	By-pass Tray Paper Height Sensor 1 (7th Tray)		
	2	LCT 1st Tray Paper Size Switch 3 (4th tray)	See Table 5	
	1	LCT 1st Tray Paper Size Switch 2 (4th tray)		
	0	LCT 1st Tray Paper Size Switch 1 (4th tray)		
20	7	Not Used		
	6	Not Used		
	5	Not Used		
	4	By-pass Tray Paper Length Sensor (7th Tray)	See Table 6	
	3	By-pass Tray Lower Limit Sensor Paper (7th Tray)	Not detected	Detected
	2	LCT 2nd Tray Paper Size Switch 3 (5th tray)	See Table 5	
	1	LCT 2nd Tray Paper Size Switch 2 (5th tray)		
	0	LCT 2nd Tray Paper Size Switch 1 (5th tray)		
21	7	Not Used		
	6	Not Used		
	5	Not Used		
	4	By-pass Tray Motor Lock	Not lock	Lock
	3	LCT Motor Lock	Not lock	Lock
	2	Not Used		
	1	Not Used		
	0	LCT 3rd Tray Set (6th Tray)	Set	Not set
22	7	Not Used		
	6	Not Used		
	5	Not Used		
	4	By-pass Tray Set	Set	Not set
	3	By-pass Tray Lift SW	Lifted	Not lifted
	2	LCT Door Open SW	Door closed	Door open
	1	LCT Exit Sensor	Paper detected	No paper
	0	LCT Connection	Connected	Not connected

Class 3 No.	Bit No.	Description	Reading	
			0 (LOW)	1 (HIGH)
23	7	Not Used		
	6	Not Used		
	5	Not Used		
	4	By-pass Tray Open	Tray closed	Tray open
	3	LCT 1st Tray Paper Height sensor 4 (4th tray)	See Table 2	
	2	LCT 1st Tray Paper Height sensor 3 (4th tray)		
	1	LCT 1st Tray Paper Height sensor 2 (4th tray)		
	0	LCT 1st Tray Paper Height sensor 1 (4th tray)		
24	7	Not Used		
	6	Not Used		
	5	Not Used		
	4	Not Used		
	3	LCT 2nd Tray Paper Height sensor 4 (5th tray)	See Table 2	
	2	LCT 2nd Tray Paper Height sensor 3 (5th tray)		
	1	LCT 2nd Tray Paper Height sensor 2 (5th tray)		
	0	LCT 2nd Tray Paper Height sensor 1 (5th tray)		
25	7	Not Used		
	6	Not Used		
	5	Not Used		
	4	Not Used		
	3	LCT 3rd Tray Paper Height sensor 4 (6th tray)	See Table 2	
	2	LCT 3rd Tray Paper Height sensor 3 (6th tray)		
	1	LCT 3rd Tray Paper Height sensor 2 (6th tray)		
	0	LCT 3rd Tray Paper Height sensor 1 (6th tray)		
26	7	Not Used		
	6	Not Used		
	5	Not Used		
	4	Not Used		
	3	By-pass Tray Paper Size SW 4 (7th tray)	See Table 6	
	2	By-pass Tray Paper Size SW 3 (7th tray)		
	1	By-pass Tray Paper Size SW 2 (7th tray)		
	0	By-pass Tray Paper Size SW 1 (7th tray)		

Table 1: 2nd and 3rd Tray Paper Size Switch Combination (0:Low, 1:High)

Class 3 No.	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Paper Width	
						Metric version	Inch version
11, 12	1	1	1	1	0	A3	DLT
	1	1	1	0	0	8 1/4" x 13"	8 1/2" x 14"
	1	1	0	0	1	A4 SEF	LT SEF
	1	0	0	1	0	A4 LEF	LT LEF
	0	0	1	0	0	8 1/2" x 13"	HLT SEF
	0	1	0	0	0	A5 SEF	HLT LEF
	1	0	0	0	0	A5 LEF	8"X10 1/2"
	0	0	0	0	1	7 1/4"X10 1/2"	7 1/4"X10 1/2"
	0	0	0	1	1	-	8" x 13"
	0	0	0	0	1	*	*

Table 2: 1st, LCT 1st(4th Tray), 2nd(5th Tray) and 3rd (6th Tray) Paper Height Sensor Combination

Class 3 No.	Bit 3	Bit 2	Bit 1	Bit 0	Paper Height
15,23,24 25	0	0	0	0	76%~100%
	1	0	0	0	51%~75%
		1	0	0	26%~50%
			1	0	1%~25%
				1	Near End

Table 3: 2nd and 3rd Tray Paper Height Sensor Combination

Class 3 No.	Upper Bit	Lower Bit	Paper Height
16, 17	1	1	71 ~ 100%
	1	0	31 ~ 70%
	0	0	11 ~ 30%
	0	1	0 ~ 10%

Table 4: By-pass Tray (7th tray) Paper Height Sensor Combination

Class 3 No.	Upper Bit	Lower Bit	Paper Height
19	0	0	91 ~ 100%
	0	1	51 ~ 90%
	1	1	11 ~ 50%
	1	0	0 ~ 10%

Table 5 LCT 1st(4th Tray) and 2nd(5th Tray) Paper Size Switch Combination (0:Low, 1:High)

Class 3 No.	Bit 2	Bit 1	Bit 0	Paper Size
19, 20	1	1	0	A4 LEF
	1	0	1	B5 LEF
	0	1	0	A5 LEF
	1	0	0	A5 SEF
	0	0	0	LT LEF
	0	0	1	HLT LEF
	0	1	1	HLT SEF

Table 6: By-pass Tray (7th Tray) Paper Size Switch Combination (0:Low, 1:High)

Class 3 No.	Bit 4	Bit 3	Bit 2	Bit 1	Paper Length Sensor	Paper Width	
						Metric version	Inch version
20,26	0	1	1	1	0	A3	A3
	0	1	1	1	1	A4 LEF	A4LEF
	0	0	1	1	0	DLT	DLT
	0	0	1	1	1	LT LEF	LT LEF
	1	0	1	1	0	B4	B4
	1	0	1	1	1	B5 LEF	B5 LEF
	1	0	0	1	0	A4 SEF	Lt SEF
	1	0	0	1	1	A5 LEF	HLT LEF
	1	1	0	1	0	8" x 13"	8" x 13"
	1	1	0	0	1	A5 SEF	A5 SEF
	1	1	1	0	1	HLT SEF	HLT SEF

5.4.2 ADF INPUT CHECK: SP6007

Class 3 No.	Bit No.	Description	Reading	
			0	1
1	7	Inverter Sensor	No original	Original detected
	6	Exit Sensor	No original	Original detected
	5	Registration Sensor	No original	Original detected
	4	Entrance Sensor	No original	Original detected
	3	Original Width Sensor 3	No original	Original detected
	2	Original Width Sensor 2	No original	Original detected
	1	Original Width Sensor 1	No original	Original detected
	0	Original Set Sensor	No original	Original detected
2	7	ADF Feed-in Motor Encoder Pulse	Change the “0” and “1” during rotation	
	6	Pick-up Roller HP Sensor	At home position	Not home position
	5	Bottom Plate Position Sensor	Detected	Not detected
	4	Bottom Plate HP Sensor	At home position	Not home position
	3	Exit Cover Sensor	Close	Open
	2	Feed Cover Sensor	Close	Open
	1	APS Start Sensor	Start	Off
	0	DF Position Sensor	Down	Up
3	7	Not Used		
	6	Not Used		
	5	Not Used		
	4	Not Used		
	3	Not Used		
	2	Original Length Sensor	No original	Original detected
	1	ADF Feed-out Motor Encoder Pulse	Change the “0” and “1” during rotation	
	0	ADF Transport Motor Encoder Pulse	Change the “0” and “1” during rotation	

5.4.3 FINISHER INPUT CHECK: SP6117 (B478 ONLY)

Class 3 No.	Bit No.	Description	Reading	
			0	1
1	7	Stack Feed-out Belt HP Sensor	Home position	Not home position
	6	Not Used		
	5	Shift Tray Lower Limit 2 Sensor	Not detected	Detected
	4	Shift Tray Lower Limit 3 Sensor	Not detected	Detected
	3	Stapler Tray Exit Sensor	Paper not detected	Paper detected
	2	Shift Tray Exit Sensor	Paper detected	Paper not detected
	1	Upper Tray Exit Sensor	Paper detected	Paper not detected
	0	Entrance Sensor	Paper not detected	Paper detected
2	7	Not used		
	6	Front Door Safety Switch	Door closed	Door open
	5	Stapler Tray Paper Sensor	Paper not detected	Paper detected
	4	Staple End Sensor	Not end	End
	3	Staple Hammer HP Sensor	Home position	Not home position
	2	Stapler HP Sensor	Not home position	Home position
	1	Shift Tray Half-turn Sensor	Home position	Not home position
	0	Jogger HP Sensor	Not home position	Home position
3	7	Not Used		
	6	Staple Cartridge Set Sensor	Set	Not set
	5	Staple Mode HP Sensor 2	Not detected	Detected
	4	Staple Mode HP Sensor 1	Not detected	Detected
	3	Not Used		
	2	Punch Waste Hopper Sensor	Not full	Full
	1	Punch HP1 Sensor	Home position	Not home position
	0	Punch Unit Connection	Connected	Not connected
4	7	Stapler Ready	Ready	Not ready
	6	Stapler Return Sensor	Not detected	Detected
	5	Exit Guide Open Sensor	Home position	Not home position
	4	Stack Plate –Center HP Sensor	Not home position	Home position
	3	Pre-stack Tray Paper Sensor	Paper not detected	Paper detected
	2	Staple Waste Hopper Sensor	Not full	Full
	1	Stapler Rotation HP Sensor	Not home position	Home position
	0	Upper Tray Limit Sensor	Not full	Full
5	7	Punch HP 2 Sensor	Home position	Not home position
	6	Not Used		
	5	Shift Lower Limit - Large Paper Sensor	Not detected	Detected
	4	Shift Mode HP Sensor	Not detected	Detected
	3	Stacking Roller HP Sensor	Home position	Not home position
	2	Positioning Roller HP Sensor	Not home position	Home position
	1	Stack Plate – Rear HP Sensor	Not home position	Home position
	0	Stack Plate – Front HP Sensor	Not home position	Home position

INPUT CHECK

Class 3 No.	Bit No.	Description	Reading	
			0	1
6	7	Not Used		
	6	Not Used		
	5	Not Used		
	4	Not Used		
	3	Emergency Stop Switch	Not press	Press
6	2	Shift Jogger Lift HP Sensor (Optional Jogger Unit)	Home position	Not home position
	1	Shift Jogger HP Sensor (Optional Jogger Unit)	Not home position	Home position
	0	Optional Jogger Unit Connection	Connection	Not connection

5.5 OUTPUT CHECK

5.5.1 MAIN MACHINE OUTPUT CHECK: SP5804

NOTE: Motors keep turning in this mode regardless of upper or lower limit sensor signals. To prevent mechanical or electrical damage, do not keep an electrical component on for a long time.

Main Machine Output Check (SP5-804)

1. Open SP mode 5-804.
2. Select the SP number that corresponds to the component you wish to check. (Refer to the table on the next page.)
3. Press On then press Off to test the selected item.

No.	Description	No.	Description
001	1st Paper Feed Clutch	027	LCT 3rd Grip Clutch
002	2nd Paper Feed Clutch	028	Bypass Grip Clutch
003	3rd Paper Feed Clutch	029	Relay Clutch
004	LCT 1st Paper Feed Clutch	030	LCT Relay Clutch
005	LCT 2nd Paper Feed Clutch	031	Lower Relay Clutch
006	LCT 3rd Paper Feed Clutch	032	LCT Transport Clutch 1
007	Bypass Paper Feed Clutch	033	LCT Transport Clutch 2 (By-pass)
008	1st Pick-up Solenoid	034	LCT Guide Plate Solenoid
009	2nd Pick-up Solenoid	035	1st Tray Lift Motor
010	3rd Pick-up Solenoid	036	2nd Tray Lift Motor
011	LCT 1st Pick-up Solenoid	037	3rd Tray Lift Motor
012	LCT 2nd Pick-up Solenoid	038	LCT 1st Tray Lift Motor
013	LCT 3rd Pick-up Solenoid	039	LCT 2nd Tray Lift Motor
014	Bypass Pick-up Solenoid	040	LCT 3rd Tray Lift Motor
015	1st Separation Roller Solenoid	041	Bypass Tray Lift Motor
016	2nd Separation Roller Solenoid	042	Rear Fence Drive Motor
017	3rd Separation Roller Solenoid	043	Tandem Tray Connect Solenoid
018	LCT 1st Separation Roller Solenoid	044	Front Side Fence Solenoid
019	LCT 2nd Separation Roller Solenoid	045	Rear Side Fence Solenoid
020	LCT 3rd Separation Roller Solenoid	046	Left 1st Tray Lock Solenoid
021	Bypass Separation Roller Solenoid	047	Relay Motor
022	1st Vertical Transport Clutch	048	Paper Feed Motor
023	2nd Vertical Transport Clutch	049	LCT Motor
024	3rd Vertical Transport Clutch	050	Bypass Tray Motor
025	LCT 1st Grip Clutch	051	Drum Motor
026	LCT 2nd Grip Clutch	052	Fusing/Exit Motor

OUTPUT CHECK

No.	Description	No.	Description
053	Registration Motor	076	Quenching Lamp
054	Web Motor	077	Charge Corona
055	Guide Plate Solenoid	078	Grid Plate
056	Inverter Gate Solenoid	079	Development Bias
057	Duplex Transport Motor1	080	Transfer Belt Bias
058	Duplex Transport Motor2	081	Polygonal Motor Mirror Cooling Fan
059	Inverter Exit Roller Clutch	082	Exhaust Fan (Low)
060	Duplex Inverter Gate Solenoid	083	Exhaust Fan (High)
061	Reverse Roller Solenoid	084	Drum Cooling Fan (Low)
062	Inverter Guide Plate Solenoid	085	Drum Cooling Fan (High)
063	Toner Recycling Shutter Solenoid	086	Paper Cooling Pipe Fan1
064	Jogger Motor	087	Steam Removal Fan (Low)
065	Toner Supply Roller Clutch	088	Steam Removal Fan (High)
066	Development Motor	089	Development Unit Cooling Fan1
067	Toner Supply Pump Motor	090	Laser Diode
068	Upper Toner Bottle Motor	091	Development Unit Cooling Fan2
069	Lower Toner Bottle Motor	092	Duplex Entrance Cooling Fan
070	Toner Bank Motor	093	Paper Cooling Pipe Fan2
071	Toner Supply Coil Clutch	094	Duplex Cooling Fan
072	Exposure Lamp	095	Toner Suction Motor
073	Optics Cooling Fan	096	Total Counter
074	ID Sensor LED	097	Upper Bottle Cap Motor
075	Transfer Belt Lift Solenoid	098	Lower Bottle Cap Motor

5.5.2 ADF OUTPUT CHECK: SP6008

No.	Description	0	1
1	Feed-in Motor (High)	OFF	ON
2	Feed-in Motor (Low)	OFF	ON
3	Transport Motor (Forward)	OFF	ON
4	Transport Motor (Reverse)	OFF	ON
5	Feed-out Motor	OFF	ON
6	Exit Gate Solenoid	OFF	ON
7	Inverter Solenoid	OFF	ON
8	LEDs (Operation Panel)	OFF	ON
9	Pick-up Motor	OFF	ON
10	Bottom Plate Motor	OFF	ON
11	Feed-in Clutch	OFF	ON

5.5.3 FINISHER OUTPUT CHECK: SP6118

No.	Description
1	Upper Transport Motor
2	Shift Tray Exit Motor
3	Upper Tray Junction Gate Solenoid
4	Shift Tray Lift Motor
5	Jogger Motor
6	Stapler Motor
7	Staple Hammer Motor (Stapler Unit)
8	Punch Motor
9	Stapler Junction Gate Solenoid
10	Positioning Roller Solenoid
11	Stack Feed-out Belt Motor
12	Shift Motor
13	Stapler Rotation Motor
14	Lower Transport Motor
15	Exit Guide Motor
16	Stack Plate-Center Motor
17	Pre-stack Junction Gate Solenoid
18	Pre-stack Paper Stopper Solenoid
19	Stapler Return Solenoid
20	Stack Plate- Front Motor
21	Stack Plate – Rear Motor
22	Stacking Roller Drag Motor
23	Stacking Roller Motor
24	Shift Jogger Motor (Optional Jogger Unit)
25	Shift Jogger Lift Motor (Optional Jogger Unit)

5.6 SMC LISTS (SYSTEM PARAMETERS AND REPORT DATA)

1. Access the SP mode corresponding to the list that you wish to print.

SP5-990-1:	All system parameter list
SP5-990-2:	SP mode data list
SP5-990-3:	UP mode data list
SP5-990-4:	Machine logging data list
SP5-990-5:	Self-diagnosis report list
SP5-990-7:	NIB summary
SP5-990-8:	Net file log
SP5-990-21:	Copier user program list
SP5-990-22:	Scanner SP list
SP5-990-23:	Scanner user program list

2. Touch the “Copy Window” key to access the copy mode display.
3. Select the paper size and press the “SP Mode” key to retune the SP mode.
4. Press the “Execute” key to print the list.
5. Exit SP mode.

5.7 MEMORY ALL CLEAR: SP5801

As a rule, you should always print an SMC Report before initializing or adjusting the SP settings. The SMC Report provides a concise list of all the SP commands and their current settings. The report can be used for reference if the service manual is not available.

Executing Memory All Clear resets all the settings stored in the NVRAM to their default settings except the following:

SP7-003-1:	Electrical total counter value
SP5-811-1:	Machine serial number
SP5-907:	Plug & Play Brand Name and Production Name Setting

1. Execute SP5990 to print out all SMC Data Lists.
2. Open SP5801.
3. Press the number for the item that you want to initialize. The number you select determines which application is initialized. For example, press 1 if you want to initialize all modules.

No.	What It Initializes	Comments
1	All modules	Initializes items 2 ~ 15 below.
2	Engine	Initializes all registration settings for the engine and copy process settings.
3	SCS (System Control Service) /SRM	Initializes default system settings, CSS settings, operation display coordinates.
4	IMH	Initializes the image file system.
5	MCS (Memory Control Service)	Initializes the automatic delete time setting for stored documents.
6	Copier application	Initializes all copier application settings.
8	Printer application	Initializes the printer defaults, programs registered, the printer SP bit switches, and the printer CSS counter.
9	Scanner application	Initializes the defaults for the scanner and all the scanner SP modes.
10	Network application	Initializes all service-mode settings about access to the document server from the DeskTopBinder software on a PC. For example, initializes the resolution of images the PC gets using the image converter board option.
11	NCS (Network Control Service)	Initializes the system defaults and interface settings (IP addresses also), the SmartNetMonitor for Admin settings, WebStatusMonitor settings, and the TELNET settings.
14	DCS	Initializes the DCS (Delivery & Receive Control Server) settings.
15	UCS	Initializes the UCS (User Directory Control Server) settings.

4. Press Execute, then follow the prompts on the display to complete the procedure.
5. Make sure that you perform the following settings:
   - Do the printer and scanner registration and magnification adjustments. (☛ 3-17).
   - Execute SP2115 – Main Scan Beam Pitch Adjustment
   - Do the touch screen calibration (☛ Section 3 “Touch Screen Calibration”).
   - Referring to the SMC data lists, re-enter any values, which had been changed from their factory settings.
   - Execute SP 3001 002 – ID Sensor Initial Setting
   - Switch SP 3901 001 (Auto Process Control Setting) to 1 (On), if you wish auto process control to be used.
6. Check the copy quality and the paper path, and do any necessary adjustments.

5.8 SOFTWARE AND COPY SETTING RESET (UP MODE)

5.8.1 SOFTWARE RESET

The software can be rebooted when the machine hangs up. Use the following procedure.

Turn the main power switch off and on.

-or-

Press and hold down * # together for over 10 seconds. When the machine beeps once, release both buttons. After “Now loading. Please wait” is displayed for a few seconds, the copy window will open. The machine is ready for normal operation.

5.8.2 RESETTING THE SYSTEM

The system settings in the UP mode can be reset to their defaults using the following procedure.

1. Make sure that the machine is in the copier standby mode.
2. Press the User Tools key.
3. Hold down the “#” key and touch the “System Setting” key.
4. A confirmation message will be displayed, then press “Yes”.

5.8.3 RESETTING COPY/DOCUMENT SERVER FEATURES ONLY

The copy/document server settings in the UP mode can be reset to their defaults using the following procedure.

1. Make sure that the machine is in the copier standby mode.
2. Press the User Tools key.
3. Hold down the “#” key and touch “Copy/Document Server Features” key.
4. A confirmation message will be displayed, then press “Yes”.

5.8.4 RESETTING SCANNER FEATURES ONLY

The scanner settings in the UP mode can be reset to their defaults using the following procedure

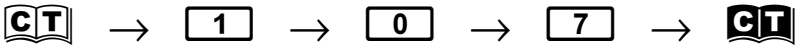
1. Make sure that the machine is in the copier standby mode.
2. Press the User Tools key.
3. Hold down the “#” key and touch “Scanner Features” key.
4. A confirmation message will be displayed, then press “Yes

5.9 PM COUNTER

5.9.1 ACCESSING THE PM COUNTERS

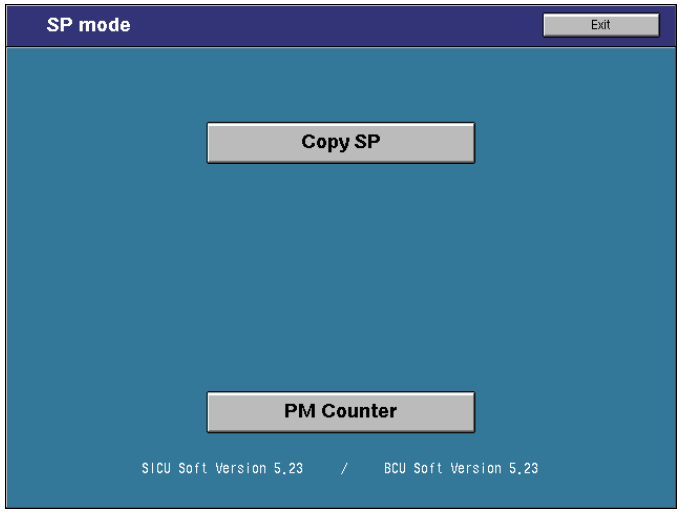
Each PM part has a counter which counts up at the appropriate time. (For example, the counter for the hot roller counts up every copy, and the counter for a feed roller counts up when paper is fed from the corresponding tray.) These counters should be used as references for part replacement timing.

1) Press the following keys in sequence.



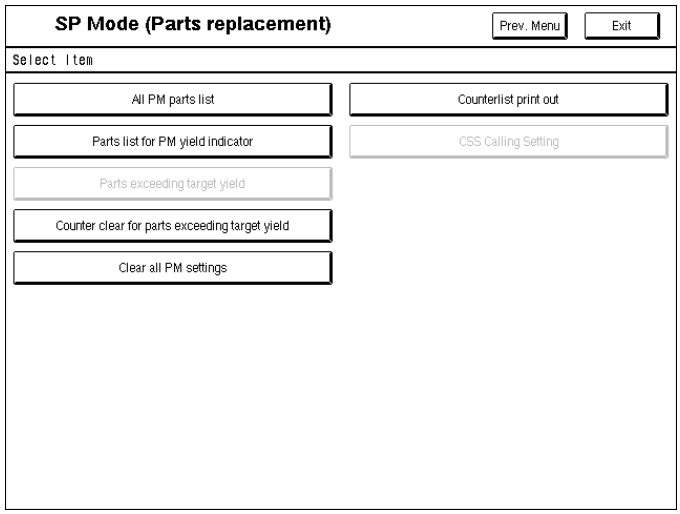
Hold the CT key for more than 3 seconds

The SP mode menu is displayed.



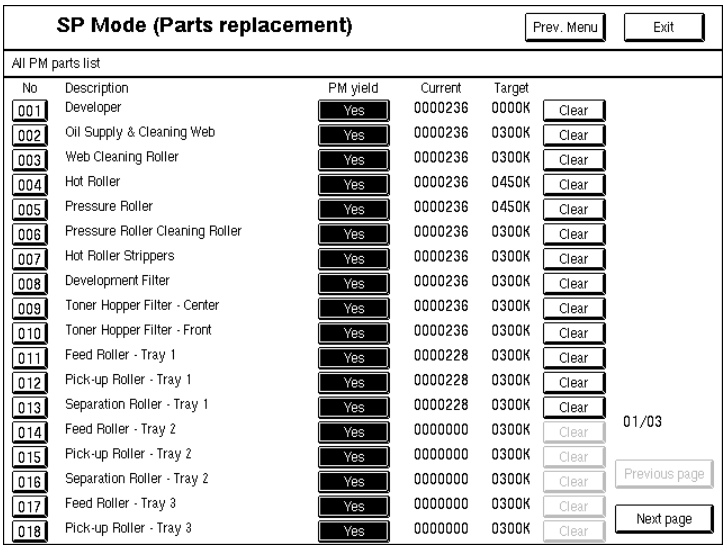
2) Press [PM Counter] on the display.

3) The following menu appears on the display.



All PM Parts List

Displays all the counters for PM parts.

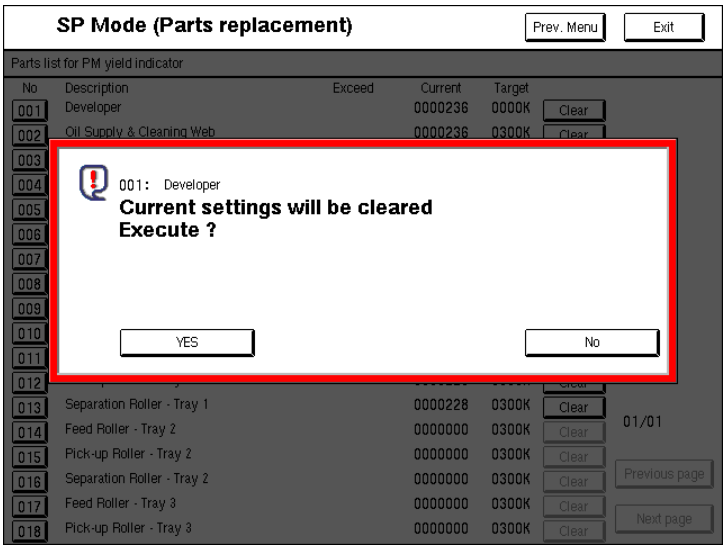


On this screen, the current counter and the target yield of each PM part can be checked.

Additionally, the PM yield indicator setting can be changed. To change the setting press [Yes/No] key in the “PM yield” column.

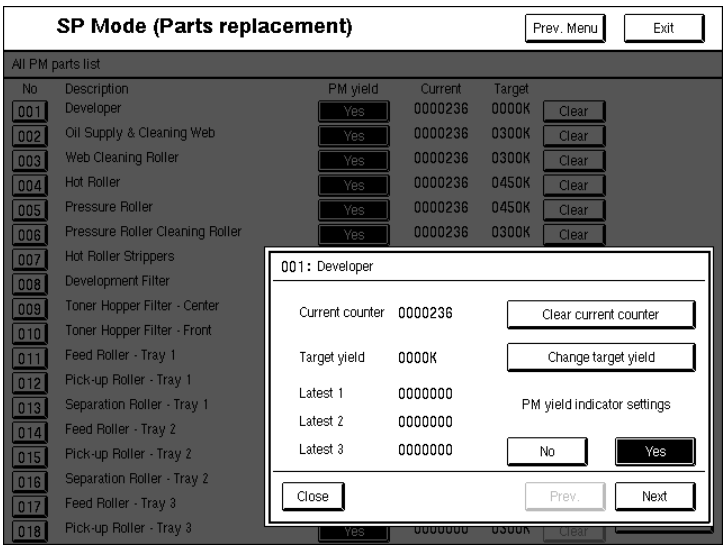
When “Parts list for PM yield” is selected in the parts replacement menu, only the parts with [Yes] in the “PM yield” are listed.

To clear a counter, press [Clear] on the display. The following appears.



Then press [Yes] to clear the counter.

If one of the keys in the “No” column is pressed, the following appears on the display.

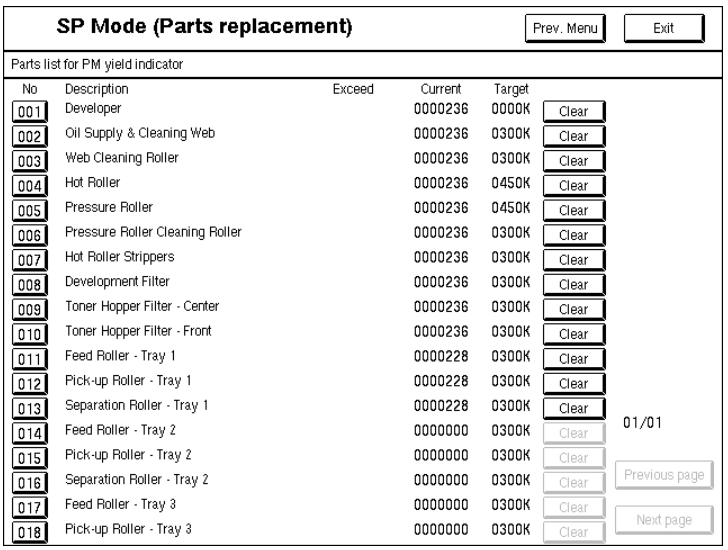


On this screen, the records of the last three part replacements are displayed. When ‘Clear current counter’ is pressed, the current counter is cleared, the current counter is overwritten to “Latest 1”, the Latest 1 counter is overwritten to “Latest 2”, and the Latest 2 counter is overwritten to “Latest 3”.

Additionally, the target yield can be changed on this screen. To change the target yield setting, do the following:

1) Press [Change target yield] on the screen.
2) Input the target yield using the ten-key pad.
3) Press the # key.

Parts List for PM Yield Indicator



On this screen, only the parts selected in the “All PM parts list” screen are displayed. Normally, the PM parts counters should be checked on this screen.

If the current counter exceeds the target yield, there is a * mark in the “Exceed” column.

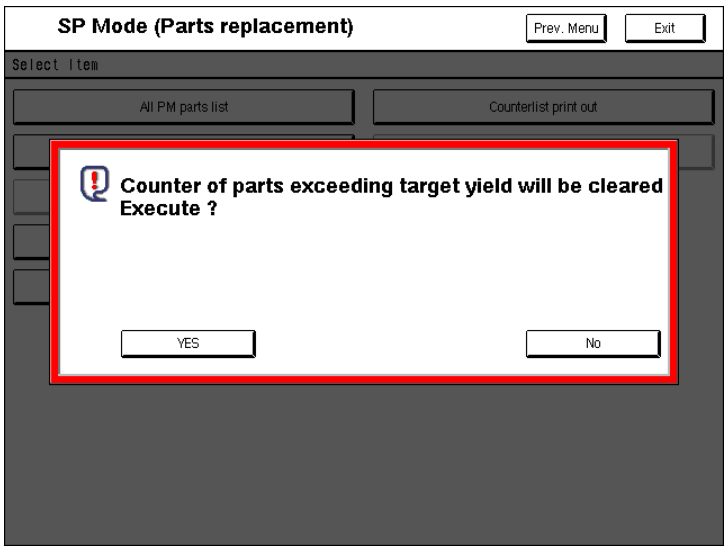
Each counter can also be cleared on this screen. To clear all counters on this screen at once, see ‘Counter Clear for Parts Exceeding Target Yield’ on the next page.

Parts Exceeding Target Yield

Only the parts whose counters are exceeding the target yield are displayed. If none of the PM counters is exceeding the target yield, this item cannot be selected from the parts replacement menu.

Counter Clear for Parts Exceeding Target Yield

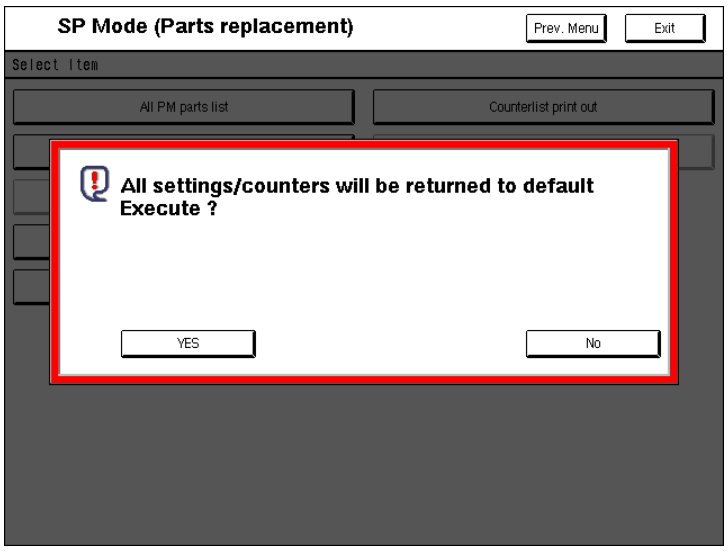
Clears all the counters which are exceeding the target yield. When this item is selected, the following appears on the display.



Press [Yes] to clear the counters.

Clear All PM Settings

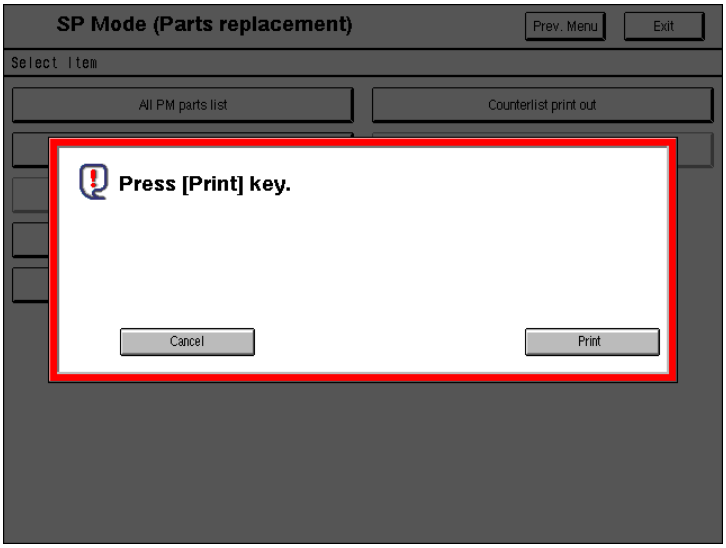
Clears all the PM counters and returns all the settings (PM parts list and target yield) to the defaults. When this item is selected, the following appears.



Press [Yes] to clear the settings.

Counter List Print Out

Prints a list of all the PM part counters. When this item is selected, the following appears on the display.



Press [Print] to print out the counter list.

CSS Calling Setting (RSS Function)

This function is for Japanese machines only.

5.10 FIRMWARE UPDATE

To update the firmware for this machine, you must have the new version of the firmware downloaded onto an SD (Secure Digital) Card. The SD Card is inserted into the C3 slot on the right side of the controller box, viewed from the back of the machine.

5.10.1 BEFORE YOU BEGIN…

An SD card is a precision device, so always observe the following precautions when handling SD cards:

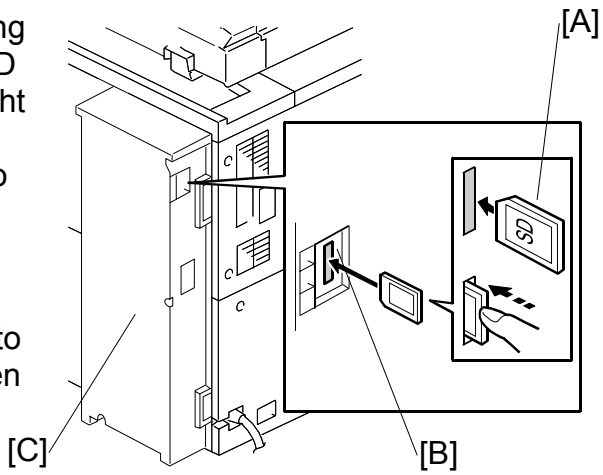
- Always switch the machine off before inserting an SD card. Never insert the SD card into the slot with the power on.
- After the power has been switched on, never remove the SD card from the service slot.
- Never switch the machine off while the firmware is downloading from the SD card.
- Store SD cards in a safe location where they are not exposed high temperature, high humidity, or exposure to direct sunlight.
- Always handle SD cards with care to avoid bending or scratching them. Never drop an SD card or expose it to other shock or vibration.

Keep the following points in mind while you are using the firmware update software:

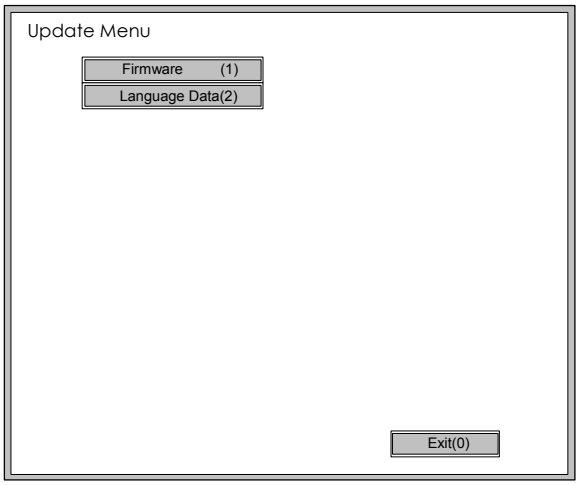
- “Upload” means to send data from the machine to the SD card, and “download” means to send data from the SD card to the machine.
- To select an item on the LCD, touch the appropriate button on the soft touch-screen of the LCD, or press the appropriate number key on the 10-key pad of the operation panel. For example, “Exit (0)” displayed on the screen means you can touch the Exit button on the screen, or press the ⓪ button on the operation panel of the copier.
- Before starting the firmware update procedure, always make sure that the machine is disconnected from the network to prevent a print job for arriving while the firmware update is in progress.

5.10.2 UPDATING FIRMWARE

1. On the machine, switch off the main power switch.
2. With the label on the SD card [A] facing as shown in the diagram, insert the SD card into service slot C3 [B] on the right side of the controller box [C]. Slowly push the SD card once into the slot so it locks in place.
3. Make sure the SD card is locked in place.
   NOTE: To remove the SD, push it in to unlock the spring lock and then release it so it pops out of the slot.



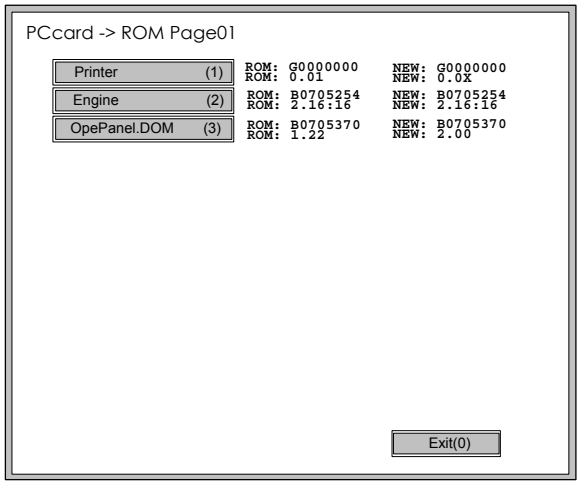
4. If the machine is connected to a network, disconnect the network cable from the copier.
5. Switch the main power switch on. After about 10 seconds, the initial version update screen appears on the LCD in English.



KEY	WHAT IT DOES
Firmware (1)	Press this button on the touch-screen (or ① on the 10-key pad) to open the firmware update screen.
Language Data (2)	Press this button on the touch-screen (or ② on the 10-key pad) to open the language update screen.
Exit (0)	Press this key on the touch-screen (or ⓪ on the 10-key pad) to quit the update procedure and return to normal machine operation.

NOTE: The firmware update and language update cannot be performed during the same session. If you need to do both, do the firmware update, switch the machine off and on to confirm the successful update of the firmware, then do the language update.

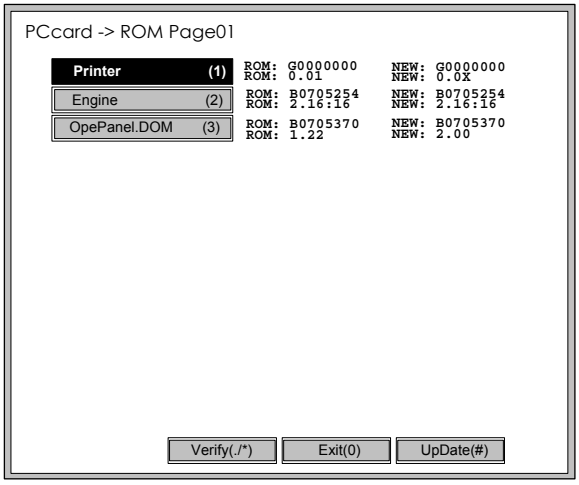
6. Touch “Firmware (1)” to open the firmware update screen.



ROM/NEW	WHAT IT MEANS
ROM:	Tells you the number of the module and name of the version presently installed. The first line is the module number, the second line the version name.
NEW:	Tells you the number of the module and name version on the SD card. The first line is the module number, the second line the version name.

7. On the screen, touch the button or press the corresponding number key on the operation panel to select the item in the menu that you want to update.

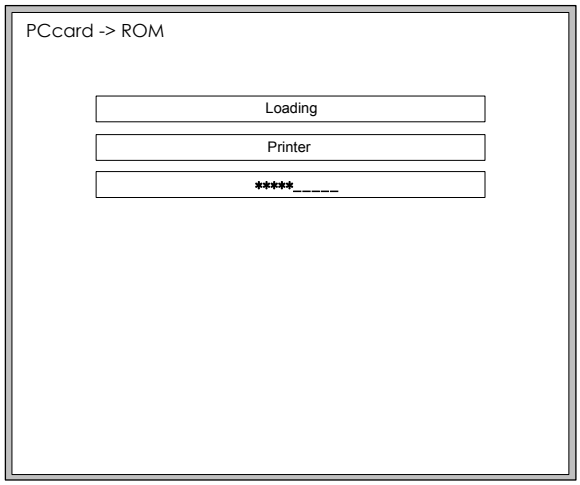
8. After pressing the module button, or entering the appropriate number with the 10-key pad to select the module, the “Verify” and “Update” keys appear at the bottom of the screen.
   NOTE: The screen below shows only the “Printer” option selected for update.



KEY	WHAT IT DOES
Verify (./*)	Press this button (or ⊙) to verify the selected module.
Update(#)	Press this button (or #) to upgrade the selected module.
Exit(0)	Press this button (or 0) to return to the previous screen.

9. To start the update, touch “UpDate (#)” (or #).

After selecting “Update”, three lines are displayed on the screen:

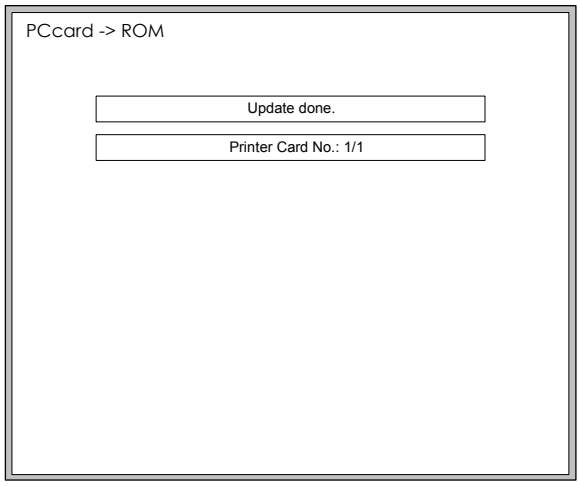


The first line tells you what is happening, the second line is the name of the module, and the third line tells you about the progress of the operation. As the update progresses, the underscores (_) in the progress bar are replaced by asterisks.

The update is finished after all 10 underscores are replaced by asterisks.

NOTE: The progress bar (*****_ _ _ _) is not displayed for the operation panel firmware after you touch “OpePanel”. While the LCDC firmware is updating, the power on key flashes on and off at 0.5 s intervals. When the update is finished, the power key flashes on and off slower at 3 s intervals.

When the update is finished, you will see a screen like the one below:



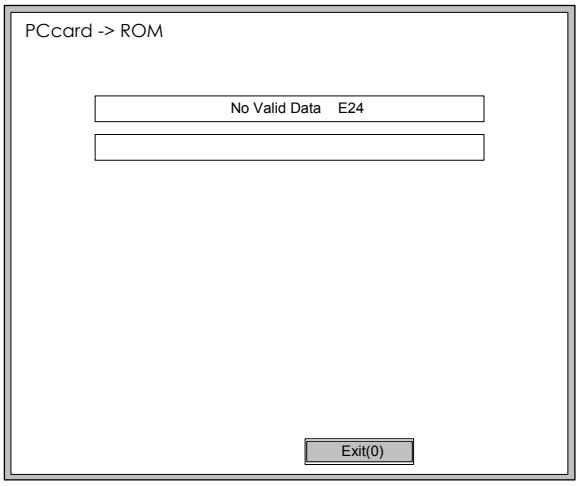
The first line prompts you that the update is finished, and the second line tells you the name of the module that has just been updated.

NOTE: If you have selected more than one module for updating, only the screen for the last module updated will be displayed.

10. When you see the “Update Done” message, switch the copier main power switch off.
11. Press in the SD card to release it, then remove it from the slot.
12. Switch the copier on for normal operation.

Error Messages

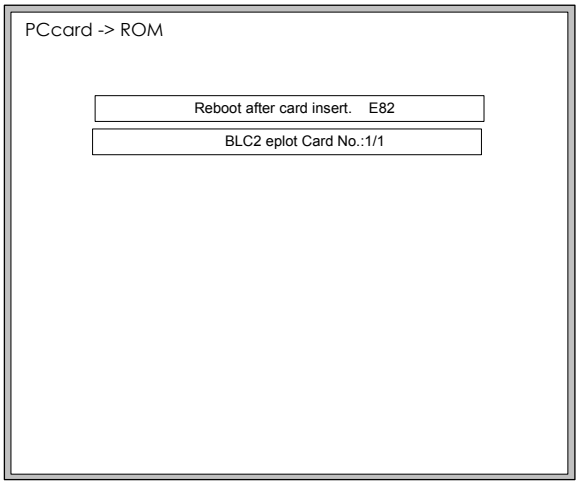
If an error occurs during the download, an error message will be displayed in the first line.



The error code consists of the letter “E” and a number. The example above shows error “E24” displayed. For details, refer to the Error Message Table. (☛5.10.8)

Firmware Update Error

If a firmware update error occurs, this means the update was cancelled during the update because the module selected for update was not on the SD card.



Recovery After Power Loss

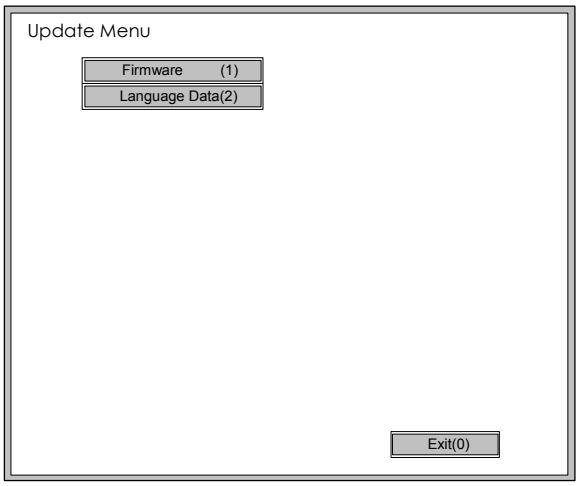
If the ROM update is interrupted as a result of accidental loss of power while the firmware is updating, then the correct operation of the machine cannot be guaranteed after the machine is switched on again. If the ROM update does not complete successfully for any reason, then in order to ensure the correct operation of the machine, the ROM update error will continue to be displayed until the ROM is updated successfully.

In this case, just insert the card once again and switch on the machine to continue the firmware download automatically from the card without the menu display.

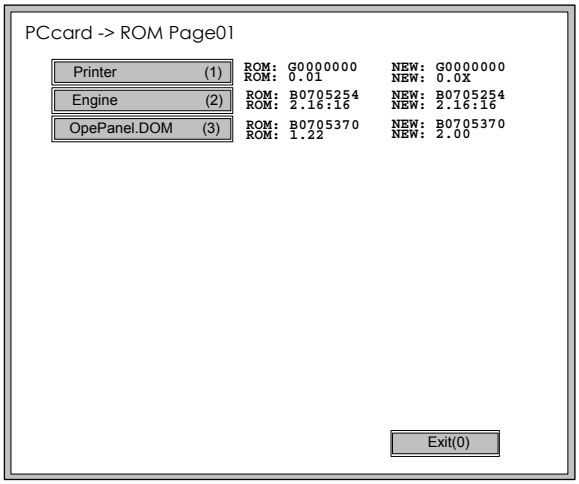
5.10.3 VERIFYING A SUCCESSFUL UPDATE

Follow this procedure to verify that a module has been updated successfully.

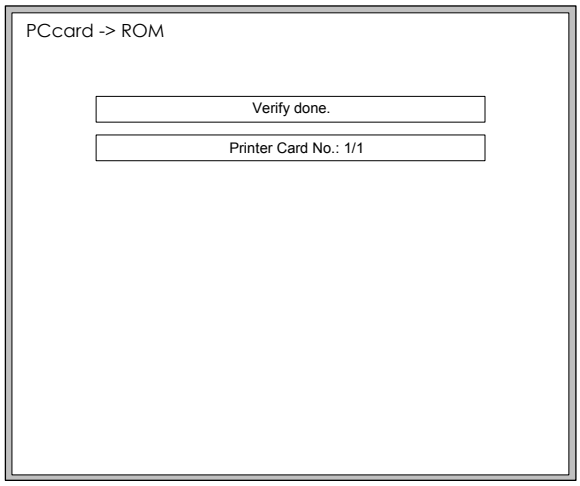
1. Switch off the main power switch.
2. If the SD card is not in the machine, insert it into service slot C3.
3. Switch the main power switch on. After about 10 seconds, the initial screen appears on the LCD in English.



4. Press “Firmware (1)” to open the firmware update screen.



5. On the touch-screen, touch the button or press the corresponding number key on the operation panel to select the item in the menu that you want to verify
6. After pressing the key, the items selected for verification are displayed in reverse and the “Verify” and “Update” keys appear at the bottom of the screen.
7. To start the verification, touch “Verify (./*” (or press ⊙).
   After selecting “Verify”, two lines are displayed on the screen:



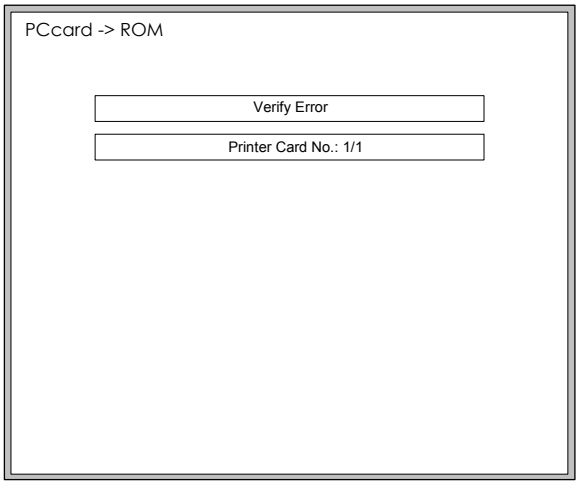
The first line tells you the status of the verification for the item selected from the menu, and the second name tells you the name of the item verified.

NOTE: If you selected more than one item for verification, the “Verify Done” message is displayed only once for the last module verified.

9. When you see the “Verify Done” message, switch the copier main power switch off.
10. Press in the SD card to release it, then remove it from the slot.
11. Switch the copier on for normal operation.

Error During Verification

If anything abnormal is detected during verification, an error message is displayed:



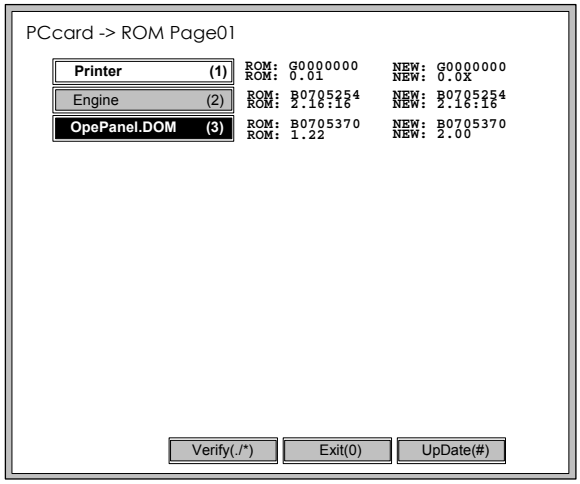
The second line tells you the name of the module where the error was detected.

If an error occurs during verification, switch the printer off and download the firmware from the SD card again.

5.10.4 UPDATING THE LCDC FOR THE OPERATION PANEL

Follow this procedure to update the LCDC (LCD Control Board).

1. Turn the copier main switch off.
2. Insert the SD card into service slot C3.
3. Switch the copier main switch on.
4. After about 10 seconds the initial screen opens in English.
5. Touch “OpePanel”.



6. Touch “UpDate(#) (or ⓗ) to start the update.
   After about 9 seconds, the downloading starts.

   While the data is downloading, the operation panel goes off and the main power on key flashes at 0.5 s intervals. When the update is finished, the same key starts flashing slower at 3 s intervals.
7. Switch the copier main power switch off, remove the SD card, then switch the copier on again.

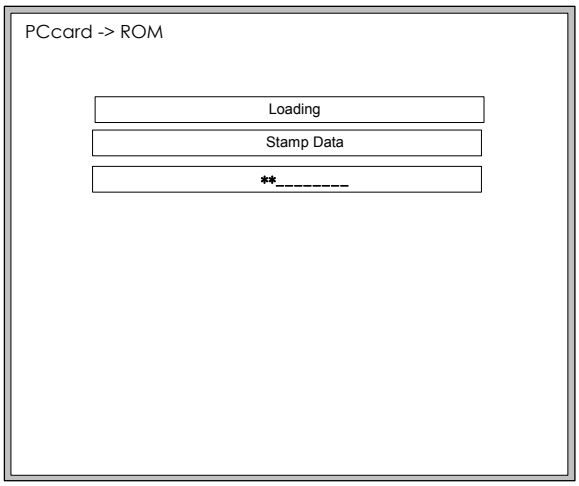
5.10.5 DOWNLOADING STAMP DATA

The stamp data should be downloaded from the controller firmware to the hard disks:

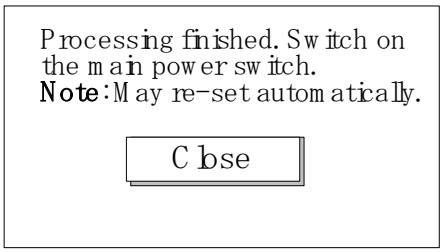
- When the machine is installed.
- After the hard disks have been replaced.

The print data contains the controller software, so execute SP5853 to download the fixed stamp data required by the hard disks.

1. Enter the SP mode.
2. Select SP5853 then press “Execute”. The following screen opens while the stamp data is downloading.



The download is finished with the message prompts you to close.



3. Press the “Close” button then cycle the copier off and on again.

5.10.6 NVRAM DATA UPLOAD/DOWNLOAD

Uploading Content of NVRAM to an SD card

Follow this procedure to upload SP code settings from NVRAM to an SD card.

NOTE: This data should always be uploaded to an SD card before the NVRAM is replaced.

1. Before switching the machine off, execute SP5990 001 (SMC Print). You will need a record of the NVRAM settings if the upload fails.
2. Switch the copier main power switch off.
3. Insert the SD card into service slot C3, then switch the copier on.
4. Execute SP5824 001 (NVRAM Data Upload) then press the “Execute” key

   When uploading is finished, the following files are coped to an NVRAM folder on the SD card. The fileis saved to the path and filename:

   NVRAM\<serial number>.NV

   Here is an example with Serial Number “B0700017”:

   NVRAM\B0700017.NV

5. In order to prevent an error during the download, be sure to mark the SD card that holds the uploaded data with the number of the machine from which the data was uploaded.

   NOTE: NVRAM data from more than one machine can be uploaded to the same SD card.

Downloading an SD Card to NVRAM

Follow this procedure to download SP data from an SD card to the NVRAM in the machine.

- If the SD card with the NVRAM data is damaged, or if the connection between the controller and BCU is defective, the NVRAM data down load may fail.
- If the download fails, repeat the download procedure.
- If the second attempt fails, enter the NVRAM data manually using the SMC print you created before uploading the NVRAM data. (☛5.10.6)

1. Switch the copier main power switch off.
2. Insert the SD card with the NVRAM data into service slot C3.
3. Switch the copier main power switch on.
4. Execute SP5825 001 (NVRAM Data Download) and press the “Execute” key.
   NOTE: In order for the NVRAM data to download successfully, the serial number of the file on the SD card must match the serial number of the machine. If the serial numbers do not match, the download will fail.

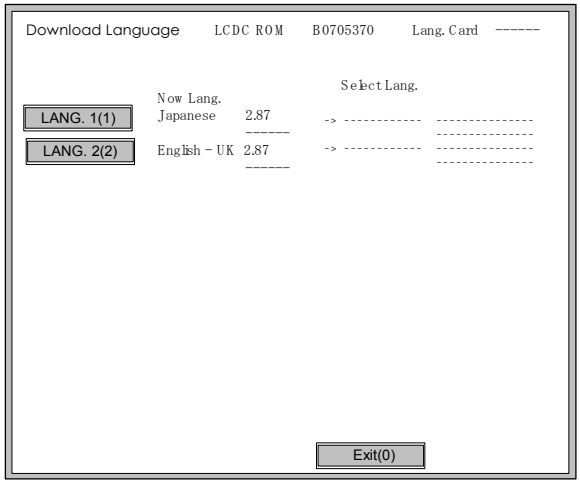
This procedure downloads the following data to the NVRAM:

- Total Count
- C/O, P/O Count

5.10.7 INSTALLING ANOTHER LANGUAGE

Many languages are available for selection, but only two can be selected for switching. Follow this procedure to select the two languages, either of which can be selected for the user interface on the operation panel.

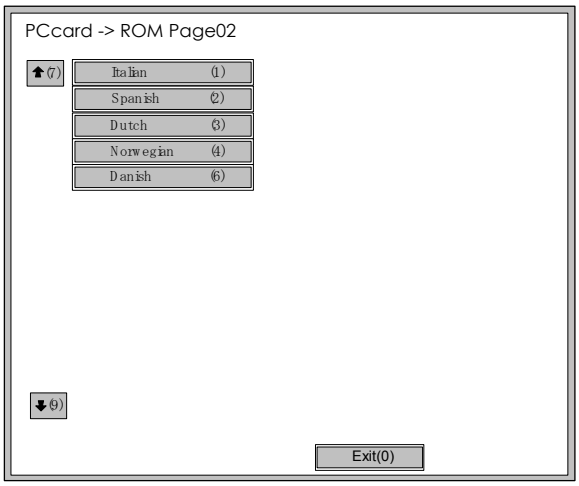
1. Switch the copier main power switch off.
2. Insert the SD card with the language data into service slot C3.
3. Switch the copier main power switch on. The initial screen opens after about 10 seconds.
4. Touch the "Language (2)" on the screen (or press ②).



5. Touch "LANG. 1(1)" or "LANG 2(2)

Key	What it does
LANG. 1(1)	Touch this button on the screen (or press ① on the 10-key pad) to open the next screen so you can select the 1st language.
LANG. 1(2)	Touch this button on the screen (or press ② on the 10-key pad) to open the next screen so you can select the 2nd language.
Exit(0)	Touch this key on the screen (or press ⓪ on the 10-key pad) to quit the update procedure and return to normal screen.

6. To select the 1st Language, touch “LANG 1(1)”.
   -or-
   To select the 2nd Language, touch “LANG(2)”.



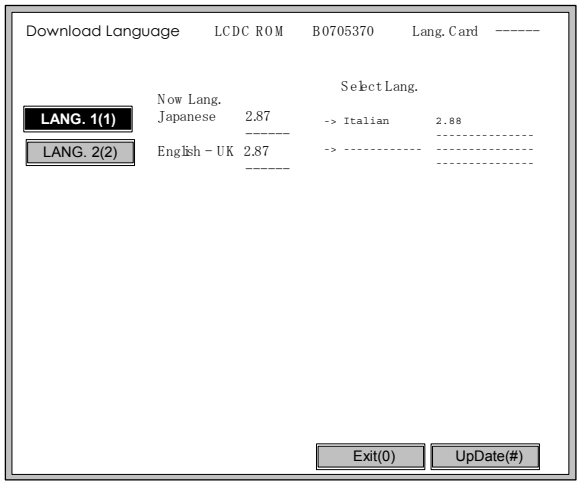
7. Touch the appropriate button on the screen (or press the number on the 10-keypad) to select a language as the 1st (or 2nd) Language.
   If a language is already selected, it will be displayed in reverse.
   Touching “Exit(0)” also returns the previous screen.
8. If you do not see the language that you want to select, touch “↑(7)” or “↓(9)” on the screen (or press ⑦ or ⑨) to display more choices.

After you select a language, the Download Screen opens.

The 1st or 2nd language selected for updating is displayed.

To the right of the selection, the first column displays the language currently selected and the 2nd column displays the language selected to replace that language.

The example below shows that the download will replace “Japanese” with “Italian” as the 1st language.



9. Touch “Update(#)” on the screen (or press #) to start the download.
   Another screen with a progress bar is not displayed while the language is downloading.

   While the language is downloading:
   - The operation panel switches off.
   - The LED on the power on key flashes rapidly.
10. After the Start LED begins to flash slowly, switch the copier main power switch off, then remove the SD card from the slot.
11. Switch the copier main power switch on to resume normal operation.

5.10.8 HANDLING FIRMWARE UPDATE ERRORS

If an error occurs during a download, an error message will be displayed in the first line. The error code consists of the letter “E” and a number (“E20”, for example).

Error Message Table

CODE	MEANING	SOLUTION
20	Cannot map logical address	Make sure SD card inserted correctly, or use another SD card.
21	Cannot access memory	HDD connection incorrect or replace hard disks.
22	Cannot decompress compressed data	Incorrect ROM data on the SD card, or data is corrupted.
23	Error occurred when ROM update program started	Controller program abnormal. If the second attempt fails, replace controller board.
24	SD card access error	Make sure SD card inserted correctly, or use another SD card.
30	No HDD available for stamp data download	HDD connection incorrect or replace hard disks.
31	Data incorrect for continuous download	Insert the SD card with the remaining data required for the download, the re-start the procedure.
32	Data incorrect after download interrupted	Execute the recovery procedure for the intended module download, then repeat the installation procedure.
33	Incorrect SD card version	Incorrect ROM data on the SD card, or data is corrupted.
34	Module mismatch - Correct module is not on the SD card)	SD update data is incorrect. Acquire the correct data (Japan, Overseas, OEM, etc.) then install again.
35	Module mismatch – Module on SD card is not for this machine	SD update data is incorrect. The data on the SD card is for another machine. Acquire correct update data then install again.
36	Cannot write module – Cause other than E34, E35	SD update data is incorrect. The data on the SD card is for another machine. Acquire correct update data then install again.
40	Engine module download failed	Replace the update data for the module on the SD card and try again, or replace the BCU board.
42	Operation panel module download failed	Replace the update data for the module on the SD card and try again, or replace the LCDC.
43	Stamp data module download failed	Replace the update data for the module on the SD card and try again, or replace the hard disks.
44	Controller module download failed	Replace the update data for the module on the SD card and tray again, or replace controller board.
50	Electronic confirmation check failed	SD update data is incorrect. The data on the SD card is for another machine. Acquire correct update data then install again.

5.11 USER PROGRAM MODE

5.11.1 ENTERING AND EXITING USER PROGRAM MODE

The user program (UP) mode is accessed by users, and by sales and service staff. UP mode is used to input the copier's default settings.

Press the User Tools/Counter button, then select the UP mode program. After finishing the UP mode program, touch "Exit" key to exit UP mode.

5.12 BOARD LEDS

BCU

Number	Monitored Signal
LED101 (Green)	Not Used. Normally remains off.
LED102 (Red)	Flashes while BCU operating to monitor operation of BCU.

PSU-E

Number	Monitored Signal
LED2	On: Normal Off: Energy saver mode
LED3	On: Normal Off: Energy saver mode

LCDC

Number	Monitored Signal
LED101 (Red)	Normally OFF. Blinks Slowly: During data download from SD card. Blinks Rapidly: When data download from SD card fails.
LED102 (Green)	Normally blinks Green. Blinks Slowly: During data download from SD card.

IPU

Number	Monitored Signal
LED 801 (Green)	Monitors Printer Flashes: ICs operating normally for image processing. Off: Operation failure.
LED 802 (Green)	Monitors Printer Flashes: ICs operating normally for image processing. Off: Operation failure.
LED 803 (Red)	Monitors Scanner Flashes: ICs operating normally for image processing. Off: Operation failure.

I/O Board

Number	Monitored Signal
LED201	Turns on when motor/solenoid drive signal is sent from the BCU to IOB (Normally on).

Controller Board

This table refers to the appearance of the array LEDs to the left of center on the controller board during the firmware upgrade, viewed from the back of the machine with the controller box cover removed.

LED	Color	Comments
Power	Green	Flashes during normal operation.
8	Red	While upgrading the firmware from the SD card inserted in the controller slot, each LED lights red as the download progresses. All LEDs light and remain on after the download is completed.
7	Red	
6	Red	
5	Red	
4	Red	
3	Red	
2	Red	
1	Red	

ADF Main Board LEDs

❍: ON ☆: Blinking

LED100	LED101	LED102	
❍	—	—	Entrance Sensor Jam
—	❍	—	Registration Sensor Jam
❍	❍	—	Exit Sensor Jam
—	—	❍	Inverter Sensor Jam
❍	—	❍	Jammed paper not removed: Between entrance sensor + registration sensor
❍	❍	❍	Jammed paper not removed: On the exposure glass
☆	—	—	Feed-in Motor Abnormal
—	☆	—	Transport Motor Abnormal
—	—	☆	Feed-out Motor Abnormal
☆	☆	—	Pick-up Motor Abnormal
—	☆	☆	Bottom Plate Motor Abnormal
☆	☆	☆	DF Position (Open)
☆	—	☆	APS Sensor ON
☆	—	—	Normal

5.13 DIP SW LEDS AND TEST POINT LEDS

5.13.1 DIP SWITCHES

BCU

NO.	NA	EUR/A	COMMENTS
1	**ON**	OFF	NA: Only SW1 Set to ON, Others OFF.
2	OFF	**ON**	EUR/A: Only SW2 set to ON, Others OFF
3	OFF	OFF	Do not change these settings.
4	OFF	OFF	
5	OFF	OFF	
6	OFF	OFF	
7	OFF	OFF	
8	OFF	OFF	

ADF Main Board

DPS100				Description
4	**3**	**2**	**1**	
0	0	0	0	Normal operating mode
0	0	0	1	Motor Test: Transport motor – Forward
0	0	1	0	Motor Test: Transport motor – Reverse
0	0	1	1	Motor Speed Adjustment (Automatic)
0	1	0	0	Original stop position adjustment – Single-sided original mode (No original skew correction)
0	1	0	1	Original stop position adjustment – Double sided original mode
1	0	0	0	Free Run: Single-sided original mode with skew correction
1	0	1	0	Free Run: Single-sided original mode without skew correction
0	1	1	0	Free Run: Double-sided original mode
Others				Do not select

"SADF" LED turns on when one of DIP switch turns on.

IEEE 802.11b (Wireless LAN) (Option)

NO.	NA	EUR/A	COMMENTS
1	---	---	Not used with this machine.

IEEE 1394 (FireWire) (Option)

NO.	NA	EUR/A	COMMENTS
1	---	---	Not used with this machine.

MCU

DIP SW No.1 must be ON, and all others (No.2 ~ No.4) OFF.

Controller Board

DIP SW No.5

NO.		COMMENTS
1	OFF	Boot ROM Bank Switching
2	OFF	Design Use Only

DIP SW No.4

NO.		COMMENTS	
1	OFF	Never change this setting.	
2	**ON**	ON	Monitor display and BIOS memory check.
		OFF	Monitor display but no BIOS memory check. Never change this setting.
3	OFF	Design use only.	
4	OFF	Never change this setting.	
5	OFF	Production use (Jig boot selection 1)	
6	OFF	Production use (Jig boot selection 2)	
7	OFF	Production use (Jig boot selection 3)	
8	OFF	Not used.	

5.13.2 TEST POINTS

ADF Main Board

Number	Label	Monitored Signal
TP100	TXD	TXD to the copier
TP101	RXD	RXD from the copier
TP102	GND	Ground
TP103	12 V	+12 V
TP104	5 V	+5 V

5.14 FUSES

ADF Main Board

Number	Description
FU100	Protects the 38 V line
FU101	Protects the 24 V line

PSU-E

Number	Description
Fuse101	Protects AC input line.

PSU-C

Number	Description
Fuse 1	Protects AC input line

LCDC

Number	Description
Fuse 101	12V fuse for the FFC cable that connects the SBU.

Controller

Number	Description
Fuse 101	Monitors 5V line between the mother board and controller.

Mother Board

Number	Description
Fuse 3	Breakers. Do not require replacement.
Fuse 4	
Fuse 5	

Centronics (Option)

Number	Description
Fuse 1	Monitors 3.3V power supply line from controller.
Fuse 2	Monitors 5V power supply line from controller.

NIC (Option)

Number	Description
Fuse 1	Monitors 3.3V power supply line from controller.

IEEE 802.11b (Wireless LAN) (Option)

Number	Description
Fuse 2	Monitors 3.3V power supply line from controller.
Fuse 3	Monitors 5V power supply line from controller.
Fuse 4	Monitors 3.3V power supply line from controller.

USB 2.0 (Option)

Number	Description
Fuse 1	Monitors 3.3V power supply line from controller.

EFI (Option)

Number	Description
Fuse 1	Monitors 3.3V power supply line from controller.

IEEE 1394 (FireWire) (Option)

Number	Description
Fuse 1	Breakers. Do not require replacement.
Fuse 2	
Fuse 3	Monitors 5V power supply line from controller.

5.15 VARIABLE RESISTORS

ADF Main Board

Number	Function
VR100	Adjusts the original stop position for the single-sided original at no skew correction mode.
VR101	Adjusts the original stop position for the double-sided original.

CBG Power Pack

Number	Function
VR16	For the charge corona PWM. Do not change the setting in the field.
VR101	For grid PWM. Do not change the setting in the field.

Transfer Bias Power Pack

Number	Function
VR101	For monitoring transfer voltage.

⇒5.16 USING THE DEBUG LOG

This machine provides a Save Debug Log feature that allows the Customer Engineer to save and retrieve error information for analysis.

Every time an error occurs, debug information is recorded in volatile memory but this information is lost when the machine is switched off and on.

The Save Debug Log feature provides two main features:

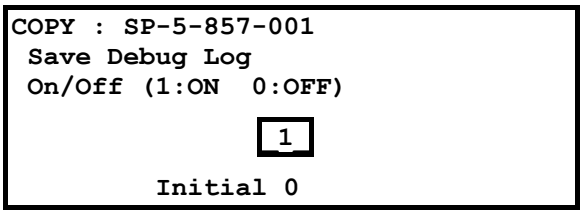
- Switching on the debug feature so error information is saved directly to the HDD for later retrieval.
- Copying the error information from the HDD to an SD card.

When a user is experiencing problems with the machine, follow the procedure below to set up the machine so the error information is saved automatically to the HDD.

5.16.1 SWITCHING ON AND SETTING UP SAVE DEBUG LOG

The debug information cannot be saved the until the “Save Debug Log” function has been switched on and a target has been selected.

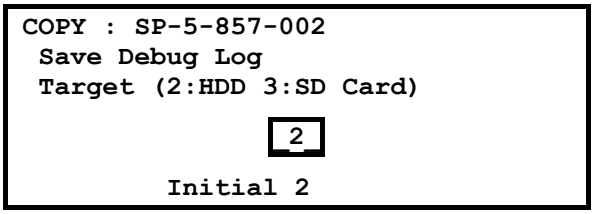
1. Enter the SP mode and switch the Save Debug Log feature on.
   - Press [⌂] then use the 10-key pad to enter ①⓪⑦.
   - Press and hold down [C/⊘] for more than 3 seconds.
   - Touch “Copy SP”.
   - On the LCD panel, open SP5857.
2. Under “5857 Save Debug Log”, touch “1 On/Off”.



3. On the control panel keypad, press “1” then press ⓝ. This switches the Save Debug Log feature on.

NOTE: The default setting is “0” (OFF). This feature must be switched on in order for the debug information to be saved.

⇒ 4. Next, select the target destination where the debug information will be saved. Under “5857 Save Debug Log”, touch “2 Target”, enter “2” with the operation panel key to select the hard disk as the target destination, then press #.



NOTE: Select “3 SD Card” to save the debug information directly to the SD card if it is inserted in the service slot.

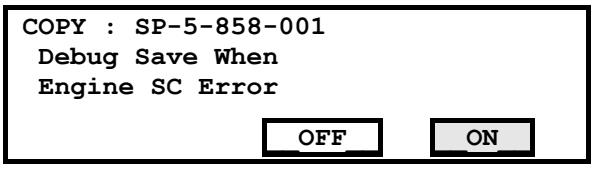
5. Now touch “5858” and specify the events that you want to record in the debug log. SP5858 (Debug Save When) provides the following items for selection.

1	Engine SC Error	Saves data when an engine-related SC code is generated.
2	Controller SC Error	Saves debug data when a controller-related SC Code is generated.
3	Any SC Error	Saves data only for the SC code that you specify by entering code number.
4	Jam	Saves data for jams.

NOTE: More than one event can be selected.

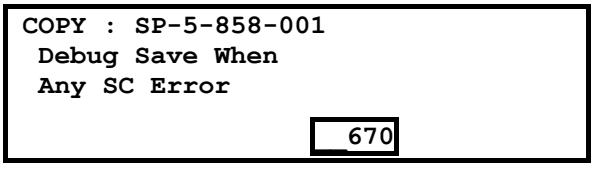
Example 1: To Select Items 1, 2, 4

Touch the appropriate items(s). Press “ON” for each selection. This example shows “Engine SC Error” selected.



Example 2: To Specify an SC Code

Touch “3 Any SC Error”, enter the 3-digit SC code number with the control panel number keys, then press #. This example shows an entry for SC670.



NOTE: For details about SC code numbers, please refer to the SC tables in Section “4. Troubleshooting”.

Service Tables

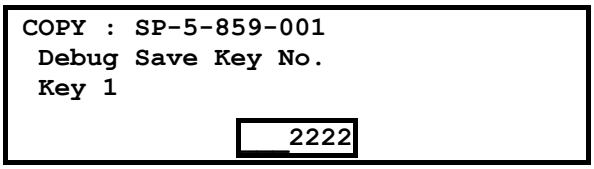
⇒6. Next, select the one or more memory modules for reading and recording debug information. Touch “5859”.

Under “5859” press the appropriate key item for the module that you want to record.

Enter the appropriate 4-digit number, then press #.

NOTE: Refer to the two tables below for the 4-digit numbers to enter for each key.

The example below shows “Key 1” with “2222” entered.



The following keys can be set with the corresponding numbers. (The initials in parentheses indicate the names of the modules.)

4-Digit Entries for Keys 1 to 10

KEY NO.	COPY	PRINTER	SCANNER	WEB
1	2222 (SCS)			
2	2223 (SRM)			
3	256 (IMH)			
4	1000 (ECS)			
5	1025 (MCS)			
6	4848 (COPY)	4400 (GPS)	5375 (Scan)	5682 (NFA)
7	2224 (BCU)	4500 (PDL)	5682 (NFA)	6600 (WebDB)
8		4600 (GPS-PM)	3000 (NCS)	3300 (PTS)
9		2000 (NCS)	2000 (NCS)	6666 (WebSys)
10		2224 (BCU)		2000 (NCS)

NOTE: The default settings for Keys 1 to 10 are all zero (“0”).

Key to Acronyms

Acronym	Meaning	Acronym	Meaning
ECS	Engine Control Service	NFA	Net File Application
GPS	GW Print Service	PDL	Printer Design Language
GSP-PM	GW Print Service – Print Module	PTS	Print Server
IMH	Image Memory Handler	SCS	System Control Service
MCS	Memory Control Service	SRM	System Resource Management
NCS	Network Control Service	WebDB	Web Document Box (Document Server)

The machine is now set to record the debugging information automatically on the HDD (the target selected with SP5-857-002) for the events that you selected SP5-858 and the memory modules selected with SP5-859.

⇒ Please keep the following important points in mind when you are doing this setting:

- Note that the number entries for Keys 1 to 5 are the same for the Copy, Printer, Scanner, and Web memory modules.
- The initial settings are all zero.
- These settings remain in effect until you change them. Be sure to check all the settings, especially the settings for Keys 6 to 10. To switch off a key setting, enter a zero for that key.
- You can select any number of keys from 1 to 10 (or all) by entering the corresponding 4-digit numbers from the table.
- You cannot mix settings for the groups (COPY, PRINTER, etc.) for 006~010. For example, if you want to create a PRINTER debug log you must select the settings from the 9 available selections for the "PRINTER" column only.
- One area of the disk is reserved to store the debug log. The size of this area is limited to 4 MB.

5.16.2 RETRIEVING THE DEBUG LOG FROM THE HDD

Retrieve the debug log by copying it from the hard disk to an SD card.

1. Insert the SD card into the service slot of the copier.
2. Enter the SP mode and execute SP5857 009 (Copy HDD to SD Card (Latest 4 MB)) to write the debugging data to the SD card.
3. After you return to the service center, use a card reader to copy the file and send it for analysis to Ricoh by email, or just send the SD card by mail.

5.16.3 RECORDING ERRORS MANUALLY

Since only SC errors and jams are recorded to the debug log automatically, for any other errors that occur while the customer engineer is not on site, please instruct customers to perform the following immediately after occurrence to save the debug data. Such problems would include a controller or panel freeze.

NOTE: In order to use this feature, the customer engineer must have previously switched on the Save Debug Feature (SP5857-001) and selected the hard disk as the save destination (SP5857-002).

1. When the error occurs, on the operation panel, press Clear Modes (Clear Modes).
2. On the control panel, enter "01" then hold down C/⊘ for at least 3 sec. until the machine beeps then release. This saves the debug log to the hard disk for later retrieval with an SD card by the service representatives.
3. Switch the machine off and on to resume operation.

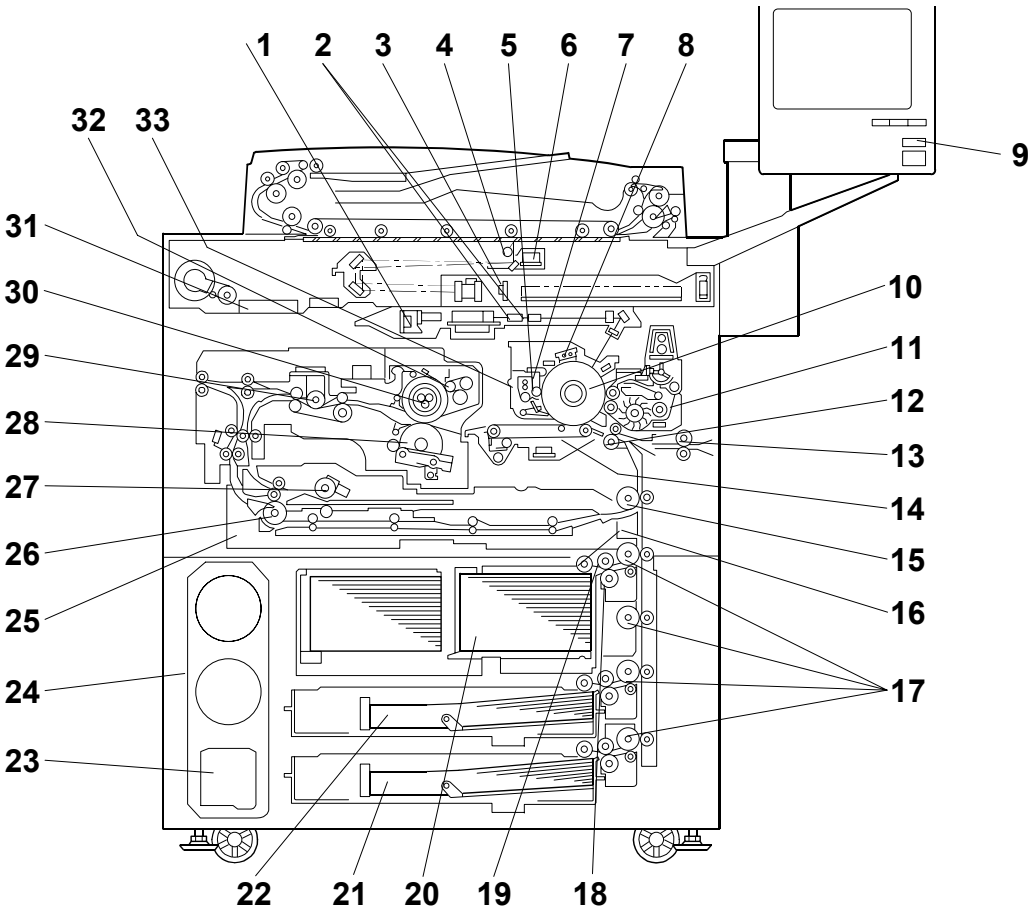
   The debug information for the error is saved on the hard disk so the service representatives can retrieve it on their next visit by copying it from the HDD to an SD card.

DETAILED DESCRIPTION

6. DETAILED DESCRIPTION

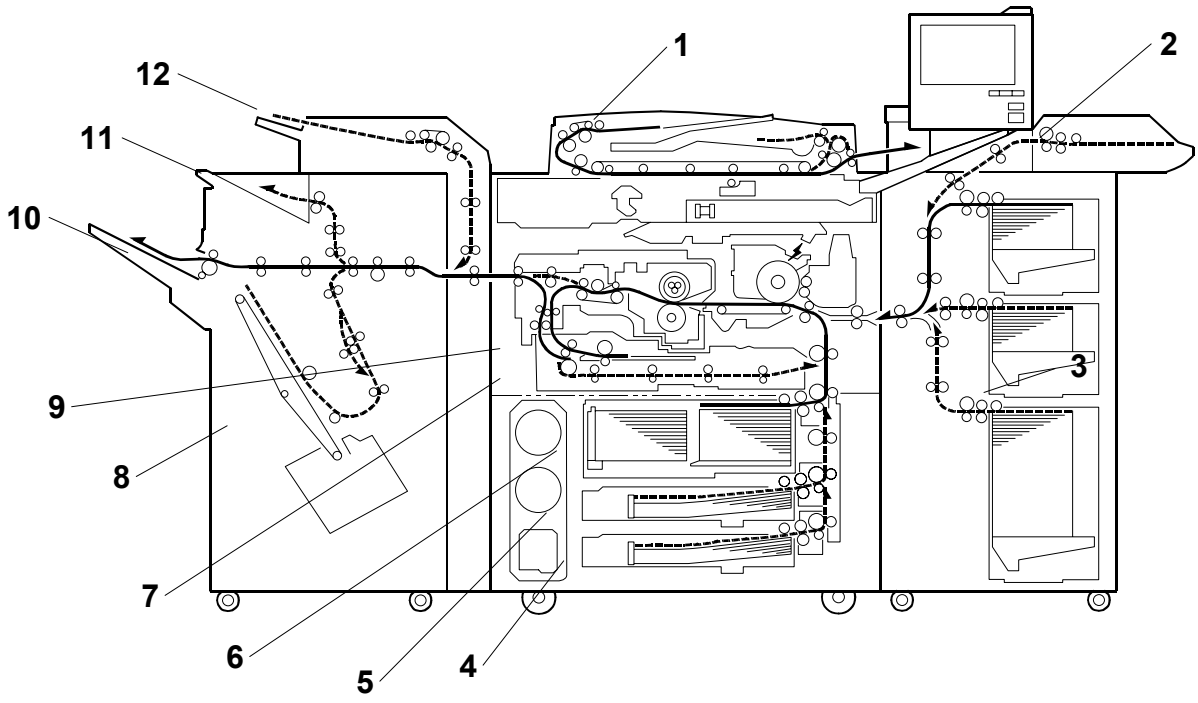
6.1 COMPONENT LAYOUT

6.1.1 COPIER ENGINE



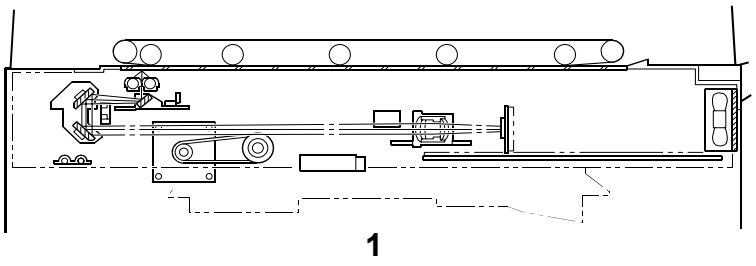
1. Laser Diode Board
2. fθ Lenses
3. Sensor Board Unit
4. Exposure Lamp
5. Cleaning Brush
6. Lamp Regulator
7. Cleaning Blade
8. Charge Corona Unit
9. Color LCD
10. Drum
11. Development Unit
12. Registration Roller
13. LCT Relay Roller
14. Transfer Belt Unit
15. Relay Roller
16. Pick-up Roller
17. Vertical Transport Rollers
18. Separation Roller
19. Feed Roller
20. 1st Tray (Tandem, 1,000 sheets each)
21. 3rd Tray (500 sheets)
22. 2nd Tray (500 sheets)
23. Used Toner Bottle
24. Toner Bank Unit
25. Duplex Tray
26. Inverter Unit Paper Exit Roller
27. Inverter Feed Roller
28. Pressure Roller
29. Paper Cooling Pipe
30. Hot Roller
31. Motor Control Unit
32. Oil Supply & Cleaning Web
33. Drum Unit

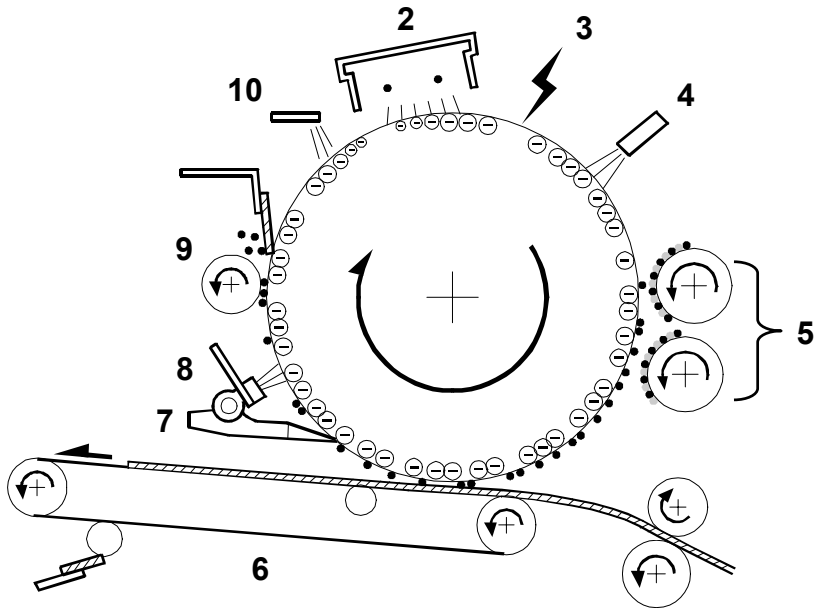
6.2 PAPER PATH



1. ADF
2. Bypass Tray
3. Optional LCT
4. Tray 3
5. Tray 2
6. Tray 1
7. Duplex Unit
8. Optional Finisher
9. Inverter Unit
10. Shift Tray
11. Upper Tray
12. Cover Interposer

6.3 COPY PROCESS





1. EXPOSURE

A xenon lamp exposes the original. Light reflected from the original passes to the CCD, where it is converted into an analog data signal. This data is converted to a digital signal, processed, and stored in the memory. At the time of printing, the data is retrieved and sent to the laser diode. For multi-copy runs, the original is scanned once only and stored to the hard disk.

2. DRUM CHARGE

An OPC (organic photoconductor) drum is used in this machine. In the dark, the charge corona unit gives a negative charge to the drum. The grid plate ensures that corona charge is applied uniformly. The charge remains on the surface of the drum because the OPC layer has a high electrical resistance in the dark.

3. LASER EXPOSURE

The processed data from the scanned original is retrieved from the hard disk and transferred to the drum by four laser beams, which form an electrostatic latent image on the drum surface. The amount of charge remaining as a latent image on the drum depends on the laser beam intensity, which is controlled by the laser diode board (LDB).

4. DRUM POTENTIAL SENSOR

The drum potential sensor detects the electric potential on the drum to correct various process control elements.

5. DEVELOPMENT

The magnetic developer brush on the development rollers comes in contact with the latent image on the drum surface. Toner particles are electrostatically attracted to the areas of the drum surface where the laser reduced the negative charge on the drum.

6. IMAGE TRANSFER

Paper is fed to the area between the drum surface and the transfer belt at the proper time to align the copy paper and the developed image on the drum. Then, the transfer bias roller and brush apply a high positive charge to the reverse side of the paper through the transfer belt. This positive charge pulls the toner particles from the drum to the paper. At the same time, the paper is electrically attracted to the transfer belt.

7. PAPER SEPARATION

Paper separates from the drum as a result of the electrical attraction between the paper and the transfer belt. The pick-off pawls also help separate the paper from the drum.

8. ID SENSOR

The laser forms a sensor pattern on the drum surface. The ID sensor measures the reflectivity of the pattern. The output signal is one of the factors used for toner supply control.

9. CLEANING

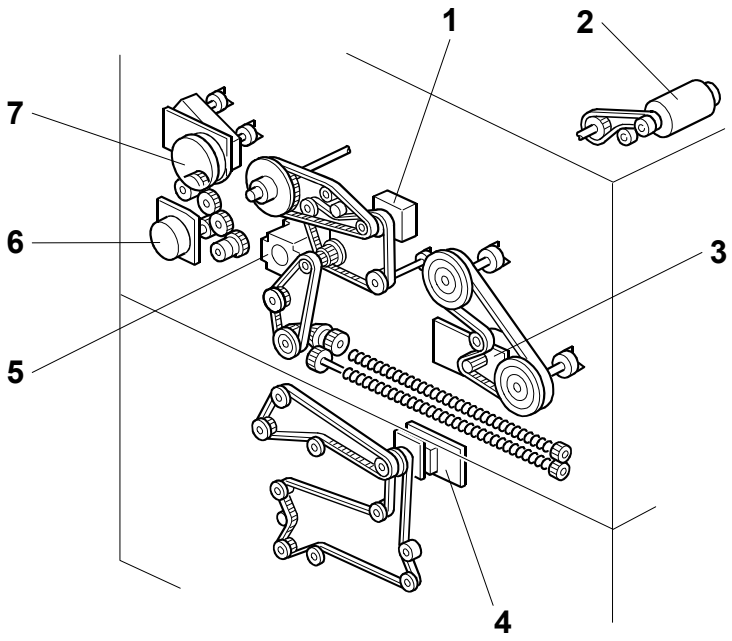
The cleaning brush removes toner remaining on the drum after image transfer and the cleaning blade scrapes off all remaining toner.

10. QUENCHING

The light from the quenching lamp electrically neutralizes the charge on the drum surface.

6.4 DRIVE LAYOUT

6.4.1 COPIER ENGINE



1. Drum Motor
2. Scanner Motor
3. Fusing/Duplex Motor
4. Paper Feed Motor
5. Registration Motor
6. Relay Motor
7. Development Motor

6.5 ELECTRICAL COMPONENT DESCRIPTIONS

Refer to the electrical component layout on the reverse side of the point-to-point diagram for the location of the components using the symbols and index numbers.

6.5.1 COPIER ENGINE

Number	Name	Description
Lamps		
L01	Exposure Lamp	Applies high intensity light to the original for exposure.
L02	Fusing Lamp 1	Provides heat to the hot roller.
L03	Fusing Lamp 2	Provides heat to the hot roller.
L04	Fusing Lamp 3	Provides heat to the hot roller.
L05	Quenching Lamp	Neutralizes any charge remaining on the drum surface after cleaning.
Magnetic Clutches		
MC01	Toner Supply Coil Clutch	Transfers drive from the toner bank motor to the toner transport coil to transport toner towards the hopper.
MC02	Toner Supply Roller Clutch	Turns the toner supply roller to supply toner from the toner hopper to the development unit.
MC03	1st Paper Feed Clutch	Starts paper feed from tray 1.
MC04	2nd Paper Feed Clutch	Starts paper feed from tray 2.
MC05	3rd Paper Feed Clutch	Starts paper feed from tray 3.
MC06	Inverter Exit Roller Clutch	Releases the drive from the inverter exit roller in the duplex unit.
MC07	1st Vertical Transport Clutch	Drives the 1st vertical transport rollers.
MC08	2nd Vertical Transport Clutch	Drives the 2nd vertical transport rollers.
MC09	3rd Vertical Transport Clutch	Drives the 3rd vertical transport rollers.
MC10	Upper Relay Clutch	Drives the upper relay rollers (between tray 1 and the registration rollers)
MC11	LCT Relay Clutch	Drives the relay rollers for paper feed into the machine from the LCT.
MC12	Lower Relay Clutch	Drives the lower relay rollers (between paper trays 1 and 2.
Motors		
M01	Scanner Motor	Drives the 1st and 2nd scanners.
M02	Polygon Mirror Motor	Drives the polygon mirror in the laser optics unit
M03	Drum Motor	Drives the drum, cleaning unit, and transfer belt unit.
M04	Development Motor	Drives the development unit.
M05	Toner Supply Pump Motor	Mounted between the toner hopper and the toner supply cylinder, this pumps the toner that the supply cylinder has received from the toner bank into the toner hopper.
M06	Toner Bank Motor	Drives the toner transport coil, which feeds fresh toner from the toner bank to the toner supply cylinder.

Number	Name	Description
M07	Upper Toner Bottle Motor	Rotates the upper toner bottle to supply toner to the toner entrance tank.
M08	Upper Bottle Cap Motor	Opens and closes the inner cap of the upper toner bottle.
M09	Lower Toner Bottle Motor	Rotates the lower toner bottle to supply toner to the toner entrance tank.
M10	Lower Bottle Cap Motor	Opens and closes the inner cap of the lower toner bottle.
M11	Charge Corona Wire Cleaner	Drives the charge corona wire cleaner.
M12	Fusing/Exit Motor	Drives the fusing unit, inverter unit, reverse trigger roller, and paper exit rollers.
M13	Paper Feed Motor	Drives the paper feed, separation, pick-up, lower relay, and vertical transport rollers in the three trays.
M14	Relay	Drives the upper relay roller and the LCT relay roller.
M15	1st Tray Lift Motor	Raises and lowers the bottom plate in the 1st paper tray.
M16	2nd Tray Lift Motor	Raises and lowers the bottom plate in the 2nd paper tray.
M17	3rd Tray Lift Motor	Raises and lowers the bottom plate in the 3rd paper tray.
M18	Registration Motor	Drives the registration rollers.
M19	Web Motor	Drives the oil supply/cleaning web.
M20	Rear Fence Drive Motor	Moves the paper stack in the left tandem tray to the right tandem tray.
M21	Jogger Motor	Drives the jogger fences to square the paper stack in the duplex unit.
M22	Duplex Transport Motor 1	Drives the duplex transport rollers (transport).
M23	Duplex Transport Motor 2	Drives the duplex transport rollers (transport 2).
M24	Toner Suction Motor	Drives the air pump that creates the vacuum to draw loose toner from the development unit to the development unit waste toner collection bottle.
M25	Optics Cooling Fan	Removes heat from the scanner optics unit.
M26	Polygon Mirror Motor Cooling Fan	Removes heat from around the polygon mirror motor.
M27	LDB Cooling Fan	Removes heat from around the LDB.
M28	SBU Cooling Fan	Removes heat from around the SBU.
M29	Drum Cooling Fan	Removes heat from the drum.
M30	Development Unit Cooling Fan 1	Removes heat from the development unit.
M31	Development Unit Cooling Fan 2	Removes heat from the development unit.
M32	Paper Cooling Pipe Fan 1	Removes heat from the paper cooling pipe.
M33	Paper Cooling Pipe Fan 2	Removes heat from the paper cooling pipe.
M34	Duplex Cooling Fan	Removes heat from the horizontal paper path of the duplex/inverter unit.
M35	Exhaust Fan	Removes heat from around the fusing unit.
M36	Steam Removal Fan	Removes water vapor from around the fusing unit.
M37	Duplex Entrance Cooling Fan 1	Removes heat from around the entrance to the duplex/inverter unit.

Number	Name	Description
M38	Duplex Entrance Cooling Fan 2	Removes heat from around the entrance to the duplex/inverter unit.
M39	Controller Board Fan Motor	Removes heat from around the controller board.
M40	Mother Board Fan Motor 1	Removes heat from around the mother board.
M41	Mother Board Fan Motor 2	Removes heat from around the mother board.
PCBs		
PCB01	BCU	BCU (Base-Engine Control Unit): Main control board, controls the engine sequence, timing for peripherals, image processing, and the video data path
PCB02	PSU-E	PSU-E (Power Supply Unit-Engine): Supplies DC power for the machine, and controls the anti-condensation heaters.
PCB03	PSU-C	PSU-C (Power Supply Unit-Controller): Supplies DC power for the controller.
PCB04	IOB	IOB (Input/Output Board): Performs three functions (1) Continues conversion done in the BCU of the sensor input from the main unit paper trays, toner supply unit, and LCT, (2) Converts serial data from the BCU to parallel data for control of the man unit paper trays, toner supply unit, and LCT components (motors, solenoids, clutches), (3) Routes the power supply from the PSU in the BCU to the LCT, and routes power interlock power supply to all the motors.
PCB05	SBU	SBU (Sensor Board Unit): Contains the CCD. Converts the CCD output to digital before sensing it to the IPU (Image Processing Unit).
PCB06	MCU	MCU (Main Control Unit): Controls the scanner motor with the commands from the BCU. Also controls fusing lamp on/off timing, APS detection, the fan motors, generation of gate signals, and transmission of serial data.
PCB07	Lamp Regulator	Controls the xenon exposure lamp in the flat bed scanner
PCB08	Polygon Mirror Motor Control Board	Controls the polygon motor.
PCB09	LDB	LDB (Laser Diode Board) controls the laser diodes. It also contains the laser diodes.
PCB10	AC Drive	Drives the ac components (fusing lamps, anti-condensation heaters).
PCB11	Operation Panel	Controls the operation panel and LCD display panel.
PCB12	Operation Switch Board	Switches main power to the machine on/off.
PCB13	Mother Board	MB (Mother Board): Interfaces the controller and the IPU.

Number	Name	Description
PCB14	Controller	Controls the memory and all peripheral devices. GW architecture allows the board to control all applications, i.e. copying, printing, and scanning. In order to add an option (printer, scanner), the appropriate ROM DIMM must be installed on the controller.
PCB15	LCDC	LCDC (LCD Controller): Controls the operation panel and connects the scanner to the IPU
PCB16	IPU	IPU (Image Processing Unit): Contains large-scale integrated circuits that perform image processing with the digital data sent from the SBU, then sends the processed data to the controller and to the exposure ASIC which sends it to the LD unit. Also relays data transmissions between the controller and LCDC.
PCB17	SD Card Board	Allows SD cards to be connected to the controller.
PCB18	DC Supply Board	Converts the DC current supplied from the PSU to the correct DC voltage for the operation of the Controller.
PCB19	External Controller Interface Board	Interfaces the controller with the IEEE1394 card and other options
PCB20	Laser Synchronization Detector Board	Detects when the laser is about to start another main scan line across the OPC
Power Packs		
PP01	CGB (Charge, Grid, Bias) Power Pack	Provides high voltage for the charge corona wires, grid plate, and the development roller.
PP02	Transfer Power Pack	Supplies high voltages to the transfer unit.
Sensors		
S01	Scanner HP Sensor	Informs the CPU when the 1st and 2nd scanners are at home position.
S02	Original Width Sensors 1~3	Detect the width of the original.
S03	Original Length 1	Detects the original length.
S04	Original Length 2	Detects the original length.
S05	Drum Potential Sensor	Detects the drum surface potential.
S06	Toner Density Sensor	Measures the concentration of toner in the toner-developer mixture.
S07	Image Density (ID) Sensor	Detects the density of the ID sensor pattern on the drum.
S08	Toner Hopper Sensor	Monitors the level of toner in the toner supply unit.
S09	Toner Supply Pump Motor Sensor	Detects whether the toner supply pump motor is rotating.
S10	Upper Toner Bottle Sensor	Detects when the upper toner bottle is set.
S11	Lower Toner Bottle	Detects when the lower toner bottle is set.
S12	Upper Bottle Inner Cap Sensor	Detects when the inner cap of the upper toner bottle is opened.
S13	Lower Bottle Inner Cap Motor	Detects when the inner cap of the lower toner bottle is opened.
S14	Toner Collection Bottle Sensor	Detects when the waste toner collection bottle is set.

Number	Name	Description
S15	Toner Overflow Sensor	Detects when the waste toner collection bottle is full.
S16	Toner Near End Sensor	Detects toner near end in the toner bank unit.
S17	1st Paper Feed Sensor	Controls the 1st paper feed clutch on/off timing and the 1st pick-up solenoid off timing.
S18	2nd Paper Feed Sensor	Controls the 2nd paper feed clutch on/off timing and the 1st pick-up solenoid off timing.
S19	3rd Paper End	Informs the CPU when tray 3 runs out of paper.
S20	1st Tray Lift Sensor	Detects the correct paper height for feeding in the 1st tray.
S21	2nd Tray Lift Sensor	Detects the correct paper height for feeding in the 2nd tray.
S22	3rd Tray Lift Sensor	Detects the correct paper height for feeding in the 3rd tray.
S23	1st Paper End Sensor	Informs the CPU when tray 1 runs out of paper.
S24	2nd Paper End Sensor	Informs the CPU when tray 2 runs out of paper.
S25	3rd Paper Feed	Controls the 3rd paper feed clutch on/off timing and the 3rd pick-up solenoid off timing.
S26	Rear Fence HP Sensor	Informs the CPU when the tandem tray rear fence is in the home position.
S27	Rear Fence Return Sensor	Informs the CPU when the tandem tray rear fence is in the return position.
S28	Front Side Fence Open Sensor	Detects whether the tandem tray front side fence is opened.
S29	Front Side Fence Closed Sensor	Detects whether the tandem tray front side fence is closed.
S30	Rear Side Fence Open Sensor	Detects whether the tandem tray rear side fence is opened.
S31	Rear Side Fence Closed Sensor	Detects whether the tandem tray rear side fence is closed.
S32	Lower Limit Sensor	After the tandem tray is empty, the tray lowers until this sensor detects the tray.
S33	1st Tray Paper Height 1	Detects the paper height in the 1st tray (tandem tray), stage 1.
S34	1st Tray Paper Height 2	Detects the paper height in the 1st tray (tandem tray), stage 2.
S35	1st Tray Paper Height 3	Detects the paper height in the 1st tray (tandem tray), stage 3.
S36	1st Tray Paper Height 4	Detects the paper height in the 1st tray (tandem tray), stage 4.
S37	Left 1st Tray Paper Sensor	Detects whether there is paper in the left side of the 1st tray.
S38	Right 1st Tray Paper Sensor	Detects whether there is paper in the right side of the 1st tray, allowing the tray to lift if paper is present.

Number	Name	Description
S39	Duplex Inverter Sensor	Detects when to turn the inverter gate and exit gate solenoids off and checks for misfeeds.
S40	Duplex Entrance Sensor	Detects the leading and trailing edges of the paper to determine the reverse roller solenoid on or off timing.
S41	Duplex Transport Sensor 1	Detects the position of paper in the duplex unit.
S42	Duplex Transport Sensor 2	Detects the position of paper in the duplex unit.
S43	Duplex Transport Sensor 3	Detects the position of paper in the duplex unit.
S44	Duplex Jogger HP Sensor	Detects whether the duplex jogger fences are at the home position.
S45	LCT Relay Sensor	Detects misfeeds.
S46	Relay Sensor	Detects misfeeds.
S47	Registration Sensor	Detects misfeeds and controls registration motor on/off timing.
S48	Guide Plate Position Sensor	Detects whether the registration guide plate is open or closed.
S49	Web End Sensor	Detects when the oil supply/cleaning web has been used up.
S50	Fusing Exit Sensor	Detects misfeeds.
S51	Exit Sensor	Detects misfeeds.
S52	Toner Suction Motor Rotation Sensor	Detects whether the development unit toner suction motor is rotating.
S53	Toner Suction Bottle Set Sensor	Detects whether the development unit waste toner bottle is set.
⇒		
Solenoids		
SOL01	Transfer Belt Lift	Controls the up-down movement of the transfer belt unit.
SOL02	1st Pick-up Solenoid	Controls the up-down movement of the pick-up roller in tray 1.
SOL03	1st Pick-up Solenoid	Controls the up-down movement of the pick-up roller in tray 2.
SOL04	3rd Pick-up Solenoid	Controls the up-down movement of the pick-up roller in tray 3.
SOL05	1st Separation Roller Solenoid	Controls the up-down movement of the separation roller in tray 1.
SOL06	2nd Separation Roller Solenoid	Controls the up-down movement of the separation roller in tray 2.
SOL07	3rd Separation Roller Solenoid	Controls the up-down movement of the separation roller in tray 3.
SOL08	Front Side Fence	Opens and closes the front side fence in the tandem tray.
SOL09	Rear Side Fence	Opens and closes the rear side fence in the tandem tray.
SOL10	Tandem Tray Connect	Connects/disconnects the two halves of the tandem tray.

Number	Name	Description
SOL11	Left 1st Tray Lock	Locks the left tandem tray while paper is being transported from left tray to right tray.
SOL12	Duplex Inverter Gate Solenoid	Moves the junction gate to direct copies to the duplex tray or to the paper exit.
SOL13	Reverse Roller	Controls the up-down movement of the reverse roller in the duplex unit.
SOL14	Inverter Guide Plate Solenoid	Controls the up-down movement of the inverter feed guide plate in the duplex unit.
SOL15	Guide Plate Solenoid	Opens the guide plate when a paper misfeed occurs around this area.
SOL16	Inverter Gate Solenoid	Directs paper either straight out or down to the inverter.
SOL17	Toner Recycling Shutter Solenoid	Controls the shutter mechanism in the toner recycling system.
SOL18	LCT Guide Plate SOL	Opens and closes the LCT guide plate between the LCT and the bypass tray.
Switches		
SW01	Main Power	Provides power to the machine. If this is off, there is no power supplied to the machine.
SW02	Right Front Door Safety Switch 1	Cuts the 24V dc power from the PSU-E to the fusing/exit motor when the door is opened.
SW03	Right Front Door Safety Switch 2	Cuts the 24V power from the PSU-E to the IOB when the front right door is opened.
SW04	Right Front Door Safety Switch 3	Cuts the +5 LD dc power to disable the LD unit when the right door is open.
SW05	Right Front Door Safety Switch 4	Cuts the +5 LD dc power to disable the LD unit when the right door is open.
SW06	Left Front Door Safety Switch 1	Cuts the 24V dc power from the PSU-E to the fusing/exit motor when the door is opened.
SW07	Left Front Door Safety Switch 2	Cuts the 24V power from the PSU-E to the IOB when the front left door is opened.
SW08	Left Front Door Safety Switch 3	Cuts the +5 LD dc power to disable the LD unit when the left door is open.
SW09	Left Front Door Safety Switch 4	Cuts the +5 LD dc power to disable the LD unit when the left door is open.
SW10	2nd Tray Paper Size	Determines the size of paper in tray 2. Also detects when the tray has been placed in the machine.
SW11	3rd Tray Paper Size	Determines the size of paper in tray 3. Also detects when the tray has been placed in the machine.
Other		
CB01	Circuit Breaker	Provides back-up high current protection for the electrical components.
CS01	Ext. Control Slot	Factory use only.
EN01	Encoder	Generates pulses for the scanner motor (this motor is a dc motor, not a stepper motor)
H01	Drum Heater	Ensures that the drum operates at a suitable temperature to prevent blurred or uneven copies.

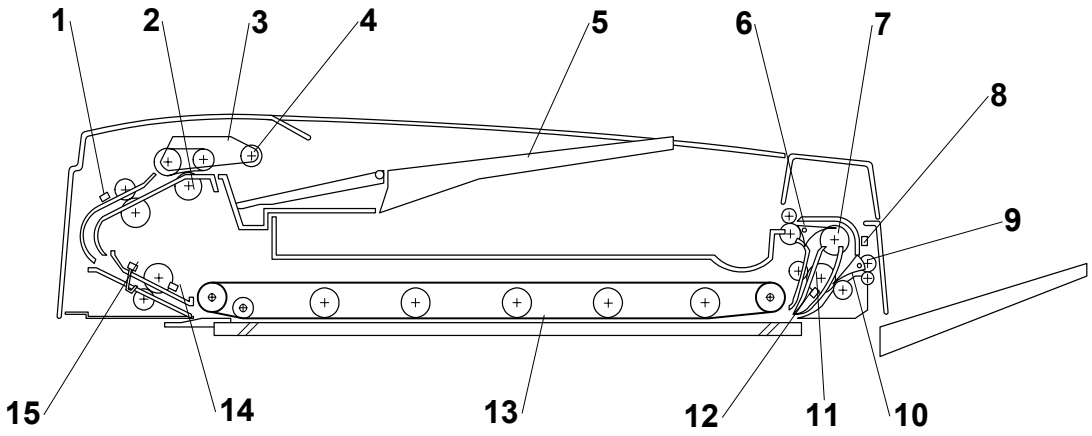
Number	Name	Description
H02	Optics Anti-condensation Heater (option)	Turns on when the main switch is off to keep the scanner unit dry.
H03	Drum Anti-condensation Heater (option)	Turns on when the main switch is off to prevent moisture from forming around the drum.
H04	Tray Anti-Condensation Heater 1 (option)	Turns on when the main switch is off to keep paper dry in the paper trays.
H05	Tray Anti-Condensation Heater 2 (option)	Turns on when the main switch is off to keep paper dry in the paper trays.
H06	LCT Anti-Condensation Heater	Turns on when the main switch is off to keep paper dry in the LCT paper trays. Contains two heaters.
HDD1	HDD 1	Scanned image data is compressed and held here temporarily.
HDD2	HDD 2	Scanned image data is compressed and held here temporarily.
NF1	Noise Filter	Removes noise from the power line.
TC1	Total Counter	Counts the total number of copies.
TH1	Fusing Thermistor	In direct contact with the drum, detects the temperature of the not roller.
TS01	Thermostat 1	One of a pair of wafer thermostats mounted directly above the center of the hot roller to monitor the temperature of the hot roller and signal the CPU to switch it off if it overheats.
TS02	Thermostat 2	One of a pair of wafer thermostats mounted directly above the center of the hot roller to monitor the temperature of the hot roller and signal the CPU to switch it off if it overheats.
TS3	Drum Thermostat	Prevents the drum heater from overheating

6.5.2 ADF

Symbol	Name	Function
Motors		
M1	Pick-up	Moves the pick-up roller up and down.
M2	Feed-in	Drives the feed belt, and the separation, pick-up, and transport rollers.
M3	Transport Belt	Drives the transport belt.
M4	Feed-out	Drives the exit and inverter rollers.
M5	Bottom Plate	Moves the bottom plate up and down.
Sensors		
S1	APS Start	Informs the CPU when the DF is opened and closed (for platen mode) so that the original size sensors in the copier can check the original size.
S2	DF Position	Detects whether the DF is lifted or not.
S3	Original Set	Detects whether an original is on the table.
S4	Bottom Plate HP	Detects whether the bottom plate is in the down position or not.
S5	Bottom Plate Position	Detects when the original is at the correct position for feeding.
S6	Pick-up Roller HP	Detects whether the pick-up roller is up or not.
S7	Entrance	Detects when to restart the pick-up motor to lift up the pick-up roller, detects when to change the feed motor direction, detects the trailing edge of the original to finish checking the original length, and checks for misfeeds.
S8	Registration	Detects the leading edge of the original to check the original length, detects when to stop the original on the exposure glass, and checks for misfeeds.
S9	Original Width 1	Detects the original width.
S10	Original Width 2	Detects the original width.
S11	Original Width 3	Detects the original width.
S12	Original Length	Detects the original length.
S13	Exit	Detects when to stop the transport belt motor and checks for misfeeds.
S14	Inverter	Detects when to turn the inverter gate and exit gate solenoids off and checks for misfeeds.
S15	Feed Cover	Detects whether the feed cover is open or not.
S16	Exit Cover	Detects whether the exit cover is open or not.
Solenoids		
SOL1	Exit Gate	Opens and closes the exit gate.
SOL2	Inverter Gate	Opens and closes the inverter gate.
Magnetic Clutches		
MC1	Feed-in	Drives the feed belt, separation roller, and pick-up roller.
PCBs		
PCB1	DF Main	Controls the DF and communicates with the main copier boards.
PCB2	DF Indicator	Indicates whether an original has been placed in the feeder, and indicates whether SADF mode has been selected.

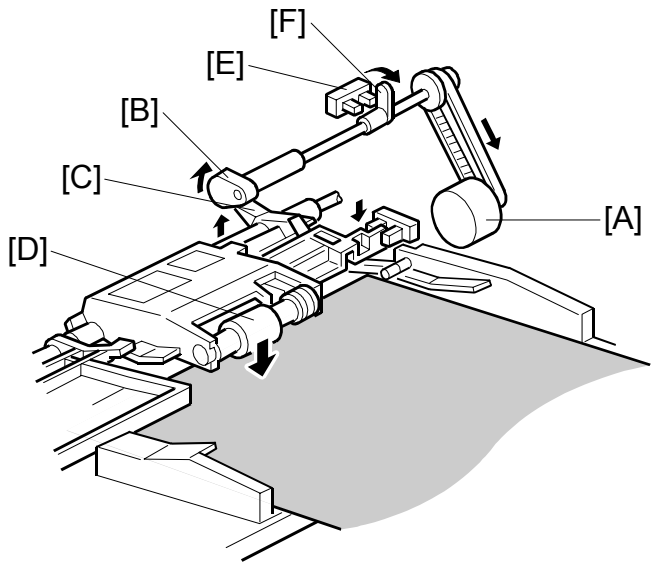
6.6 ADF

6.6.1 OVERVIEW



1. Entrance Sensor
2. Separation Roller
3. Feed Belt
4. Pick-up Roller
5. Original Tray
6. Inverter Junction Gate
7. Inverter Guide Roller
8. Inverter Sensor
9. Feed-out Roller
10. Exit Junction Gate
11. Inverter Roller
12. Exit Sensor
13. Transport Belt
14. Registration Sensor
15. Width Sensors (x3)

6.6.2 PICK-UP ROLLER RELEASE

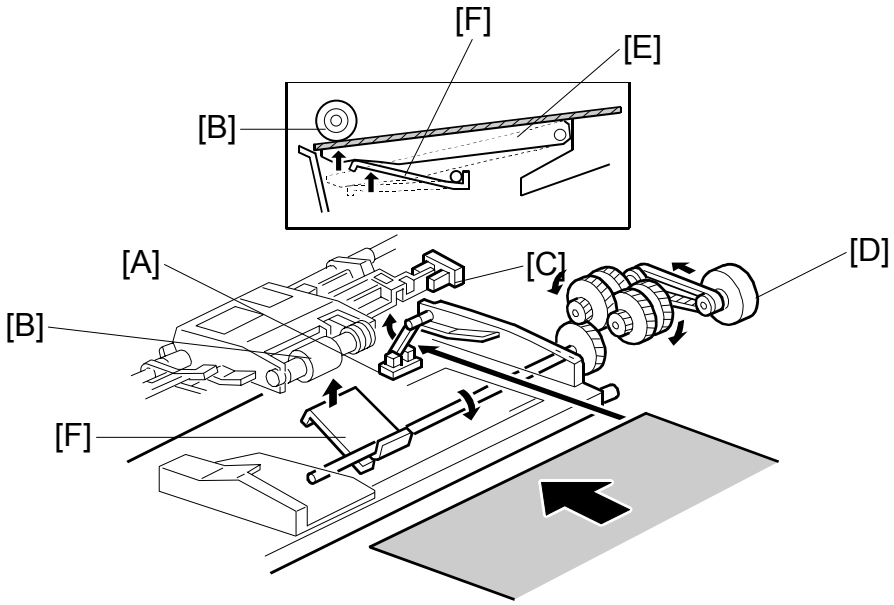


When the original set sensor is off (no original on the original tray), the pick-up roller stays in the up position.

When the original set sensor turns on (or when the trailing edge of a page passes the entrance sensor while pages remain on the original tray), the pick-up motor [A] turns on. The cam [B] rotates away from the pick-up roller release lever [C]. The lever then rises and the pick-up roller [D] drops onto the original.

When the original reaches the entrance sensor, the pick-up motor turns on again. The cam pushes the lever down, and the pick-up roller rises until the pick-up roller HP sensor [E] detects the actuator [F].

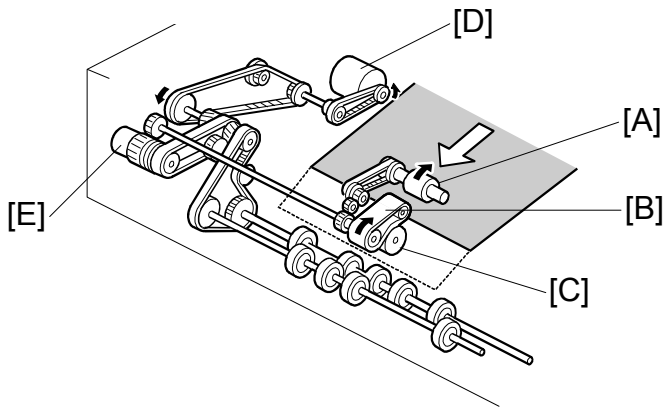
6.6.3 BOTTOM PLATE LIFT

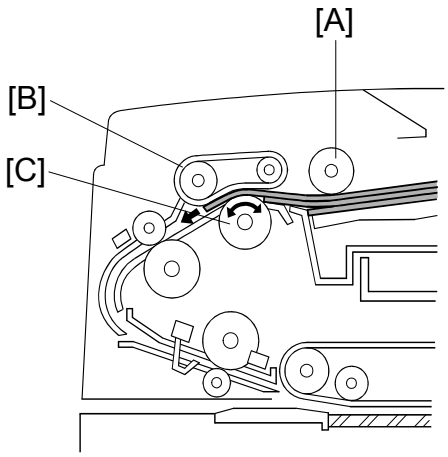


When an original is placed on the original tray, the original set sensor [A] turns on, the pick-up roller [B] drops on to the original, and the bottom plate position sensor [C] turns off. Then the bottom plate motor [D] turns on and lifts the bottom plate [E] by raising the lift lever [F] until the bottom plate position sensor turns on.

The level of the pick-up roller drops as the stack of originals becomes smaller, and eventually, the bottom plate position sensor [C] turns off. Then, the bottom plate motor turns on and lifts the bottom plate until the bottom plate position sensor turns on. This keeps the original at the correct height for feeding.

6.6.4 PICK-UP AND SEPARATION



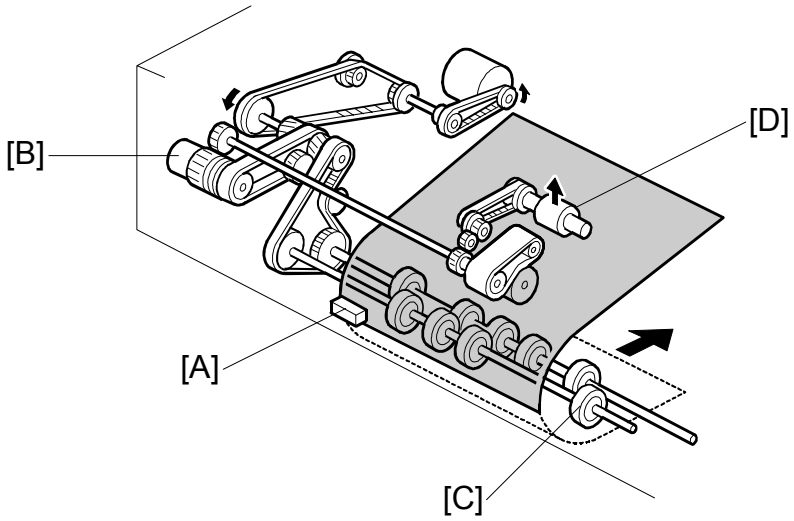


The original separation system is a Feed and Reverse Roller (FRR) system. The pick-up roller [A], feed belt [B], and separation roller [C] are driven by the feed-in motor [D].

To drive this mechanism, the feed-in motor [D] and feed-in clutch [E] turn on.

(CT Handling Paper> Handling Originals> Document Feed> **FRR with Feed Belt)**

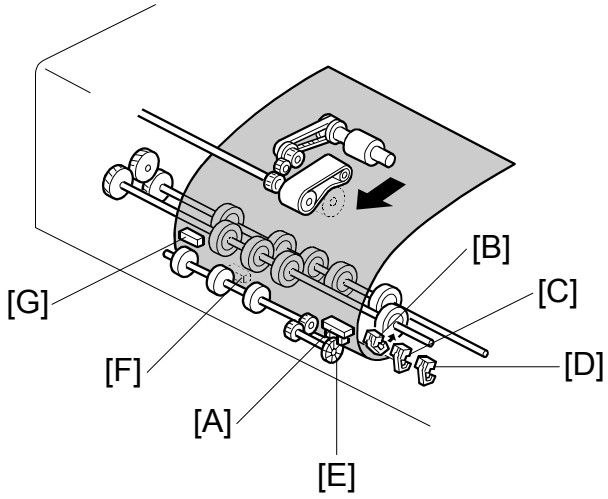
6.6.5 ORIGINAL FEED



When the leading edge of the original turns the entrance sensor [A] on, the feed-in clutch [B] turns off and the drive for the feed belt is released. The original is fed by the transport rollers [C].

At the same time, the pick-up motor starts again and the pick-up roller [D] is lifted up. When the pick-up roller HP sensor turns on, the pick-up motor stops (see Pick-up Roller Release).

6.6.6 ORIGINAL SIZE DETECTION



The ADF detects the original size by combining the readings of original length sensor [A], and original width sensors-1 [B], -2 [C], and -3 [D].

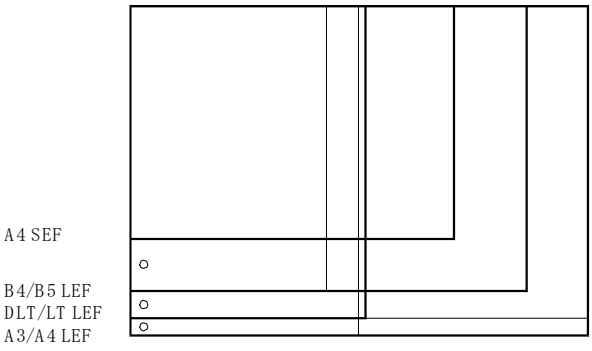
Original Length

The original length sensor and the disk [E] (connected to the transport roller) generate a pulse signal. The CPU counts pulses, starting when the leading edge of the original turns on the registration sensor [F], until the trailing edge of the original turns off the entrance sensor [G].

Original Width

The CPU detects original width using three original width sensors -1, -2, -3 as shown above. Three small circles on the diagram indicate the positions of the sensors.

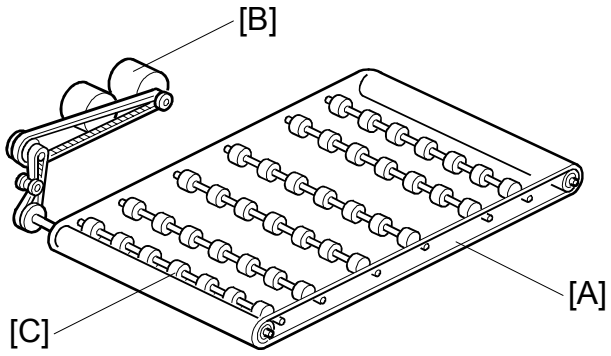
Original Width Sensor Location

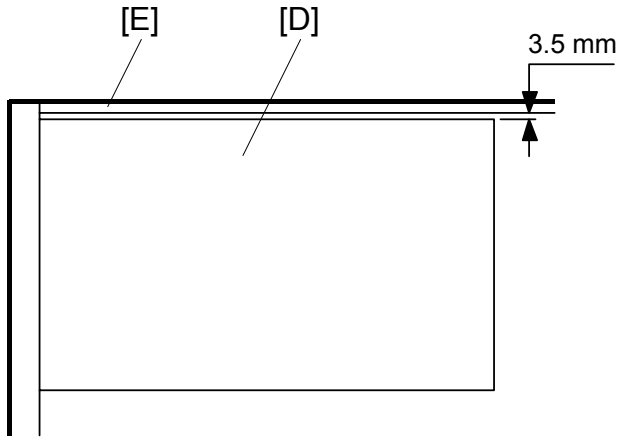


Detectable Paper Sizes

Please refer to the “1.2 ADF” table in “Specifications”.

6.6.7 ORIGINAL TRANSPORT





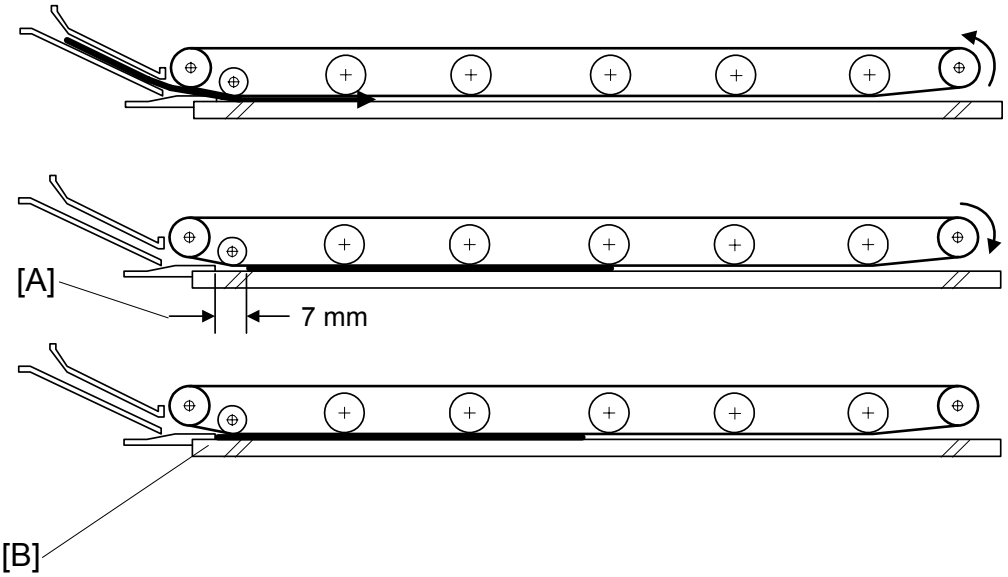
The transport belt [A] is driven by the transport belt motor [B]. The transport belt motor starts when the copier sends an original feed-in signal.

The pressure rollers inside the transport belt maintain the correct pressure between belt and original. The pressure roller [C] closest to the left original scale is made of rubber for the stronger pressure needed for thick originals. The other rollers are sponge rollers.

Normally, originals are manually placed at the left rear corner, so an original [D] fed from the ADF must also be at this position. But if the original touches the rear scale [E] as it feeds, original skew, jam, or wrinkling may occur.

To prevent such problems, the original transfer position is set to 3.5 mm away from the rear scale as shown. The 3.5 mm gap is compensated for by changing the starting position of the main scan for when the image is exposed on the drum.

6.6.8 ORIGINAL SKEW CORRECTION



The transport belt motor remains energized to carry the original to the right about 7 mm past the left scale [A]. Then the motor stops and reverses to feed the original 12 mm to the left against the left scale to correct skew. This forces the original to hit the left scale, which aligns the trailing edge to minimize original skew on the exposure glass.

If thin original mode is selected, the original is not forced back against the left scale. This is to prevent damage to the original.

After a two-sided original has been inverted to copy the 2nd side, it is fed in from the inverter against the left scale [B] without skew correction.

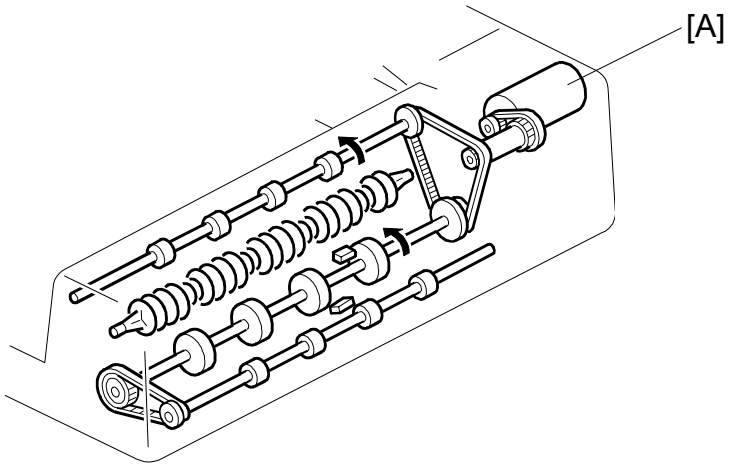
NOTE: The bottom drawing applies to duplex scanning; the top two drawings do not apply in this mode.

The amount of reverse feed against the left scale can be adjusted as follows:

- One-sided originals, and side 1 of two-sided originals: SP6006-3 (DF Registration Adjustment – Leading Edge Duplex 1st)
- Side 2 of two-sided originals: SP6006-4 (DF Registration Adjustment – Leading Edge Duplex 2nd).

6.6.9 ORIGINAL INVERSION AND FEED-OUT

General Operation

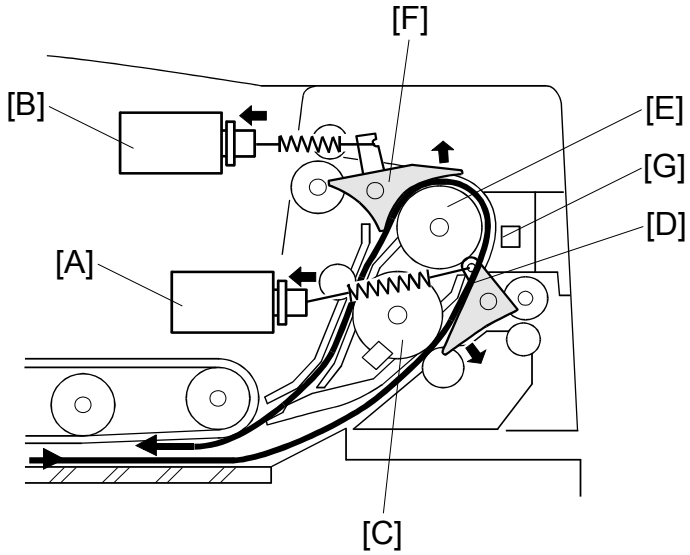


When the scanner reaches the return position, the copier CPU sends the feed-out signal to the ADF. When the ADF receives the feed-out signal, the transport belt motor and feed-out motor [A] turn on. The original is then fed out to the exit tray or fed back to the exposure glass after reversing in the inverter section.

This ADF has two exit trays. For single-sided original mode, the original is fed out straight out to the right exit tray, but for double-sided original mode, the original is fed out to the upper exit tray.

This causes the originals to be fed out in the correct order on the exit trays and allows the maximum one-to-one copy speed for each mode.

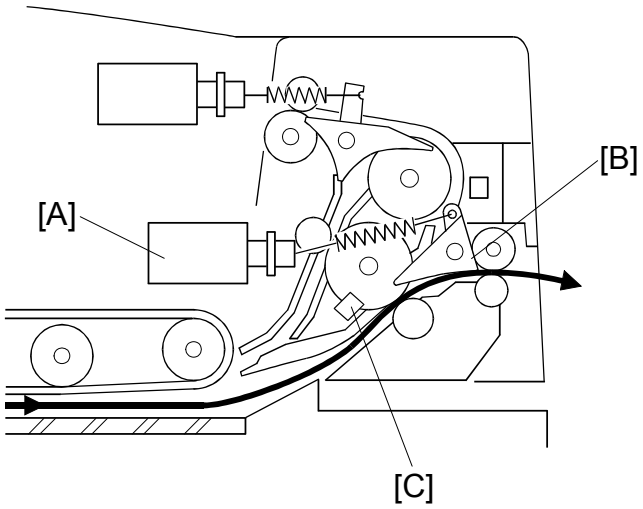
Original Inversion



When the ADF receives the original invert signal from the copier, the transport belt motor, feed-out motor, exit gate solenoid [A], and inverter gate solenoid [B] turn on and the original is fed back to the exposure glass through the inverter roller [C], exit gate [D], inverter guide roller [E], inverter gate [F], and inverter roller.

The transport belt motor reverses shortly after the leading edge of the original turns on the inverter sensor [G], and feeds the original to the left scale.

Original Exit (Single-Sided Original Mode)

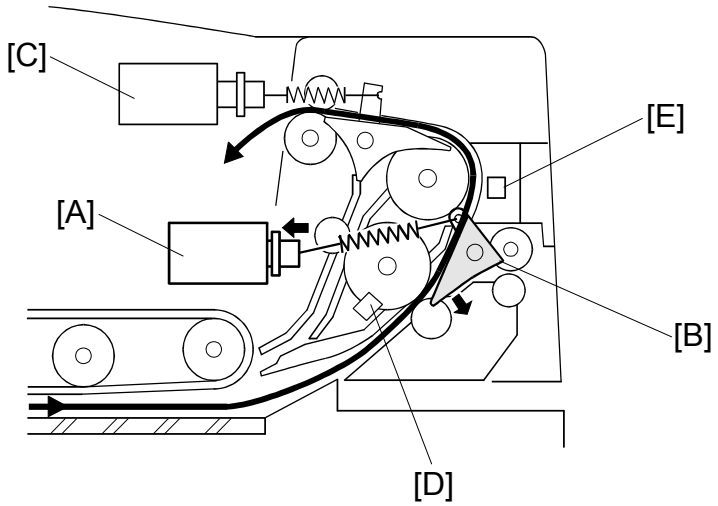


The exit gate solenoid [A] remains off, the exit gate [B] remains closed, and the original is fed out to the right exit tray.

The speed of the motor is reduced about 30 mm from the trailing edge of the original to ensure the originals stack neatly on the exit tray. This timing is determined by the length of the original, and the time since the exit sensor [C] detected the leading edge.

The transport belt motor turns off after the exit sensor [C] turns off.

Original Exit (Double-Sided Original Mode)

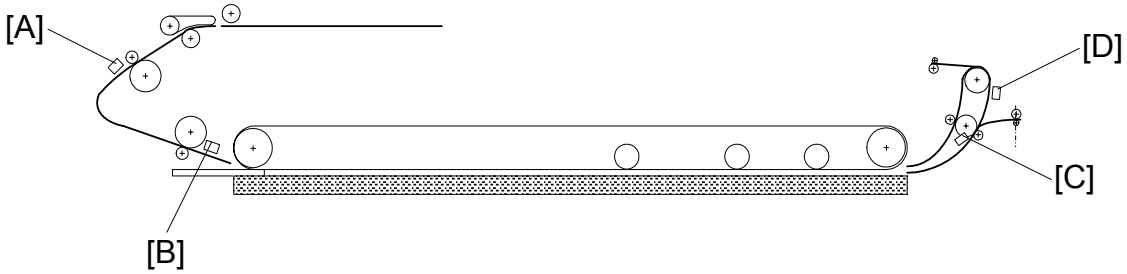


The exit gate solenoid [A] turns on and the exit gate [B] opens.

The inverter gate solenoid [C] remains off, and the original is fed out to the upper tray. The transport belt motor turns off when the trailing edge of the original passes the exit sensor [D].

To stack the originals neatly on the upper tray, the feed-out motor speed is reduced shortly after the trailing edge of the original turns off the inverter sensor [E].

6.6.10 ADF JAM CONDITIONS



Feed-in

1. The entrance sensor [A] is still off 500 ms after the feed-in motor turned on.
2. The registration sensor [B] is still not off 300 ms after the feed-in motor speed increased.
3. The entrance sensor is still on when the feed-in and transport motors have fed the original 442 mm after the registration sensor turned on.

Feed-out

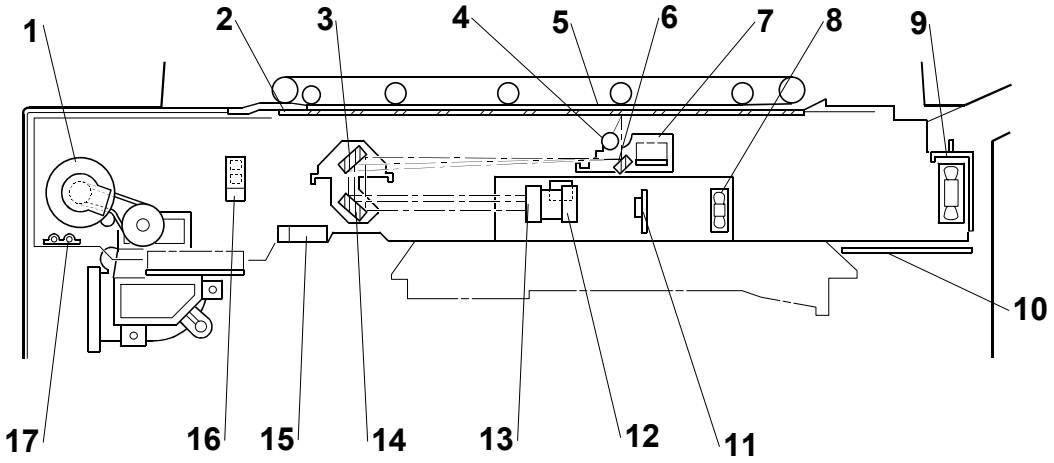
4. The registration sensor is still on when the feed-in and transport motors have fed the original 751 mm after the registration sensor turned on.
5. The exit sensor [C] is still off when the transport and feed-out motors have fed the original 129 mm after the feed-out motor turned on.
6. The exit sensor is still on when feed-out motor has fed the original X mm (X = original length x 1.3) after the exit sensor turned on.

Inversion

7. The exit sensor is still off when the transport and exit motors have fed the original 198 mm after the transport motor turned on to feed the original to the inverter section.
8. The exit sensor is still on when the feed-out motor has fed the original X mm (X = original length x 1.3) after the exit sensor turned on.
9. The inverter sensor [D] is still off when the transport and feed-out motors have fed the original 96 mm after the exit sensor turned on.
10. The inverter sensor is still off when the transport and feed-out motors have fed the original 96 mm to the exposure glass after the exit sensor turned off.

6.7 SCANNING

6.7.1 OVERVIEW



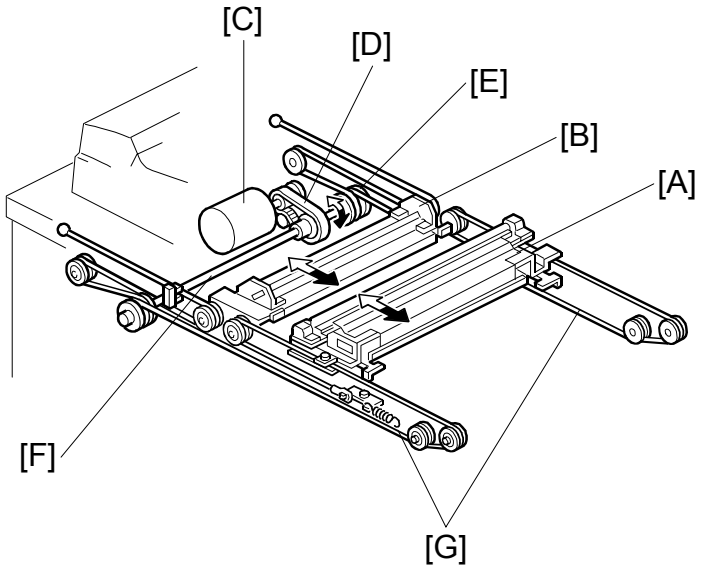
1. Scanner Motor
2. White Plate (on exposure glass)
3. 2nd Mirror
4. Exposure Lamp (Xenon)
5. Exposure Glass
6. 1st Mirror
7. Lamp Regulator
8. SBU Cooling Fan
9. Optics Cooling Fan
10. LCDC (LCD Control Board)
11. CCD (Charge Coupled Device)
12. Original Length Sensor (APS)
13. Scanner Lens
14. 3rd Mirror
15. Original Width Sensors 1, 2, 3 (APS)
16. Scanner HP Sensor
17. Optics Anti-condensation Heater (option)

One xenon lamp (23W) as the exposure lamp [4] illuminates the original. The image is reflected onto the CCD [11] (600 dpi resolution) via the 1st, 2nd, and 3rd mirrors, and through the lens [13].

The lens, CCD, and SBU are in a single unit, the lens block. The optical axis, focus, and MTF are pre-adjusted, so this lens block requires no adjustment in the field. The 1st scanner consists of the exposure lamp [4], the lamp regulator [7] and the 1st mirror.

Two fans, the optics cooling fan [9] and the SBU cooling fan [8], draw cool air into the scanning unit. The optics cooling fan turns on when the scanner motor starts and turns off 10 seconds after the scanner motor turns off. The SBU cooling fan operates while the operation switch is on. The optional optics anti-condensation heater [17] (if installed as an option) turns on while the main switch is off, to prevent moisture from forming on the optics.

6.7.2 SCANNER DRIVE



The scanner motor is a dc servo motor. The 1st and 2nd scanners [A, B] are driven by the scanner motor [C] through the timing belt [D], scanner drive pulley [E], scanner drive shaft [F], and two scanner wires [G].

The MCU (Motor Control Unit) board controls the scanner motor. The exposure lamp scans a sheet with 100% magnification at 515 mm/s and returns to the scan position for the next scan at 2500 mm/s.

Magnification and Reduction

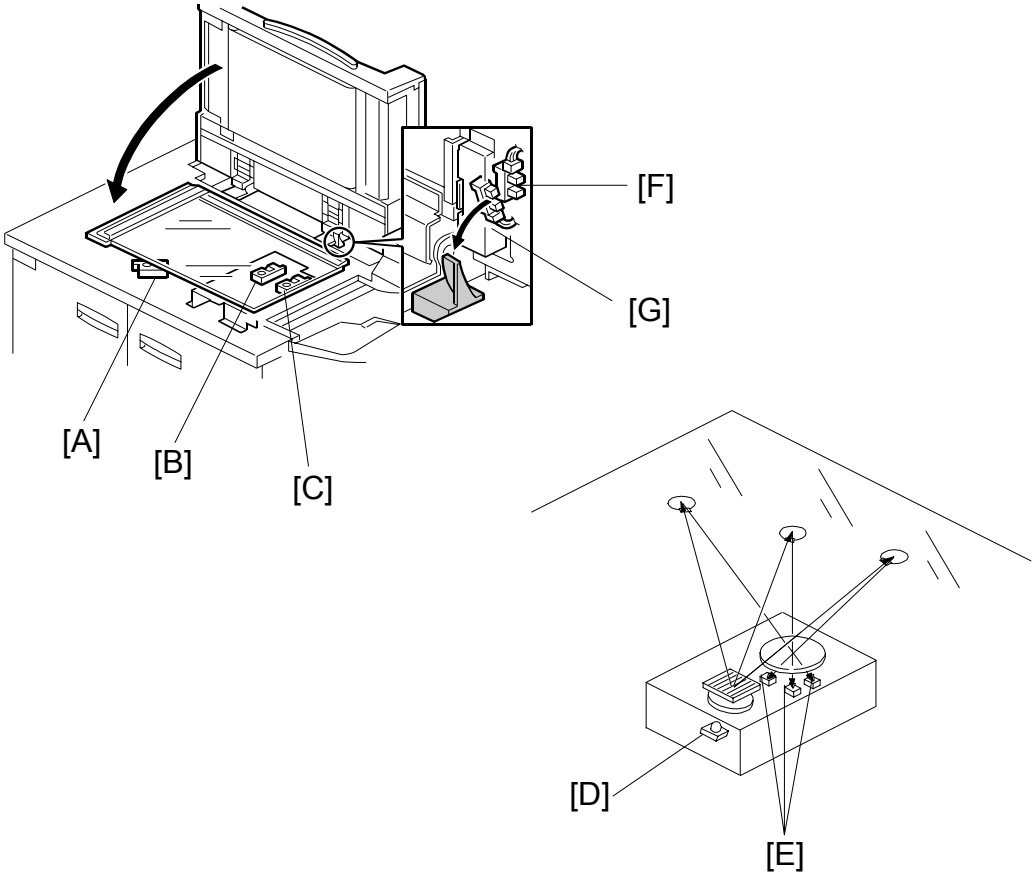
Magnification and reduction in the main scan direction are done in the IPU board.

Magnification and reduction in the sub scan direction, however, are done by controlling the speed of the scanner motor in sync with the main scan processing done in the IPU.

- Magnification above 101% is done in the IPU. For example, at 200% magnification, the IPU doubles magnification while the scanner motor speed remains at 100%.
- Reduction in the range 51% to 100% is done by the scanner motor.
- Reduction in the range 25% to 50% is done by the scanner motor, assisted by IPU processing. For example, at 40% reduction, the scanner motor speed is 80% and the IPU reduces the image by 1/2.
- Reduction below 25% is done by the scanner motor, assisted by IPU processing. For example, at 24% reduction the scanner motor speed is 96% and the IPU reduces the image by 1/4.

NOTE: Magnification in the sub scan direction can be adjusted by changing the scanner motor speed with SP4008 (Scanner Sub Scan Magnification).

6.7.3 ORIGINAL SIZE DETECTION



There are three reflective sensors at three locations in the optics cavity for original size detection.

The original width sensor [A] detects the original width, and the original length sensor 1 [B] and original length sensor 2 [C] detect the original length. These are the APS (Auto Paper Select) sensors.

Inside each APS sensor, there is an LED [D] and either three photoelectric devices [E] (for the width sensor) or one photoelectric device (for each length sensor). In the width sensor, the light generated by the LED is separated into three beams and each beam scans a different point of the exposure glass (in each length sensor, there is only one beam). If the original or ADF cover is present over the scanning point, the beam is reflected and each reflected beam exposes a photoelectric device and activates it.

While the main switch is on, these sensors are active and the original size data is always sent to the main CPU. However, the main CPU checks the data only when the ADF is being closed.

The ADF functions as the platen. The DF position sensor [F] (attached to the ADF) detects whether the ADF is open or closed.

The APS start sensor [G] triggers auto paper size detection.

NOTE: The Europe/Asia model has one length sensor (L1), but the North American model has two length sensors (L1, L2)

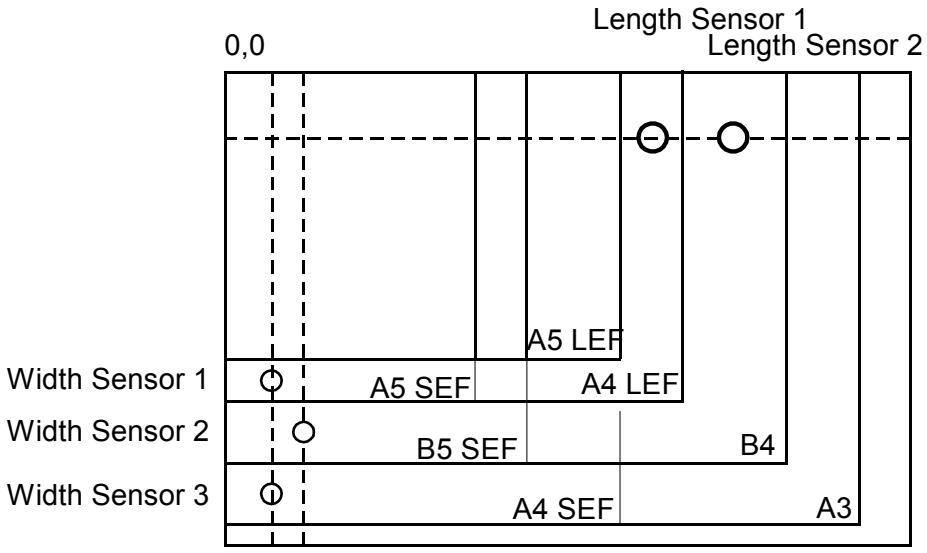
Original Size		Length Sensor		Width Sensor			SP4301 Display
A4/A3 Version	**LT/DLT Version**	**2**	**1**	**1**	**2**	**3**	
A3	11" x 17"	H	H	H	H	H	00011111
B4	10" x 14"	H	H	H	H	L	00011110
F4	8 1/2" x 14" (8" x 13")	H	H	H	L	L	00011100
A4 SEF	8 1/2" x 11"	L	H	H	L	L	00001100
B5 SEF	—	L	H	L	L	L	00001000
A5 SEF	5 1/2" x 8 1/2"	L	L	L	L	L	00000000
A4 LEF	11" x 8 1/2"	L	L	H	H	H	00000111
B5 LEF	—	L	L	H	H	L	00000110
A5 LEF	8 1/2" x 5 1/2"	L	L	H	L	L	00000100

H:High (Paper Present) L: Low

The original size data is taken by the main CPU when the DF position sensor is activated. This is when the ADF is positioned about 12 cm above the exposure glass. At this time, only the sensor(s) underneath the original receive the reflected light and switch on. The other sensor(s) are off. The main CPU recognizes the original size from the on/off signals from the five sensors.

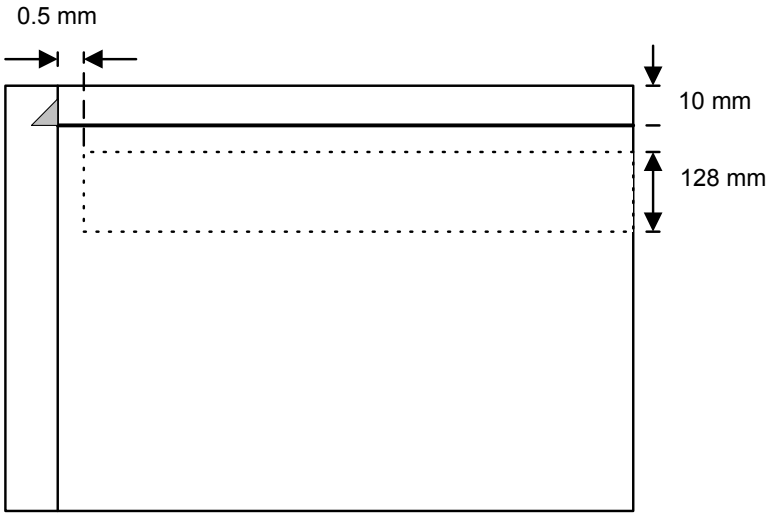
If the copy is made with the ADF open, the main CPU decides the original size from the sensor outputs when the Start key is pressed.

The above table shows the outputs of the sensors for each original size. This original size detection method eliminates the necessity for a pre-scan and increases the machine productivity.



6.7.4 AUTO IMAGE DENSITY (ADS)

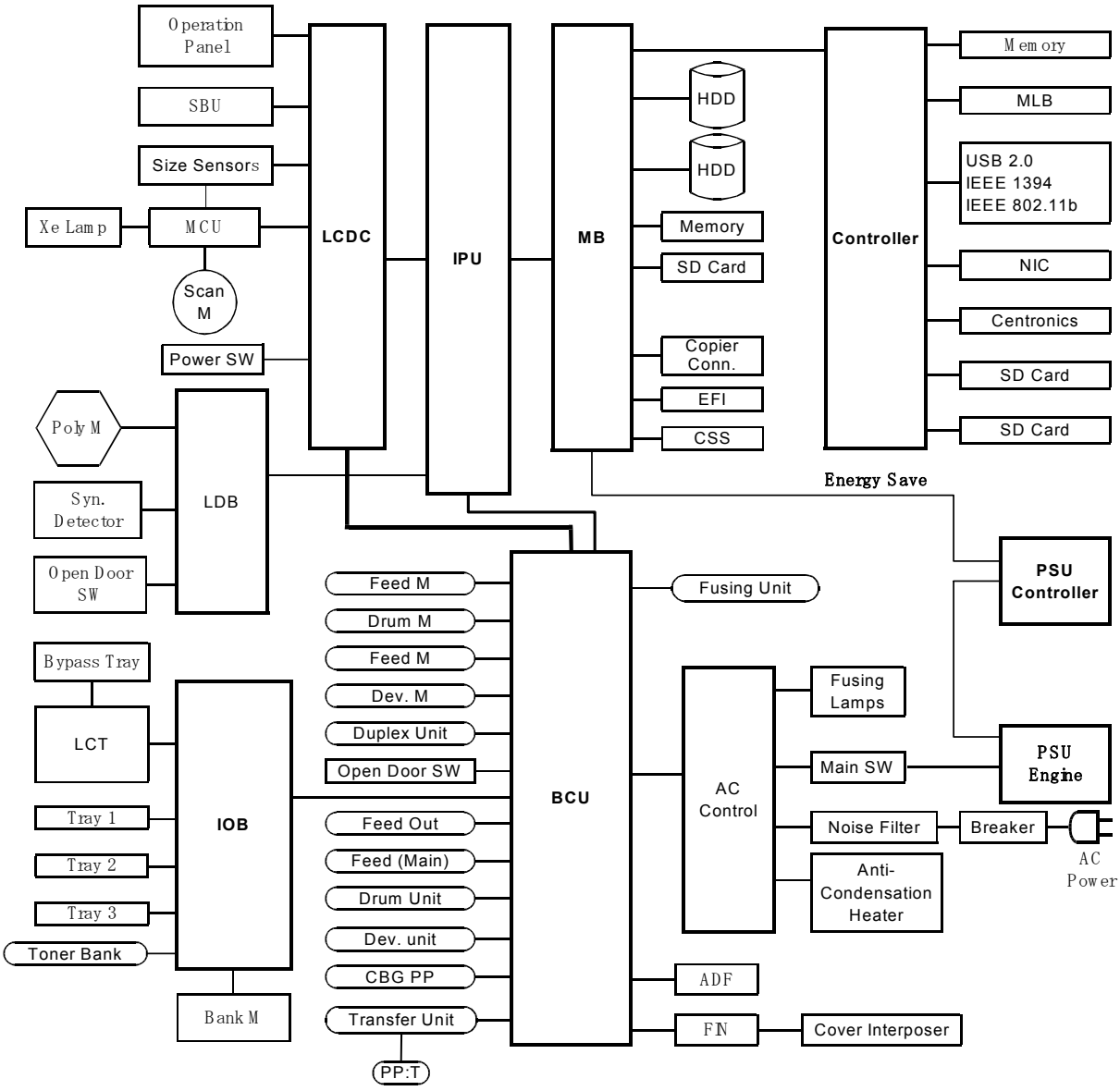
The area that the CCD uses as a reference for ADS is shown in the following diagram.



(CT Digital Processes> Image Processing> Black and White CCD Systems> Analog Signal Processing> **Automatic Image Density**)

6.8 BOARD STRUCTURE

6.8.1 BLOCK DIAGRAM



6.8.2 COMPONENT DESCRIPTIONS

This machine employs Ricoh GW (Grand Work) architecture that allows the copier to be expanded as an MFP (Multi-Function Product) by installation of simple modular components (ROM DIMMs) on the controller board.

Here is a summary of the main parts of the board structure.

NOTE: The DIP switch settings and the board should not be changed. For details, please refer to the “Specifications”, the last section of this manual.

BCU (Base Engine Control Unit): This is the main control board that controls the engine sequence, timing for peripherals. The BCU also controls:

- High voltage
- Duplexing
- Paper feed
- Paper registration
- Fusing
- Peripheral interfaces
- Drive
- Toner supply

Controller Board: The controller board controls all devices for memory DIMMs, HDD, copying, printing, and scanning. The controller board also provides all the connection points for easy installation of the options (printer, scanner, FireWire, wireless LAN, and so on). The controller board also controls:

- Printer/scanner
- Document server
- Image rotation
- Conversion of all image formats
- Image compression and decompression

Mother Board: Interfaces the controller and the IPU, and installed options.

IPU (Image Processing Unit): Contains large-scale integrated circuits that perform image processing on the digital data sent from the SBU, then sends the processed data to the controller and then to the LD unit. Also relays data transmissions between the controller and LCDC.

SBU (Sensor Board Unit): The SBU receives analog signals from the CCD and converts them into the digital signals that are used for image processing. A/D conversion divides the range between black and white into 256 levels and digitizes the analog signal based on these levels. The 256 levels are called grayscales.

IOB (Input/Output Board): Performs three functions:

- Converts sensor output from the paper bank, toner bank unit, and LCT then sends it to the BCU.
- Converts serial data from the BCU to parallel data for control of the paper bank, toner bank unit, and LCT components (motors, solenoids, clutches).
- Supplies the 24V power supply from the PSU to the BCU, LCT, and interlock system for the development motor, drum motor, and paper feed motor.

LCDC (LCD Control): The LCDC controls the operation panel and relays the internal signals of the optical system (SBU, MCU←→IPU, BCU)

LDB (LD Board): The LDB controls the laser diodes. It also contains the laser diodes.

AC Drive Board: The AC drive board controls AC power for the fusing lamps and the anti-condensation heaters.

MCU (Motor Control Unit): Controls the scanner motor with the commands from the BCU. Also controls Xenon lamp on/off timing, APS detection, the fan motors, generation of gate signals, and transmission of serial data.

Lamp Regulator: Controls the Xenon exposure lamp in the flat bed scanner

Operation Panel: Controls the operation panel and LCD display panel.

Operation Switch Board: Switches main power to the machine on/off.

Polygon Mirror Motor Control Board: Controls the polygon motor.

PSU-C (Power Supply Unit-Controller): Supplies DC power for the controller.

PSU-E (Power Supply Unit-Engine): Supplies DC power for the machine.

HDD (Hard Disk Drive)

The combined capacity of the HDD's is 80 GB (40 GB x2) for image storage. They can store up to approximately 3,000 copy images, based on the ITU-T No. 4 Chart.

The ASIC on the controller handles data by dividing each 32-bit word into 16-bit units and writes the high-end bits to one hard disk and the low-end bits to the other hard disk. This effectively reduces the write speed by 50% because each half of each 32-bit word is saved simultaneously. Because the data is divided between the two hard disks, replacing only one of the hard disks will cause errors. Therefore, both disks must always be replaced together.

Area	Power Off	Capacity	Control		Comment
Local image storage	Store	49325 MB	15,000 Copies		Doc. server storage
Temporary images	Delete	6750 MB	Copies	3000	Electronic sort, test printing, confidential printing
		1350 MB	Allocated Copies	100	
		2100 MB	Printer	3000	
		2100 MB	Sample	3000	
		3375 MB	Scanner	3000	
FileSystem1	Store	500 MB			Print font download, form registration
FileSystem2	Delete	500 MB	150 jobs		Job spool area, RTIFF spool area (both cannot be used at same time)
FileSystem3	Store	2000 MB			Desk Top Binder thumbnails, work data area
FileSystem4~7	Store	1600 MB			Email address storage area
Debug Log	Store	100 MB			Debug log
Job Log	Store	10 MB			
Debug	Store	256 MB			Object area
Swap	Store	256 MB			Swap area

Note the following important points regarding HDD replacement:

- Both HDD's must always be replaced together as one set.
- Replacing the HDD loses all document server documents, and user stamps.
- When the HDD is replaced, the default user stamps must be re-installed, so use SP5853 to copy these files from the controller firmware onto the hard disk.
- The "Scan to Email" addresses are also lost by HDD replacement. However, addresses can be backed up with Smart Net Monitor.
- Print fonts must also be re-entered after HDD replacement.

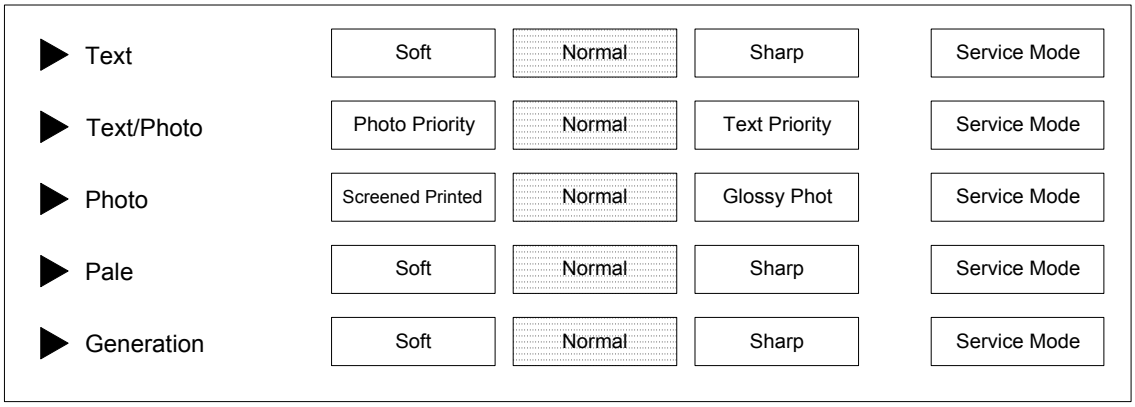
6.9 IMAGE PROCESSING

6.9.1 IMAGE PROCESSING STEPS AND RELATED SP MODES

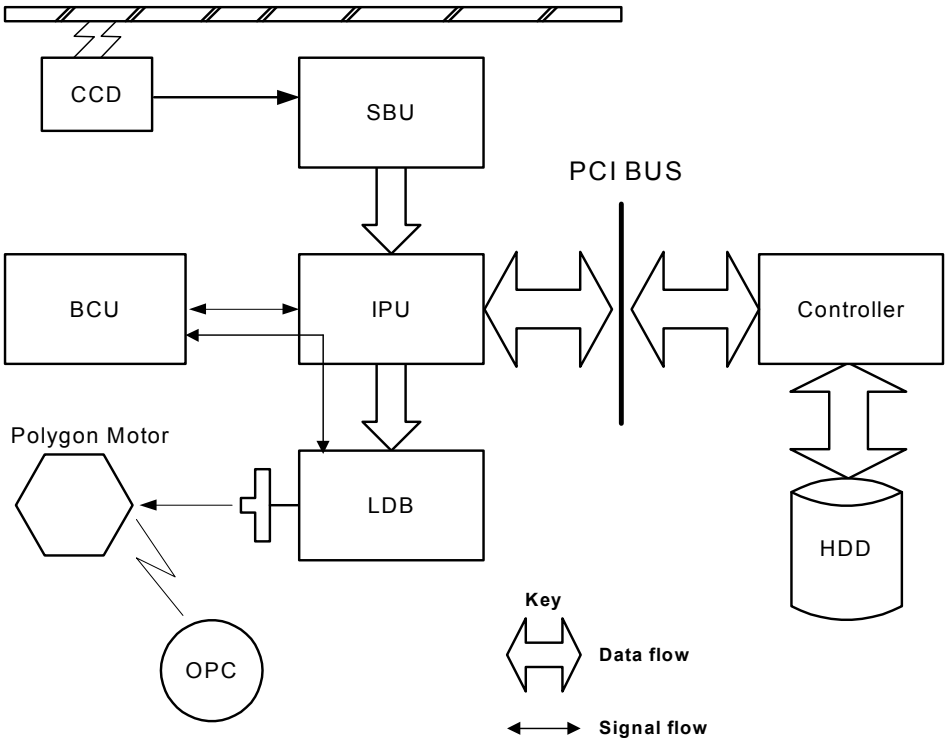
The following tables describe the image processing path and the related SP modes used for each image processing mode.

The user can adjust many of the image processing parameters with a UP mode (Copy/Document Server Features> General Features> Original Mode Quality Level), using fixed settings such as Sharp, Normal, and Soft. Each of these fixed settings have different parameters, but user changes do not affect the relevant SP mode settings.

If the user is not satisfied with any of the available settings for this UP mode, the technician can adjust the SP modes. However, the SP mode settings are not used unless the user selects ‘Service Mode’ with the UP Mode.



6.9.2 IMAGE PROCESSING OVERVIEW



SBU: Photoelectric conversion, Odd/even allocation, Amplification, A/D Conversion (analog to digital), Light intensity detection (scanning)

BCU: Engine control, Scanner control, SBU settings, IPU settings, LDB settings

IPU: Shading correction, Image Processing, Main/Sub scan magnification, Video path switching, Image Compression/ Decompression. The GAVD on this board performs density conversion processing, FCI processing, and edge processing, and also generates the test patterns.

Controller: System control, software application control, image storage control, file compression/decompression

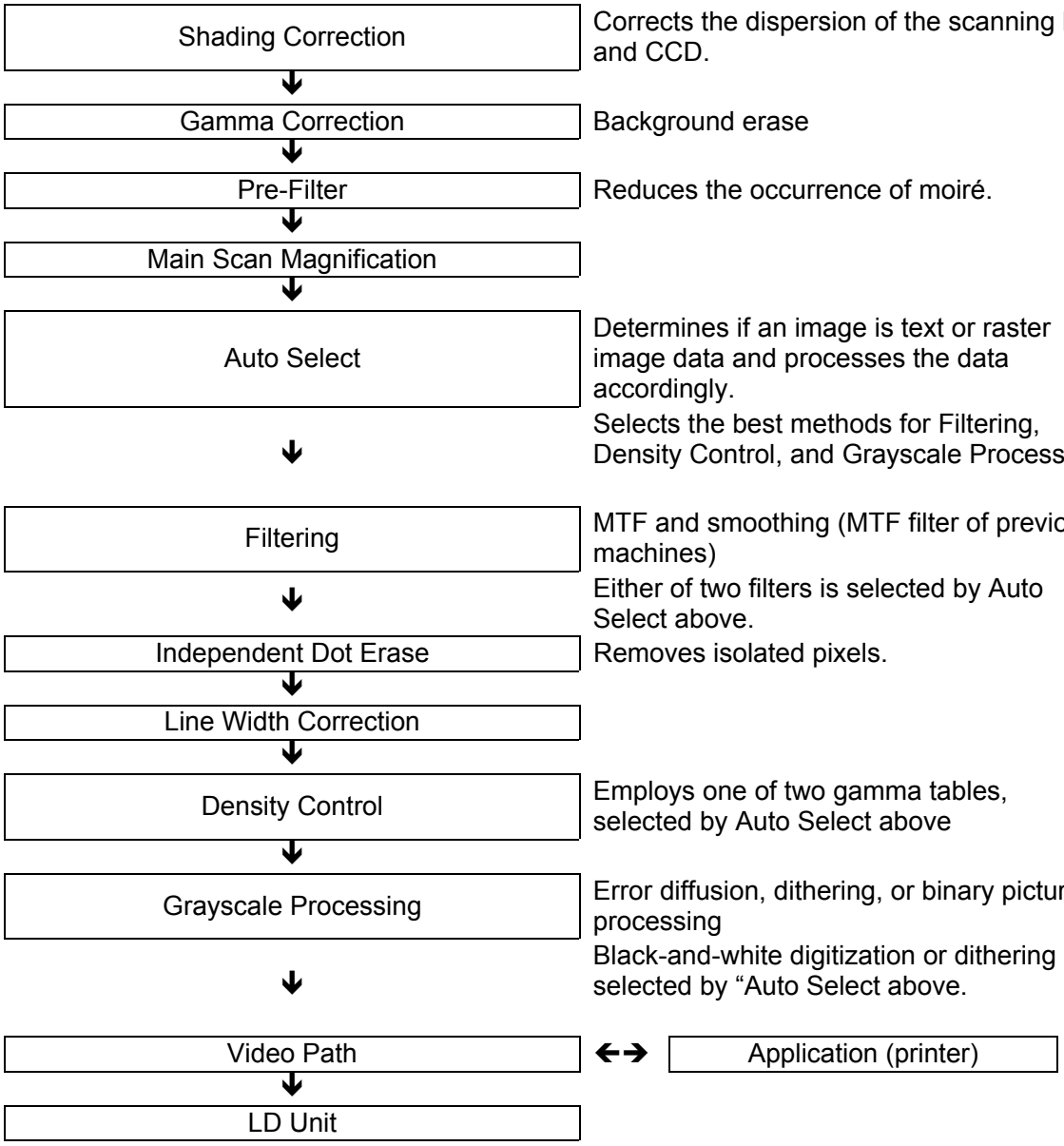
LDB: 8-beam laser exposure, binary-to-grayscale conversion, synchronization detection

6.9.3 IMAGE PROCESSING FLOW

Image processing is done by the IPU (Image Processing Unit), following the steps shown below.

Overall image processing for this machine is designed to:

- Target edges with filters to improve the angles of text characters and reduce the occurrence of moiré filled areas.
- Improve the evenness of granular areas in images



6.9.4 IMAGE PROCESSING MODES

The user can select one of the following five modes with the User Tools screen: Text, Text/Photo, Photo, Pale, Generation.

Each mode has four different settings (described below). Each mode has a Custom Setting that can be customized with SP modes to meet special requirements that cannot be covered by the standard settings.

NOTE: To see these settings in the User Tools mode, press the User Tools key, press “Copier/Document Server Functions”, then press “Copy Quality”.

Mode	Setting	Function
Text	Soft	Rough texture background drops out.
	Normal	Used for black-and-white printed material and documents that contain mainly text. Easily reads lines as well as text.
	Sharp	Use for newspapers, time schedules, or any type of printed material with fine print. Emphasizes black over white.
	Custom Setting	Stores SP command settings.
Tex/Photo	Photo Priority	Used for documents that contain text and color or black-and-white photos, such as catalogs, magazines, maps, etc. Provides more faithful reproduction than the Text mode.
	Normal	
	Text Priority	
	Custom Setting	Stores SP command settings.
Photo	Print Photo	Used for magazines, graphics, for smooth reproduction. Employs dithering.
	Normal	Used for copying photographs, graphics, for sharp reproduction. Employs error diffusion.
	Glossy Photo	Used for best results in copying glossy photographs for sharp reproduction. Employs error diffusion.
	Custom Settings	Stores SP command settings. Employs either error diffusion or dithering, depending on an SP setting.
Pale	Soft	Used for low density documents with text handwritten in black or color pencil (or carbon copies) such as receipts, invoices, etc.
	Normal	
	Sharp	
	Custom Setting	Stores SP command settings.
Generation Copy	Soft	Used to achieve an image smoother than Normal.
	Normal	Used to achieved best reproduction of “copies of copies” by smoothing the image.
	Sharp	Used to emphasize lines and text stronger than Normal for better image quality.
	Custom Setting	Stores SP command settings.
Background Dropout	Strong	Drops out the blue background color of tab sheets or other paper.
	Medium	Drops out the green background color of tab sheets or other paper.
	Weak	Drops out the orange background color of tab sheets or other paper.

6.9.5 IMAGE QUALITY SP ADJUSTMENTS

Adjustments are easier with this machine, because the parameters have been grouped and no longer have to be adjusted one by one.

In this section, we will cover the custom settings for each of the 5 original modes: These custom settings are:

- Image Quality
- Line Width Correction

Settings adjustable for each original mode will also be covered (these do not just affect the custom settings; they also affect all sub original modes, such as sharp text).

- Independent Dot Erase
- Background Erase

Custom Settings for Each Mode: Image Quality

Custom Setting: Text Mode Image Quality

Item		Range	Default	SP No.
Text	25~55%	0~10	5 Normal	SP4903 001
	55.5~75%			SP4903 002
	75.5~160%			SP4903 003
	160.5~400%			SP4903 004

If the value is increased, the outlines of lines become sharper but this could cause moiré to appear in dot patterns. If the value is decreased, image patterns become smoother, the occurrence of moiré decreases, but the corners of characters and intersections of lines at acute angles may not be as sharp.

There are two sets of custom settings for photo mode. One is for dithering, and one is for error diffusion. The set of custom settings that will be used depends on the setting of SP4904 002. The possible settings are:

0	Dither (106 line)
1	Dither (141 line)
2	Dither (212 line)
3	Error Diffusion

Custom Setting: Photo Mode (Dithering) Image Quality

Item		Range	Default	SP No.
Photo	25~55%	0~6	3 Print Photo	SP4903 005
	55.5~75%			SP4903 006
	75.5~160%			SP4903 007
	160.5~400%			SP4903 008

Used for coarse, dithered tone photographs such as newsprint.

If the value is increased, the photo becomes sharper, but blurring could occur in the sub scan direction. If the value is decreased, blurring in the sub scan direction is less obvious but outlines become fuzzy.

Custom Setting: Photo Mode (Error Diffusion) Image Quality

Item		Range	Default	SP No.
Photo	25~55%	0~6	1 Normal	SP4903 009
	55.5~75%			SP4903 010
	75.5~160%			SP4903 011
	160.5~400%			SP4903 012

Used for printed materials (magazines, etc.) with photographs to sharp patterns in copies.

If the photos have dithered tones, the image becomes sharper if the value is increased, but blurring could occur in the sub scan direction. If the value is decreased, blurring in the sub scan direction is less obvious but outlines become fuzzy.

Custom Setting: Text/Photo Mode Image Quality

Item		Range	Default	SP No.
Text/Photo	25~55%	0~10	5 Normal	SP4903 013
	55.5~75%			SP4903 014
	75.5~160%			SP4903 015
	160.5~400%			SP4903 016

See the remarks for ‘Custom Setting: Text Mode Image Quality’ above.

Custom Setting: Pale Mode Image Quality

Item		Range	Default	SP No.
Pale	25~55%	0~10	5 Normal	SP4903 017
	55.5~75%			SP4903 018
	75.5~160%			SP4903 019
	160.5~400%			SP4903 020

If the value is increased, low density areas become sharper, but the background could become dirtier. If the value is decreased, the background disappears but the density of low density areas becomes low.

Custom Setting: Generation Mode Image Quality

Item		Range	Default	SP No.
Generation	25~55%	0~10	5 Normal	SP4903 021
	55.5~75%			SP4903 022
	75.5~160%			SP4903 023
	160.5~400%			SP4903 024

See the remarks for ‘Custom Setting: Pale Mode Image Quality’ above.

Custom Settings for Each Mode: Line Width Correction

Custom Setting: Text Mode Line Width Correction

Selection		Range	Default	Content	SP No.
Item	Line Width Correction	0~8	2	0 (Thin) - 4 (Off) - 8 (Thick)	SP4903 080
	Main Scan	0~1	1	0:OFF 1:ON	SP4903 081
	Sub Scan	0~1	1	0:OFF 1:ON	SP4903 082

If the value is made smaller, the line width correction becomes thinner, and if the value is made larger, the line width correction becomes thicker. To switch this feature off, select “4”.

If the above settings do not make the lines thin enough, use SP4904 020 (Image Quality Exposure: Thin Line - Text Mode). Normally, SP4904 020 is set to 0 (OFF). As the setting is increased (1~3), the line width correction effect becomes stronger, and lines become thinner. All settings of SP4903 080 will be affected by the same amount.

Custom Setting: Photo Mode Line Width Correction

Selection		Range	Default	Content	SP No.
Item	Line Width Correction	0~8	4	0 (Thin) - 4 (Off) - 8 (Thick)	SP4903 083
	Main Scan	0~1	1	0:OFF 1:ON	SP4903 084
	Sub Scan	0~1	1	0:OFF 1:ON	SP4903 085

See the remarks for ‘Custom Setting: Text Mode Line Width Correction’ above.

If the above settings do not make the lines thin enough, use SP4904 021 (Image Quality Exposure: Thin Line – Photo Mode). Normally, SP4904 021 is set to 0 (OFF). As the setting is increased (1~3) the line width correction effect becomes stronger, and lines become thinner. All settings of SP4903 083 will be affected by the same amount.

Custom Setting: Text/Photo Mode Line Width Correction

Selection		Range	Default	Content	SP No.
Item	Line Width Correction	0~8	4	0 (Thin) - 4 (Off) - 8 (Thick)	SP4903 086
	Main Scan	0~1	1	0:OFF 1:ON	SP4903 087
	Sub Scan	0~1	1	0:OFF 1:ON	SP4903 088

See the remarks for ‘Custom Setting: Text Mode Line Width Correction’ above.

If the above settings do not make the lines thin enough, use SP4904 022 (Image Quality Exposure: Thin Line – Text/Photo Mode). Normally, SP4904 022 is set to 0 (OFF). As the setting is increased (1~3) the line width correction effect becomes stronger, and lines become thinner. All settings of SP4903 086 will be affected by the same amount.

Custom Setting: Pale Mode Line Correction

Selection		Range	Default	Content	SP No.
Item	Line Width Correction	0~8	4	0 (Thin) - 4 (Off) - 8 (Thick)	SP4903 089
	Main Scan	0~1	1	0:OFF 1:ON	SP4903 090
	Sub Scan	0~1	1	0:OFF 1:ON	SP4903 091

See the remarks for 'Custom Setting: Text Mode Line Width Correction' above.

If the above settings do not make the lines thin enough, use SP4904 023 (Image Quality Exposure: Thin Line – Pale Mode). Normally, SP4904 023 is set to 0 (OFF). As the setting is increased (1~3) the line width correction effect becomes stronger, and lines become thinner. All settings of SP4903 089 will be affected by the same amount.

Custom Setting: Generation Copy Line Width Correction

Selection		Range	Default	Content	SP No.
Item	Line Width Correction	0~8	1	0 (Thin) - 4 (Off) - 8 (Thick)	SP4903 092
	Main Scan	0~1	1	0:OFF 1:ON	SP4903 093
	Sub Scan	0~1	1	0:OFF 1:ON	SP4903 094

See the remarks for 'Custom Setting: Text Mode Line Width Correction' above.

If the above settings do not make the lines thin enough, use SP4904 024 (Image Quality Exposure: Thin Line – Generation Mode). Normally, SP4904 024 is set to 0 (OFF). As the setting is increased (1~3) the line width correction effect becomes stronger, and lines become thinner. All settings of SP4903 092 will be affected by the same amount.

Settings Adjustable for Each Original Mode

Independent Dot Erase

Item	Range	Default	SP No.
Text	0~14	8	SP4903 060
Photo		0	SP4903 061
Text/Photo		0	SP4903 062
Pale		0	SP4903 063
Generation Copy		8	SP4903 064

Independent dot erase removes isolated black pixels. As this setting is increased, the greater the number of eliminated isolated pixels. Setting to zero switches this function off.

Background Erase

Item	Range	Default	SP No.
Text	0~255	0 (Off)	SP4903 070
Photo			SP4903 071
Text/Photo			SP4903 072
Pale			SP4903 073
Generation Copy			SP4903 074

Background erase attempts to eliminate the heavy background texture from copies of newspaper print or documents printed on coarse paper. Pixels of density below the selected threshold level are eliminated. Setting this feature to zero switches it off. Increasing this setting increases the effect of background erase.

6.9.6 RELATION BETWEEN THE SP AND UP SETTINGS

The tables below illustrate the relationship between the UP and SP settings for each of the 5 original modes. The scale across the top of the table is the range of settings for the SP modes.

The settings in the gray areas indicate the UP settings overlaid on the SP scale of the table. Words that are not shaded within the tables, such as 'softer', indicate how the image changes if you change the SP setting is a certain direction. The related UP mode is User Tools> Copier Features> General Features> Copy Quality.

Text Mode

Setting	0	1	2	3	4	5	6	7	8	9	10	SP No.
25% ~55%		Soft				Normal				Sharp		SP4903 001
55.5 ~ 75%												SP4903 002
75.5 ~ 160%												SP4903 003
160.5 ~ 400%												SP4903 004

Photo Mode (Dithering)

Setting	0	1	2	3	4	5	6	SP No.
25% ~55%	Softer			Print Photo			Sharper	SP4903 005
55.5 ~ 75%								SP4903 006
75.5 ~ 160%								SP4903 007
160.5 ~ 400%								SP4903 008

Photo Mode (Error Diffusion)

Setting	0	1	2	3	4	5	6	SP No.
25% ~55%	Softer	Normal				Glossy Photo	Sharper	SP4903 009
55.5 ~ 75%								SP4903 010
75.5 ~ 160%								SP4903 011
160.5 ~ 400%								SP4903 012

Text/Photo Mode

Setting	0	1	2	3	4	5	6	7	8	9	10	SP No.
25% ~55%		Photo Priority				Normal				Text Priority		SP4903 013
55.5 ~ 75%												SP4903 014
75.5 ~ 160%												SP4903 015
160.5 ~ 400%												SP4903 016

Pale Mode

Setting	0	1	2	3	4	5	6	7	8	9	10	SP No.
25% ~55%		Soft				Normal				Sharp		SP4903 017
55.5 ~ 75%												SP4903 018
75.5 ~ 160%												SP4903 019
160.5 ~ 400%												SP4903 020

Generation Copy

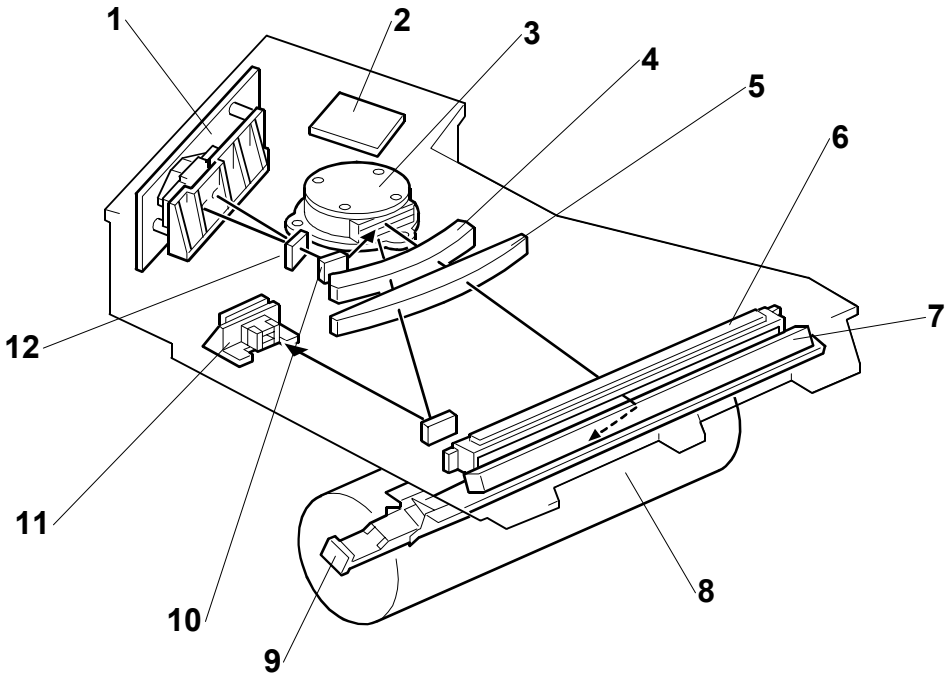
Setting	0	1	2	3	4	5	6	7	8	9	10	SP No.
25% ~55%		Soft				Normal				Sharp		SP4903 021
55.5 ~ 75%												SP4903 022
75.5 ~ 160%												SP4903 023
160.5 ~ 400%												SP4903 024

Background Color Dropout

SP NO.	MODE NAME	TARGETTED COLOR	VALUES
4901 020	Background Dropout – Weak	Orange	165 ~ 255 (Default: 180)
4901 021	Background Dropout – Medium	Green	115 ~164 (Default: 155)
4901 022	Background Dropout - Strong	Blue	15 ~ 144 (Default: 105)

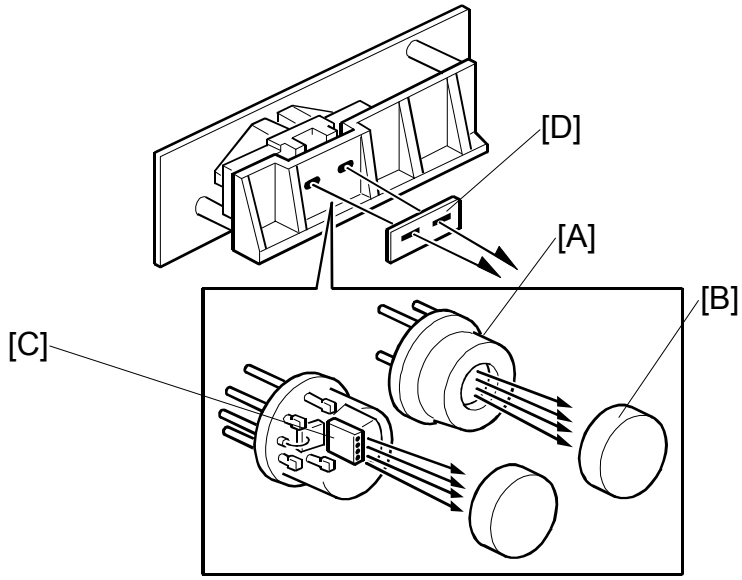
6.10 LASER EXPOSURE

6.10.1 OVERVIEW



1. LD Unit
2. Polygon Mirror Motor Control Board
3. Polygon Mirror Motor
4. F-Theta Lens 1
5. F-Theta Lens 2
6. BTL Lens
7. 2nd Mirror
8. Drum
9. Toner Shield Glass
10. 1st Mirror
11. Laser Synchronization Detector
12. Cylindrical Lens

6.10.2 LASER EXPOSURE MECHANISM



The LD unit consists of two 4-channel LDA's (Laser Diode Arrays) and two collimating lenses.

Each LDA produces 4 beams [A]. Each collimating lens [B] is a fixed lens, seated in a V-groove and held in place by a spring and a screw.

Four beams from each LDA [C] pass through the collimating lenses, though the apertures [D], then strike the polygonal mirror. Due to this multi-beam writing, the polygonal mirror motor speed can be reduced, thus the noise generated by the polygon mirror motor and the wear on the motor can be reduced.

Auto Power Control (APC)

A built-in photo diode detects the light emitted from the LD unit. When the photo diode detects this light, it generates a signal and the feedback of this signal to the LD control board is used to adjust the strength and amount of light in the laser beams.

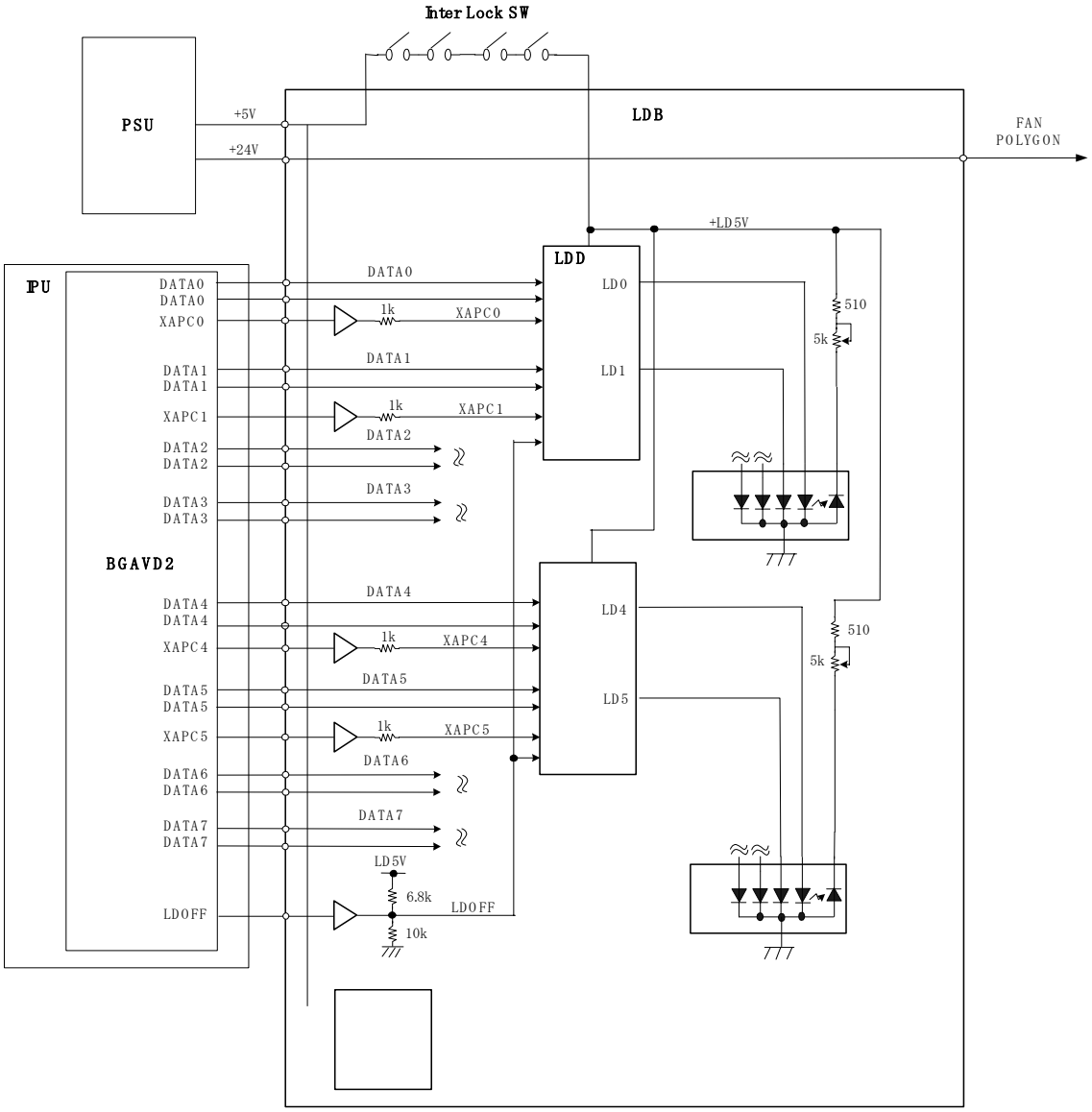
NOTE: The laser diode array is assembled and adjusted in the factory, and does not require physical position adjustment in the field.

LD drivers control the power output from the laser diodes.

(CT Digital Processes > Printing > Laser Printing > **Laser Diode Power Control)**

NOTE: The reference levels are adjusted on the production line. Never touch the variable resistors on the LD unit.

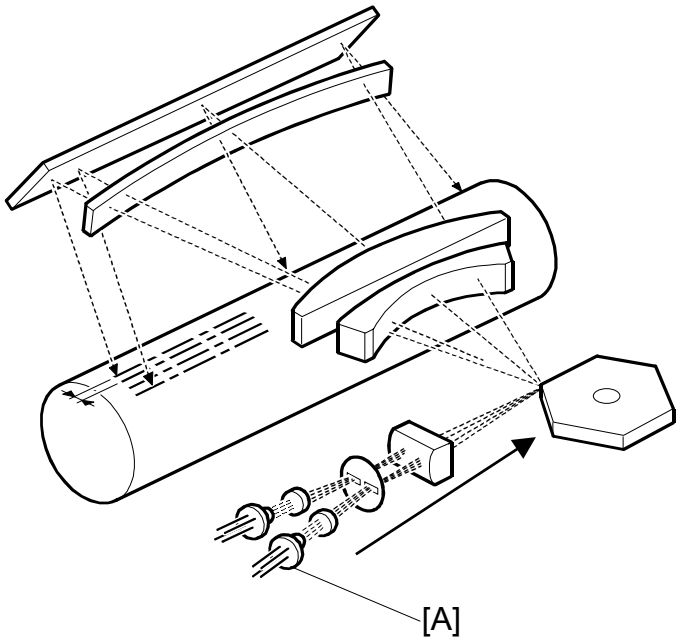
6.10.3 LD SAFETY SWITCHES



To ensure technician and user safety and to prevent the laser beam from inadvertently switching on during servicing, there are four safety switches inside the front cover (these are the 4th front left and 4th front right door safety switches).

When one of the front covers is open, the 5 V line connecting to the LD drivers (LDD) is disconnected.

6.10.4 MULTI-BEAM LINE EXPOSURE



The LD unit contains two laser diode arrays (LDA) [A], each with one 4-channel array, allowing the LD unit to produce a total of eight beams. This multi-beam exposure mechanism has the following advantages:

- Reduces the number of rotations required of the polygon mirror motor.
- Reduces the amount of noise generated by the polygon mirror motor because it is rotating at lower speed.
- Reduces the need for LD unit replacement.
- Allows production of a more precision beam on a stable platform.

The laser synchronization detector detects only Channel 0 and Channel 1, the uppermost beams of each parallel array.

The main scan pitch of Channels 2 to 7 is determined by setting SP2115 001~006 (Main Scan Beam Pitch Adjustment) at the factory. For this reason, when the LD unit is replaced, these SP codes must be input for the new unit. The correct SP settings are printed on a label attached to the LD unit.

An SC code is issued for a laser synchronization detector error if the LD unit malfunctions and does not emit the laser beams.

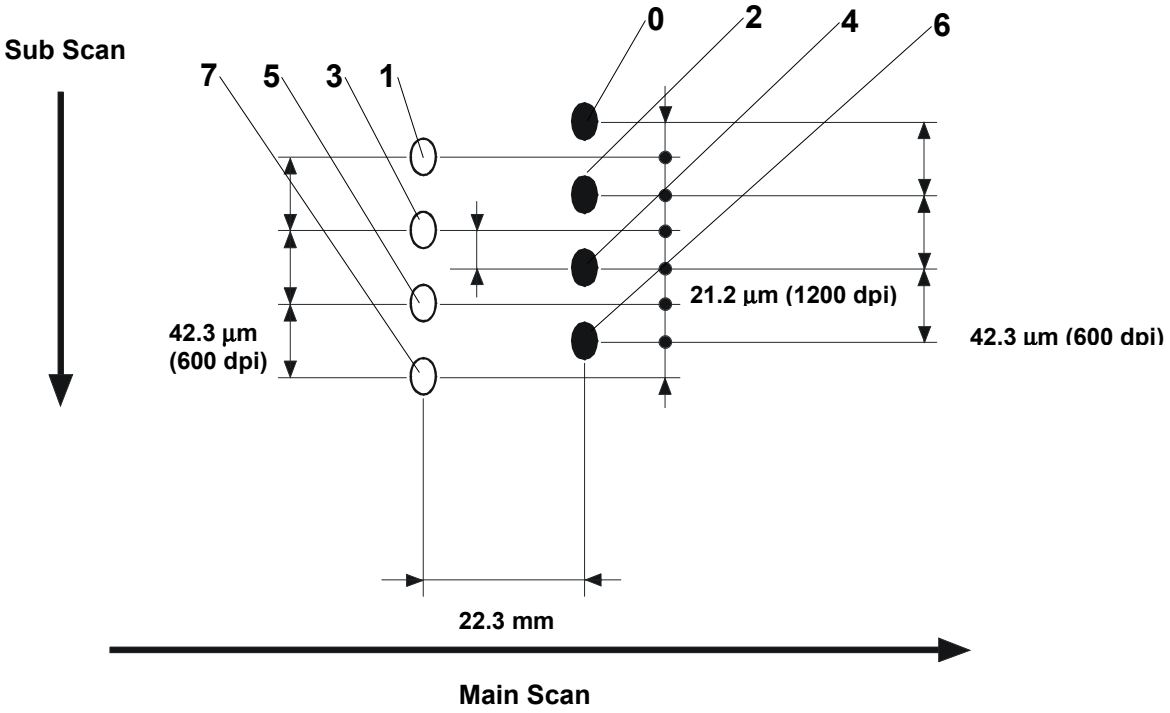
6.10.5 POLYGON MIRROR MOTOR

The polygon mirror reflects the laser beam onto the OPC drum to expose the image line by line in the main scan direction. The polygon mirror motor rotates at a constant speed, even while the copier is in standby mode, but shuts off when the copier enters the energy conservation mode.

The polygon mirror motor has no brake mechanism, so it requires about 3 minutes to stop rotating. Before moving the machine or before servicing the motor or the area around the polygon mirror motor, you should switch off the copier main power switch, disconnect the machine, and wait at least three minutes for the motor to stop rotating.

NOTE: The polygon mirror motor requires about 10 seconds to reach full speed after the machine awakes from the energy conservation mode, or after the machine is switched from the normal mode to low speed mode for printing on thick paper. The machine cannot print during this 10 second interval until it reaches full rotation speed.

6.10.6 1200-DPI RESOLUTION



0 LDA 1-0	4 LDA 1-2
1 LDA 2-0	5 LDA 2-2
2 LDA 1-1	6 LDA 1-3
3 LDA 2-1	7 LDA 2-3

The original is scanned at 600 dpi, then the 600 dpi output is boosted to 1200 dpi 1-bit data during image processing in the IPU.

This machine can produce an image at 1200 dpi by writing each dot twice, possibly with two different values, depending on the results of image processing. This is achieved with the LD unit, which has two laser diode arrays, each with 4 channels which together produce 8 beams. As shown in the illustration above, the beams from each laser diode are emitted in two parallel lines.

For copying, 1200 dpi is used. For printing, the default is 600 dpi, but 1200 dpi can be selected.

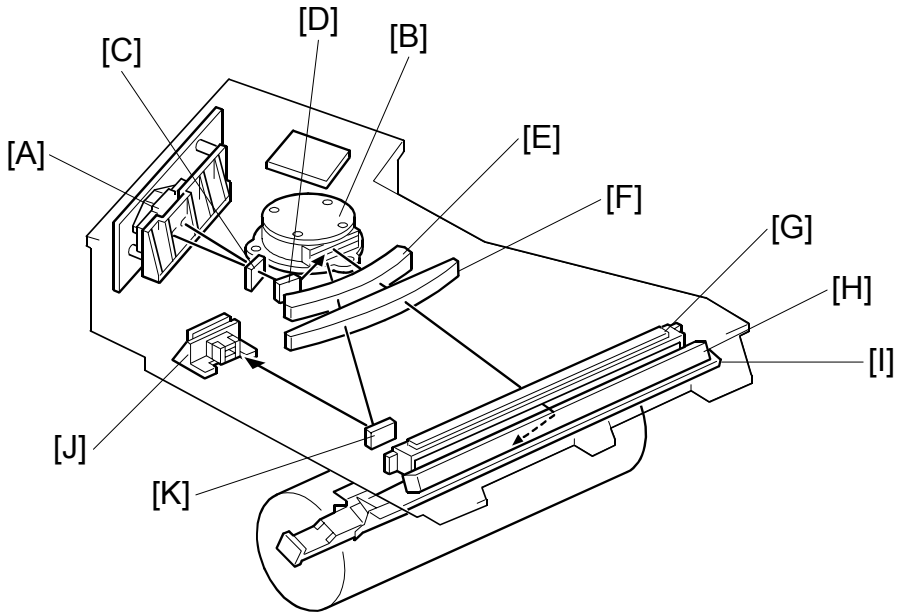
The diagram shows how the two sets of four beams are interlaced to produce a sub scan resolution of 1200 dpi.

There are two parallel rows of four beams, separated by 22.3 mm in the main scan direction. In each of these rows, the beams are spaced at 42.3 micrometer intervals (this is the same as 600 dpi).

The rows are also offset in the sub scan direction by 21.2 micrometers.

The net result is that we have dots at 21.2 micrometer intervals, which is the same as 1200 dpi

6.10.7 OPTICAL PATH



The output path from the laser diode to the drum is shown above.

The LD unit [A] outputs eight laser beams to the polygonal mirror [B] (six mirror surfaces) through the cylindrical lens [C] and the 1st mirror [D].

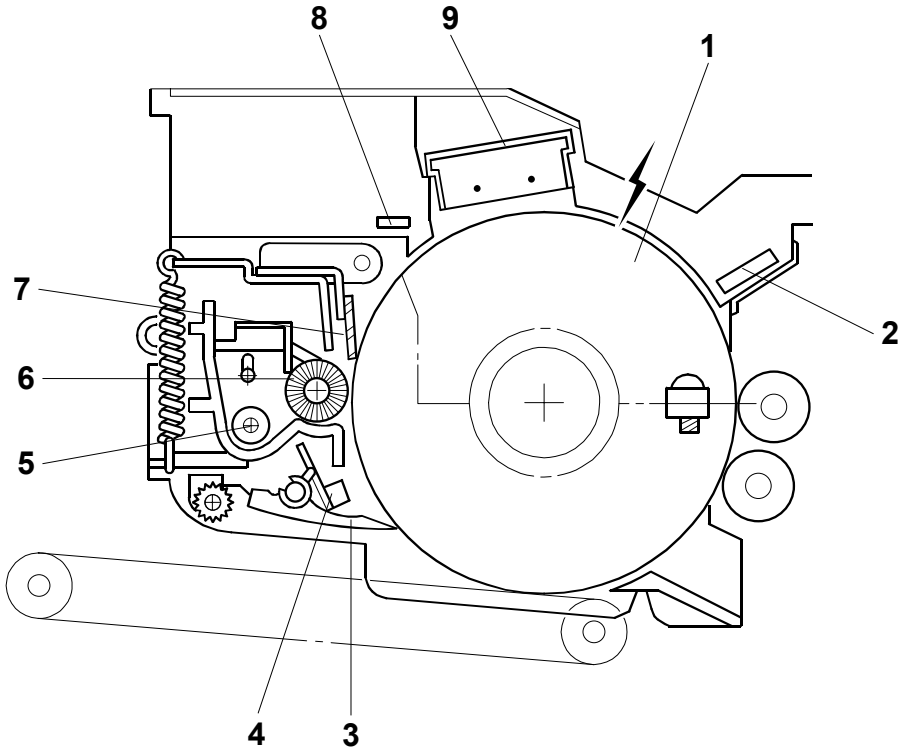
Each surface of the polygon mirror reflects eight full main scan lines. The laser beams go to the F-theta lens 1 [E], F-theta lens 2 [F], BTL (barrel toroidal lens) [G], and mirror [H]. Then these laser beams go to the drum through the toner shield glass [I].

The laser synchronizing detector [J] determines the main scan starting position. This sensor sends a synchronization signal when the laser synchronization detector mirror [K] reflects the laser beam to the detector as the laser beam starts its sweep across the drum.

The laser synchronization detector detects only the beams emitted from Channels 1 and 0, the uppermost beams of each parallel array.

6.11 DRUM UNIT

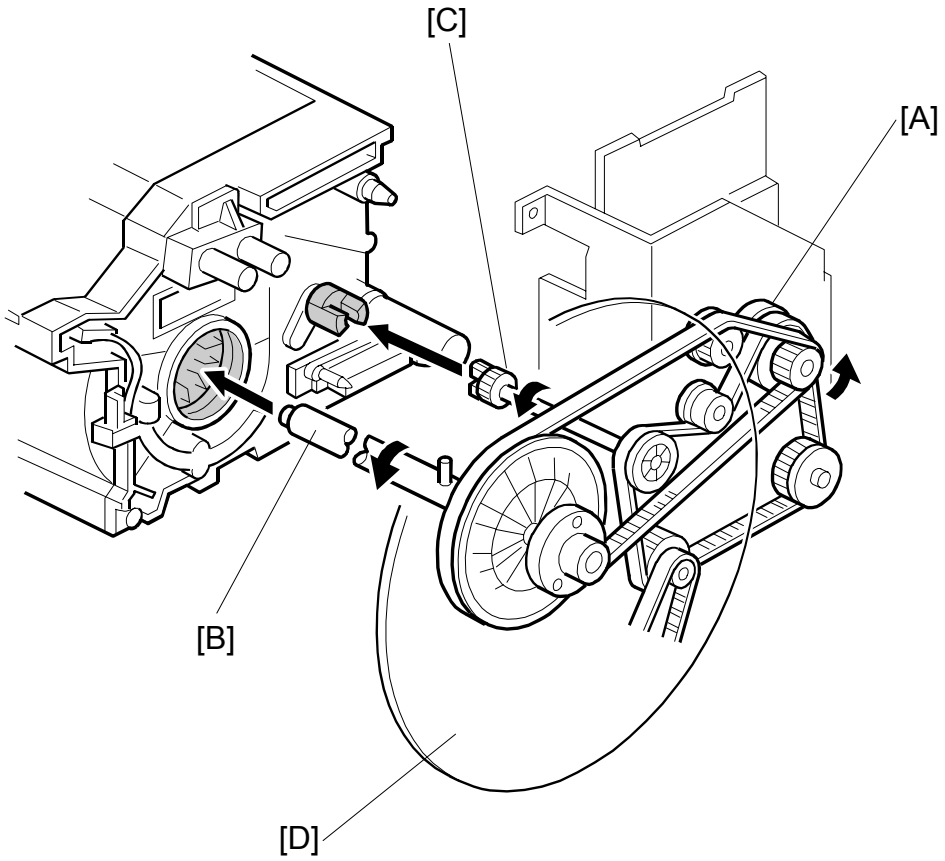
6.11.1 OVERVIEW



The drum unit consists of the components shown in the above illustration. An organic photoconductor drum (diameter: 100 mm) is used for this model.

1. OPC Drum
2. Drum Potential Sensor
3. Pick-off Pawl
4. Image Density Sensor
5. Toner Collection Coil
6. Cleaning Brush
7. Cleaning Blade
8. Quenching Lamp
9. Charge Corona Unit

6.11.2 DRUM DRIVE



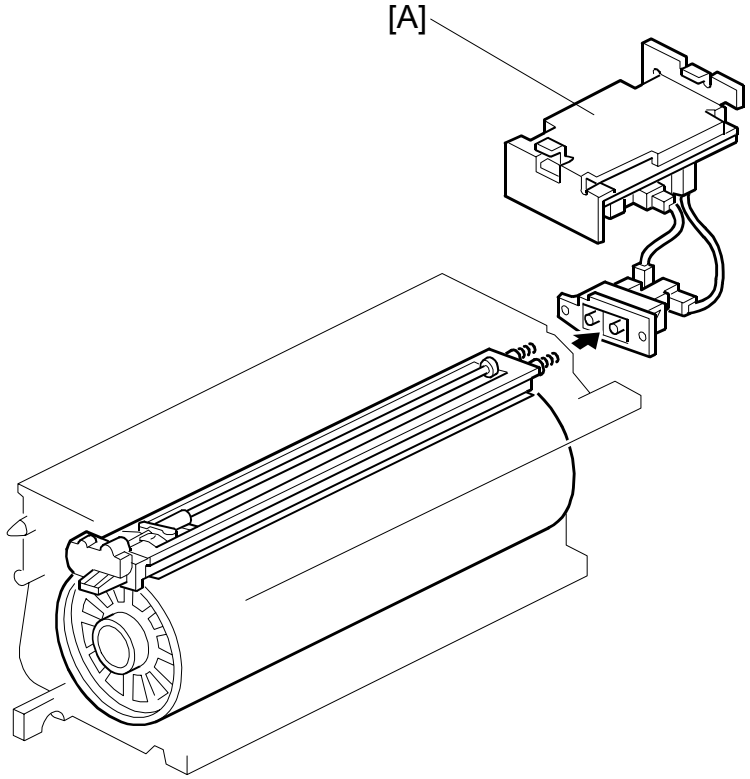
The drive from the drum motor [A] is transmitted to the drum and the cleaning unit through timing belts, gears, the drum drive shaft [B], and the cleaning unit coupling [C].

The drum motor has a drive controller, which outputs a motor lock signal when the rotation speed is out of the specified range. The drum speed for the B070 (90 cpm) is 450 mm/s and for the B071 (105 cpm) 500 mm/s.

The flywheel [D] on the end of the drum drive shaft stabilizes the rotation speed.

6.11.3 DRUM CHARGE

Overview

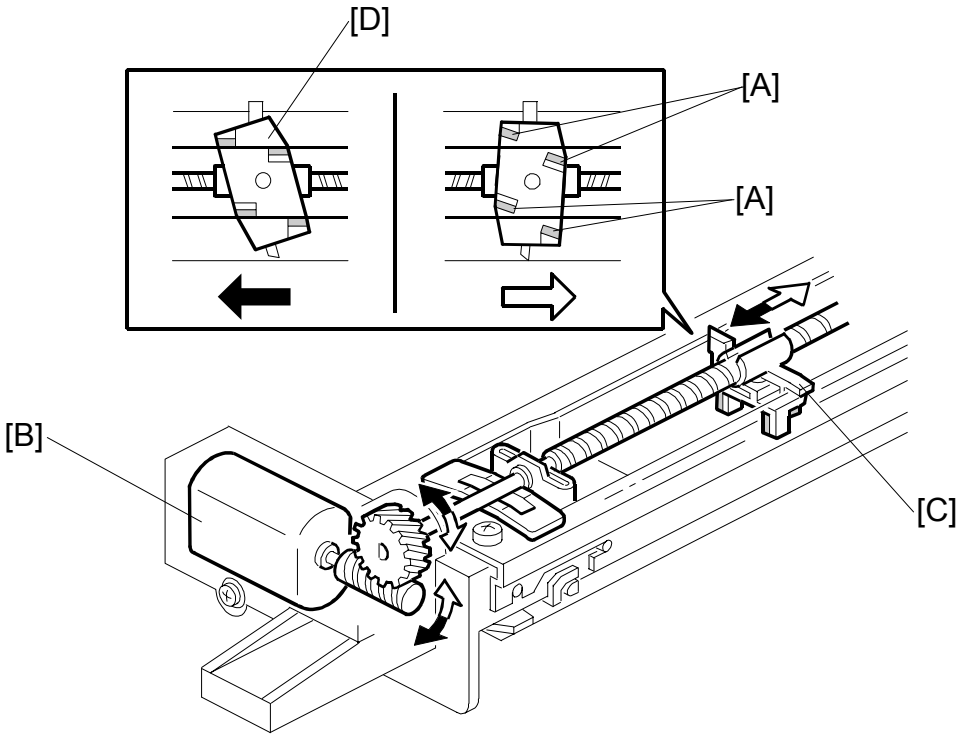


This copier uses a double corona wire Scorotron system to charge the drum. Because of the high speed of this copier, two corona wires are needed to give a sufficient, uniform negative charge to the drum surface. The stainless steel grid plate makes the corona charge uniform and controls the amount of negative charge on the drum surface by applying a negative voltage to the grid.

The CBG (Charge, Bias, Grid) power pack [A] supplies a constant corona current to the corona wires, –1600 μA for Photo mode and –1400 μA for all other modes (Text, Text/Photo, Pale, Generation Copy).

The voltage to the grid plate is automatically controlled to maintain the correct image density in response to changes in drum potential caused by dirt on the grid plate and charge corona casing. (☛6.11.8)

Charge Corona Wire Cleaning



Air flowing around the charge corona wire may deposit toner particles on the corona wires. These particles may interfere with charging and cause low density bands on copies.

The wire cleaner pads [A] automatically clean the wires to prevent such a problem.

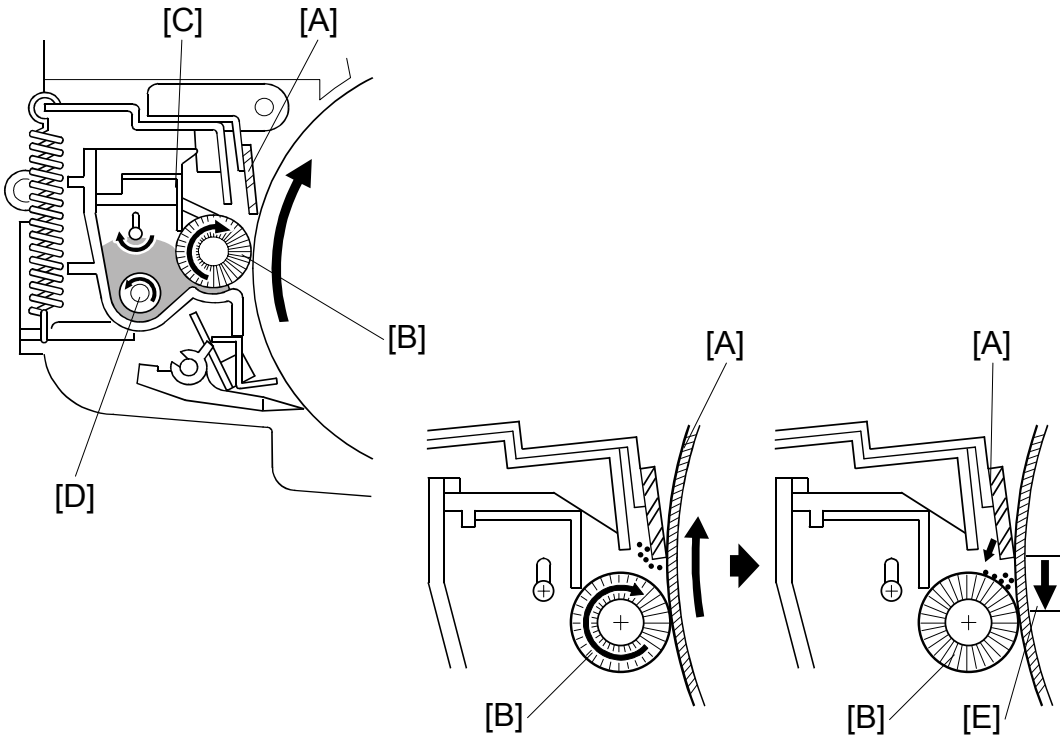
The wire cleaner is driven by a dc motor [B]. Normally the wire cleaner [C] is at the front end (the home position). Just after the main switch is turned on, the wire cleaner motor turns on to bring the wire cleaner to the rear and then back to the home position. When the wire cleaner [D] moves from the rear to the home position, the wire cleaner pads swivel, bringing the pads into contact with the wires, and clean the wires as it moves forward.

Cleaning is executed when:

- The machine is switched on and the fusing temperature is less than 100°C while auto process control executes.
- Every 24 hours.
- After every 5,000 copies. This can be adjusted with SP2804 002 (Charge Corona Cleaner Setting – Corona Wire Cleaning Interval).

6.11.4 DRUM CLEANING

Overview



This copier uses a counter blade system to clean the drum. In a counter blade system, the drum cleaning blade [A] is angled against drum rotation. The counter blade system has the following advantages:

- Less wearing of the cleaning blade edge
- High cleaning efficiency

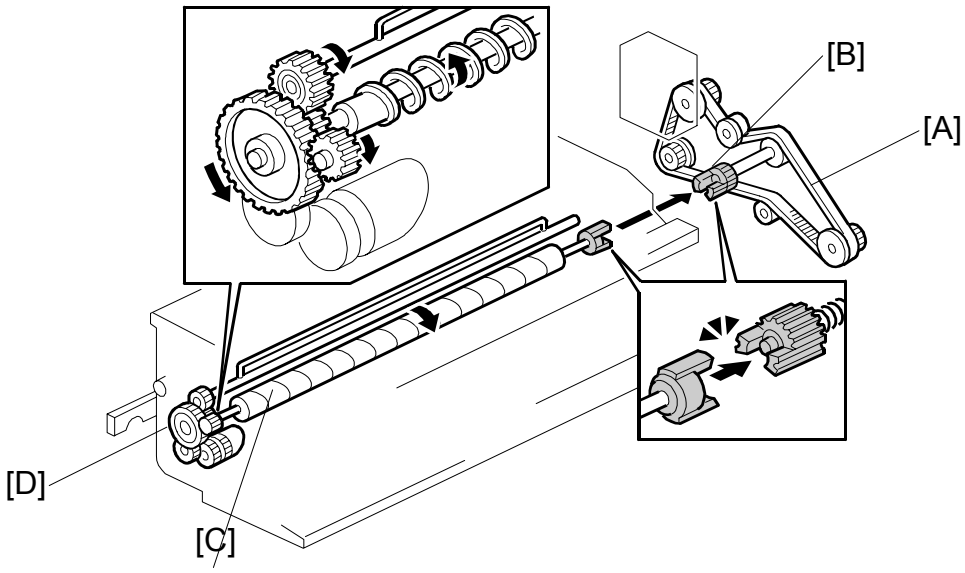
Due to the high efficiency of this cleaning system, the pre-cleaning corona and cleaning bias are not used for this copier.

The cleaning brush [B] helps the cleaning blade. The brush removes toner from the drum surface and any remaining toner is scraped off by the cleaning blade. Toner on the cleaning brush is scraped off by the mylar [C] and falls onto the toner collection coil [D]. The coil transports the toner to back to the toner entrance tank in the toner bank unit for recycling.

To remove any accumulated toner at the edge of the cleaning blade, the drum turns in reverse for about 40 ms [E] at the end of every copy job. This is also during long copy jobs every 30 min. For details, refer to SP2506 002 (Cleaning Interval – Multiple Copy - Inteval) in Section “5. Service Tables”.

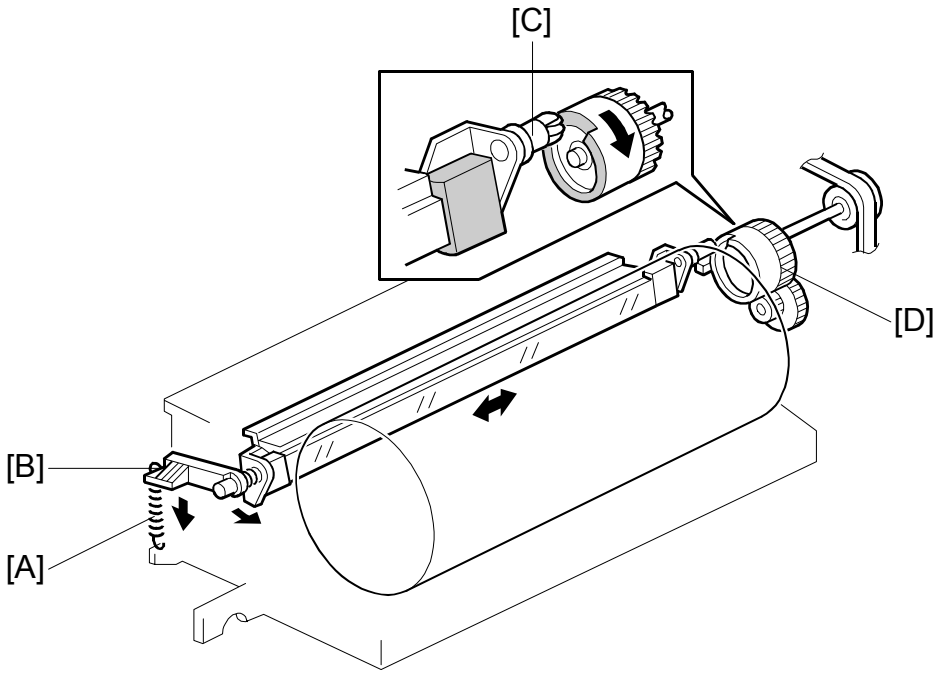
The accumulated toner is deposited on the drum and is removed by the cleaning brush.

Cleaning Unit Drive



Drive from the drum motor is transmitted to the cleaning unit drive gear via the timing belt [A] and the cleaning unit coupling [B]. This coupling drives the cleaning brush [C] directly. The cleaning brush then transmits the drive to the gear at the front, which drives the toner collection coil gear [D].

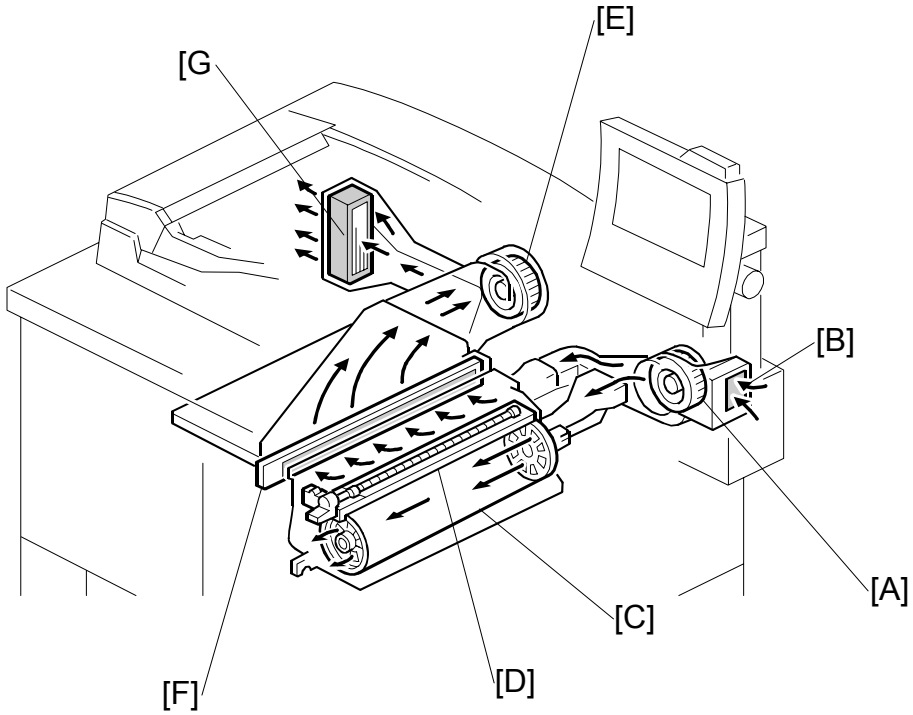
Cleaning Blade Pressure and Side-to-Side Movement



The spring [A] always pushes the cleaning blade against the drum. The cleaning blade pressure can be manually released by pushing up the release lever [B]. To prevent cleaning blade deformation during transportation, the release lever must be locked in the pressure release (upper) position.

The guide roller [C] at the rear end of the cleaning blade holder touches the cam gear [D], which moves the blade from side to side. This movement helps to disperse accumulated toner to prevent early blade edge wear.

6.11.5 AIR FLOW AROUND THE DRUM



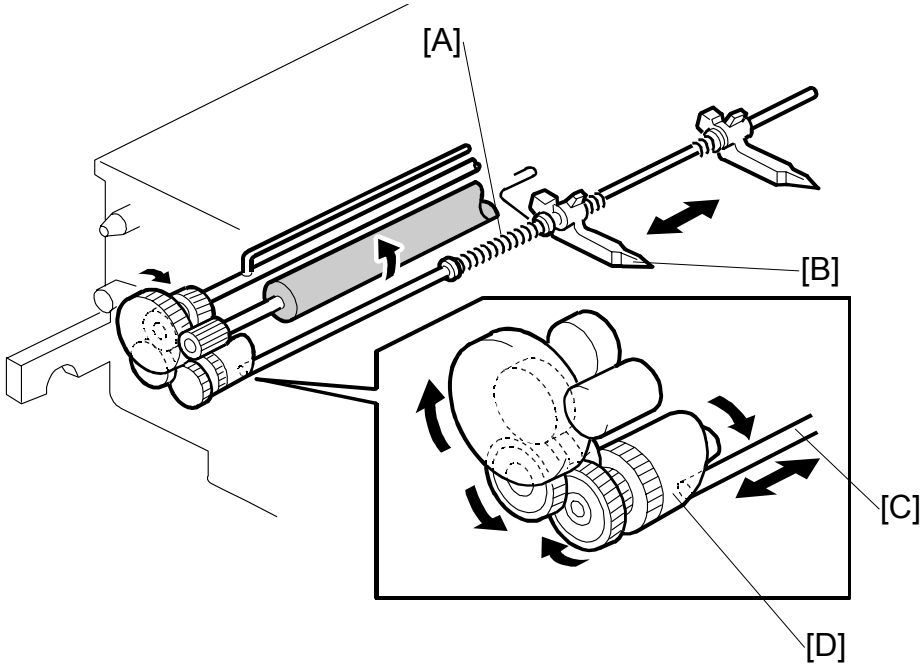
The drum cooling fan [A] draws cool air through the filter [B] and sends it to the center of the drum [C], then over the charge corona unit [D].

Holes in the flanges on both ends of the drum allow air to pass through the drum to cool it. After the air has passed through the center of the drum, the exhaust fan [E] draws the air out of the interior of the machine, through the toner filter [F] to remove free floating toner, through the ozone filter [G] to remove ozone, then finally out of the machine.

To keep the temperature inside the machine constant, the drum cooling fan turns slowly during standby, but turns faster during copying.

NOTE: This ozone filter does not require replacement.

6.11.6 DRUM PICK-OFF PAWLS

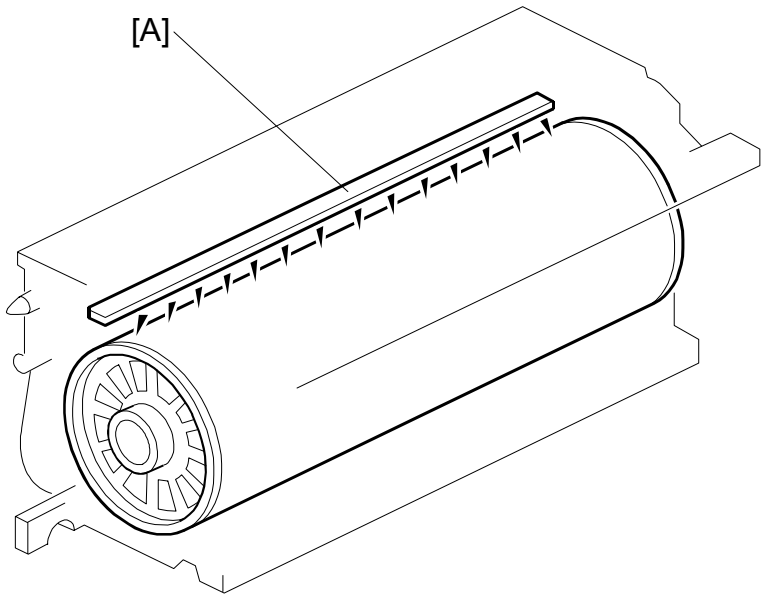


If the paper does not separate from the drum after image transfer, the drum pick-off pawls strip the paper from the drum.

Pressure from small springs [A] press the pick-off pawls [B] against the surface of the drum.

The shaft [C] and the cam [D] move the pick-off pawls from side to side to ensure that they never remain at the same location (this prevents wear on the drum).

6.11.7 DRUM QUENCHING



In preparation for the next copy cycle, light from the quenching lamp [A] neutralizes any charge remaining on the drum.

The quenching lamp consists of an array of 16 red LEDs extending across the full width of the drum.

6.11.8 PROCESS CONTROL

Drum potential gradually changes for the following reasons:

- Dirty optics, exposure glass
- Dirty charge corona casing, grid plate
- Deterioration of drum sensitivity

What Happens at Power On

Here is a description of what happens while the fusing temperature is below 100°C immediately after the main power switch is switched on (process control must also be enabled with SP3901 001, or this will not happen).

At any time, this process can also be executed manually by using SP2962. However, process control must be enabled with SP3901 001 and the fusing temperature must be below 100°C, or this will not work.

1. Drum potential sensor is calibrated.
2. Drum starts first rotation after fusing temperature reaches 100°C.
3. ID sensor is calibrated (Vsg).

⇒ 4. Readout from the drum potential sensor is used to adjust:
   - Grid voltage (Vg)
   - Laser diode (LD) power.

   NOTE: This step occurs only if process control is enabled with SP3901 001 (Auto Process Control On/Off Setting). If this SP is disabled, then:
   - Development bias is set to the value stored in SP2201 1
   - Grid voltage is set to the value stored in SP2001 1
   - Laser power is set to the values stored in SP2103

5. TD sensor is calibrated (Vref).

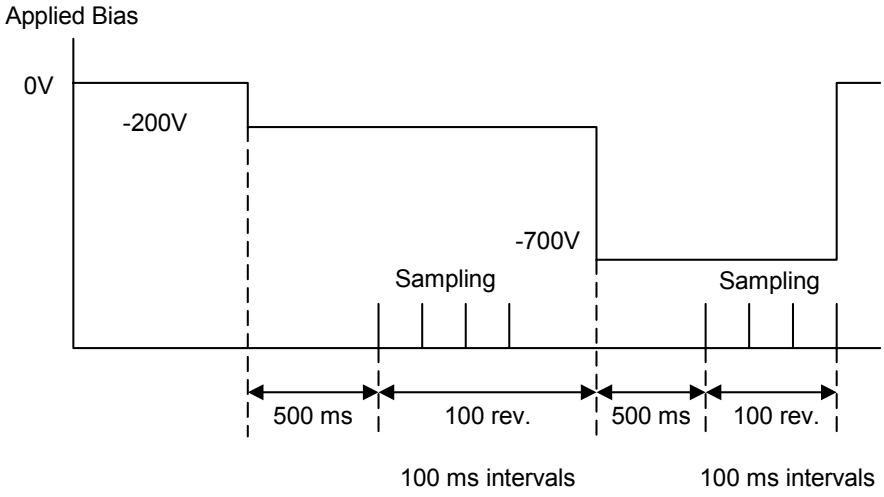
⇒

Any SC codes that are generated during auto process control are logged in the memory and do not appear. The machine will continue to operate.

Drum Potential Sensor Calibration

The drum potential sensor output is affected by the distance of the sensor from the OPC, paper dust or other matter on the surface of the sensor, and environmental conditions. For these reasons, the potential sensor is calibrated often, as described below.

1. 100 samples are taken at –200V and at –700V, and the readings are averaged.



2. If the readings are within the normal range, then these readings are used to calibrate the drum potential sensor.

   If the variations in the readings exceed the specified range, then an SC is logged (Sensor Calibration Error, SC310 to SC312) and automatic process control halts. The charge grid voltage Vg, development bias, and LD power are set as follows.

   - Development bias is set to the value stored in SP2201 1
   - Grid voltage is set to the value stored in SP2001 1
   - Laser power is set to the values stored in SP2103

Grid Voltage (Vg) Adjustment

Then, the machine determines the corona grid voltage (Vg) that will be used during copying. This is done as follows:

1. A Vd pattern is unexposed on the drum and the bias for the unexposed area is adjusted.
2. The drum potential sensor reads the Vd potential.
3. Vd should be –800 ± 20V. If it is within this range, the current value of Vg will be used for copying. If it is not within this range, - (Vd + 800)V is added to Vg, and the process starts again from Step 1.

⇒ **NOTE:** VD Correction - As the development sleeve accumulates toner over time, the gap between VD and VB decreases, which makes it easier for dirty background to occur. To compensate for this, the machine increases the target VD value to -850±20V when the number of copies exceeds the value set with SP3903: VD Correction Counter (default: 200K). As a result, VD increases and the VD-VB gap is maintained

⇒ 4. If Vd cannot be adjusted to this standard within 5 attempts, Vg is set to the value of SP2001-001 (default: –900V) and SC315 (Potential Sensor Calibration Error 3) is logged.

LD Power Adjustment

Finally, the machine determines the laser diode power that will be used during copying. This is done as follows.

1. The laser power is changed to the value needed to write a halftone pattern to the drum.
2. The drum potential sensor reads the potential, Vh, from this pattern.
   Vh: Standard halftone drum potential
3. Vh should be –260 ± 20V. If it is within this range, the current value of the laser power will be used for copying.
   - If it is not, the laser power changes by 5 units, and the process starts again from step 1.
   - The laser power cannot be adjusted within the range –70 to +185.
4. If Vh cannot be adjusted to this standard within 45 attempts, LD power is set to the most recent value and SC316 (Potential Sensor Error 7) is logged.

ID Sensor Calibration (Vsg)

After power-on, Vsg (the ID sensor output from reading the bare drum) is set to 4.00±0.2V by changing the intensity of the light from the sensor shining on the drum. This can also be done at any time with SP3001 002 (ID Initial Setting – Vsg).

⇒

NOTE: If the ID sensor output cannot be adjusted to the standard, then after 20 seconds SC353 or SC354 is issued. Toner supply during copying will then be controlled using the TD sensor only, until the machine is repaired.

TD Sensor Calibration (Vref)

Next, Vref (TD sensor reference voltage) is updated using the latest calibration values from the ID sensor.

Vref is updated to stabilize the concentration of toner in the development unit. By shifting the value of Vref, the density of the ID sensor pattern image is controlled. Toner supply control is covered in the Development and Toner Supply section.

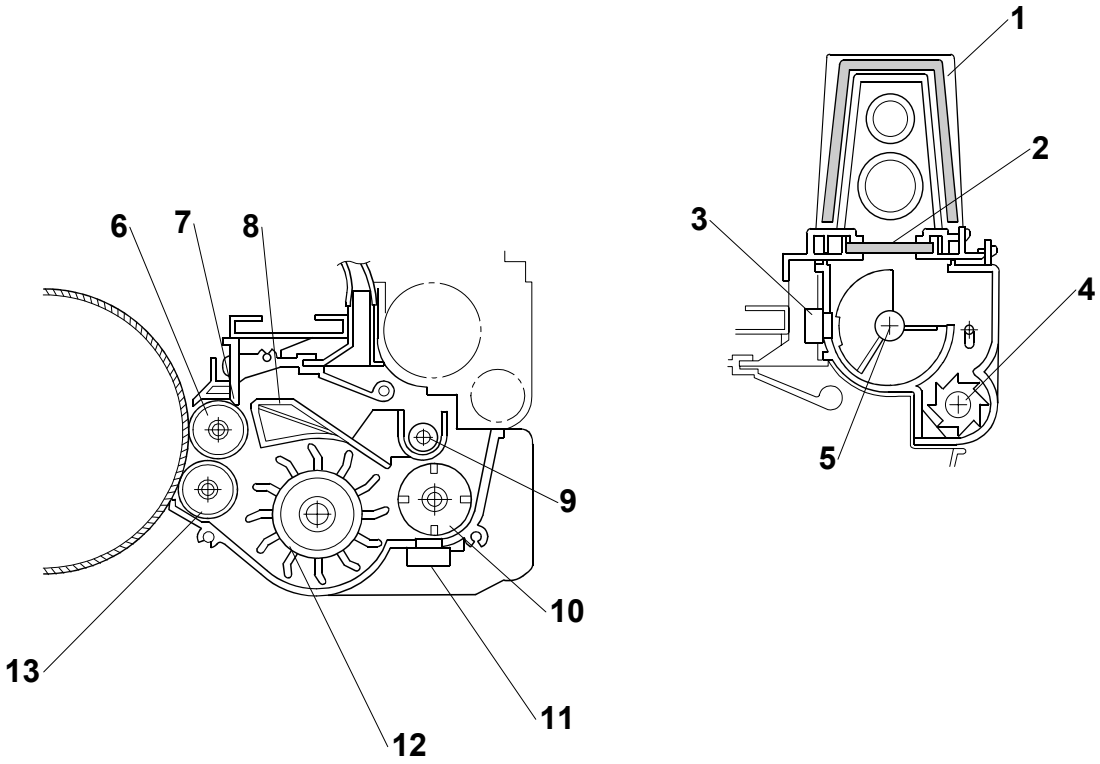
Vref is determined from a table in the machine software, using the following values:

- Vsp/Vsg
  Vsp: ID sensor output when checking the ID sensor pattern.
  Vsg: ID sensor output when checking the bare drum.
- Vref-Vt:
  Vref is the TD sensor reference voltage
  Vt is the current output voltage of the TD sensor.

NOTE: If the ID sensor could not be calibrated during the latest process control (when measuring Vsg), then the previous ID sensor value is used.
If the ID sensor output is abnormal when measuring Vsp, SC350, 351, or 352 is issued, and Vref is not updated (the machine uses the previous value).

6.12 DEVELOPMENT

6.12.1 OVERVIEW



1. Hopper Filter
2. Hopper Center Filter
3. Toner Hopper Sensor
4. Agitator
5. Toner Supply Roller
6. Upper Development Roller
7. Doctor Blade
8. Separator
9. Toner Transport Coil
10. Development Agitator
11. TD Sensor
12. Paddle Roller
13. Lower Development Roller

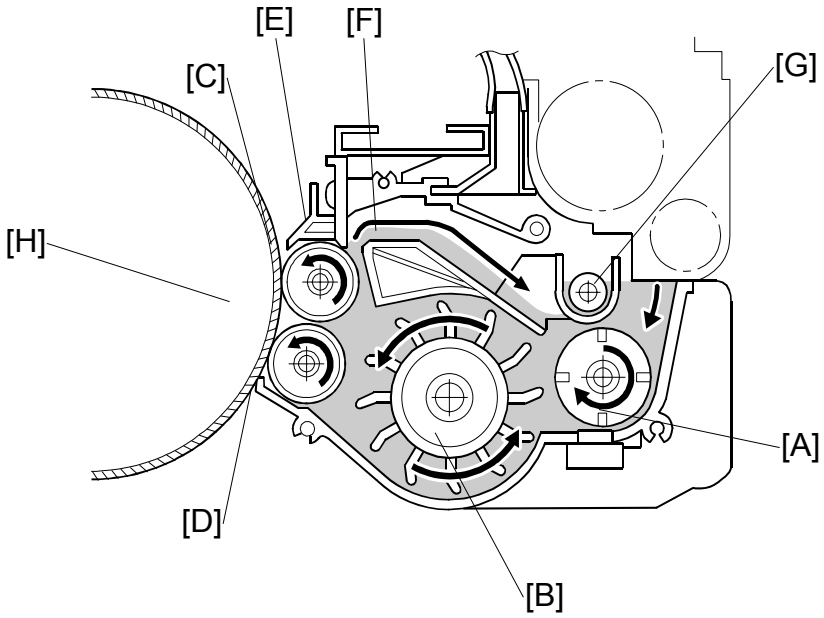
This copier uses a double roller development system and a dual component development process with toner particles 6.8 μm and developer particles 50 μm. To improve image quality, the width of the magnetic area on the lower development roller has been reduced.

This system differs from single roller development systems in that:

- It develops the image in a narrower area
- It develops the image twice
- The relative speed of each development roller against the drum is reduced.

This machine contains a toner recycling system. Toner recycled from the drum cleaning unit is transferred to the toner hopper with fresh toner, where they are mixed by the toner agitator. (☛6.13)

6.12.2 DEVELOPMENT MECHANISM



Toner and developer are mixed in the toner agitator by the cross-mixing roller [A]. The paddle roller [B] picks up the developer and sends it to the upper development roller [C]. Internal permanent magnets in the development rollers attract the developer to the development roller sleeve. Developer from the upper development roller sleeve is also attracted to the lower development roller [D].

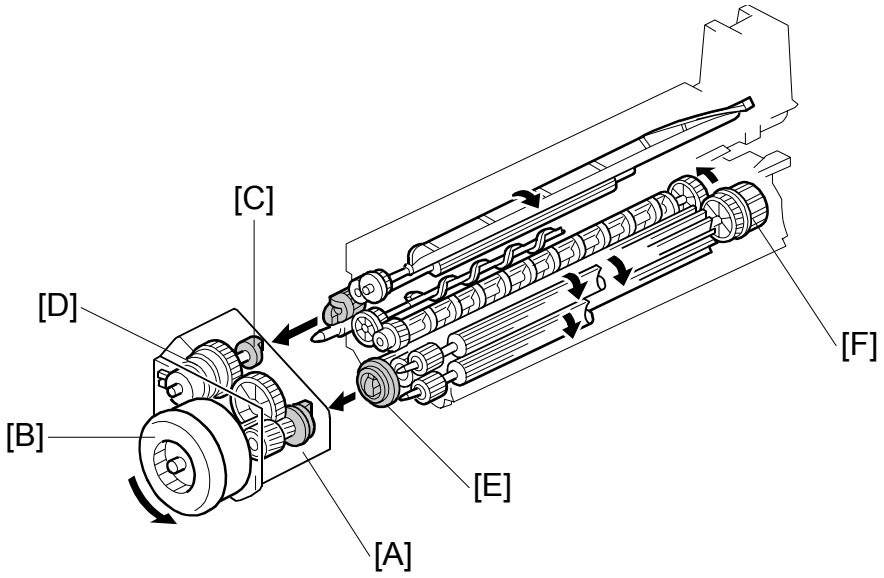
The upper development roller carries the developer past the doctor blade [E] which trims the developer to the desired thickness. Backspill (excess toner) spills over the separator [F] to the toner transport coil [G] which sends the developer from back to front to the cross-mixing roller.

In this machine, black areas of the latent image are at a low negative charge (about –150 V) and white areas are at a high negative charge (about –800 V).

The development roller is given a negative bias to attract negatively charged toner to the black areas of the latent image on the drum.

The development rollers continue to turn, carrying the developer to the drum [H]. When the developer brush contacts the drum surface, the low-negatively charged areas of the drum surface attract and hold the negatively charged toner. In this way, the latent image is developed.

6.12.3 DRIVE

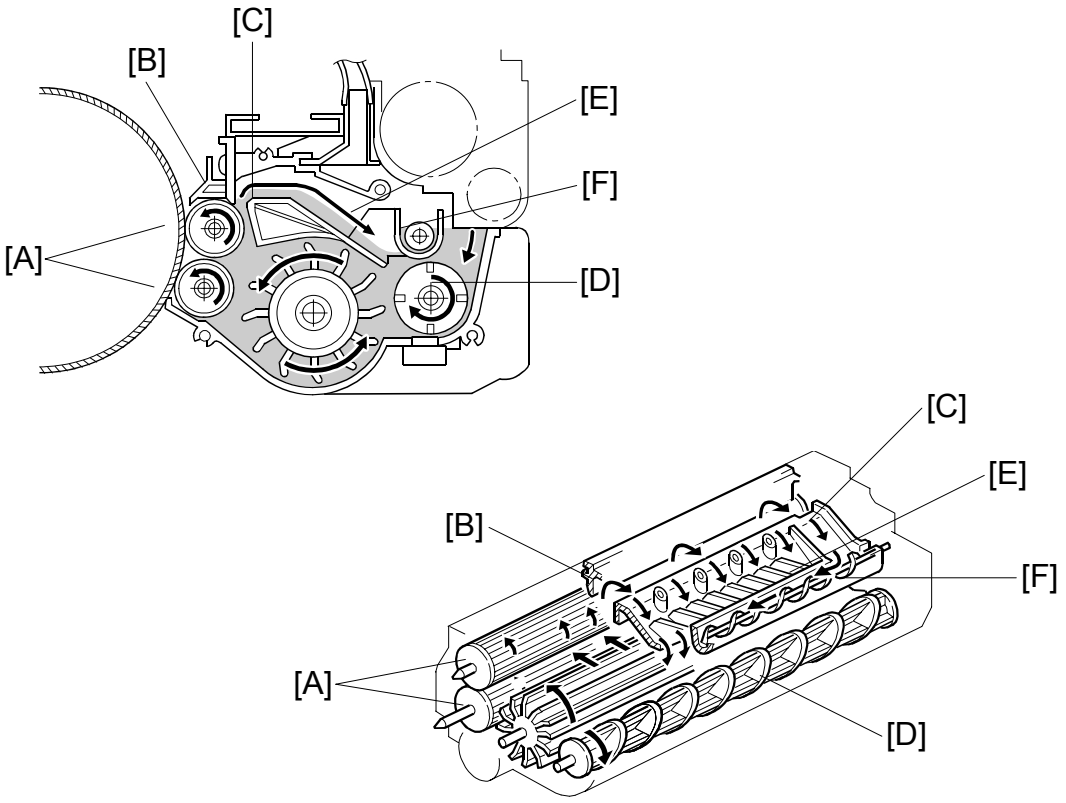


The gears in the development unit are driven by the development drive gear [A] when the development motor [B] (a dc servomotor) turns.

The gears in the toner hopper are driven by the toner supply roller drive gear [C] when the toner supply roller clutch [D] activates.

A one-way clutch on the paddle roller knob [F] prevents counter-clockwise rotation of the paddle roller.

6.12.4 CROSSMIXING

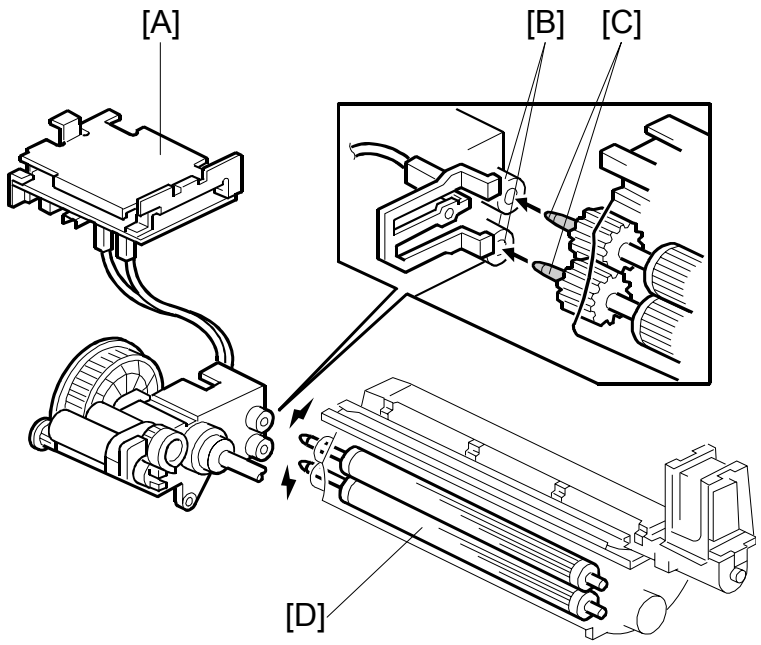


This copier uses a standard cross-mixing mechanism to keep the toner and developer evenly mixed. It also helps agitate the developer to prevent developer clumps from forming and helps create the triboelectric charge.

The developer on the turning development rollers [A] is split into two parts by the doctor blade [B]. The part that stays on the development rollers forms the magnetic brush and develops the latent image on the drum. The part that is trimmed off by the doctor blade goes to the backspill plate [C].

As the developer slides down the backspill plate to the agitator [D], the mixing vanes [E] move it slightly toward the rear of the unit. Part of the developer falls into the auger inlet and is transported to the front of the unit by the auger [F].

6.12.5 DEVELOPMENT BIAS

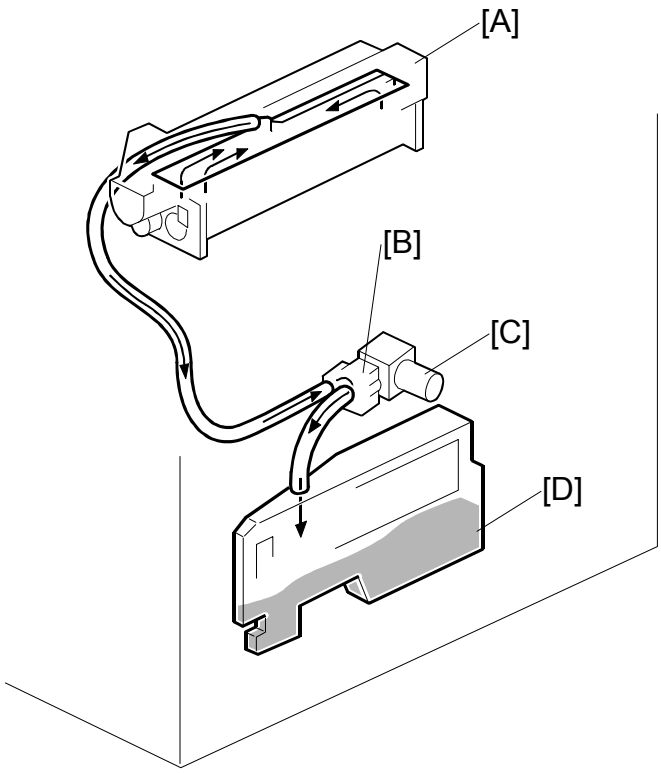


The CBG (Charge Bias Grid) power pack [A] applies the negative development bias (-550V) to both the lower sleeve roller and upper sleeve roller through the receptacles [B] and the sleeve roller shafts [C].

The development bias prevents toner from being attracted to the non-image areas on the drum where there is residual voltage. In addition, the development bias changes with the image density setting chosen for the copy job by the user.

The development rollers [D] employ fixed shafts that do not rotate. This eliminates friction on the shafts so they never require lubrication.

6.12.6 DEVELOPMENT UNIT TONER SUCTION



To ensure that the fine-grained toner does not scatter and blacken the interior of the development unit, a toner suction assembly reduces the pressure inside the development unit.

Below the development unit [A] the toner suction pump [B], driven by the toner suction motor [C], draws air out of the development unit along with any airborne toner. The toner is sent to the development unit waste toner bottle [D] on the right side of the machine.

The toner suction motor switches on and off with the development motor.

The toner suction motor and the waste toner bottle both have near-end and end.

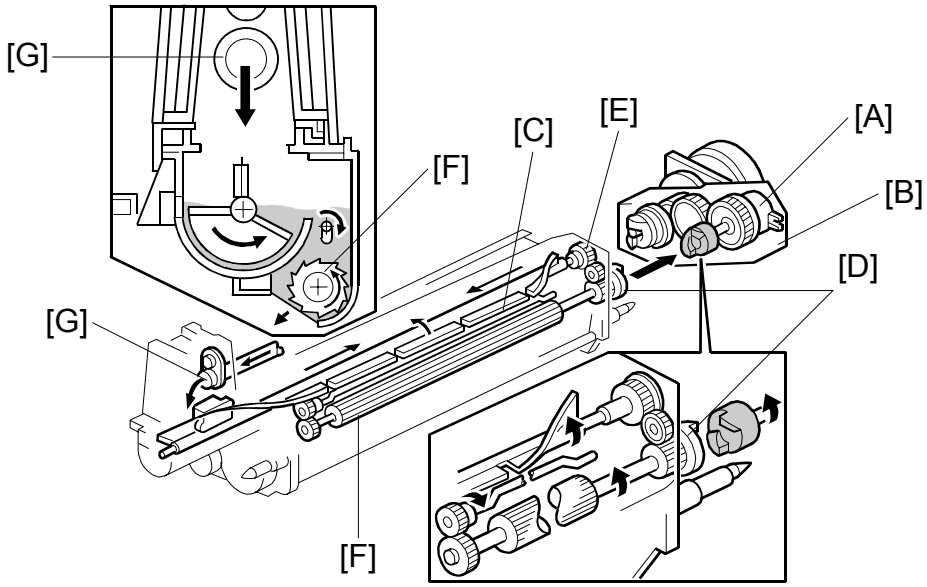
When an end alert is issued for either the development unit waste toner bottle or the toner suction motor, a message is displayed on the copier LCD panel. (See the next page.)

	Near End	End
Toner Waste Collection Bottle [*1]	No Alert	Displays message on screen: `Used toner bottle is full. Please call service.`
Development Unit Toner Waste Collection Bottle	Displays an alert on bottom line of the LCD: `Sucked Toner Collection Bottle is almost full. Call service.`	Displays message on screen: `Sucked Toner Collection Bottle is full. Please call service.`
Development Unit Toner Suction Motor	Displays an alert on bottom line of the LCD: `Toner suction motor replacement is now necessary. Call service.`	**SC593**

[*1]: The toner waste collection bottle on the left side of the machine.

6.12.7 TONER HOPPER

Toner Supply



The toner supply pump motor pumps toner from the toner bottle into the hopper. (☛6.13.3)

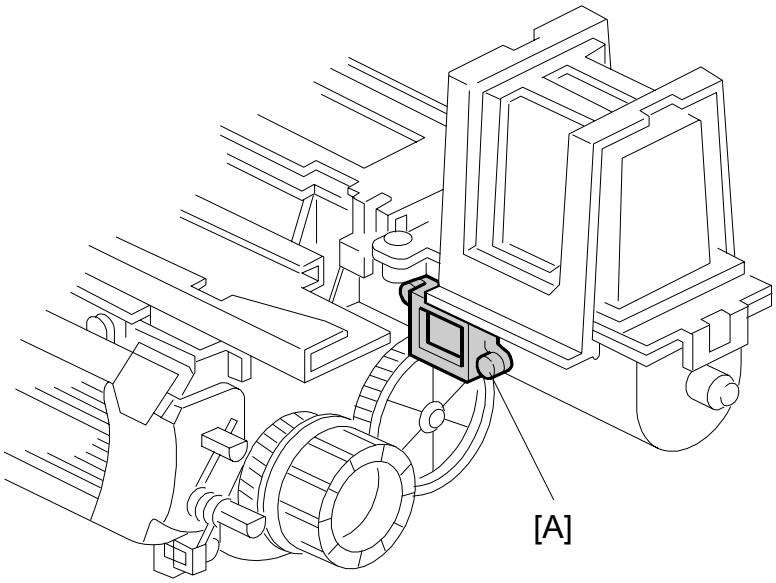
When the toner supply roller clutch [A], inside the development motor unit [B], turns on, the agitator [C] mixes the toner transported by the air tube [G] from the toner bank (the toner from the toner bank is new toner mixed with recycled toner). Then it moves the toner from front to rear and sends it to the toner supply roller.

Toner is caught in the grooves in the toner supply roller [F]. Then, as the grooves turn past the opening, the toner falls into the development unit.

The toner supply roller clutch [A] transfers drive from the development motor to the toner supply roller gear [D], which drives the agitator gear [E].

Toner supply is controlled by the ID sensor and the toner density sensor. (☛6.12.8)

Toner Hopper Empty Detection



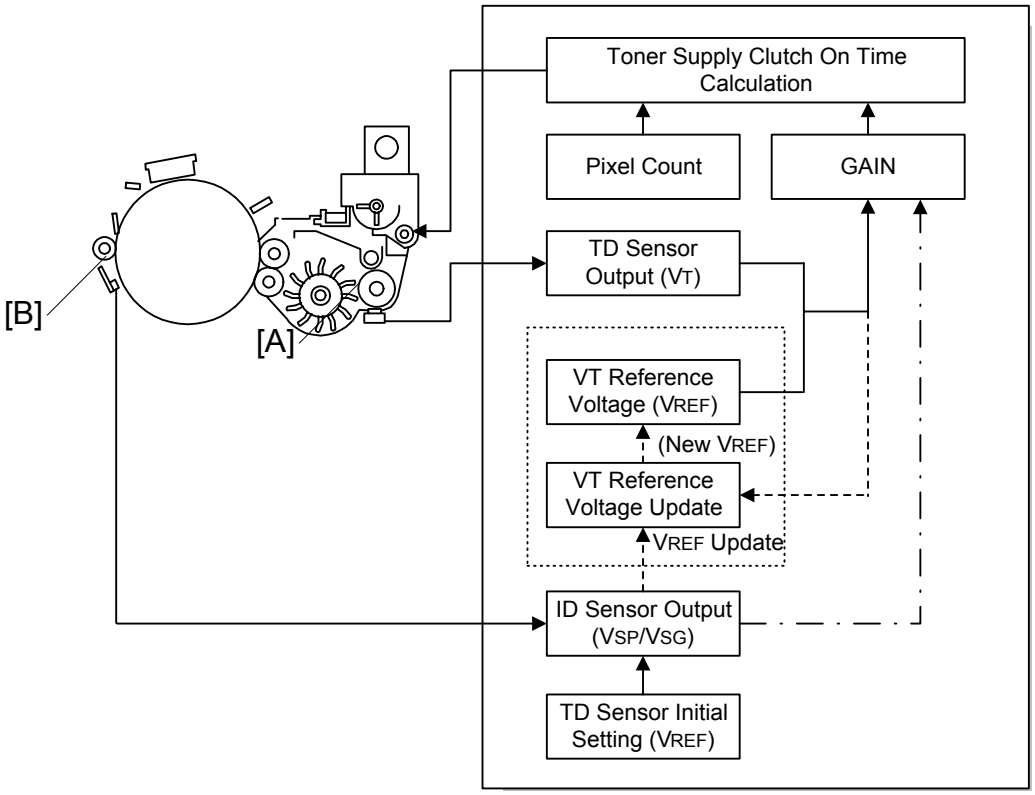
The toner hopper sensor [A] detects whether there is enough toner in the toner hopper.

The toner hopper sensor checks for toner once when the toner supply roller clutch turns on. When there is only a small amount of toner inside the toner hopper and pressure on the toner hopper sensor becomes low, the toner hopper sensor outputs a pulse signal for each copy. Then the toner bank mechanism supplies more toner to the toner hopper, as explained in previous sections.

6.12.8 TONER DENSITY CONTROL

Overview

There are two modes for controlling toner supply: sensor control mode and image pixel count control mode. The mode can be selected with SP2208. The factory setting is sensor control mode. Image pixel count mode should only be used if the TD or ID sensor is defective and cannot be replaced immediately.



Toner Supply Timing

After the trailing edge of the image leaves the development area, the machine calculates how long the toner supply clutch should be switched on (based on the TD sensor reading). Then, the toner supply clutch switches on for the time prescribed by the calculation. Until the toner supply clutch switches off, the development motor, main motor, charge, and development bias all remain on.

Regardless of whether the machine is in the sensor control or pixel count toner supply mode, toner is supplied based on the setting for the toner supply interval entered with SP2974 (Toner Supply Interval); the default is every print.

- If the TD sensor malfunctions, then toner is supplied for each copy and the setting for SP2974 is ignored.
- The SP2974 setting has no effect on the ID sensor pattern interval; the ID sensor pattern interval is set with SP2210 (ID Sensor Pattern Interval)

Sensor Control Mode

In sensor control mode, the machine varies toner supply for each copy to maintain the correct proportion of toner in the developer and to account for changes in drum reflectivity over time. The adjustment depends on two factors.

- Amount of toner needed to print the page (based on the black pixel amount for the page).
- Readings from the TD sensor and ID sensor.

Sensor control mode has two phases, called 'ID sensor control' and 'TD sensor control'. In ID sensor control, V_{SP}/V_{SG} from the most recent ID sensor pattern check determines the GAIN factor in the toner supply calculation (see later in this section). In TD sensor control mode, GAIN depends on the current TD sensor output also ($V_T - V_{REF}$ is used).

The phase that is used depends on the number of copies since the start of the job. See the table below for details.

Number of copies in the job	Copy no.	Control method
10 or fewer	1 to 10	ID Sensor Control
More than 10	From 11	TD Sensor Control

Vref Decision

When new developer is installed, TD sensor initial setting must be done using SP2801. This sets the sensor output to 2.5 ±0.1V. This value is used as the TD sensor reference voltage (V_{REF}). Thereafter, a new reference value for the TD sensor is calculated from the ID sensor output (every time the ID sensor pattern is read) and the current TD sensor reading (Vt).

If the sensor output cannot be adjusted to within the standard, SC341 or SC342 is logged and the toner density control is set to the pixel count control.

V_{SP} and V_{SG} Detection

The ID sensor detects the following voltages.

- V_{SG}: The ID sensor output when checking the drum surface
- V_{SP}: The ID sensor output when checking the ID sensor pattern

In this way, the reflectivity of both the drum and the pattern on the drum are checked.

The ID sensor pattern is made on the drum with the charge corona and laser diode.

VREF Update

To update VREF (the TD sensor reference voltage), VSP/VSG is detected at the end of the copy job, if 10 or more copies have been made since the last VREF update. This compensates for any variations in the reflectivity of the pattern on the drum or the reflectivity of the drum surface. The 10-copy interval can be changed using SP2210.

VREF is also updated during process control initial setting.

If the reading of the ID sensor becomes abnormal while checking the ID sensor pattern, SC350, SC351, or SC352 is logged and the toner density control is done using TD sensor only.

VT Detection

The toner density in the developer is detected once every copy cycle, after the trailing edge of the image passes the development roller.

If the reading from the TD sensor, done for every page in the copy job, becomes abnormal ($Vt \leq 0.5V$ or $Vt \geq 4.0V$), then the machine holds the GAIN factor constant to allow toner supply to vary with only the pixel count for the rest of the copy job. Then at the end of the job, SC340 is generated and the machine must be repaired.

If the TD sensor needs to be replaced and none is available, the toner supply mode can be set to image pixel count mode using SP2208.

Image Pixel Count

For each copy, the CPU adds up the value of each pixel and converts the sum to a value between 0 and 255. (The value would be 255 if the page was all black.)

Gain Determination

GAIN is another factor in the toner supply roller clutch on time calculation. Its value can be 0, 1, 1.5, 2, 3, or 4. It is calculated either using V_{SP}/V_{SG} if ID sensor control is being used, or every copy using "$V_T - V_{REF}$" if TD sensor control is being used (see Sensor Control Mode – Overview for more on TD and ID sensor control).

ID Sensor Control	
V_{SP}/V_{SG}	GAIN
≤ 3/40	0
≤ 9/100	0
≤ 21/200	1
≤ 1/8	1
≤ 4/25	2
≤ 41/200	3
≤ 1/2	4
> 1/2	1

TD Sensor Control	
$a = V_T - V_{REF}$	GAIN
$a < 0.00$	0
$0.00 \leq a < 0.06$	1
$0.06 \leq a < 0.10$	2
$0.10 \leq a < 0.20$	3
$0.20 \leq a$	4

Toner Supply Roller Clutch On Time Calculation

The toner supply roller clutch on time for each copy is decided using the following formula: (GAIN x Image pixel count x 0.7mg/cm^2/Toner Supply Rate) + 50 ms

When GAIN is "0", the above 50 ms is set to "0".

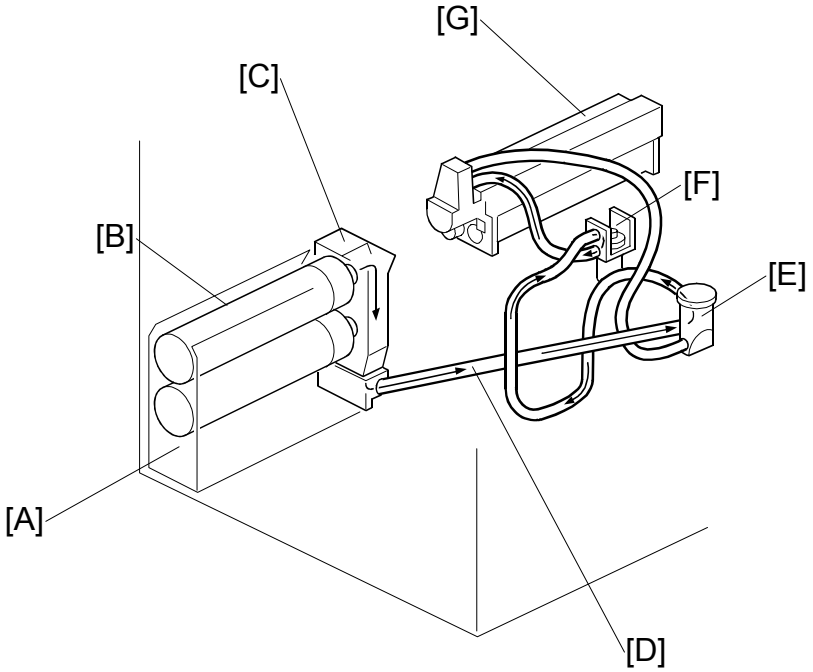
The toner supply rate can be changed using SP2209.

Image Pixel Count Control

This mode should only be use as a temporary countermeasure while waiting for replacement parts, such as a TD sensor. This mode controls the toner supply using the same formula for the toner supply roller clutch on time. However, the GAIN value is fixed at 0.7.

6.13 TONER SUPPLY AND RECYCLING

6.13.1 OVERVIEW



Toner is supplied from a toner bank [A] on the left side of the machine and separated from the development unit. The toner bank holds two bottles, but only one bottle operates at a time.

A toner bottle motor turns the bottle [B], causing toner to leave the bottle and drop into the toner entrance tank [C].

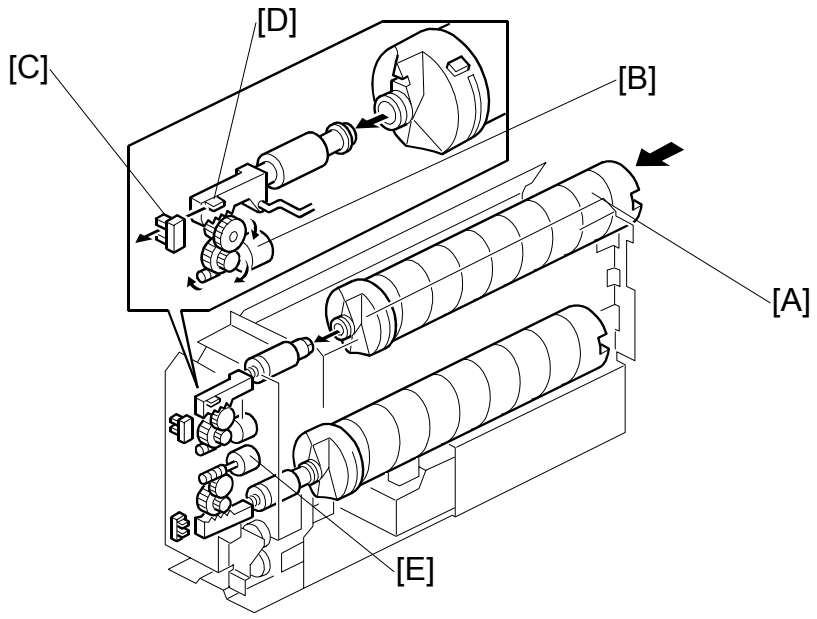
The toner transport coil in the toner transport tube [D] transports toner to the toner supply cylinder [E]. Due to the length of the toner supply path, a toner supply pump [F] is needed to draw the toner into the toner hopper [G].

Here are some important points to remember about the toner bank:

- The toner bank holds two toner bottles. This doubles the toner supply capacity for the machine and allows replacement of an empty toner bottle while the machine is operating.
- The machine works even if there is only one bottle installed.
- Toner can be supplied from either the upper or lower toner bottle, but not from both at the same time. When toner runs out in one bottle, toner supply from the other bottle starts automatically.
- After the toner near-end message is displayed for both toner bottles, the toner bottle still has enough toner for about 200 copies.
- Load the lower toner bottle first, then the upper toner bottle. If the upper toner bottle is loaded first, a message will be displayed on the operation panel to request loading the lower toner bottle.
- Handle the toner bottles carefully to avoid shaking them.

6.13.2 TONER BANK

Toner Bottle Switching Mechanism

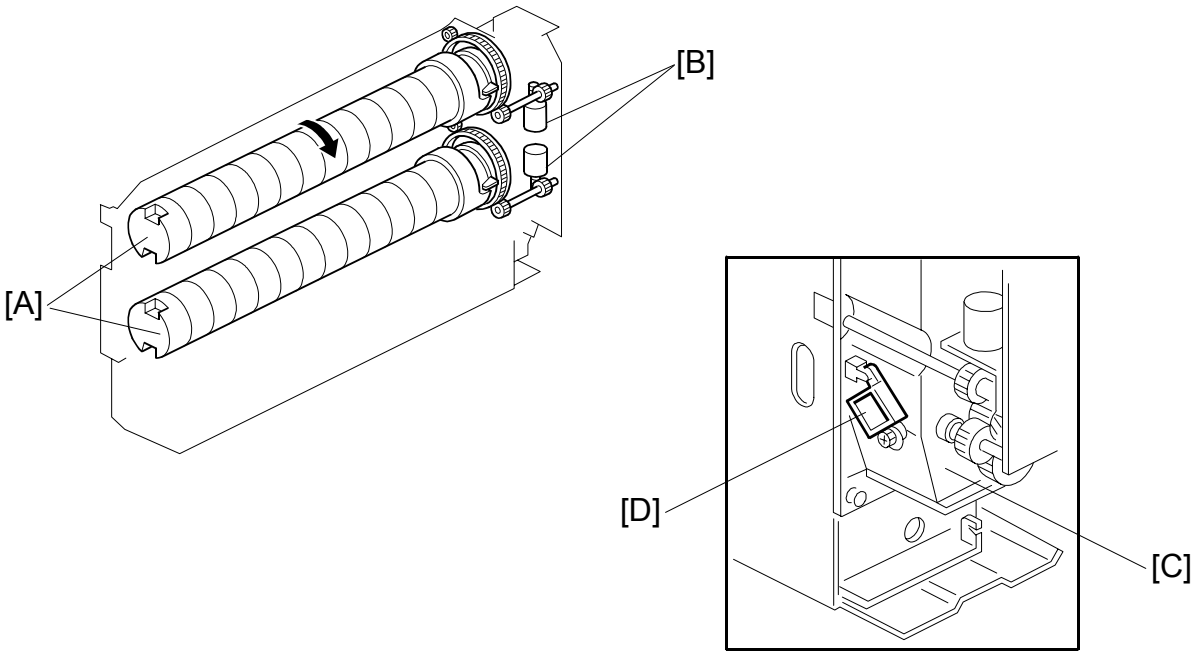


When the upper toner bottle [A] is supplying toner, the upper bottle cap motor [B] pulls out the toner bottle cap. The upper bottle cap sensor [C] detects the actuator [D] of the toner bottle opening rod, then the motor shuts off to close the cap again.

Toner is supplied from the toner bottle to the toner entrance tank where a toner near end sensor (see the next page) checks for the presence of toner in the toner entrance tank.

When the toner near-end sensor (not shown) can no longer detect any toner, it signals the machine that it is time to switch bottles. The upper bottle cap motor switches on and closes the cap of the top bottle, while the lower bottle cap motor [E] switches on and opens the cap of the lower bottle so it can start supplying toner.

Toner Near-end, Toner End, Bottle Replacement



Each toner bottle [A] has an independent toner bottle motor [B]. An empty toner bottle can be replaced during printing.

The toner near-end sensor detects toner as it falls from the toner bottle into the toner entrance tank [C]. If the toner near end sensor [D] detects that no toner has come out of the toner bottle, the toner bottle enters the toner near-end condition.

The toner bottle motor then rotates the toner bottle up to 20 times to try to supply toner to the toner entrance tank. If the sensor detects toner more than 5 times, the near-end condition is cleared. However, if the toner near end sensor fails to detect toner 5 consecutive times, 200 more copies can be made from that bottle, then the machine declares it to be empty.

When the bottle is empty, the machine switches to the second toner bottle. The first toner bottle cap motor closes the bottle cap and the second toner bottle cap motor pulls out the second bottle cap. The motors operate until the first bottle inner cap sensor does not detect the actuator and the second bottle inner cap sensor does detect the actuator.

The second toner bottle is then rotated up to 15 times. If the near-end sensor detects toner after 5 times, the machine can print from that bottle.

Meanwhile, the machine indicates that the first bottle is empty. When the user takes out the old bottle, and puts in a new one, this is detected by the toner bottle sensor. (☛"Toner Bottle Sensors", 6-87) However, this bottle is not tested until the second bottle is empty.

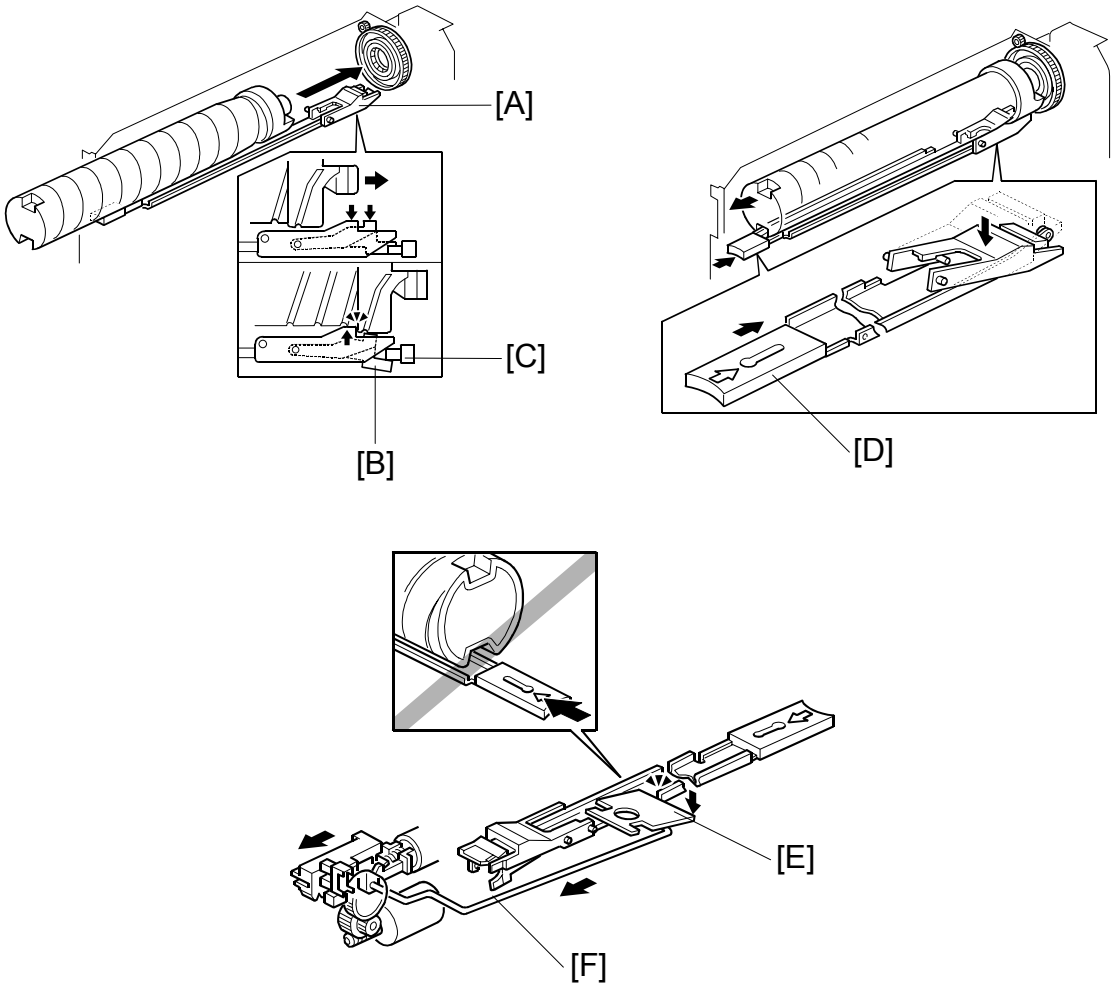
NOTE: If an empty bottle is not replaced, and the other bottle becomes empty (no toner detected 10 consecutive times, as described above), 200 more copies can be made. Then the machine enters the system toner end condition (both bottles are empty), and this is indicated in the operation panel display.

When the second bottle is empty, the machine switches back to the first bottle.

The first bottle is tested now, by rotating it 15 times as usual. If this bottle is also found to be empty, the machine enters the system toner end condition. This time, the machine cannot print until one of the toner bottle sensors detects that a new toner bottle has been inserted (the machine does not allow the 200 extra copies).

When both bottles are empty and a new toner bottle is placed in the toner bank, the new toner bottle is rotated 15 times to supply toner to the toner entrance tank. If the toner near end sensor then detects toner in the toner entrance tank, the system toner end condition is cleared. If the toner near end sensor detects there is still no toner in the toner entrance tank, the bottle cap motor closes the toner bottle cap. The system toner end condition continues and printing is not possible.

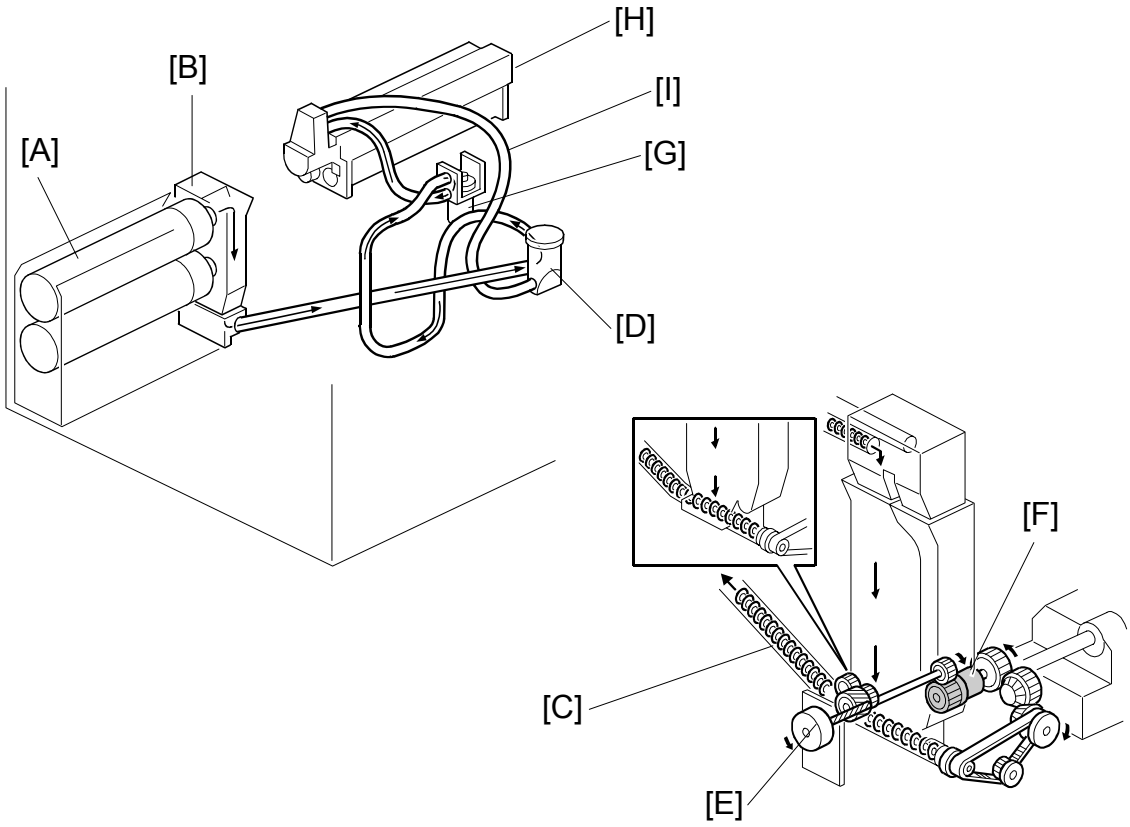
Toner Bottle Sensors



When placing a toner bottle in the toner bank, the toner bottle pushes the lock arm [A] downwards. Then the lock arm catches the toner bottle and also pushes down lever [B]. This causes toner bottle sensor [C] to detect that a bottle has been installed (the actuator leaves the toner bottle sensor while the bottle is being inserted in the holder).

When replacing a toner bottle, push the toner bottle release lever [D] to release the lock mechanism. While a toner bottle is supplying toner, the toner bottle opening rod is pulled to the rear and the lock plate [E] is lowered by the link [F] so that the toner bottle release lever cannot be pushed. Therefore, the toner bottle that is supplying toner is always locked in place, and the user cannot pull out the bottle until it is empty.

6.13.3 SUPPLYING TONER TO THE DEVELOPMENT UNIT



The toner bottle motor turns the toner bottle [A], causing toner to leave the bottle and drop into the toner entrance tank [B].

NOTE: Recycled toner in the tube from the drum cleaning unit also enters the toner entrance tank, and is mixed with fresh toner from the toner bottle.

The toner transport coil [C] in the toner transport tube transports toner to the toner supply cylinder [D]. The toner bank motor [E] drives the toner transport coil via the toner supply coil clutch [F].

The toner supply pump motor [G] creates the suction needed to draw the toner from the toner supply and send it to the toner hopper [H].

The toner hopper has two air pressure release filters and an air return tube [I] connected to the toner supply cylinder. Air returns to the toner supply cylinder from the toner hopper through the air return tube.

If the toner hopper sensor (☛6.12.7) detects an insufficient amount of toner in the hopper, the toner bank mechanism is started up.

If there is sufficient toner in the toner entrance tank (detected by the toner near end sensor in the toner bank), the toner supply coil clutch turns on for 2 seconds. The toner supply pump motor turns on for 7 seconds at the same time as the toner supply coil clutch.

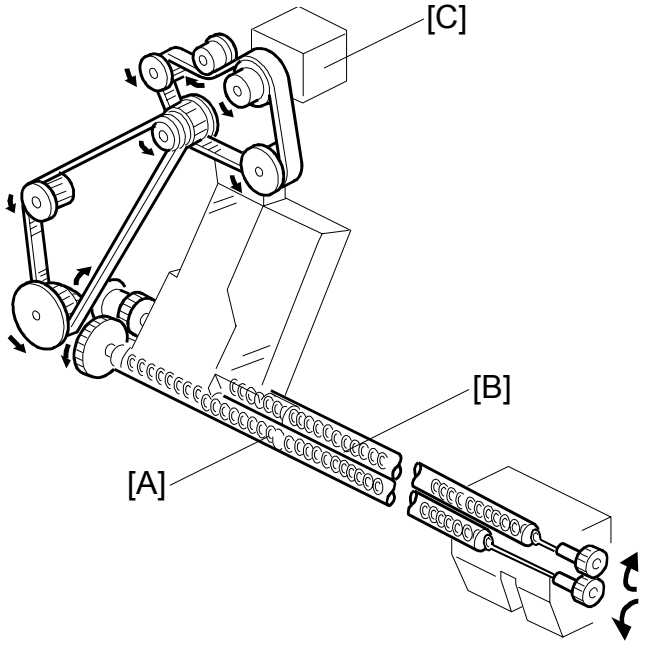
Next, if the toner hopper sensor still does not detect toner, the toner supply coil clutch turns on for 2 seconds again until the toner hopper sensor detects toner (this is done a maximum of 10 times). When the toner hopper sensor detects toner, the toner supply pump motor turns off 1 second after the toner supply coil clutch turns off.

If the toner hopper sensor does not detect toner in the toner hopper after the toner supply coil clutch has turned on 10 times, the operation panel returns SC495 (Toner Bank Error).

The toner supply pump motor sensor (mounted on the toner supply pump motor) monitors the operation of the pump motor. If the sensor detects that the motor does not rotate during the toner supply process, the operation panel returns SC591 (Toner Supply Motor Lock) and the job halts.

6.13.4 TONER RECYCLING AND WASTE TONER COLLECTION

Overview

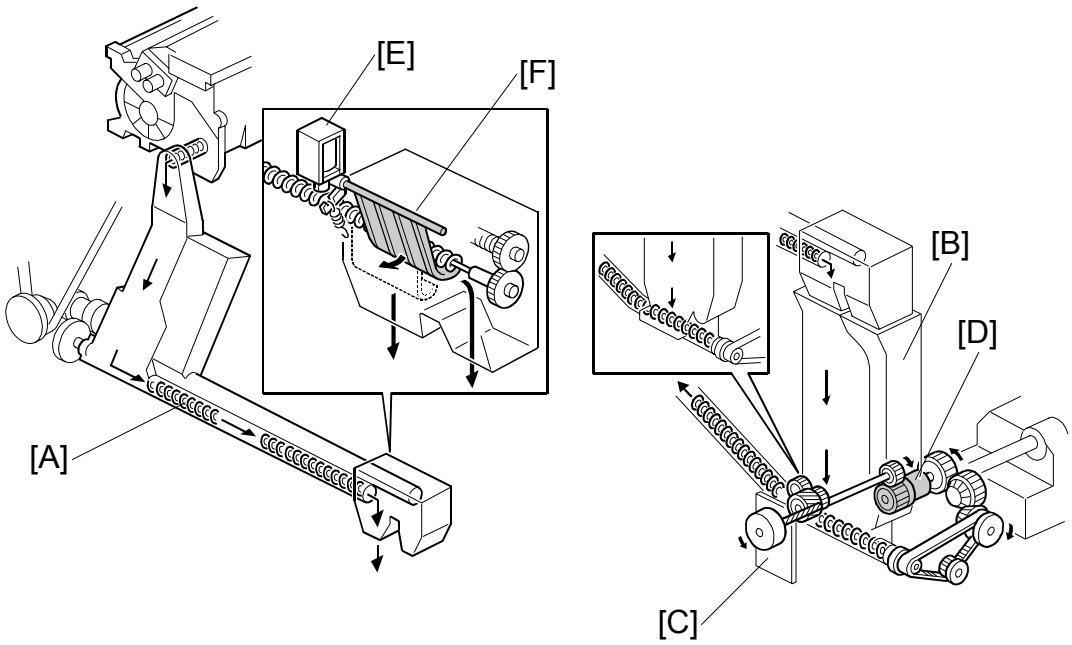


To recycle used toner for re-use, the toner recycling coil in the tube [A] transports the toner collected by the drum cleaning to the toner entrance tank for recycling.

To collect waste toner that will no longer be used, the toner collection coil in the tube [B] transports the toner collected by the transfer belt unit to the waste toner collection bottle.

The drum motor [C] drives the toner recycling coil [A] via timing belts and gears, whose rotation in return drives the toner collection coil [B] via gears.

Toner Recycling



The toner recycling coil in the tube [A] transports the toner collected by the drum cleaning unit to the toner entrance tank [B] for recycling. This toner is dropped into the toner entrance tank and mixed with fresh toner from the toner bottle. The toner bank motor [C] drives the toner transport coil via the toner supply coil clutch [D].

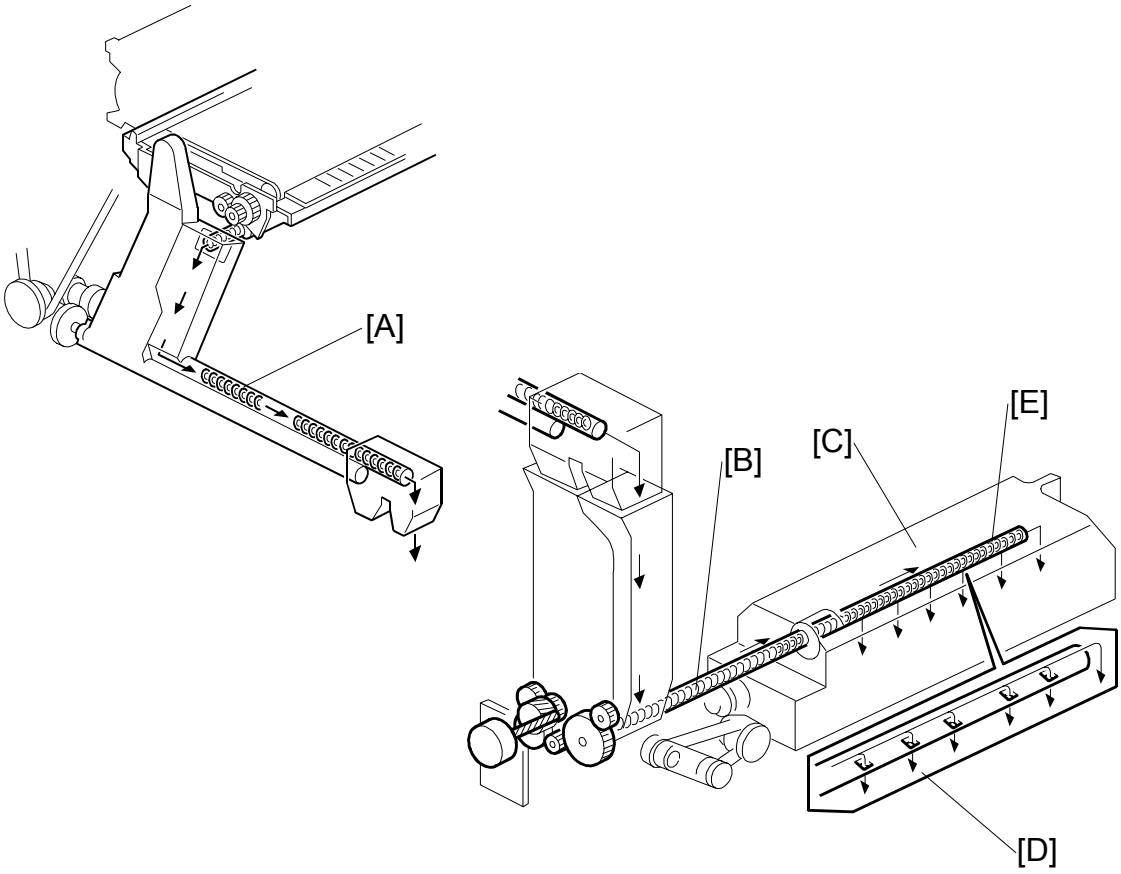
The new toner separation shutter mechanism (toner recycling shutter solenoid [E] and shutter [F]) reduces the amount of paper dust in the toner. During recycling, paper dust gradually collects in the toner, which can cause black dots to appear on copies. At the prescribed interval, the toner separation mechanism purges all toner from the toner supply system and replaces it with new toner, as described below.

Normally during toner recycling, the toner recycling shutter solenoid remains on and the shutter remains open, but when the number of copies exceeds 200K, the toner recycling shutter solenoid switches off and the shutter closes.

After the solenoid switches off, no toner recycling is done for the next 25K copies, and all used toner is sent to the waste toner collection bottle without recycling. Toner from the toner hopper takes about 20K copies to pass through the recycling path cleaning and collection tubes, so during the 25K copies after the solenoid switches off, all the toner in the toner supply path is purged from the system and replaced with fresh toner.

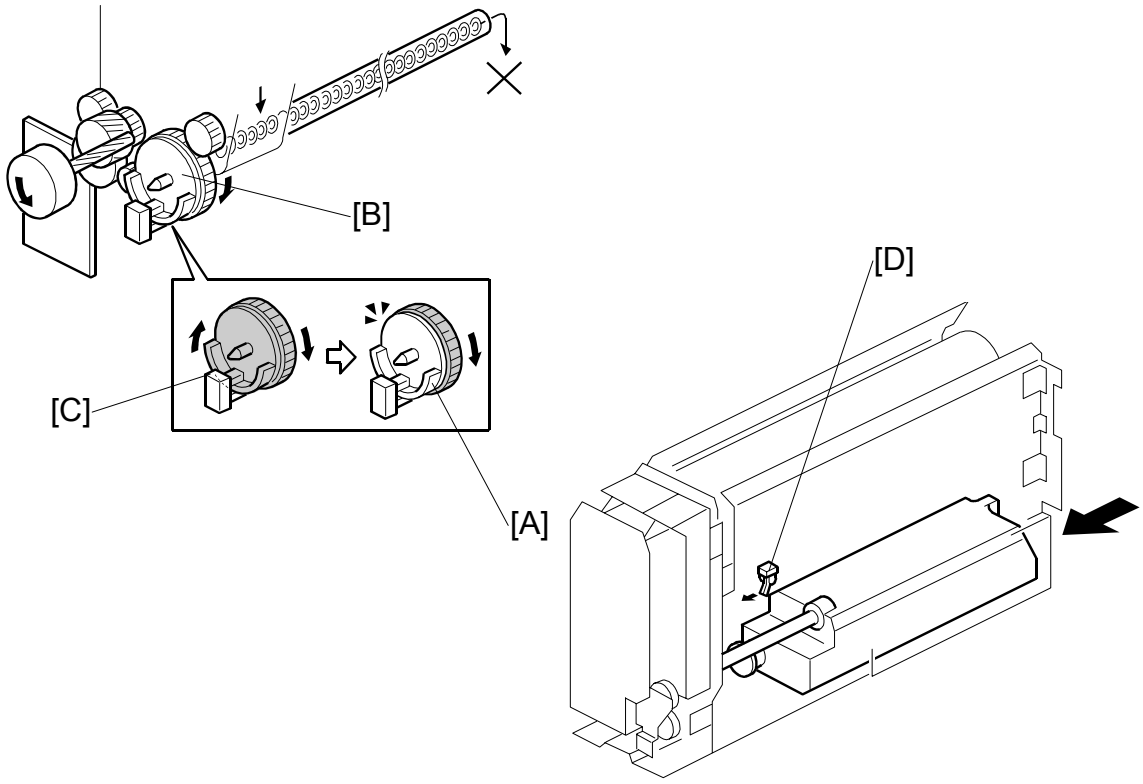
NOTE: The timing of this operation can be adjusted with SP2975 001, 002 (Toner Recycle Cut Counter – ON Counter/OFF Counter). SP2975 001 determines how often the toner is purged (default: 200k), and SP2975 002 determines how long the purge is done for (default: 25k copies)

Waste Toner Collection



The toner collection coil in the tube [A] transports the toner collected by the transfer belt unit to the waste toner collection bottle. This toner contains paper dust and cannot be recycled.

The waste toner coil [B] transports the waste toner dropped from the toner collection coil tube to the waste toner collection bottle [C]. The waste toner coil tube has five holes [D] and the end [E] of the tube is open. The waste toner drops from these holes.



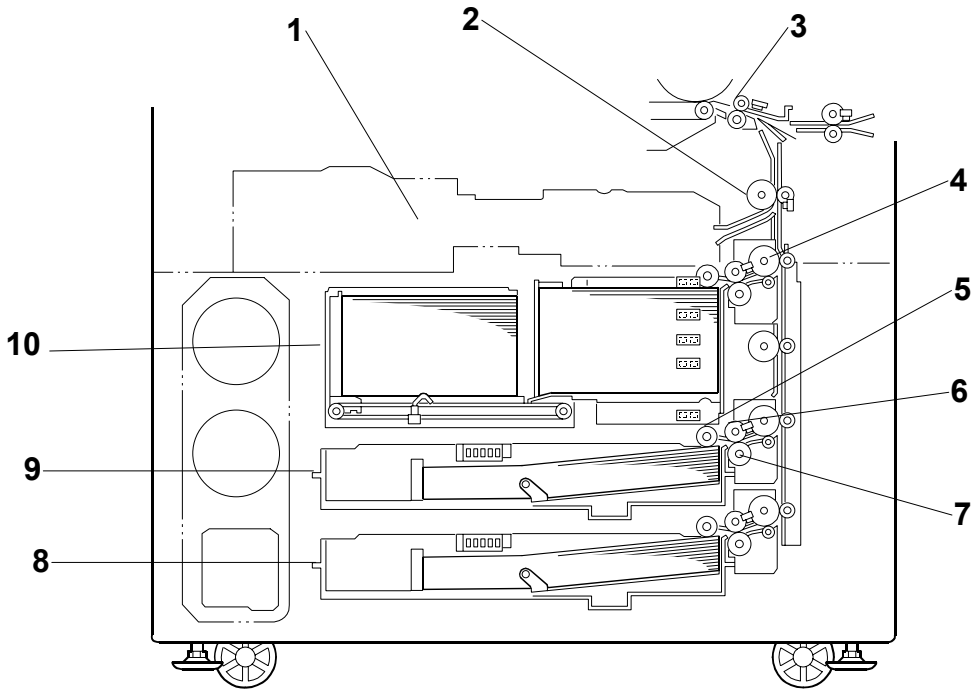
When the waste toner collection bottle fills up, the pressure in the bottle increases and the waste toner coil becomes harder to turn. When this occurs, the actuator plate [A] does not rotate because the waste toner coil drive gear [B] has a torque limiter, and the output of the toner overflow sensor [C] becomes constant. In this condition, the operation panel LCD indicates “Waste Toner Full” and printing is stops.

The bottle contains 1,300 g to 1,500 g of waste toner. About 2,400K copies can be made before the waste toner bottle becomes full.

If the waste toner bottle is not properly installed inside the toner bank, the toner collection bottle sensor [D] detects this condition and the operation panel LCD displays SC496 (Toner Collection Bottle Error).

6.14 PAPER FEED

6.14.1 OVERVIEW



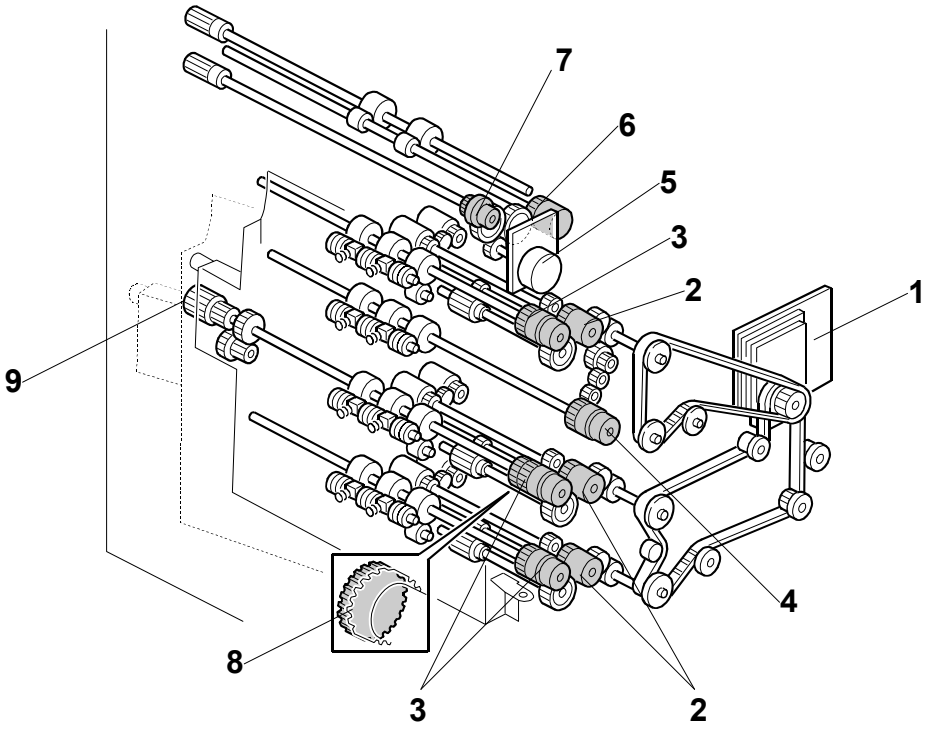
1. Duplex Tray
2. Relay Roller
3. Upper Registration Roller
4. Grip Roller
5. Pick-up Roller
6. Feed Roller
7. Separation Roller
8. 3rd Tray (Universal)
9. 2nd Tray (Universal)
10. 1st Tray (Tandem)

This model has three paper tray feed stations. The 1st tray (10), the tandem feed tray, holds 2,000 sheets of paper (1,000 sheets x 2 stacks). The tandem tray also be can be converted to a 1,000-sheet tray for larger paper sizes with the optional A3/DLT Feed Kit B331.

The 2nd tray (9) and 3rd trays (8) are universal trays and each can hold 500 sheets of paper. To allow easy removal, the paper cassettes are not fastened to the trays with screws.

All feed stations use an FRR feed system. Rotation of the pick-up roller (5) drives the top sheet of paper to the feed (6) and separation (7) rollers. These rollers then take over the paper drive. If the pick-up roller feeds more than one sheet, the separation rollers rotate in the opposite direction and prevent all but the top sheet from passing through to the registration rollers. The large grip rollers (4) feed paper from the trays in the vertical paper path.

6.14.2 DRIVE



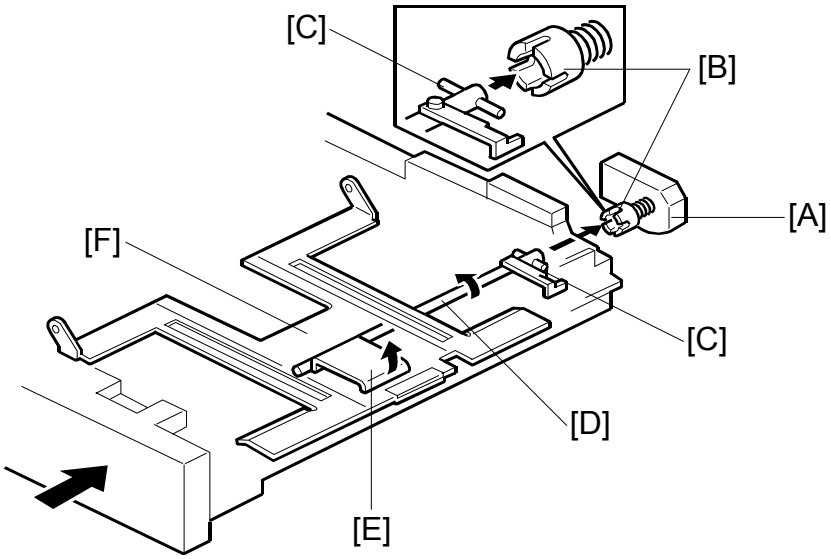
1. Paper Feed Motor
2. Paper Feed Clutches 1 to 3
3. Vertical Transport Clutches 1 to 3
4. Lower Relay Clutch
5. Relay Motor
6. Upper Relay Clutch
7. LCT Relay Clutch
8. One-way Gear
9. Knob

The paper feed motor (1) drives feed, pick-up, and separation rollers in trays 1, 2, and 3 via timing belts, clutches (2), and gears. The paper feed motor also drives the vertical transport rollers and the lower relay roller. Drive is transferred to each of the three vertical transport rollers by a vertical transport clutch (3), and to the lower relay roller by the lower relay clutch (4).

The relay motor (5) drives the upper relay roller and LCT relay roller via gears and clutches (6) and (7).

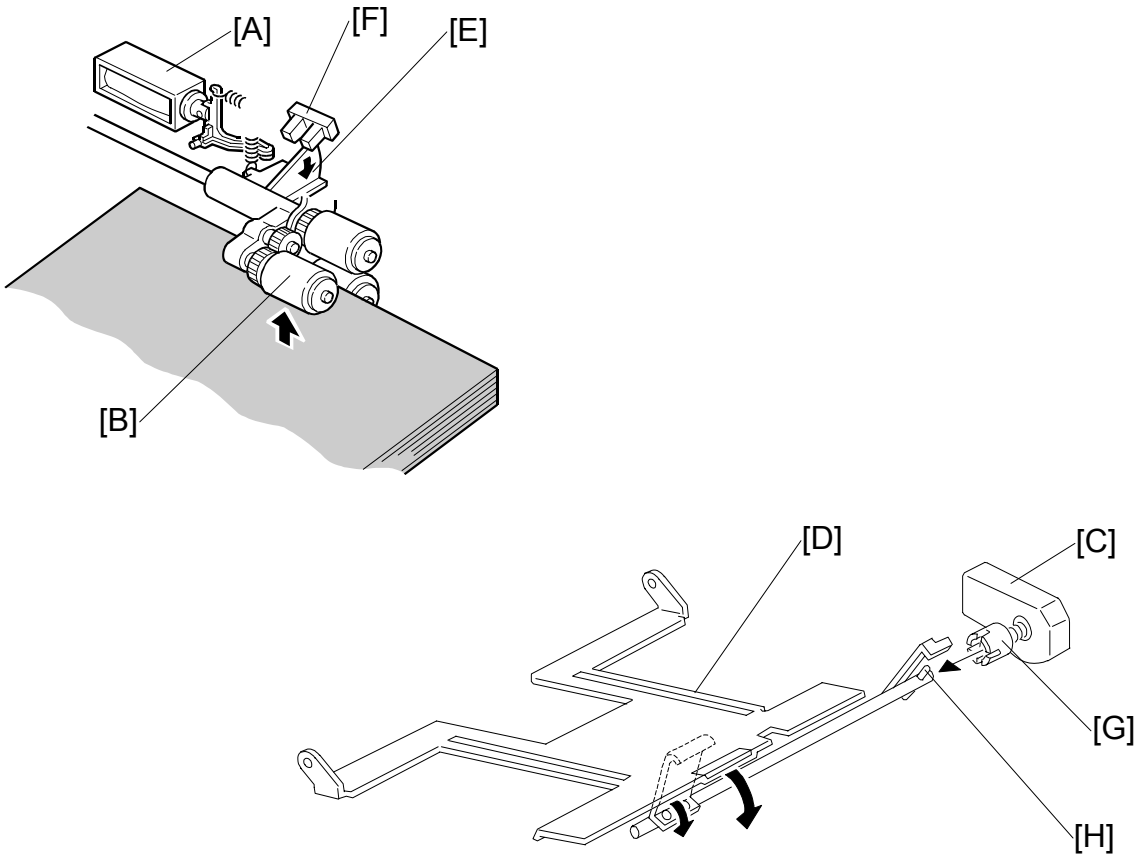
The 2nd vertical transport clutch has a one-way-gear (8). This prevents the clutch from slipping when the knob (9) is turned to remove jammed paper in the paper feed tray and vertical transport area.

6.14.3 PAPER LIFT – TRAYS 2 & 3



The machine detects when a tray has been placed in the machine by a signal from the paper size switch. When this is detected, the tray lift motor [A] turns on. The coupling gear [B] on the tray lift motor engages the pin [C] on the lift arm shaft [D], then it turns the tray lift arm [E] to lift the tray bottom plate [F].

For tray 1, an electrical signal from the tray connector automatically informs the cpu when the tray has been placed in the machine.



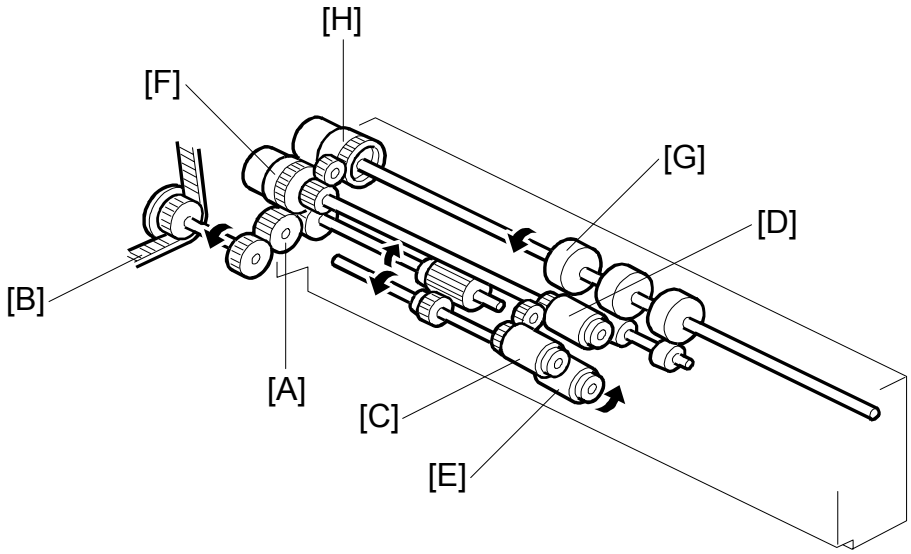
When a stack of paper is loaded in the tray, the paper end sensor below the stack (not shown) activates and switches on the pick-up solenoid [A] to lower the pick-up roller [B]. At the same time, the tray lift motor [C] switches on and lifts the bottom plate [D]. This plate pushes the top of the stack up against the pick-up roller until the actuator [E] descends and leaves the tray lift sensor [F] slot. This de-activates the tray lift sensor; the tray is now at the correct feed position so the machine switches off the tray lift motor.

The pick-up roller descends gradually with each sheet fed, so the tray lift sensor actuator ascends until it activates the tray lift sensor. This signals the machine to switch on the tray lift motor to raise the stack to the correct feed height. The tray lift sensor again deactivates to switch off the tray lift motor. This process is repeated to position the top of the stack at the correct feed height.

When the tray is drawn out of the feed unit, the lift motor coupling gear [G] disengages the pin [H] of the lift arm shaft, then the tray bottom plate drops under its own weight.

6.14.4 PICK-UP AND FEED – TRAYS 1, 2, 3

Overview

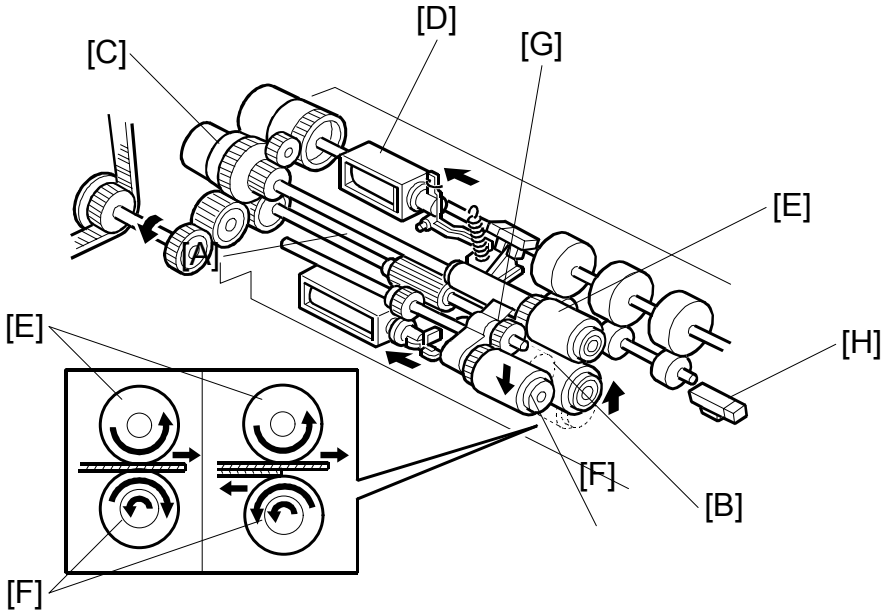


Drive from the paper feed motor is transmitted to the gear [A] in the paper feed unit via the timing belt [B].

Then the gear [A] transmits this drive to the pick-up [C], paper feed [D] and separation [E] rollers via gears and the paper feed clutch [F].

The gear [A] also transmits this drive to the vertical transport roller [G] via gears and the vertical transport clutch [H].

Pick-up and Feed



If a paper feed station is not selected, its separation roller solenoid [A] de-activates and the separation roller [B] can turn freely in the opposite direction to paper feed.

When the paper feed station is selected and the start key is pressed, the feed clutch [C], separation roller solenoid [A], and the pick-up solenoid [D] all turn on.

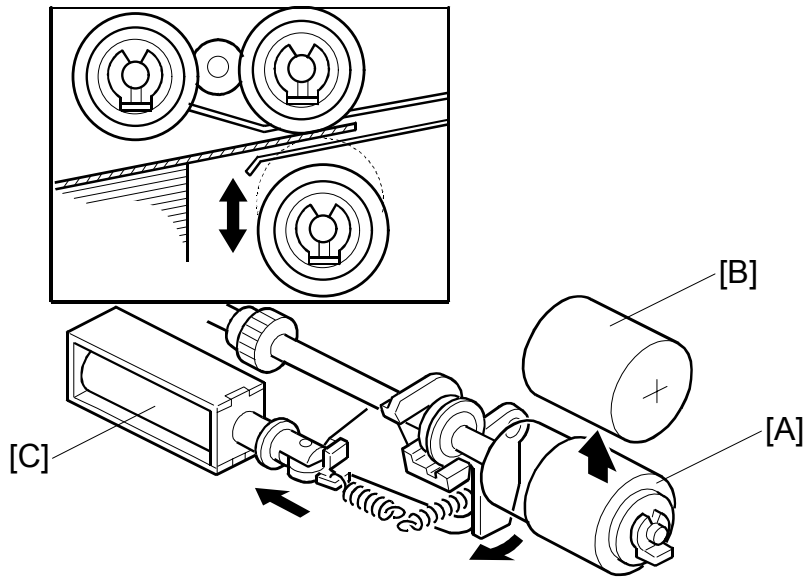
When the feed clutch [C] activates to transfer drive to the feed roller [E], the pick-up roller [F] also turns because it is linked to the feed roller by an idle gear [G].

When the separation roller solenoid [A] turns on, the separation roller [B] contacts the paper feed roller [E] and turns with the feed roller in spite of the torque limiter in the separation roller, which forces it in the opposite direction.

When the pick-up solenoid [D] activates, the pick-up roller [F] lowers to contact the top sheet of the paper stack and send it to the paper feed and separation rollers.

When the paper feed sensor [H] detects the leading edge of the paper, the pick-up solenoid de-energizes to lift the pick-up roller [F], and the vertical transport clutch [I] energizes to feed the paper to the vertical paper feed section.

Separation Roller Release



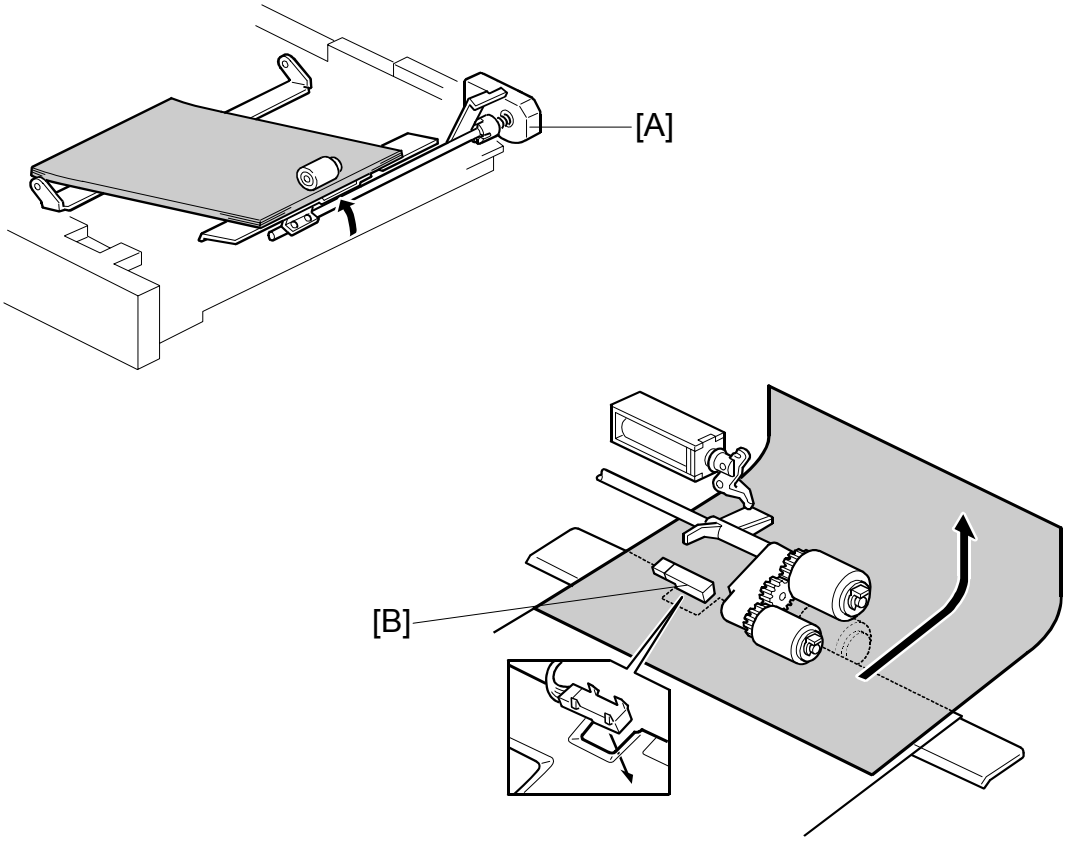
The separation roller [A] is normally away from the feed roller [B]. When the paper feed station is selected, the separation roller solenoid [C] contacts the separation roller with the feed roller as explained on the previous two pages.

This contact/release mechanism has the following three advantages:

1. When the paper feed motor turns on, all the separation rollers in the three feed stations rotate. If the separation roller is away from the feed roller, it reduces the load on the paper feed motor and drive mechanism, and it also reduces wear to the rubber surface of the separation roller caused by friction between the separation roller and the feed roller.
2. After paper feed is completed, paper sometimes remains between the feed and separation rollers. If the feed tray is pulled out in this condition, this paper might be torn. When the separation roller is away from the feed roller, the remaining paper can be removed from between the rollers.
3. When paper misfeeds occur around this area, the user can easily pull out the jammed paper between the feed and the separation rollers if the separation roller is away from the feed roller.

After paper feed and the paper feed clutch turns off, the paper feed motor still turns the separation roller [A] in reverse. The separation roller, still contacting the feed roller, turns the feed roller in reverse for 100 ms. Then, the separation solenoid turns off.

6.14.5 REMAINING PAPER/PAPER END DETECTION (TRAY 2, 3)



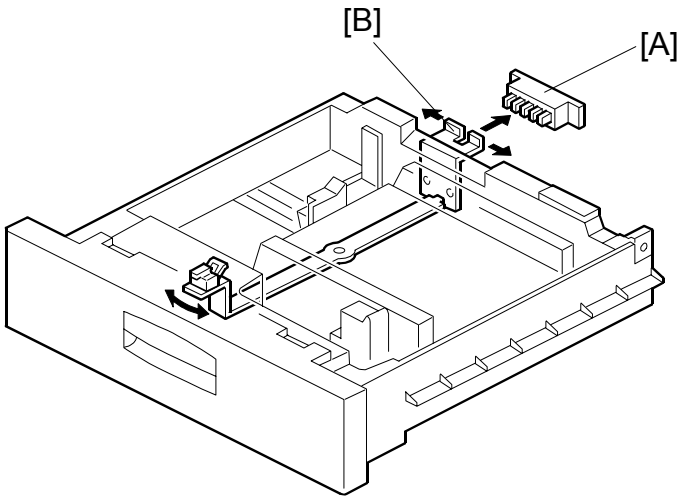
Remaining Paper Detection

The tray lift motor [A] rotates when the tray is pushed in. The CPU detects the remaining paper by monitoring the lift motor rotation angle (4 levels).

End Detection

The paper end sensor [B] is a photo-reflective sensor. While there is paper in the tray, light is reflected back to the sensor, but after the last sheet feeds, the sensor deactivates and signals paper out.

6.14.6 PAPER SIZE DETECTION – TRAY 2, 3



North America

Paper Size	Paper Size Switch
11” x 17” SEF	01111
8½”x14” SEF	00111
8½”x11” SEF	10011
11” x8½” LEF	01001
5½”x8½” SEF	00100
8½” x5½” LEF	00010
8”x10½” SEF	00001
7¼“x10½“ SEF	10000
8”x13” SEF	11000
*	11110

1: HIGH 0: LOW

Europe/Asia

Paper Size	Paper Size Switch
A3 SEF	01111
8¼”x 13” SEF	00111
A4 SEF	10011
A4 LEF	01001
8 ½”x13” SEF	00100
A5 SEF	00010
A5 LEF	00001
7¼“x10½“ SEF	10000
*	11110

1: HIGH 0: LOW

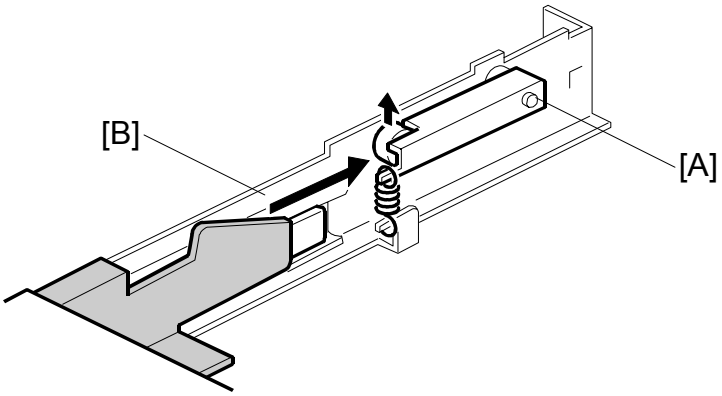
For the 1st feed tray, the paper size has to be stored with SP5019 002.

For the 2nd and 3rd feed tray (universal trays), the paper size switch [A] detects the paper size. The paper size switch contains five microswitches. The paper size switch is actuated by an actuator plate [B] at the rear of the tray. Each paper size has its own unique combination as shown in the table and the CPU determines the paper size by the combination.

Using the asterisk setting (*****), a wider range of sizes can be used for custom paper sizes entered by the user (press the Tray Paper Settings key on the operation panel). SP5112 must be set to 1 (Yes).

	Metric version	Inch version
Main Scan Direction	139.7 mm ~ 305 mm	5.5" ~ 12"
Sub Scan Direction	139.7 mm ~ 458 mm	5.5" ~ 18.0"

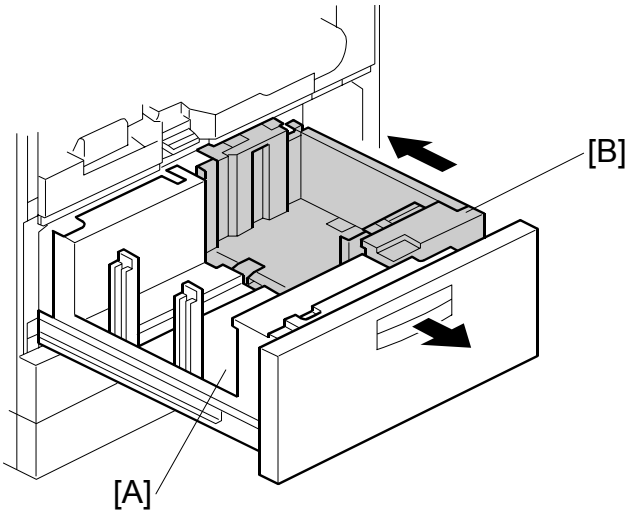
6.14.7 TRAY LOCK – TRAY 2, 3



When the tray is placed in the paper feed unit, the lock lever [A] drops behind the lock plate [B] on the support bracket to lock the tray in the proper position.

6.14.8 TANDEM FEED – TRAY 1

Overview

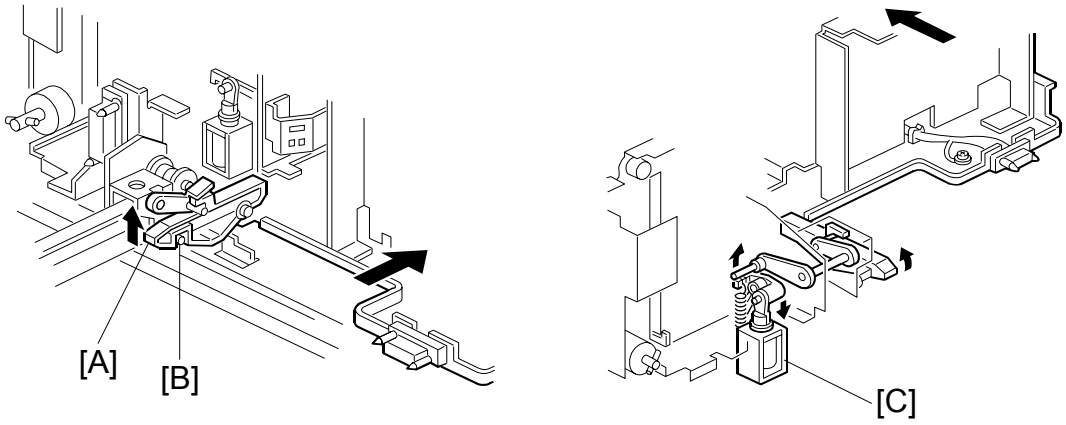


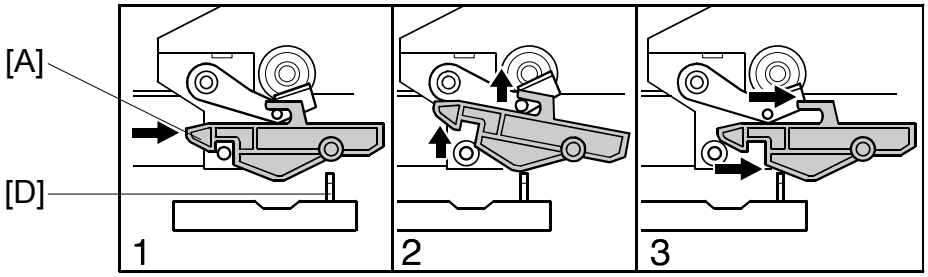
1,000 sheets of paper can be set in the left tray [A] and right tray [B] of tray 1, the tandem paper tray. Paper is fed from the right tray. When the paper in the right tray runs out, the paper stack in the left tray automatically is pushed to the right tray. After the stack is moved from the left tray to the right tray, paper feeding resumes.

Normally both the right and the left trays are joined. However, during copying, if there is no paper in the left tray, the left tray can be pulled out to load paper while the right tray stays in the machine so paper feed can continue.

NOTE: After moving the adjustable side fences for a different paper size, be sure to execute SP5019 002 (Tray Paper Size Selection – 1st Tray) to select the correct setting for the paper size loaded in the tandem tray. (The tandem tray cannot detect the paper size automatically.)

Connecting the Left and Right Sides of the Tray



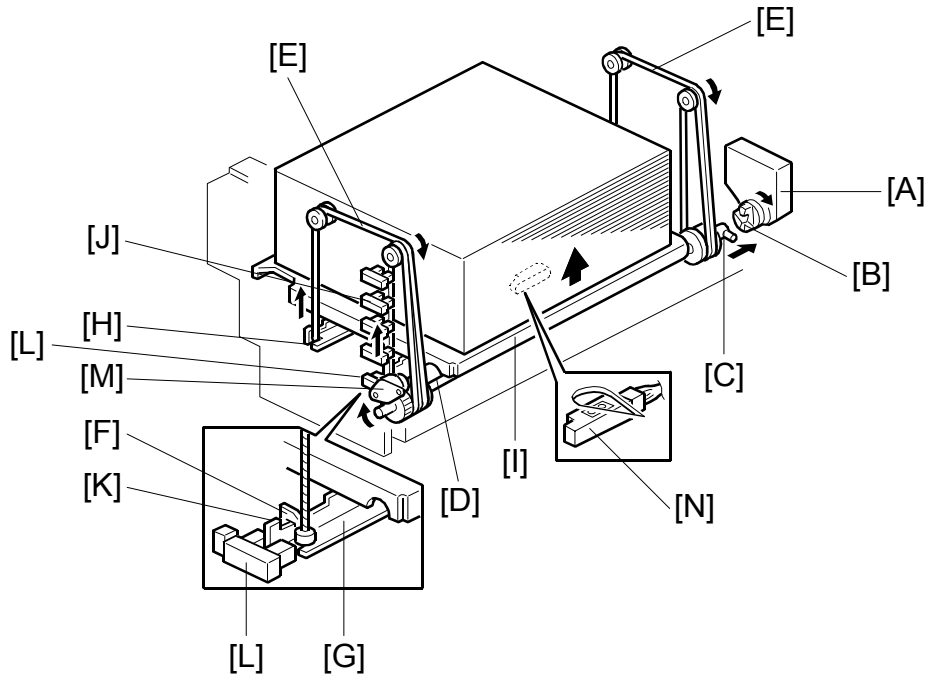


Normally the left tray lock lever [A] catches the pin [B] in the right tandem tray. During copying, if there is no paper in the left tray, the tandem tray connect solenoid [C] turns on to release the tray lock lever so the left tray separates from the right tray. Therefore, the left tray can be pulled out to load paper while paper is still being fed into the machine from the right tray.

When the tandem tray is drawn out fully, the projection [D] pushes up the left tray lock lever [A] so that both trays separate for easier paper loading.

Paper Lift/Remaining Paper Detection: Tray 1

The machine detects when the 1st tray has been placed in the machine by monitoring the tray set signal through the connector.



When the machine detects the 1st paper tray, the right 1st tray paper sensor [N] (under the tray) checks whether there is paper in the right tandem tray. When paper is detected, the tray lift motor [A] rotates and the coupling gear [B] on the tray lift motor engages the pin [C] of the lift shaft [D].

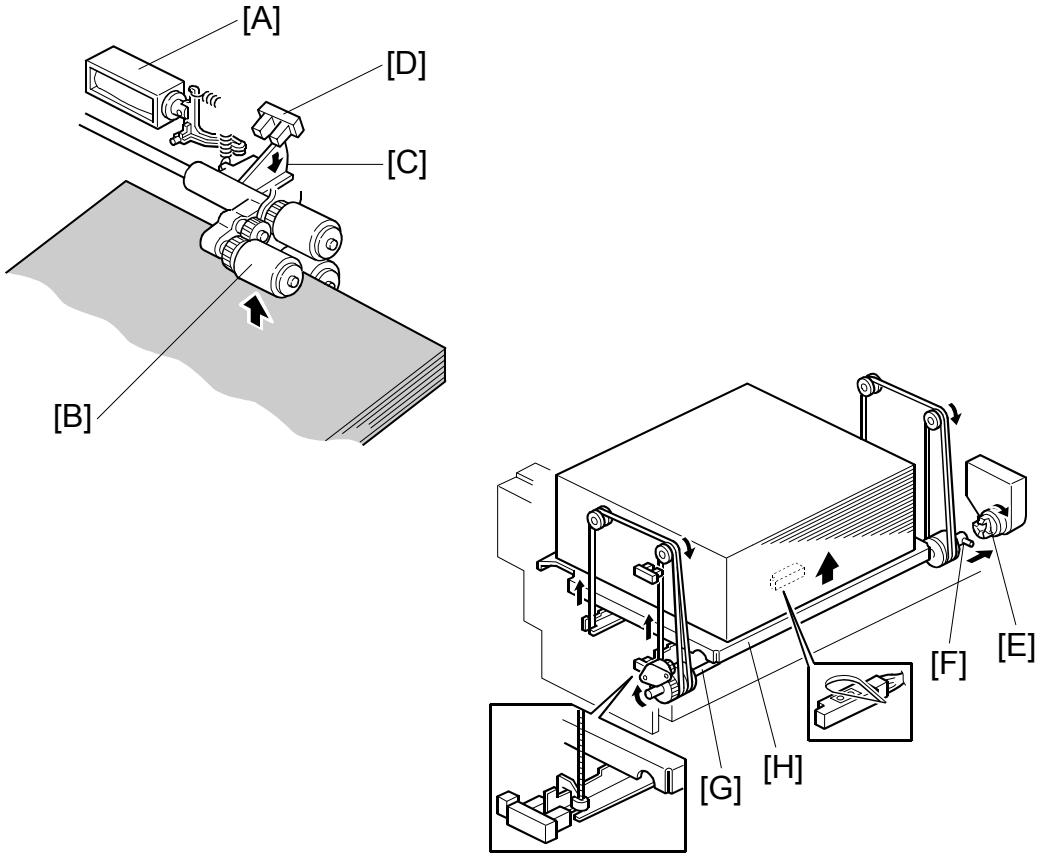
The tray wires [E] are fixed in the slots [F] at the ends of the tray support rods [G, H]. When the tray lift motor rotates clockwise, the tray support rods and the tray bottom plate [I] rise. The tray rises until stack pushes up the pick-up roller until the tray lift sensor de-activates and switches off the tray lift motor.

As the actuator [K] on the right support rod [G] rises, it de-activates each of the 4 paper height sensors [J] to trigger 5 levels of paper remaining alerts on the operation panel.

Paper Height Sensor	Remaining Paper	Comment
None	100%	Bottom position, no sensors de-activated.
1	75%	Each sensor de-activates as the actuator rises.
2	50%	
3	25%	
4	Near End	
	Paper Out	Detected by the paper sensor [N] below the stack when the last sheet feeds.

When the tray is removed, the coupling gear [B] separates from pin [C], so the tray bottom plate descends. The tray descends until the actuator activates the lower limit sensor [L]. The damper [M] provides resistance so the tray bottom plate descends slowly.

Feed and Lift: Tray 1



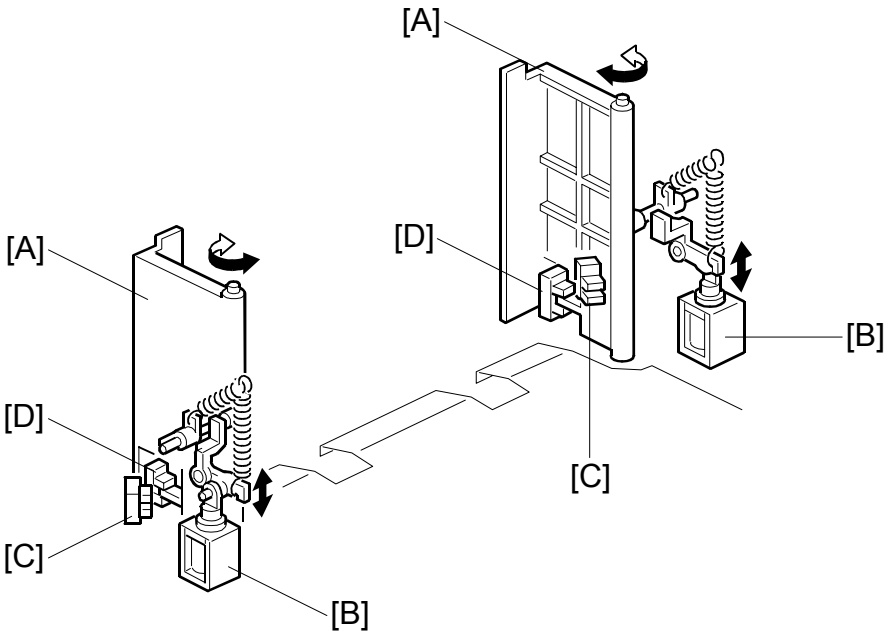
When the tray lift motor turns on, the pick-up solenoid [A] actuates and lowers the pick-up roller [B]. When the top of the stack reaches the correct height for paper feed, it pushes up the pick-up roller and lowers the actuator [C]. This actuator de-activates the tray lift sensor [D] when it leaves the sensor slot, and this stops the tray lift motor.

After several paper feeds, the pick-up roller descends and the actuator rises and enters the tray lift sensor and activates it. This switches on the tray lift motor again, which raises the stack once again to the correct paper height.

When the tray is pulled out of the feed unit, the lift motor coupling gear [E] disengages the pin [F] on the lift shaft [G], then the tray bottom plate [H] drops. The damper provides resistance so the tray descends slowly.

There is also a paper end sensor for the 1st tray, which works in the same way as the sensor in the 2nd and 3rd trays.

Side Fence Drive: Tray 1

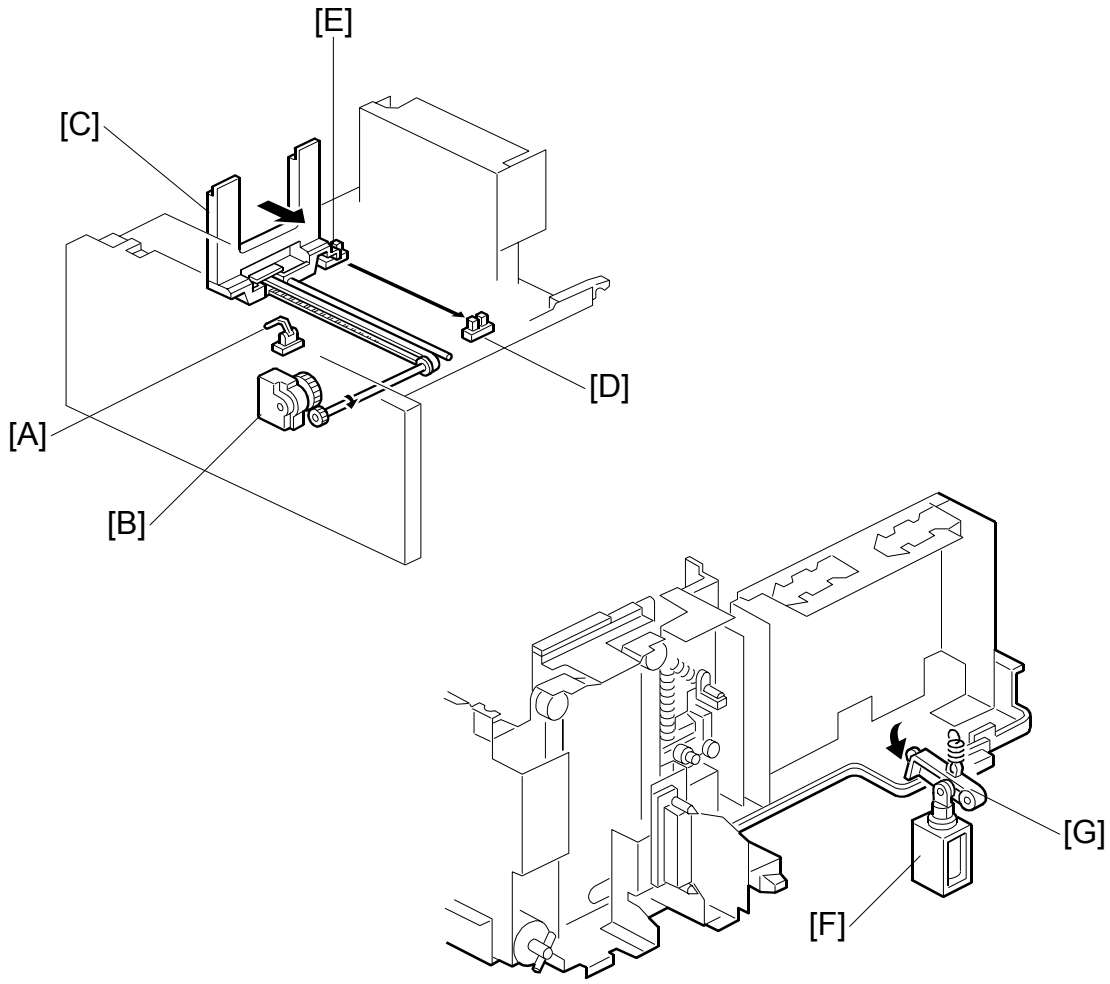


The side fences [A] of the right tray are normally closed. They open only when paper in the left tray is moving to the right tray.

The side fence solenoids [B] drive the side fences. When the paper loaded in the left tray transfers to the right tray, the side fence solenoids turn on to open the side fences until the side fence open sensors [C] activate.

When the rear fence in the left tray has pushed the stack of paper into the right tray, the side fence solenoids turn off to close the side fences. Then, when the side fence closed sensors [D] activate, the LCD displays a message advising the user to load some paper into the left side of the tandem tray.

Rear Fence Drive

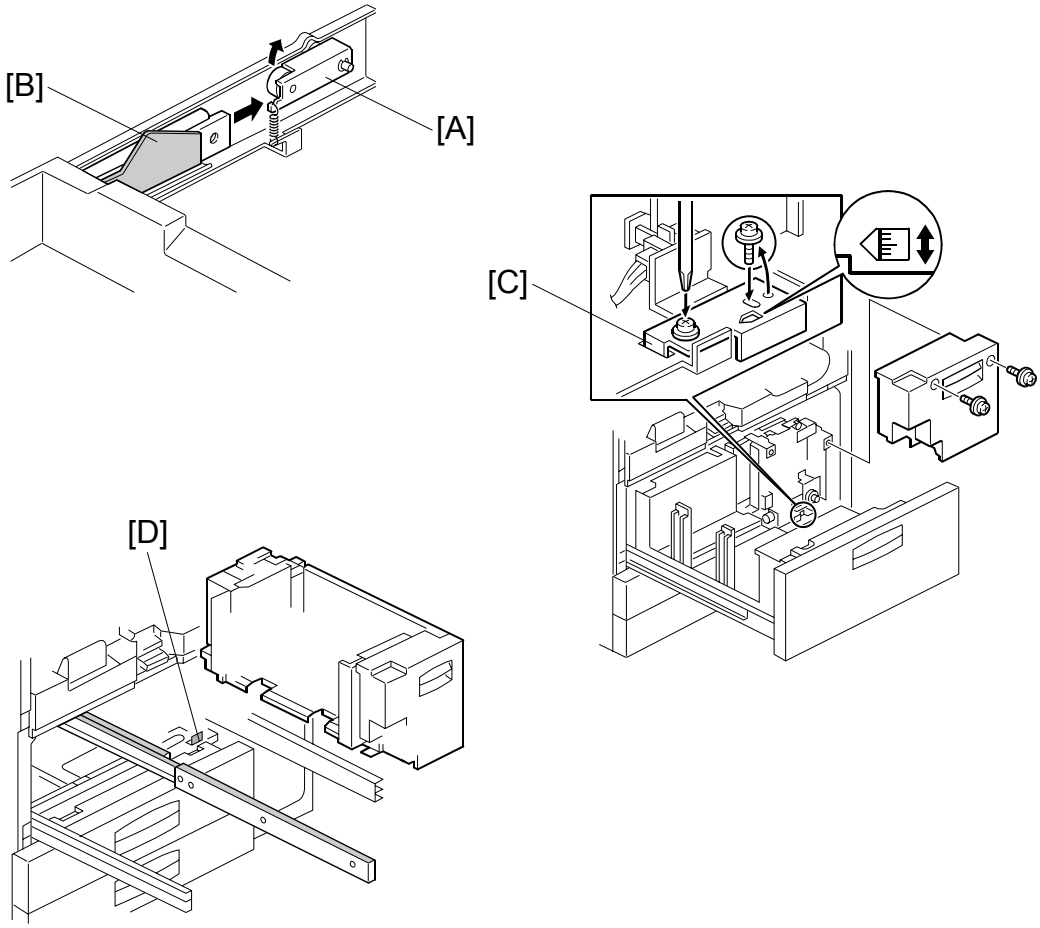


When the left 1st tray paper sensor [A] detects paper but the right 1st tray paper sensor does not, the rear fence drive motor [B] (a DC motor) in the left tray turns counter-clockwise causing the rear fence [C] to push the paper stack into the right tray.

When the actuator on the rear fence activates the rear fence return sensor [D], the rear fence drive motor turns clockwise until the actuator activates the rear fence HP sensor [E].

While the rear fence is moving, the left 1st tray lock solenoid [F] turns on and the lock lever [G] locks the left tray.

Tray Positioning



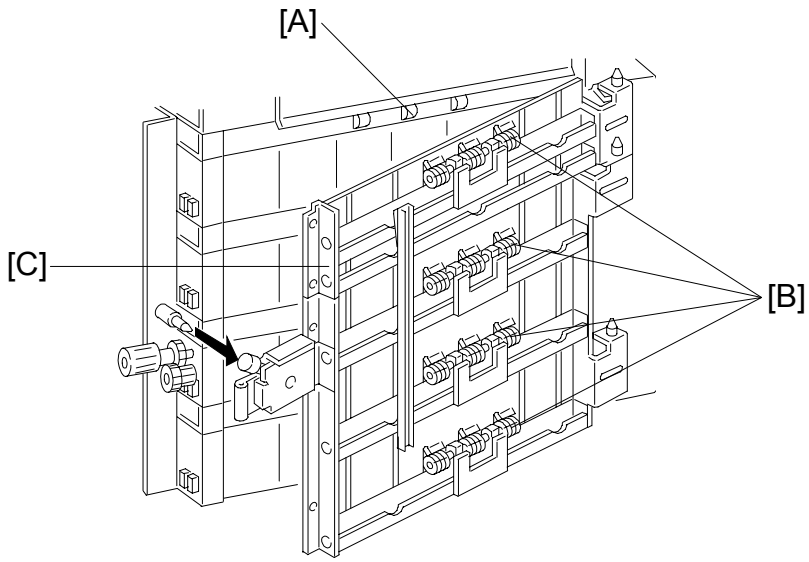
Tray Lock

When the feed tray is set in the paper feed unit, the lock lever [A] drops behind the lock plate [B] on the Accuride support bracket to lock the tray in the proper position.

Side-to-side Positioning

When the feed tray is set in the paper feed unit, the side-to-side positioning plate [C] presses the feed tray against the stopper [D]. By moving the positioning plate, the tray position can be changed to adjust the side-to-side registration.

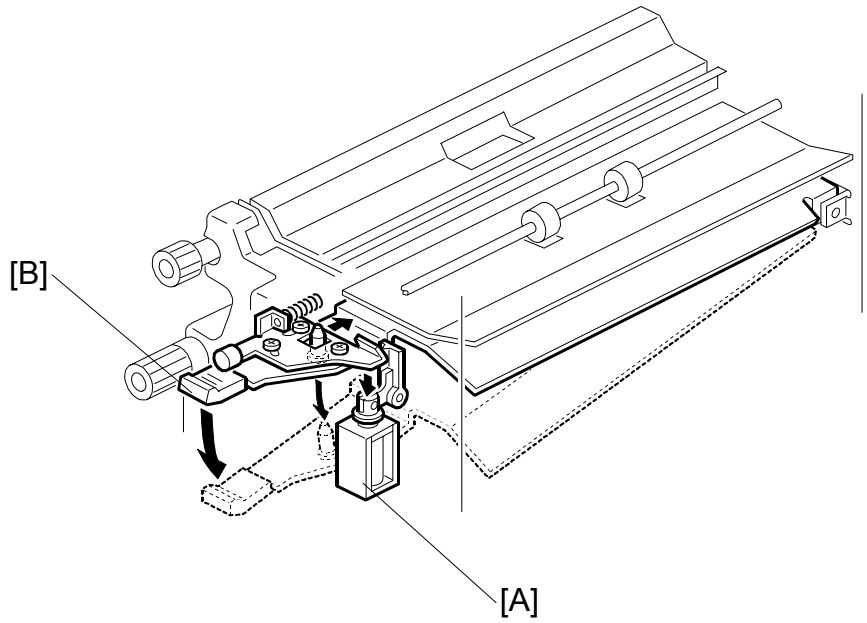
6.14.9 VERTICAL TRANSPORT



The vertical transport rollers [A] in each feed unit are all driven by the paper feed motor. The vertical transport rollers and the vertical transport idle rollers [B], on the inner and outer vertical guide plates, transport the paper up from each feed unit towards the relay and registration rollers.

The vertical transport guides [C] can be opened to remove jammed paper in the vertical transport area.

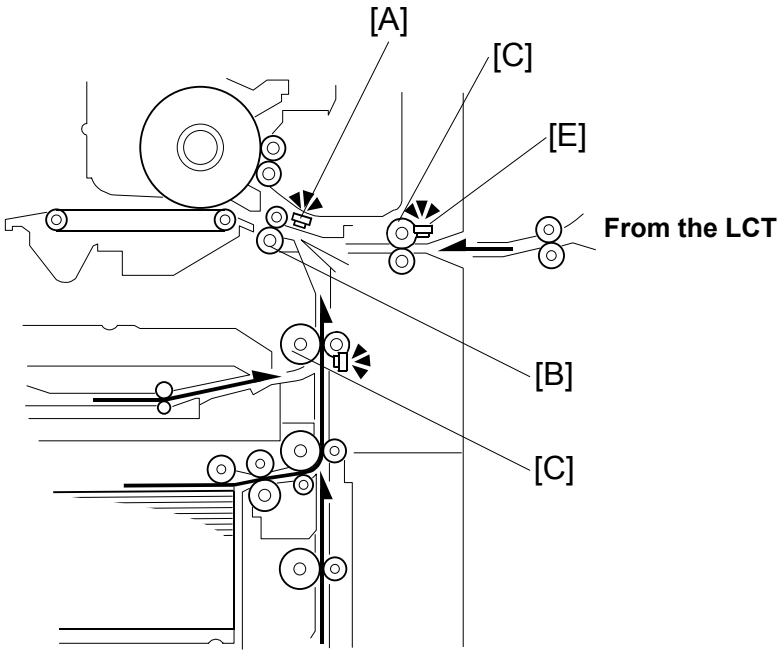
6.14.10 LCT GUIDE PLATE



When the machine detects a jam at the LCT exit, paper feed stops, and the LCT guide plate solenoid [A] releases the guide plate (labeled ‘B5’) [B] so that the user can easily remove the jammed paper. After removing the jam, the user must return the B5 lever to its normal position.

6.14.11 PAPER REGISTRATION

Overview



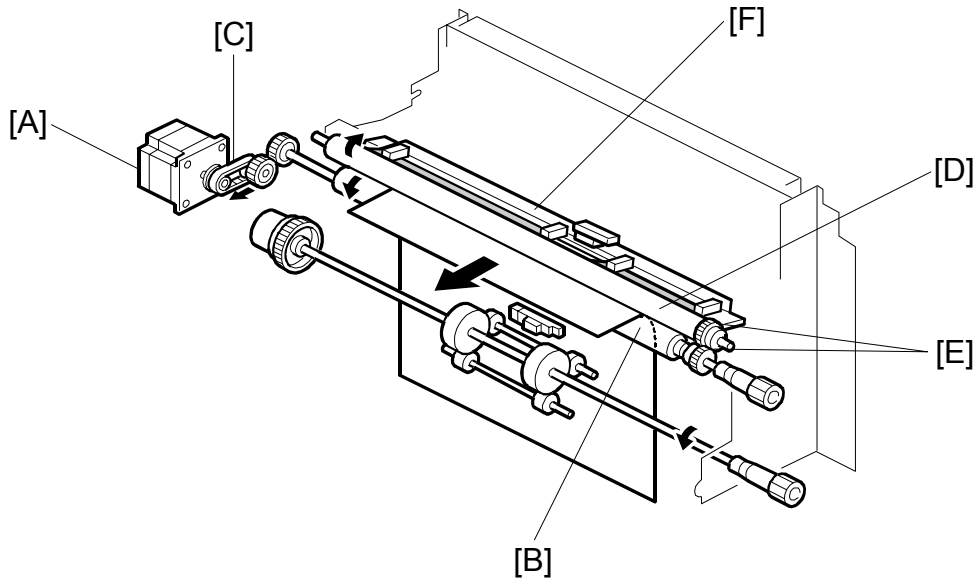
The registration sensor [A] is positioned just before the registration rollers [B].

When the paper leading edge activates the registration sensor, the registration motor is off and the registration rollers are not turning. However, the upper relay roller (or LCT relay roller for feed from the LCT) [C] stays on for a bit longer.

This delay allows time for the paper to press against the registration rollers and buckle slightly to correct skew. Next, the registration motor energizes and the upper relay clutch re-energizes at the proper time to align the paper with the image on the drum. The registration and relay rollers feed the paper to the image transfer section.

The registration sensor is also used for paper misfeed detection, and the LCT relay sensor [E] detects jams at the LCT roller.

Registration Drive

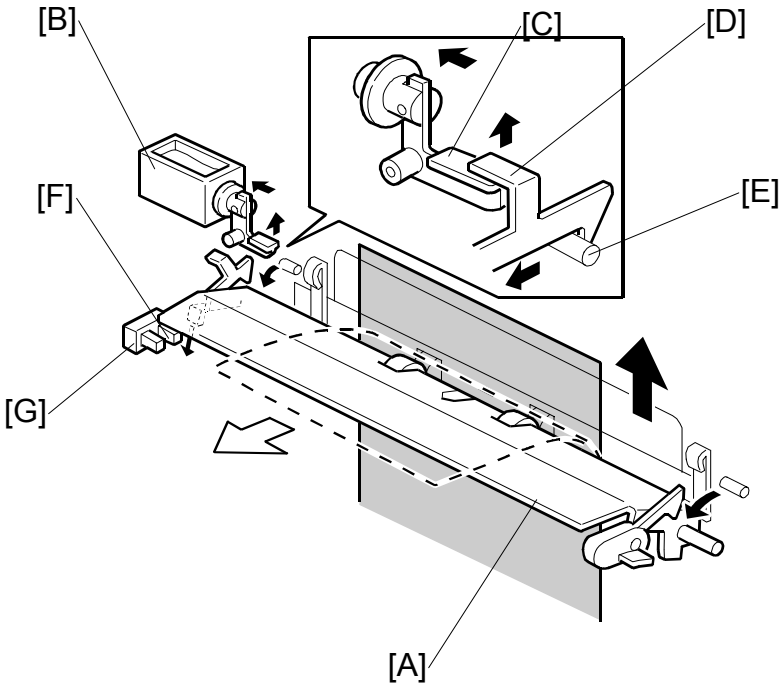


The registration motor [A] drives the lower registration roller [B] through a timing belt [C] and some gears. Drive is transmitted to the upper registration roller [D] via two gears [E] at the front.

The paper dust remover [F] extends across the length of the paper registration roller [D], where most paper dust is generated.

NOTE: Clean the dust remover every PM visit.

Jam Removal at Paper Registration



If a sheet misfeeds between the vertical transport rollers and the registration rollers, the next sheet is already on its way up from the paper tray, and must be stopped, or there will be a pile-up of jammed paper.

To prevent this, when the registration sensor is not activated at a certain jam check timing, the lower paper guide plate [A] automatically opens.

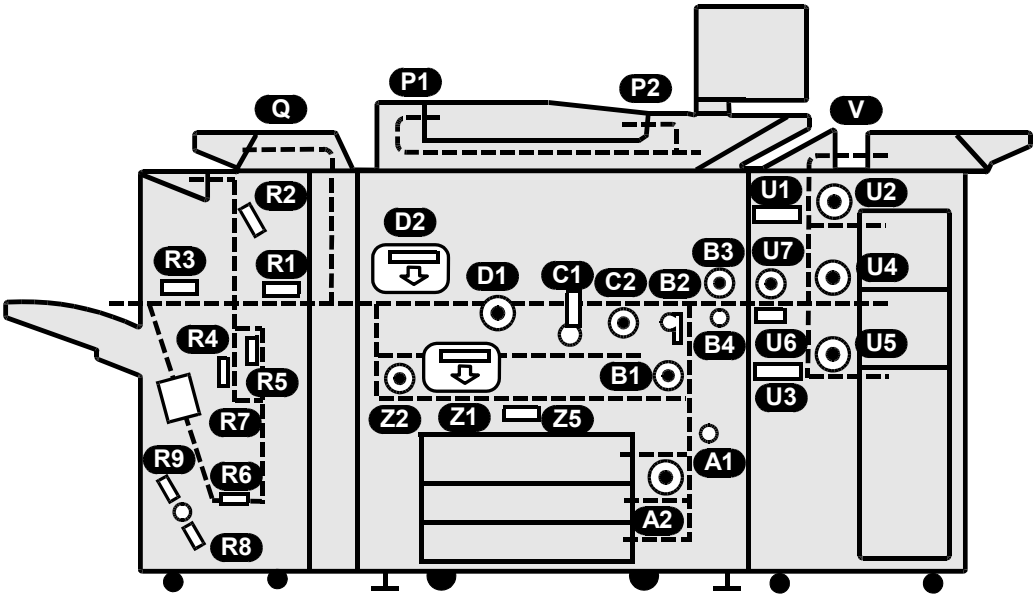
Guide plate solenoid [B] turns on ➔ Lever [C] raises ➔ Lock lever [D] (on the guide plate) releases from pin [E] (on the rear side frame) ➔ Guide plate [A] falls open ➔ Paper coming along the feed path is diverted to the duplex tray.

Actuator [F] on the guide plate activates the guide plate position sensor [G] when the guide plate opens.

The user must remove jammed paper in the feed path, the sheet in the duplex tray, and manually close the guide plate.

To prevent the guide plate from being left open, if the guide plate position sensor is activated, copying is disabled and a caution is displayed on the LCD panel.

6.14.12 JAM DETECTION



When a jam occurs, a graphic illustration of the main machine, finisher, LCT, and bypass tray appears on the operation panel screen.

The location where the jammed paper remains lights (does not flash) in the graphic illustration.

A jam code is displayed on the operation panel to indicate the cause and location of the jam. For more details, please refer to the tables on the following pages.

Jam Location Display Tables

A Trays 1 ~ 3

Related Sensors	Knob/Lever
Between paper feed sensor and relay sensor (Tray 1, 2, 3), excluding relay sensor. **A1**, **A2**.	**A1**
	A2

B Before Registration Roller/Sensor

Related Sensors	Knob/Lever
• Between duplex transport sensor 3 and relay sensor (excluding duplex transport sensor). **B1**, **B2** • Between relays sensor and registration sensor. **B1**, **B2** • Between LCT relay sensor and registration sensor (excluding registration sensor). **B3**, **B4**	**B1**
	B2
	B3
	B4
	B5

C Transfer Unit

Related Sensors	Knob/Lever
• Between registration sensor and fusing exit sensor (excluding fusing exit sensor) **C1**, **C2**	**C1**
	C2

D Fusing Exit/Paper Output

Related Sensors	Knob/Lever
• Between fusing exit sensor and duplex entrance sensor (excluding duplex entrance senor). **D1**, **D2** • Between fusing exit sensor and exit sensor (excluding exit sensor). **D1**, **D2** • Between inverter sensor and exit sensor (excluding inverter sensor) **D1**, **D2** • Between registration sensor and fusing exit sensor (excluding fusing exit sensors) **D1**, **D2**	**D1**
	D2
	D3
	D4
	D5
	D6

Z Duplex Unit

Related Sensors	Knob/Lever
• Between duplex entrance sensor and inverter sensor. **Z1**, **Z2** • Between duplex transport sensor 1, 2, 3 and relay sensor (excluding relay sensor) **Z1**, **Z5**	**Z1**
	Z2
	Z3
	Z4
	Z5

U LCT (B511)

Related Sensors	Knob/Lever
• Between LCT feed sensor 1 and LCT exit sensor. **U1**, **U2** • Between LCT feed sensor 2 and LCT exit sensor. **U3**, **U4** • Between LCT feed sensor 3 and LCT exit sensor. **U3**, **U5** • Between LCT exit sensor and LCT relay sensor (excluding LCT relay sensor. **U6**, **U7**	**U1**
	U2
	U3
	U4
	U5
	U6
	U7

V Bypass Tray (B512)

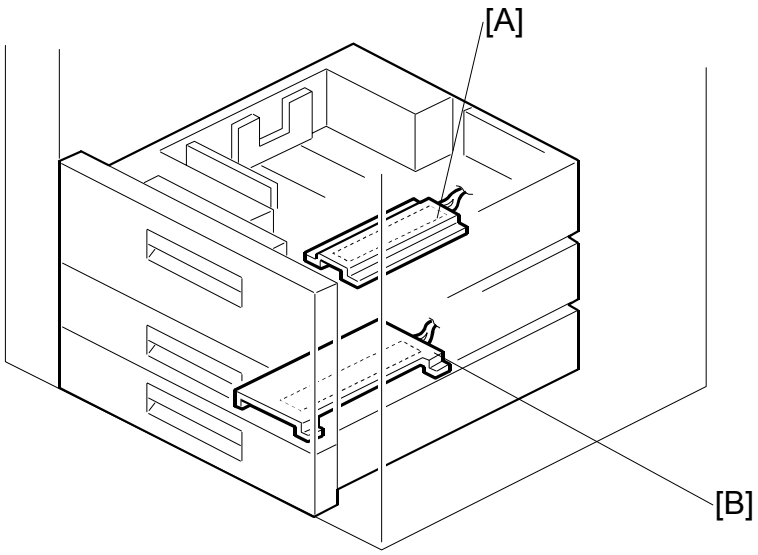
Related Sensors	Knob/Lever
• Between bypass tray feed sensor and LCT exit sensor (excluding LCT exit sensor)	**V**

Jam Error Code Table

Code	
3	1st Tray Feed (Tandem Tray – Main Machine) – no feed
53	1st paper tray feed sensor check-out error.
4	2nd Tray Feed (Universal Cassette – Main Machine) – no feed
54	2nd tray paper feed sensor check-out error.
5	3rd Tray Feed (Universal Cassette – Main machine) – no feed
55	3rd tray paper feed sensor check-out error
6	4th Tray (LCT – Top Tray) no feed
56	4th tray paper feed sensor check-out error
7	5th Tray (LCT – Middle Tray) no feed
57	5th Tray paper feed sensor check-out error
8	6th Tray (LCT – Bottom Tray) no feed
58	6th Tray paper feed sensor check-out error
9	Bypass no feed
59	Bypass feed paper feed sensor check-out error
10	LCT relay sensor check-in error
60	LCT relay sensor check-out error
11	LCT exit sensor check-in error
61	LCT exit sensor check-out error
12	Relay sensor check-in error
62	Relay sensor check-out error
13	Registration sensor check-in error
63	Registration sensor check-out error
15	Fusing exit sensor check-in error
65	Fusing exit sensor check-out error
16	Exit sensor check-in error
66	Exit sensor check-out error
19	Duplex entrance sensor check-in error
69	Duplex entrance sensor check-out error
20	Duplex transport sensor 1 check-in error
70	Duplex transport sensor 1 check-out error
21	Duplex transport sensor 2 check-in error
71	Duplex transport sensor 2 check-out error
22	Duplex transport sensor 3 check-in error
72	Duplex transport sensor 3 check-out error
23	Duplex inverter sensor check-in error
73	Duplex inverter sensor check-out error

Check-out error: Paper fails to leave after prescribed time has elapsed.
Check-in error: Paper fails to arrive after prescribed time has elapsed.

6.14.13 ANTI-CONDENSATION HEATERS (OPTIONS)



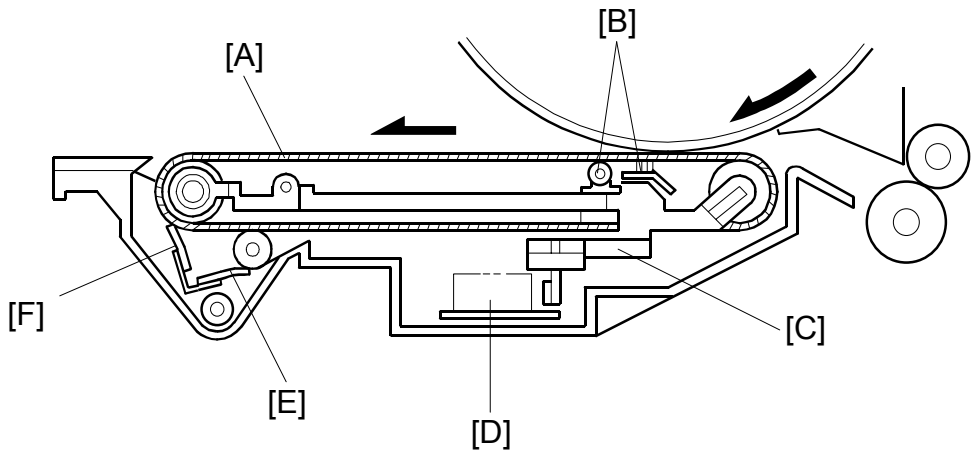
Two optional anti-condensation heaters can be installed below the 1st tray [A] and below the 3rd tray [B].

The anti-condensation heaters switch on when the main switch or operation switch are switched off. The anti-condensation trays prevent moisture from collecting in and around the paper trays when the machine is not in use.

NOTE: The anti-condensation heater connectors are not pre-set at the factory and must be connected correctly before use. For details, see “1. Installation” in the main service manual.

6.15 IMAGE TRANSFER AND PAPER SEPARATION

6.15.1 OVERVIEW



The transfer belt unit consists of the following parts:

[A]: Transfer belt
A belt (length: 321 mm) with high electrical resistance which holds a high positive electrical potential to attract toner from the drum to the paper. Also, the electrical potential attracts the paper itself and helps the paper to separate from the drum.

[B]: Transfer bias roller and transfer belt bias brush
Applies transfer voltage to the transfer belt.

[C]: Transfer belt lift lever (driven by a solenoid)
Lifts the transfer belt into contact with the drum.

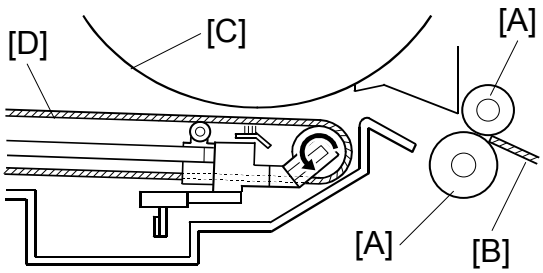
[D]: Transfer power pack
Generates a constant transfer current.

[E]: Cleaning roller and cleaning roller cleaning blade
Removes toner remaining on the transfer belt to prevent the rear side of the paper from getting dirty.

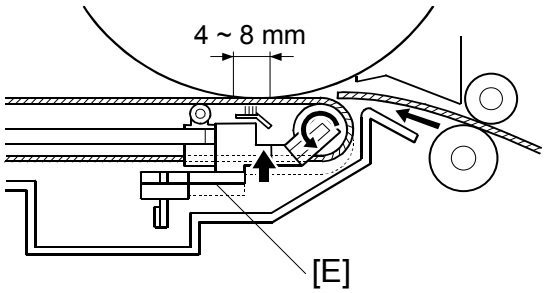
[F]: Transfer belt cleaning blade
Removes toner from the transfer belt. Any toner that is not removed by this blade is removed by the cleaning roller [E].

6.15.2 IMAGE TRANSFER AND PAPER SEPARATION

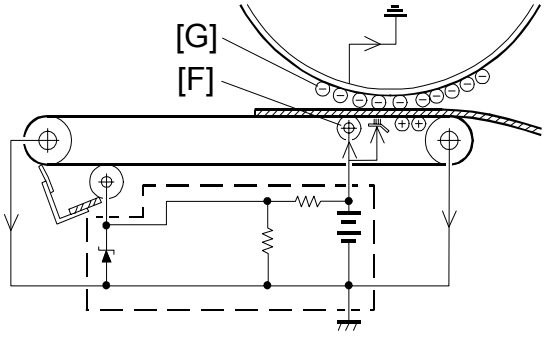
The registration rollers [A] feed the paper [B] to the gap between the drum [C] and the transfer belt [D].



As soon as the leading edge of the first sheet reaches the gap between the transfer belt and the drum, the transfer belt lift lever [E] raises the transfer belt into contact with the drum. The lift lever is driven by a solenoid.



Then a positive charge is applied to the transfer bias roller [F] and transfer belt bias brush to attract the negatively charged toner [G] from the drum. It also attracts the paper and separates it from the drum.



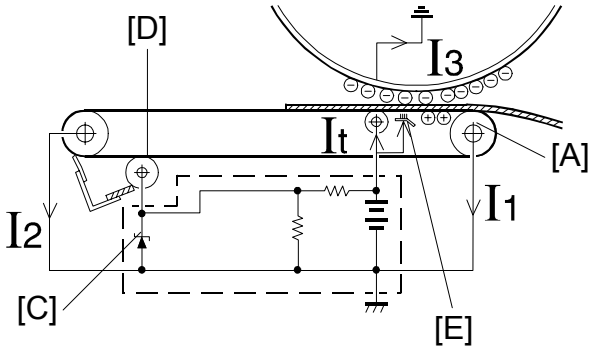
After the image transfer is completed, the charge on the transfer belt holds the paper to the transfer belt. After separating the paper from the transfer belt, the transfer belt is discharged by the transfer belt drive roller [A].

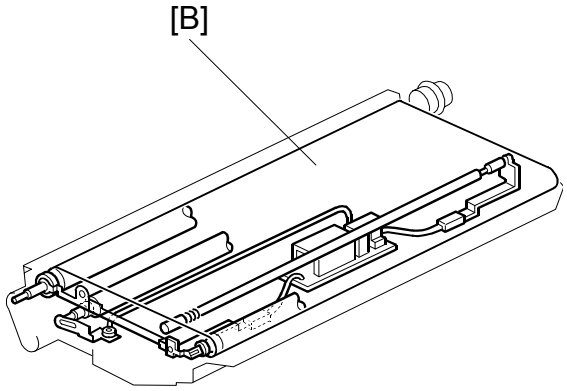
The transfer power pack [B] inside the transfer belt unit monitors the current (I_1 and I_2) fed back from the drive rollers at each end of the transfer belt to adjust the transfer current.

The power pack then adjusts "I_t" to keep the current through the drum (I_3) constant, even if the paper, environmental conditions, or transfer belt surface resistance change.

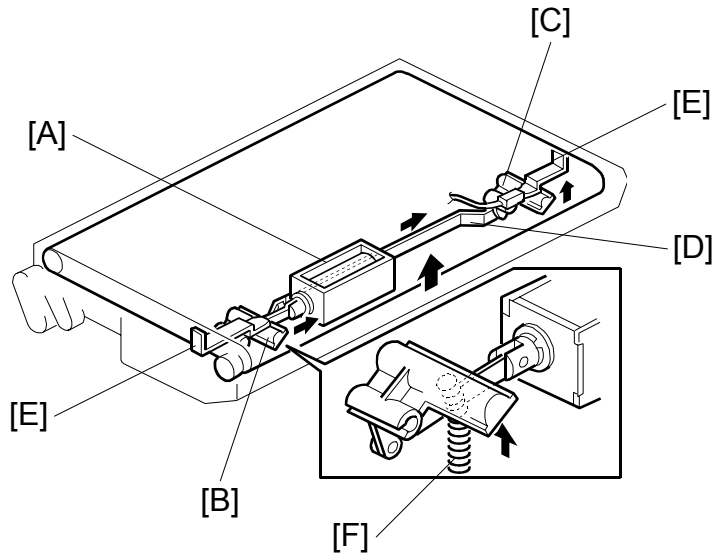
The varistor [C] keeps the voltage at the cleaning bias roller [D] constant.

To apply a higher current to the transfer belt without a higher voltage, the bias brush [E] has been incorporated near the nip between drum and belt. This ensures that enough transfer current is applied for this machine, which has a higher copy volume.





6.15.3 TRANSFER BELT UNIT LIFT



The transfer belt lift solenoid [A] inside the transfer belt unit turns on to raise the transfer belt into contact with the drum. The front lever [B] and the rear lever [C] are connected to the solenoid by links [D], and they push up the stays [E] when the solenoid turns on.

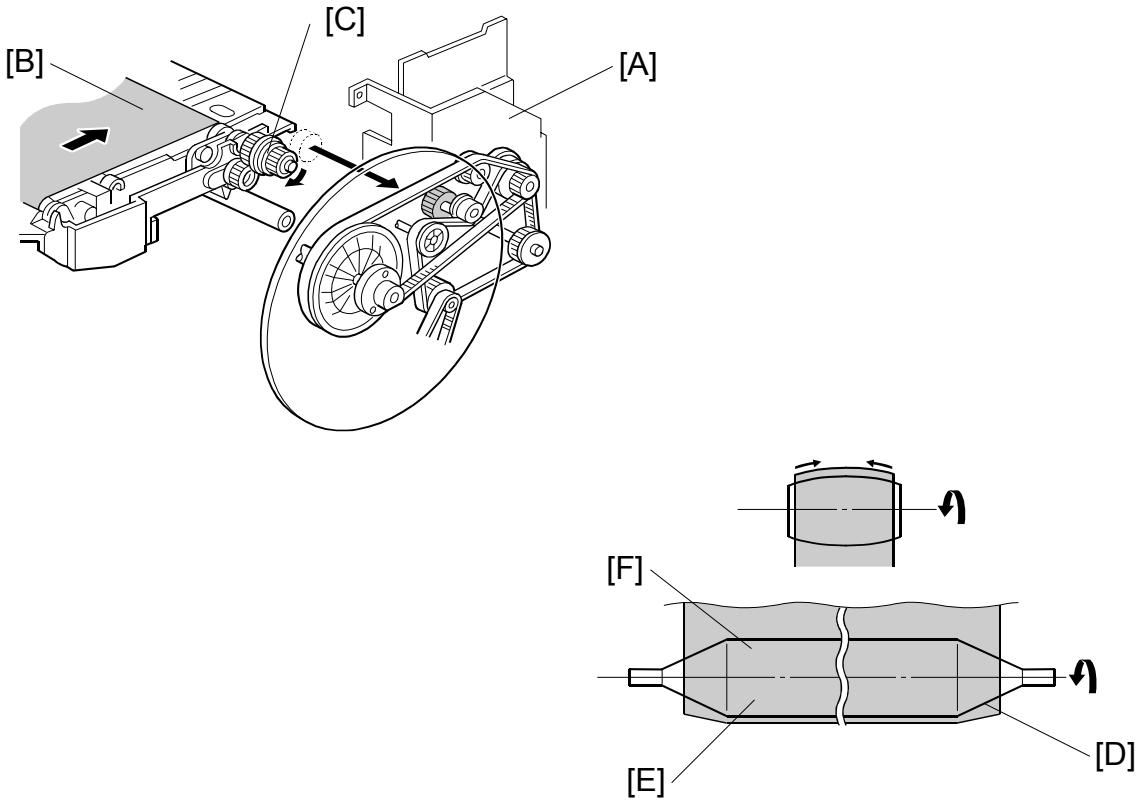
The support spring [F] helps the solenoid to raise the transfer belt.

The solenoid turns off after the copy job is finished.

The transfer belt must be released from the drum for the following reasons:

1. To prevent the ID sensor pattern on the drum from being rubbed off by the transfer belt, because the transfer belt is located between the development unit and the ID sensor.
2. To decrease the load on the bias roller cleaning blade, it is better to prevent toner on non-image areas (for example V_D, V_H, ID sensor patterns developed during process control data initial setting) from being transferred onto the transfer belt.
3. To prevent drum characteristics from being changed by remaining in contact with the rubber belt.

6.15.4 PAPER TRANSPORTATION AND BELT DRIVE

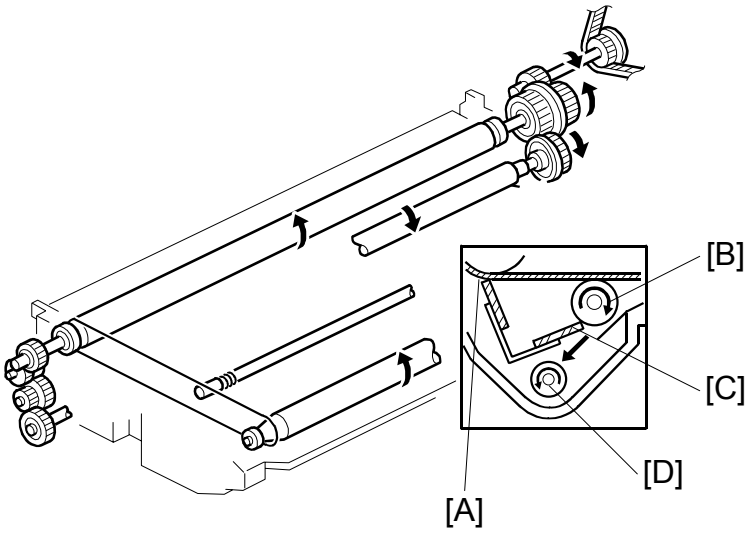


The drum motor [A] drives the transfer belt through belts and gears. Since the transfer belt electrically attracts the paper [B], a transport fan is not required.

At the turn in the transfer belt, the transfer belt drive roller [C] discharges the belt to reduce paper attraction, and the paper separates from the belt as a result of its own stiffness.

The tapered parts [D] at both ends of the roller [E] help keep the transfer belt [F] in the center, so that it does not run off the rollers.

6.15.5 TRANSFER BELT CLEANING



Some toner may adhere to the transfer belt when paper jams occur. The adhered toner must be removed to prevent the rear side of the copy paper from getting dirty.

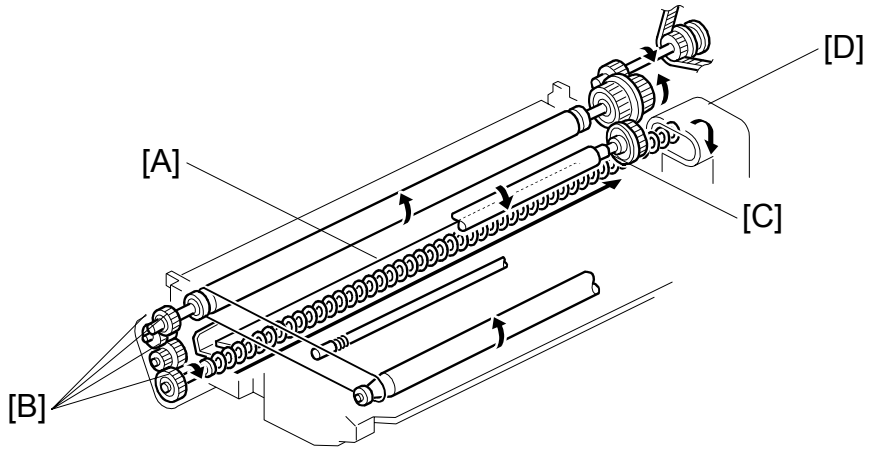
The cleaning blade [A] scrapes off any toner remaining on the transfer belt. This is a counter blade system.

Even if the toner is not completely removed due to paper dust stuck on the transfer belt cleaning blade [A], the positively charged cleaning bias roller [B] attracts the remaining toner. The bias roller cleaning blade [C] scrapes toner off the cleaning bias roller.

The surface of the transfer belt is coated to make it smooth and prevent the transfer belt from flipping the cleaning blade.

The toner collection coil [D] transports toner cleaned off the transfer belt to the waste toner collection bottle (see Toner Supply and Recycling for more on this).

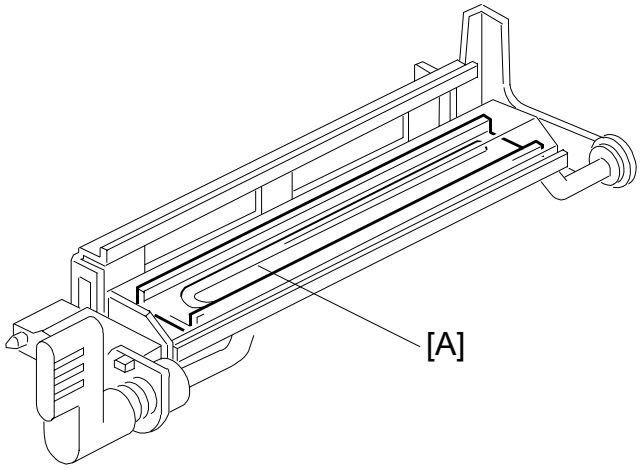
6.15.6 TONER COLLECTION



Transfer belt drive is transmitted to the toner collection coil [A] through idle gears [B]. The toner collection coil [C] transports the collected toner to the toner recycling unit [D] and from there it goes to the waste toner collection bottle.

See Toner Supply and Recycling for details.

6.15.7 DRUM ANTI-CONDENSATION HEATER

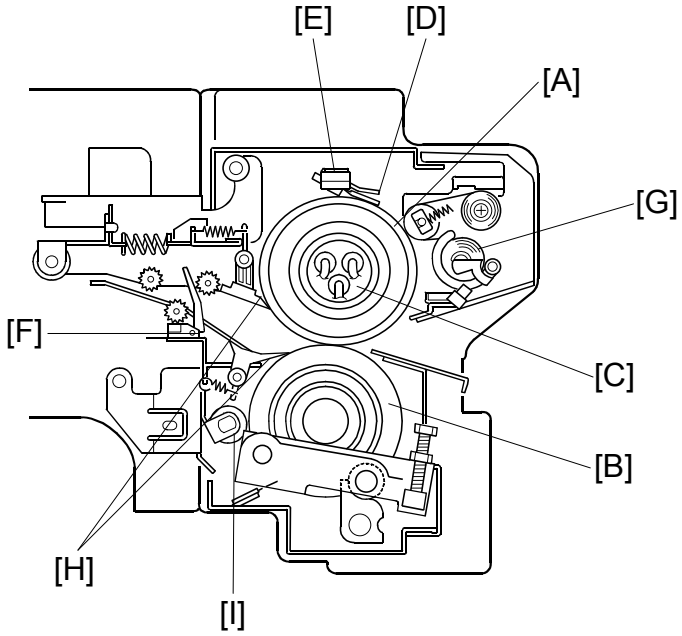


The drum anti-condensation heater [A] is located under the transfer belt unit. It turns on when the main switch is off to prevent moisture from forming on the transfer belt.

The heater is included in the machine at the factory, but the connector is not connected.

6.16 FUSING

6.16.1 OVERVIEW



After transferring the image, the copy paper enters the fusing unit. A heat and pressure process using a hot roller [A] and a pressure roller [B] fuses the image to the copy paper. There are three fusing lamps of different wattage [C] inside the hot roller. They are turned on and off to maintain the target fusing temperature. (☛6.16.4)

The CPU monitors the hot roller surface temperature through a thermistor [D], which is in contact with the hot roller's surface. A thermostat [E] protects the fusing unit from overheating.

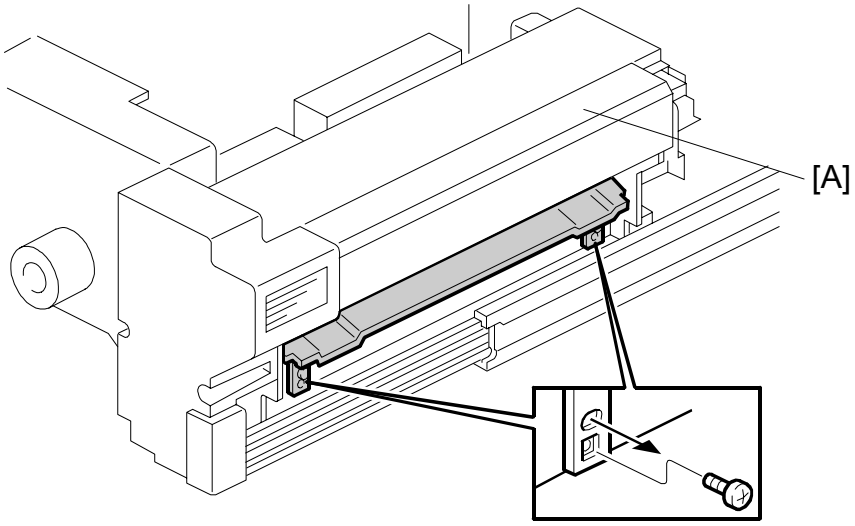
The fusing exit sensor [F] monitors the progress of the copy paper through the fusing unit and acts as a mis-feed detector while the exit rollers drive the copy paper to the inverter section.

The oil supply roller and cleaning web [G] applies a light coat of silicone oil to the hot roller. It also removes the paper dust on the hot roller.

The hot roller and pressure roller have stripper pawls [H] to prevent wrap-around jams.

The pressure roller is cleaned by a steel cleaning roller [I]. Toner adheres to steel more readily than to silicone rubber.

6.16.2 FUSING ENTRANCE GUIDE



The entrance guide [A] for this machine is adjustable for thick or thin paper by changing the screw position from the upper to the lower.

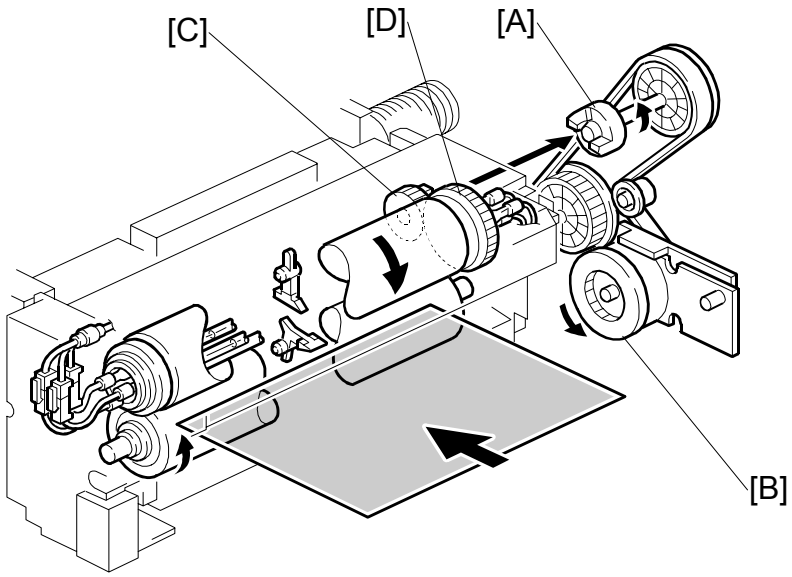
With thin paper, set the entrance guide in the upper position. This slightly lengthens the paper path, which prevents the paper from creasing in the fusing unit.

With thick paper, set the entrance guide in the lower position. This is because thick paper does not bend as easily, and is therefore less prone to creasing. In addition, the lower setting allows more direct access to the gap between the hot and pressure rollers. This prevents thick paper from buckling against the hot roller, which can cause blurring at the leading edge of the copy.

In this model, the transfer belt improves paper transport and stabilizes the paper path to the fusing entrance. This reduces the chance of paper creasing due to paper skews in the fusing unit.

Use the screws to adjust the guide plate position. Since there are very few reasons to change the guide plate position, there is no guide plate position adjustment lever for customer use.

6.16.3 FUSING UNIT DRIVE



The fusing drive gear [A] transmits drive from the fusing/exit motor [B] to the gear [C], which drives the hot roller gear [D]. Rotation passes from the gear [C] through an idle gear to the exit roller drive section. The pressure roller is driven by the friction between the hot and pressure rollers.

6.16.4 FUSING LAMP AND FUSING TEMPERATURE CONTROL

Overview

This machine controls the fusing temperature of the hot roller by switching the fusing lamps on and off. Three fusing lamps (each of different Wattage) are mounted inside the hot roller.

NAME	WATTAGE		FUNCTION
	NA	EUR/A	
Fusing Lamp A	800 W	730 W	Heats center of the hot roller.
Fusing Lamp B	530 W	530 W	Heats length of the hot roller.
Fusing Lamp C	560 W	540 W	Heats ends of the hot roller.

The table below shows how the fusing temperature control method depends on the mode.

DEFAULT VALUES	B070	B071	SP No.	
Standby Temp.	168°C	173°C	SP1105 001	168 ~ 178°C
Fusing Lower Limit	148°C	153°C	SP1105 002	148 ~ 158°C
Correction for Small Paper Size	7°C	10°C	SP1105 003	0 to 10°C
Correction for Normal Paper Size	2°C	5°C	SP1105 004	0 to 10°C
Correction for OHP	2°C	5°C	SP1105 005	-10 to +5°C
Correction for Tracing Paper	2°C	5°C	SP1105 006	-10 to +5°C

During long jobs some images may not fuse correctly, depending on variables such as paper and image type, and room temperature. In such circumstances, a lower limit is set to prevent paper feed and copying while a “Please Wait” message is displayed to allow time for fusing temperature control to achieve the correct temperature, then the job is re-started.

In most cases, the three fusing lamps never switch on together or in pairs. Usually, the lamps are switched on and off one-by-one at 1 sec. intervals. When a small paper size (smaller than A4/LT) is selected for a job, two lamps are switched on and off at 4 sec. intervals during the job.

Warm-up

Here is a summary of how the machine operates differently during warmup, depending on the temperature of the hot roller.

- **Power On at Less Than 100°C**. If the fusing unit is less than 100°C when the machine is switched on, and auto process control executes.
- **Power On at 100°C or Higher.** If the fusing unit is 100°C or higher when the machine is switched on, and auto process control does not execute.
- **Door Opened Then Closed at Less Than 100°C.** If one of the front doors is opened to remove a jam or perform another procedure, if the fusing unit is less than 100°C when the door is closed, and auto process control does not execute.

- **Door Opened Then Closed at Less Than 140°C.** If the fusing unit is lower than 140°C when the machine is switched on, or when the front doors are closed, the machine enters the fusing idle warm-up mode. The 3 fusing lamps light until the fusing temperature reaches 40°C, then the center fusing lamp switches off, leaving two fusing lamps on (the 40°C target temperature can be adjusted with SP1107 007).
  After the fusing unit reaches 150°C (adjustable with SP1105 009), the hot roller rotates for 10 sec. (adjustable with SP1107).
- **Door Opened and Closed at Higher Than 140°C.** If the fusing unit is higher than 140°C when the machine is switched on, or after the front doors are closed, the machine does not enter the fusing idle mode. It warms up in the same way as returning to normal operation from the low power mode (the machine switches off the center lamp when the fusing unit reaches the temperature set with SP1105 001 [168C°/173°C for the B070/B071] minus 10°C set with SP1105 011).

Start of Copying

When the fusing unit warms up without idling (higher than 140°C), the machine can start copying once it reaches a temperature 5 degrees lower than the pre-target stand-by temperature.

When the fusing unit warms up in the idling mode (less than 140°C), the machine can start copying 80 sec. after it reaches the temperature 8 degrees lower than the target stand-by temperature.

- The pre-stand-by temperature is 168°C/173°C for the B070/B071 (adjustable with SP1105 001) plus the value with SP2208 002 (Default: 160°C, for the B070 and 165°C for the B071)
- The 80 sec. default wait time can be adjusted with SP1108 001.

Temperature Control for Different Paper

The machine automatically adjusts fusing temperature control for the size and type of paper or other print media. This is not done to maintain the target fusing temperature, but to account for differences in the type of paper and power supply fluctuation.

- **Temperature Control for A4/LT sideways or wider:** Three lamps are switched on when copying with A4/LT size paper. In this case, the target fusing temperature, 168°C for the B070 or 173°C for the B071, is raised by adding the setting of SP1105 004 (2°C [B070] or 5°C [B071]).
- **Temperature Control for paper less wide than A4/LT sideways:** Immediately after a copy job starts with small size paper, three fusing lamps are used, then lamp C is switched off. In this case, the target fusing temperature, 168°C for the B070 (90 cpm) or 173°C for the B071 (105 cpm), is raised by adding the setting of SP1105 003 (7C [B070] or 10°C [B071]).
- **Temperature Control for OHP:** When copying with OHP transparencies or tracing paper, three lamps are used and no lamp is switched off.

Temperature Control: General Comments

The fusing lamps switch on to raise the temperature of the hot roller to the target fusing temperature and switch off when the hot roller is 2°C higher than the target temperature.

If more than one fusing lamp ceases to function during a copy job, the fusing temperature drops, the machine enters the stand-by mode and issues SC542 (Fusing Temperature Warm-up Error).

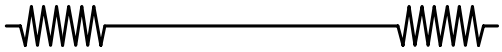
Fusing temperature control is not affected when:

- The machine operates in the low speed mode.
- When thick paper is selected for copying.
- When thick paper is selected for copying in the low speed mode.

The table below describes the sequence for switching the lamps on and off to control the fusing temperature.

Fusing Lamp A (Center)

Fusing Lamp B (Length)



Fusing Lamp C (Ends)

NAME	WATTAGE		FUNCTION
	NA	EUR/A	
Fusing Lamp A	800 W	730 W	Heats center of the hot roller.
Fusing Lamp B	530 W	530 W	Heats length of the hot roller.
Fusing Lamp C	560 W	540 W	Heats ends of the hot roller.

CONDITION	LAMPS USED	CONTROL SEQUENCE	
Warm up, Re-load (See Note 1) (before the hot roller temperature reaches the hot roller idle rotation start temperature of 140°C)	3	ON:	A→ B→ C (See Note 2)
Warm up, Re-load (after the hot holler reaches temperature higher than the hot roller idle rotation start temperature of 140°C)	2	ON:	B → C
Standby	1	ON	B, C Alternates
Normal Size Paper Copying (ON/OFF timing fixed at 1 sec. intervals)	3	ON	A → B → C
		OFF	C → B → A
Small Size Paper (ON/OFF timing fixed at 4 sec. intervals)	2	ON	A → B
		OFF	B → A

Note 1 Re-load temperature is the temperature while the machine is idling.
Note 2 When a small paper size (smaller than A4/LTR) is selected for the job, all three lamps remain on until the fusing unit reaches the target temperature, then Lamp C switches off to prevent the ends of the hot roller from over heating.

6.16.5 LOW SPEED MODE (CPM DOWN TO 70 PPM)

The User Tools has a selection that allows the customer to improve the fusing of images and text to thick paper and tracing paper by slowing down the machine (System Settings> General Features> Optimum for Thick Paper: Set to 'On'). For example, the speed is reduced to 70 cpm (350 mm/s) using A4 LEF. With this setting switched on, the machine speed is not only lowered but this setting affects process control as well.

In the low speed mode, the speed of the polygon mirror motor is reduced to about 20,000 rpm, and the initial setting for the speed of the web motor on interval is reduced to 25.3 second (NA) or 15.4 sec. (Europe/Asia).

Speed Reduction

Paper Size and Variable Speeds

Size	Speed
A3	30 cpm
B4	40 cpm
A4 SEF	40 cpm
A4 LEF	70 cpm
B5 SEF	50 cpm
B5 LEF	70 cpm
A5 SEF	70 cpm
A5 LEF	70 cpm

Process Control

In low speed mode, the following items are adjusted as described below.

1. Development Line Speed. Does not change.

2. Toner Supply Rate. Uses the settings of SP2209 002 (Toner Supply Rate – Low Speed).

3. Transfer Conditions. Uses the settings of SP2301 007~012 (Transfer Current Adjustment) and SP2940 009~016 (Leading Edge Transfer Current)

4. LD Intensity

With process control ON, the amount of light emitted by the laser is reduced by:

LD Adjustment by Process Control x Line Speed Rate

With process control OFF, the amount of LD adjustment is set to "0" and the line speed rate/s and quantity of light are reduced.

5 Charge Conditions

These depend on whether auto process control is switched off or on.

Process Control Off

Depends on the settings of the following SP codes:

SP2001 008	Adjusts the voltage applied to the grid plate during copying.
SP2001 009	Adjusts the voltage applied to the grid plate for making the ID sensor pattern.

Process Control On

Depends on the voltage setting of SP2001 010.

The current grid voltage as a result of process control can be checked SP3902 004 (Process Control Display - VG). From this value for VG (SP3902 004 – SP2001 010) , the value of the minus VL correction (SP3902 013) and the value of SP2001 010 (the value for the bias grid is determined for line speed of 350 mm/s) and VL is adjusted for 350 mm/s (low speed mode).

6 Development Bias Conditions

The development potential for low speed mode is determined by subtracting the value of SP2201 008 from the value for SP2201 004.

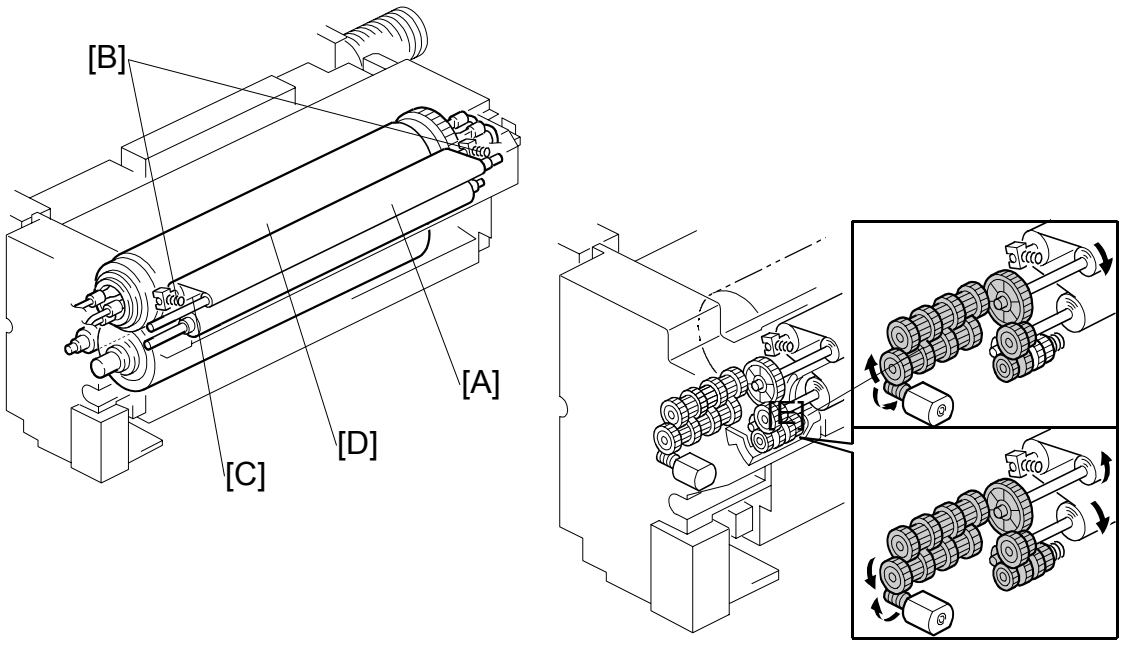
8 ID Pattern Interval and LD Exposure Level

Uses the settings of SP2104 002 (LD Power Adjustment for ID Sensor Pattern – Low Speed).

Others

- Leading edge registration: SP1001 003 and 004
- Fusing unit web motor (how often it turns on): SP1902 005

6.16.6 OIL SUPPLY AND CLEANING



The oil supply and cleaning web [A] feeds the web felt soaked with silicone oil. Springs [B] hold a roller under the web [C] against the hot roller [D].

This intermediate roller applies a light coat of silicone oil to the hot roller and removes paper dust and toner from the hot roller.

A spring clutch inside the mechanism pulls the web to take up the slack, to prevent it getting pulled in between the fusing rollers.

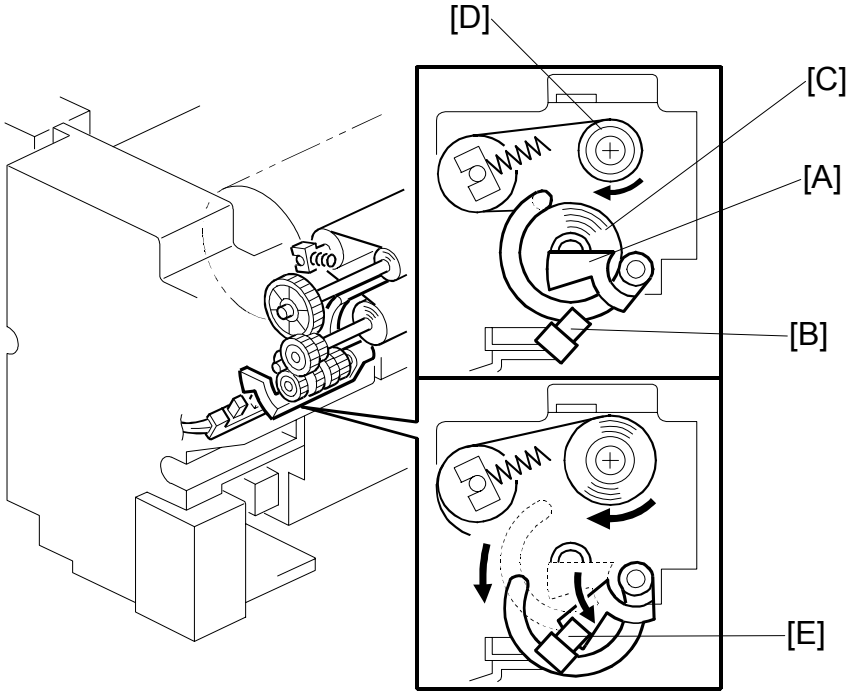
At prescribed intervals (see below), the web motor [E] switches on for 2.8 sec. to move the oil supply and cleaning web felt.

Web Motor Run Time Intervals

	B070 (90 cpm)	B071 (105 cpm)
NA	20.7 s	17.0 s
EUR/A	12.6 s	10.4 s

The interval starts when the first copy reaches the fusing exit sensor, and ends 2 sec. after the last copy has passed this sensor. SP1902 002, 003 (Web Motor Control – Web Motor Drive Interval, Web Motor Drive Time) can be used to adjust the motor rotation time and rotation interval. SP1902 004 (Web Motor Control - Web Near End Setting) is used to adjust the near end timing for the web (Default: 90% for NA, 86% for EUR/A).

The web is 20 m long and lasts for about 600K copies for NA, or 350K copies for EUR/A.



SP1902 001 displays the web consumption. When the web consumption exceeds the value set with SP1-902-4 (Web Near End), the machine indicates web near-end on the operation display.

The machine still operates while the actuator [A] remains above the web end sensor [B] undetected. The actuator arm of the actuator remains in contact with the supply roller [C] and gradually lowers as the amount of web on the supply roller grows smaller as it is fed to the take-up roller [D] above.

When the web runs out, the actuator drops into the web end sensor at [E] and the sensor signal to the CPU displays SC550 on the operation panel display. In this condition, a technician must install a new oil supply and cleaning web, and then reset SP1902 001 to 0 to clear SC550.

SP1902 004 (Web Near End) can be adjusted to change the near-end period. The defaults for and amount of web that remains for copying are different for NA and EUR/A.

Near-End

Area	Near-End	Web Remaining
NA	90%	600K
EUR/A	86%	350K

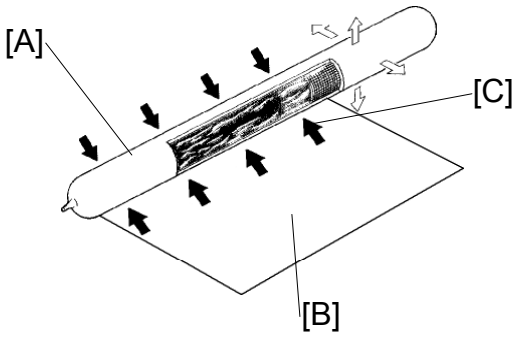
The table below, provided for your reference, shows approximately how adjustment of SP1902 002 affects the near-end and end displays on the B070 (90 cpm) or B071 (105 cpm).

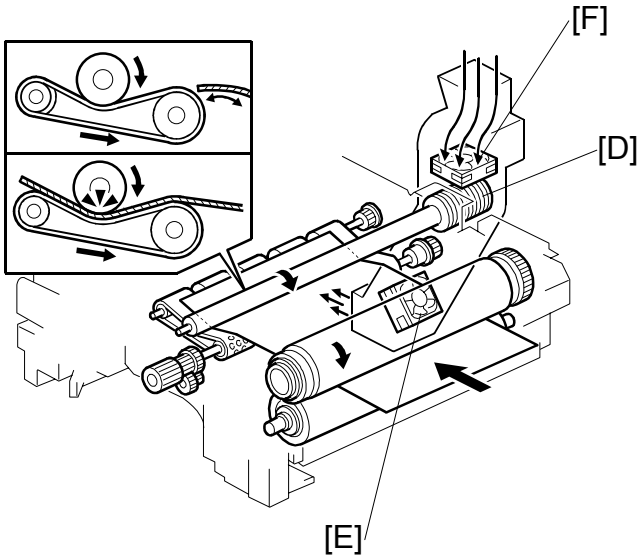
Note that adjustment of SP1902 002 also affects SP1902 005 (Web Motor Control – Web Motor Drive Interval (Low Speed)).

SP1902 002 *1			SP1902 004 *3	Near-End Display (Sheets) *4	End Display (Sheets)	Comments
B070	B071	Low Speed Mode *2				
20.7 s	17.0 s	25.3 s	90%	600K	670K	NA Default
15.6 s	12.8 s	19.0 s	90%	450K	500K	
12.1 s	10.0 s	14.8 s	90%	350K	385K	
10.4 s	8.5 s	12.7 s	90%	300K	330K	
6.9 s	5.7 s	8.5 s	90%	200K	220K	
12.6 s	10.4 s	15.4 s	86%	350K	410K	EUR/A Default
10.8 s	9.0 s	13.2 s	86%	300K	350K	
7.2 s	6.0 s	8.8 s	86%	200K	230K	

*1: SP1902 002 (Web Motor Control – Web Motor Drive Interval)
*2: SP1902 005 (Web Motor Control – Web Motor Drive Interval (Low Speed))
*3: SP1902 004 (Web Motor Control – Web Near End Setting)
*4: Calculated based on A4 LEF at 100% magnification.
NOTE: SP1902 003 (Web Motor Control – Web Near End Setting) not adjusted.

6.16.7 PAPER COOLING





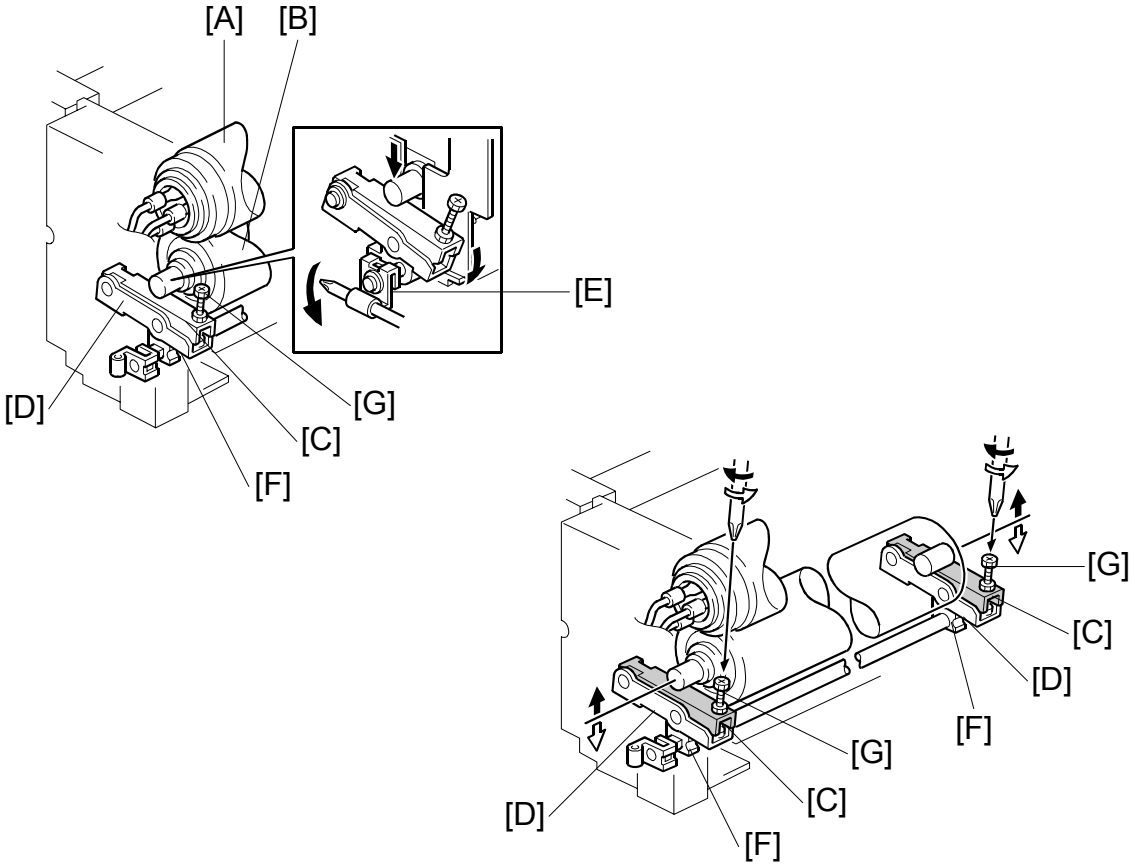
The paper cooling pipe [A] cools the copy paper [B] after it has gone through the fusing unit. This prevents the temperature around the drum from increasing in duplex mode.

The paper cooling pipe has a hollow metal tube inside. Water capillary tubes run along the inside of the paper cooling pipe, and these transfer heat within the pipe.

The hot paper leaving the fusing unit heats the parts of the cooling pipe that it touches at [C] (black arrows), causing the water in the pipe to vaporize. This creates a high-speed flow of steam to the ends of the pipe, which are cooler, especially to the rear, which is well away from the paper feed path, and has the cooling fins [D] attached to it. When the steam reaches this area, it cools and condenses. Capillary action returns the condensation to the heated part of the pipe.

This heat transfer cycle (vaporization → steam transfer → condensation) repeats continuously. Paper cooling pipe fan 1 [E] in the duct at the machine rear side cools the fins and paper cooling fan 2 [F] pulls the air around the fins out of the fusing unit.

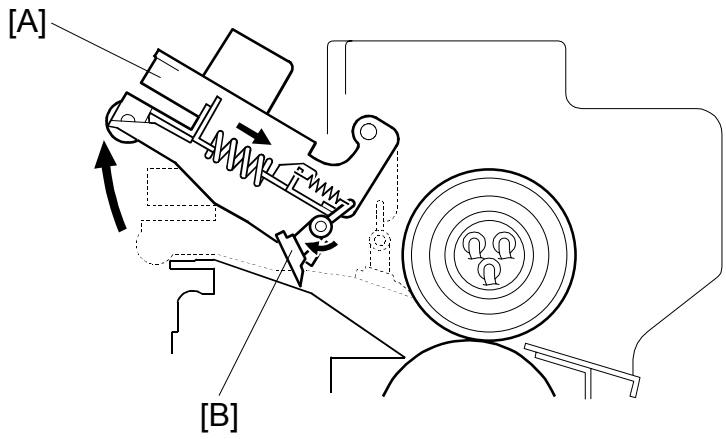
6.16.8 FUSING PRESSURE



Fusing pressure is constantly applied between the hot roller [A] and pressure roller [B] by the upper pressure lever [C] and lower pressure lever [D], which are lifted by the fusing unit release lever [E] via the pressure cam [F]. The pressure can be adjusted by using the pressure adjustment screw [G].

The fusing pressure is released by turning the fusing unit release lever counterclockwise.

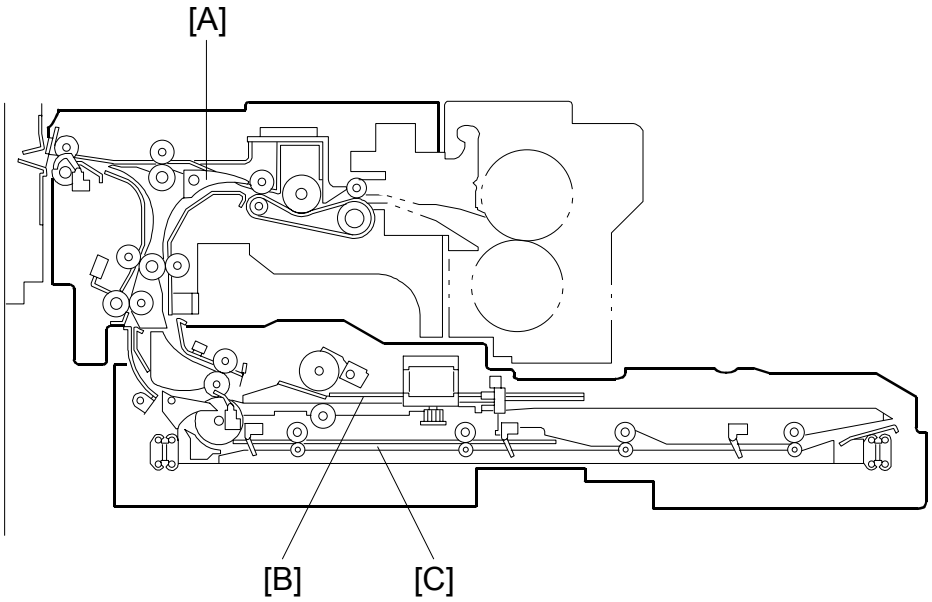
6.16.9 HOT ROLLER STRIPPER RELEASE



For easier jam removal, when the hot roller stripper unit [A] is opened, the stripper pawls [B] turn clockwise to expand the jam removal area.

6.17 PAPER EXIT/DUPLEX

6.17.1 OVERVIEW

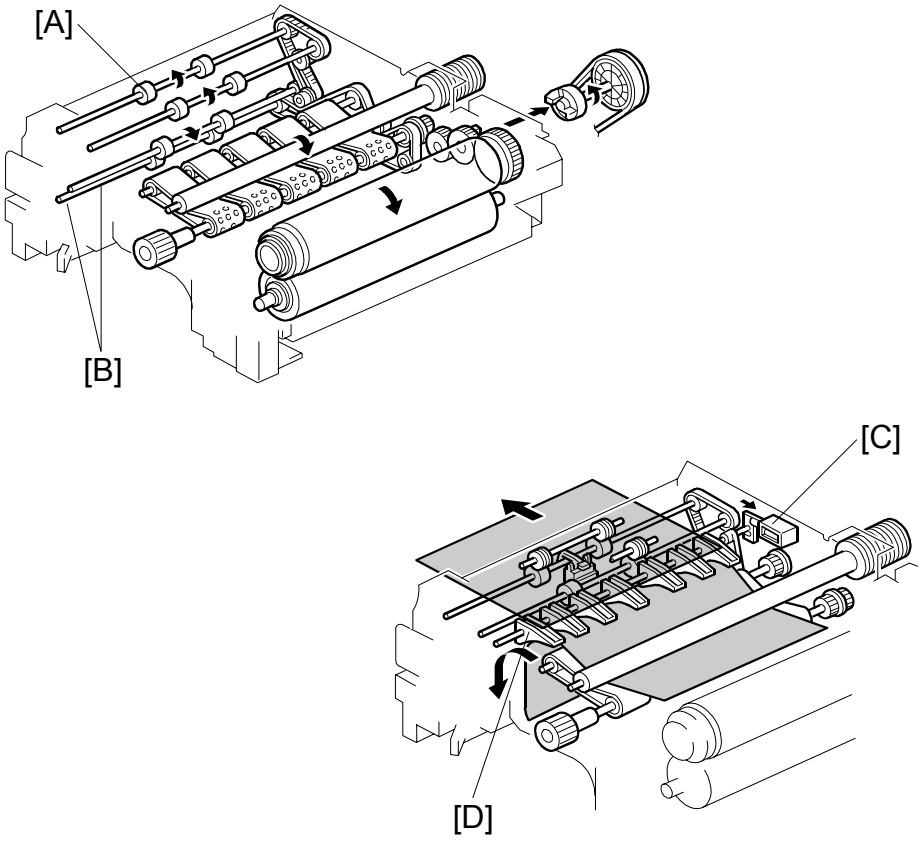


The printed page from the fusing unit goes either straight through to the output tray or finisher, or downward through to the inverter or duplex unit, depending on the position of the junction gate [A].

If the page is fed out directly, it arrives on the tray face-up. If the user selected face-down output, the page goes to the inverter [B] before being fed out.

If the user selects duplex mode, the page is directed to the duplex tray [C] after inverting, and back to the machine for printing the second side.

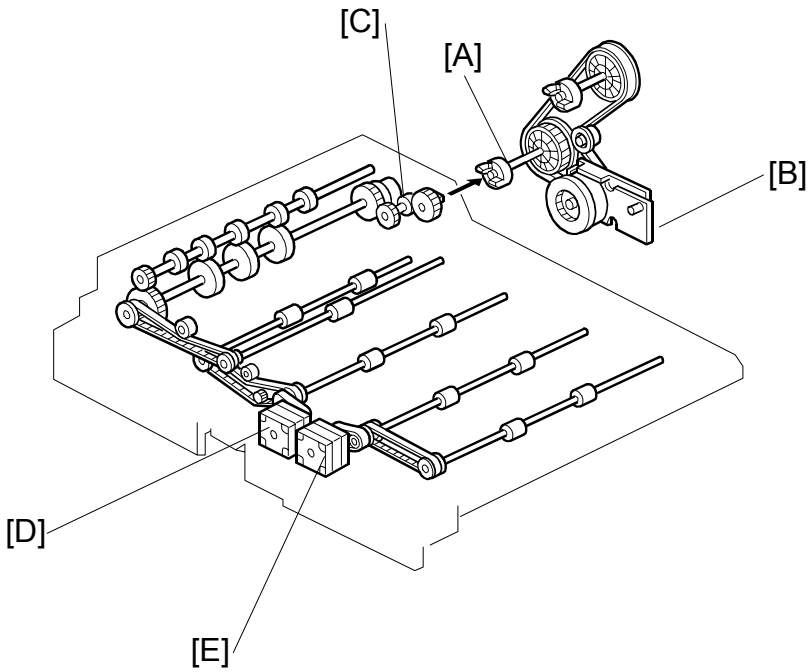
6.17.2 PAPER EXIT MECHANISM



Drive from the fusing/exit motor is transmitted to the paper exit roller [A] and transport rollers [B].

To feed the printed page from the fusing unit straight through to the output tray or finisher, the inverter gate solenoid [C] energizes to open the junction gate [D]. To feed the page to the inverter and duplex unit, the solenoid stays off.

6.17.3 DUPLEX DRIVE MECHANISM



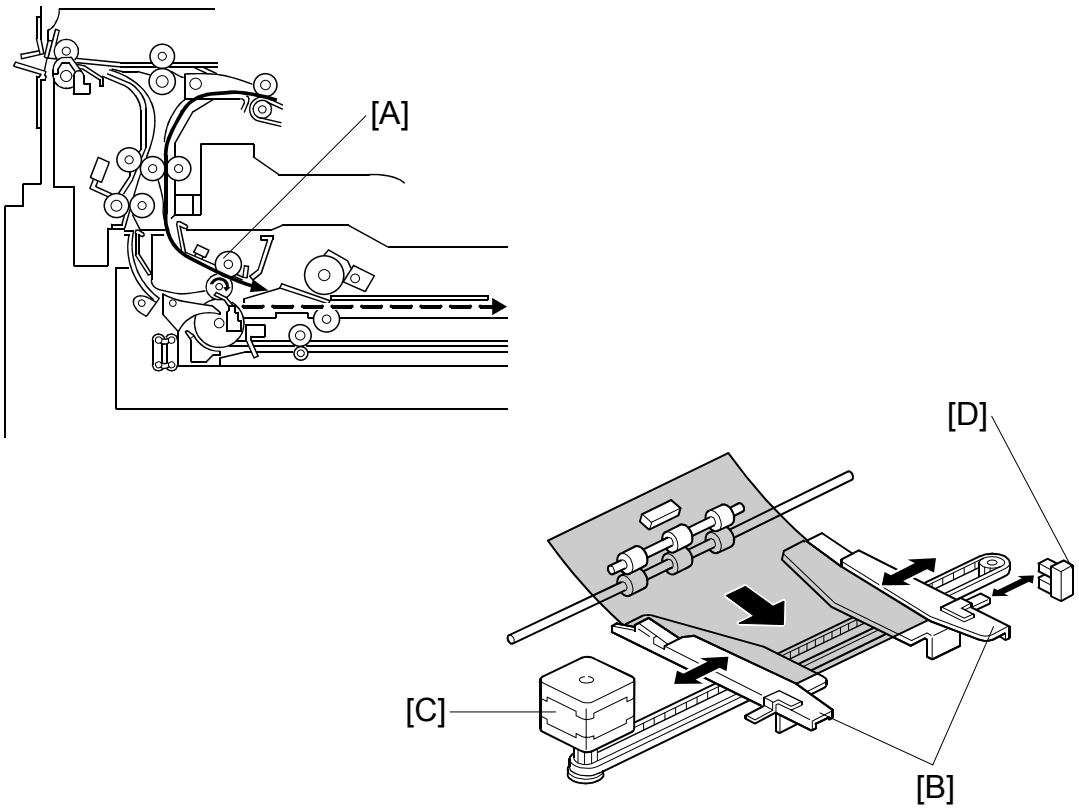
The duplex drive coupling gear [A] transmits drive from the fusing/exit motor [B] to the duplex unit. This motor drives the inverter and the reverse roller.

The inverter exit roller clutch [C] transmits drive from this motor to the duplex inverter exit section. The inverter exit roller clutch engages the drive (i.e., the roller turns) while the clutch is not energized. This clutch disengages the drive when the clutch is turned on. This prevents the clutch from being energized for a long time.

Duplex transport motors 1 [D] and 2 [E] drive the paper feed rollers in the horizontal paper path of the duplex unit and feed out the paper from the duplex unit.

6.17.4 INVERTER

Feed-in and Jogging



The inverter feed roller [A] feeds paper to the jogger section. After the trailing edge of the paper passes through the inverter feed roller, the jogger fences [B] move to square the paper. This happens every page.

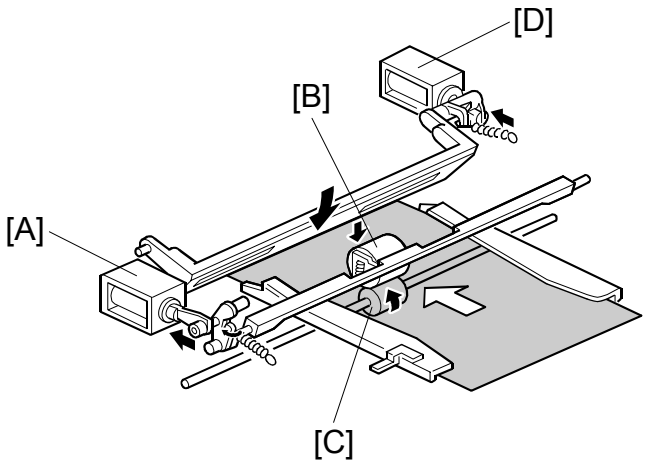
The jogger motor (a stepper motor) [C] moves the jogger fences [B] inward or outward.

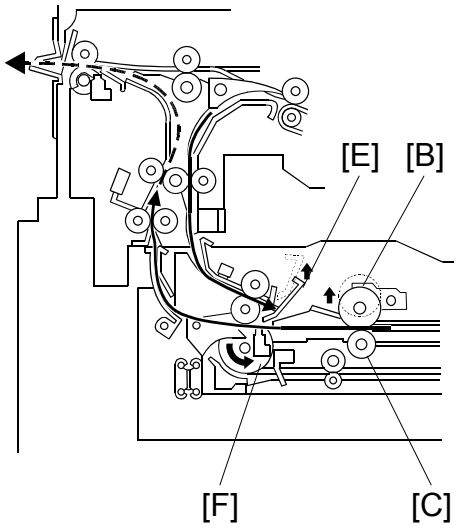
When the main switch is turned on, the jogger motor places the jogger fences at the home position, which is determined by monitoring the signal from the jogger home position sensor [D].

When the start key is pressed, the jogger motor positions the jogger fences 15 mm away from the selected paper size to wait for the paper.

When the paper is delivered to the jogger fences, the jogger fences move inward to square the paper. After this, the jogger fences move back to the previous position (15 mm away from the paper).

Feed-out

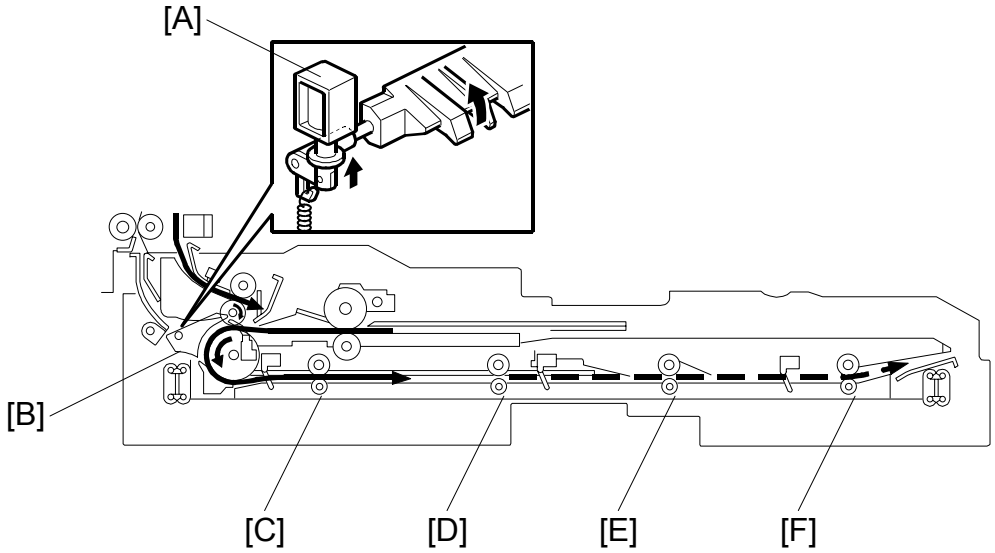




After jogging, the reverse roller solenoid [A] energizes to push down the reverse trigger roller [B]. The reverse roller [C] turns counterclockwise continuously, so the paper starts to reverse when the reverse trigger roller is down and catches the paper between the rollers. The inverter guide plate solenoid [D] energizes to lower the inverter guide plate [E], so that the paper is guided by the inverter guide plate. The next sheet waits at the inverter guide plate.

The paper is fed from the reverse roller to the inverter exit roller [F]. After the paper starts to be fed by the inverter exit roller, the reverse trigger roller and inverter guide plate move back up.

6.17.5 DUPLEX TRAY FEED MECHANISM



In duplex mode, after the paper leaves the inverter, the duplex inverter gate solenoid [A] switches the junction gate [B] to direct the paper to the duplex tray. The paper is fed through the duplex tray by duplex transport rollers 1 [C], 2 [D], 3 [E], and the duplex feed roller [F].

If duplex mode is not selected, the solenoid does not switch the junction gate, and the paper goes to the output tray or finisher face down.

6.17.6 BASIC DUPLEX FEED OPERATION

To improve the productivity of duplex copying, a non-stacking style duplex mechanism is adopted. This type of mechanism allows more than one page to be processed at once, in a process called 'interleaving'. Examples of this are given below.

For paper lengths up to A4/Letter LEF, the top duplex speed is possible, with the duplex unit processing four sheets of copy paper at the same time.

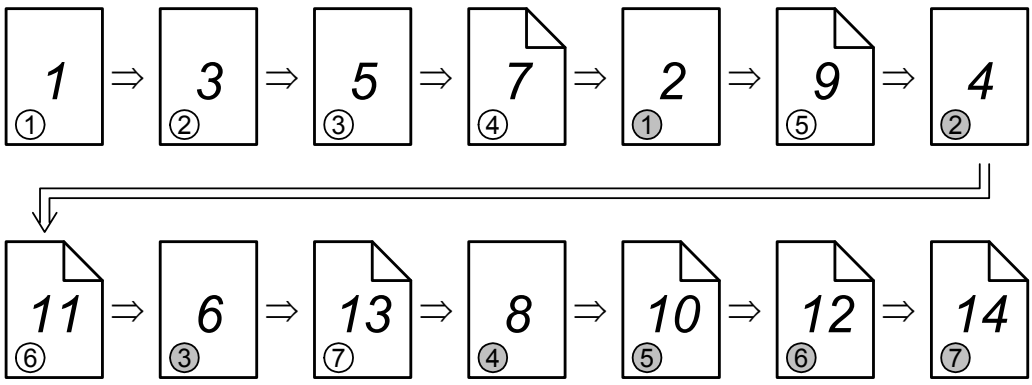
For paper longer than this, the duplex tray can process two sheets of copy paper at once.

For a single-set duplex copy job, the duplex unit stores only one sheet of copy paper. For a multi-set duplex job, the job is stored first, then the first set is made using interleaving.

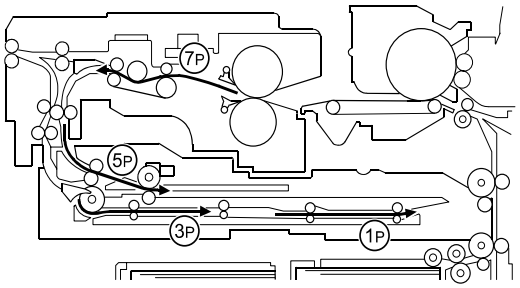
Length up to A4/Letter LEF

The duplex unit can process four sheets of copy paper

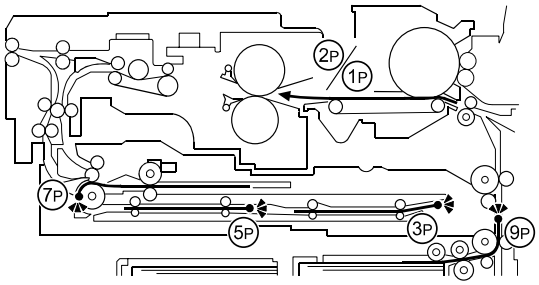
Example: A 14-page copy. The large numbers in the illustration show the order of pages. The small numbers in circles show the order of sheets of copy paper (if shaded, this indicates the second side).



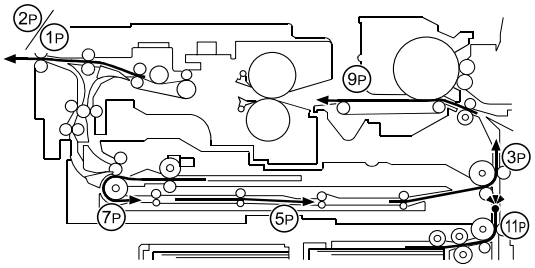
1. The first 4 sheets are fed and printed.
   1) 1st sheet printed (1st page)
   2) 2nd sheet printed (3rd page)
   3) 3rd sheet printed (5th page)
   4) 4th sheet printed (7th page)



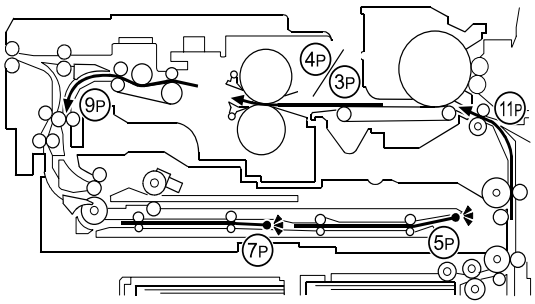
2. The back of the 1st sheet is printed (2nd page).
3. The 2nd, 3rd, 4th sheets (3rd, 5th, and 7th pages) go into the duplex unit.
4. The 5th sheet (9th page) is fed in.

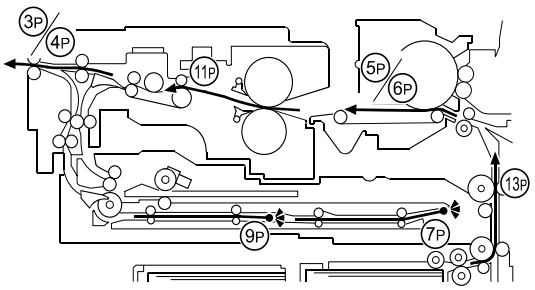


5. The 5th sheet is printed (9th page).
6. The 1st sheet is fed out (1st and 2nd pages printed).



7. The 5th sheet (9th page) is directed to the duplex unit.
8. The 6th sheet (11th page) is fed.
9. The back of the 2nd sheet is printed (4th page).



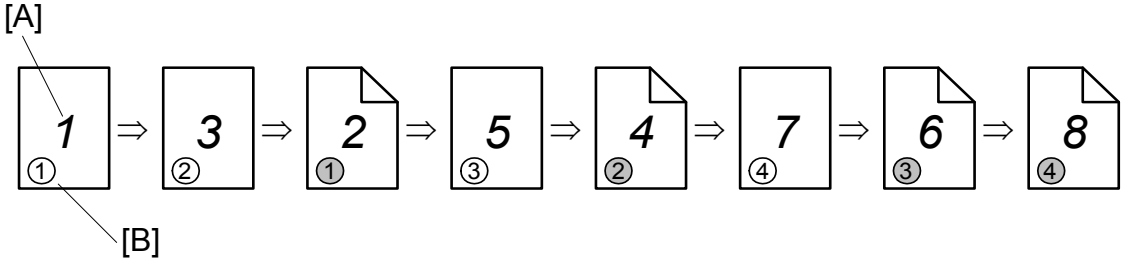


10. The 2nd sheet is fed out (3rd and 4th pages printed).
11. The 6th sheet is printed (11th page) and directed to the duplex unit.
12. The back of the 3rd sheet (6th page) is printed.
13. The 7th sheet is fed and printed (13th page).
14. The back of the 4th sheet is printed (8th page) and fed out (7th and 8th page).
15. The back of the 5th sheet is printed (10th page) and fed out (9th and 10th pages).
16. The back of the 6th sheet is printed (12th page) and fed out (11th and 12th pages).
17. The back of the 7th sheet is printed and fed out (13th and 14th pages).

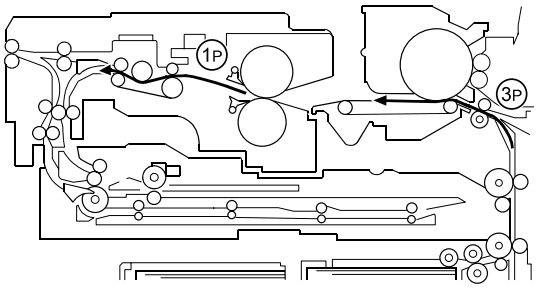
Longer than A4/Letter LEF

The duplex unit can process two sheets of copy paper

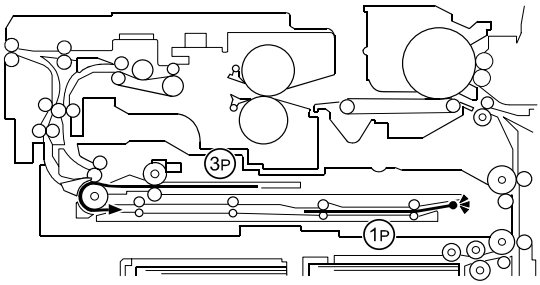
Example: 8 pages. The number [A] in the illustration shows the order of pages. The number [B] in the illustration shows the order of sheets of copy paper (if shaded, this indicates the second side).



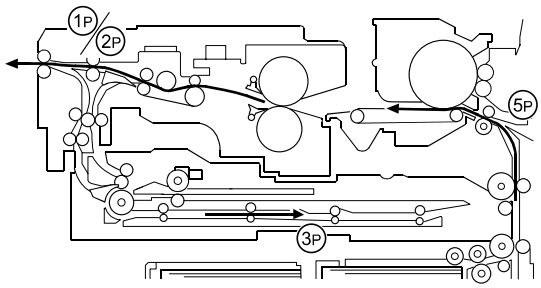
1. The first 2 sheets are fed and printed.
   1) 1st sheet printed (1st page)
   2) 2nd sheet printed (3rd page)



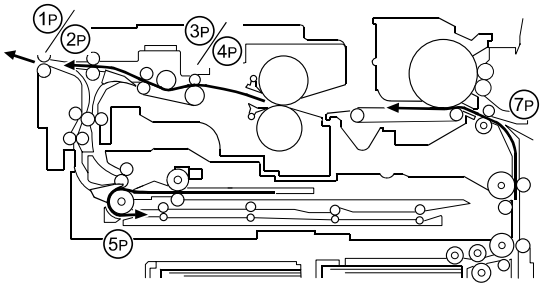
2. The first 2 sheets go into the duplex unit.



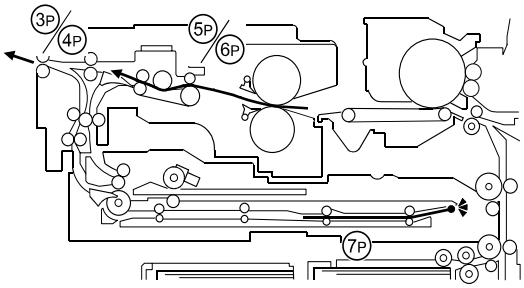
3. The back of the 1st sheet (2nd page) is printed.
4. The 3rd sheet (5th page) is fed and printed.



5. The 1st sheet (1st and 2nd pages) is fed out.
6. The back of the 2nd sheet (4th page) is printed.
7. The 4th sheet (7th page) is fed and printed.



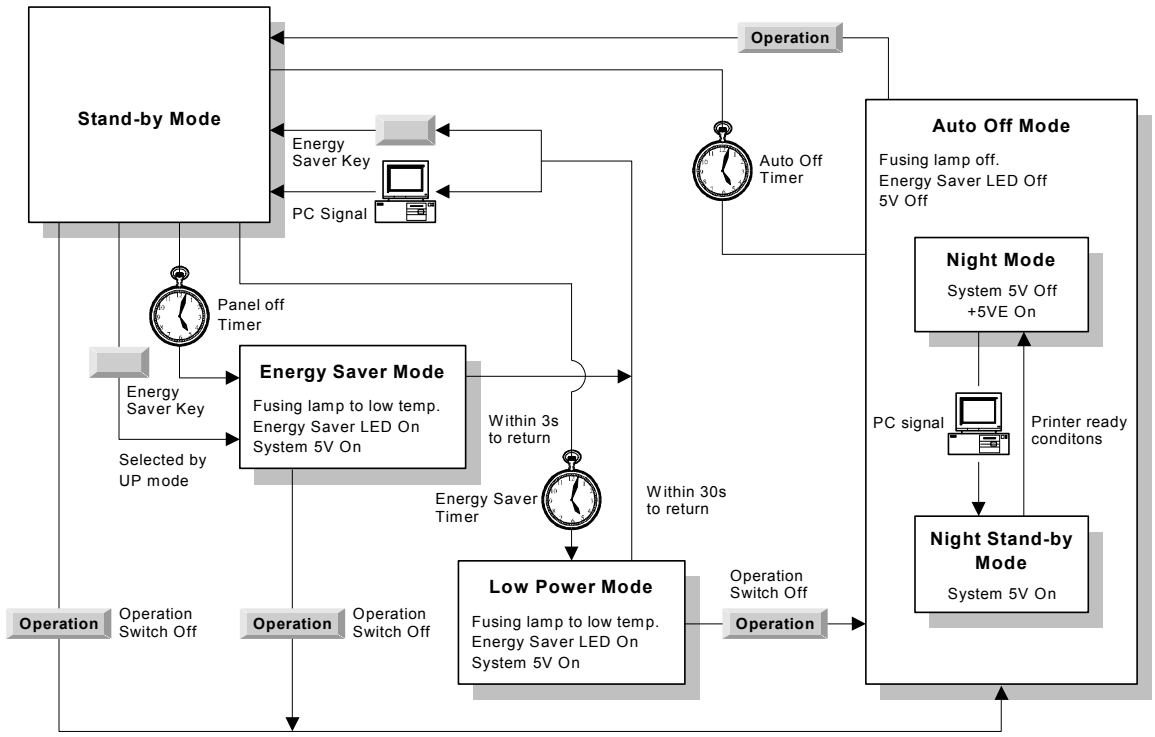
8. The 2nd sheet (3rd and 4th pages) is fed out.
9. The back of the 3rd sheet (6th page) is printed.



10. The 3rd sheet (5th and 6th pages printed) is fed out.
11. The back of the 4th sheet (8th page) is printed.
12. The 4th sheet (7th and 8th pages) is fed out.

6.18 ENERGY CONSERVATION MODES

6.18.1 OVERVIEW



When the machine is not used, the energy saver function reduces power consumption by lowering the fusing temperature.

This machine has four types of energy saver mode as follows.

1) Energy saver mode (called 'panel off mode' in the operation manual)
2) Low power mode (called 'energy saver mode' in the operation manual)
3) Auto off mode (copier configuration only)
4) Night mode (copier/printer/scanner configuration only)

These modes are controlled by the following User Tools:

- Panel off timer
- Energy saver timer
- Auto off timer
- Auto off disabling

The way that the machine operates depends on the combination of installed equipment (copier only, or whether a printer/scanner is installed).

6.18.2 ENERGY SAVER MODE

Entering the energy saver mode

The machine enters energy saver mode when one of the following is done.

- The Energy Saver Key is held down for a second.
- The panel off timer runs out after the last job (User Tools - System Settings - Timer Setting - Panel Off Timer: default setting is 60 s).

What happens in energy saver mode

When the machine enters energy saver mode, the fusing lamp drops to a certain temperature and the operation panel indicators are turned off except for the Energy Saver LED and the Power LED.

If the CPU receives the image print out command from an application (e. g. to print data from a PC), the fusing temperature rises to print the data. However, the operation indicators stay off.

Return to stand-by mode

If one of the following is done, the machine returns to stand-by mode:

- The Energy Saver Mode key is pressed
- An original is placed in the ADF
- The ADF is lifted
- A sheet of paper is placed in the by-pass feed table

Operation Switch	Energy Saver LED	Fusing Temp.	Approx. Recovery Time	System +5V
On	On	168°C (B070/90 cpm) 173°C (B071/105 cpm)	3 s	On

6.18.3 LOW POWER MODE

Entering the low power mode

The machine enters low power mode when:

The energy saver timer runs out after the last job.
(User Tools - System Settings - Timer Setting - Energy Saver Timer: default setting is 15 min)

What happens in low power mode

The fusing lamp drops to the prescribed temperature, as shown in the table below (the temperature drops more than that in energy saver mode). The other conditions are the same as for the energy saver mode.

Return to stand-by mode

The machine returns to standby mode in the same way as from the energy saver mode.

Operation Switch	Energy Saver LED	Fusing Temp.	Approx. Recovery Time	System +5V
On	On	143 °C (B070/90 cpm) 150°C (B071/105 cpm)	40 s	On

6.18.4 AUTO OFF MODE

Auto off mode is used only if no optional printer/scanner unit is installed.

Entering auto off mode

The machine enters auto off mode when one of the following is done.

- The auto off timer runs out after the last job (User Tools – System Settings – Timer Setting – Auto Off Timer: default setting is 90 min)
- The operation switch is pressed to turn the power off

What happens in auto off mode

When the machine enters auto off mode, the fusing lamps and all dc supplies except +5VE/12VE (+5V/12V for energy saver mode) turn off.

Returning to stand-by mode

The machine returns to stand-by mode when the main operation switch is pressed.

Operation Switch	Energy Saver LED	Fusing Temp.	Approx. Recovery Time	System +5V	Note
Off	Off	Room Temp. (Fusing lamp off)	360 s	Off	Only +5VE/+12VE is supplied to the Controller, MB, HDD.

Disabling auto off mode

If the user wishes to disable auto off mode, use the following user tool: User Tools – System Settings – AOF (change the setting to 'OFF').

6.18.5 NIGHT MODE

This is used instead of auto off mode when an optional scanner/printer unit is installed.

There are two types of night mode: Night Stand-by Mode and Night Mode. The difference between night stand-by mode and night mode is the machine's condition when the machine enters auto off mode.

Entering night stand-by and night modes

The machine enters the night stand-by mode and night modes when one of the following is done.

- The operation switch is pressed to turn the power off
- The auto off timer runs out (the operation switch is then turned off, but the main power switch stays on)

If the machine is in one or more of the following conditions, the machine enters night stand-by mode. If not, the machine enters night mode.

- Error or SC condition
- Image data is stored in the memory
- An original is in the ADF
- The ADF is open
- Paper is left in the duplex unit or staple tray

What happens in night stand-by and night modes

When the machine enters either of these modes, the fusing lamp and operation switch turn off, and only the main power LED is lit.

Night stand-by mode

The system +5V and +24 V are supplied to all components.

Night mode

The system +5V supply is also turned off. However, +5VE (+5V for energy saver mode) is still activated. When the machine detects a signal from the PC, the machine goes back to night stand-by mode and the system +5V and +24V supplies are activated. Then the machine receives the incoming message and prints it.

Returning to stand-by mode

The machine returns to stand-by mode when the operation switch is pressed.

Mode	Operation Switch	Energy Saver LED	Fusing Temp.	System +5V	Note
Night stand-by mode	Off	Off	Room Temp. (Fusing lamp off)	On	
Night mode	Off	Off	Room Temp. (Fusing lamp off)	Off	Only +5VE/+12VE is supplied to the controller, MB, HDD.

SPECIFICATIONS

SPECIFICATIONS

1. GENERAL SPECIFICATIONS

1.1 COPIER ENGINE

Configuration:	Console	
Copy Process:	Dry electrostatic transfer system	
Originals:	Sheet/Book/Object	
Original Size:	Max.: A3/11" x 17"	
	Min.: A5, 5 1/2" x 8 1/2" (with ADF)	
Original Alignment:	Rear left corner (for platen mode, ADF mode)	
Paper Weight:	Tray 1~3:	52 to 163 g/m^2
	Tray 6 (LCT):	Bond: 16 to 40 lb. Cover: 50 to 60 lb. Index: 90 lb.
	Tray 4~5 (LCT):	52 to 216 g/m^2
	Tray 7 (Bypass):	Bond: 16 to 40 lb. Cover: 50 to 60 lb. Index: 90 to 110 lb.
	Duplex Tray (Possible Weight):	64 to 163 g/m^2 Bond: 20 to 40 lb. Cover: 50 to 60 lb. Index: 90 lb.
Paper Size:	Tray 1 (Tandem):	8 1/2" x 11" LEF, A4 LEF
	Tray 2, Tray 3:	5 1/2" x 8 1/2" to 11" x 17", 12" x 18" A5 to A3
	Duplex Tray (Possible Sizes):	A5 to A3, 5 1/2" x 8 1/2" to 11" x 17", 12" x 18"
Reproduction Ratios:	7 reduction and 5 enlargement	

	Metric Version	Inch Version
Enlargement	400% 200% 141% 122% 115%	400% 200% 155% 129% 121%
Full Size	100%	100%
Reduction	93% 82% 75% 71% 65% 50% 25%	93% 85% 78% 73% 65% 50% 25%

Zoom: 25 ~ 400% (allows manual adjustment in 1% steps vertically, horizontally)

Copy Speed:

B070	90 ppm	Copying with image stored in memory with A4/LT LEF feeding from the same tray.
B071	105 ppm	
B070/B071	75 ppm	When using ADF 1-to-1 with A4/LT LEF magnification feeding from the same tray.

Resolution: Scanning 600 dpi; Printing 1200 dpi

Gradation: 256 levels Scanning (8 bits/pixel) Printing (1 bit/pixel, 9 values):

Warm-up Time: Less than 360 s from Off mode at 23°C (73.4°F)

First Copy Time: Copy Tray 1, A4/8 1/2" x 11" LEF

	B070 (90 cpm)	B071 (105 cpm)
Face-up	Less than 3.5 s	Less than 3.2 s
Face-down	Less than 5.0 s	Less than 4.2 s

Copy Number Input: 1 to 9999

Copy Paper Capacity (Sheets):

Copier	3,000	Tray 1: (Tandem) 1000 x 2 Tray 2: 500 Tray 3: 500
LCT	4,550	Tray 4: 1,000 , Tray 5: 1,000, Tray 6: 2,550
Bypass	500	Tray 7, 500 (Optional Bypass Tray B512)
Total	8,050	

Memory Capacity: RAM; 256 MB (128 x 2) Standard
256 MB (Optional, Required for Scanner/Printer Option)
HDD; 80 GB (40 GB x2), approximately 1,735 copies

Toner Replenishment: Cartridge exchange (1,450 g/cartridge)

Toner Yield: 55 K copies, (A4 LEF, 6% chart, B070 (90 cpm) 1 to 25 Repeat Copying), (B071 (105 cpm), 1 to 50 Repeat Copying)

Power Source: North America; 208 to 240 V, 60 Hz, 20 A
Europe/Asia; 220 to 240 V, 50/60 Hz, 16 A

Dimensions (W x D x H): Copier; 870 x 858.5 x 1476 mm
32.3" x 33.8" x 58.1"
Full System; 2218 x 8585 x 1476 mm
87.3" x 33.8" x 58.1"

Weight: Less than 275 kg (605 lb.) including ADF, and no options

Space Requirements:

Copier (w x d) 1202 x 858.5 mm (47.3" x 33.8")

Full System[*1] (w x d)

Max.	2528 x 858.5 mm 99" x 33.7"	Finisher + Bypass with bypass tray extended for A3 SEF
Min.	2804 x 858.5 mm 110.4" x 33.7"	Finisher + Bypass with bypass tray extended for A4 LEF.

Full System: Mainframe + ADF + Finisher B478 + LCT B511 + Cover Interposer Tray B470 + Bypass Tray B512

Power Consumption: North America Version (Unit: W)

	Mainframe Only		Full System*	
	B070	**B071**	**B070**	**B071**
Warm-up	2.20 K	2.20 K	2.30 K	2.30 K
Stand-by	0.65 K	0.65 K	0.70 K	0.70 K
Copying	2.70 K	2.80 K	2.80 K	2.90 K
Maximum	2.80 K	2.90 K	2.90 K	3.00 K

*Full System: Mainframe + ADF + LCT + Bypass Tray + Cover Interposer + Finisher[1]
[1] Finisher: B478 + Punch Unit with B071 (105 cpm), B468 + Punch Unit with B070 (90 cpm)

Power Consumption: Europe Version (Unit: W)

	Mainframe Only		Full System*	
	B070	**B071**	**B070**	**B071**
Warm-up	2.10 K	2.10 K	2.20 K	2.20 K
Stand-by	0.65 K	0.65 K	0.70 K	0.70 K
Copying	2.50 K	2.60 K	2.60 K	2.70 K
Maximum	2.60 K	2.70 K	2.70 K	2.80 K

*Full System: Mainframe + ADF + LCT + Bypass Tray + Cover Interposer + Finisher[1]
[1] Finisher: B478 + Punch Unit with B071 (105 cpm), B468 + Punch Unit with B070 (90 cpm)

Energy Star

	North America				Europe			
	B071 (105 cpm)		B070 (90 cpm)		B071 (105 cpm)		B070 (90 cpm)	
	Basic	MFP	Basic	MFP	Basic	MFP	Basic	MFP
Low Power Mode								
Power Consumption (W)	350	355	340	345	350	355	340	345
Default Interval (Min.)	15	15	15	15	15	15	15	15
Recovery Time (Sec.)	40	40	40	40	40	40	40	40
Off Mode								
Power Consumption (W)	6		6		6		6	
Default Interval (Min.)	120		90		120		90	
Recovery Time (Sec.)	Less than 360		Less than 360		Less than 360		Less than 360	
Sleep Mode								
Power Consumption (W)		50		50		50		50
Default Interval (Min.)		120		90		120		60
Recovery Time (Sec.)		Less than 360		Less than 360		Less than 360		Less than 360

Noise Emission

B070 (90 cpm)		Sound Power Level db (A)	Sound Pressure Level dB (A)
Mainframe	Stand-by	60	45
	Copying	74	60
Full System	Stand-by	59	46
	Copying	78	68
B070 (105 cpm)		**Sound Power Level dB (A)**	**Sound Pressure Level dB (A)**
Mainframe	Stand-by	60	45
	Copying	76	61
Full System	Stand-by	59	46
	Copying	79	68

1.2 ADF

Original Size:	Normal Original Mode:	A3 to B5, 11" x 17" to 5 1/2" x 8 1/2"
	Thin Original Mode	A3 to B5, 11" x 17" to 5 1/2" x 8 1/2"
	Duplex Original Mode:	A3 to B5, 11" x 17" to 5 1/2" x 8 1/2"
Original Weight:	Normal Original Mode:	52~128 g/m^2 (**Note 1**)
	Thin Original Mode	40~128 g/m^2 (**Note 1**)
	Duplex Original Mode:	52~105 g/m^2 (**Note 2**)
Table Capacity:	100 sheets (80 g/m^2, 20 lb)	
Original Feeding Speed:	75 cpm (A4/8 1/2" x 11" LEF, 1 to 1)	
Original Standard Position:	Rear left corner (Face-up)	
Separation:	FRR	
Original Transport:	One flat belt	
Original Feed Order:	From the top original	
Power Source:	DC 24 V and DC 38 V from the copier	
Power Consumption:	Less than 130 W	
Dimensions (W x D x H):	680 x 560 x 150 mm (26.8" x 22" x 5.9")	
Weight	Less than 17.5 kg (38.5 lb.)	

Note 1:156 g/m^2 possible, but not guaranteed.
Note 2:128 g/m^2 possible, but not guaranteed.

1.3 PAPER SIZES BY FEED STATION

The tables on the next three pages describe how paper size detection operates, depending on the geographical area, namely, North American, Europe/Asia, and China.

Here are important notes and the key for reading these tables.

General Notes

Symbol	Meaning
①	Tandem Tray
❶	A3/DLT Kit B331 Installed
②	Main Machine Universal Trays
③	
④	LCT B511
⑤	
⑥	
⑦	Bypass Tray B512 (Installed on LCT B511)

Key

Trays ①, ❶, ⑥ are fixed trays and do not support automatic paper size detection. Use this key for columns ①, ❶, ⑥.

Symbol	Meaning
❍	Paper size must be selected with an SP code.
▲	A Custom Size must be selected with an SP code.

Trays ②, ③, ④, ⑤ are universal paper cassettes. ②, ③: Paper size can be selected by manually setting the dial on the tray. ④, ⑤: Paper size depends on the position of the actuator plates. Use this key for columns ②, ③, ④, ⑤.

Symbol	Meaning
●	Paper size is detected automatically by paper size detection sensors.
❍	Set dial setting to ✳, move the fences to the correct positions for the paper size, then select paper size with the Tray Paper Settings button.
❑	Setting the dial to ✳ and moving the size fences does not detect the paper size. Select paper size with the Tray Paper Settings button.

Tray ⑦ is the optional Bypass Tray B512. Use this key for column ⑦.

Symbol	Meaning
●	Paper size is detected automatically by the position of the side fence and one paper length sensor.
❍	Paper size can be detected after the operator selects the bypass tray as the feed source, pushes ⓯ on the operation panel, then select the paper size with the Tray Paper Settings button.

NOTE: The side fences and end fence can be adjusted freely to accept any paper size. However, only a limited number of standard paper sizes can be detected automatically. For details, refer to Column 8 (⑦) and the Bypass Tray B512 manual ("Paper Size Detection").

North America

			①	❶	②	③	④	⑤	⑥	⑦
A3	SEF	297 x 420 mm		❍	❍	❍				❍
A3	LEF	420 x 297 mm								
B4	SEF	257 x 364 mm		❍	❑	❑				❍
B4	LEF	364 x 257 mm								
A4	SEF	210 x 297 mm		❍	❍	❍				❍
A4	LEF	297 x 210 mm	❍	❍	❍	❍	●	●	❍	❍
B5	SEF	182 x 257 mm			❑	❑				❍
B5	LEF	257 x 182 mm			❑	❑	●	●	❍	❍
A5	SEF	148 x 210 mm			❍	❍	●	●	❍	❍
A5	LEF	210 x 148 mm			❍	❍	●	●	❍	❍
DLT	SEF	11" x 17"		❍	●	●				●
DLT	LEF	17" x 11"								
LG	SEF	8 1/2" x 14"		❍	●	●				❍
LG	LEF	14" x 8 1/2"								
LT	SEF	8 1/2" x 11"		❍	●	●				●
LT	LEF	11" x 8 1/2 "	❍	❍	●	●	●	●	❍	●
HLT	SEF	5 1/2 " x 8 1/2"			●	●	●	●	❍	●
HLT	LEF	8 1/2" x 5 1/2"			●	●	●	●	❍	●
Executive	SEF	7 1/4" x 10 1/2"			●	●				❍
Executive	LEF	10 1/2" x 7 1/4"								❍
F	SEF	8" x 13"			●	●				●
F	LEF	13" x 8"								
Foolscap	SEF	8 1/2" x 13"			❍	❍				❍
Foolscap	LEF	13" x 8 1/2"								
Folio	SEF	8 1/4" x 13"			❍	❍				❍
Folio	LEF	13" x 8 1/4"								
Folio	SEF	11" x 14"								
Folio	SEF	11" x 15"			❍	❍				❍
Folio	SEF	10" x 14"			❍	❍				❍
Folio	SEF	8 1/4" x 14"								
Folio	SEF	8" x 10 1/2"			●	●				
Folio	SEF	8" x 10"			❑	❑				❍
Folio	SEF	12" x 18"			❑	❑				❍
Custom Size	Width	139 ~ 305 mm			❑	❑				❍
Custom Size	Length	139 ~ 458 mm								
Custom Size	Width	210 ~ 305 mm		▲						
Custom Size	Length	210 ~ 439 mm								

Europe/Asia

			①	❶	②	③	④	⑤	⑥	⑦
A3	SEF	297 x 420 mm		❍	●	●				●
A3	LEF	420 x 297 mm								
B4	SEF	257 x 364 mm		❍	❍	❍				❍
B4	LEF	364 x 257								
A4	SEF	210 x 297 mm		❍	●	●				●
A4	LEF	297 x 210 mm	❍	❍	●	●	●	●	❍	●
B5	SEF	182 x 257 mm			❍	❍				❍
B5	LEF	257 x 182 mm			❍	❍	●	●	❍	❍
A5	SEF	148 x 210 mm			●	●	●	●	❍	●
A5	LEF	210 x 148 mm			●	●	●	●	❍	●
DLT	SEF	11" x 17"		❍	❍	❍				❍
DLT	LEF	17" x 11"								
LG	SEF	8 1/2 " x 14"		❍	❍	❍				❍
LG	LEF	14 x 8 1/2 "								
LT	SEF	8 1/2" x 11"		❍	❍	❍				❍
LT	LEF	11" x 8 1/2 "	❍	❍	❍	❍	●	●	❍	❍
HLT	SEF	5 1/2" x 8 1/2 "			❍	❍	●	●	❍	❍
HLT	LEF	8 1/2" x 5 1/2"			❍	❍	●	●	❍	❍
Executive	SEF	71/4" x 10 1/2"			❑	❑				❍
Executive	LEF	10 1/2" x 7 1/4"								❍
F	SEF	8" x 13"			❍	❍				❍
F	LEF	13" x 8"								
Foolscap	SEF	8 1/2" x 13"			●	●				❍
Foolscap	LEF	13" x 8 1/2"								
Folio	SEF	8 1/4" x 13"			●	●				❍
Folio	LEF	13" x 8 1/4"								
	SEF	11" x 14"								
	SEF	11" x 15"			❍	❍				❍
	SEF	10" x 14"			❑	❑				❍
	SEF	8 1/4" x 14"								
	SEF	8" x 10 1/2"			❍	❍				❍
	SEF	8" x 10"			❑	❑				❍
	SEF	12" x 18"			❑	❑				❍
Custom Size	Width	139 ~ 305 mm			❑	❑				❍
	Length	139 ~ 458 mm								
Custom Size	Width	210 ~ 305 mm		▲						
	Length	210 ~ 439 mm								

China

			①	❶	②	③	④	⑤	⑥	⑦
A3	SEF	297 x 420 mm		❍	●	●				●
A3	LEF	420 x 297 mm								
B4	SEF	257 x 364 mm		❍	❍	❍				❍
B4	LEF	364 x 257								
A4	SEF	210 x 297 mm		❍	●	●				●
A4	LEF	297 x 210 mm	❍	❍	●	●	●	●	❍	●
B5	SEF	182 x 257 mm			❍	❍				❍
B5	LEF	257 x 182 mm			❍	❍	●	●	❍	❍
A5	SEF	148 x 210 mm			●	●	●	●	❍	●
A5	LEF	210 x 148 mm			●	●	●	●	❍	●
DLT	SEF	11" x 17"		❍	❍	❍				❍
DLT	LEF	17" x 11"								
LG	SEF	8 1/2" x 14"		❍	❍	❍				❍
LG	LEF	14" x 8 1/2"								
LT	SEF	8 1/2" x 11"		❍	❍	❍				❍
LT	LEF	11" x 8 1/2"	❍	❍	❍	❍	●	●	❍	❍
HLT	SEF	5 1/2" x 8 1/2 "			❍	❍	●	●	❍	❍
HLT	LEF	8 1/2" x 5 1/2"			❍	❍	●	●	❍	❍
Executive	SEF	7 1/4" x 10 1/2"			❑	❑				❍
Executive	LEF	10 1/2" x 7 1/4"								❍
F	SEF	8" x 13"			❍	❍				❍
F	LEF	13" x 8"								
Foolscap	SEF	8 1/2" x 13"			●	●				❍
Foolscap	LEF	13" x 8 1/2"								
Folio	SEF	8 1/4" x 13"			●	●				❍
Folio	LEF	13" x 8 1/4"								
	SEF	11" x 14"								
	SEF	11" x 15"			❍	❍				❍
	SEF	10" x 14"			❑	❑				❍
	SEF	8 1/4" x 14"								
	SEF	8" x 10 1/2"			❍	❍				❍
	SEF	8" x 10"			❑	❑				❍
	SEF	12" x 18"			❑	❑				❍
8-K	SEF	390 x 267 mm			❑	❑				❍
16-K	SEF	267 x 195 mm			❑	❑				❍
16-K	LEF	195 x 267 mm			❑	❑				❍
Custom Size	Width	139 ~ 305 mm			❑	❑				❍
	Length	139 ~ 458 mm								
Custom Size	Width	210 ~ 305 mm		▲						
	Length	210 ~ 439 mm								

1.4 A3/DLT TRAY KIT (B331)

Paper Size	A3 SEF, B4 SEF, 11"x17" SEF, 8 1/2"x14" SEF, A4 SEF, A4 LEF, 8 1/2"x11" SEF, 11"x8 1/2" LEF, 305 mm x 439 mm
Paper Weight	52 ~ 163 g/m^2
Tray Capacity	1,000 sheets
Remaining Paper Detection	5-Step: 100%, 75%, 50%, 25%, End

1.5 LCT (B511)

Paper Weight	Tray 4, 5	52 to 216 g/m^2
	Tray 6	52 to 216 g/m^2
Paper Size	Tray 4,5,6	A4 LEF, B5 LEF, 8 1/2"x11" LEF, A5, 5 1/2"x8 1/2"
Tray Capacity:	Tray 4, 5	1,000 sheets (Thick Paper 0.11 mm)
	Tray 6	2,550 sheets (Thick Paper 0.11 mm)
Tab Sheet:	Feed possible from Tray 4 or Tray 5. Requires installation of tab sheet fence. **Note**: Only A4 LEF, 8 1/2" x 11" LEF tab sheets can be fed.	
Paper Feed System:	FRR	
Remaining Paper Detection:	5-Step including Near-End for Trays 4, 5, 6	
Power Source:	24 Vdc, 5 Vdc (from copier)	
Power Consumption:	55 W	
Weight:	Less than 82 kg (180.4 lb.)	
Size (W x D x H):	540 mm x 730 mm x 980 mm (21.3" x 28.7" x 38.6")	

1.6 BYPASS TRAY (B512)

NOTE: The Bypass Tray is attached to the top of the LCT B511.

Paper Feed System	FRR
Tray Capacity	500 sheets (Thick Paper 0.11 mm)
Remaining Paper Detection	4-Step: Including Near-End
Paper Size	A5 to A3, 5 1/2" x 8 1/2" to 12" x 18"
Tab Sheets	A4 LEF, 8 1/2" x 11" LEF (requires attachment of tab fence)
Paper Weight	52 to 216 g/m^2
Weight	Less than 18 kg (39.6 lb.)
Power Source	24 Vdc, 5 Vdc (from copier)
Power Consumption	50 W
Dimensions (W x D x H)	680 x 561 x 181 mm (26.7 x 21.1 x 7.1 in.)

1.7 3000 SHEET BOOKLET FINISHER (B468)

NOTE: The 3000 Sheet Booklet Finisher B468 is used with the B070 (90 ppm) only.

Upper Tray

Tray Capacity (80 g/m^2)	Unstapled	500 sheets (A4, A5 LEF, B5, 8 1/2"x11") 250 sheets (A3 SEF, B4 SEF, 11"x17" SEF, 8 1/2"x11", 12"x18" 100 sheets (A5 SEF, A6 SEF, B6 SEF, 5 1/2"x8 1/2")		
	Stapled	Max docs.	Total sheets	Size
		50 docs.	500 sheets	A4 LEF, 8 1/2"x11" LEF
		25 docs.	250 sheets	A3, A4 SEF, B4, B5, 12"x18", 11"x17", 8 1/2"x11"
	Stapled (Mixed Sizes)	16 docs	30 sheets	A3 LEF, A4 LEF, B4 LEF, B5 LEF, 11"x17" LEF, 8 1/2"x11" LEF
Paper Size		A3 ~ A5, A6 SEF, B6 SEF, 12"x18", 11"x17" ~ 5 1/2"x8 1/2"		
Paper Weight		52 g/m^2 ~ 216 g/m^2		

Lower Tray

Documents selected for booklet finishing (saddle-stitching) are folded, stapled, and output only to the lower tray.

Tray Capacity (80 g/m^2)	Unstapled	2,500 Sheets	A4 LEF, 8 1/2"x11" LEF	
		1,250 Sheets	A3 SEF, A4 SEF, B4 SEF, B5, 11"x17" SEF, 8 1/2"x14", 8 1/2"x11" SEF, 12"x18"	
		500 Sheets	A5 LEF	
		100 Sheets	A5 SEF, B6 SEF, 5 1/2"x8 1/2"	
	Stapled	Max docs.	Total sheets	Size
		50 docs.	2,500 sheets	A4 LEF, 8 1/2"x11" LEF
		50 docs.	1,250 sheets	A4 SEF, B5, 8 1/2"x11" SEF
		30 docs.	1,250 sheets	A3, B4, 12"x18", 11"x17"
	Stapled (Mixed Sizes)	50 docs.	30 sheets	A3 LEF, A4 LEF, B4 LEF, B5 LEF, 11"x17" LEF, 8 1/2"x11" LEF.
Paper Size		A3 ~ A5, A6 SEF, B6 SEF, 12"x18", 11"x17" ~ 5 1/2"x8 1/2" LEF		
Paper Weight		52 g/m^2 ~ 216 g/m^2		

Proof Tray

Tray Capacity	250 sheets (A4, 8 1/2"x11" or smaller) 50 sheets (B4, 8 1/2"x14" or larger)
Paper Weight	52 g/m^2 ~ 216 g/m^2

Staple Specifications

Binding Capacity (80 g/m^2)	Same Size	50 sheets (A4, 8 1/2" x 11" or smaller) 30 sheets (B4, 8 1/2" x 14" or larger)
	Mixed Sizes	30 sheets (A3 and A4 LEF, B4 and B5 LEF, 11" x 17"and 8 1/2" x 11" LEF
Paper Size	A3 to B5, 11" x 17" to 8 1/2" x 11"	
Paper Weight	64 g/m^2 to 90 g/m^2	
Stapling Position	Front (1), Back (1), Back (1: diagonal), 2 positions	
Stapling Capacity	5,000 staples/cartridge	

Booklet Staple Specifications

Binding Capacity (80 g/m^2)	15 Sheets		
Paper Size	A3 SEF, B4 SEF, A4 SEF, 11" x 17" SEF, 8 1/2" x 11" SEF		
Paper Weight	64 g/m^2 ~ 90 g/m^2		
Stapling Position	Center, 2 Locations		
Stapling Capacity	2,000 Staples/Cartridge		
Fold Position	Center, Half-Folding		
Saddle-Stitch Capacity	**Max. Docs.**	**Total Sheets**	**Size**
	25	2~5	A4 SEF, 8 1/2" x 11" SEF
	15	6~10	
	10	11~15	
	30	2~5	A3 SEF, B4 SEF, 11" x 17" SEF
	20	6~10	
	10	11~15	

1.8 PUNCH UNIT (B377)

The Punch Unit B377 is installed in the 3000 Sheet Booklet Finisher B468 connected to the B070 (90 ppm).

<table>
<tr><td rowspan="3">Punch Position</td><td colspan="2">North America (NA)</td><td>2/3 holes</td><td>B377-17</td></tr>
<tr><td colspan="2">Europe (E)</td><td>2/4 holes</td><td>B377-27</td></tr>
<tr><td colspan="2">Northern Europe (NE)</td><td>4 holes</td><td>B377-31</td></tr>
<tr><td>Punching Allowed</td><td colspan="4">All modes</td></tr>
<tr><td rowspan="13">Allowed Paper Sizes</td><td>Holes</td><td>Feed</td><td colspan="2">Paper Size</td></tr>
<tr><td rowspan="2">2-hole
(EUR/A)</td><td>SEF</td><td colspan="2">A3 ~ A5, 11" x 17" ~ 5 1/2" x 8 1/2"</td></tr>
<tr><td>LEF</td><td colspan="2">A4 ~ A5, 8 1/2" x 11", 5 1/2" x 8 1/2"</td></tr>
<tr><td rowspan="2">2-hole (NA)</td><td>SEF</td><td colspan="2">A3 ~ A5, 11" x 17" ~ 5 1/2" x 8 1/2"</td></tr>
<tr><td>LEF</td><td colspan="2">A4 ~ A5, 8 1/2" x 11", 5 1/2" x 8 1/2"</td></tr>
<tr><td rowspan="2">3-hole (NA)</td><td>SEF</td><td colspan="2">A3, B4, 11" x 17"</td></tr>
<tr><td>LEF</td><td colspan="2">A4, B5, 8 1/2" x 11"</td></tr>
<tr><td rowspan="2">4-holes
(EUR/A)</td><td>SEF</td><td colspan="2">A3, B4, 11x17"</td></tr>
<tr><td>LEF</td><td colspan="2">A4, B5, 8 1/2" x 11"</td></tr>
<tr><td rowspan="2">4-holes (North Europe)</td><td>SEF</td><td colspan="2">A3 ~ A5, 11" x 17" ~ 5 1/2" x 8 1/2"</td></tr>
<tr><td>LEF</td><td colspan="2">A3 ~ A5, 8 1/2" x 11", 5 1/2" x 8 1/2"</td></tr>
<tr><td rowspan="7">Allowed Paper Weight</td><td>Holes</td><td colspan="3">Weight</td></tr>
<tr><td>2-hole</td><td colspan="3" rowspan="6">52 ~ 163 g/m^2
(14 ~ 43 lb.)</td></tr>
<tr><td>3-hole</td></tr>
<tr><td>4-hole (E)</td></tr>
<tr><td>4-hole (NE)</td></tr>
<tr><td>2-hole (NA)</td></tr>
<tr><td rowspan="3">Hopper Capacity</td><td colspan="2">NA (2/3-hole)</td><td colspan="2">More than 6 K prints</td></tr>
<tr><td colspan="2">EUR/A (4-hole)</td><td colspan="2">More than 8 K prints</td></tr>
<tr><td colspan="2">EUR/A (2-hole)</td><td colspan="2">More than 10 K prints</td></tr>
<tr><td>Rated Voltage of Output Connector</td><td colspan="4">Max. DC 24 V</td></tr>
<tr><td>Dimensions (W x D x H)</td><td colspan="4">700 x 620 x 960 mm (27.6" x 24.4" x 37.8")</td></tr>
<tr><td>Weight</td><td colspan="4">Approx. 65 kg (143 lb.) (With Finisher)</td></tr>
<tr><td>Power Consumption</td><td colspan="4">72 W (3 A/24 V)</td></tr>
<tr><td>Power Supply</td><td colspan="4">DC 24 V (From Copier to Finisher)</td></tr>
</table>

1.9 3000 SHEET FINISHER (B478)

UPPER TRAY			
Paper Capacity (80 g/m^2)	500 sheets (A4, 8 1/2" x 11" and smaller)		
	250 sheets (B4, 8 1/2" x 14" and larger)		
Paper Size	A3 to A6 SEF, 11" x 17" to 5 1/2" x 8 1/2", 12" x 18"		
Paper Weight	52 to 216 g/m^2		
Upper Tray Full Detection	Provided		
SHIFT TRAY			
Paper Capacity (80 g/m^2)	3000 sheets (A4 LEF, B5 LEF, 8 1/2" x 11" LEF)		
	1500 sheets (A3, A4 SEF, B4 and B5 SEF, 11" x 17", 8 1/2" x 14", 8 1/2" x 11" SEF, 12" x 18")		
	500 sheets (A5 LEF, 5 1/2" x 8 1/2" LEF)		
	100 sheets (A5 SEF, 5 1/2" x 8 1/2" SEF)		
Paper Size	A3 to A5, 11" x 17" to 5 1/2" x 8 1/2", 12" x 18" (including tab paper)		
Paper Weight	52 to 216 g/m^2		
Shift Tray Full Detection	Provided		
STAPLER			
Stapling Stack Size	A4, B5, 8 1/2" x 11" (Max. 100 Sheets) A3, B4, 11" x 17", 8 1/2" x 14" (Max. 50 sheets)		
Stapling Paper Size	A3 to B5 11" x 17" to 8 1/2" x 11"		
Stapling Paper Weight	64 to 80 g/m^2		
Staple Position	4 Modes		
	1 Staple: Front, Rear, Rear-Oblique		
	2 Stapes: 2 locations		
Staple Capacity	5000 staples/cartridge		
Staple Supply	Cartridge or Staple Replacement		
Stapled Stack Size	**Sheets**	**Sets**	**Sizes**
	10 ~ 100	200 ~ 30	A4 SEF, B5 SEF, 8 1/2" x 11" SEF A4 LEF, B5 LEF, 8 1/2" x 11" LEF
	2 ~ 9	150	
	10 ~ 50	150 ~ 30	A3, B4, 11" x 17", 8 1/2" x 14"
	2 ~ 9	150	
Trim Waste Staple Capacity	30,000 or more		
Waste Staple Hopper Full Detection	Provided		
Power Consumption	Less than 100 W		
Power Source	DC 24 V (From Mainframe)		
Size (W x D x H)	800 x 730 x 980 mm 31.5 x 28.7 x 38.6 in.		
Weight	Less than 65 kg (143 lb.)		
Compatible Machines	B070 (90 cpm), B071 (105 cpm), B064 (60 cpm), B065 (75 cpm)		

1.10 PUNCH UNIT (B531)

The Punch Unit B531 is installed in the 3000 Sheet Finisher B478.

Punch Hole Positions	2/3-hole (North America)
	2/4-hole (Europe)
Punch Paper Size	
2-Hole (NA)	A5 ~ A3 SEF, 11" x 17"~5 1/2" x 8 1/2" SEF A5 ~ A4 LEF, 8 1/2" x 11" LEF, 5 1/2" x 8 1/2" LEF
3-Hole (NA)	A3 SEF, B4 SEF, 11" x 17" SEF A4 LEF, B5 LEF, 8 1/2" x11" LEF
4-Hole (EUR/A)	A3 SEF, 11" x 17" SEF A4 LEF, 8 1/2" x 11" LEF
Paper Weight	
2-Hole (NA)	52 g/m^2 ~ 163 g/m^2
3-Hole (NA)	52 g/m^2 ~ 163 g/m^2
4-Hole (EUR/A)	52 g/m^2 ~ 128 g/m^2
Punch Waste Hopper Capacity	
2-Hole (NA)	10K
3-Hole (NA)	15K
4-Hole (EUR/A)	15K
Operation Modes	All (Shift, Proof, Staple)

DIP SW Settings

The correct DIP SW settings of the Punch Unit 531 are provided in the table below for your reference only. The DIP switches of these punch units do not need to be changed at installation, or adjusted for operation.

Punch Unit	Unit No.	DIP SW Settings			
		1	2	3	4
2/3-Hole (NA)	B531-17	1	0	1	0
2/4-Hole (EUR/A)	B531-27	1	0	0	1

0: OFF
1: ON

1.11 PUNCH UNIT (A812)

The Punch Unit A812 is installed in the 3000 Sheet Finisher B478.

Punch Hole Positions	2-hole, 3-hole (NA) 4-hole (EUR/A) 4-hole (North Europe)
Punch Paper Size	
2-Hole	A5 ~ A3 SEF, 11" x 17" ~ 8 1/2" x 11" SEF A5 ~ A4 LEF, 8 1/2" x 11" LEF
3-Hole (NA)	A3 SEF, B4 SEF, 11" x 17" SEF A4 LEF, B5 LEF, 8 1/2" x 11" LEF
4-Hole (EUR/A)	A3 SEF, 11" x 17" SEF A4 LEF, 11" x 17" LEF
4-Hole (North Europe)	B5 ~ A3 SEF, 8 1/2" x 11" ~ 11" x 17" SEF A5 ~ A4 LEF, 8 1/2" x 11" LEF, 5 1/2" x 8 1/2" LEF
Paper Weight	
2-Hole, 3-Hole (NA)	52 g/m^2 ~ 163 g/m^2
4-Hole (Europe/North Europe)	52 g/m^2 ~ 128 g/m^2
Punch Waste Hopper Capacity	
2-Hole	40K
3-Hole (NA)	15K
4-Hole (EUR/A)	15K
4-Hole (North Europe)	15K
Power Supply	DC 24 V (From Finisher)
Power Consumption	60 W
Weight	Less than 2.4 K (5.3 lb.)
Operation Modes	All (Shift, Proof, Staple)

DIP SW Settings

The correct DIP SW settings of the Punch Unit A812 are provided in the table below for your reference only. The DIP switches of these punch units do not need to be changed at installation, or adjusted for operation.

Punch Unit	Unit No.	DIP SW Settings			
		1	2	3	4
2-Hole (EUR/A)	A812-40/A812-67	0	0	0	0
3-Hole (NA)	A812-57	1	0	0	0
4-Hole (EUR/A)	A812-30	0	1	0	0
4-Hole (North Europe)	A812-31	0	0	1	0
2-Hole (NA)	A812-32	0	0	0	1

0: OFF
1: ON

1.12 JOGGER UNIT B513

The Jogger Unit B513 is installed above the shift tray of the 3000 Sheet Finisher B478.

Paper Size	A3 SEF, B4 SEF, 11" x 17" SEF A4 LEF, B5 LEF, 8 1/2" x 11" LEF
Paper Weight	52 g/m^2 ~ 216 g/m^2
Weight	Less than 1.7 kg (3.7 lb.)
Dimensions (W x D x H)	125 mm x 450 mm x 100 mm 5" x 17.7" x 4"
Power Supply	DC 24 V, DC 5V (From Finisher)
Power Consumption	24 W

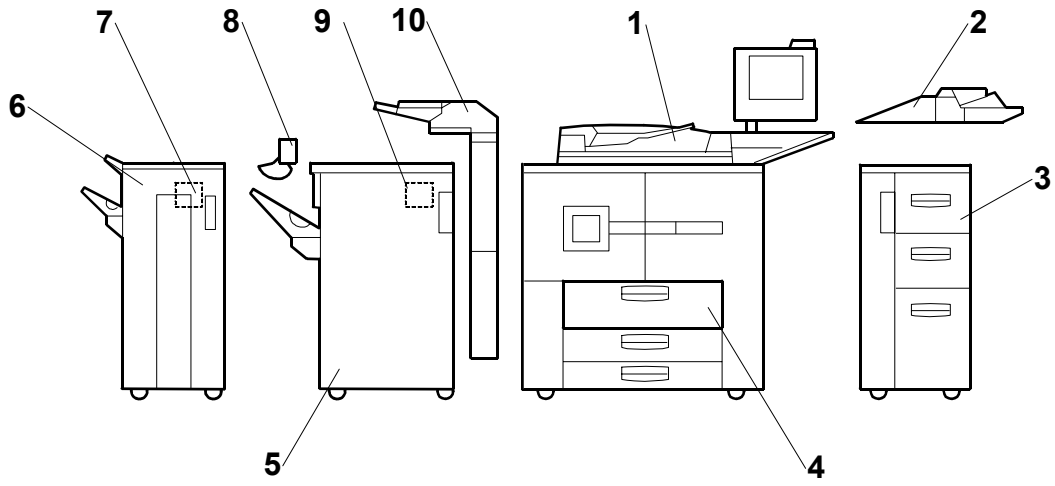
1.13 COVER INTERPOSER TRAY B470

Paper Separation	FRR System with Feed Belt
Paper Sizes	A3 ~ A5, 11" x 17" ~ 5 1/2" x 8 1/2"
Paper Weight	64 ~ 216 g/m^2
Capacity	200 sheets (80 g/m^2)
Power Supply (from main machine)	24 V ±10%, 5 V ±5% (From Finisher)
Power Consumption	Less than 48 W
Dimensions (W x D x H)	500 x 620 x 200 mm 19.7" x 24.4" x 7.9"
Weight	Less than 12 kg (26.4 lb.)

⇒1.14 CONNECTION KIT B328

Copy Speed		
B070 (90 cpm)	2 Connected:	180 cpm
B071 (105 cpm)	2 Connected	210 cpm
Operation		
Master Machine	Prints simultaneously with scanning, same as a stand-alone machine.	
Slave Machine	Starts printing after the 2nd set is printed on the master machine. **Note**: Start time may be slower, due to sizes of images.	
Document Server (Printing)		
Master Machine	Press the Start key to begin printing, same as a stand-alone machine.	
Slave Machine	Starts printing after the 2nd set is printed on the master machine. **Note**: Start time may be slower, due to sizes of images.	
Connection Cables		
Length (x1)	4. 5 m	1 cable, no repeater hub
Length (x2)	9 m	2 cables, 1 repeater hub for connection.
Length (x3)	13.5 m	3 cables, 2 repeater hubs for connection.

2. MACHINE CONFIGURATION



No.	Item	Machine Code	Comments
1	Mainframe	B070/B071	B070 (95 cpm), B071 (105 cpm).
2	Bypass Tray	B512	
3	LCT	B511	
4	A3/DLT Tray Kit*[1]	B331	Replace Tray 1 (tandem tray) inside.
5	3000 Sheet Finisher	B478	
6	3000 Sheet Booklet Finisher	B468	Attached to B070 only for booklet binding.
7	Punch Unit	B377	Inside Finisher B468
8	Output Jogger Unit	B513	Attached to Finisher B478
9	Cover Interposer Tray	B470	Attached to B468 or B478 Finisher.
10	Punch Unit	B531, A812	Inside Finisher B478
	Copier Connection Kit	B328	Not shown.

*[1]: Replaces Tandem Tray in main unit.

FIRMWARE HISTORY

FIRMWARE HISTORY

1. MAIN MACHINE FIRMWARE MODIFICATION HISTORY

- If no firmware history data is present in the table below, then no data was available at the time of this service manual's printing.
- Please check the http://tsc.ricohcorp.com website for current firmware downloads.
- Accessory firmware modification history is provided in the appropriate accessory section of the service manual.

MAIN MACHINE FIRMWARE MODIFICATION HISTORY			
DESCRIPTION OF MODIFICATION	FIRMWARE LEVEL	SERIAL NUMBER	FIRMWARE VERSION

B331
A3/DLT TRAY KIT

A3/DLT TRAY KIT B331

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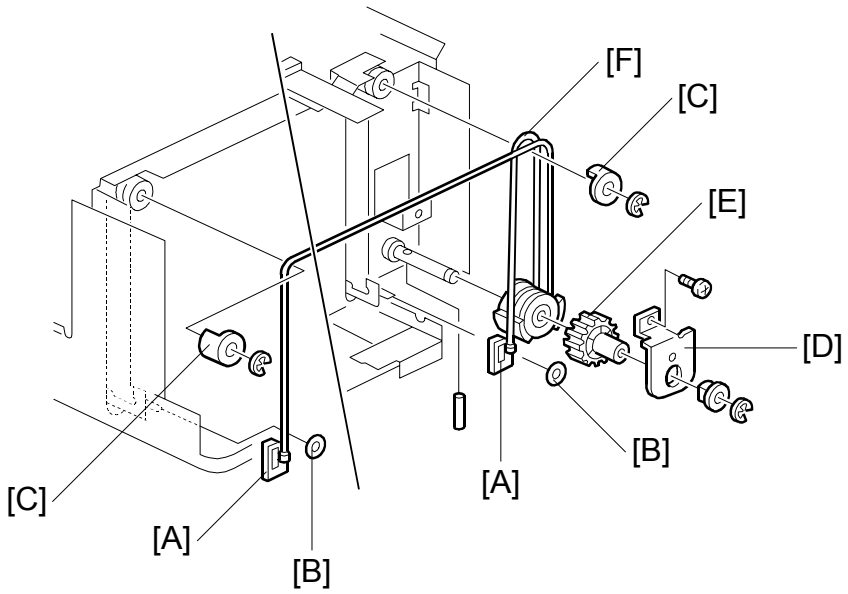
1. INSTALLATION

For details about installing the A3/DLT Kit B331, please refer to the instructions you received with the instructions or the “1. Installation” in the main machine service manual.

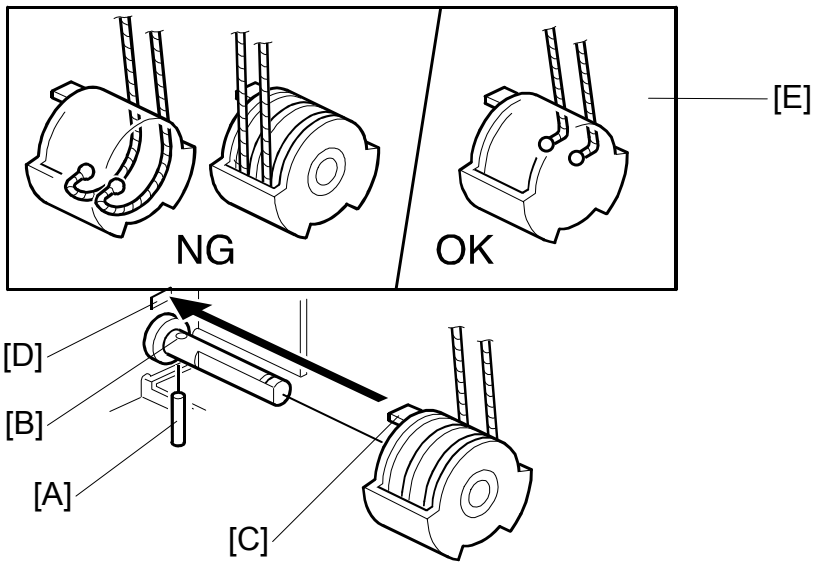
2. REPLACEMENT AND ADJUSTMENT

2.1 BOTTOM PLATE LIFT WIRE REPLACEMENT

NOTE: Before replacing the rear bottom plate lift wire, remove the front bottom plate lift wire. The procedure for the two wires is the same.



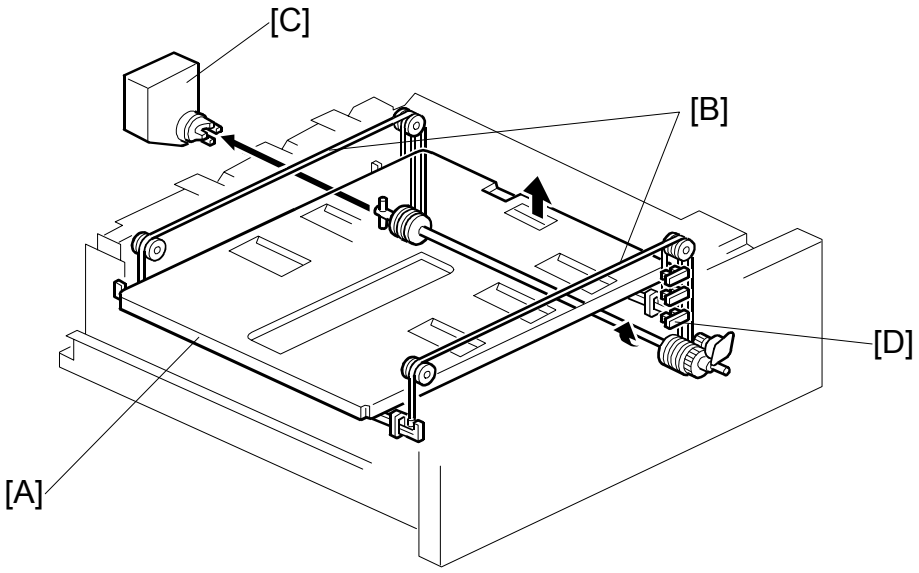
1. Remove the tray.
2. Remove the inner cover (2 screws).
3. Slightly lift the front bottom plate and unhook the wire stoppers [A] (2 stoppers [B]).
4. Remove the wire cover [C] (1 E-ring each).
5. Remove the bracket [D] (1 screw, 1 E-ring, and 1 bushing).
6. Remove the gear [E].
7. Replace the bottom plate lift wire [F].



NOTE: When re-installing the bottom plate lift wire:
1) Set the positioning pin [A] in the hole [B] and set the projection [C] in the hole [D].
2) Position the wire as shown [E].
3) Do not cross the wires.

3. DETAILED DESCRIPTIONS

3.1 SECTIONAL DESCRIPTION



This tray mechanism is basically same as the tandem LCT. This tray bottom plate [A] is lifted through the tray wires [B] by the lift motor [C] rotation. There is no remaining paper capacity detection.

The paper remaining sensors [D] trigger messages on the LCD to let the user know how much paper remains in the tray.

The operation panel LCD displays “full” whether there is paper in the tray. Except for the above matter, refer to the main copier tandem LCT section for details.

B511

LCT

LCT B511

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1. INSTALLATION

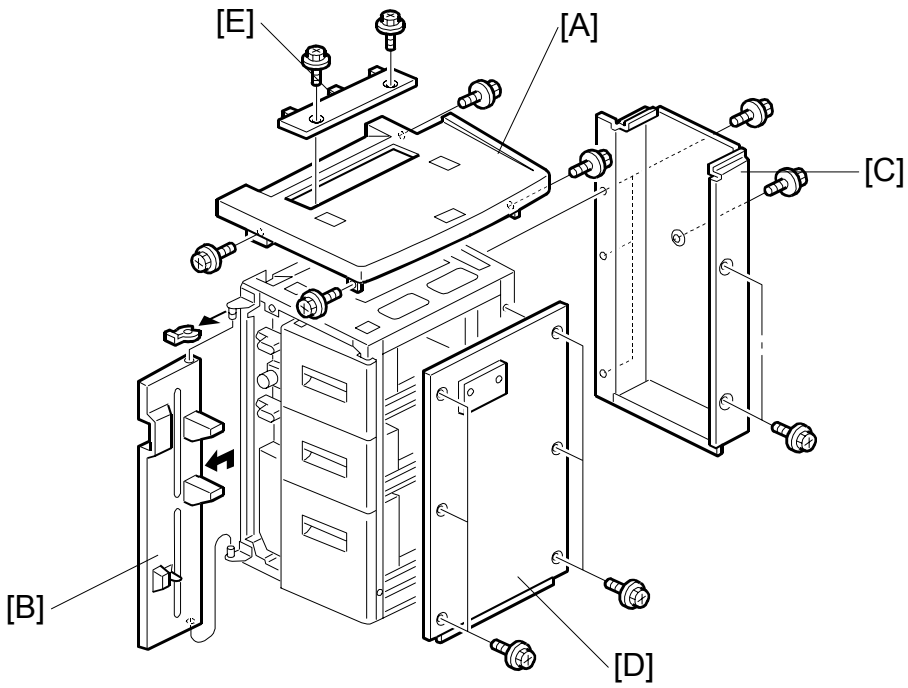
For a details about installing the LCT B511, please refer to the instructions you received with the unit or “1. Installation” in the main machine service manual.

2. PREVENTIVE MAINTENANCE

For more details about preventive maintenance for the LCT B511, please refer to Section “2. Preventive Maintenance” in the main machine service manual.

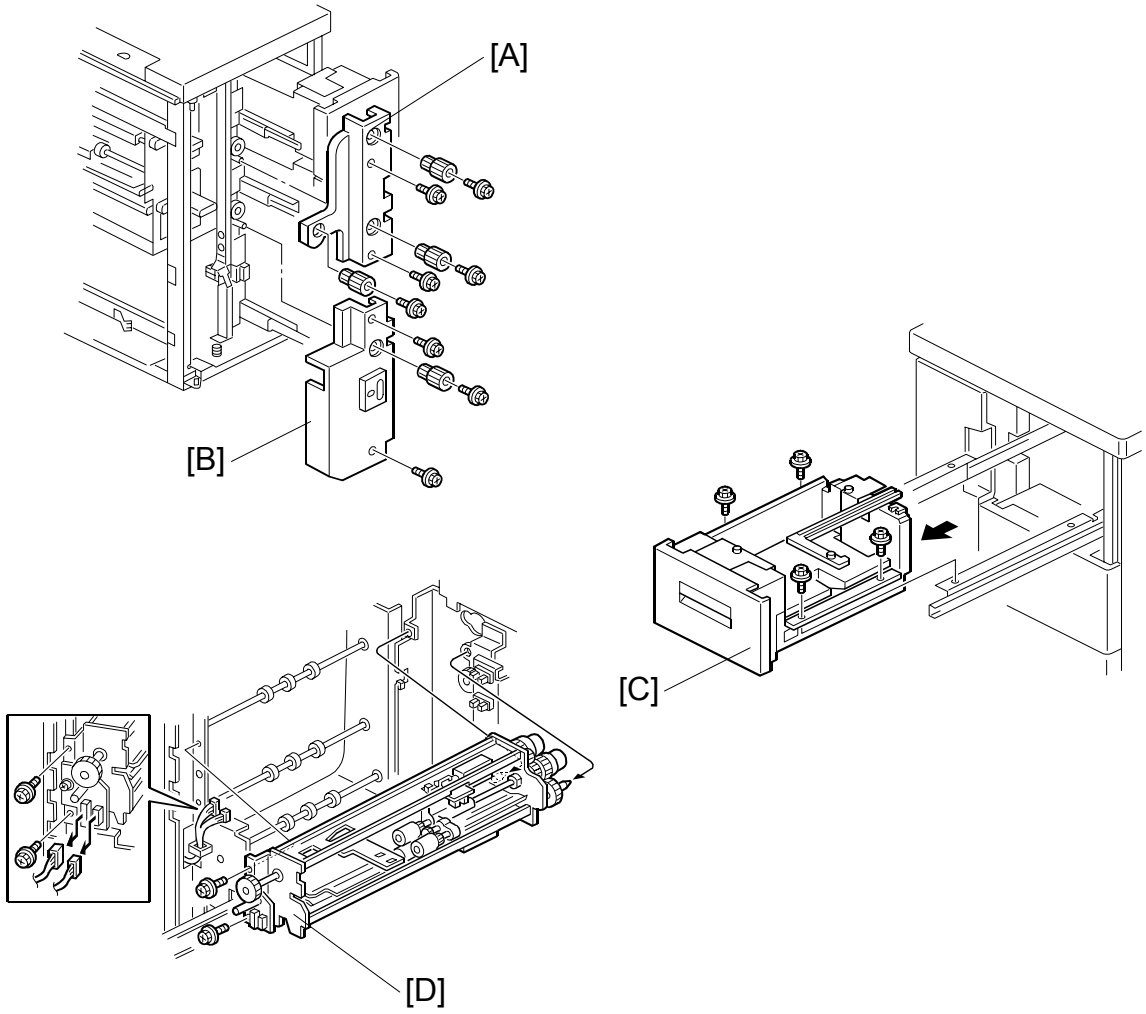
3. REPLACEMENT AND ADJUSTMENT

3.1 FRONT DOOR AND COVERS



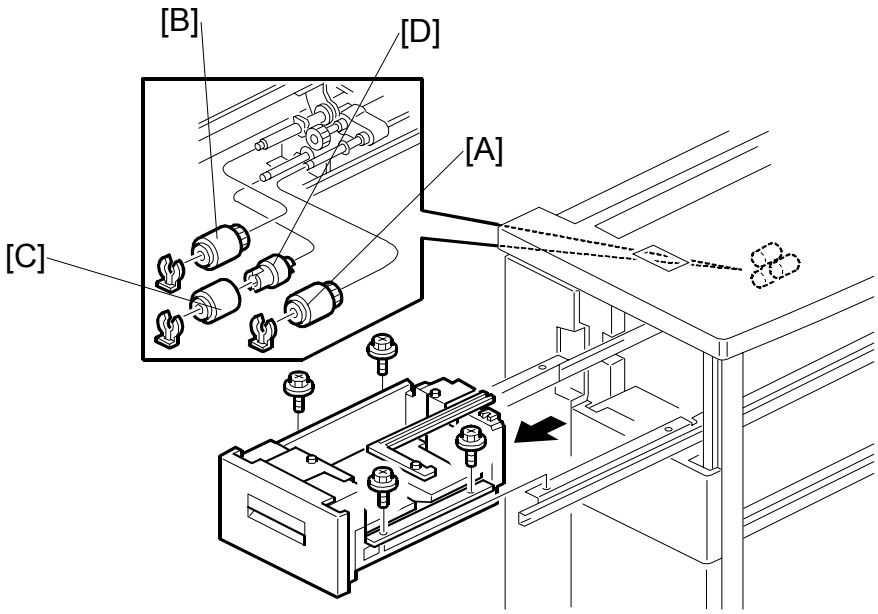
1. Remove the top cover [A] (x 4).
2. Remove the front door [B] (x 1).
   NOTE: While lifting the top cover, remove the snap ring and front door.
3. Remove the rear cover [C] (x 6).
4. Remove the right cover [D] (x 6).
5. Remove the paper slot cover [E] (x 2).

3.2 INNER COVER, PAPER FEED UNIT



1. Open the front door and remove the upper inner cover [A] (🔩 x 5, knobs x 3).
2. Open the front door and remove the lower inner cover [B] (🔩 x 3, knob x 1).
3. Pull out the tray [C] and remove it (🔩 x 4).
4. Remove the right cover (🔩 x 6). (☛3.1)
5. Remove the paper feed unit [D] (✋ x 2, 🔩 x 2).

3.3 PAPER FEED ROLLER

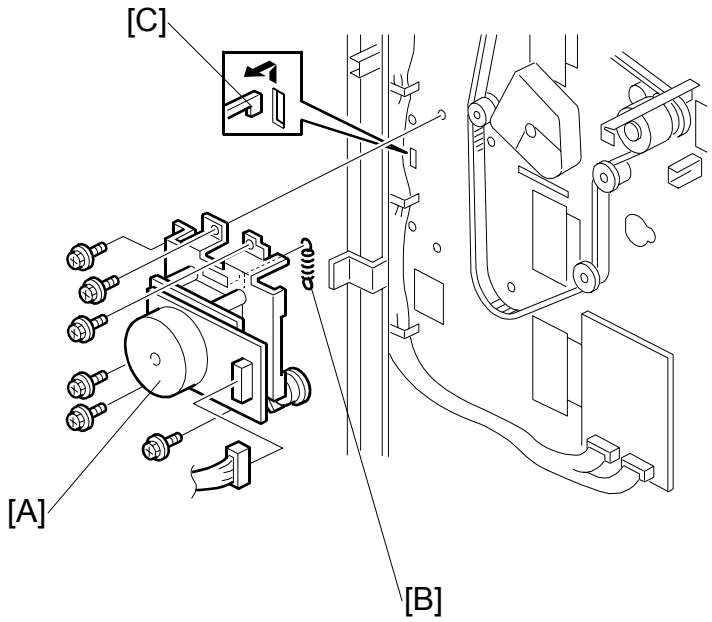


1. Remove the right cover (☛3.1).
2. Remove the paper trays. (☛3.2).
3. Remove the pick-up roller [A] (⟲ x 1).
4. Remove the feed roller [B] (⟲ x 1).
5. Remove the separation roller [C] from the torque limiter [D] (⟲ x 1).

NOTE: 1) The LCT pick-up and separation rollers are the same as pick-up and separation rollers of the main machine. These rollers are interchangeable.
2) The feed rollers of the LCT and main machine are different because they are designed to rotate in opposite directions. The feed rollers of the LCT and main machine are not interchangeable.
3) Do not touch the surface of the rollers with bare hands.

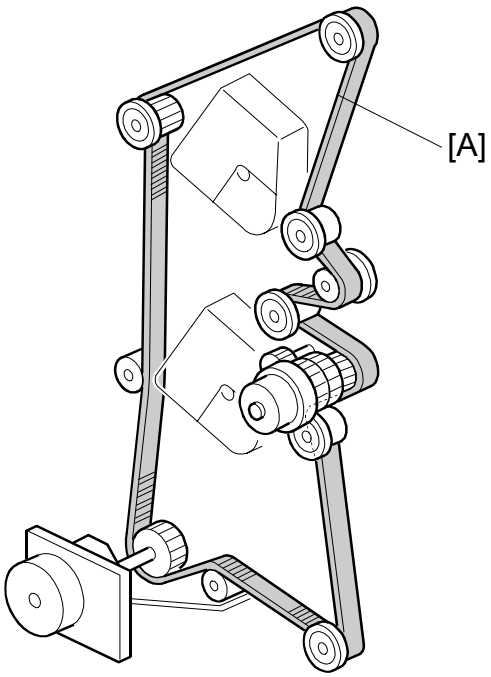
6. Reset the counters for the new rollers with SP7816 005~007 (Print Counter Reset – Paper Trays)

3.4 LCT MOTOR



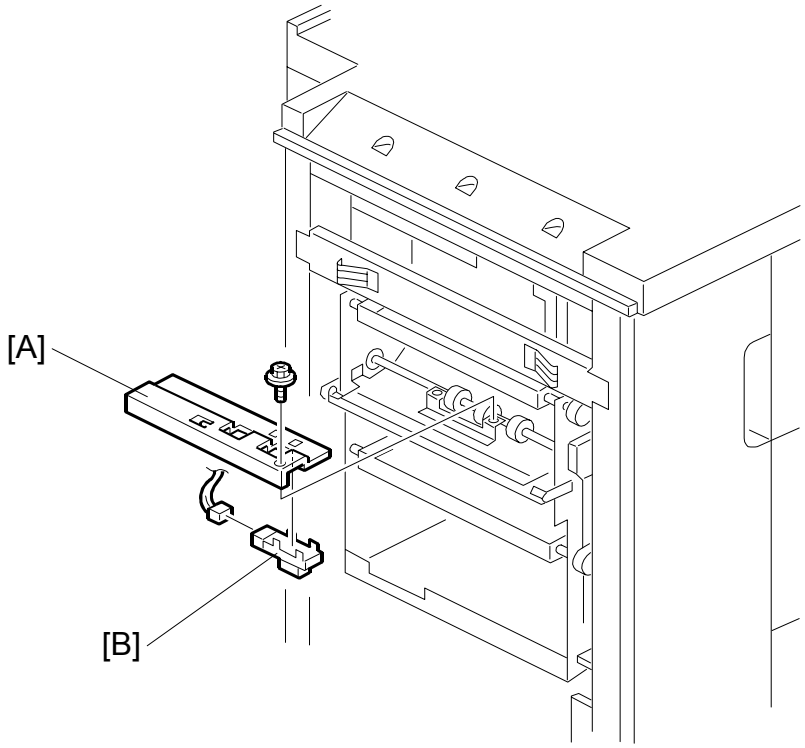
1. Remove the rear cover. (☛3.1)
2. Remove the motor bracket with the LCT motor [A] (☞ x 1, harness clamps x 3, 🔩 x 6, spring x 1).
   NOTE: The spring [B] is behind the motor. Raise the motor slightly to release the hook [C].

3.5 MAIN DRIVE BELT



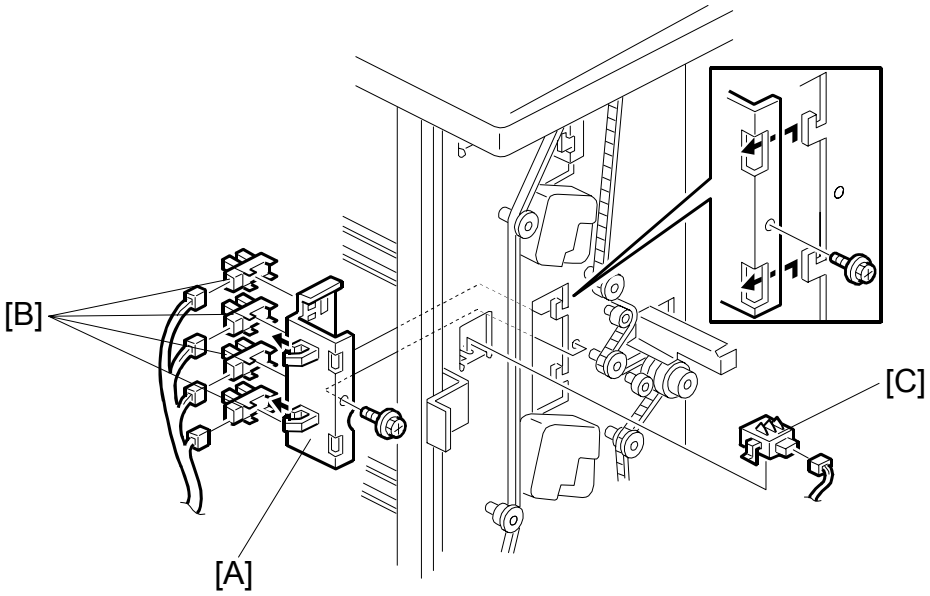
1. Remove the rear cover. (☛3.1).
2. Remove the LCT motor (🔩 x 6). (☛3.4)
3. Remove the main drive belt.
4. Mount the main drive belt [A] as shown in the illustration.
   NOTE: If a pulley or gear is removed in the belt path, be sure to re-attach it correctly.

3.6 EXIT SENSOR



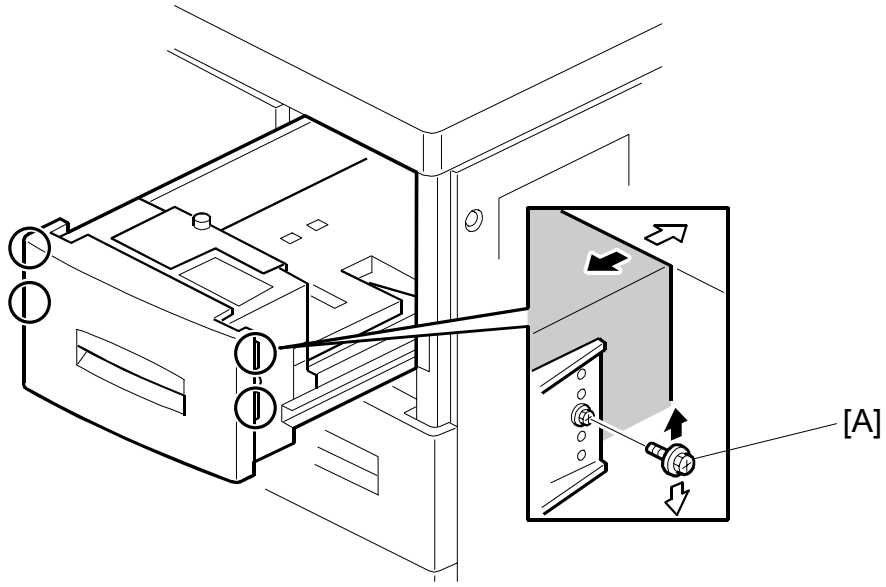
1. Disconnect the LCT from the copier.
2. Remove the bracket [A] (x 1).
3. Remove the exit sensor [B] (x 1).

3.7 PAPER HEIGHT SENSOR, PAPER SIZE SWITCH



1. Rear cover. (☛3.1)
2. Right cover. (☛3.1)
3. Paper height sensor bracket [A] (☞ x 1, ☞ x 4).
4. Paper height sensors [B] (hooks x 4 each)
5. Paper size switch [C] (☞ x 1).

3.8 SIDE REGISTRATION ADJUSTMENT



Normally the side registration of the image can be adjusted with SP1002 004~006 (Side-to-Side Registration – Tray 4, 5, 6). When the punch hole positions are not aligned from a particular feed station, adjust the side registration by changing the tray cover position for the tray, as described below. Then adjust the side registration of the image with the SP1002.

1. Pull out the tray.
2. Change the screw positions [A] at both the right and left sides as shown.
   NOTE: Adjustment range: 0 ± 2.0 mm adjustment step: 1.0 mm/step

4. TROUBLESHOOTING

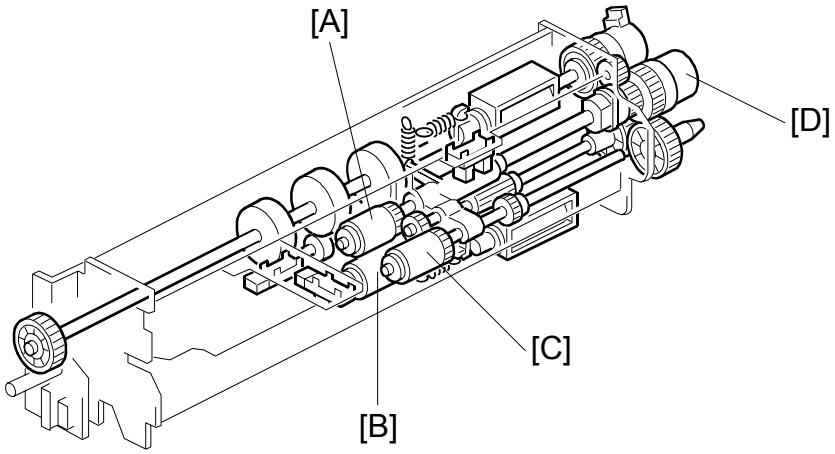
For details about LCT-related SC codes, please refer to “4. Troubleshooting” in the main machine service manual.

5. SERVICE TABLES

For details about LCT-related SP codes, please refer to “5. Service Tables” in the main machine service manual.

6. DETAILED DESCRIPTIONS

6.1 PAPER FEED



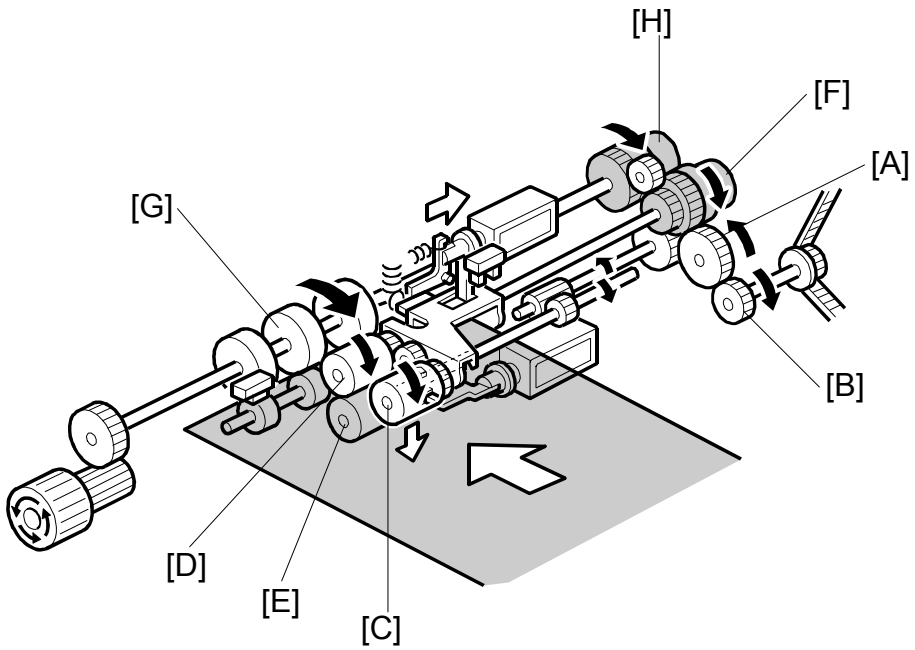
This LCT has three paper tray feed stations.

The upper and middle trays can each hold 1,000 sheets of paper. The lower tray can hold 2,550 sheets of paper.

All feed stations use an FRR paper feed system (paper feed roller [A], separation roller [B], pick-up roller [C]), and those rollers are driven by the LCT motor via the paper feed clutch [D].

6.2 PICK-UP AND FEED

6.2.1 OVERVIEW

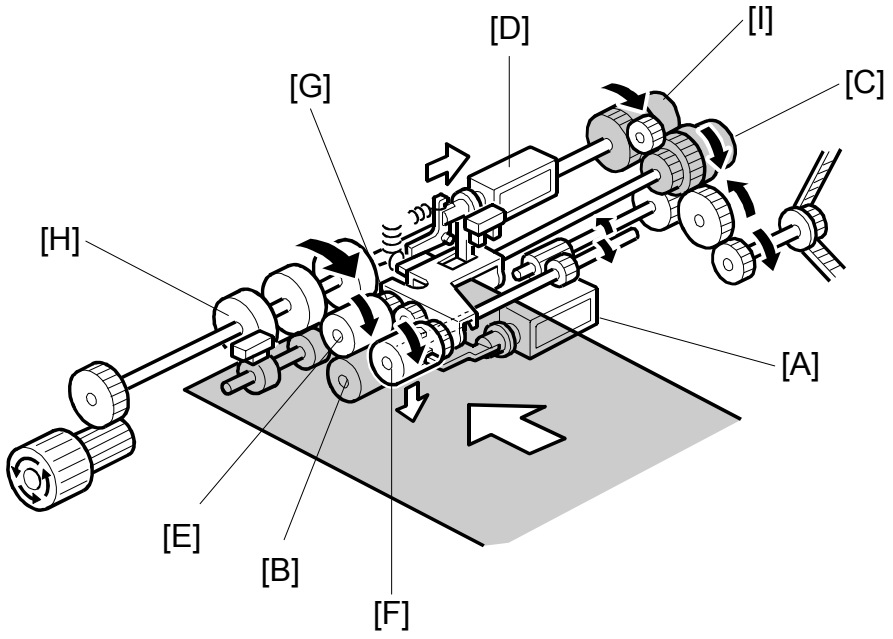


Drive from the LCT motor is transmitted to the gear [A] in the paper feed unit via the timing belt [B].

Then the gear [A] transmits the drive to the pick-up [C], paper feed [D], and separation [E] rollers via gears and the paper feed clutch [F].

The gear [A] also transmits the drive to the grip roller [G] via gears and the grip roller clutch [H].

6.2.2 PICK-UP AND FEED



When a paper feed station is not selected, its separation roller solenoid [A] is de-activated and the separation roller [B] can turn freely.

When the paper feed station is selected and the Start key is pressed, the feed clutch [C], separation roller solenoid [A], and pick-up solenoid [D] turn on.

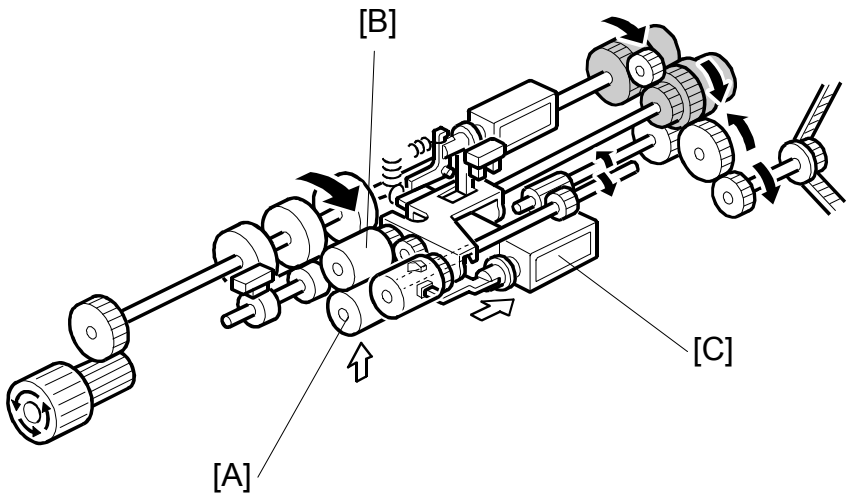
When the feed clutch [C] actuates, it drives the feed roller [E], and turns the pick-up roller [F] because it is linked to the feed roller by an idle gear [G].

When the separation roller solenoid [A] turns on, the separation roller [B] contacts the paper feed roller [E] and turns with the feed roller, unless more than one sheet of paper is fed. The three trays of the LCT unit use the standard FRR mechanism.
☛CT Handling Paper> Paper Feed Methods> **Forward and Reverse Roller (FRR)**

When the pick-up solenoid [D] actuates, the pick-up roller [F] lowers until it contacts the top sheet of the paper stack and then sends it to the paper feed and separation roller.

When the paper feed sensor [H] detects the leading edge of the paper, the pick-up solenoid de-actuates and lifts the pick-up roller [F], and the grip roller clutch [I] actuates and feeds the paper out of the tray.

6.2.3 SEPARATION ROLLER RELEASE



The separation roller [A] is normally away from the feed roller [B]. When the paper feed station is selected, the separation roller solenoid [C] contacts the separation roller with the feed roller as explained on the previous two pages.

This contact/release mechanism has the following three advantages:

1. When the LCT motor turns on, all the separation rollers in the three feed stations rotate. If the separation roller is away from the feed roller, it reduces the load on the paper feed motor and drive mechanism, and it also reduces wear to the rubber surface of the separation roller caused by friction between the separation roller and the feed roller.
2. After paper feed is completed, paper sometimes remains between the feed and separation rollers. If the feed tray is removed at this time, this paper might be torn. When the separation roller is away from the feed roller, the remaining paper can be removed from between the rollers.
3. When paper misfeeds occur around this area, the user can easily pull out the jammed paper between the feed and the separation rollers if the separation roller is away from the feed roller.

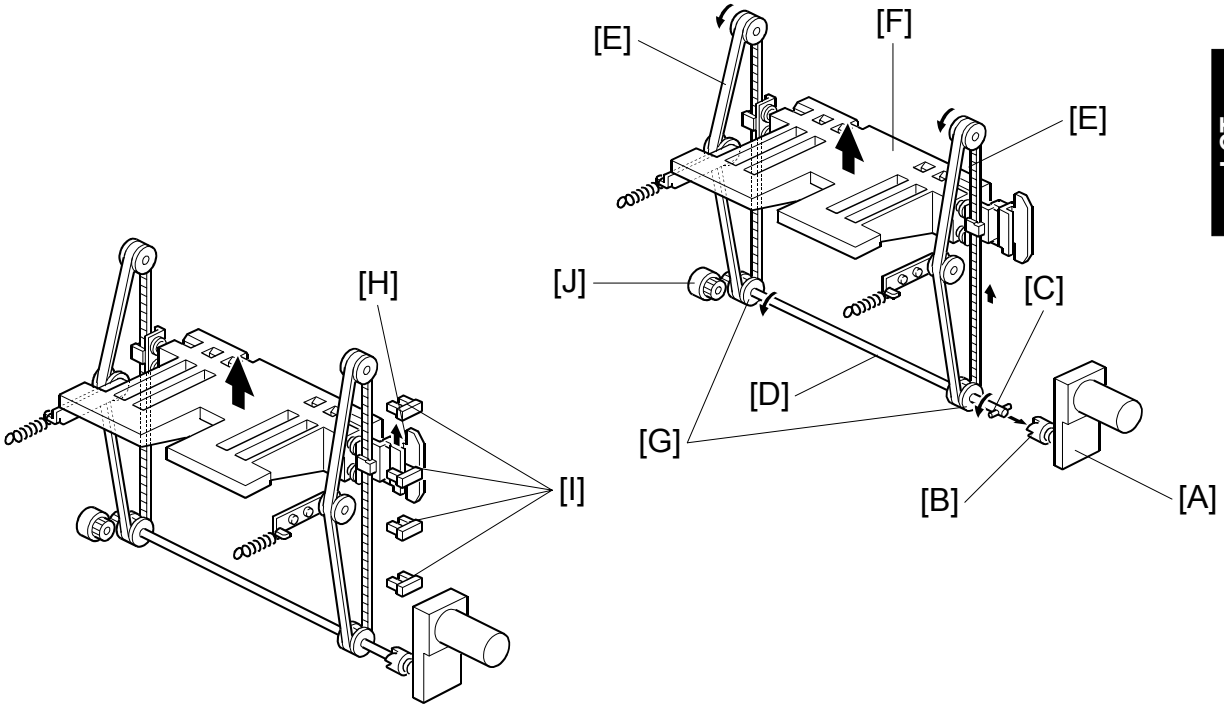
After paper feed, the paper feed clutch tuns off, but the LCT motor still turns the separation roller [A] in reverse. The separation roller, still contacting the feed roller, turns the feed roller in reverse for 100 ms. Then the separation solenoid turns off.

6.3 PAPER LIFT

6.3.1 TRAY DETECTION

When a tray is set in the machine, the tray detection method used depends on the tray:

- The upper tray and middle tray are detected when any one of the paper size switch signals is low.
- The lower tray is detected when the switch 1 signal of the paper size switch is low.



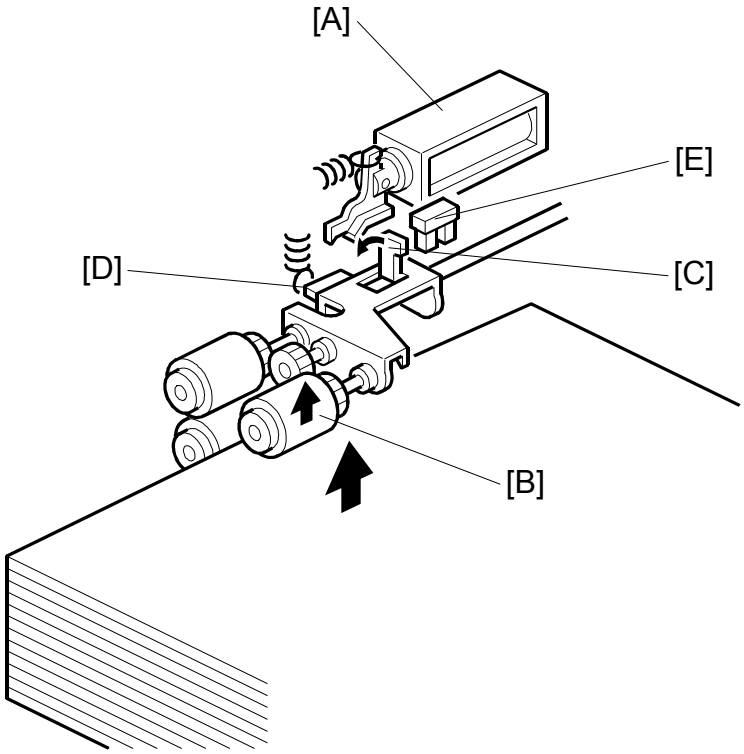
6.3.2 LIFT MECHANISM

When the machine detects that the paper tray is set in the machine, the tray lift motor [A] rotates and the coupling gear [B] on the tray lift motor engages the pin [C] of the lift drive shaft [D]. The tray drive belts [E] are connected to the tray bottom plate [F] and are driven by the tray lift motor via the lift drive shaft [D] and tray drive pulleys [G]. When the lift motor turns counterclockwise, the tray bottom plate [F] moves up. The tray goes up until the top of the paper stack pushes up the pick-up roller and the lift sensor in the feed unit is de-activated.

When the actuator [H] on the rear end of the bottom plate activates the paper height sensors [I], the remaining paper capacity is detected. (☛6.5)

When pulling out the tray, the coupling gear [B] separates from the pin [C], so that the tray bottom plate moves downward. In the bottom tray, the damper [J] lets the tray bottom plate drop slowly.

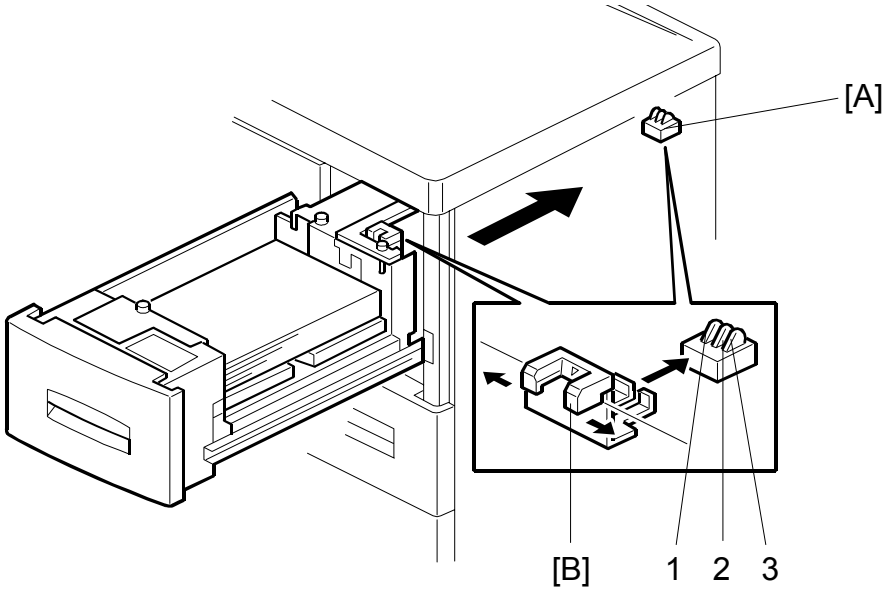
6.3.3 LIFT SENSOR



When the lift motor turns on, the pick-up solenoid [A] activates to lower the pick-up roller [B]. When the top sheet of paper reaches the proper paper feed level, the paper pushes up the pick-up roller and the actuator [C] on the pick-up roller supporter [D] de-activates the lift sensor [E] to stop the lift motor.

After several paper feeds, the paper level gradually lowers, then the lift sensor is activated and the lift motor turns on again until the lift sensor is de-activated again.

6.4 PAPER SIZE DETECTION



	A4-LEF	B5-LEF	A5-LEF	A5-SEF	LT-LEF	HLT-LEF	HTL-SEF
SW1	0	1	0	0	0	1	1
SW2	1	0	1	0	0	0	1
SW3	1	1	0	1	0	0	0

1: HI 0: LOW

Top Tray (Tray 1) and Middle Tray (Tray 2)

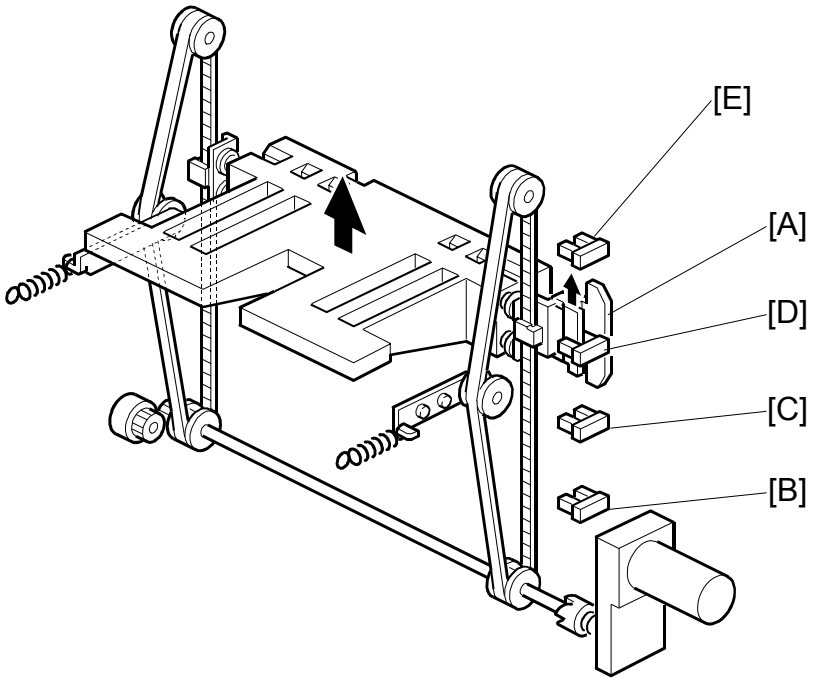
For the top and middle trays, the paper size switch [A] detects the paper size. The paper size switch contains three microswitches. The paper size switch is actuated by an actuator plate [B] at the rear of the tray. Each paper size has its own unique combination as shown in the table and the CPU determines the paper size by the combination.

Bottom Tray (Tray 3)

The bottom tray has the same switch as the top and middle trays. However, it is only used for detecting when the tray is pushed in.

For the bottom tray, the paper size must be selected in the SP5019-007:

6.5 REMAINING PAPER DETECTION

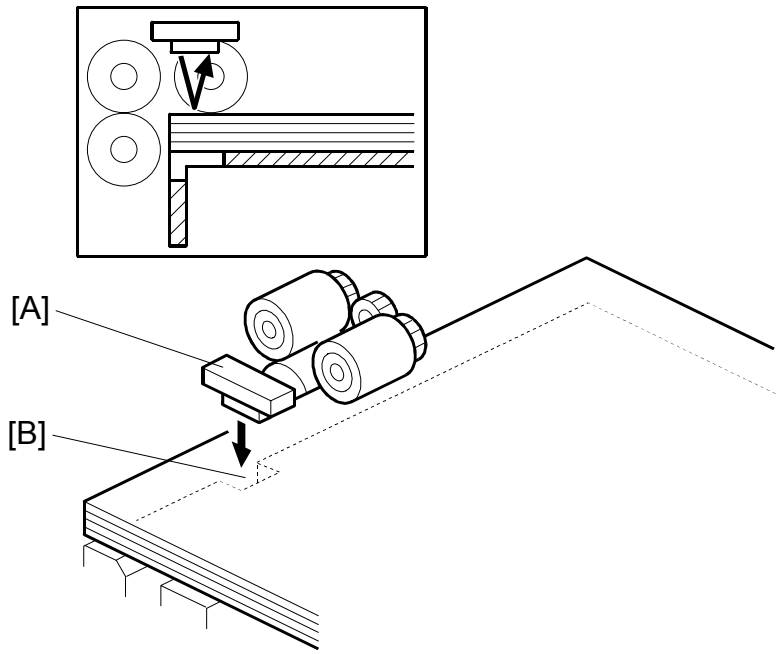


The amount of paper remaining in the tray is detected by the three paper height photointerrupter sensors on the left rail as the bottom plate rises. Five states, determined by the position of the actuator are possible.

1. With the actuator [A] below paper height sensor 1 [B], no sensor is actuated and the display indicates 100%.
2. When the actuator passes paper height sensor 1 [B] , the display indicates 75% of the paper supply remaining.
3. When the actuator passes paper height sensor 2 [C], the display indicates 50% of the paper supply remaining.
4. When the actuator passes paper height sensor 3 [D], the display indicates 25% of the paper supply remaining.
   NOTE: When the actuator enters the gap of the near end sensor [E], the machine signals near end.

Finally, when the last sheet feeds, the paper end sensor signals that the tray is empty. (☛6.6)

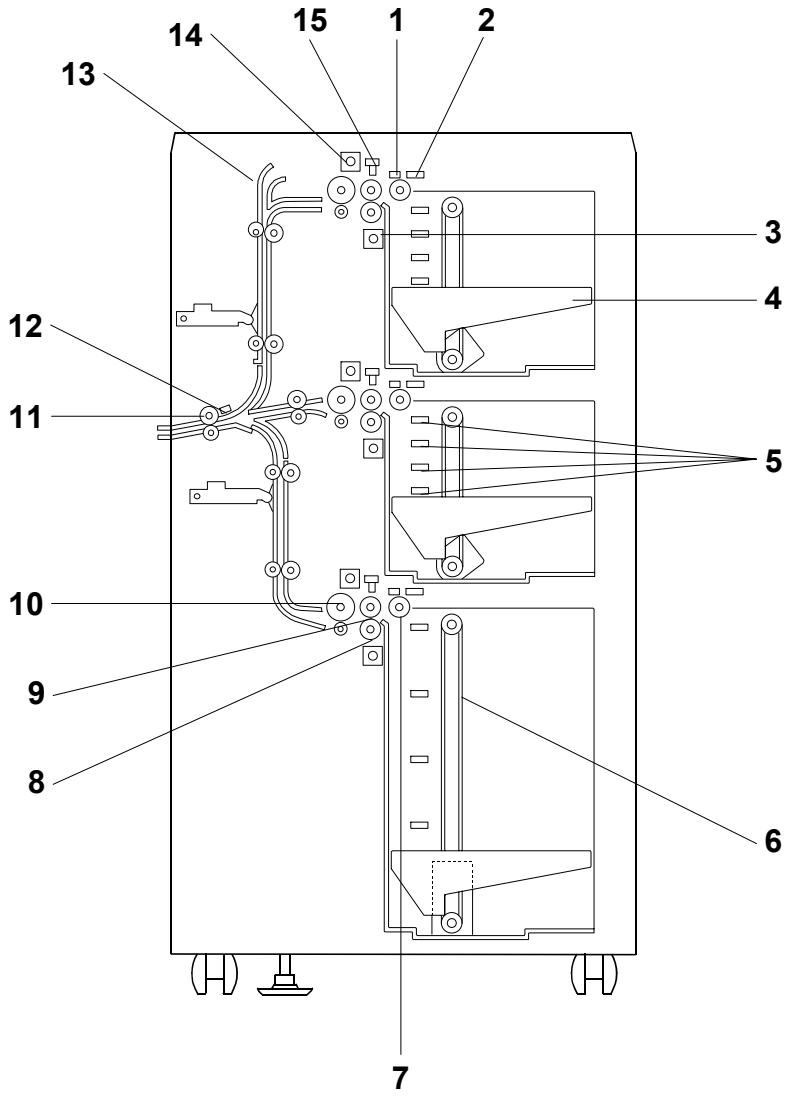
6.6 PAPER END DETECTION



The paper end sensor [A] detects the top sheet of the paper in the tray by monitoring the reflected light. When the paper tray runs out of paper, the paper end sensor does not receive the reflected light due to the cutout [B]. Then, the tray lift motor rotates backwards 2 seconds to drop the tray bottom plate.

7. OVERALL MECHANICAL INFORMATION

7.1 MECHANICAL COMPONENT LAYOUT



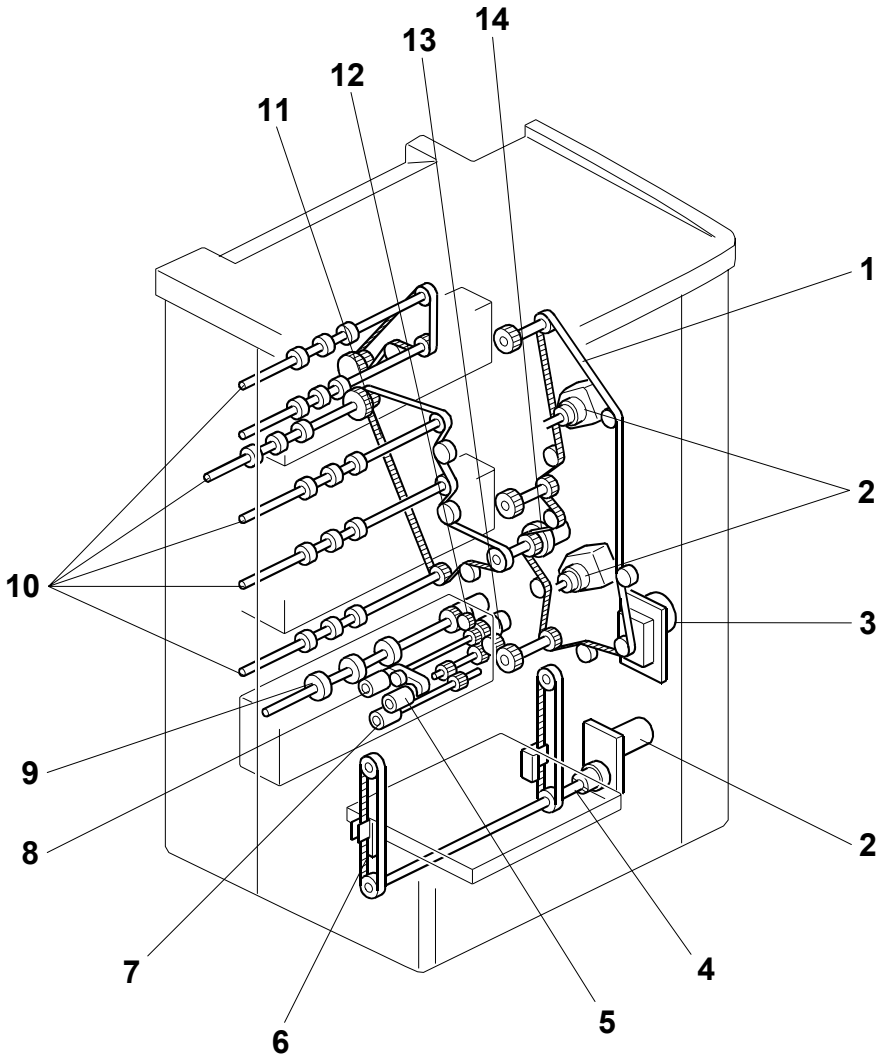
1. Paper Feed Sensor
2. Paper End Sensor
3. Separation Solenoid
4. Paper Tray
5. Paper Height Sensors
6. Tray Drive Belt
7. Pick-up Roller
8. Separation Roller
9. Paper Feed Roller
10. Grip Roller
11. Relay Roller
12. Relay Sensor
13. Feed Slot (Bypass Tray)
14. Pick-up Solenoid
15. Lift Sensor

7.2 ELECTRICAL COMPONENT DESCRIPTIONS

Symbol	Name	Function
Clutches		
MC1	Transport	Drives the transport rollers in the LCT.
MC2	1st Paper Feed	Drives the paper feed roller in the 1st tray.
MC3	1st Grip	Drives the grip roller in the 1st tray.
MC4	2nd Paper Feed	Drives the paper feed roller in the 2nd tray.
MC5	2nd Grip	Drives the grip roller in the 2nd tray.
MC6	3rd Paper Feed	Drives the paper feed roller in the 3rd tray.
MC7	3rd Grip	Drives the grip roller in the 3rd tray
Motors		
M1	LCT	Drives all rollers in the LCT.
M2	1st Lift	Drives the 1st tray up and down.
M3	2nd Lift	Drives the 2nd tray up and down.
M4	3rd Lift	Drives the 3rd tray up and down.
PCB		
PCB1	LCT Control Board	Controls the LCT and communicates with the copier.
Sensors		
SN1	1st Paper Height 1	Detects the paper height in the 1st tray.
SN2	1st Paper Height 2	Detects the paper height in the 1st tray.
SN3	1st Paper Height 3	Detects the paper height in the 1st tray.
SN4	1st Paper Height 4	Detects the paper height in the 1st tray.
SN5	2nd Paper Height 1	Detects the paper height in the 2nd tray.
SN6	2nd Paper Height 2	Detects the paper height in the 2nd tray.
SN7	2nd Paper Height 3	Detects the paper height in the 2nd tray.
SN8	2nd Paper Height 4	Detects the paper height in the 2nd tray.
SN9	3rd Paper Height 1	Detects the paper height in the 3rd tray.
SN10	3rd Paper Height 2	Detects the paper height in the 3rd tray.
SN11	3rd Paper Height 3	Detects the paper height in the 3rd tray.
SN12	3rd Paper Height 4	Detects the paper height in the 3rd tray.
SN13	Exit	Checks for the presence of paper (misfeeds) at the LCT exit.
SN14	1st Paper Feed	Detects the copy paper coming to the 1st paper feed roller and checks for misfeeds.
SN15	1st Paper End	Informs the copier when the paper in the 1st tray has run out.
SN16	1st Lift	Detects when the paper in the 1st tray is at the correct paper feed height.
SN17	2nd Paper Feed	Detects the copy paper coming to the 2nd paper feed roller and checks for misfeeds.
SN18	2nd Paper End	Informs the copier when the paper in the 2nd tray has run out.
SN19	2nd Lift	Detects when the paper in the 2nd tray is at the correct paper feed height.
SN20	3rd Paper Feed	Detects the copy paper coming to the 3rd paper feed roller and checks for misfeeds.
SN21	3rd Paper End	Informs the copier when the paper in the 3rd tray has run out.

Symbol	Name	Function
SN22	3rd Lift	Detects when the paper in the 3rd tray is at the correct paper feed height.
Solenoids		
SOL1	1st Separation	Controls up-down movement of the separation roller in the 1st tray.
SOL2	2nd Separation	Controls up-down movement of the separation roller in the 2nd tray.
SOL3	3rd Separation	Controls up-down movement of the separation roller in the 3rd tray.
SOL4	1st Pick-up	Controls up-down movement of the pick-up roller in the 1st tray.
SOL5	2nd Pick-up	Controls up-down movement of the pick-up roller in the 2nd tray.
SOL6	3rd Pick-up	Controls up-down movement of the pick-up roller in the 3rd tray.
Switches		
SW1	Front Door Safety	Detects whether the tray cover is opened or not.
SW2	1st Paper Size	Detects the paper size in the 1st tray, and whether the 1st tray is in the machine.
SW3	2nd Paper Size	Detects the paper size in the 2nd tray, and whether the 2nd tray is in the machine.
SW4	3rd Paper Size	Detects whether the 3rd tray is in the machine. The paper size must be input with a user tool.

7.3 DRIVE LAYOUT



1. Main Drive Belt
2. Tray Lift Motors
3. LCT Motor
4. Tray Drive Shaft
5. Pick-up Roller
6. Tray Drive Belt
7. Separation Roller
8. Paper Feed Roller
9. Grip Roller
10. Transport Rollers
11. Transport Roller Drive Belt
12. Grip Roller Clutch
13. Paper Feed Clutch
14. Transport Clutch

B468

3000-SHEET BOOKLET FINISHER

3000-SHEET BOOKLET FINISHER
B468

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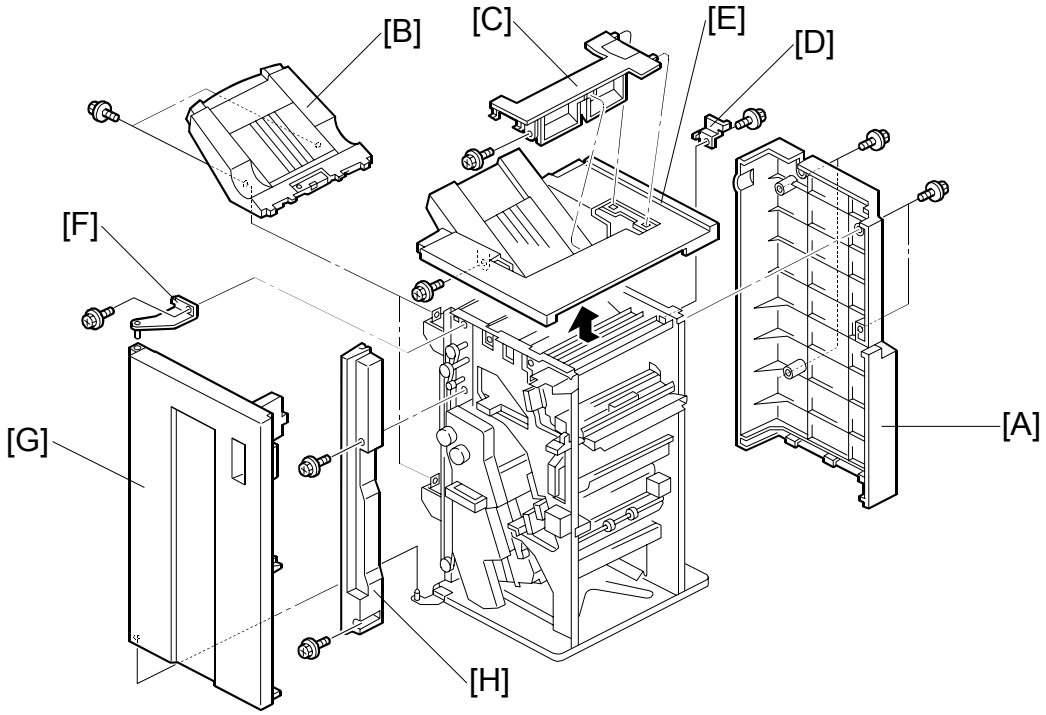
1. INSTALLATION

For details about how to 3000 Sheet Booklet Finisher B468, refer to the instructions you received with the unit or refer to “1. Installation” in the main copier service manual.

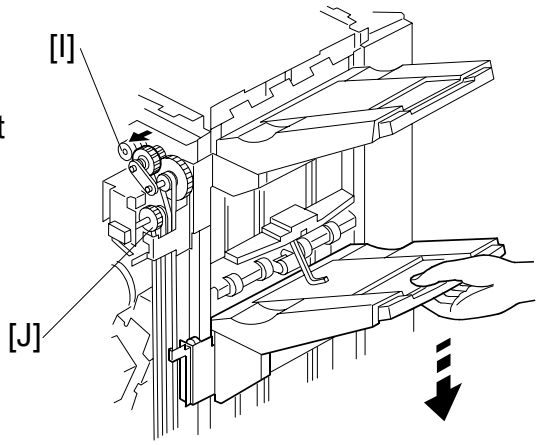
2. REPLACEMENT AND ADJUSTMENT

2.1 EXTERNAL COVERS



[A]: Rear cover (☞ x 4)
[B]: Upper tray, lower tray (☞ x 2 each) (See note below)
[C]: Top cover center (☞ x 1)
[D]: Stopper (☞ x 1)
[E]: Top cover (☞ x 1)
[F]: Front door hinge (☞ x 2)
[G]: Front door
[H]: Left side cover (☞ x 2)

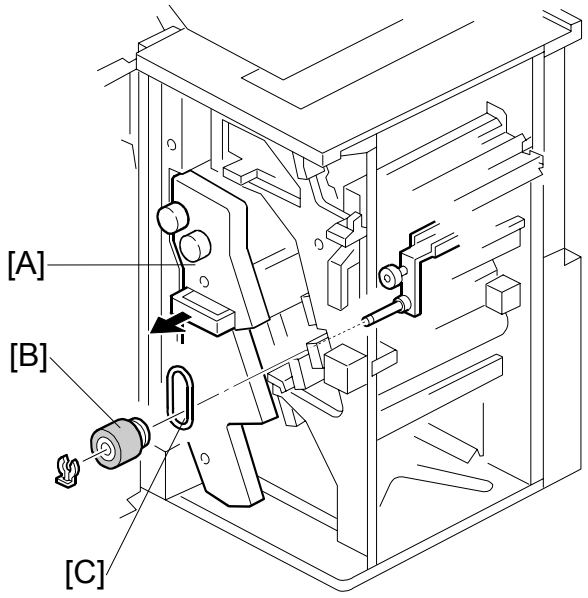
The trays may be difficult to remove at the up position. Support the tray with your hand, pull out the gear [I] (for the lower tray) or [J] (for the upper tray) to release the tray and lower it slowly.



2.2 POSITIONING ROLLER

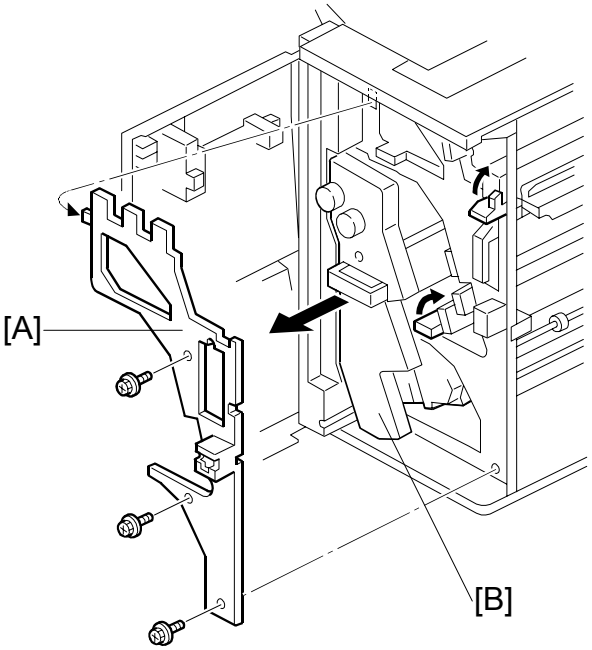
Open the front door.

[A]: Pull out the jogger unit.
[B]: Positioning roller (x 1)
[C]: Positioning roller drive belt

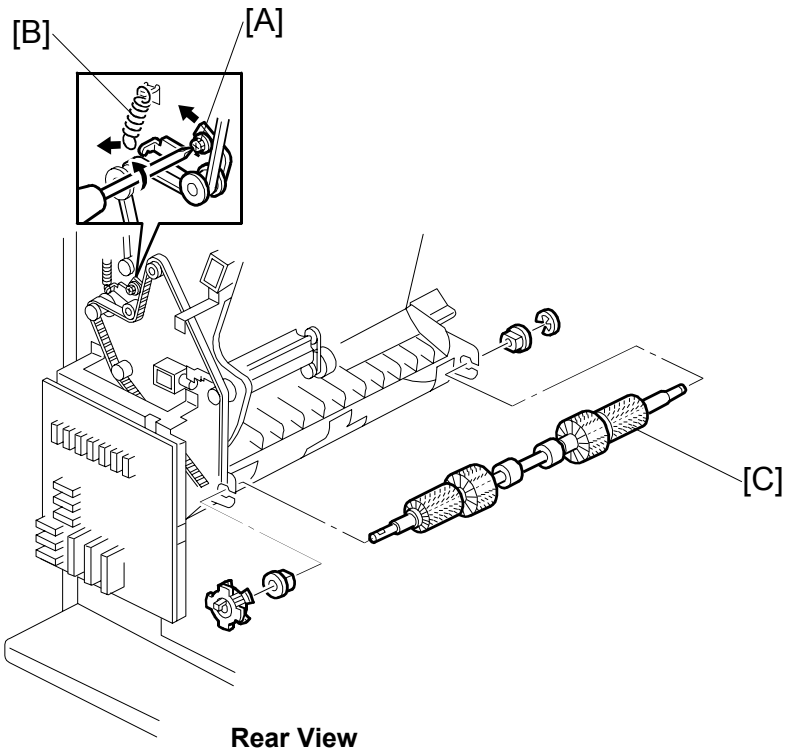


2.3 INNER COVER

[A]: Inner cover (x 3)
[B]: Pull out the jogger unit.



2.4 BRUSH ROLLER



Rear View

Open the front door.

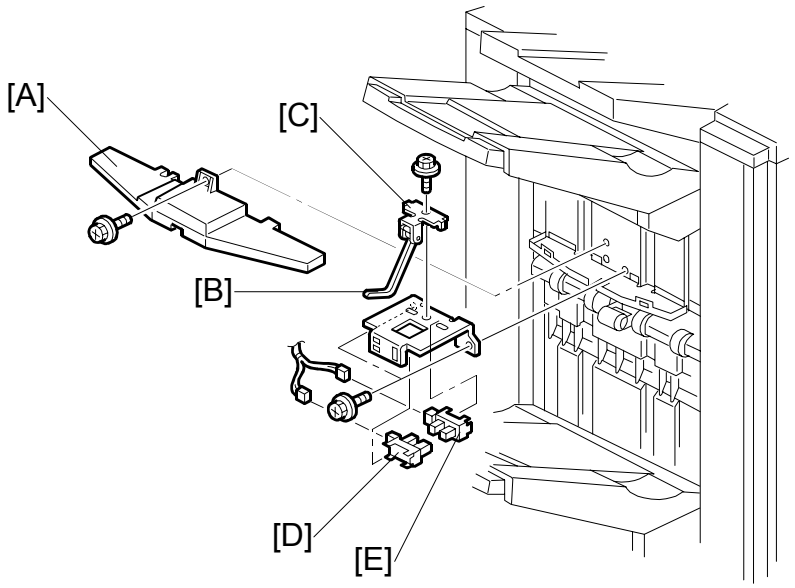
Pull out the jogger unit.

Rear cover (☛ 2.1)

[A]: Loosen tension bracket (☞ x 1)
[B]: Spring
[C]: Brush roller assy (ℂ x 1, bushing x 3)

- Remove the e-ring and bushing at [C] before removing the bushings on the back end of the shaft.

2.5 LOWER TRAY PAPER HEIGHT SENSORS 1, 2

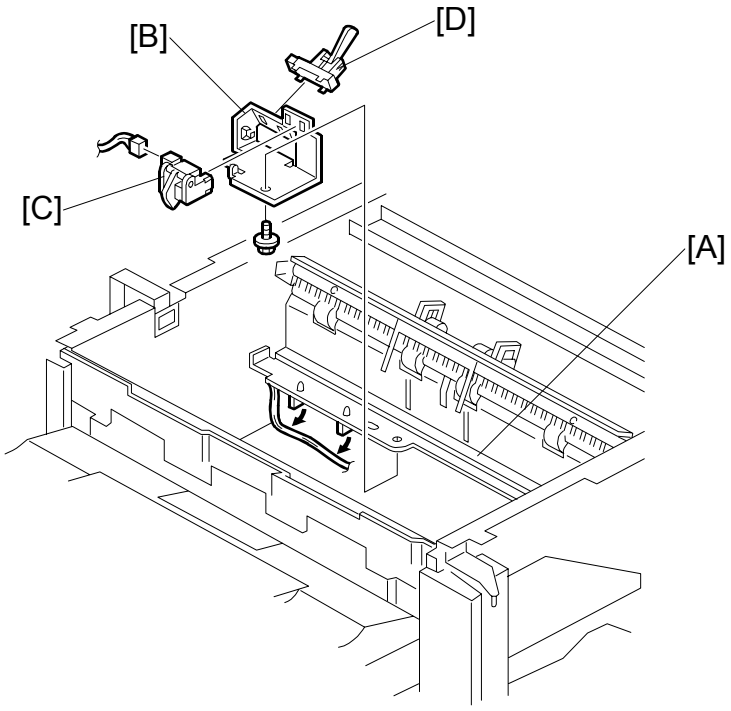


[A]: Paper height sensor cover (x 1)
- Lift the back edge of the cover up. Then pull it toward you slowly to disengage the tabs under the front edge of the cover and remove it.

[B]: Paper height sensor bracket (x 2, x 2)
- Mark the one socket and its connector with a felt pen to ensure that you do not reverse the connectors at re-connection.

[C]: Paper height sensor feeler (x 1)
[D]: Paper height sensor 1
[E]: Paper height sensor 2

2.6 PROOF TRAY EXIT AND FULL SENSORS

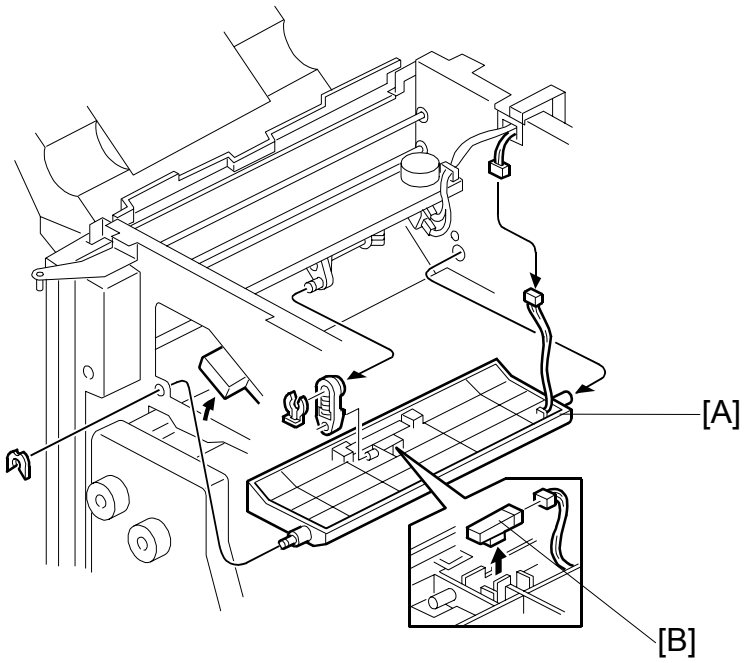


Open the front door.

Top cover (☛ 2.1)

[A]: Guide plate (🔩 x 4)
[B]: Sensor bracket (🔩 x 1)
[C]: Proof tray full sensor (✋ x 1)
[D]: Proof tray exit sensor (✋ x 1)

2.7 EXIT SENSOR



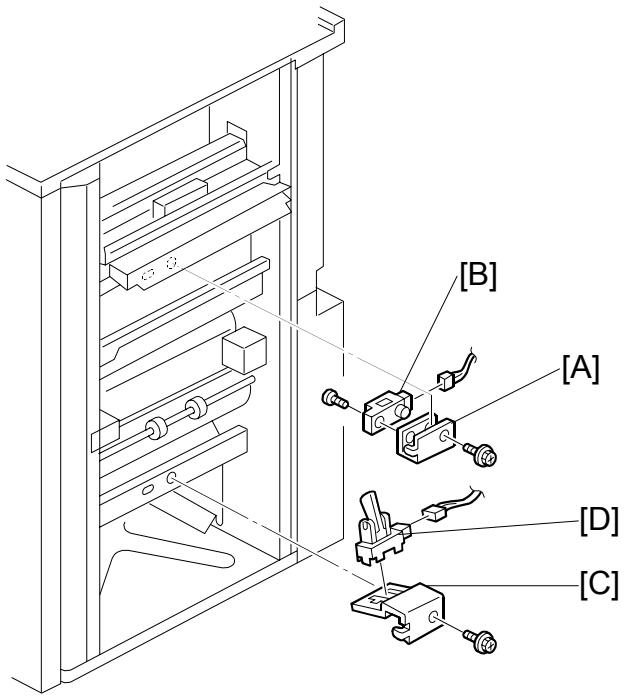
Open the front door.

Top and rear cover (☛ 2.1)

[A]: Guide plate (☞ x 1) (⚙ x 2)

[B]: Exit sensor (☞ x 1)

2.8 FINISHER, STAPLER ENTRANCE SENSORS



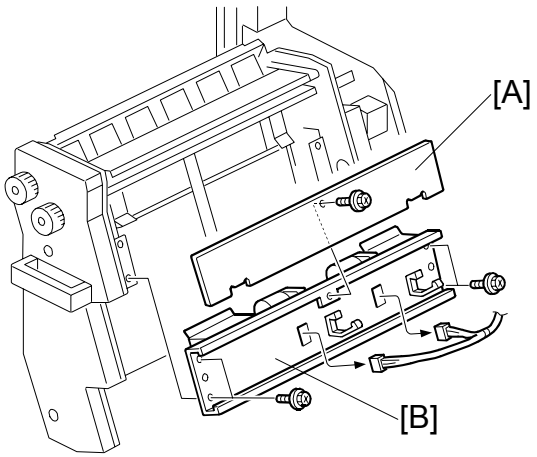
Disconnect the finisher from the main unit.

If the Cover Interposer Tray B470 is installed, remove it. Loosen the three shoulder screws, remove one set screw, then lift it off the frame.

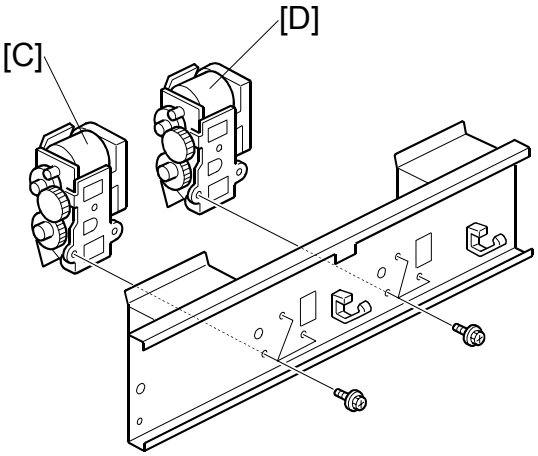
[A]: Finisher entrance sensor bracket (x 1)
[B]: Finisher entrance sensor (x 1) (x 1)
[C]: Stapler entrance sensor bracket (x 1)
[D]: Stapler entrance sensor and feeler (x 1)

2.9 SADDLE-STITCH STAPLER REPLACEMENT

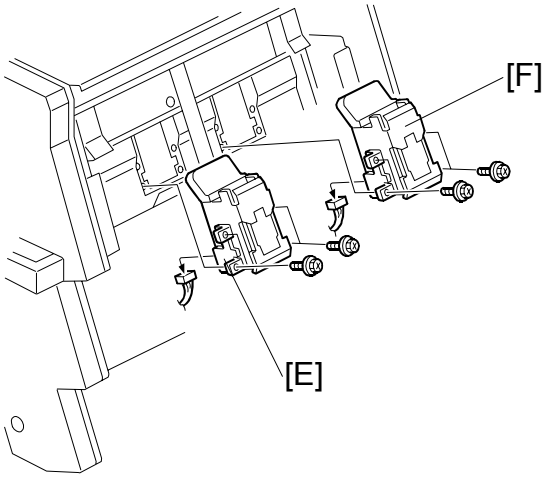
1. Remove the cover [A] (x 1).
2. Remove the staple unit motor mount [B] (x 4, x 2).



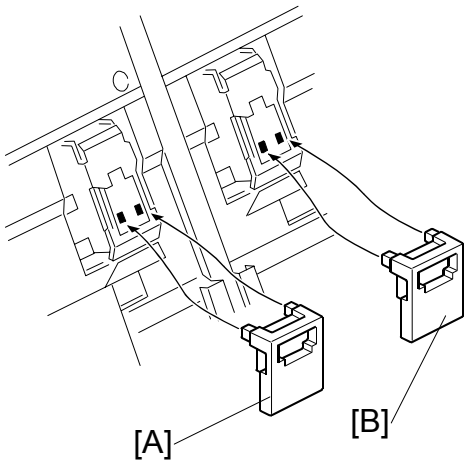
3. Remove the old booklet stapler motors (x 3 each x 1 each).
4. Attach the left booklet stapler motor [C] and right stapler motor [D] (x 3 each).
   NOTE: Do not tighten the screws.



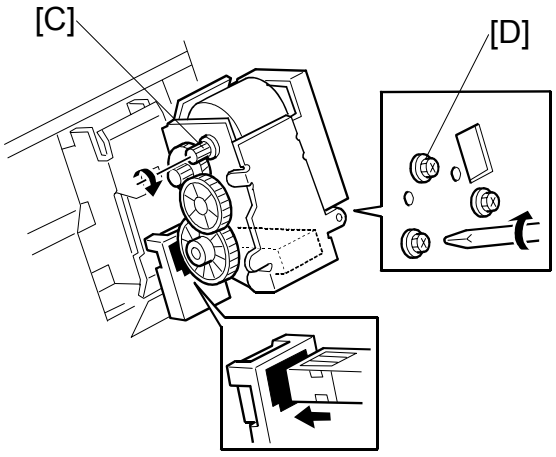
5. Remove the old booklet staplers (x 4 each, x 1 each).
6. Attach the booklet stapler [E] and the stapler [F] (x 4 each, x 1 each) and tighten the screws.



7. Attach the Teflon jigs [A] and [B].
8. Attach the new booklet stapler motor mount to the frame (x 4).



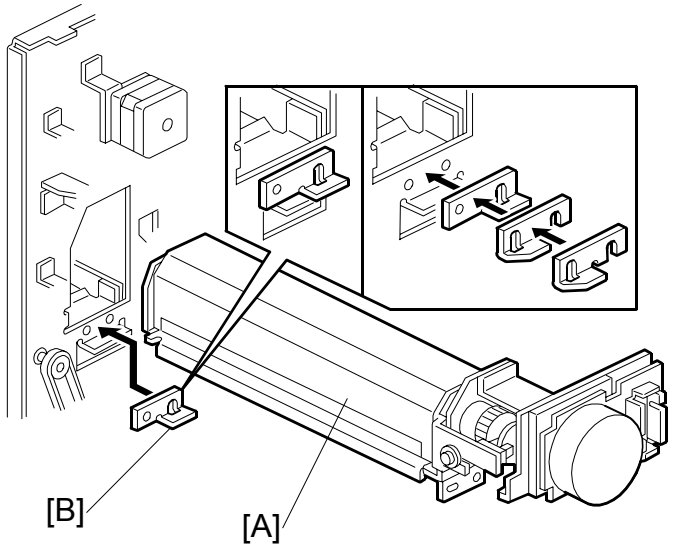
9. On each motor, with your finger turn the brass gear [C] toward you until it stops then tighten the motor screws [D] .(x 3)
10. Remove the motor mount board (x 4) and remove the jigs.
11. Fasten the new motor mount to the frame (x 4, x 2).



2.10 PUNCH POSITION ADJUSTMENT

The positions of punch holes can be adjusted in two directions:

- **Vertical positon**. To adjust the vertical positions of the punch holes, execute SP6113 (Punch Hole Adjustment) to adjust the timing of the punch motor.



- **Horizontal position**. To adjust the horizontal positions of the punch holes, install or remove the metal spacers. Three spacers are used:
  - 1 spacer, 2 mm thick
  - 2 spacers, each 1 mm thick.

Rear cover (☛ 2.1)

[A]: Punch unit (🖉 x 2)

[B]: Spacer
- Attach or remove the required number of spacers.
- The 2 mm spacer should be installed to set the default punch hole positions. Use the 1 mm spacers to adjust.

2.11 JAM DETECTION

Mode	Jam	Cause
Proof/Shift/Staple	Finisher entrance sensor check in failure	Remains off even after the main machine exit sensor goes OFF and the paper feeds 270 mm.
	Finisher entrance sensor check out failure	Remains on even after enough time has elapsed for twice the length of the paper to feed.
Proof	Proof tray exit sensor check in failure	Remains OFF even after the entrance sensor goes ON and the paper has fed 380 mm.
	Proof tray exit sensor check out failure	Remains OFF even after enough time has elapsed for twice the length of the paper to feed.
Shift	Exit sensor check in failure	Remains OFF after the entrance sensor goes ON and the paper has fed 570 mm.
	Exit sensor check out failure	Remains ON after enough time has elapsed for twice the length of the paper to feed.
Staple	Stapler exit sensor check in failure	Remains OFF after the entrance sensor goes ON and the paper has 760 mm.
	Stapler exit sensor check out failure	Remains ON after the stapler tray entrance sensor goes ON, and enough time has elapsed for twice the length of the paper to feed.
	Stapler tray sensor check out failure	Remains ON after the feed out belt motor switches ON and pulse count exceeded 466.
	Shift tray exit sensor check in failure	Remains OFF after the feed out belt motor switches ON for 1260 ms.

2.12 DIP SW 100 (MAIN BOARD)

The settings of DIP SW 100 on the main finisher board should remain set to OFF (zero in the table below). These settings should not be changed by the customer or the customer engineer during normal operation or testing. These settings are provided for reference only.

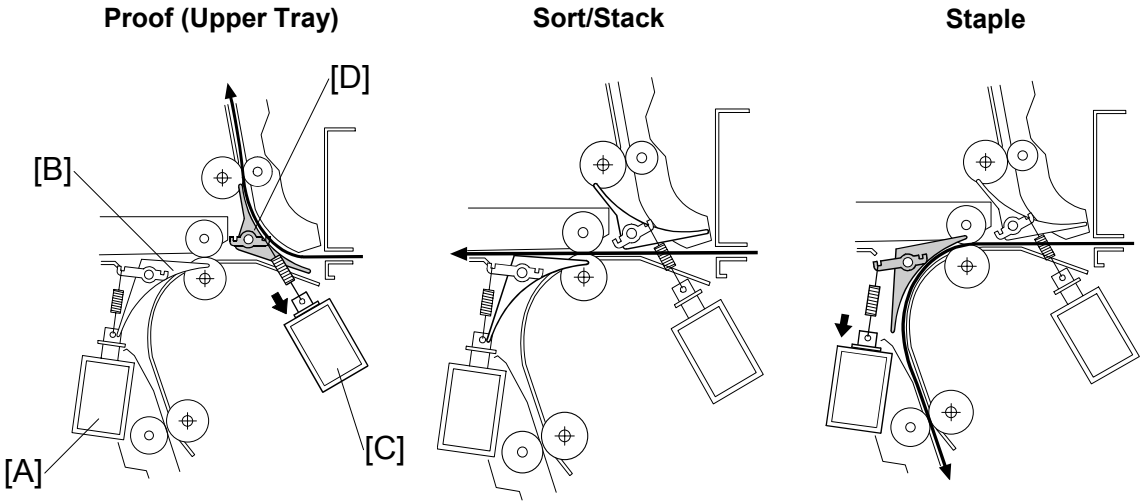
DIP SW 101				Mode	Content
1	2	3	4		
0	0	0	0	Default	
1	0	0	0	Not Used	
0	1	0	0	Cover Feeder Test	Operation Check
1	1	0	0	Cover Feeder Test	Operation Check
0	0	1	0	Move to Shipping Position *1	See note below.
1	0	1	0	Cover Feeder Check	Operation Check
1	1	1	0	Cover Feed Test	Operation Check

*1: The following procedure repositions the trays to the shipping position.

1) Make sure that the main switch is turned off.
2) Turn on DIP SW101-3.
3) Turn on the main switch. The finisher automatically repositions the trays to the shipping position.
4) After the finisher completes moving the trays, turn off DIP SW101-3.

3. DETAILS

3.1 TRAY/STAPLER JUNCTION GATES

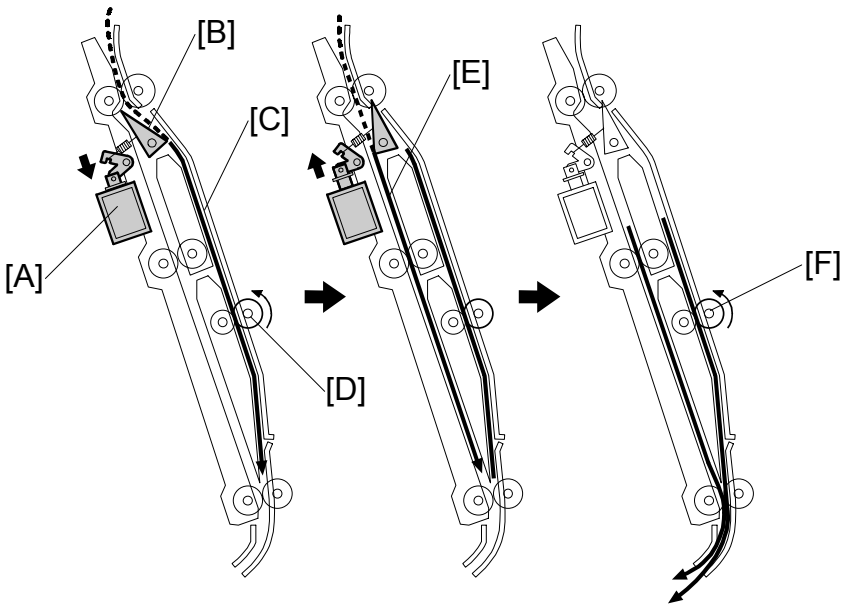


The finishing mode selected for the job determines the direction of the paper in the finisher.

- **Proof Tray (Top of the unit):** Paper is sent to the top tray.
- **Shift:** Paper is sent straight to the upper or lower tray.
- **Staple:**. Paper is sent down to the stapler unit

Solenoid/Gate		Selected Operation Mode		
		Proof	**Sort/Stack**	**Staple**
[A]	Stapler junction gate solenoid	OFF	OFF	ON
[B]	Stapler junction gate	Closed	Closed	Open
[C]	Proof tray junction gate solenoid	ON	OFF	OFF
[D]	Proof tray junction gate	Open	Closed	Closed

3.2 PRE-STACKING



During a multiple copy job selected for stapling, the pre-stacking mechanism delays the first two sheets of every set (after the first set) to allow enough time to staple the preceding stack on the stapler tray. Pre-stacking is performed with the first and second sheets for the second and all subsequent sets.

Shortly after the first sheet of the set enters the finisher, the pre-stack junction gate solenoid [A] switches on, opens the pre-stack junction gate [B] and shunts the first sheet to the paper pre-stack tray [C]. When the first sheet passes the pre-stack roller [D], the pre-stack motor switches off and the sheet stops.

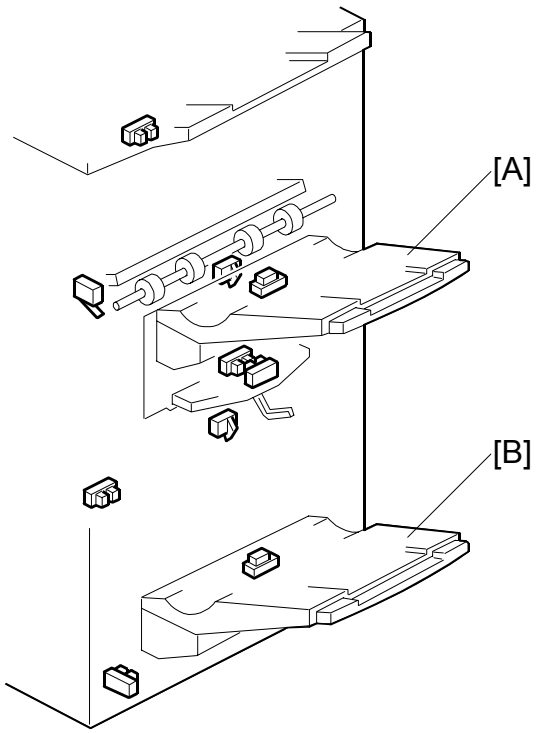
Shortly after the trailing edge of the first sheet enters the finisher, the solenoid switches off, and the junction gate closes. This allows the second sheet of the set to pass the closed junction gate and enter the main paper path [E].

At the prescribed time, the pre-stack motor switches on, and the pre-stack transport roller [F] rotates and sends the first sheet to the stapler tray at the same time as the second sheet arrives there.

All subsequent sheets of the same set are sent through the main paper path to the stapler tray for stapling.

3.3 VERTICAL LIFT MECHANISM

3.3.1 OVERVIEW

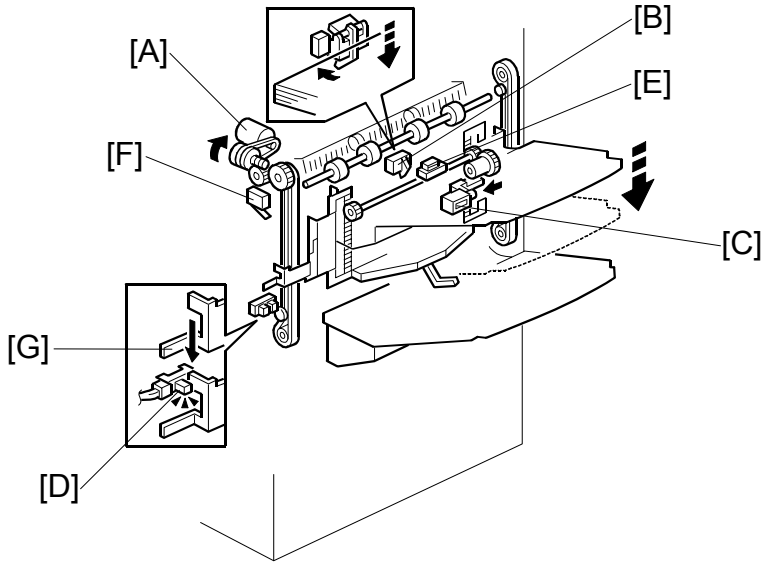


At power on, both trays lower slightly, then the upper tray stops at the feed-out position. The machine is ready for feed out to the upper tray [A]

During printing, the upper [A] or lower tray [B] (whichever is selected) is repeatedly lowered until the stack reaches a certain height and then the job halts. The upper tray holds 500 sheets (A4 LEF), and the lower tray holds 2500 sheets.

Both trays can be used for the normal, shift, and staple modes. However, only the lower tray can be used for the booklet binding (saddle-stitch mode).

3.3.2 UPPER TRAY



[A]: Upper tray lift motor
[B]: Upper tray paper height sensor
[C]: Upper tray lift solenoid
[D]: Upper tray full sensor
[E]: Upper tray paper sensor
[F]: Upper limit switch (upper tray)

Just After the Power is Switched on

At power on, the motor [A] moves the upper tray to the start position just under the feed-out slot. The motor stops when the paper height sensor [B] detects the tray.

Height Adjustment During Feed-Out

The upper tray moves up and down on a rack and pinion on a movable side fence that remains locked in place during copying.

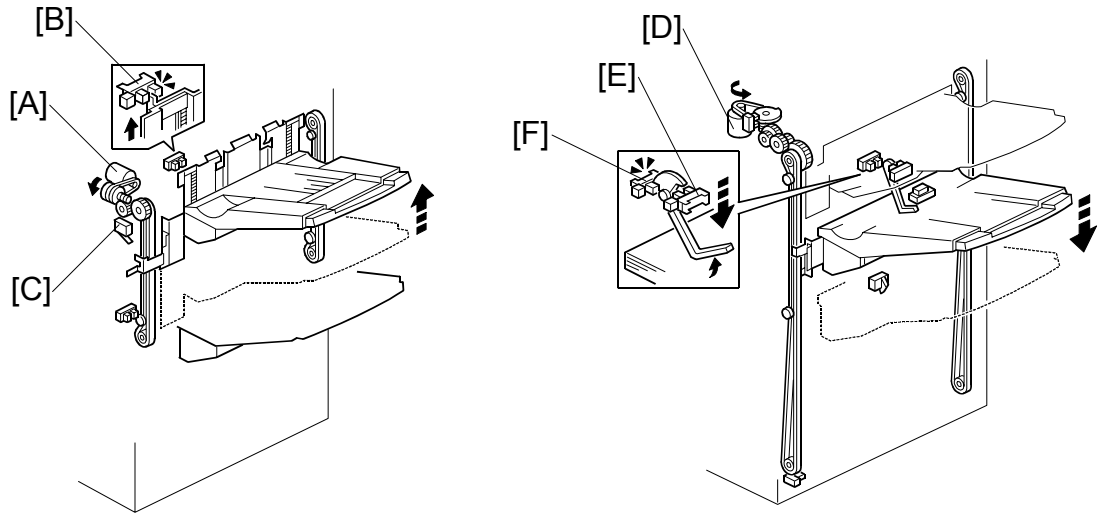
When the top of the stack actuates the sensor [B], a solenoid [C] inside the upper tray releases a locked one-way clutch long enough to lower the upper tray a short distance on its track to allow more pages to feed out. This process repeats until the tray is full.

Upper Tray Full

When the tray is full, a metal actuator [G] on the side of the upper tray frame actuates the upper tray full sensor [D] and the job stops.

The paper sensor [E] inside the upper tray detects when the stack is removed from the tray, and the tray returns to the initial position at the feed-out slot. The upper limit switch [F] (a micro-switch) is a backup if sensor [B] fails to stop the tray.

3.3.3 LOWER TRAY



[A]: Upper tray lift motor
[B]: Upper tray upper limit sensor
[C]: Upper limit switch (upper tray)
[D]: Lower tray lift motor
[E]: Lower tray paper height sensor 1
[F]: Lower tray paper height sensor 2

Just After the Power is Switched on

At power on, the upper tray moves to the start position under the feed-out slot, as described previously.

Positioning the Lower Tray for Feed-out

If the lower tray is selected for a job, the upper tray is moved away from the feed-out slot at the start of the job. The motor [A] lifts the side fence and upper tray to upper limit sensor [B], which stops the motor. The upper tray remains locked in position on the side fence (by the upper tray lift solenoid) while the lower tray is in use.

If sensor [B] fails, switch [C] stops the tray.

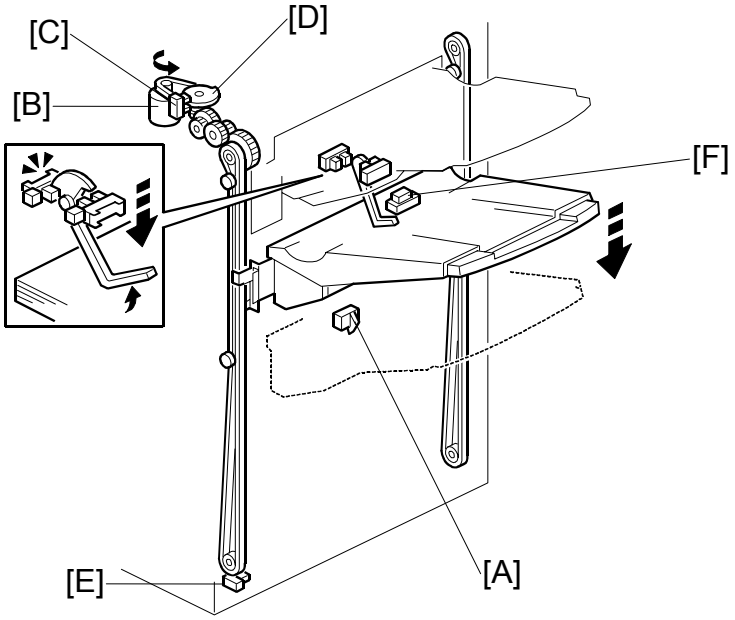
While the upper tray is being raised, motor [D] lifts the lower tray to the feed-out slot. The motor stops when the upper tray paper height sensor detects the tray.

Lower Tray Height Adjustment During Feed-out

Two sensors and a long feeler that contacts the top of the stack control the lower tray height during feed-out.

When the top of the stack is low, the feeler drops and the actuator swings up and actuates height sensor 1 [E]. As the stack grows higher, the feeler is pushed up until it actuates height sensor 2 [F]. After height sensor 2 remains active for 3 seconds, the lift motor [D] switches on and lowers the tray a short distance. This process repeats until the tray is full.

Lower Tray Full



[A]: Lower tray full sensor (sort/shift mode)
[B]: Lower tray lift motor
[C]: Lower tray encoder sensor
[D]: Encoder disk
[E]: Lower tray full sensor (saddle-stitch mode)
[F]: Lower tray paper sensor

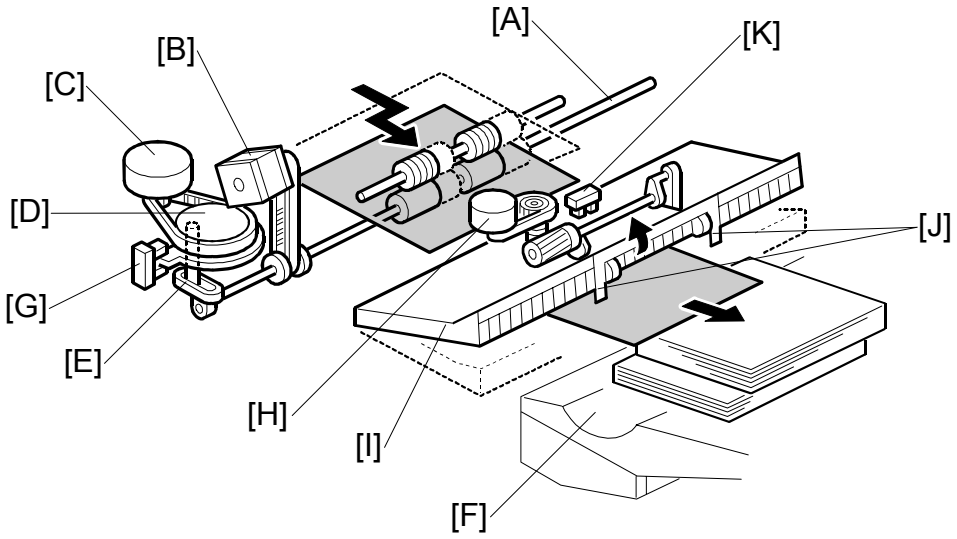
The sensor that is used depends on which mode the user has selected.

Normal sorting/stapling, without saddle stitching: When the bottom of the tray actuates sensor [A], the lift motor [B] continues to rotate for a certain number of rotations. The rotations are detected using sensor [C] and encoder disk [D]. Then printing stops. If sensor [C] fails, the upper limit switch (lower tray) stops the motor. This switch (not shown in the diagram) is next to the plastic foam roller at the feed-out slot.

Saddle-stitch mode: Sensor [A] is not used. The tray is lowered until the actuator on the side of the tray actuates sensor [E]. Then printing stops.

In both modes, when the stack is removed from the tray, sensor [F] de-actuates and returns the lower tray to the initial position at the feed-out slot.

3.4 SHIFT MECHANISM



The same shift mechanism is used for the upper tray and lower tray.

Shift Roller Rotation

The shift roller [A] is turned by the shift roller motor [B].

Shift Roller Horizontal Movement

The shift roller is moved from left to right by the shift motor [C] and shift gear disk [D].

When the trailing edge of the copy passes the upper transport roller, the shift motor switches on, moving the shift roller to the left or right via the shift gear disk [D] and the link [E].

After the paper is delivered to the tray [F], the shift roller moves to the home position, detected by the shift HP sensor [G].

The process is repeated for every page of the same set, when the trailing edge of the page passes the transport roller.

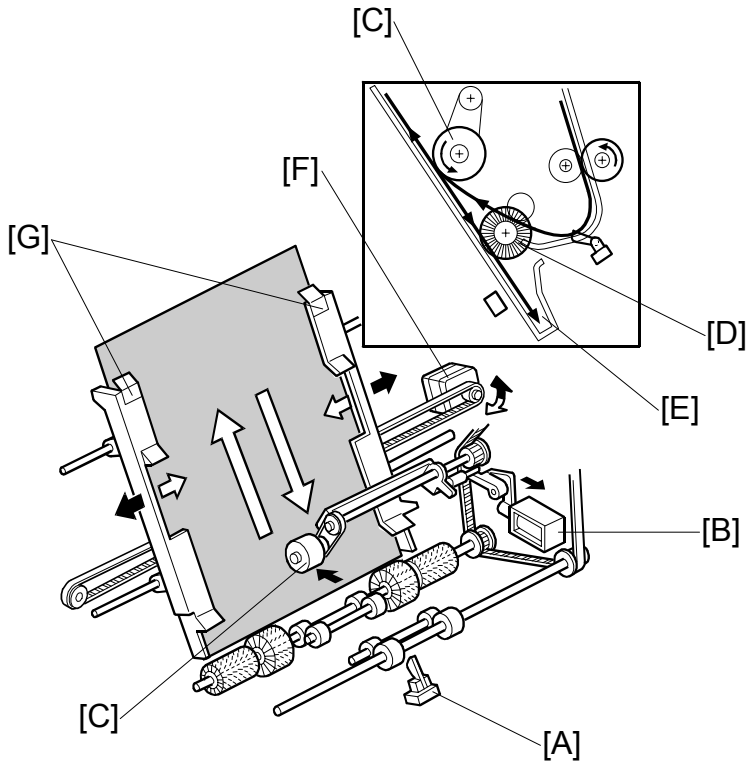
For the next set, the shift motor rotates the gear disk in the opposite direction to shift every page of the next stack to the opposite side.

Exit Guide Plate

The guide plate motor [H] (a stepper motor) controls the opening and closing of the guide plate [I], via a cam and pin mechanism. The guide plate opens for each sheet to allow the shift, then closes to keep the sheet in the correct position for feed out. Two mylars [J] above the feed-out slot keep the copies straight in the feed path.

The guide plate position sensor [K] detects whether the guide plate is open or closed.

3.5 PAPER POSITIONING



Vertical Alignment

When the trailing edge of the copy passes the stapler tray entrance sensor [A], the positioning roller solenoid [B] switches on long enough for the selected paper size and pushes the positioning roller [C] onto the paper. The positioning roller and alignment brush roller [D] rotate to push the paper and align the trailing edge of the paper with the stack stopper [E].

The stapler transport motor (not shown in this diagram) drives rollers [C] and [D].

Horizontal alignment

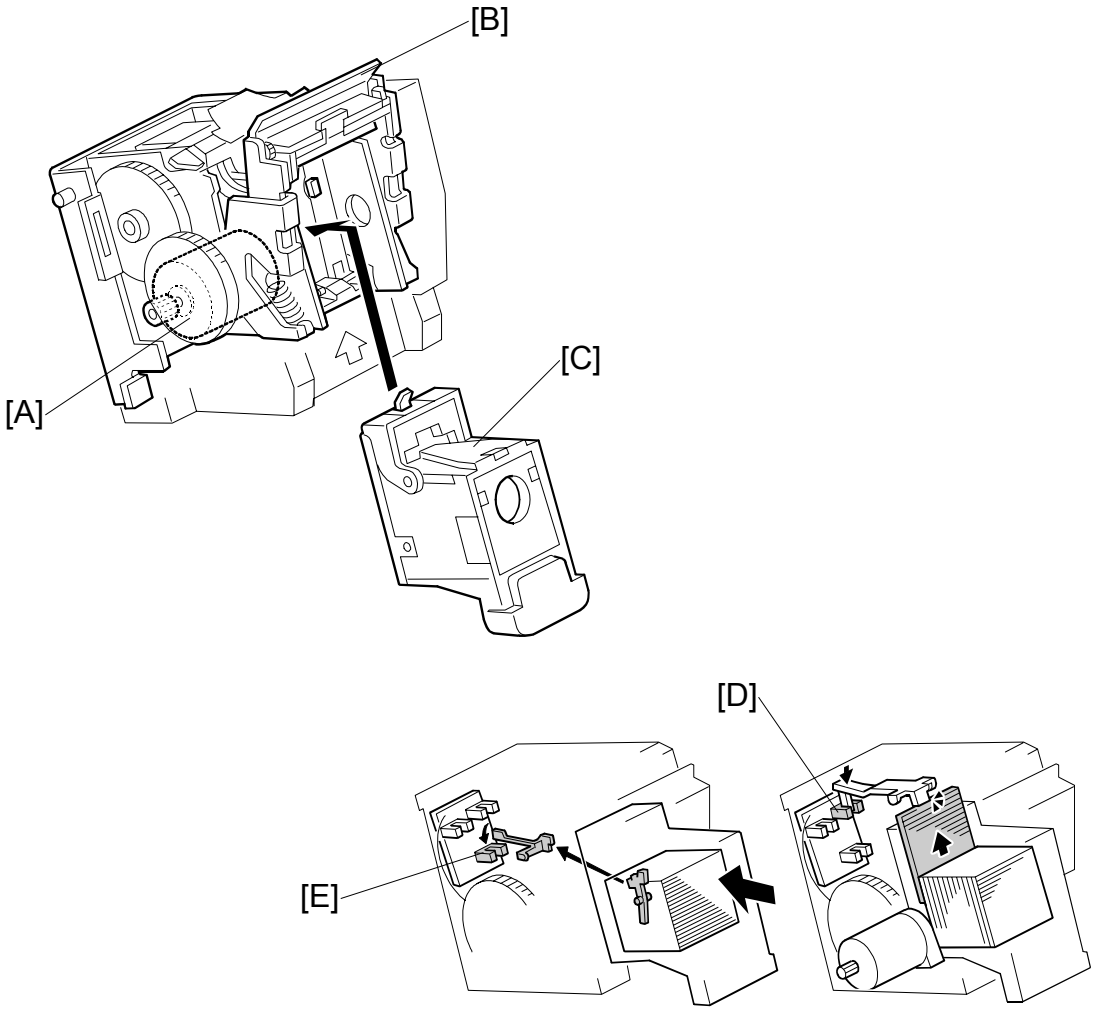
When the Start key is pressed, the jogger motor [F] switches on and opens the jogger fences 10 mm wider than the selected paper size.

When the leading edge of the sheet passes the staple unit entrance sensor, for the initial alignment, the jogger motor switches on for the prescribed time and closes the jogger fences 4 mm (2 mm closer to either side of the paper)

Next, the jogger motor switches on again for the prescribed time for the horizontal alignment to close the jogger fences 6 mm (3 mm to the sides of the paper) for the final alignment correction. The jogger motor switches on again and the fences return to the wait position 10 mm wider than the selected paper size.

3.6 STAPLER

3.6.1 STAPLING MECHANISM



Staple firing is driven by the stapler motor [A] inside the stapler unit. The stapler hammer [B] fires the stapler [C].

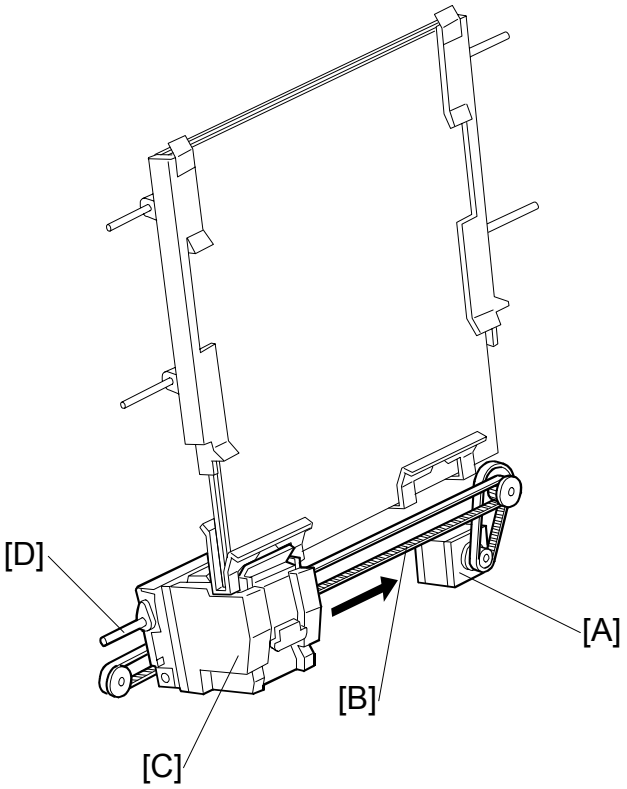
The cartridge set sensor [D] detects the cartridge at the correct position, or logs an SC if the stapler unit is not at the correct position.

The stapler end sensor [E] detects the staple end condition and logs an SC.

3.6.2 STAPLER MOVEMENT

The stapler performs horizontal and rotational movement in each of the four staple modes.

Horizontal Stapler Movement



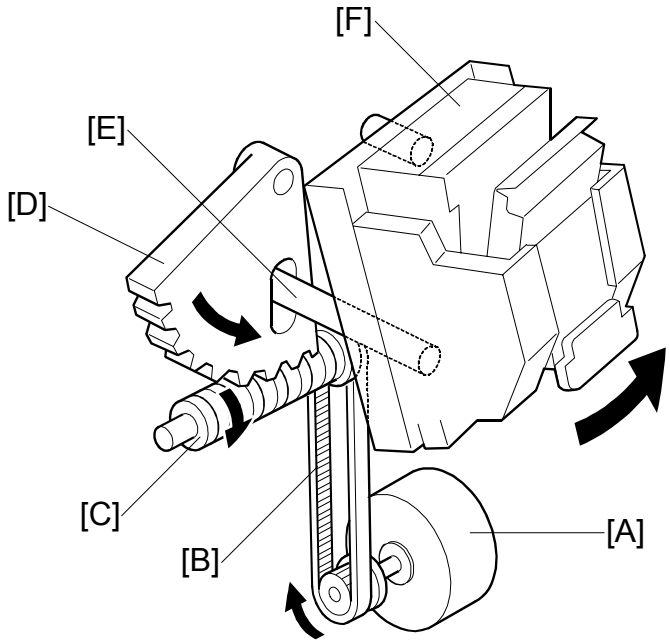
The stapler movement motor [A] drives the timing belt [B] which moves stapler [C] left and right on a support bar [D].

When the Start key is pressed, the jogger fences move to the wait position 10 mm wider than the selected paper size, the stapler motor switches on and moves the stapler to the staple position and then switches off. The motor switches on and off for the time needed to position the stapler for the paper size selected for the job.

If the stack is to be stapled at two locations, the stapler moves to the front position first, staples, moves to the back position, staples, and then returns to the home position.

NOTE: SP6120 001~011 (Staple Jogger Adjustment). Use this SP to fine adjust the staple unit jogger fences for different paper sizes. For details, see section “5. Service Tables”.

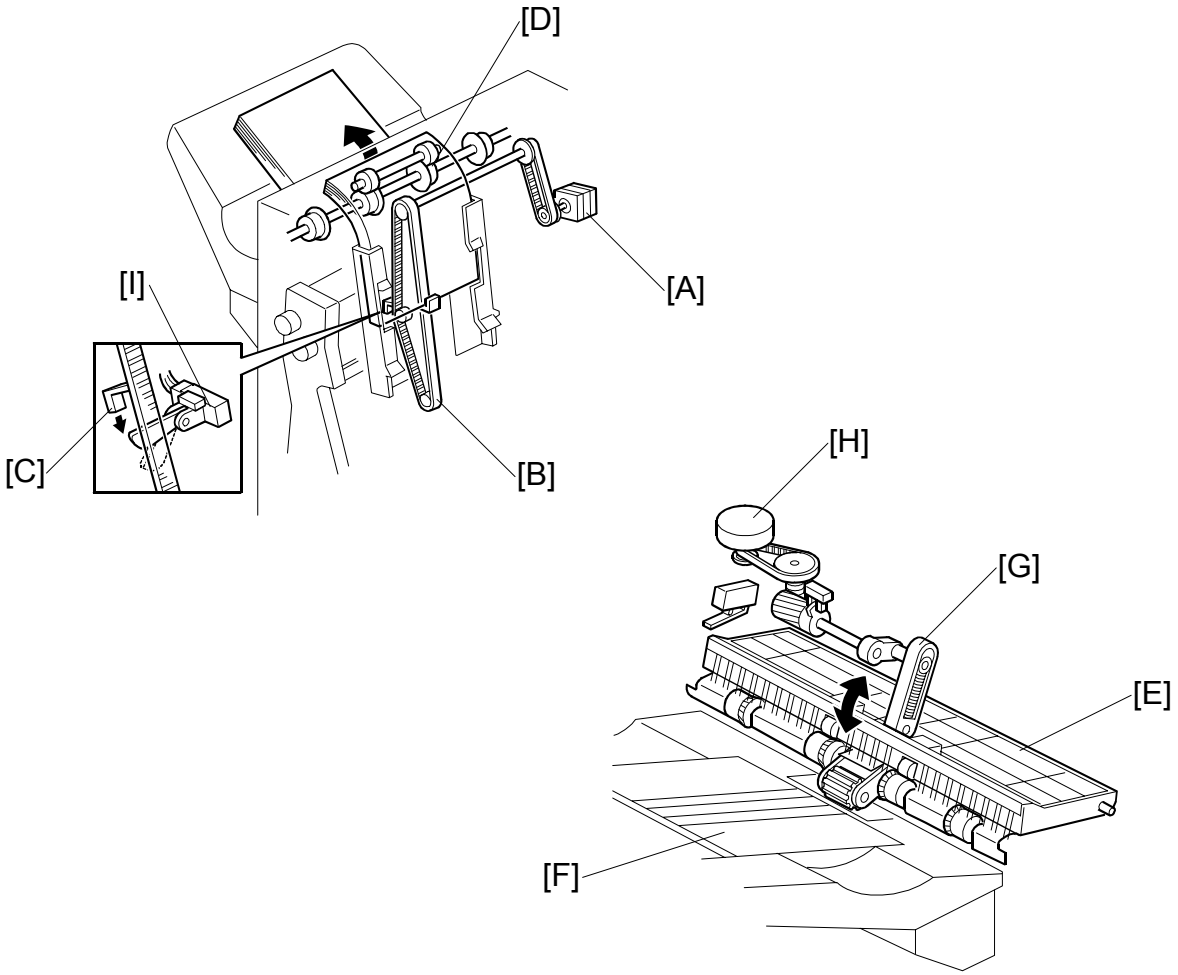
Rotational Stapler Movement



When the user has selected oblique stapling at one position, first the stapler motor switches on and off for the amount of time needed to move the stapler to the stapling position for the selected paper size.

At the correct time, the stapler rotation motor [A] switches on and via the timing belt [B] rotates the worm gear [C]. The worm gear drives the gear [D] and the lift arm [E], which lifts and positions the stapler unit [F] so the stapler can fire the staple at a 45 degree angle.

3.6.3 FEED OUT



After a set has been stapled, the stack feed out motor [A] switches on and drives the stack feed out belt [B]. The pawl [C] on the belt lifts the stapled stack and transports it to the exit rollers [D]. There are two pawls on the belt, to increase productivity.

The exit guide plate [E] remains open until the leading edge of the stapled sheets has passed the prescribed distance from the tray exit rollers, then the exit guide plate closes, and the stapled sheets feed out to the tray [F].

A cam and pin [G], powered by the guide plate motor [H], opens and closes the guide plate.

The stack feed out motor stops for 300 ms to allow the exit rollers to feed out the stapled sheets to the output tray. This pause prevents the copies from pushing out too far onto the tray.

The stack feed out motor switches on again until the pawl actuates the stack feed out belt HP sensor [I].

3.7 BOOKLET FINISHING

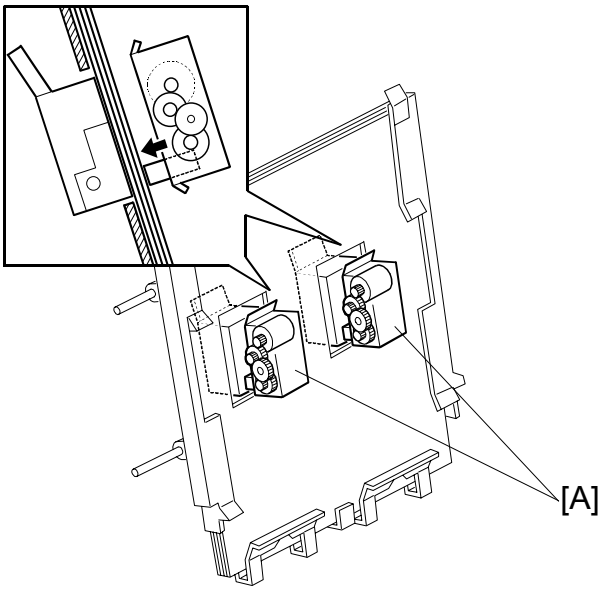
3.7.1 OVERVIEW

Stapling: Two booklet staplers are used. These are about half way up the stack fed-out path The stack feed-out belt moves the stack to the correct position for stapling.

Folding: This is done in two phases: initial folding and final folding.

- Initial folding: At the top of the stack feed-out belt, a plate pushes the centre of the copy (at the stapled place) through a pair of rollers to give the booklet an initial fold. However, this fold is only a partial fold.
- Final folding: The partially folded copy drops to the lower tray, where it is caught by a pressure plate mechanism, which completes the fold in the booklet before letting it drop onto the lower tray.

3.7.2 BOOKLET STAPLING AND FOLDING

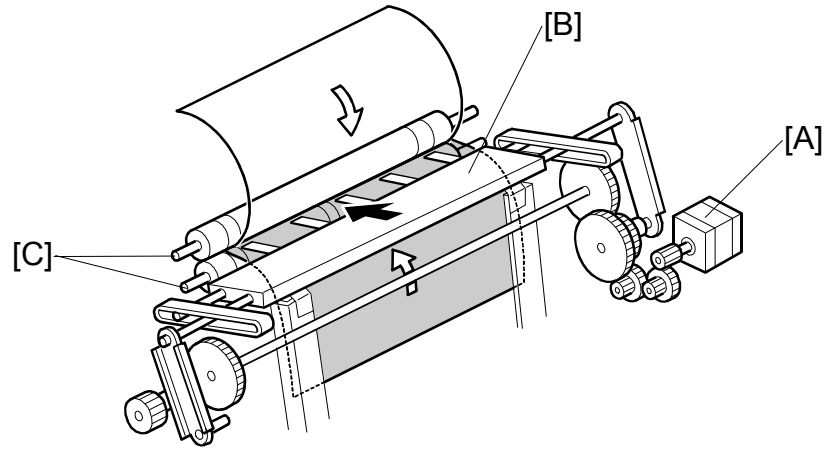


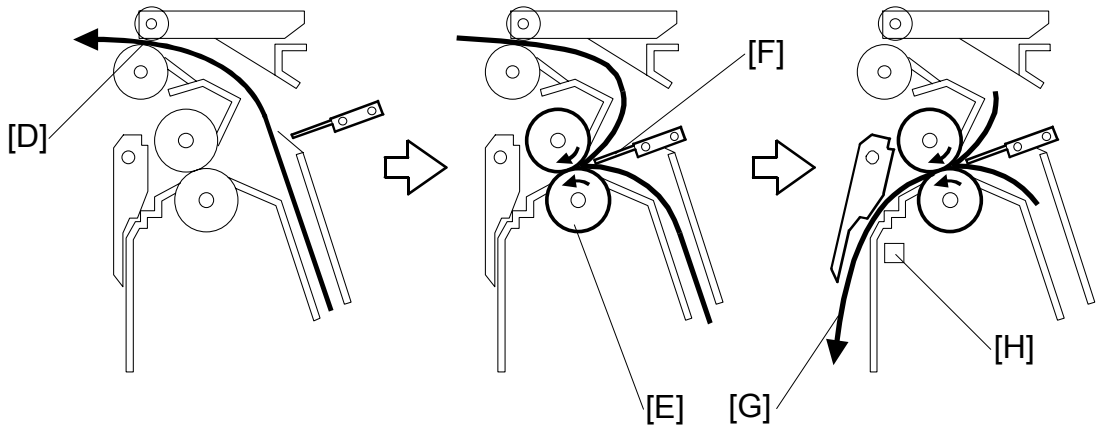
The sheets are aligned by the jogger fences before stapling. (☛ 3.5)

The aligned sheets are sent to the booklet stapler unit and positioned below the booklet staplers [A] for stapling at two locations in the center of the paper.

The stack feed-out belt lifts the booklet until two pawls on the folder plate mechanism (see the next page) catch the staples to position the booklet for folding.

3.7.3 INITIAL FOLDING





The folder plate motor [A] switches on and drives the folder plate [B] forward to push the center of the booklet into the nip of the folder rollers [C], giving the booklet a partial fold.

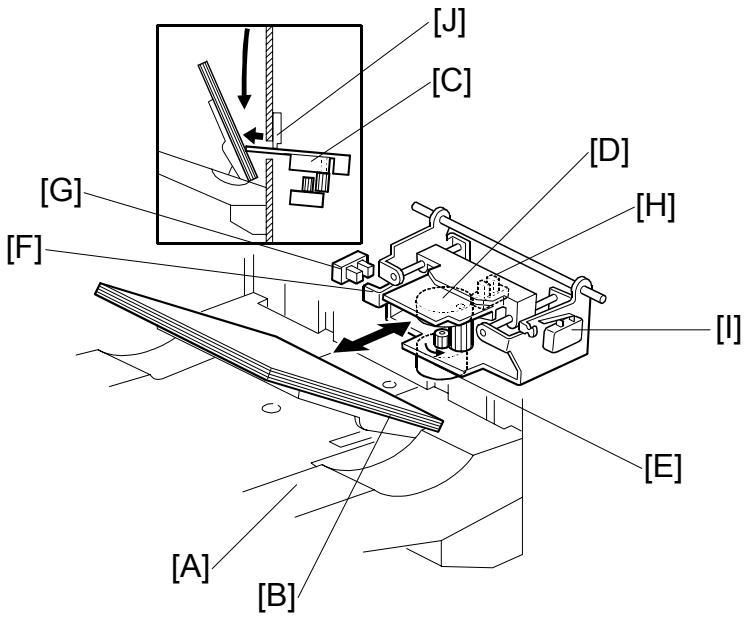
This is a detailed cross-section of the operation described above. The timing of the sequence depends on the size of the paper selected for the job.

The stack feed-out belt transports the booklet toward the paper exit [D] and stops when the center of the booklet is opposite the nip of the folder rollers [E].

The folder roller motor starts to turn and the folder rollers [E] start rotating. Then the folder plate motor switches on and pushes the folder plate [F] into the center of the booklet, driving the booklet between the rotating rollers. The booklet [G] (partially folded) then feeds out between the folder rollers.

The booklet exit sensor [H] detects the booklet when it leaves the folder rollers. This sensor triggers the mechanism for the next phase of the operation.

3.7.4 FINAL FOLDING AND FEED-OUT



When the finisher is ready to feed out the first stapled booklet, the lower tray [A] descends past the pressure plate slot [J], the spring-loaded arms inside the lower tray snap into the grooves on the side fence, and the springs push the arms against the bottom of the support wing [B] to raise it.

Then, before the first stapled booklet falls from the slot above, the pressure plate motor [E] (stepper motor) rotates the gear and cam [D] counter-clockwise to extend the pressure plate [C]. The lower tray then raises and pushes the pressure plate up until the actuator [F] actuates the pressure plate lift sensor [G] and switches off the lower tray lift motor.

Then, the folded and stapled booklet comes out of the booklet exit slot, actuates the booklet exit sensor, and falls onto the pressure plate below. The actuated booklet exit sensor switches on the pressure plate motor, which rotates the gear and cam clockwise to retract the pressure plate. The motor rotates until the actuator on the rim of the cam actuates the pressure plate HP sensor [H] and stops the motor. Retracting the pressure plate allows the stapled booklet to fall past the pressure plate slot onto the stack below.

Next, the pressure plate motor switches on again to extend the pressure plate, while the lower tray raises and pushes the folded and stapled edges of the booklets up against the pressure plate until the actuator [F] actuates the pressure plate lift sensor [G] and switches off the lower tray lift motor. The booklets remain pressed between the extended pressure plate and lower tray until the next booklet is fed out.

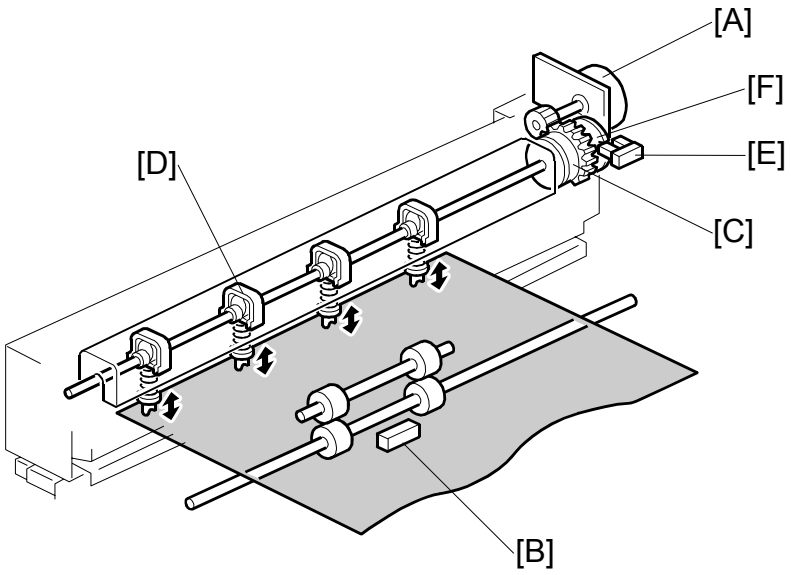
The pressure plate limit switch [I] switches off the lower tray lift motor if the pressure plate lift sensor fails.

3.8 PUNCH UNIT B377 (OPTION)

The punch unit punches holes in printed sheets, one by one. The punch unit is provided with a new punch mechanism to improve the accuracy of punching.

NOTE: The illustrations below show the unit for Europe for 2/4 hole punching. The North American unit has five holes for 2/3 hole punching.

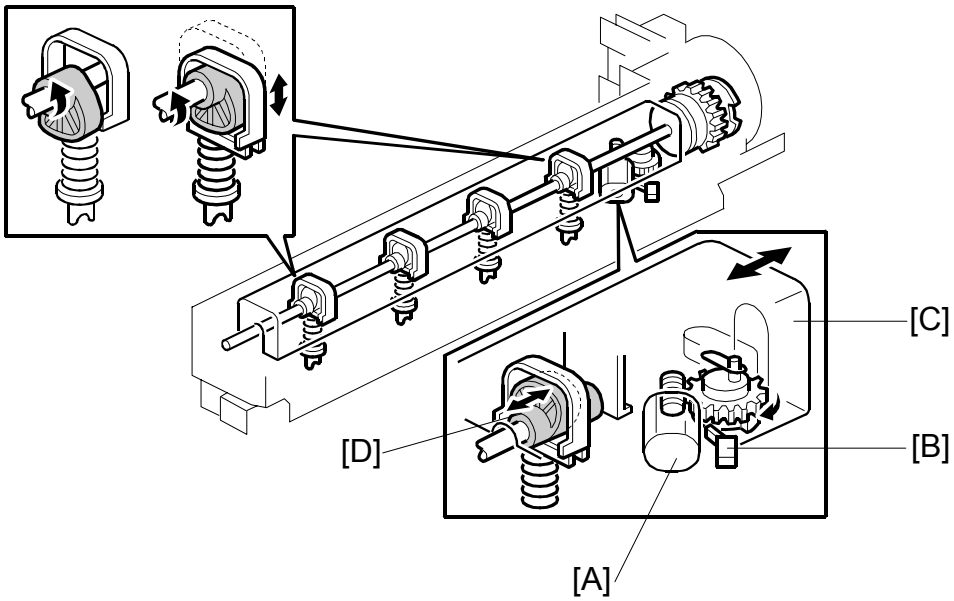
3.8.1 PUNCH DRIVE MECHANISM



The punch motor [A] drives the punch mechanism. At the correct time after the trailing edge of the paper passes the finisher entrance sensor [B], the punch motor turns on and the paper stops. The punch clutch [C] turns and drives the punch heads [D].

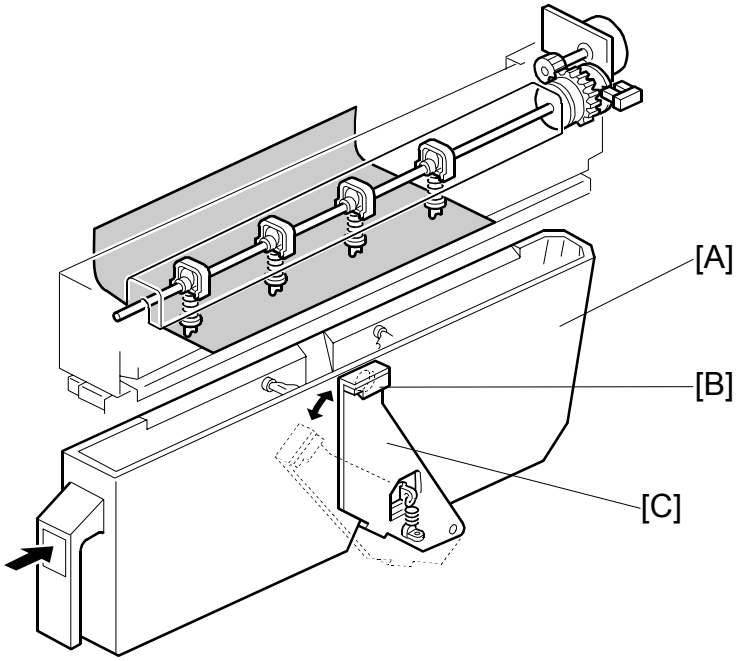
The punch HP sensor [E] detects the home position for the actuator. The punch unit switches off when the cut-out in the punch shaft disk [F] enters the punch HP sensor.

NOTE: SP6113 (Punch Hole Adjustment) adjusts the punch hole position in the sub scan direction for two holes (001 2-Hole) or for three holes (002 3-Hole). Use the spacers provided with the punch unit to adjust the position of the punch in the main scan direction. For details, refer to the installation of the punch unit in section “1. Installation”).



When the finisher has received the command that changes the number of punch holes for the job, the punch hole motor [A] turns on until the actuator disk changes the status of the punch hole switch [B] (until it switches on or off). This indicates that the cover [C] and the punch cam [D] have moved to one side or the other to determine which punchers are used.

3.8.2 PUNCH WASTE COLLECTION



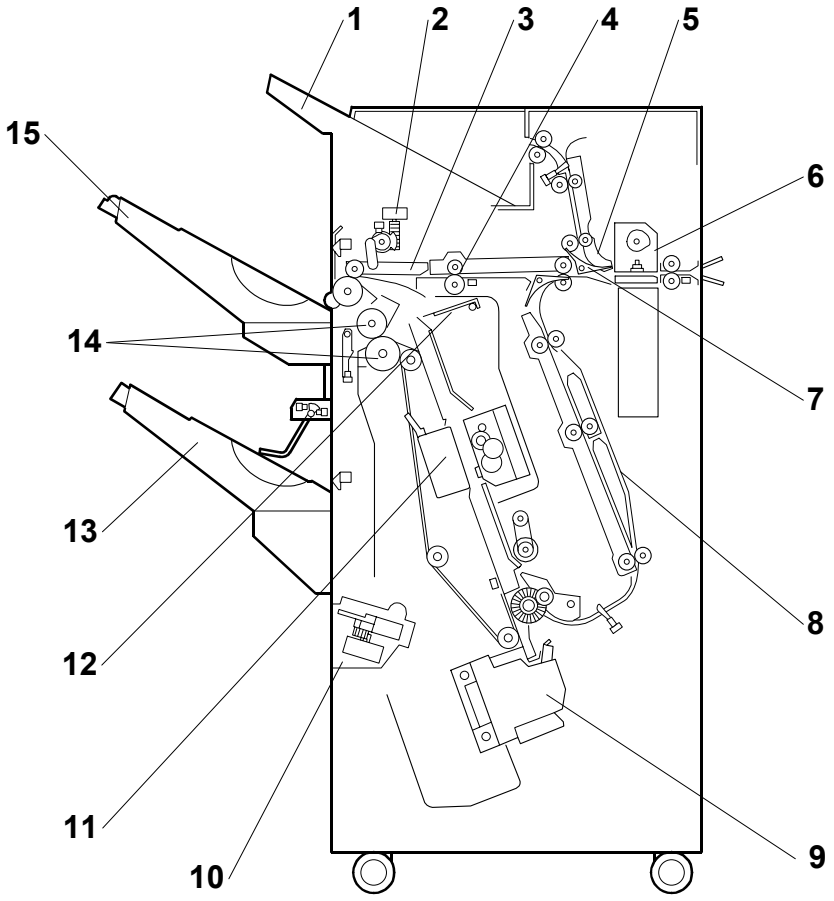
Waste punchouts are collected in the punch waste hopper [A] below the punch unit inside the finisher.

When the top of the punchout waste in the hopper reaches and actuates the hopper sensor [B], a message will be displayed on the operation panel after the current job is completed.

This sensor also detects whether the punch waste hopper is installed. When the waste hopper is taken out, the arm [C] moves down and this will actuate the sensor and display a message in the operation panel. This message is the same as for the hopper full condition.

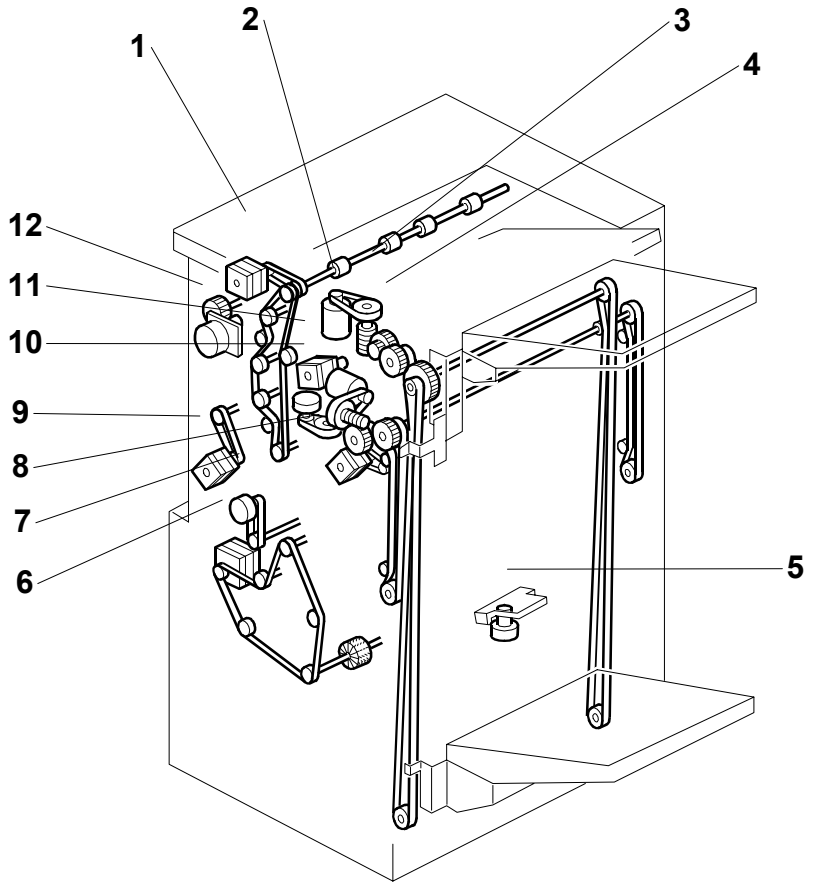
4. OVERALL MACHINE INFORMATION

4.1 MECHANICAL COMPNENT LAYOUT

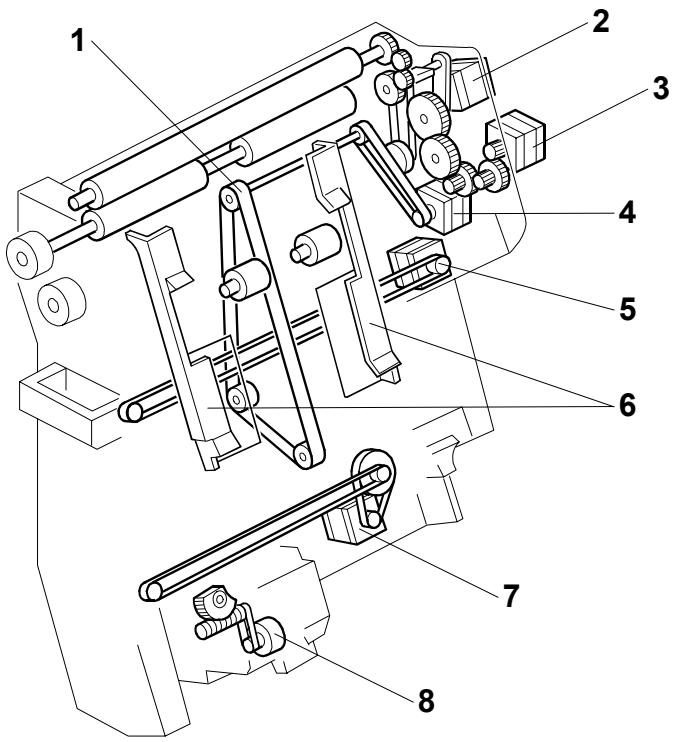


1. Proof Tray
2. Guide Plate Motor
3. Guide Plate
4. Shift Roller
5. Tray Junction Gate
6. Punch Unit
7. Stapler Junction Gate
8. Pre-Stack Tray
9. Stapler Unit
10. Pressure Plate Unit
11. Saddle Stitch Stapler
12. Folder Plate
13. Lower Tray
14. Folder Rollers
15. Upper Tray

4.2 DRIVE LAYOUT



1. Proof Tray Motor
2. Lower Tray Lift Motor
3. Lower Tray Encoder Disk
4. Upper Tray Lift Motor
5. Pressure Plate Motor
6. Stapler Transport Motor
7. Pre-Stack Motor
8. Exit Motor
9. Entrance Motor
10. Shift Roller Motor
11. Shift Drive Motor
12. Punch Motor



1. Stack Feed Out Belt
2. Folder Roller Motor
3. Folder Plate Motor
4. Feed Out Belt Motor
5. Jogger Fence Motor
6. Jogger Fences
7. Stapler Movement Motor
8. Stapler Rotation Motor

B478

3000-SHEET FINISHER

3000-SHEET FINISHER B478

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1. INSTALLATION

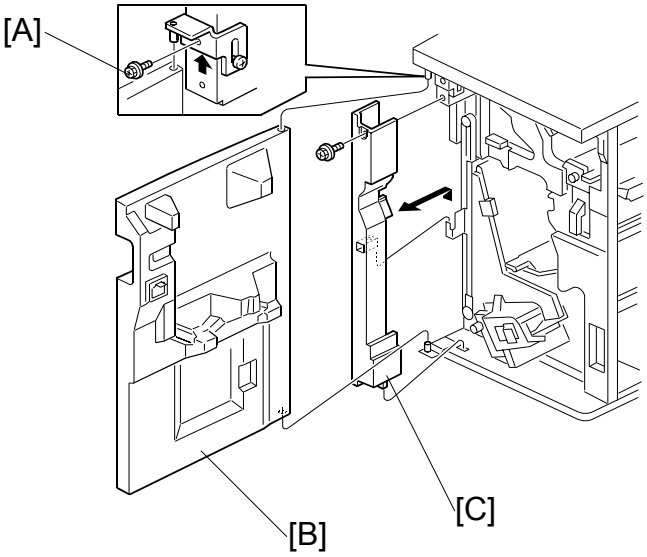
For details about installing the 3000 Sheet Finisher B478, please refer to the instructions you received with the instructions or the “1. Installation” in the main machine service manual.

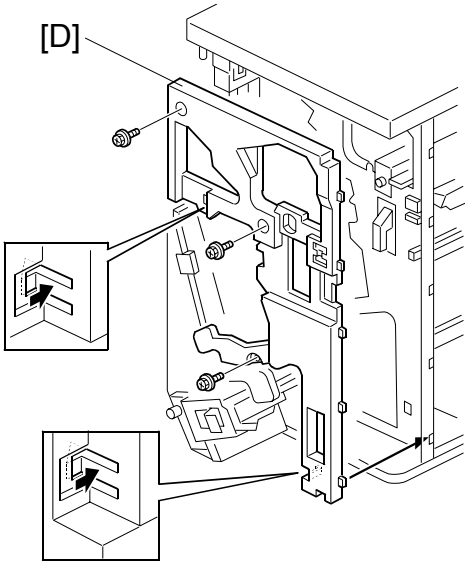
2. PREVENTIVE MAINTENANCE

For details about the 3000 Sheet Finisher B478 PM table, please refer to Section “2. Preventive Maintenance” in the main Service Manual.

3. REPLACEMENT AND ADJUSTMENT

3.1 DOOR AND COVER REPLACEMENT





Front Door

1. Remove the front door screw [A] (☞ x 1).
2. Remove the front door [B].

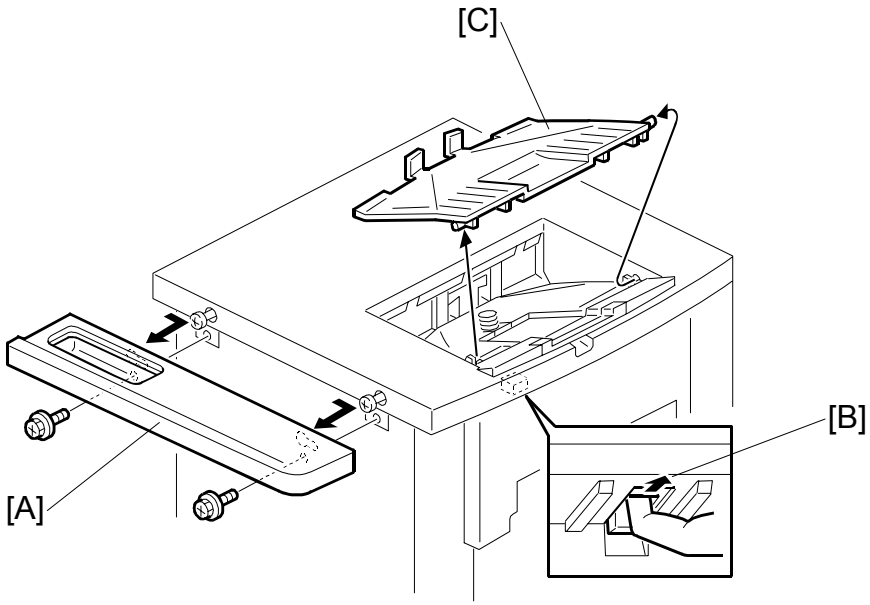
Left Inner Cover

1. Remove the front door.
2. Remove the left inner cover [C] (☞ x 1).

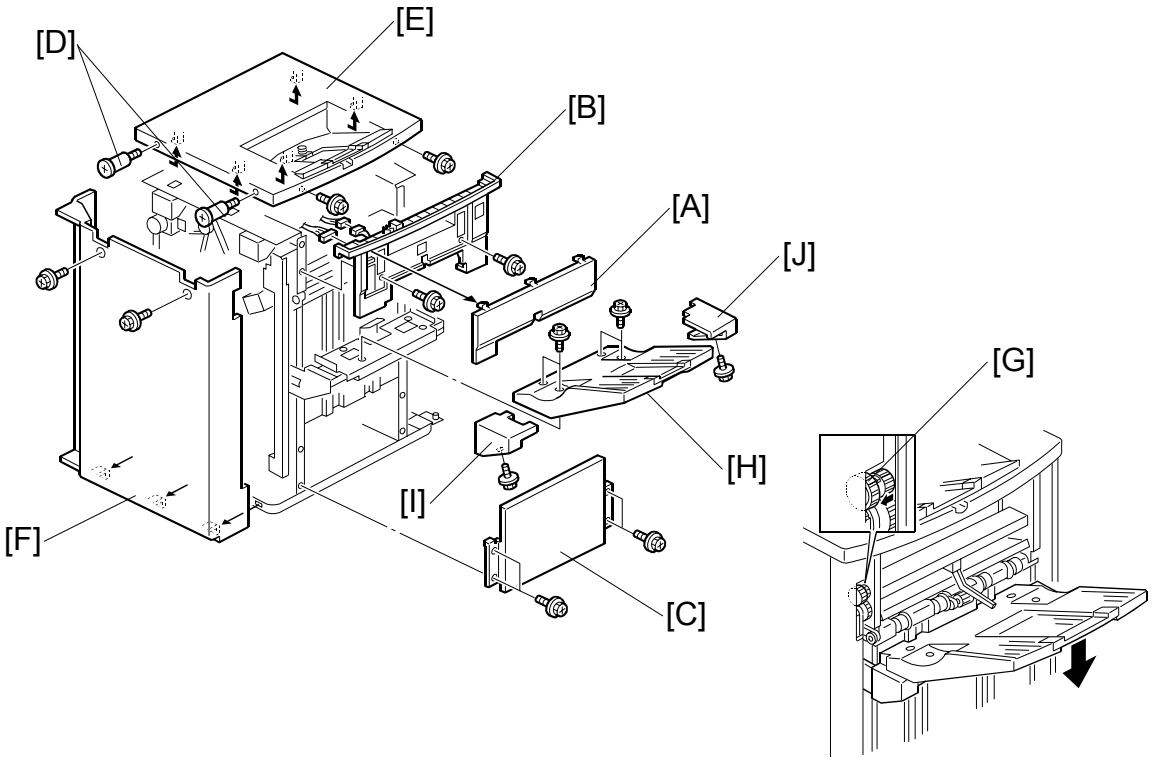
Inner Cover

1. Remove the inner cover [D] (☞ x 3).

Side Table and Upper Tray



1. Remove the side table [A] (☞ x 2). Slide to the right to remove it.
2. Click the release lever [B] and remove the upper tray [C].



Left Covers

1. Remove the left upper panel [A].
2. Remove the left upper cover [B] (x 2, x 2).
3. Remove the door and left inner cover. (See “Door and Cover Replacement”.)
4. Remove the rear cover [F] (x 2).
5. Remove the left lower cover [C] (x 4).

Rear Cover and Top Cover

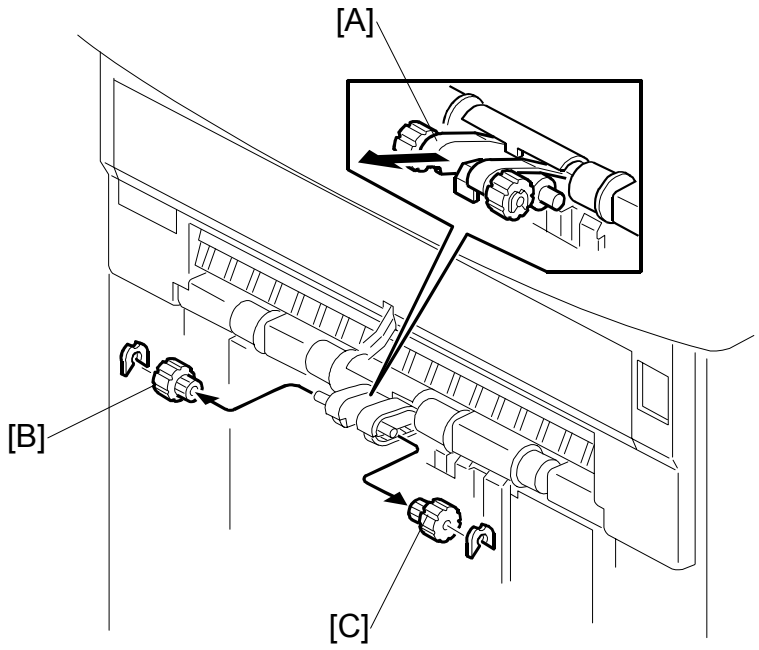
1. Remove the upper tray. (See “Side Table and Upper Tray”.)
2. Remove the step screws [D] (x 2).
3. Remove the top cover [E] (x 2). Slide to the right to remove.
4. Remove the rear cover [F] (x 2).

Shift Tray

1. If you need to lower the shift tray, support the bottom of the tray with your hand, then pull the gear toward you [G] to release the tray and lower it.
2. Remove the shift tray [H] (x 4).
3. Remove the shift tray rear cover [I] and front cover [J] (x 1 each).

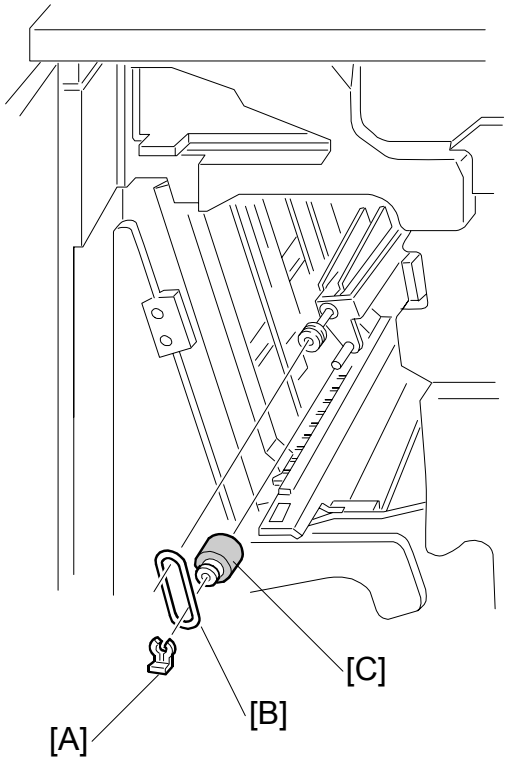
3.2 ROLLERS

3.2.1 SHIFT POSITIONING ROLLER



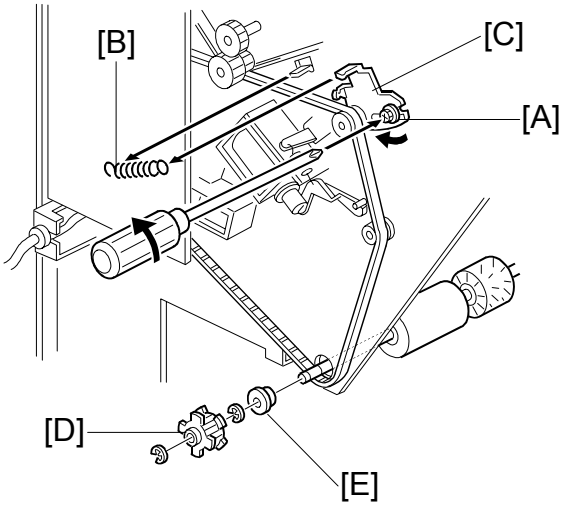
1. Above the shift tray, pull the roller mount [A] out.
2. Remove the rollers [B] and [C] (⟲ x 1 each)

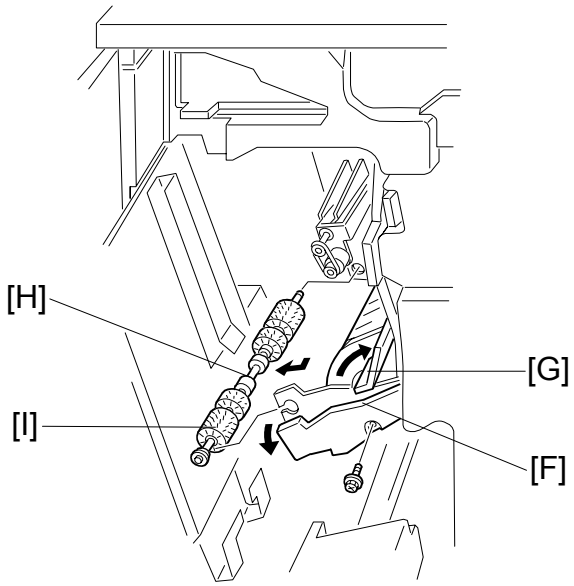
3.2.2 POSITIONING ROLLER



1. Open the front door.
2. Remove the snap ring [A].
3. Release the rubber belt [B].
4. Replace the positioning roller [C].

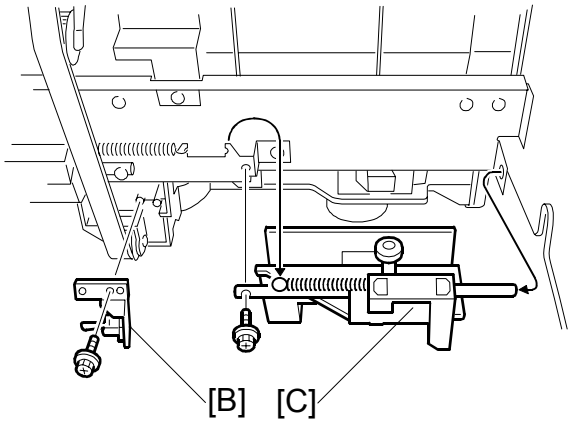
3.2.3 ALIGNMENT BRUSH ROLLER

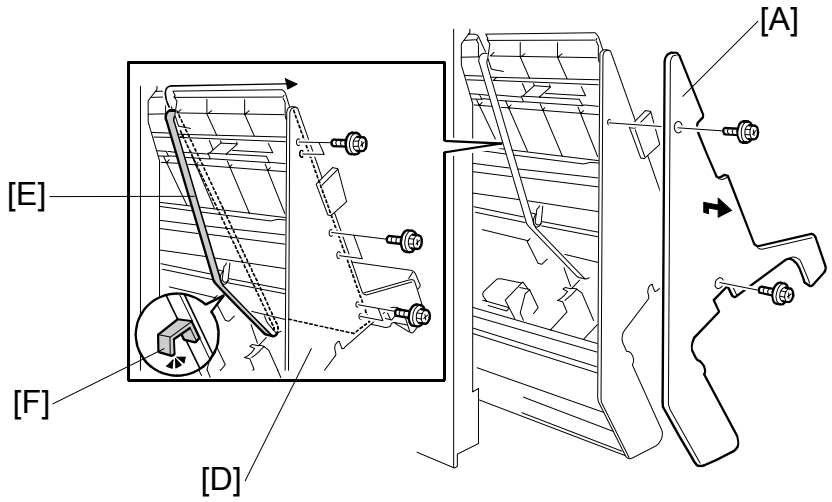




1. Open the front door and pull out the staple unit.
2. Remove the rear cover.
3. Remove the main board and all connectors (x 8).
4. Remove the screw [A] and tension spring [B] for the tension bracket [C], and release the tension of the timing belt.
5. Remove the pulley [D] and bushing [E] (x 2).
6. Remove the inner cover [F] (x 1).
7. Open the guide [G], then remove the alignment brush roller assembly [H] (x 1).
8. Remove the alignment brush roller [I] (x 1, bushing x 1 front/back).

3.3 STACK FEED-OUT BELT

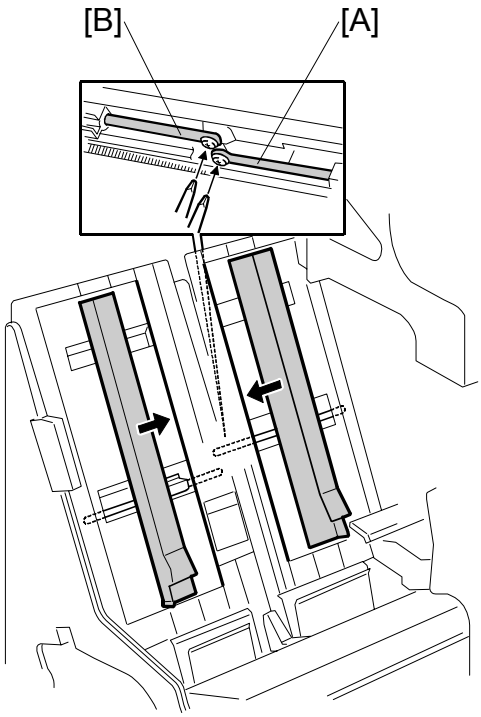




1. Open the front door.
2. Pull out the jogger and stapler unit.
3. Remove the inner cover [A] (x 2).
4. Remove the sensor bracket [B] (x 1, x 1, clamp x 1).
5. Remove the front guide [C] (x 1, spring x 1).
   NOTE: When re-installing, make sure that the flat end of the shaft is against the plate.
6. Remove the front panel [D] from the stays (x 6).
7. Remove the old belt [E] from the bottom, center, then the top.

NOTE: 1) Make sure the ribbed side of the new belt and pawl [F] are facing down.
2) Make sure the new belt is engaged at all three rollers.

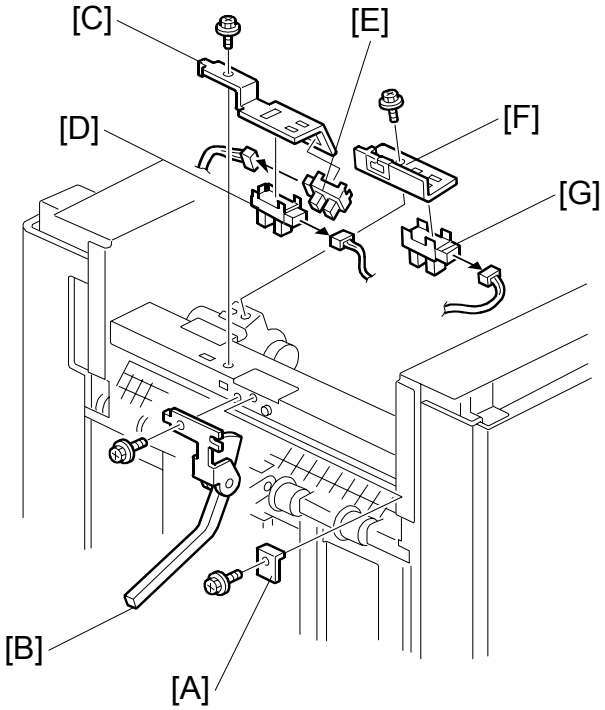
3.4 JOGGER FENCE



1. Open the front door.
2. Pull out the jogger and stapler unit.
3. Push both fences to the center.
4. Remove the left jogger fence [A] (🔩 x 1)
5. Remove the right jogger fence [B] (🔩 x 1).
   NOTE: If the screws are difficult to remove or re-attach, remove the jogger fence belt and spring plate.

3.5 SENSORS

3.5.1 STACK HEIGHT 1, 2 AND EXIT GUIDE OPEN SENSOR



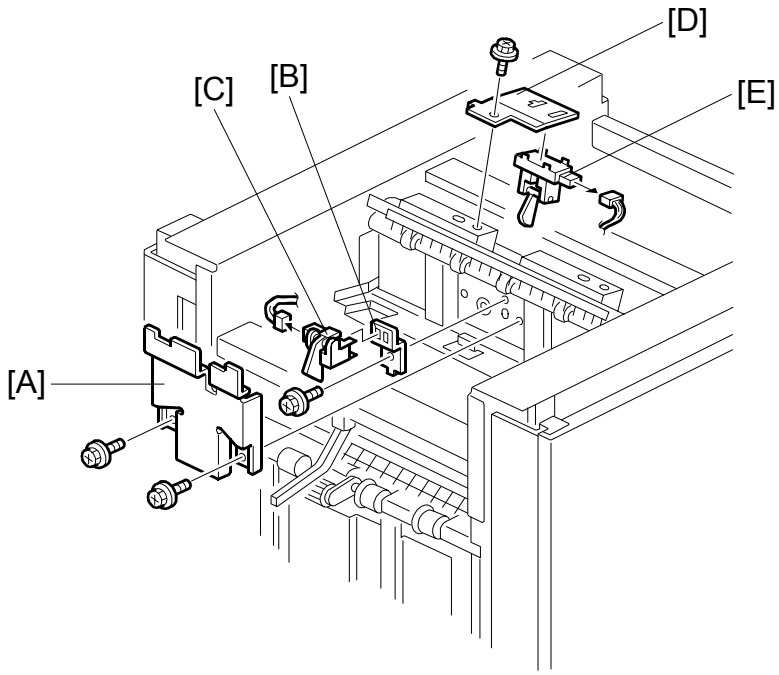
Stack Height Sensors 1 and 2

1. Remove the top cover. (See “Door and Cover Replacement”.)
2. Remove the left upper panel and left upper cover (x 2, x 2).
3. Remove the protector plate [A] (x 1).
4. Remove the sensor feeler [B] (x 1).
5. Remove the sensor bracket [C] (x 1).
6. Replace the stack height sensor 1 [D] (x 1) or 2 [E] (x 1).

Exit Guide Open Sensor

1. Remove the sensor bracket [F] (x 1).
2. Replace the exit guide open sensor [G] (x 1).

3.5.2 UPPER TRAY PAPER LIMIT AND EXIT SENSOR



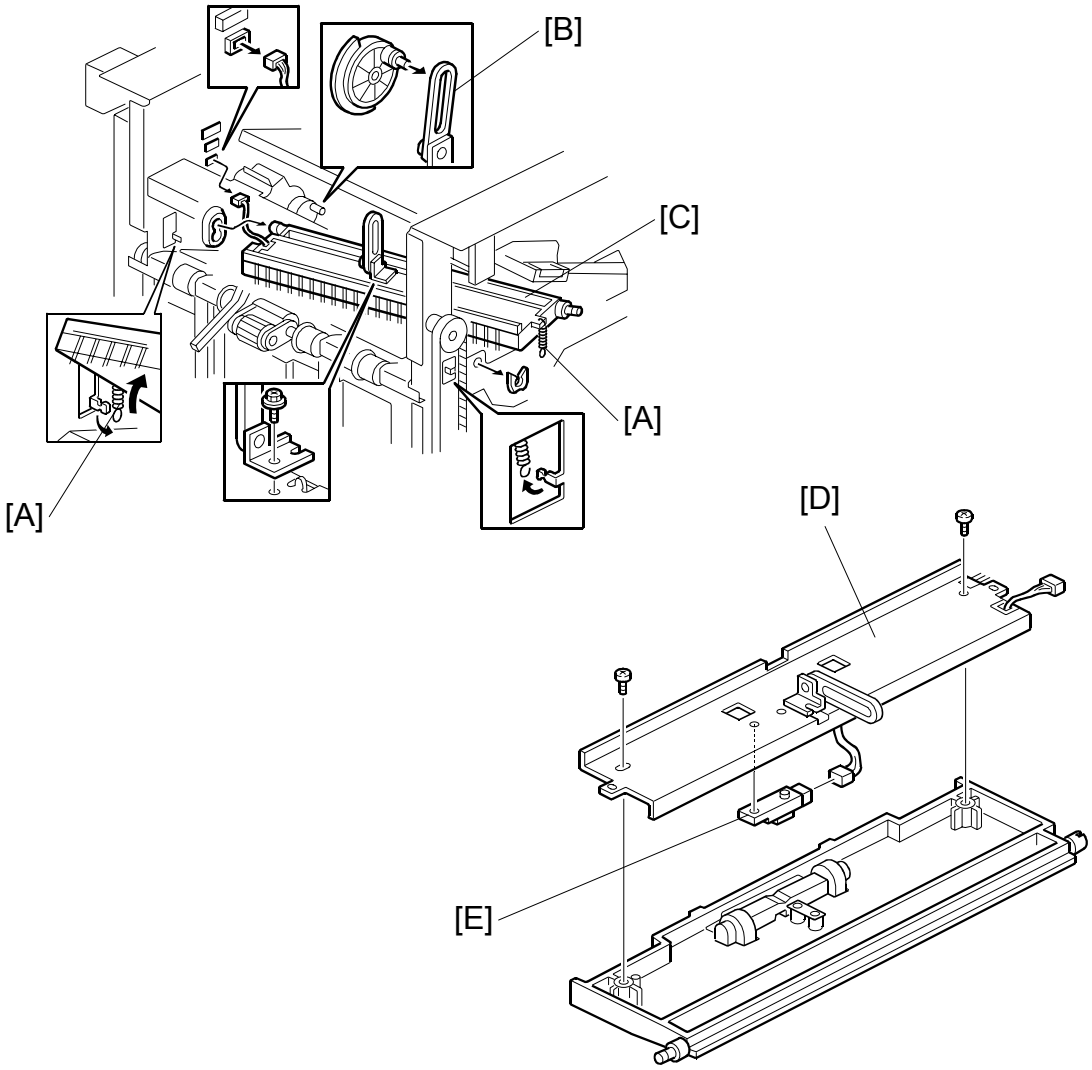
Upper Tray Paper Limit Sensor

1. Remove the top cover.
2. Remove the sensor cover [A] (☞ x 2).
3. Remove the sensor bracket [B] (☞ x 1).
4. Replace the upper tray paper limit sensor [C] (☞ x 1).

Upper Tray Exit Sensor

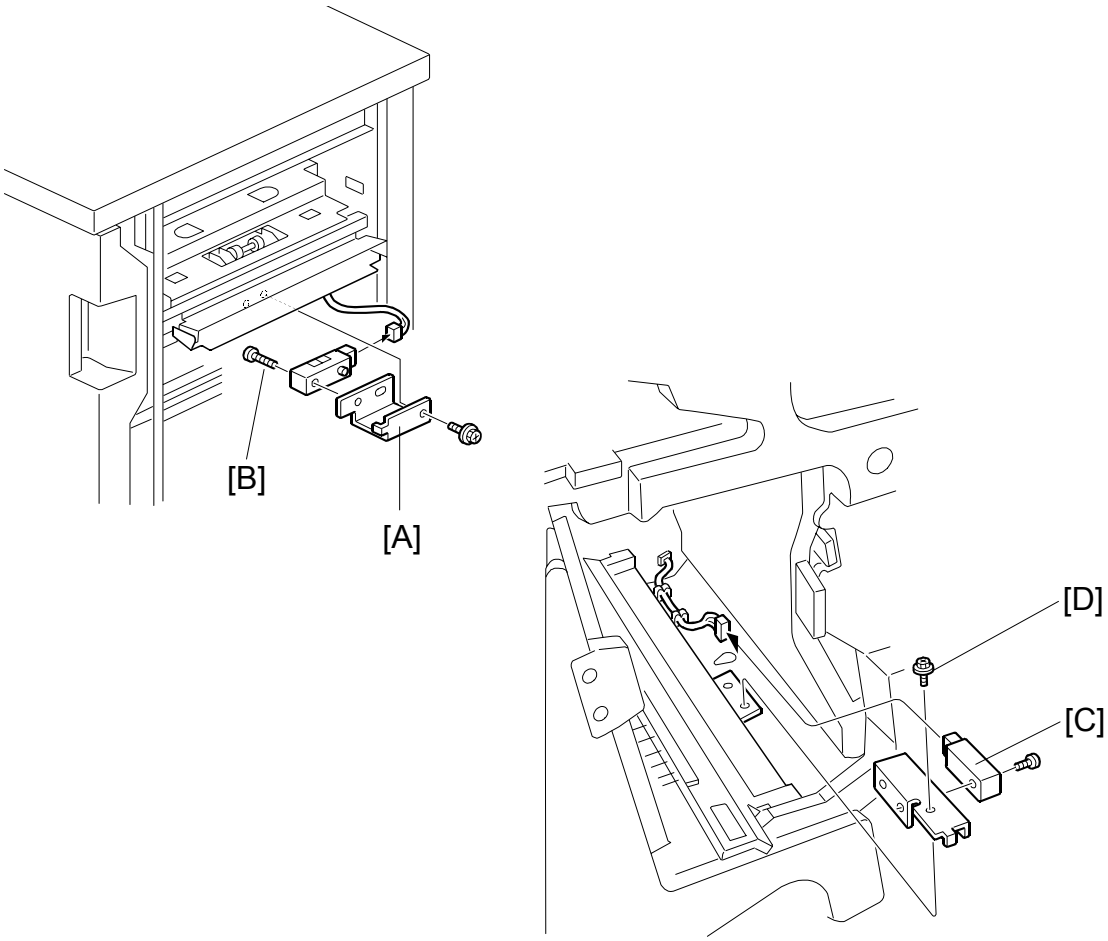
5. Remove the sensor bracket [D] (☞ x 1).
6. Replace the upper tray exit sensor [E] (☞ x 1).

3.5.3 SHIFT TRAY EXIT SENSOR



1. Remove the top cover.
2. Open the front door.
3. Remove the inner cover.
4. Release the upper exit guide springs [A] (x 2).
5. Disconnect the link [B] from the cam (x 1).
6. Remove the upper exit guide [C] (x 1, x 1).
7. Remove the guide stay [D] (x 2).
8. Replace the shift tray exit sensor [E] (x 1) (x 1).

3.5.4 ENTRANCE AND STAPLER TRAY ENTRANCE SENSORS



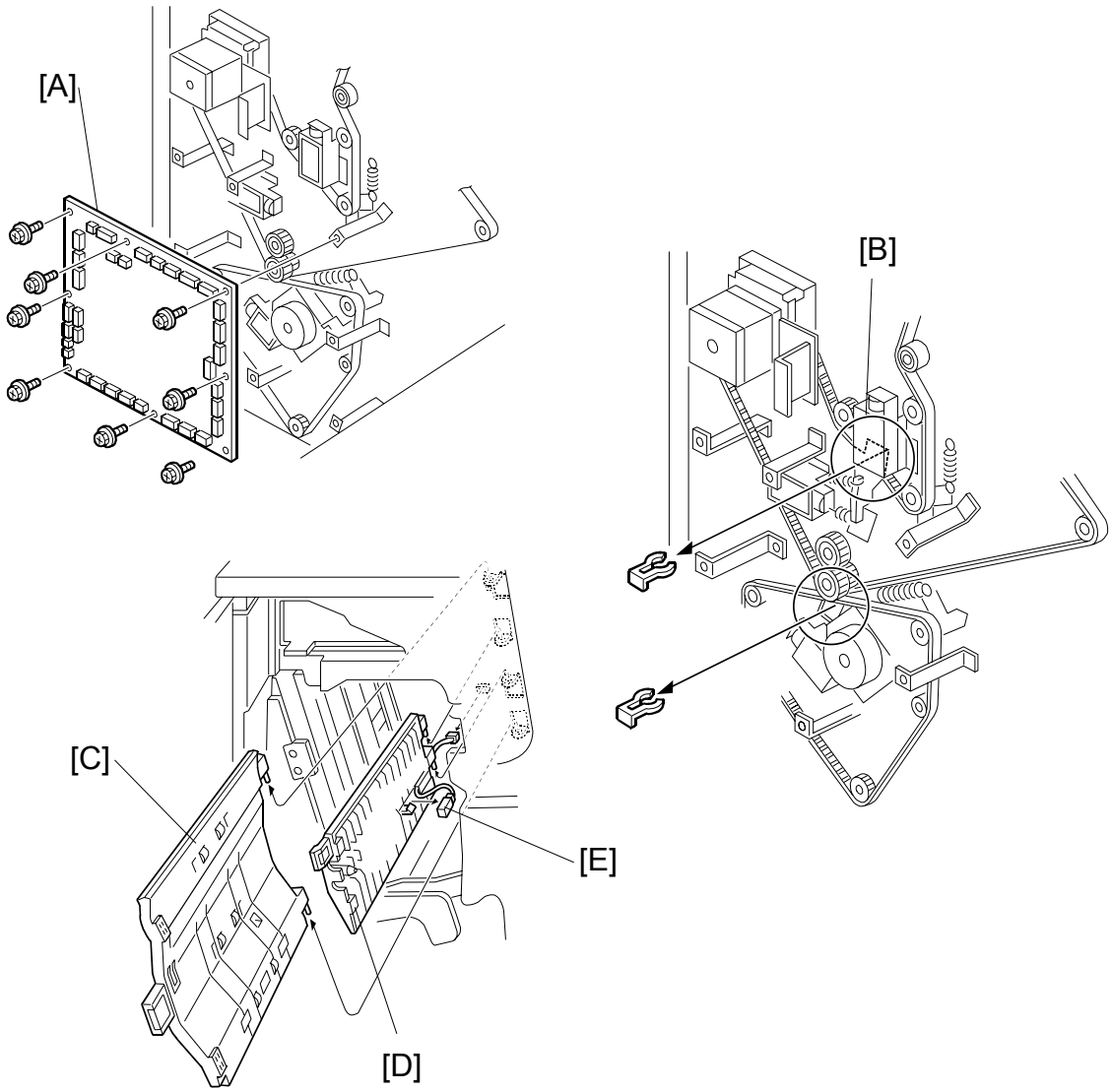
Entrance Sensor

1. Disconnect the finisher from the copier.
2. Remove the sensor bracket [A] (x 1).
3. Replace the entrance sensor [B] (x 1) (x 1).

Stapler Tray Entrance Sensor

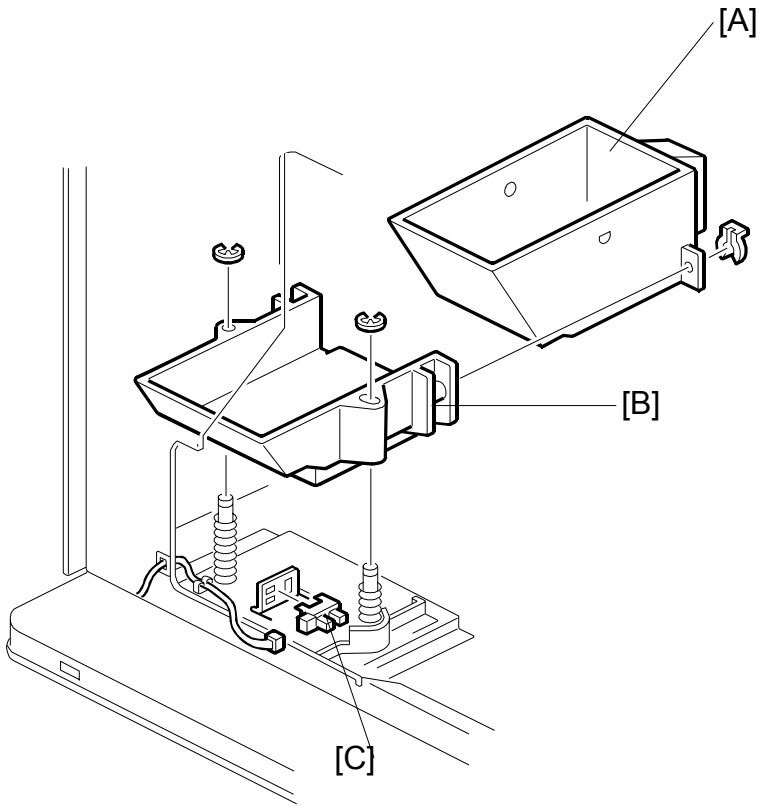
1. Open the front door.
2. Remove the sensor bracket [C] (x 1).
3. Replace the stapler tray entrance sensor [D] (x 1)(x 1).

3.5.5 PRE-STACK PAPER SENSOR



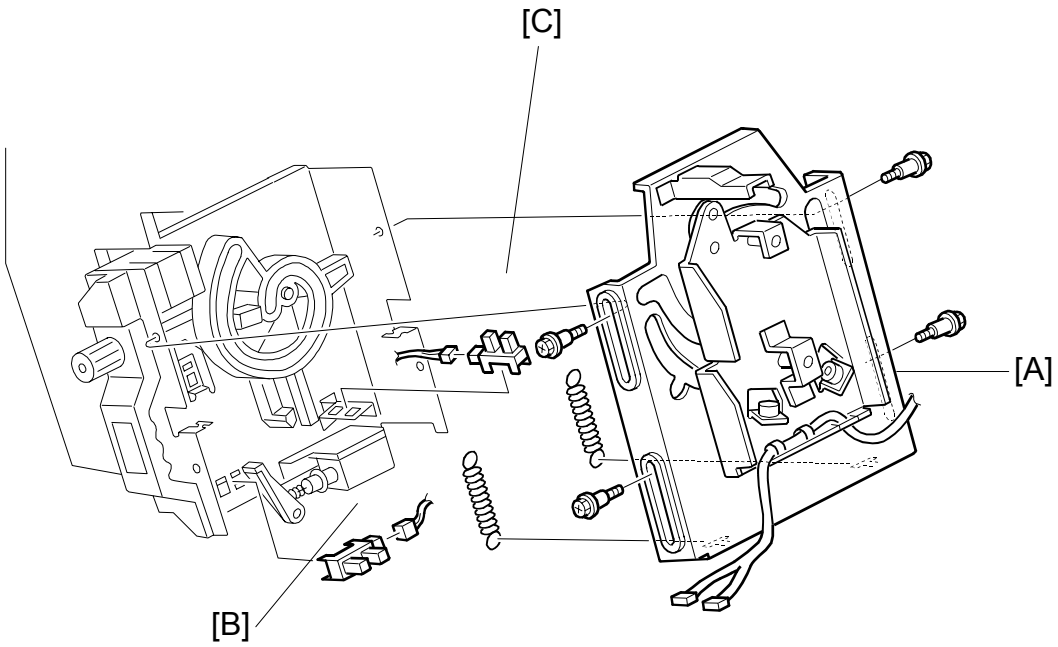
1. Remove the rear cover.
2. Remove the main board [A] (x 8, x all).
3. Release the guide [B] (x 2).
4. Open the front door.
5. Remove the left vertical transport guide [C].
6. Remove the middle vertical transport guide [D] (x 1).
7. Replace the pre-stack paper sensor [E] (x 1).

3.5.6 STAPLE WASTE HOPPER SENSOR



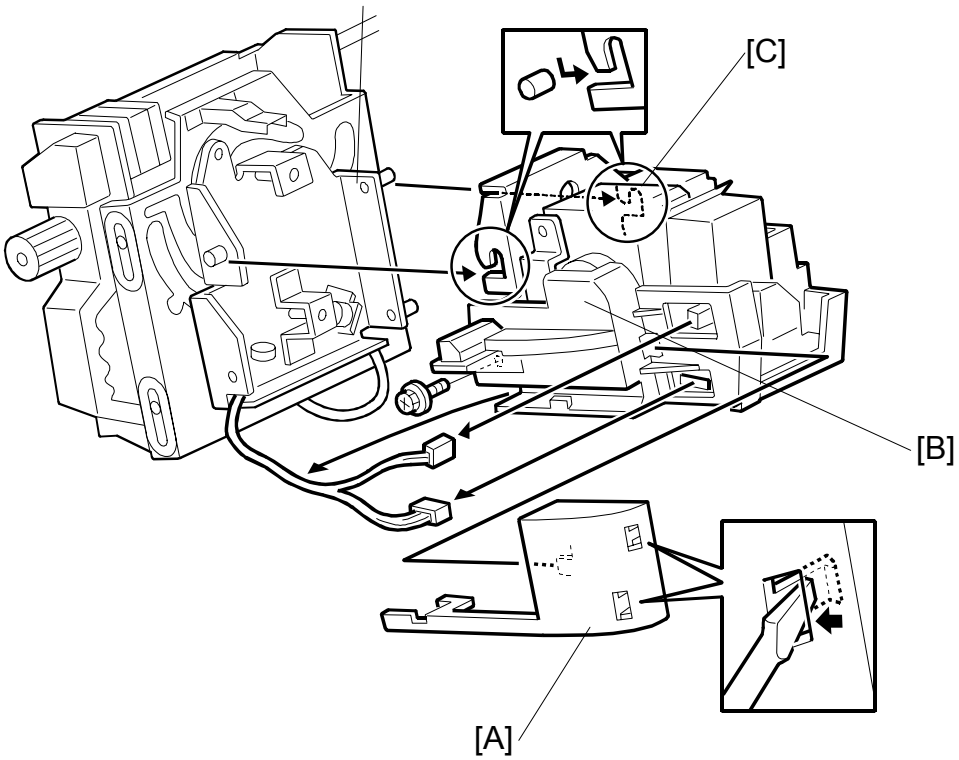
1. Open the front door, pull out the stapler unit, then remove the rear cover.
2. Remove the rear cover (x 2).
3. Remove the staple waste hopper [A] (x 1).
4. Remove the hopper holder [B] (x 2).
5. Replace the staple waste hopper sensor [C] (x 1).

3.5.7 STAPLER ROTATION HP AND STAPLER RETURN SENSORS



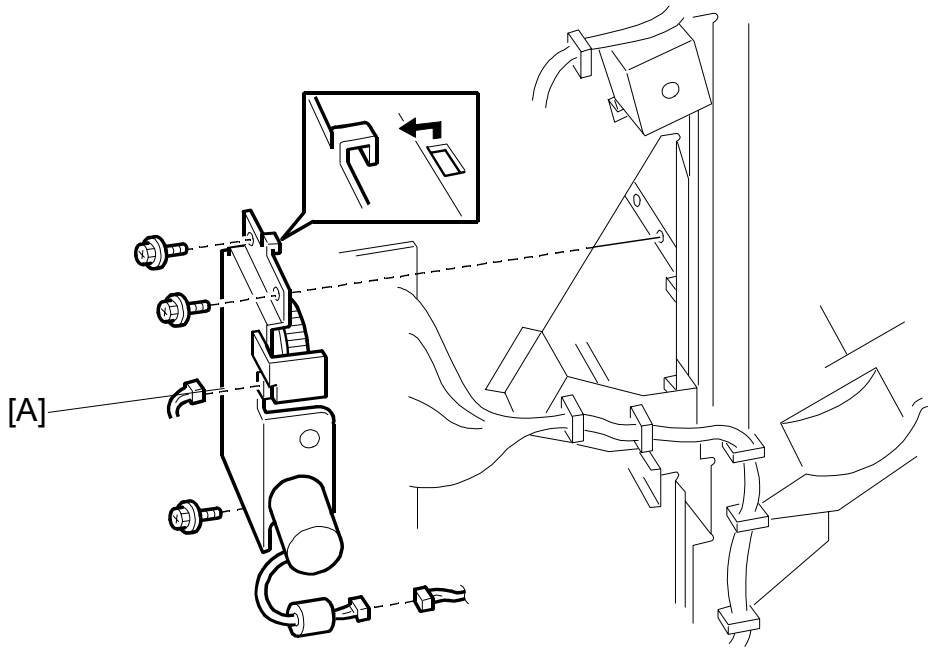
1. Remove the stapler unit. (See next page.)
2. Remove the stapler mount bracket [A] (x 4) (Springs x 2).
3. Replace the stapler rotation HP sensor [B] (x 1).
4. Replace the stapler return sensor [C] (x 1).

3.6 STAPLER



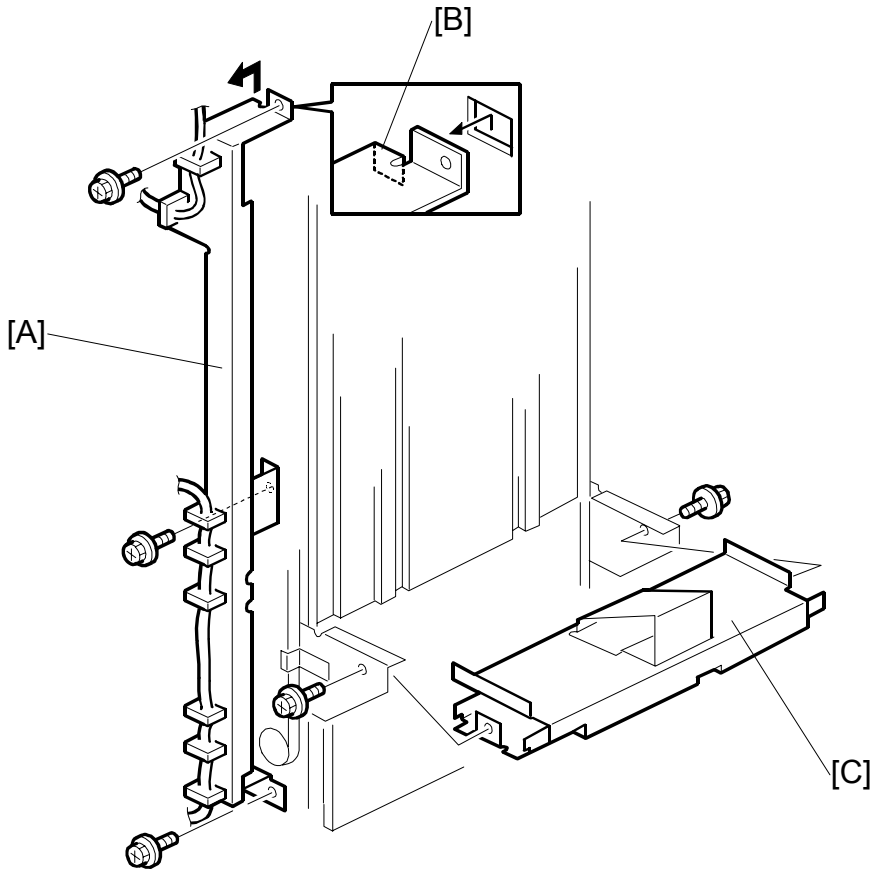
1. Open the front door and pull out the staple tray.
2. Remove the stapler unit harness cover [A].
3. Remove the stapler cover [B] (x 1, x 2).
4. Lift the stapler off of the pegs. [C]

3.7 SHIFT TRAY MOTOR

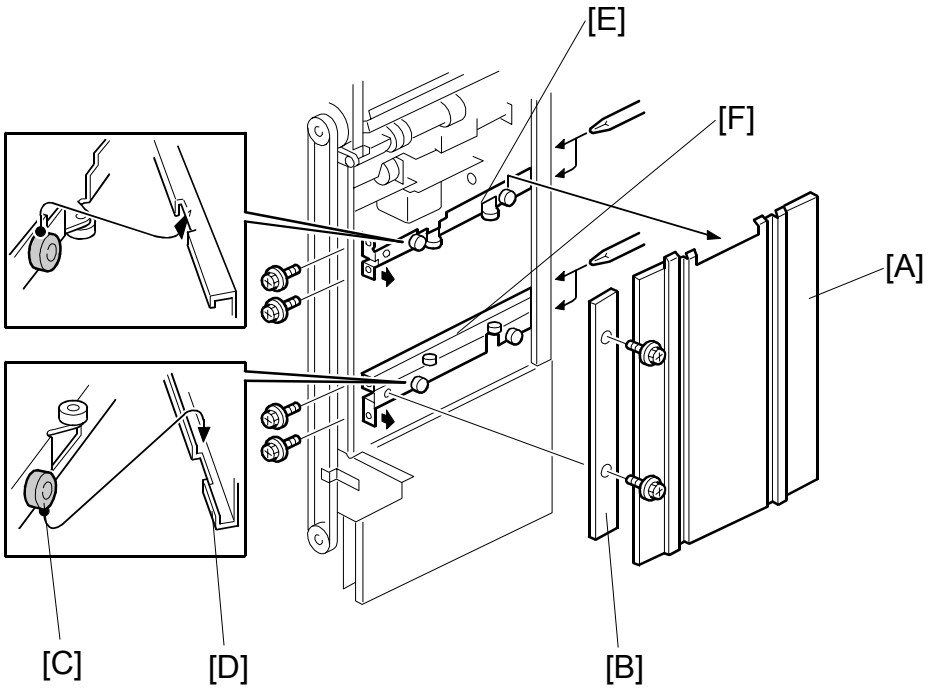


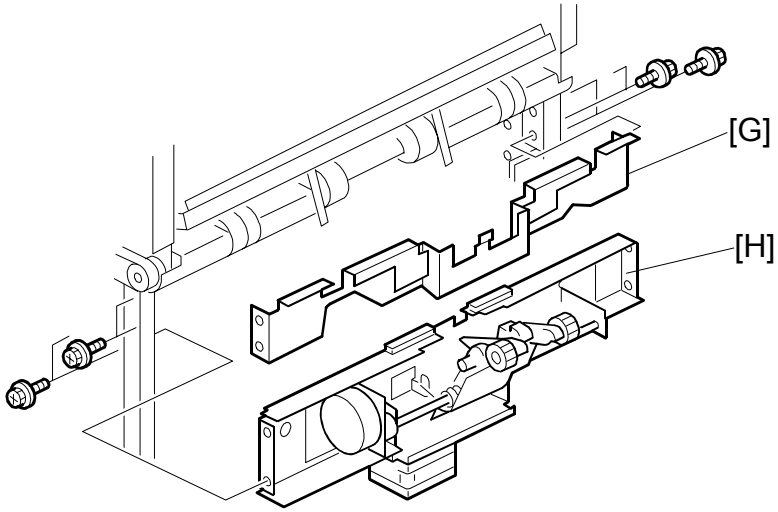
1. Do the procedures in Section 3.1 (pp. 3, 5) to remove the front door and rear cover
2. Shift motor [A] (x 2, x 3)

3.7.1 STACKING ROLLE/ROLLER DRAG MOTORS, RETURN HP SENSOR

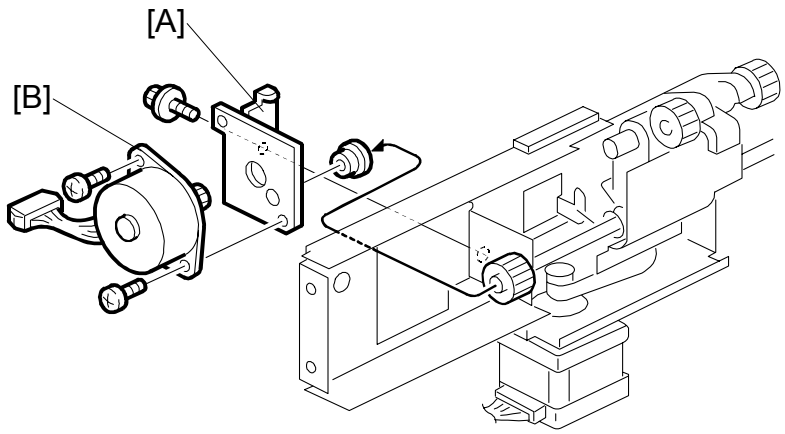


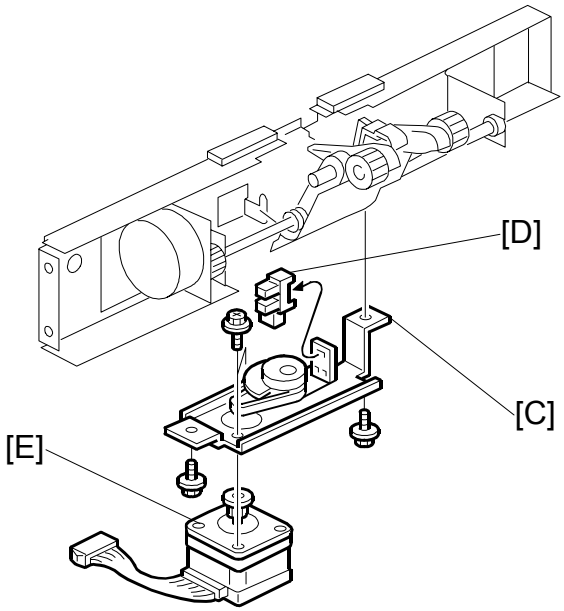
1. Do the procedures to remove the front door and all covers, with the exception of the left lower cover and top cover (labeled [C]: and [E]).
   NOTE: Be sure to lower the shift tray by pulling the gear toward you. The shift tray must be down.
2. Remove the tray shift motor. (☛ 3.7)
3. Remove the left stay [A] (x 3)
4. Unhook the stay at top [B].
5. Remove the shift tray mounting plate [C] (x 2).





6. Remove the end fence [A] and plate [B] (☞ x 2).
7. Disengage the end fence races [C] from the rollers [D] behind the fence.
8. Remove the upper stay [E] (☞ x 4).
9. Remove the lower stay [F] (☞ x 4).
10. Remove the cover [G] (☞ x 4).
11. Remove the stacking roller/drag motor stay [H] (✋ x 3, ☞ x4).
    NOTE: Make sure the motor and sensor connectors are disconnected before removing.

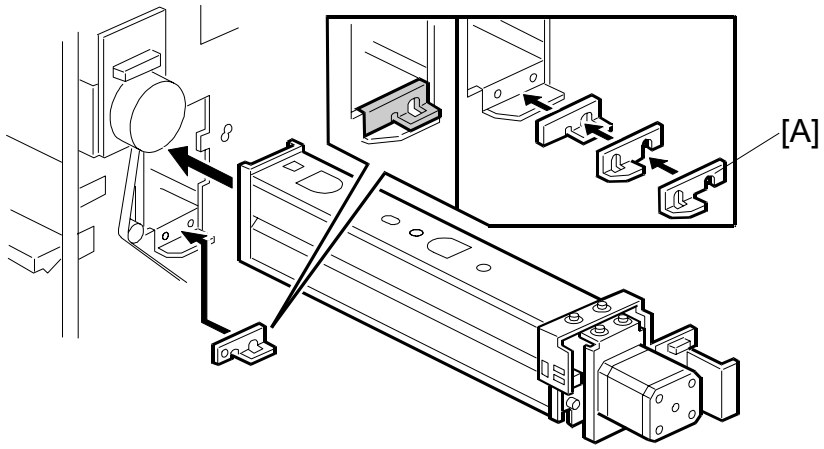




12. Remove the stacking motor bracket [A] (bushing x 1, ☞ x 1).
13. Remove the stacking motor [B] (☞ x 2).
14. Remove the roller drag motor bracket [C] (☞ x 2).
15. Remove return HP sensor [D].
16. Remove the roller drag motor [E] (☞ x 1).

3.8 PUNCH UNIT B531 (OPTION)

3.8.1 PUNCH POSITION ADJUSTMENT



The position of the punched holes can be adjusted in two ways.

Front to Rear Adjustment

Three spacers [A] are provided with the punch unit for manual adjustment of the hole position in the main scan direction:

- 2 mm (x 1)
- 1 mm (x 2)

NOTE: One spacer was installed at installation and the remaining spacers were fastened with a screw to the rear frame of the finisher under the rear cover and slightly above the lock bar.

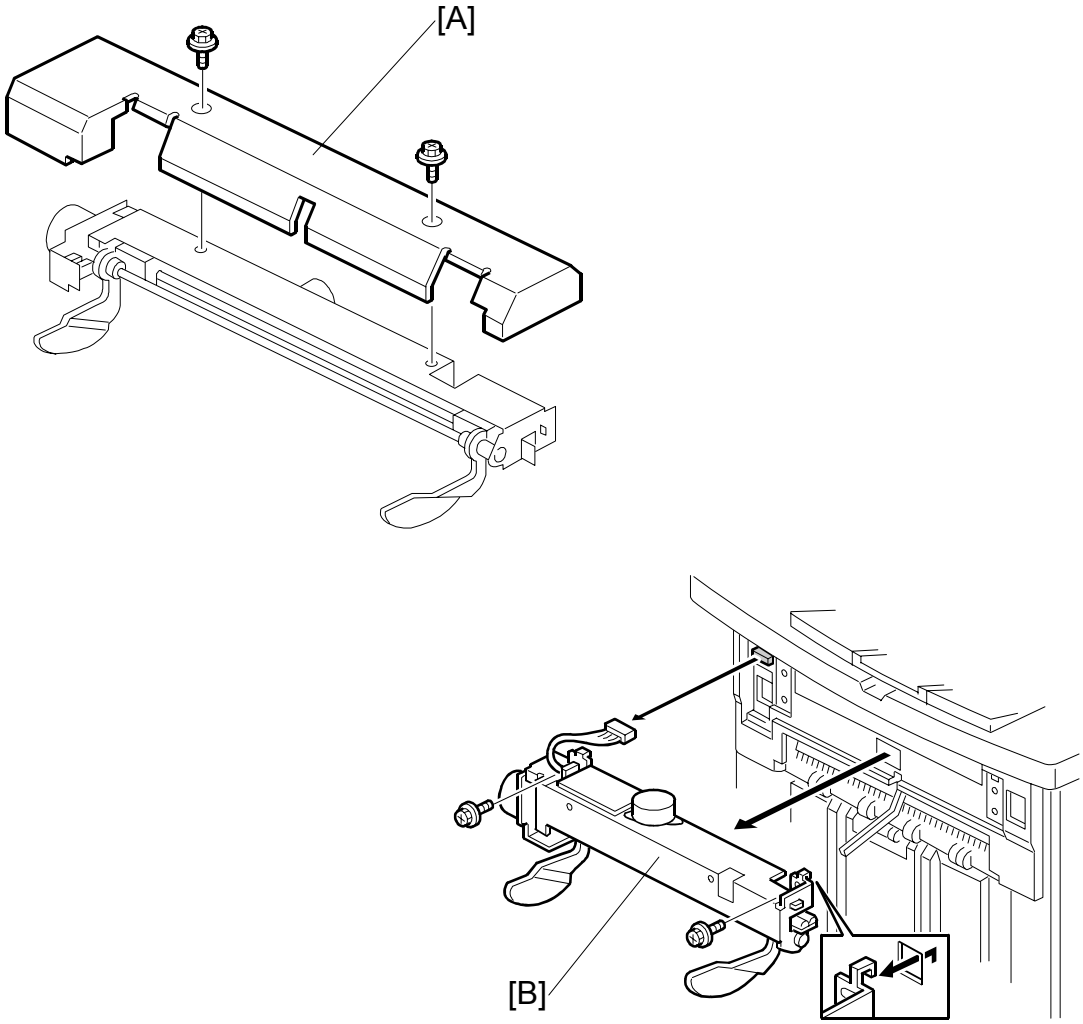
Right to Left Adjustment

The position of the punched holes can be adjusted right to left in the sub scan direction with SP6-113 Punch Hole Position Adjustment. The position can be adjusted in the range ±7.5 mm in 0.5 mm steps. The default setting is 0.

Press the ⊙/✳ key to toggle the ± selection. A +VE value shifts the punch holes left toward the edge of the paper, and a -VE value shifts the holes right away from the edge.

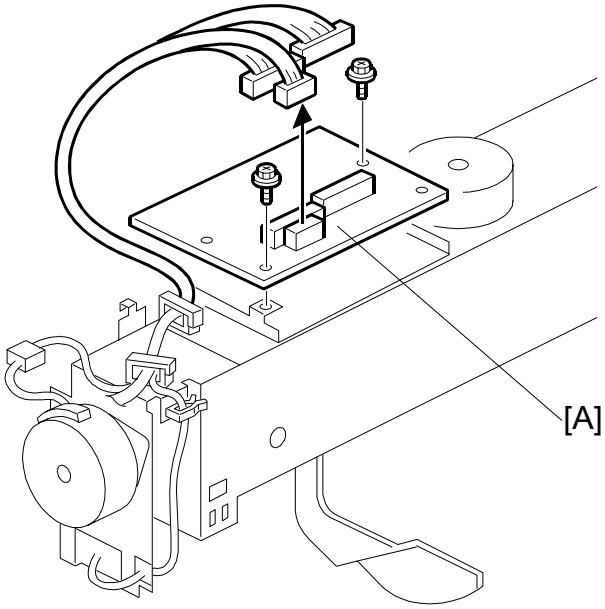
3.9 JOGGER UNIT B513 (OPTION)

3.9.1 JOGGER UNIT



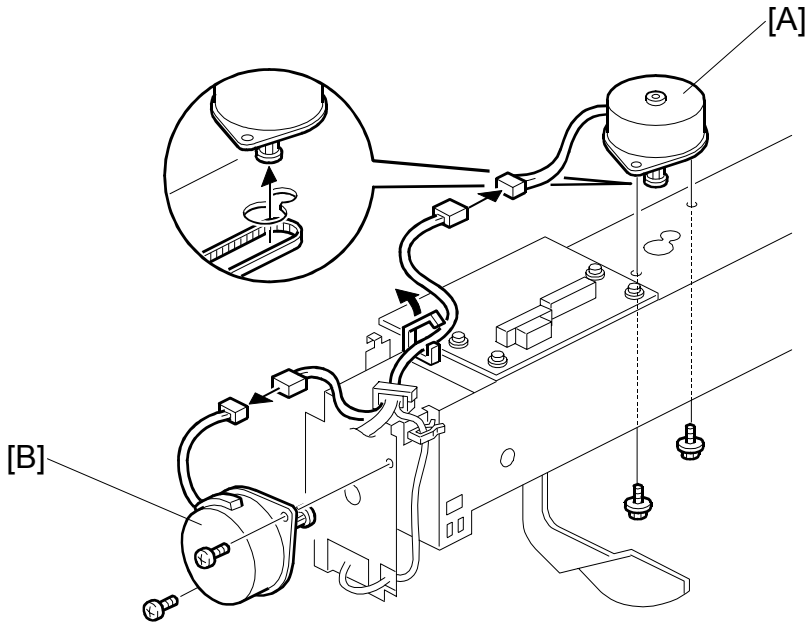
1. Remove the jogger unit cover [A] (x 2).
2. Remove the jogger unit [B] (x 2, x 1).

3.9.2 JOGGER UNIT PCB



1. Remove the jogger unit from the finisher. (☛ 3.9.1)
2. Remove the jogger unit control PCB [A] (x 2, x 3)

3.9.3 JOGGER UNIT MOTOR



1. Remove the jogger unit from the finisher. (☛ 3.9.1)
2. Remove the shift jogger motor [A] (x 2, x 1).
3. Remove the shift jogger lift motor [B] (x 2, x 1).

4. TROUBLESHOOTING

If the machine logs an SC code in the display of the operation panel, see “Section 4 Troubleshooting” of the Service Manual. Section 4 contains a complete list of all service codes and how to troubleshoot the problem.

5. SERVICE TABLES

For details about 3000-Sheet Finisher B478 SP codes, please refer to “5. Service Tables” in the main machine service manual.

5.1 DIP SWITCHES

DPS100				Description
1	2	3	4	
0	0	0	0	Default
0	0	1	0	Free run: A4 LEF, staple mode
0	0	0	1	Free run: staple and tray shift

NOTE: Do not use any other settings.

5.2 TEST POINTS

No.	Label	Monitored Signal
TP100	(5V)	+5 V
TP101	(GND)	Ground
TP102	(RXD)	RXD
TP103	(TXD)	TXD

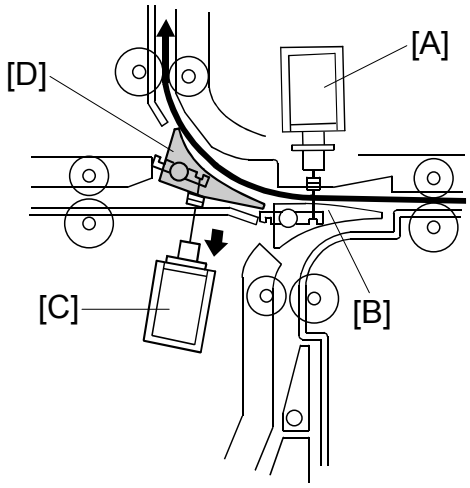
5.3 FUSES

No.	Function
FU100	Protects 24 V.

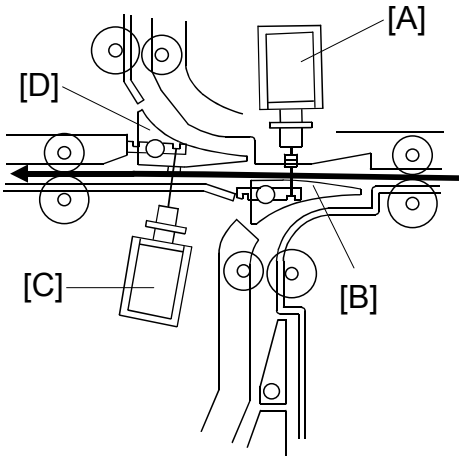
6. DETAILS

6.1 TRAY AND STAPLER JUNCTION GATE

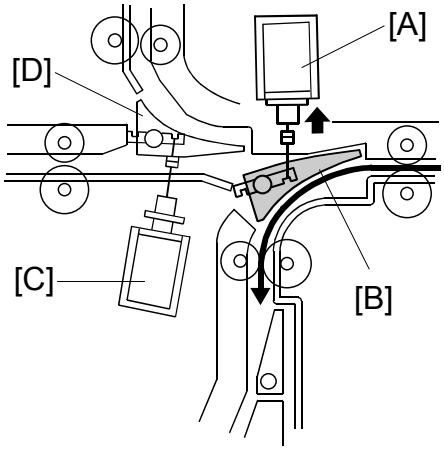
Upper Tray Mode



Sort/Stack Mode



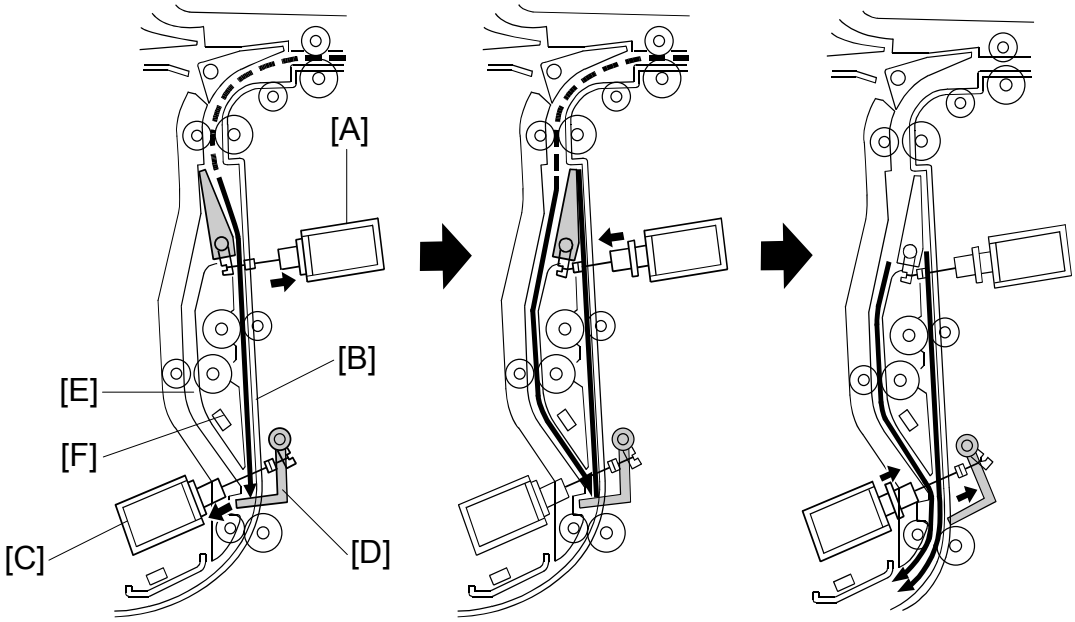
Staple Mode



Depending on the finishing mode, the copies are directed up, straight through, or down by the combinations of open and closed junction gates.

Solenoid/Gate		Selected Operation Mode		
		Upper Tray	Sort/Stack	Staple
[A]	Stapler junction gate solenoid	Off	Off	ON
[B]	Stapler junction gate	Closed	Closed	OPEN
[C]	Tray junction gate solenoid	ON	Off	Off
[D]	Tray junction gate	OPEN	Closed	Closed

6.2 PAPER PRE-STACKING



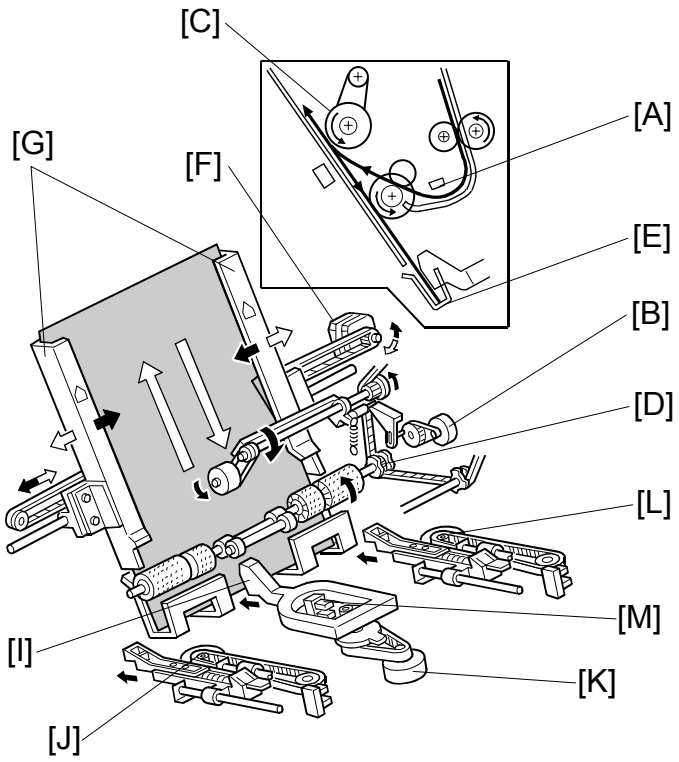
This mechanism improves productivity in staple mode. It is only used when copying on A4, LT, or B5 (all LEF).

During stapling, the copier has to wait. This mechanism reduces the wait by holding the first two sheets of a job while the previous job is still being stapled. It only works during the second and subsequent sets of a multi-set copy job.

The pre-stack junction gate solenoid [A] turns on 120 mm after the 1st sheet of paper turns on the entrance sensor, and this directs the sheet to the pre-stack tray [B]. (This sheet cannot be fed to the stapler yet, because the first set is still being stapled.) The pre-stack paper stopper solenoid [C] turns on 350 mm after the 1st sheet turns on the entrance sensor. The pre-stack paper stopper [D] then stops the paper.

The pre-stack junction gate solenoid turns off 230 mm after the trailing edge of the 1st sheet passes through the entrance sensor, and the 2nd sheet is sent to the paper guide [E]. The pre-stack paper stopper is released about 40 mm after the 2nd sheet turns on the pre-stack stopper sensor [F], and the two sheets of copy paper are sent to the stapler tray. All sheets after the 2nd sheet go to the stapler tray via the paper guide [E].

6.3 JOGGER UNIT PAPER POSITIONING



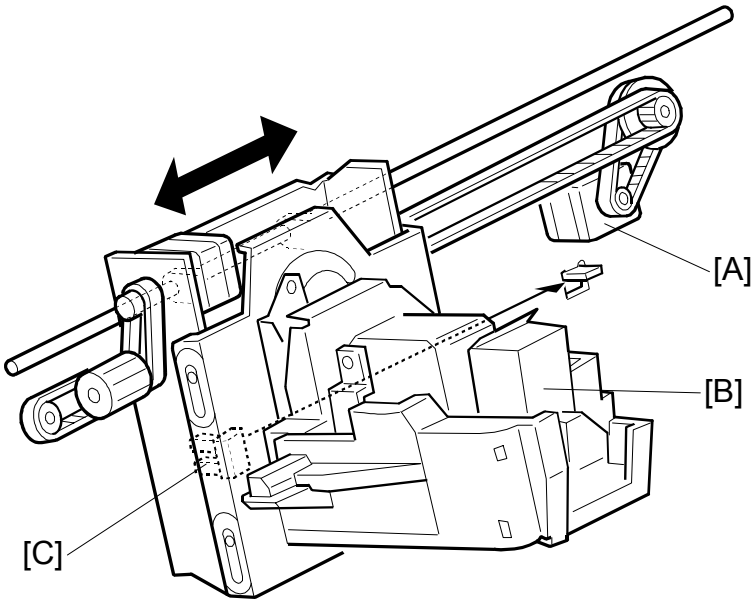
In the staple mode, as every sheet of paper arrives in the jogger unit, it is vertically and horizontally aligned, then the staple edge is pressed flat to ensure the edge of the stack is aligned correctly for stapling.

Vertical Paper Alignment: About 60 ms after the trailing edge of the copy passes the staple tray entrance sensor [A], the positioning roller motor [B] is energized to push the positioning roller [C] into contact with the paper. The positioning roller and alignment brush roller [D] rotate to push the paper back and align the trailing edge of the paper against the stack stopper [E].

Horizontal Paper Alignment: When the print key is pressed, the jogger motor [F] turns on and the jogger fences [G] move to the wait position about 7.2 mm wider than the selected paper size on both sides. When the trailing edge of the paper passes the staple unit entrance sensor, the jogger motor moves the jogger fences 3.7 mm towards the paper. Next, the jogger motor turns on again for 3.5 mm for the horizontal paper alignment then goes back to the wait position.

Paper Stack Correction: After the paper is aligned in the stapler tray, the left [J], center [K], and right [L] stack plate motors switch on briefly and drive the front stack, center stack, and rear stack plates against the edge of the stack to flatten the edge completely against the staple tray for stapling. When the next copy paper turns on the stapler entrance sensor, the stack plate motor turns on and returns to its home position. The home position is detected by stack plate HP sensor [M].

6.4 STAPLER UNIT MOVEMENT



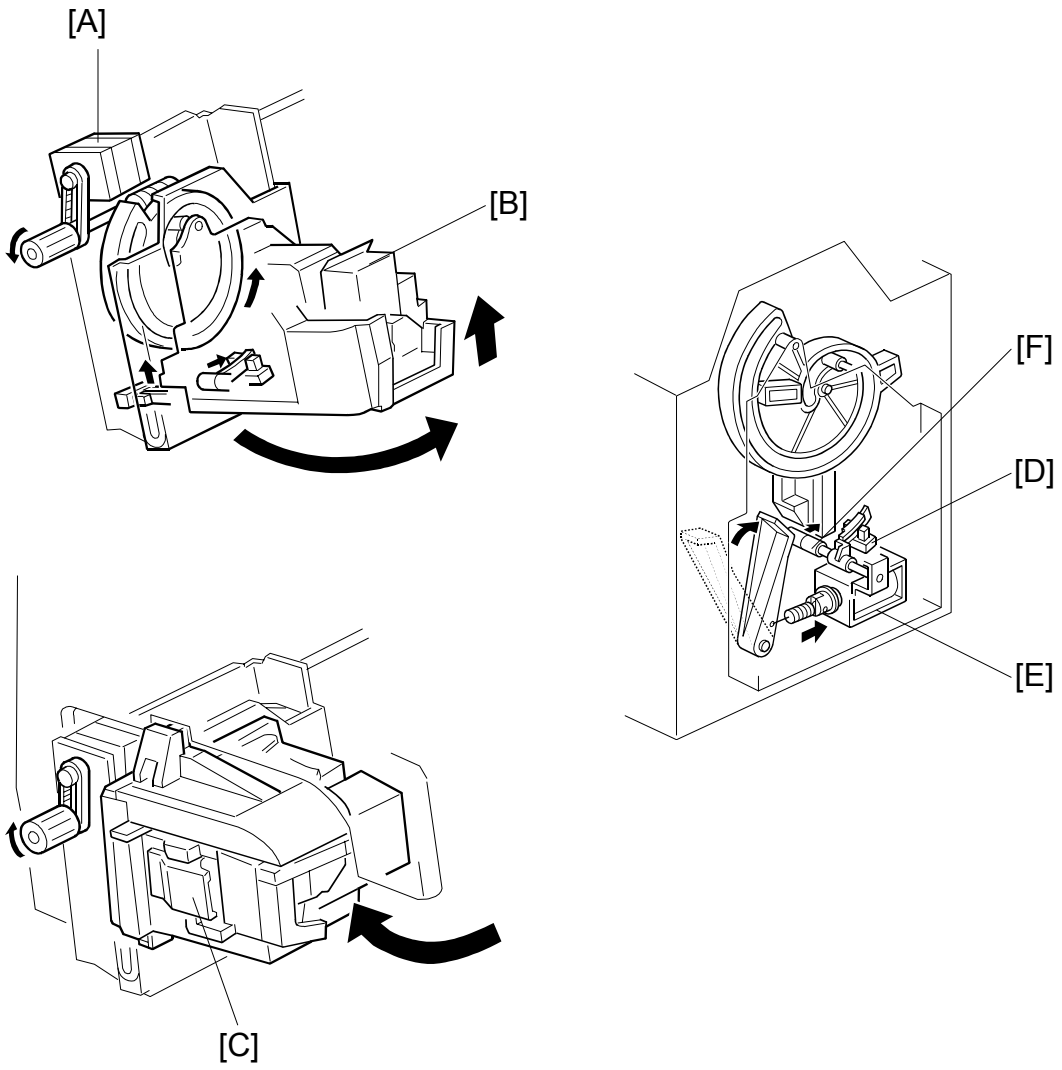
Side-to-Side

The stapler motor [A] moves the stapler [B] from side to side. After the start key is pressed, the stapler moves from its home position to the stapling position.

If two-staple-position mode is selected, for the first stack the stapler moves to the rear stapling position first, staples, moves to the front position, staples and waits at the front. For the second stack, the stapler staples the front corner first, then moves to the rear corner and staples.

NOTE: For continuous stapling jobs, the corners are stapled rear then front for the odd number stacks and stapled front then rear for even number stacks.

After the job is completed, the stapler returns to its home position. This is detected by the stapler HP sensor [C].



Rotation (1)

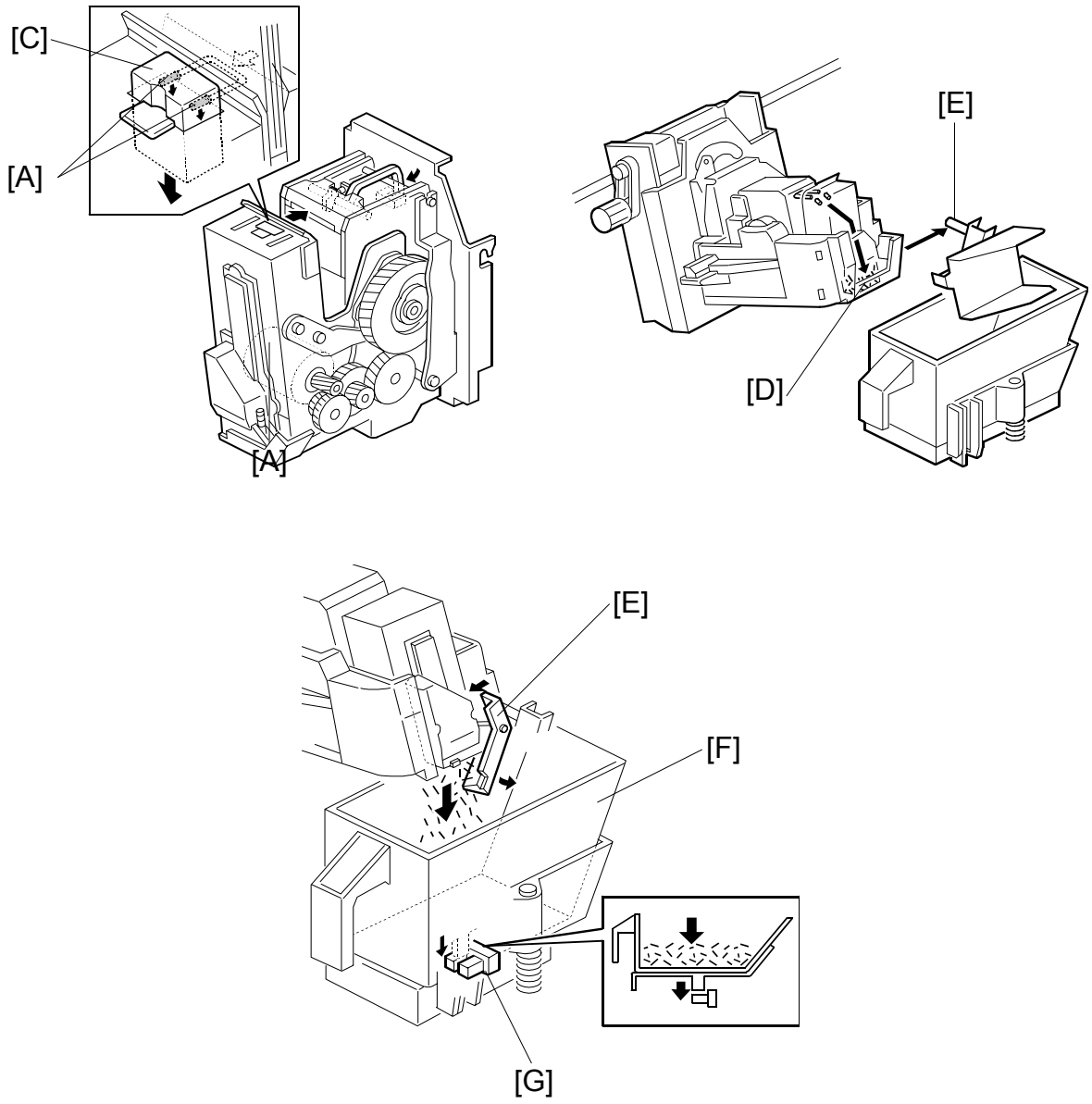
In the oblique staple position mode, the stapler rotation motor [A] rotates the stapler units [B] 45° to counterclockwise after it moves to the stapling position.

Rotation (2)

When the staple end condition arises, the stapler motor moves the stapler to the front and the stapler rotation motor rotates the stapler unit to clockwise to remove the staple cartridge [C]. This allows the user to add new staples.

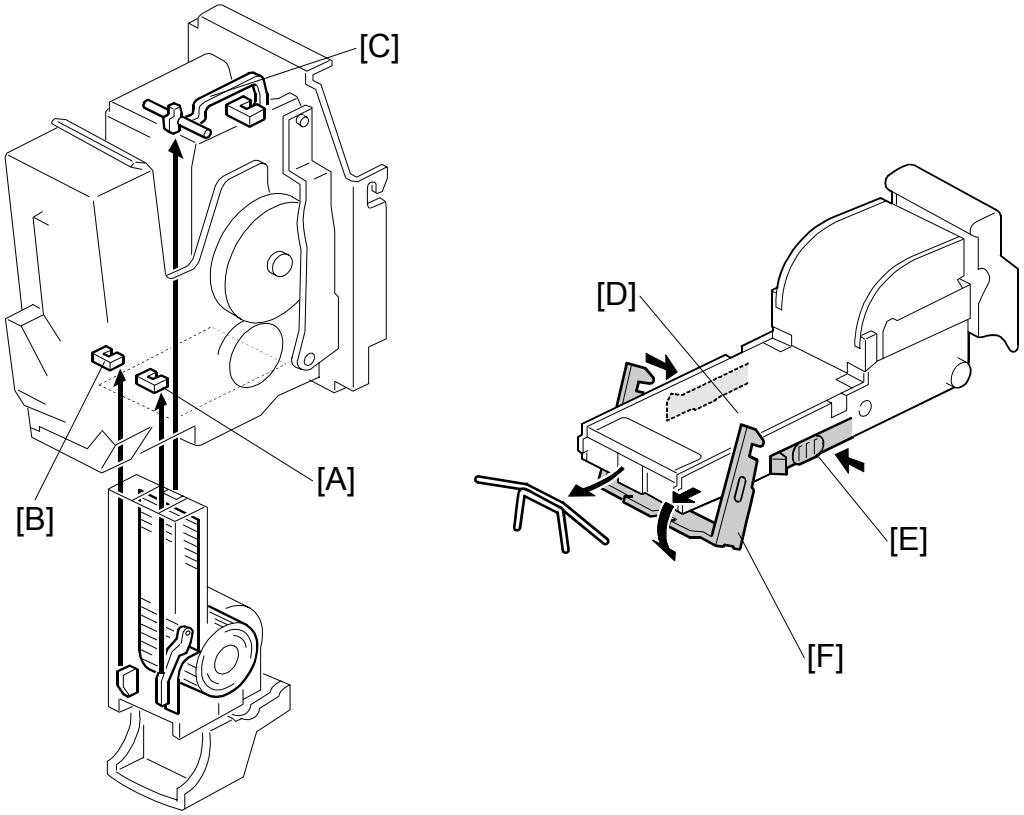
Once the staples have been installed, and the front door closed, the stapler unit returns to its home position. As the stapler unit is returning to the home position, the stapler return sensor [D] is activated, the return solenoid [E] turns on and it assists the guide roller [F] to return to its guide (this guide directs the stapler during rotation).

6.5 STAPLER



When the aligned copies are brought to the stapling position by the positioning roller and jogger fences, the staple hammer motor [A] starts stapling.

During stapling, the stapler trims off the excess length [B] of the staples by lowering the cutter [C]. This excess length depends on the number of copies in the set; there will be very little for a stack containing 100 sheets. The staple waste drops into the tray [D] in the stapler. When the stapler unit returns to its home position, the tray hits the shaft [E] and the tray opens. The staple waste drops into the staple waste hopper [F]. When the staple waste hopper is full, the actuator on its base activates the staple waste hopper sensor [G]. An SC737 (Full Finisher Staple Waste Hopper) is displayed.

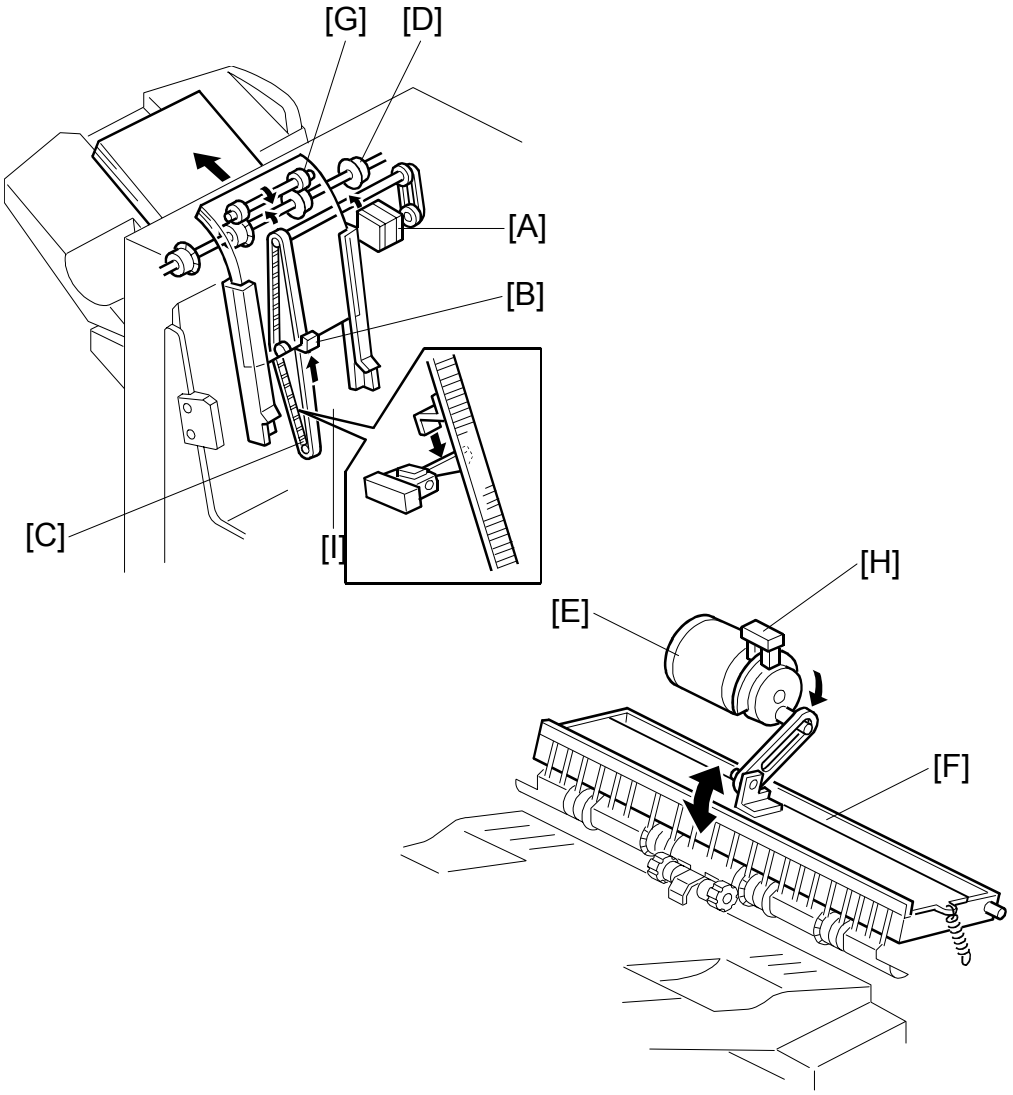


The stapler has a staple end sensor [A], cartridge set sensor [B] and staple hammer HP sensor [C].

When a staple end or no cartridge condition is detected, a message is displayed advising the operator to install a staple cartridge. If this condition is detected during a copy job, the indication will appear, and the copy job will stop.

The staple cartridge has a clinch area [D] where jammed staples collect. The operator can remove the jammed staples from the clinch area by pressing in the releases [E] on both sides, then lowering the bracket lever [F].

6.6 FEED-OUT

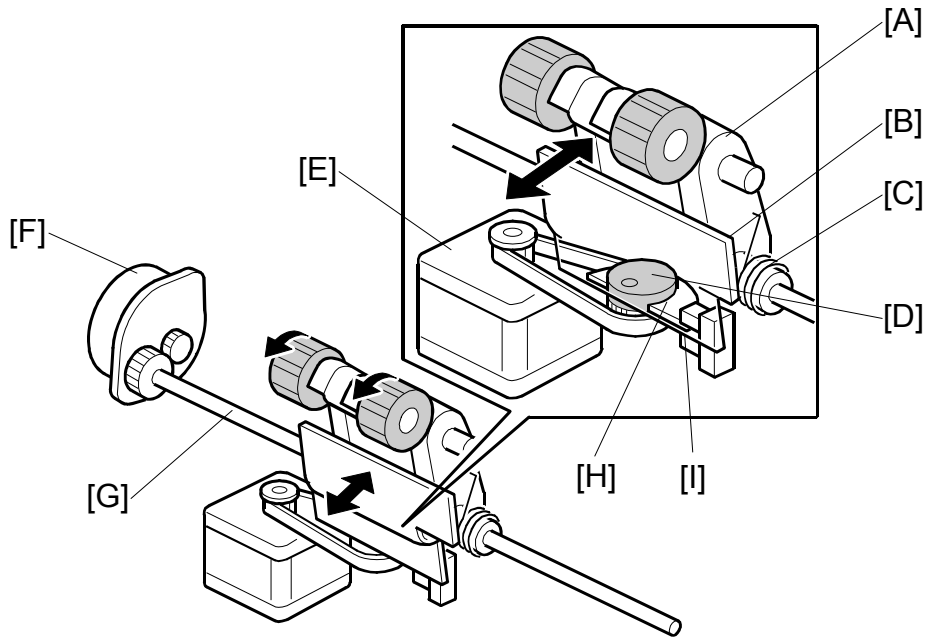


After the copies have been stapled, the stack feed-out motor [A] starts. The pawl [B] on the stack feed-out belt [C] transports the set of stapled copies up and feeds it to the shift tray exit roller [D]. When stapling starts, the exit guide motor [E] opens the upper exit guide [F], which includes the upper shift tray exit roller [G], in order to feed out the leading edge of the copy set smoothly. The exit guide motor turns on again a certain time after stapling is complete, and the upper exit guide plate is lowered. Then the shift tray exit roller takes over the stack feed-out.

The on-off timing of the exit guide motor is detected by the exit guide open sensor [H].

The stack-feed-out motor turns off when the pawl actuates the stack feed-out belt home position sensor [I].

6.7 PAPER EXIT STACKING



The stacking roller assembly [A] is fastened to a plate [B] on a shaft by a spring [C]. The cam [D], in contact with the bottom of the plate, is connected to the stacking roller drag motor [E] via a timing belt.

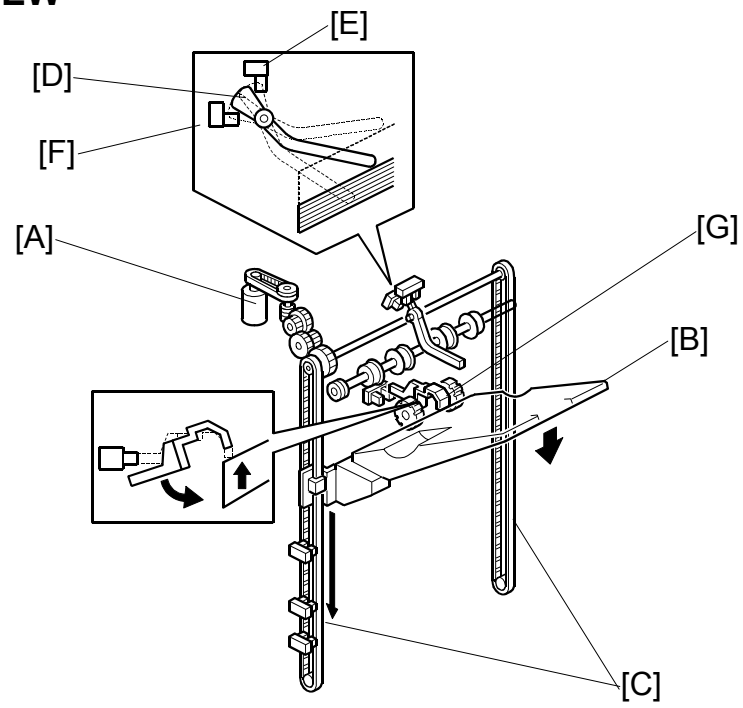
The stacking roller drag motor and timing belt rotate the cam against the bottom of the plate to move the rollers forward and back with each sheet ejected onto the shift tray.

The stacking roller motor [F] drives the shaft [G] that rotates the stacking rollers counter-clockwise as the rollers move back. The simultaneous rotation and backward movement of the roller assembly pulls each sheet back toward the copier to align the edges of the stack on the shift tray.

The actuator [H] is mounted on the cam and rotating with both rotating clockwise) and detects the roller assembly home position when the actuator leaves the gap of the return drive HP sensor [I] and signals the machine that the rollers are at the home position. The machine uses this information to control paper feed timing and confirm that the mechanism is operating correctly. The cam and actuator make one complete rotation for every sheet fed out of the machine onto the shift tray.

6.8 SHIFT TRAY

6.8.1 OVERVIEW



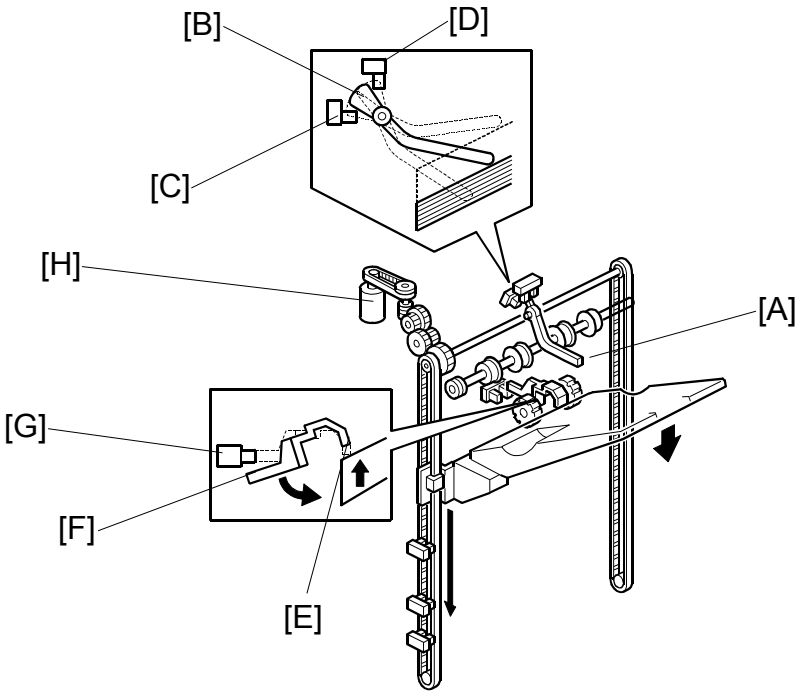
The shift tray lift motor [A] controls the vertical position of the shift tray [B] through gears and timing belts [C].

Stand-by Mode

After the main switch is turned on, or when the stack is removed from the tray, the end of the feeler on the tray falls and its actuator [D] rotates up into staple mode HP sensor 2 [E] (S7) and switches it on. This switches on the lift motor, which raises the tray until the tray pushes the actuator out of the sensor [E]. Then, the lift motor stops the shift tray; this is the home position (the actuator [D] is between the two sensors [E] and [F].

The shift tray upper limit switch (SW1) prevents the drive gear from being damaged if stack height sensor 1 [E] fails. In case of a failure, when the shift tray pushes up the actuator [G] and positioning rollers, the switch will cut the power to the shift tray lift motor.

6.8.2 SHIFT TRAY UP/DOWN MOVEMENT



Sort/Stack Mode (Shift Mode)

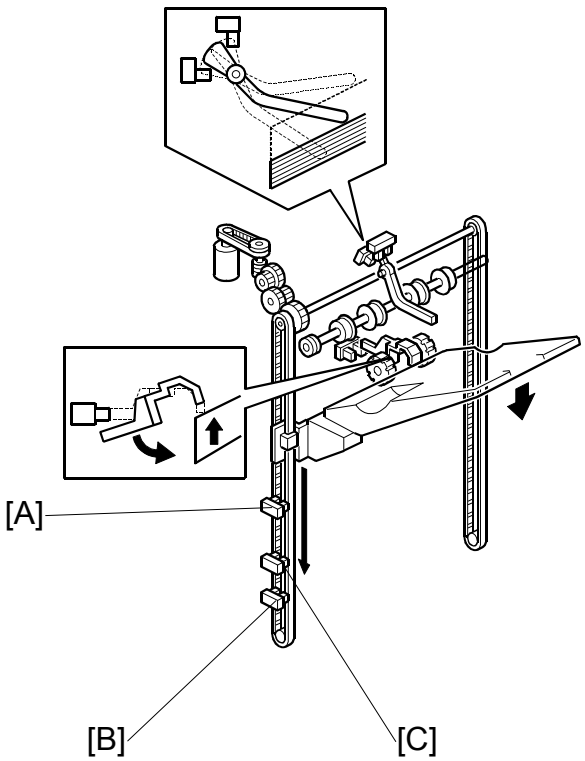
The shift tray moves to home position, which is when the actuator [F] has just exited the shift mode home position sensor [G] (S12). During feed-out, the tray is lowered automatically at prescribed intervals; sensor [D] (S7) is ignored. When the stack is removed from the tray, the end of the feeler [E] between the arms of the stacking roller falls, and its actuator [F] enters sensor [G] (S12) and switches it on. This switches on the lift motor [H], which raises the tray until the actuator leaves the sensor. Then, the lift motor stops the tray; this is the home position.

In sort/stack mode, if S12 fails when the tray is being lifted, the shift tray upper limit switch (SW1) prevents the drive gear from being damaged.

Staple Mode

The shift tray moves to home position, which is when the actuator [B] is between the staple mode home position sensors [C] and [D]. During feed-out, the shift tray is lowered automatically at prescribed intervals. When the stack is removed from the tray, the tray returns to the home position for stand-by mode. (☛6.8.1)

6.8.3 SHIFT TRAY LOWER LIMIT DETECTION



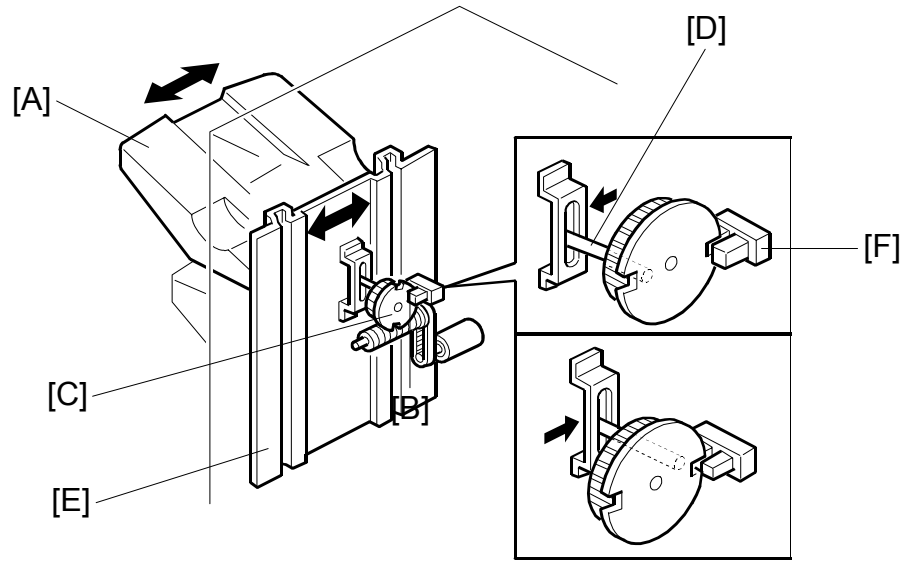
This machine has two shift tray lower limit sensors: shift lower limit sensor [A] (S9) for large paper (B4 and larger) and shift lower limit sensor [B] (S11) for small paper (smaller than B4).

NOTE: Sensor [C] (S10) is not used.

When the actuator [D] enters sensor [A] while using large paper (about 1500 sheets are on the tray), a message will be displayed and copying will stop.

When the actuator [D] enters sensor [B] while using small paper (about 3,000 sheets are on the tray), a message will be displayed and copying will stop.

6.9 SHIFT TRAY SIDE-TO-SIDE MOVEMENT



In sort/stack mode, the shift tray [A] moves from side to side to separate the sets of copies.

The horizontal position of the shift tray is controlled by the shift motor [B] and shift gear disk [C]. After one set of copies is made and delivered to the shift tray, the shift motor turns on, driving the shift gear disk and the shaft [D]. The end fence [E] is positioned by the shaft, creating the side-to-side movement.

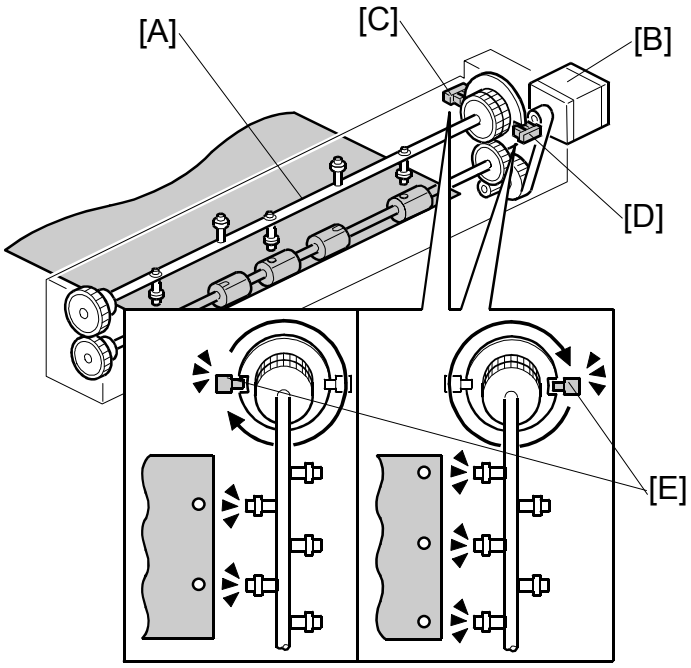
When the shift gear disk has rotated 180 degrees (when the shift tray is fully shifted across), the cut-out in the shift gear disk turns on the shift tray half-turn sensor [F] and the shift motor stops. The next set of copies is then delivered. The motor turns on, repeating the same process and moving the tray back to the previous position.

6.10 JAM CONDITIONS

1. The entrance sensor does not turn on when the copier has fed paper 426 mm after the copier exit sensor turned off.
2. The entrance sensor does not turn off when the upper transport motor has fed paper 1.5 times the paper's length after it turned on.
3. The upper tray exit sensor does not turn on when the upper transport motor has fed paper 574 mm after the entrance sensor turned on.
4. The upper tray exit sensor does not turn off when the upper transport motor has fed paper 1.5 times the paper's length after it turned on.
5. In sort/stack mode, the shift tray exit sensor does not turn on when the upper transport motor has fed paper 733 mm after the entrance sensor turned on.
6. In sort/stack mode, the shift tray exit sensor does not turn off when the upper transport motor has fed paper 1.5 times the paper's length after it turned on.
7. In staple mode, the stapler tray entrance sensor does not turn on when the upper and lower transport motor have fed paper 835 mm after the entrance sensor turned on.
8. In staple mode, the stapler tray entrance sensor does not turn off when the upper transport motor has fed paper 1.5 times the paper's length after it turned on.
9. In staple mode, the stapler tray paper sensor does not turn off within 250 pulses of the stack feed-out motor after it started.
10. In staple mode, the shift tray exit sensor does not turn off within 1,260 ms after the stack feed-out motor started.

6.11 PUNCH UNIT B531 (OPTION)

6.11.1 PUNCH UNIT DRIVE



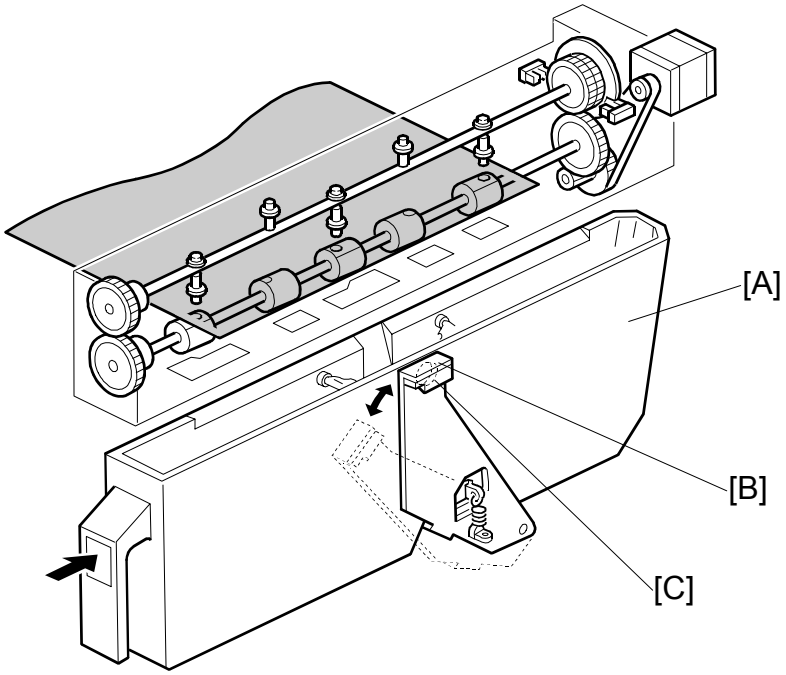
The punch unit makes 2 or 3 holes at the trailing edge of the paper. The number of holes depends on a selection made on the operation panel.

The cam [A] has 2 punches on one side and 3 punches on the other, and is turned by the punch motor [B]. The punch motor turns on immediately after the trailing edge of the paper passes the entrance sensor. The punches on the cam rotate downward and punch holes in the paper.

After punching a sheet of paper, the cam returns to home position and stops. Home position depends on whether 2 holes or 3 holes are being made, so there are two punch HP sensors. Punch HP sensor 1 [C] is used when 2-hole punching is selected, and punch HP sensor 2 [D] is used when 3-hole punching is selected. When the cut-out [E] enters the slot of the punch HP in use (sensor 1 or 2-hole punching or sensor 2 for 3/4-hole punching) the motor stops.

The knob (not shown) on the front end of the punch unit can be turned in either direction to clear paper jammed in the punch unit.

6.11.2 PUNCH WASTE COLLECTION



Punch waste is collected in the punch waste hopper [A] positioned under the punch unit.

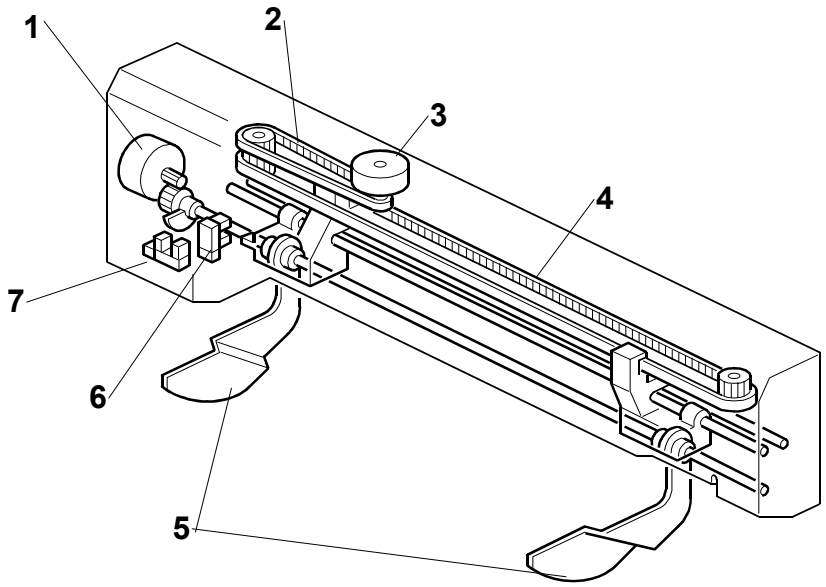
When the level of the punch waste in the hopper rises as far as the hole [B] in the hopper, the punch waste sensor [C] turns on, stops the job, and triggers a message on the operation to indicate that the hopper is full and must be removed and emptied.

The job resumes automatically after the hopper is emptied and returned to the finisher.

The punch waste hopper sensor also functions as the hopper set sensor. When the hopper is not in the finisher, or if it is not inserted completely, the spring loaded sensor arm rotates up and to the right with the punch waste sensor away from the hole in the hopper holder and a message is displayed. The message in this case is the same as the hopper full message.

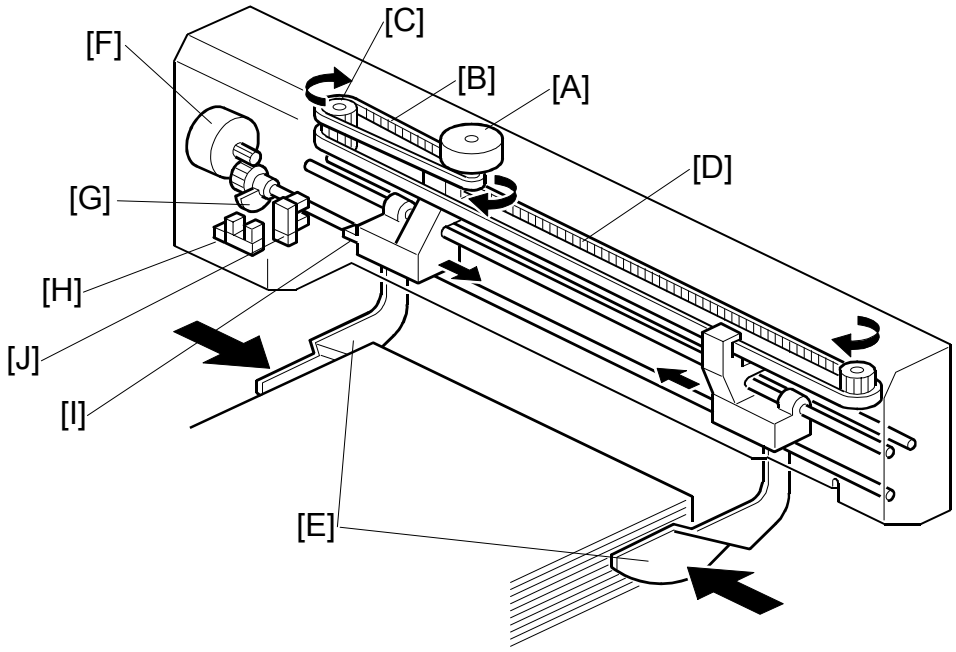
6.12 JOGGER UNIT B513 (OPTION)

6.12.1 JOGGER UNIT MECHANICAL LAYOUT



1. Shift Jogger Fence Lift Motor
2. Shift Jogger Motor Timing Belt
3. Shift Jogger Motor
4. Shift Jogger Fence Timing Belt
5. Shift Jogger Fences
6. Shift Jogger HP Sensor
7. Shift Jogger Lift HP Sensor

6.12.2 JOGGER UNIT DRIVE



At prescribed intervals, the jogger motor [A] switches on and drives the jogger timing belt [B], gear [C] and jogger fence timing belt [D] which drives the shift jogger fences [E] against the sides of the stack to align its edges.

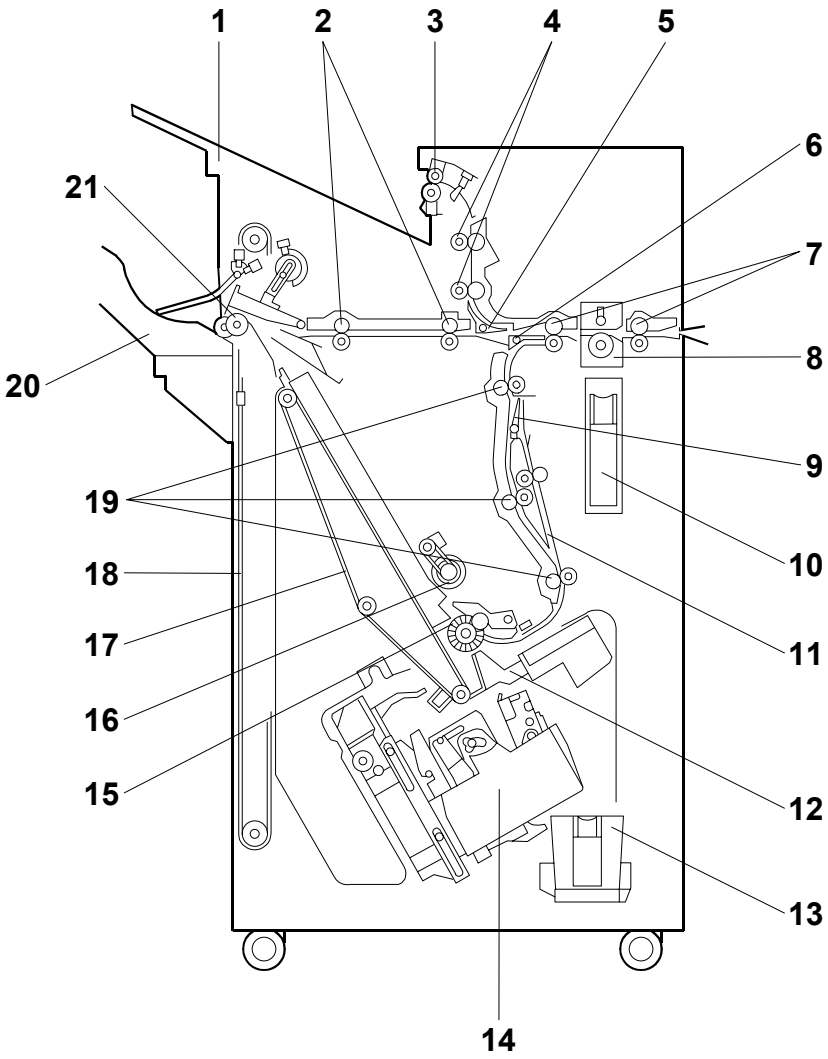
At the end of the job, the jogger fence lift motor [F] switches on and raises the fences until the actuator [G] leaves the slot of the shift jogger fence lift HP sensor [H] and shuts off the shift jogger fence lift motor.

At the same time, the jogger motor reverses and drives the fences away from the sides of the stack until the actuator [I] deactivates the shift jogger fence HP sensor [J] and switches off the jogger motor.

The jogger fences remain up in the standby position until the next job starts.

7. OVERALL MACHINE INFORMATION

7.1 MECHANICAL COMPONENT LAYOUT



1. Upper Tray
2. Middle Transport Rollers
3. Upper Tray Exit Roller
4. Upper Transport Rollers
5. Tray Junction Gate
6. Stapler Junction Gate
7. Entrance Rollers
8. Punch Unit
9. Pre-stack Junction Gate
10. Punch Waste Hopper
11. Pre-stack Tray
12. Stack Plate
13. Staple Waste Hopper
14. Stapler
15. Alignment Brush Roller
16. Positioning Roller
17. Stack Feed-out Belt
18. Shift Tray Drive Belt
19. Lower Transport Rollers
20. Shift Tray
21. Shift Tray Exit Roller

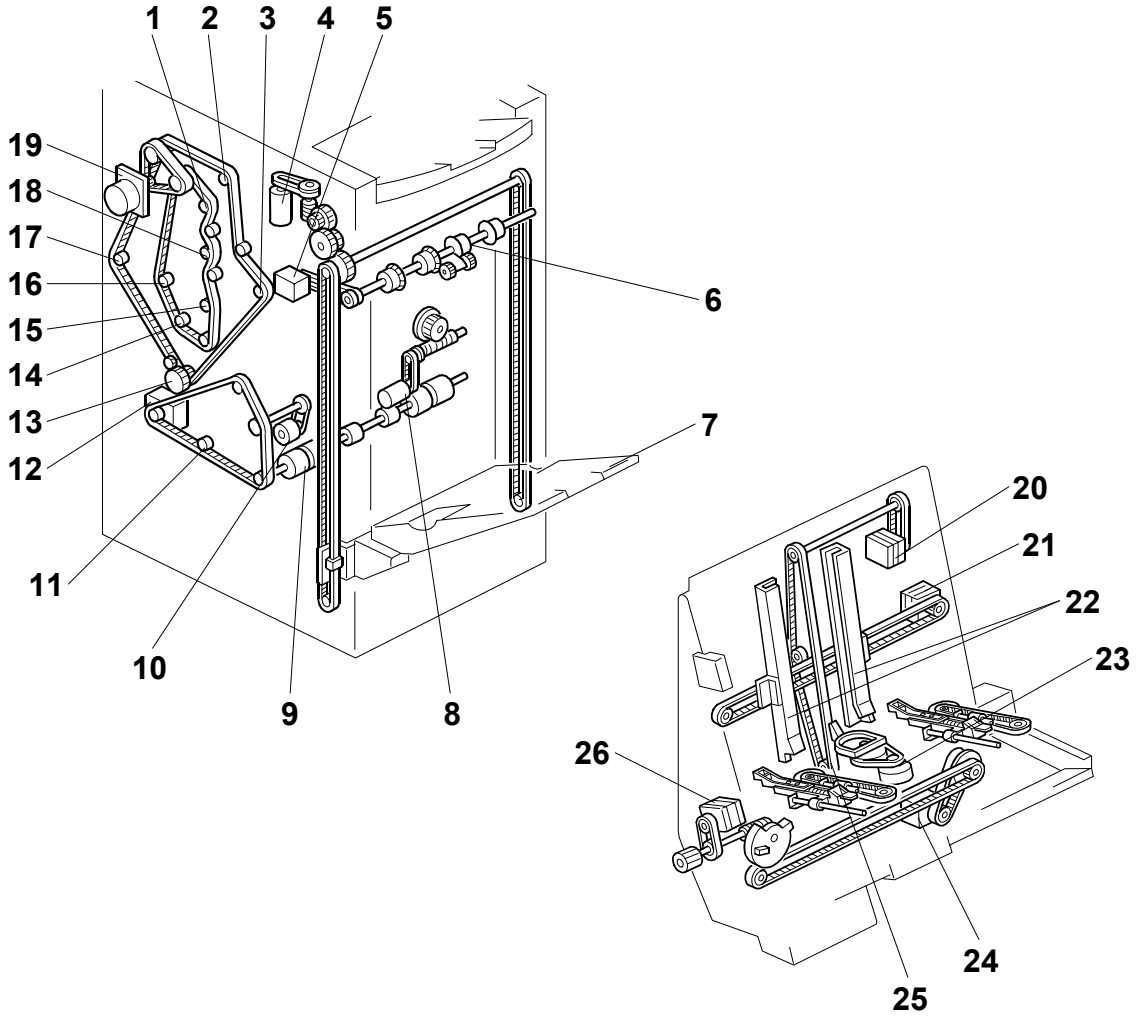
7.2 ELECTRICAL COMPONENT DESCRIPTION

Symbol	Name	Function
Motors		
M01	Shift Tray Exit	Drives the exit roller for the shift tray.
M02	Shift Tray Lift	Moves the shift tray up or down.
M03	Exit Guide	Opens and closes the upper exit guide.
M04	Lower Transport	Drives the lower transport rollers, the positioning roller and the alignment brush roller
M05	Shift	Moves the shift tray from side to side.
M06	Positioning Roller	Moves the positioning roller into contact with the paper.
M07	Stacking Roller Drag	Moves the stacking roller in and out.
M08	Stacking Roller	Rotates the stacking roller.
M09	Jogger	Moves the jogger fences.
M10	Stack Feed-Out Belt	Drives the stack feed-out belt.
M11	Stack Plate - Center	Presses down the center of the edge for stapling.
M12	Stapler	Moves the staple unit from side to side.
M13	Stack Plate – Front	Presses down the front corner of the edge for stapling.
M14	Stack Plate – Rear	Presses down the rear corner of the edge for stapling.
M15	Stapler Rotation	Rotates the stapler 45 degrees for oblique stapling.
M16	Staple Hammer	Drives the staple hammer.
M17	Punch	Drives the punch shaft and roller. Punch Unit B531 (option).
M18	Upper Transport	Drives the entrance rollers, the middle and upper transport rollers, and upper tray exit roller.
M19	Shift Jogger	Drives the shift jogger fences against the sides of the sheets to align the stack, then reverses to return them to the home position. Jogger Unit B513 (option).
M20	Shift Jogger Lift	Raises the shift jogger fences after aligning the stack, then reverses and lowers them when returning to the home position. Jogger Unit B513 (option).
BOARDS		
PCB	Main	Controls the finisher and communicates with the copier.
PCB	Stapler	Controls the stapler unit.
PCB	Punch	Passes signals between the punch unit and the finisher main board. Punch Unit B531 (option).
PCB	Jogger	Controls the shift/jogger unit B513 (option).
SENSORS		
S01	Entrance	Detects the copy paper entering the finisher and checks for misfeeds.
S02	Upper Tray Exit	Checks for misfeeds at the upper tray.

Symbol	Name	Function
S03	Upper Tray Limit	Detects when the paper stack height in the upper tray is at its upper limit.
S04	Shift Tray Exit	Checks for misfeeds at the shift tray exit.
S05	Exit Guide Open	Detects whether the guide plate is opened or not.
S06	Staple Mode HP 1	Detects the shift tray home position for standby mode and for staple mode.
S07	Staple Mode HP 2	Detects the shift tray home position for standby mode and for staple mode.
S09	Shift Lower Limit – Large Paper	Detects the lower limit for the shift tray when large paper sizes are being used
S10	Shift Tray Lower Limit 2	Not used.
S11	Shift Tray Lower Limit 3	Detects when the shift tray is at its lower limit.
S12	Shift Mode HP	Detects the shift tray home position in sort/stack mode.
S13	Stacking Roller HP	Detects when the stacking roller is at home position.
S14	Shift Tray Half-Turn	Detects whether the shift tray is at either the front or home HP.
S15	Pre-Stack Tray Paper	Determines when to turn off the pre-stack paper stopper solenoid.
S16	Stapler Tray Exit	Detects jams at the staple tray exit.
S17	Positioning Roller HP	Detects the home position of the positioning roller.
S18	Stack Feed-Out Belt HP	Detects the home position of the stack feed-out belt.
S19	Stapler Tray Paper	Detects the copy paper in the stapler tray.
S20	Jogger HP	Detects the home position of the shift jogger fences.
S21	Stack Plate - Center HP	Detects the home position of the center stack plate.
S22	Stack Plate – Front	Detects the home position of the front stack plate.
S23	Stack Plate – Rear	Detects the home position of the rear stack plate.
S24	Stapler HP	Detects the home position of the staple unit for side-to-side movement.
S25	Stapler Rotation HP	Detects the home position of the stapler unit for 45-degree rotation.
S26	Stapler Return	Detects the on timing of the stapler return solenoid.
S27	Staple Waste Hopper	Detects when the staple waste hopper is full.
S28	Punch Waste Hopper	Detects when the punch waste hopper is full and detects when the punch tray is set. Punch Unit B531 (option).
S29	Punch HP 1	Detects the cam home position for the 2-hole punch. Punch Unit B531 (option).
S30	Punch HP 2	Detects the cam home position for 3/4 punch. Punch Unit B531 (option).
S31	Shift Jogger HP	Detects the home position of the jogger unit arms during paper alignment. Jogger Unit B513 (option).
S32	Shift Jogger Lift HP	Detects the when both shift jogger fences are at the lowered position and ready to move against the sides of the stack. Jogger Unit B513 (option).

Symbol	Name	Function
SOLENOIDS		
SOL1	(Upper) Tray Junction Gate	Drives the tray junction gate.
SOL2	Stapler Junction Gate	Drives the stapler junction gate.
SOL3	Pre-Stack Junction Gate	Drives the pre-stack junction gate.
SOL4	Pre-stack Paper Stopper	Drives the stopper pawl of the pre-stacking tray.
SOL5	Stapler Return	Positions the stapler correctly on its return from the staple supply point.
SWITCHES		
SW1	Shift Tray Upper Limit	Cuts the power to the shift tray lift motor when the shift tray position is at its upper limit.
SW2	Front Door Safety	Cuts the dc power when the front door is opened.
SW3	Emergency Stop	Switches the current job off and on to allow time for the operator to remove paper from the shift tray.

7.3 DRIVE LAYOUT



1. Upper Transport Roller 2
2. Upper Tray Exit Roller
3. Lower Transport Roller 2
4. Shift Tray Lift Motor
5. Shift Tray Exit Motor
6. Shift Tray Exit Roller
7. Shift Tray
8. Shift Motor
9. Staple Tray Exit Roller
10. Positioning Roller
11. Lower Transport Roller 3
12. Lower Transport Motor
13. Lower Transport Rollers 2
14. Lower Transport Roller 1
15. Transport Roller 1
16. Entrance Roller 2
17. Entrance Roller
18. Upper Transport Roller 1
19. Upper Transport Motor
20. Stack Feed-out Motor
21. Jogger Motor
22. Jogger Fence
23. Stack Plate Motor
24. Stapler Motor
25. Stack Feed-out Belt
26. Stapler Rotation Motor

B470

COVER INTERPOSER TRAY

COVER INTERPOSER TRAY B470

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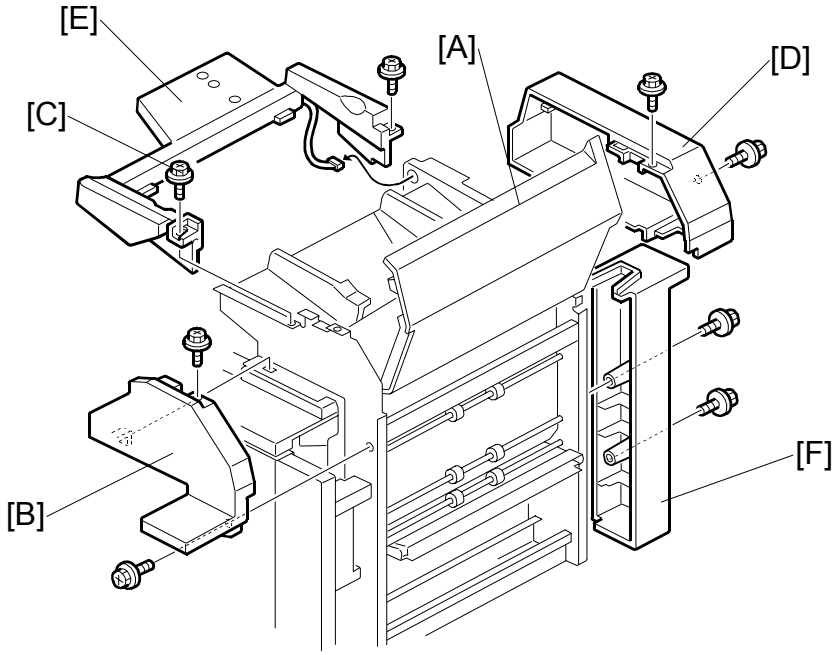
1. INSTALLATION

For a details about installing the Cover Interposer Tray B470, please refer to the instructions you received with the unit or “1. Installation” in the main machine service manual.

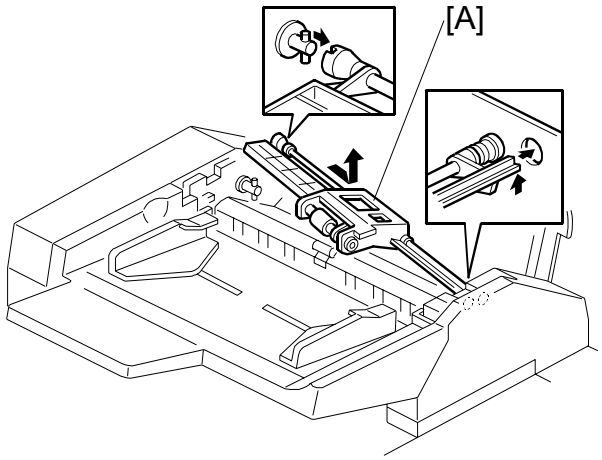
2. REPLACEMENT AND ADJUSTMENT

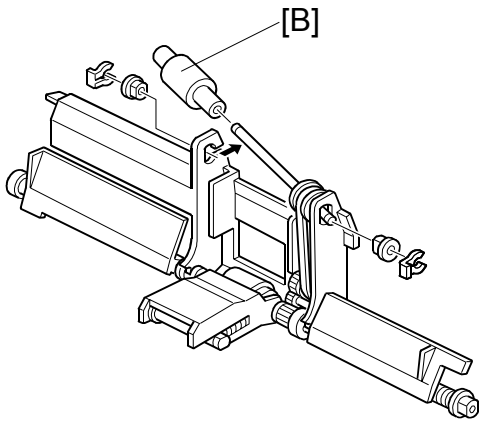
2.1 EXTERNAL COVERS



[A]: Open the feed cover.
[B]: Upper front cover (🔩 x 2)
NOTE: To remove the upper front cover, screw [C] must be removed.
[D]: Rear upper cover (🔩 x 2)
[E]: Slip sheet tray (🔩 x 2, 🖐 x 1)
[F]: Rear middle cover (🔩 x 2)

2.2 FEED UNIT AND PICK-UP ROLLER





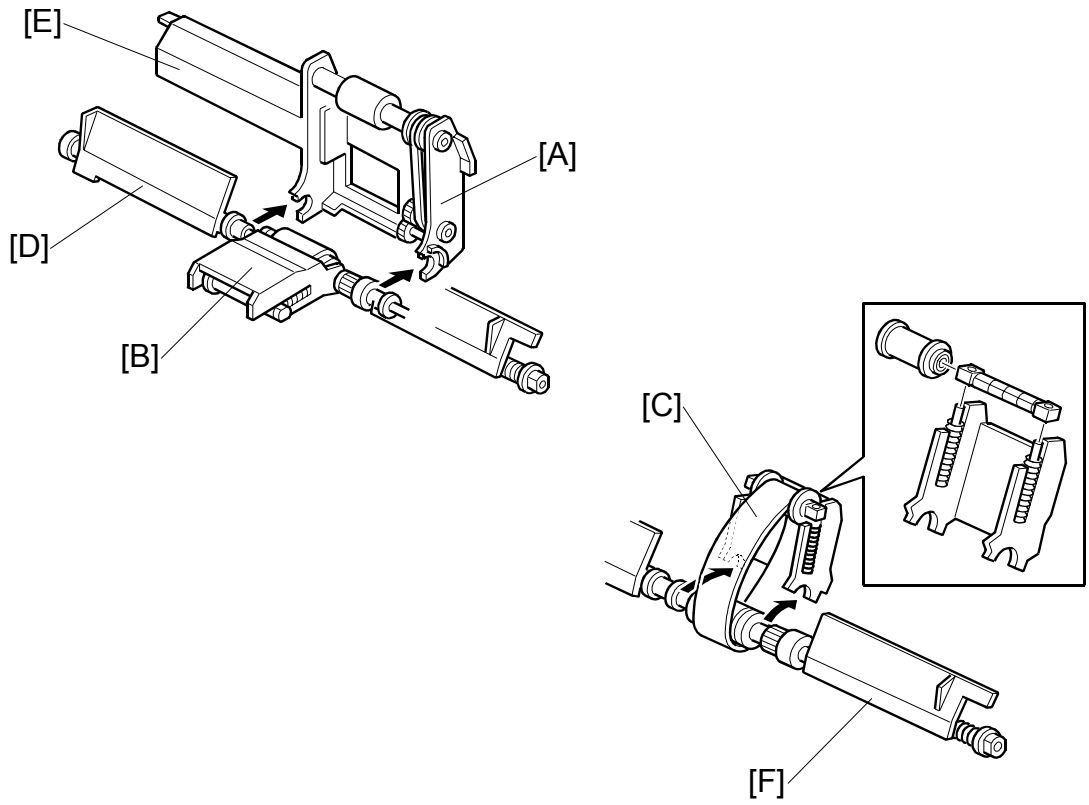
Open the feed cover.

[A]: Feed unit

- The unit is spring loaded. Push it to the right to release it, then lift it out.

[B]: Pick-up roller (⟲ x 2, bushings x 2)

2.3 FEED BELT



Feed unit (☛ 2.2)

[A]: Pick-up roller unit.
- Pull the unit away from the bushings in the direction of the arrow.

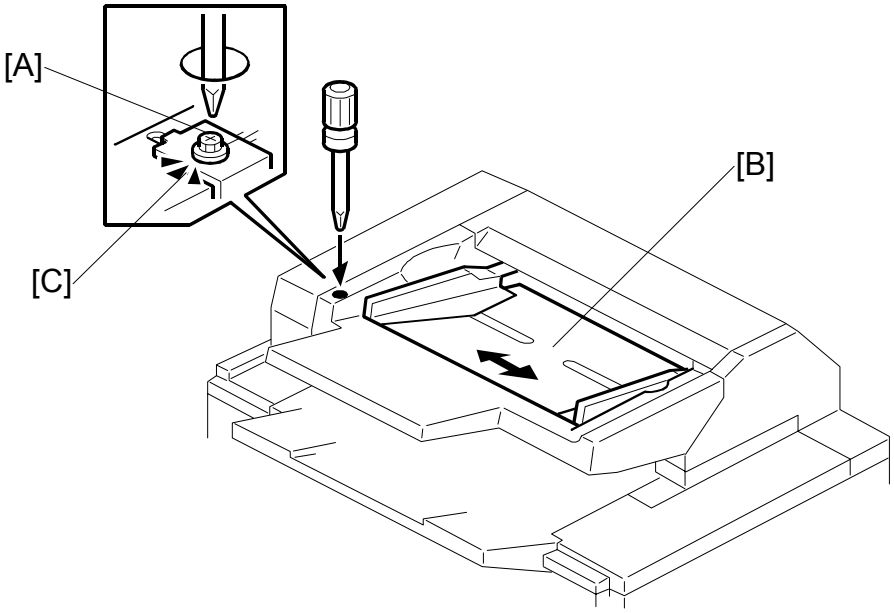
[B]: Feed belt holder
- Hold the feed belt holder by the sides, then lift up to separate from the holder.
- Pull slowly to avoid losing the springs.

[C]: Feed belt.

Re-assembly

1. Position the pick-up roller unit [A] and feed belt holder [B] as shown above.
2. On the rear side, slide out the bushing, and rotate [D] until its flat side is parallel with [E], then snap it on.
3. On the front side, rotate [F] until its flat side is parallel with [D], then snap it on. Viewed from the bottom, the plates must be aligned.

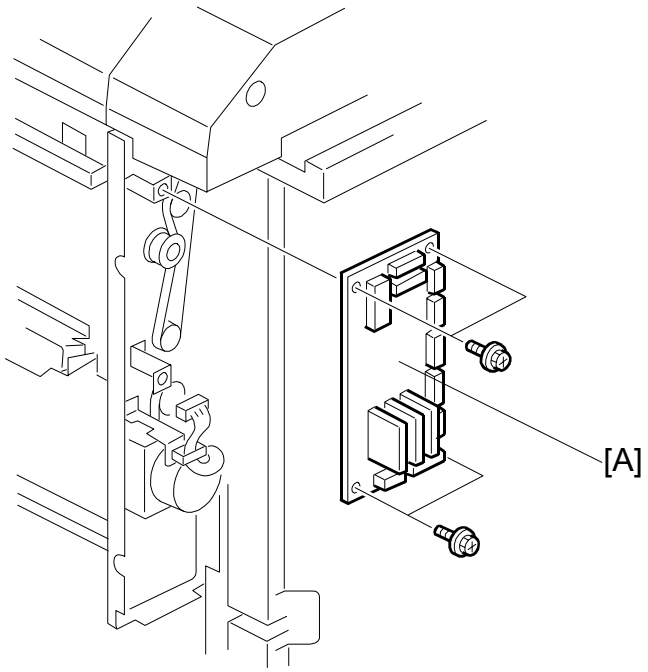
2.4 GUIDE PLATE ADJUSTMENT



Adjust the guide plate if the holes punched in the covers or slip sheets are not correctly aligned with holes punched in the other sheets.

1. Open the feed cover.
2. Loosen the screw [A].
3. Push the table [B] left or right to change its position, then tighten the screw.
   NOTE: If you want to see the scale [C], you must remove the rear cover and the support tray.

2.5 MAIN BOARD



Open the top cover.

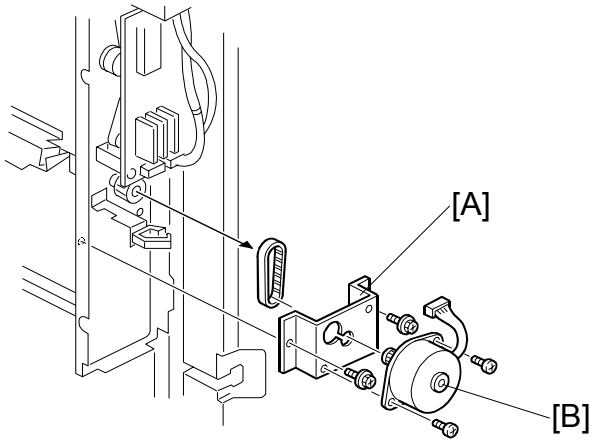
Rear cover (☞ x 1)

[A]: Main board (☞ x 9, ☞ x 4)

NOTE: All DIP switch settings on the main board of the cover sheet unit should be set to OFF.

2.6 MOTOR REPLACEMENT

2.6.1 VERTICAL TRANSPORT MOTOR



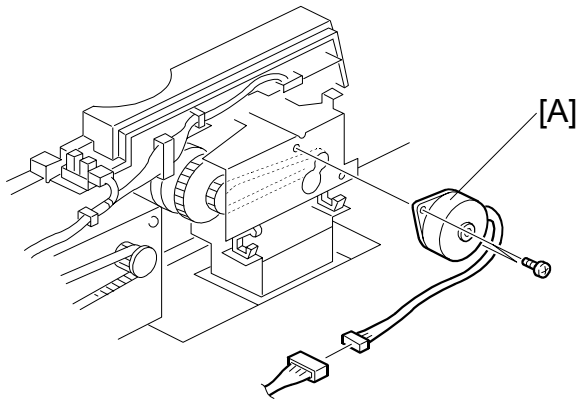
Open the top cover.

Rear cover (x 1) (☛ 2.1)

[A]: Motor bracket (x 1, harness x 1, x 2, timing belt x 1)

[B]: Motor (x 2)

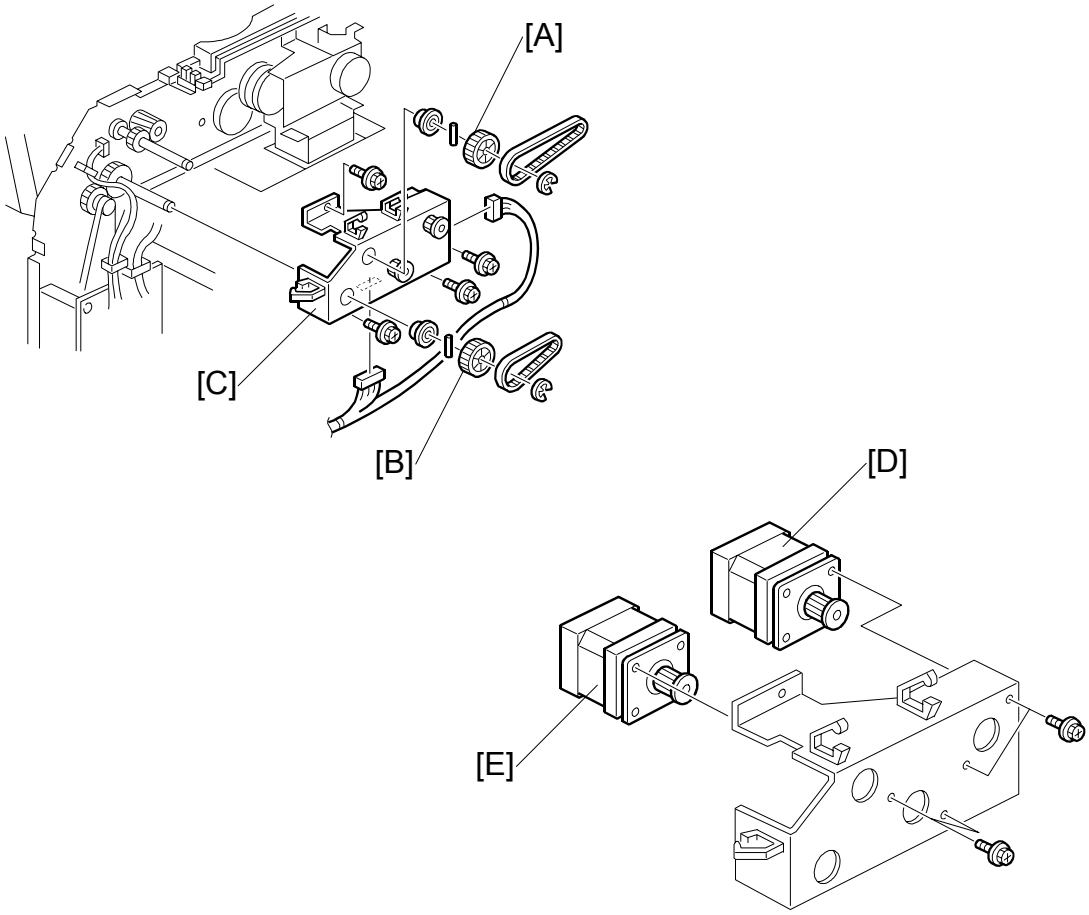
2.6.2 BOTTOM PLATE LIFT MOTOR



Rear upper cover (☛ 2.1)

[A]: Bottom plate lift motor (harness x 2, x 1, x 2)

2.6.3 FEED MOTOR, TRANSPORT MOTOR



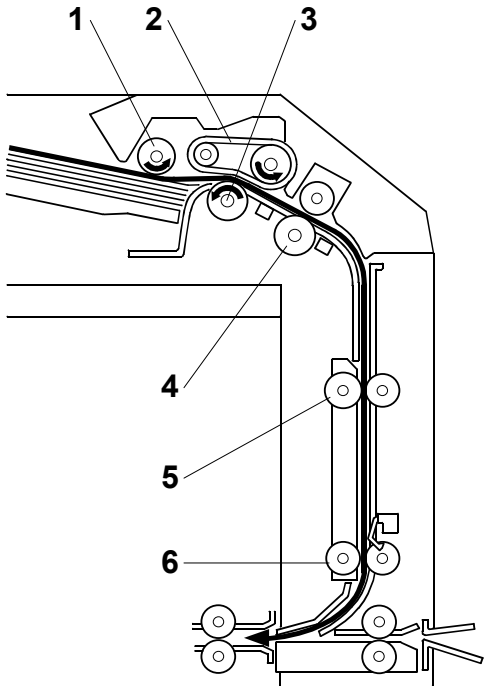
Rear upper cover (☛ 2.1)

NOTE: When removing the feed gear and transport gear, hold one hand under the gear to catch the pin as it falls from the hole in the shaft.

[A]: Feed gear (ℂ x 1, pin x 1, timing belt x 1, bushing x 1)
[B]: Transport gear (ℂ x 1, pin x 1, timing belt x 1, bushing x 1)
[C]: Motor bracket (harness x 5, 𝒻 x 4)
[D]: Feed motor (🖳 x 1, 𝒻 x 2)
[E]: Transport motor (🖳 x 1, 𝒻 x 2)

3. DETAILS

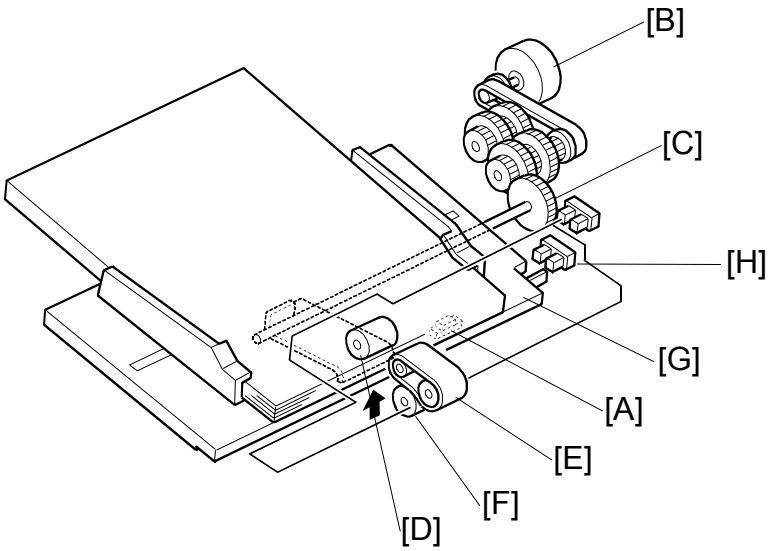
3.1 PAPER PATH



1. Pick-up Roller
2. Feed Belt
3. Separation Roller
4. Grip Roller
5. Transport Roller 1
6. Transport Roller 2

The paper feeds from the tray, to the feed belt, then to the grip roller and down into the paper path to the finisher below.

3.2 PAPER FEED



Power On

When paper is placed on the tray, the paper set sensor [A] in the tray actuates and switches on the bottom plate lift motor [B]. The top of the stack raises the pick-up roller unit until the actuator on this unit actuates the pick-up roller position sensor [C] and switches the motor off.

Paper Separation and Feed

The pick-up roller [D] picks up the original, and the feed belt [E] feeds the sheet to the grip roller. The separation roller [F] reverses if more than one sheet is fed

Bottom Tray Lift

As sheets feed from the top of the stack:

- The pick-up roller unit descends until the actuator on the pick-up roller unit drops out of the pick-up roller position sensor [C].
- The bottom plate lift motor switches on to raise the stack until the actuator enters the pick-up roller unit position sensor again and switches the motor off.
- This repeats until the end of the job or until paper runs out.

Paper Near-end

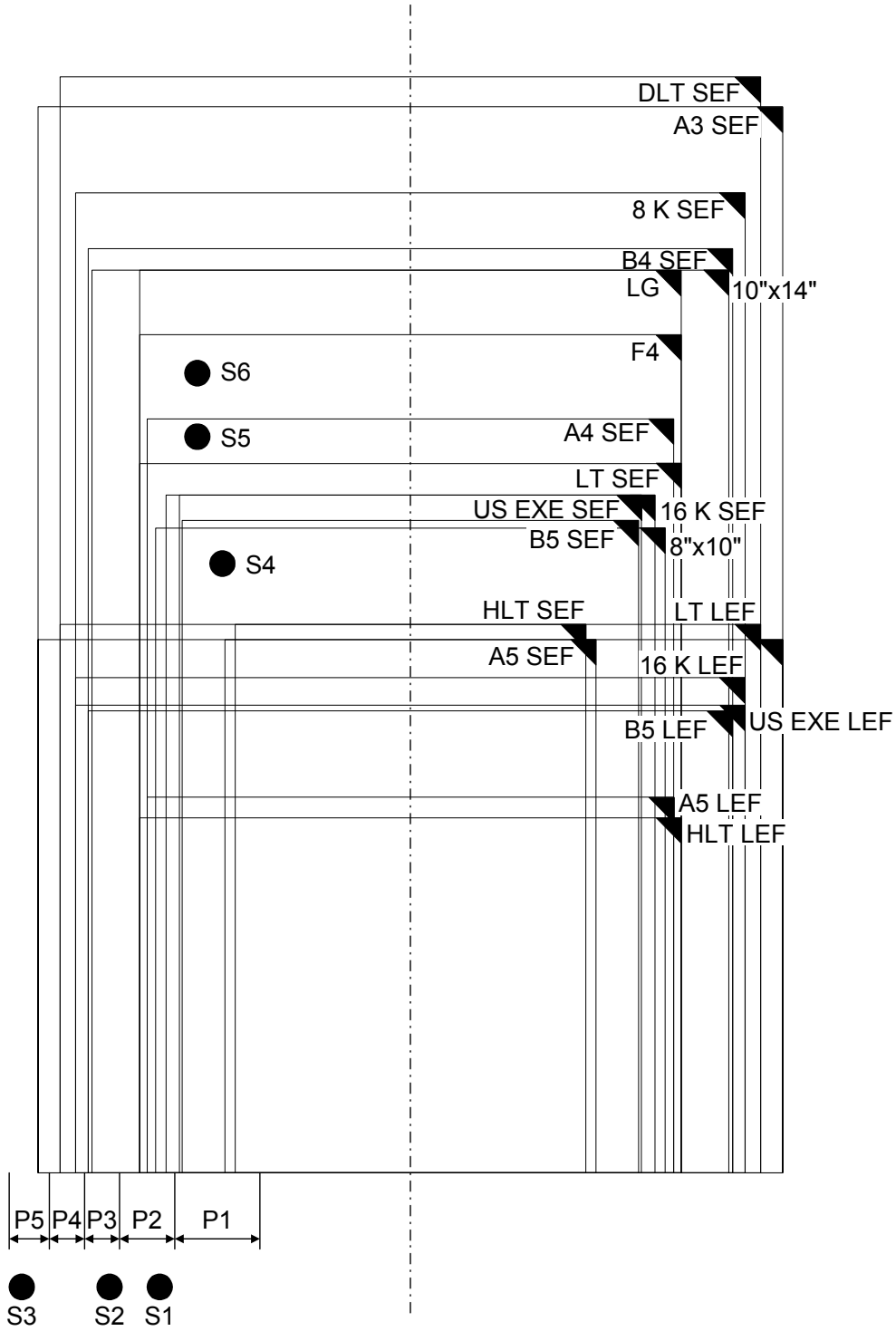
Near-end is detected when the actuator [G] on the bottom plate enters the near-end sensor [H]

Paper End

After the last sheet feeds the paper set sensor [A] goes off and signals paper out.

3.3 PAPER SIZE DETECTION

The width sensors [A] (S1, S2, S3) and length sensors [B] (S4, S5, S6) detect the width and length of the paper on the interposer feed tray.



DETAILS

The table below lists the sensor output for each paper size.

	S1	S2	S3	S4	S5	S6
A3	0	1	1	1	1	1
B4	1	1	0	1	1	1
A4 SEF	1	0	0	1	1	0
A4 LEF	0	1	1	0	0	0
B5 SEF	0	0	0	1	0	0
B5 LEF	1	1	0	0	0	0
A5 SEF	0	0	0	0	0	0
A5 LEF	1	0	0	0	0	0
11" x 17"	1	1	1	1	1	1
10" x 14" SEF	1	1	0	1	1	1
8 1/2" x 14"	1	0	0	1	1	1
8 1/2" x 13"	1	0	0	1	1	1
8 1/2" x 11"	1	0	0	1	0	0
11" x 8 1/2"	1	1	1	0	0	0
8" x 10"	1	0	0	1	0	0
5 1/2" x 8 1/2"	0	0	0	0	0	0
8 1/2" x 5 1/2"	1	0	0	0	0	0
7 1/2" x 10 1/2" (US Exec.)	0	0	0	1	0	0
10 1/2" x 7 1/2" (US Exec.)	1	1	1	0	0	0
8 K	1	1	1	1	1	1
16 K SEF	1	0	0	1	0	0
16 K LEF	1	1	1	0	0	0

The cover interposer tray detects all the paper sizes listed above. However, there are some limitations on the display of the correct paper size.

		North America	Europe/Asia
B4 SEF	257 x 364 mm	Displays 10" x 14" *1	
B5 SEF	182 x 257	Displays “US Exec.” *1	
A5 SEF	148 x 210	Displays “HLT SEF” *1	
A5 LEF	210 x 148	Displays “HLT LEF” *1	
DLT SEF	11" x 17"		Displays “8K LEF” *2
LG SEF	8 1/2" x 14"		Displays “F4 SEF” *2
LT SEF	8 1/2" x 11"		Displays “16 K SEF” *2
LT LEF	11" x 8 1/2"		Displays “16 K LEF” *2

*1: Cannot be corrected.
*2: B064/B065: Can be corrected with SP5959 006 (Paper Size – Cover Sheet).

3.3.1 B064/B065: CORRECT PAPER SIZE DISPLAY

North America

Execute SP5959 006 and enter the correct number for the size of the paper loaded for feeding from the cover interposer tray.

Loaded	Display (Default)	To Select for Display	Enter
8 1/2" x 13"	8 1/2" x 14"	8 1/2" x 13"	165
10 1/2" x 7 1/2"	8 1/2" x 11"	10 1/2" x 7 1/2"	173
8" x 10"	8 1/2" x 11"	8" x 10"	171

Europe/Asia

Execute SP5959 006 and enter the correct number for the size of the paper loaded for feeding from the cover interposer tray.

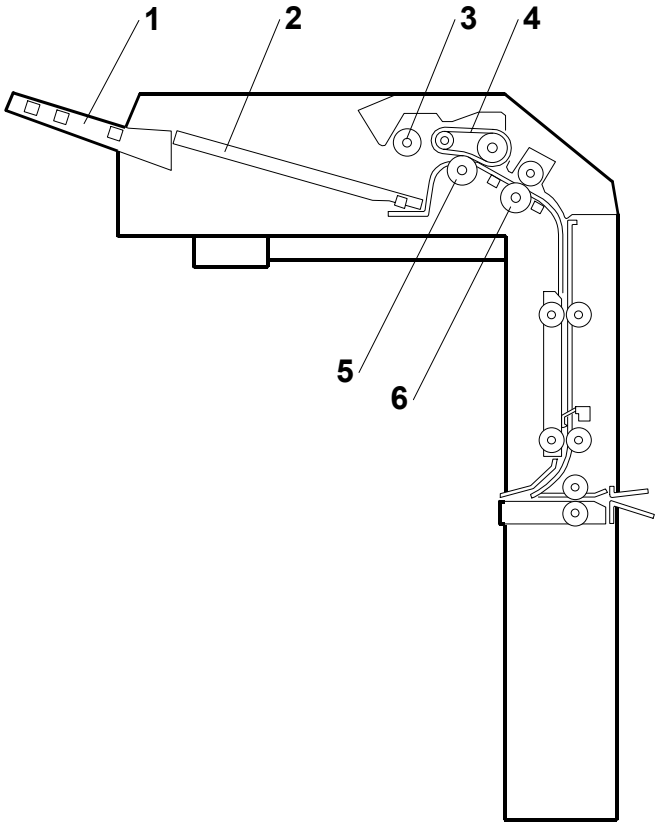
Loaded	Display (Default)	To Select for Display	Enter
11" x 17"	8 K	11" x 17"	160
8 1/2" x 11"	16 K SEF	8 1/2" x 11"	166
11" x 8 1/2"	16 K LEF	11" x 8 1/2"	38
8 1/4" x 13"	8 1/2" x 13" SEF	8 1/4" x 13"	168

B070/B071: Paper Size Detection

Some paper sizes are almost the same and cannot be distinguished by the sensors. To determine which sizes are detected, use SP 5158.

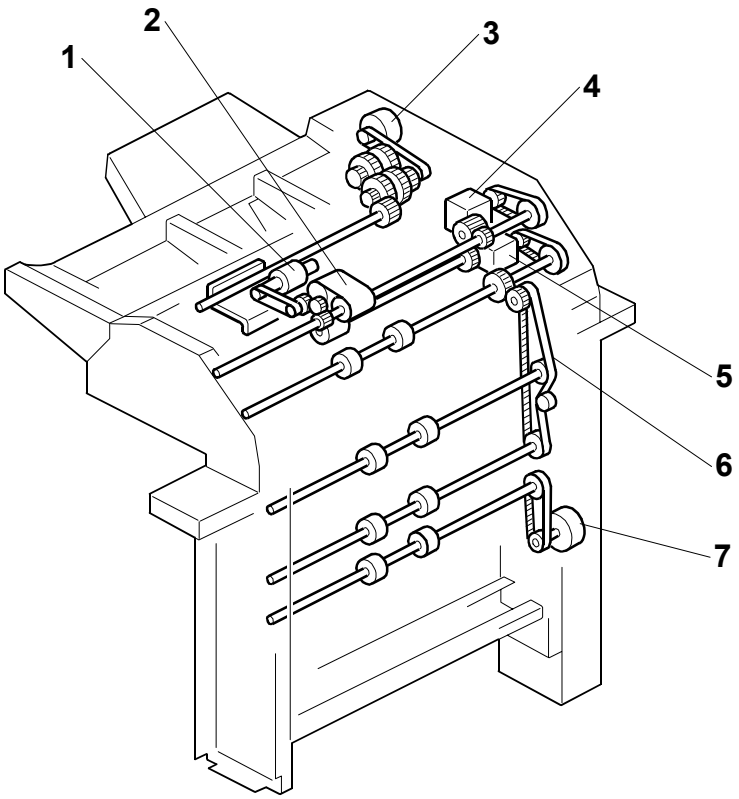
4. OVERALL MACHINE INFORMATION

4.1 MAIN LAYOUT



1. Support tray
2. Slip sheet tray
3. Pick-up roller
4. Feed belt
5. Separation roller
6. Grip roller

4.2 DRIVE LAYOUT



1. Pick-up Roller
2. Feed Belt
3. Bottom Plate Lift Motor
4. Feed Motor
5. Transport Motor
6. Timing Belt
7. Vertical Transport Motor

B512
BYPASS TRAY

BYPASS TRAY B512

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1. INSTALLATION

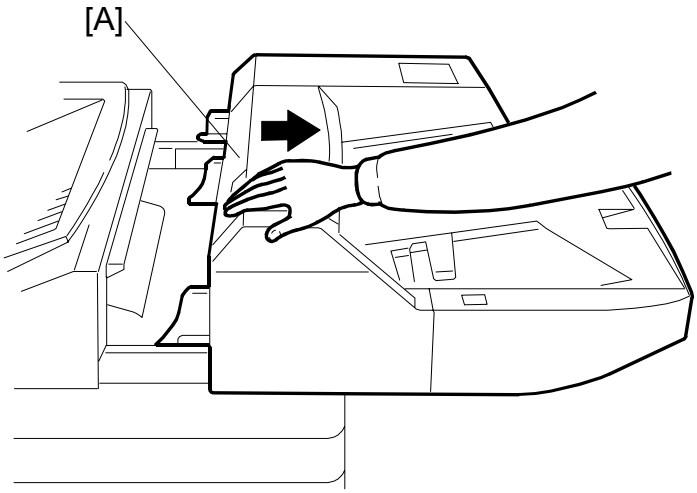
For a description of the installation procedure for the bypass tray, refer to “1. Installation” of the main machine service manual.

2. PREVENTIVE MAINTENANCE

For details about preventive maintenance for the Bypass Tray B512, please refer to Section “2. Preventive Maintenance” in the main service manual.

3. REPLACEMENT AND ADJUSTMENT

3.1 OPENING THE BYPASS TRAY

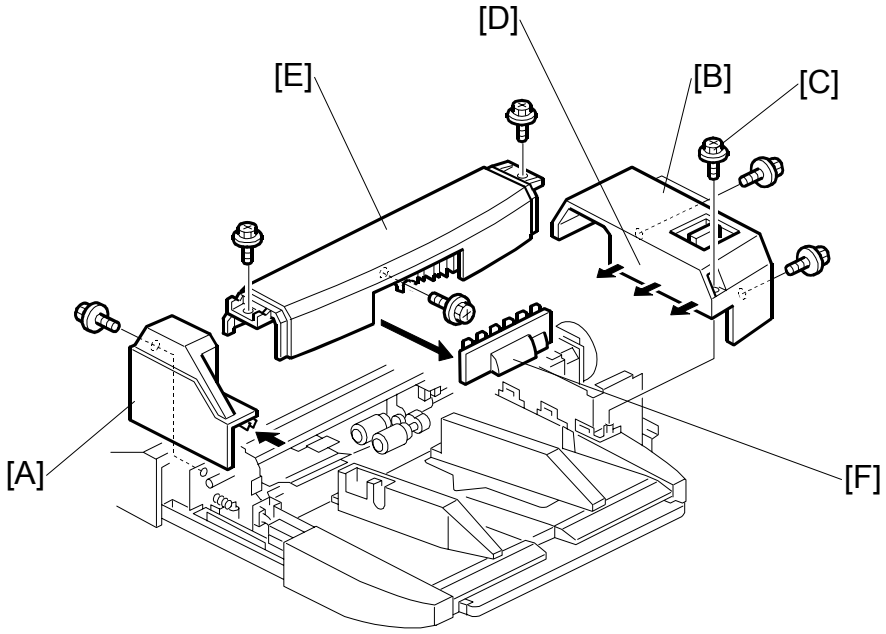


1. Pull in the direction indicated by the arrow at the front left cover.

⚠CAUTION

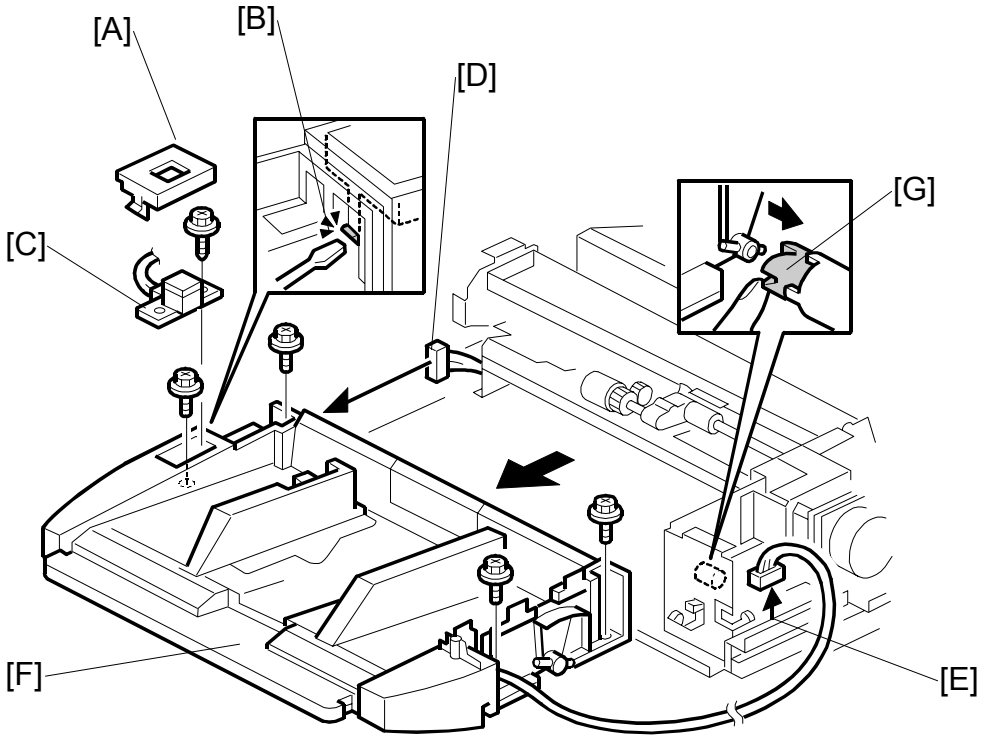
When moving the LCT with the bypass unit attached, grip and push the body of the LCT unit. To avoid damaging the bypass tray, never attempt to push or rotate the assembled units by pulling or pushing on the bypass tray.

3.2 BYPASS TRAY COVERS

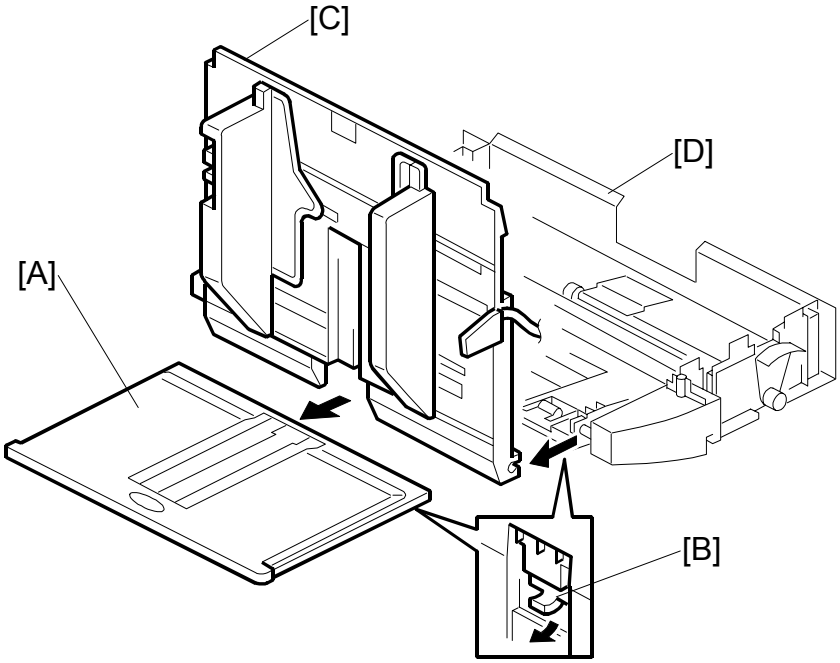


1. Open the bypass tray. (☛3.1)
2. Front cover [A] (☞ x 1).
3. Rear cover [B] (☞ x 3).
   NOTE: Screw [C] is a wide thread screw. Be sure to fasten it here when re-attaching the rear cover.
4. Push in the cover [D] to release the hooks from the slots under this side of the cover.
5. Pull off the pick-up roller cover [F].
6. Top cover [E] (☞ x 3).

3.3 TRAY LIFT SWITCH, FEED TRAY

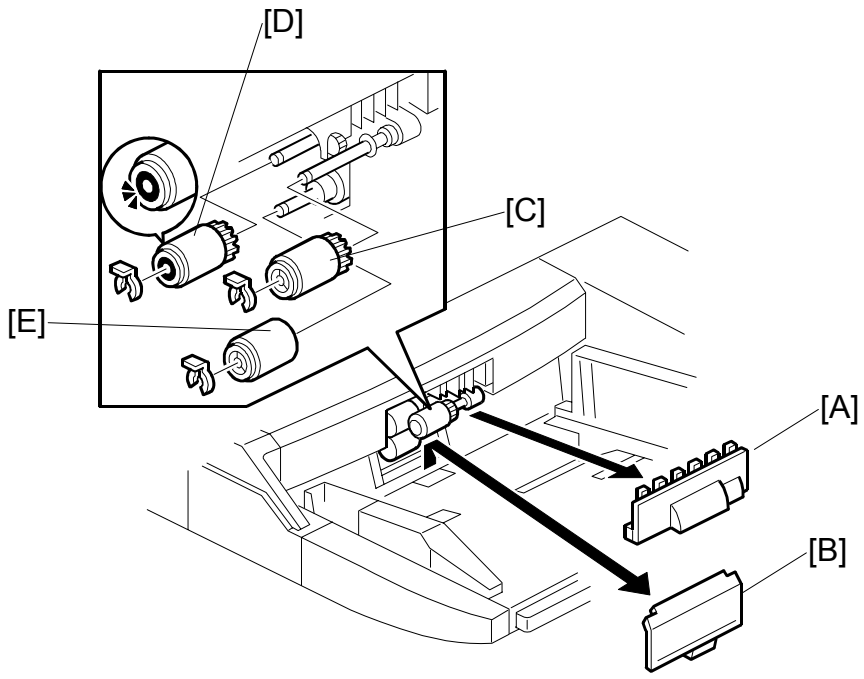


1. Open the bypass tray. (☛3.1)
2. Remove the covers. (☛3.2)
3. Remove the tray lift switch cover [A].
   NOTE: Use the tip of a screwdriver to release the hook [B] holding the plate.
4. Remove the tray lift switch [C] (☞ x 1, hooks x 2, standoff x 1, ☜ x 1).
5. Disconnect the lower limit sensor connector [D].
6. Disconnect the paper width switch [E] (☜ x 1, harness clamps x 2).
7. Remove the feed tray [F] (☞ x 4).
   NOTE: Under the tray, disengage the lift motor coupling [G]. Be sure to re-engage the coupling when re-attaching the feed tray.



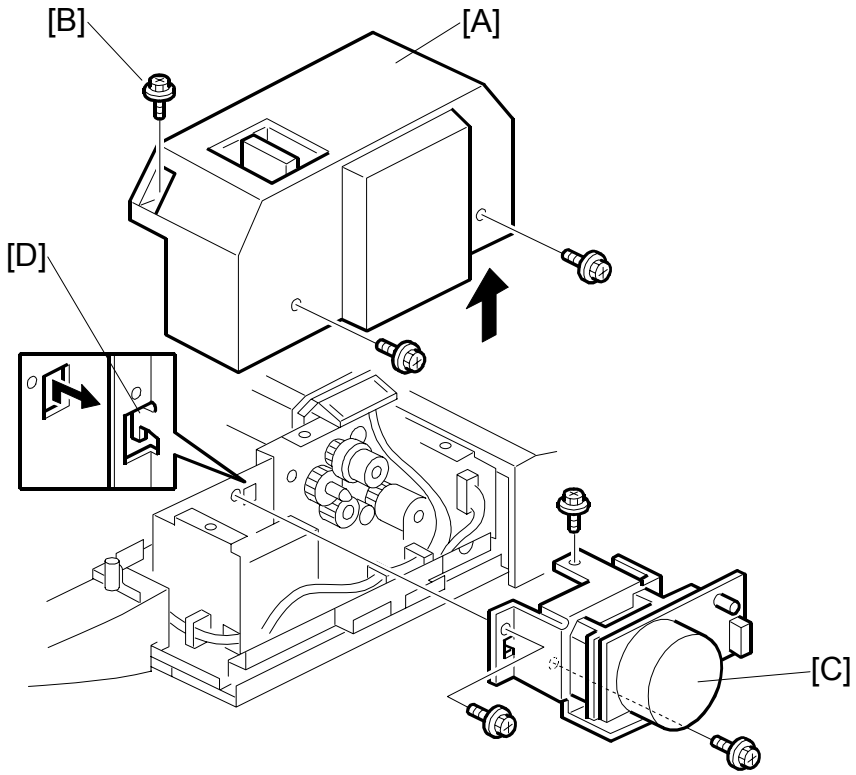
8. Pull out the extension tray [A], disengage the lock hooks [B] under the tray on both sides, then remove the extension tray.
   NOTE: The extension tray must be removed to separate the top and bottom of the bypass feed tray.
9. Separate the top [C] and bottom [D] of the feed tray.

3.4 FEED ROLLERS



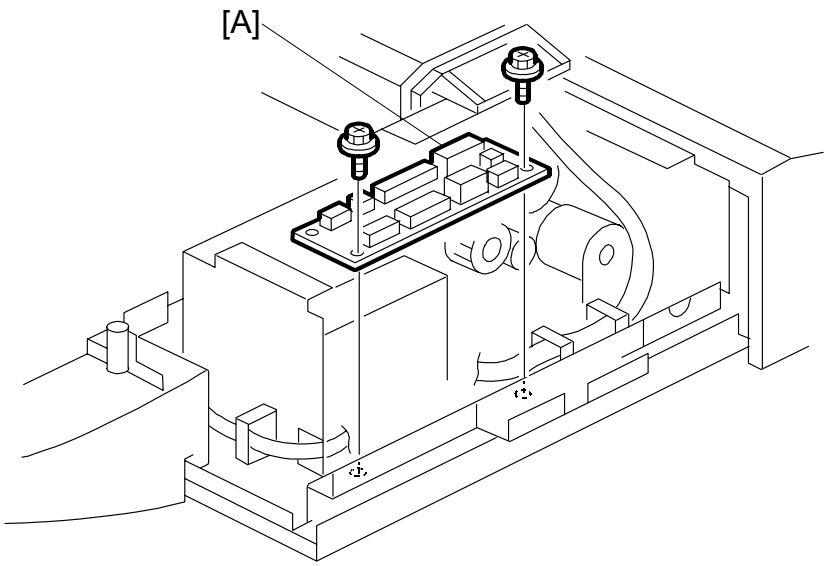
1. Pull off the pick-up roller cover [A].
2. Pull off the separation roller cover [B].
3. Remove the pick-up roller [C] (⛉ x 1).
4. Remove the feed roller [D] (⛉ x 1).
5. Remove the separation roller [E] (⛉ x 1).
   NOTE: After re-installing the feed roller, make sure that it rotates clockwise.

3.5 TRAY MOTOR



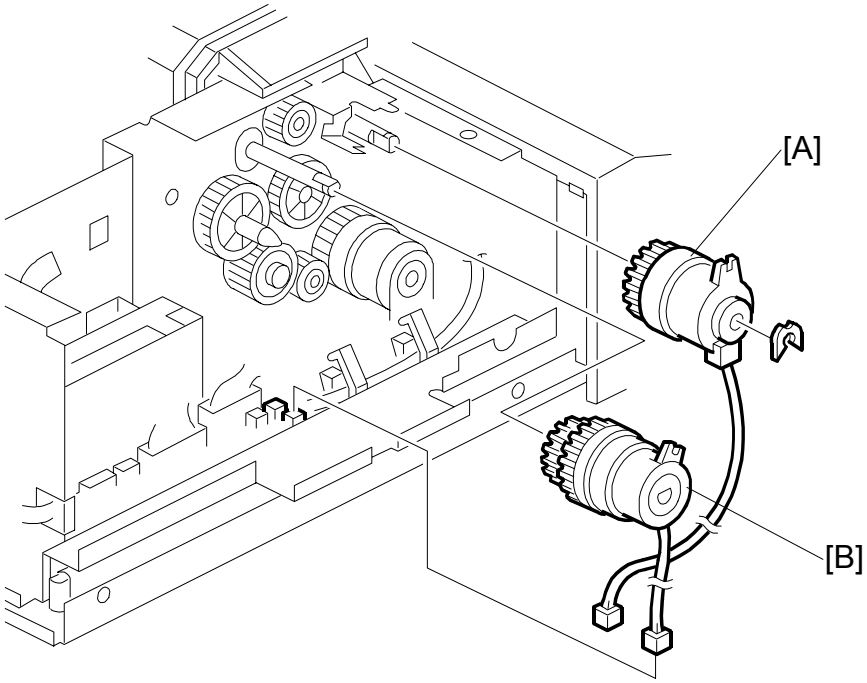
1. Remove the rear cover [A] (x 3).
   NOTE: Screw [B] is a wide thread screw. Be sure to fasten it here when re-attaching the rear cover.
2. Remove the tray motor [C] (x 3, x 1)
   NOTE: To remove the motor, raise it slightly to disengage the hook [D] from the frame.

3.6 BYPASS TRAY PCB



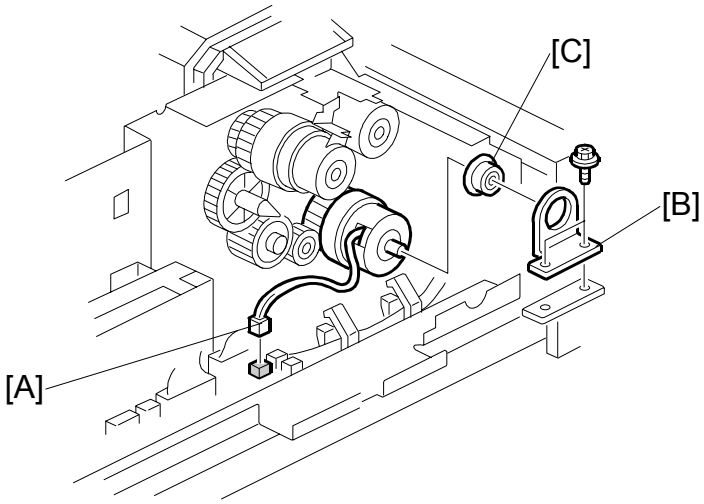
1. Remove the tray motor. (☛3.5)
2. Remove the bypass tray PCB [A] (x 11, x 2, standoffs x 2).
   NOTE: Before disconnecting CN704 and CN706, mark either connector with a marker to make sure that you re-connect them correctly. The shapes of these connectors are the same and the wires are the same color.

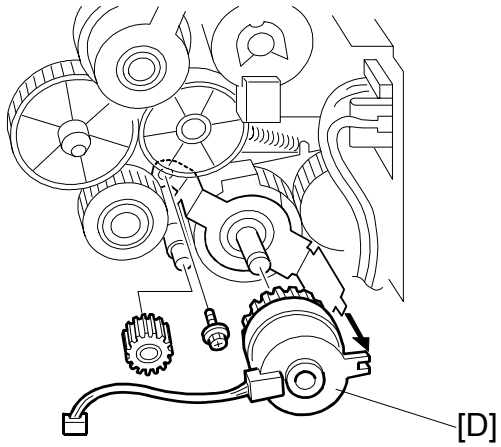
3.7 GRIP AND PAPER FEED CLUTCHES



1. Remove the tray motor. (☛3.5)
2. Remove the grip clutch [A] (☞ x 1, ⚲ x 1)
3. Release and remove the paper feed clutch [B] (☞ x 1).
   NOTE: Use the sharp point of a tool to raise the spring release on the shaft to release the clutch from the shaft.

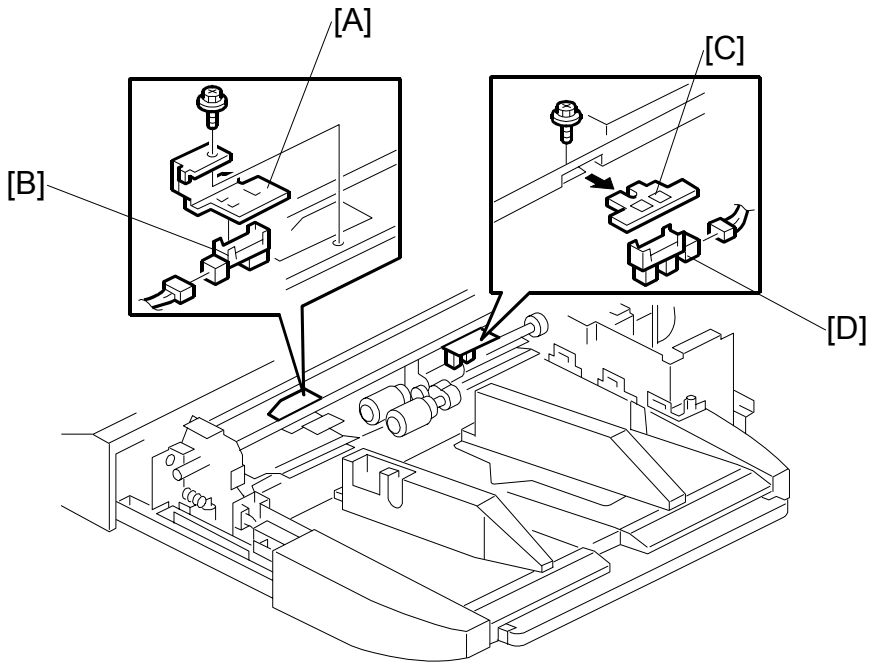
3.8 TRANSPORT CLUTCH





1. Remove the tray motor. (☛3.5)
2. Disconnect the transport clutch connector [A] (🔌 x 1).
3. Remove the bracket [B] and bushing [C] (🔩 x 2).
4. Remove the paper feed unit. (🔩 x 4)
5. Remove the transport clutch [D].

3.9 PAPER FEED AND LIFT SENSORS



Sensor Removal

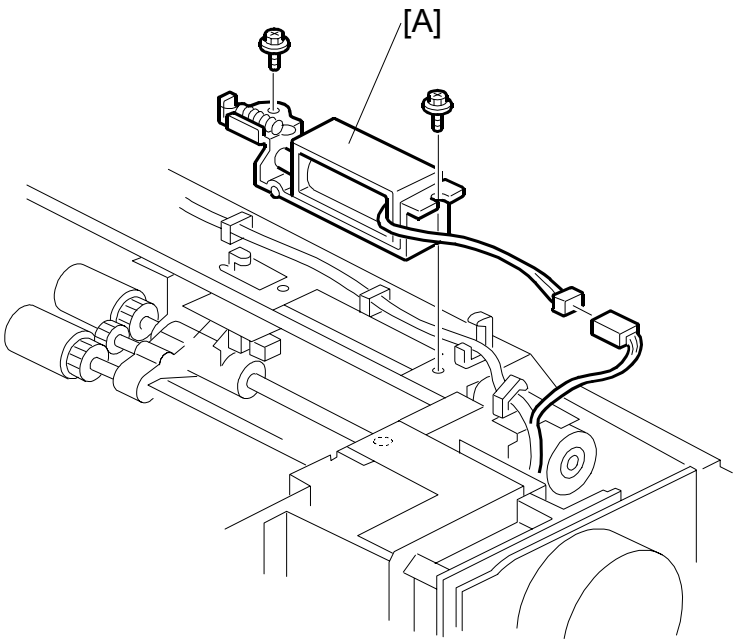
1. Remove the rear, front, and top covers. (☛3.2)
2. Remove the paper feed bracket [A] (☞ x 1).
3. Remove the paper feed sensor [B] (hooks x 4, ☞ x 1)
4. Mark the position of the lift sensor bracket [C] so you can re-attach it at its original position, then remove it (☞ x 1).
5. Remove the lift sensor [D] (hooks x 4).

Lift Sensor Position Adjustment

The lift sensor bracket [C] has a slot that allows positioning the lift sensor forward or back. When positioning the bracket for re-installation, note the following points:

1. Position the bracket at the center position at re-installation.
2. If paper does not feed, move the bracket forward and tighten the screw. Moving the bracket forward positions the pick-up roller at a lower position for paper feed.
3. If paper is multiple feeding, move the bracket back and tighten the screw. Moving the bracket back positions the pick-up roller at a higher position for paper feed.

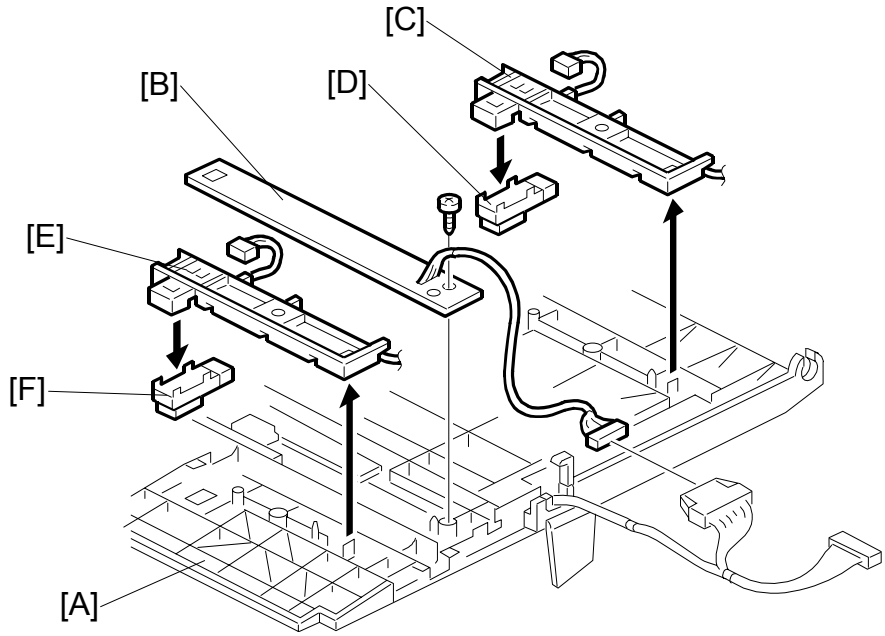
3.10 PICK-UP SOLENOID



1. Remove the rear, front, and top covers. (☛3.2)
2. Remove the pick-up solenoid [A] (x 2, x 1, harness clamp x 1)

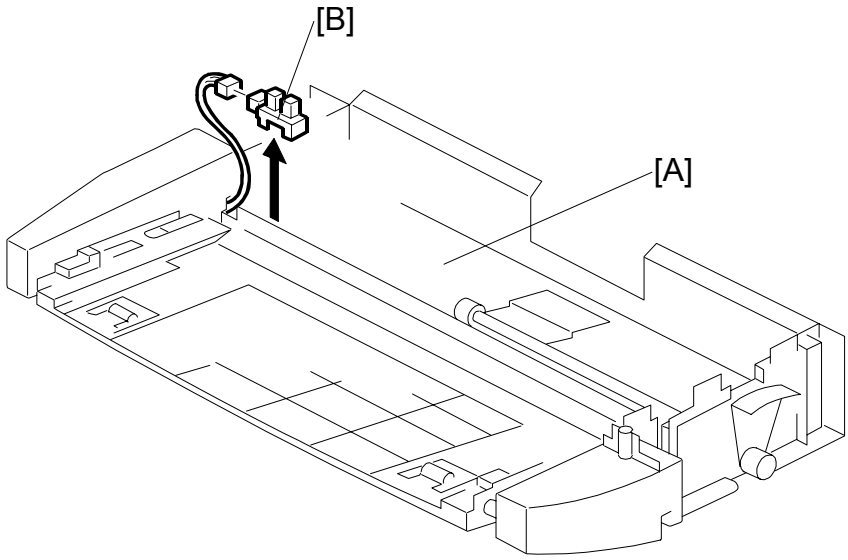
NOTE: When re-installing the solenoid, make sure that the arm of the solenoid is positioned above and in contact with the plate of the pick-up roller shaft below. To confirm correct installation, manually move the solenoid to the left and right. When the solenoid plunger is moved, the pick-up roller should move up and down smoothly.

3.11 PAPER WIDTH SWITCH, PAPER END AND PAPER LENGTH SENSORS



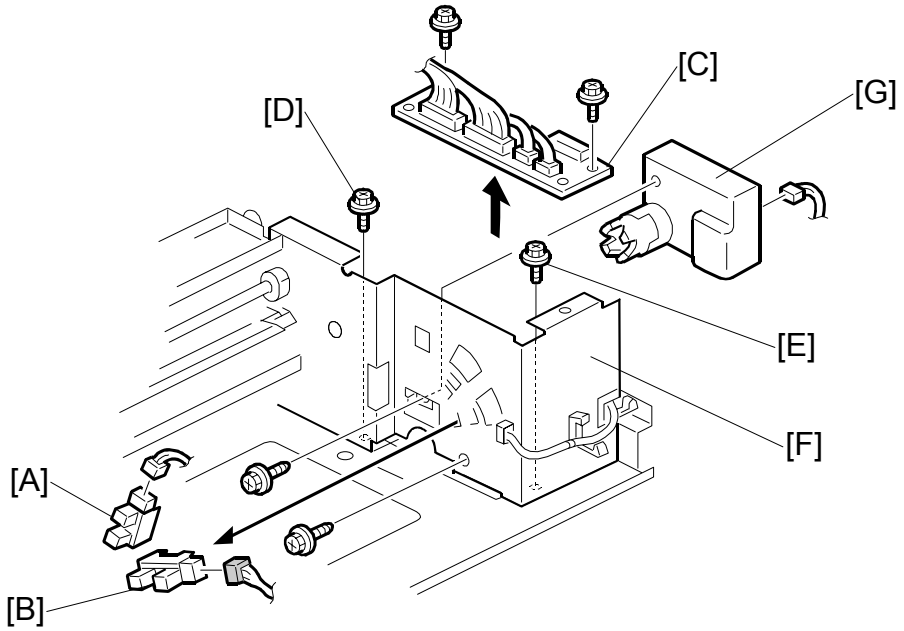
1. Remove the feed tray and separate the top and bottom. (☛3.3)
2. Turn over the top half of the feed tray [A] then lay it on a flat surface.
3. Paper width switch [B] (☞ x 1, harness clamp x 1, ☜ x 1).
4. Paper end sensor bracket [C] (tab lock x 1).
5. Paper end sensor [D] (hooks x 4, ☜ x 1).
6. Paper length sensor bracket [E] (tab lock x 1).
7. Paper length sensor [F] (hooks x 4, ☜ x 1).

3.12 LOWER LIMIT SENSOR



1. Remove the feed tray and separate the top and bottom. (☛3.3)
2. Lay the bottom of the feed tray [A] on a flat surface.
3. Remove the lower limit sensor [B] (☞ x 1, hooks x 4)

3.13 PAPER HEIGHT SENSORS, LIFT MOTOR



1. Open the bypass tray. (☛3.1)
2. Remove the bypass tray covers. (☛3.2)
3. Remove the tray motor. (☛3.5)
4. Remove the feed tray. (☛3.3)

Paper Height Sensors

1. Paper Height Sensor 1 [A] (hooks x 4, x 1)
2. Paper Height Sensor 2 [B] (hooks x 4, x 1)

Lift Motor

1. Remove the bypass tray PCB [C] (x 11, x 2, standoffs x 2).
   NOTE: Before disconnecting CN704 and CN706, mark either connector with a marker to make sure that you re-connect them correctly. The shapes of these connectors are the same and the wires are the same color.
2. Remove screws [D] and [E] to loosen the frame [F].
3. Raise the loosened frame slightly to remove the lift motor [G] (x 2, x 1).

4. TROUBLESHOOTING

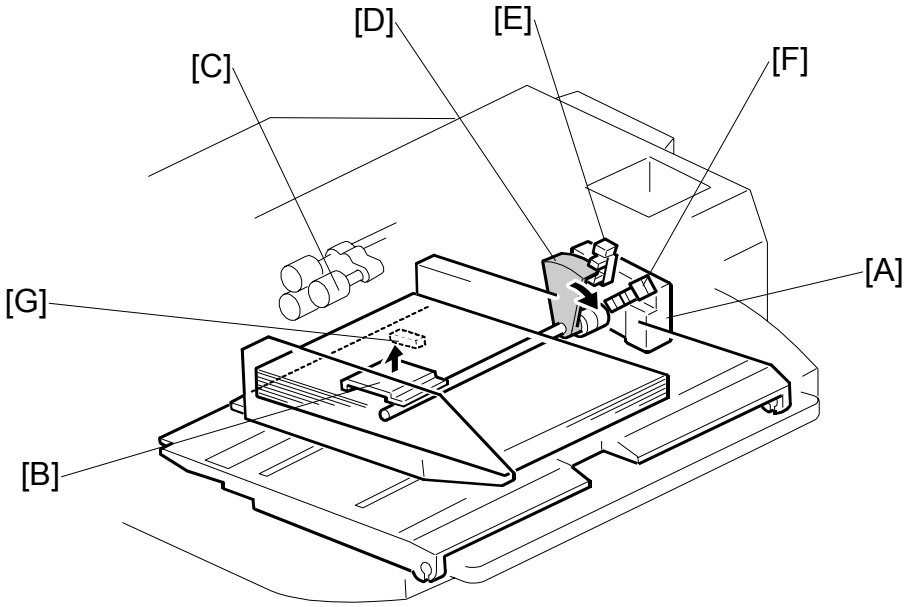
For details about bypass tray related SC codes, please refer to “4. Troubleshooting” in the main machine service manual.

5. SERVICE TABLES

For details about bypass tray-related SP codes, please refer to “5. Service Tables” in the main machine service manual.

6. DETAILS

6.1 TRAY LIFT



When the tray lift switch is pressed, the lift motor [A] switches on and pushes the lift plate [B] against the bottom of the feed tray until the top of the stack is at the correct feed position.

NOTE: If there is paper in the bypass tray when the main machine has just been switched on, the lift motor will turn on and lift the stack to the feed position.

As paper is fed, the pick-up roller [C] lowers until it activates the lift sensor which switches on the lift motor again to raise the stack to the feed level again. (☛6.2)

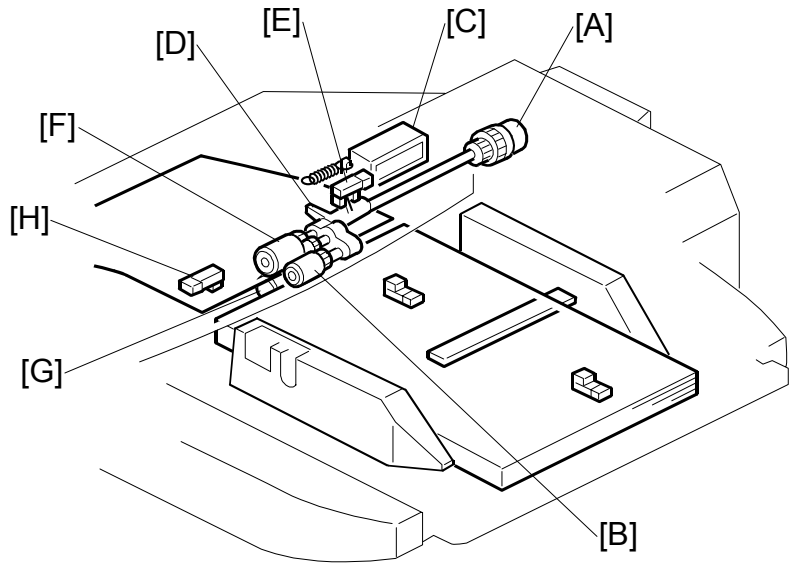
As the bottom plate shaft rotates and raises the bottom plate, the actuator [D] lowers and activates paper height sensor 1 [E] and then paper height sensor 2 [F] as the bottom plate continues to rise. With the tray full, the actuator remains upright and deactivates neither paper height sensor. During continuous feed, the actuator rotates downward through three positions, deactivating the first sensor, then both sensors, then only the second sensor. These states are used to report the amount of paper on the operation panel.

SN1	SN2	Paper Remaining Status
OFF	OFF	100% (Full)
ON	OFF	90%
ON	ON	50%
OFF	ON	25%

After the last sheet feeds, the paper end sensor [G] below the feed tray detects that the tray is empty.

NOTE: When you re-load the tray with paper, be sure to press the tray lift button to raise the bottom of the tray so the stack is at the correct feed position.

6.2 PAPER FEED



The bypass tray can hold 500 sheets of standard weight paper.

The bypass tray uses the standard FRR (Feed and Reverse Roller) feed system with a pick-up roller, feed roller, and separation (reverse) roller. ☛CT Handling Paper> Paper Feed Methods> **Forward and Reverse Roller (FRR)**

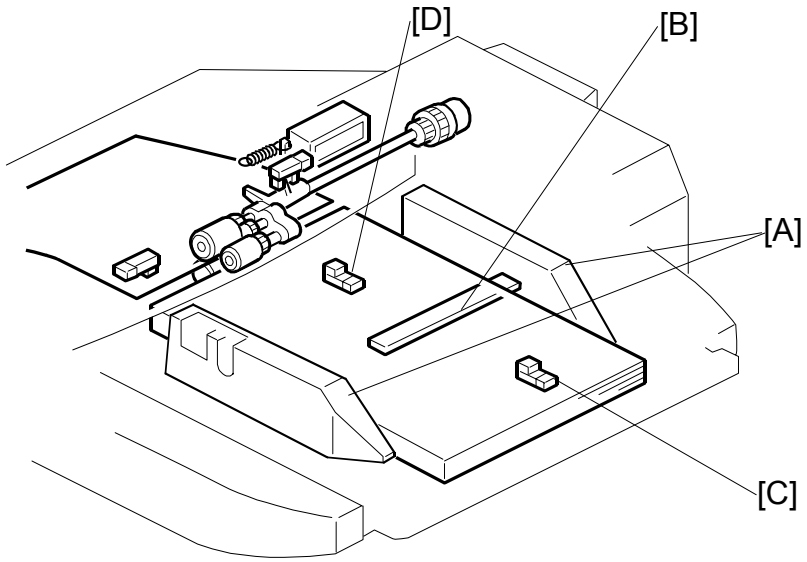
When the job starts, the feed clutch [A] switches on and rotates the pick-up roller [B]. At the same time, the pick-up solenoid [C] switches on and lowers the pick-up roller. The lift motor switches on to raise the stack until the top of the stack reaches the correct feed level and the paper pushes the pick-up roller and actuator [D] down, deactivating the lift sensor [E], which stops the lift motor.

The rotating pick-up roller picks up and feeds the first sheet to the feed roller [F] and separation roller [G]. When the feed sensor [H] detects the leading edge of the sheet, the pick-up solenoid raises the pick-up roller and the feed roller feeds the sheet.

NOTE: Unlike the separation rollers in the LCT, the separation roller [G] always remains in contact with the feed roller above.

When the pick-up roller [B] lowers far enough to deactivate the lift sensor [E], the lift motor switches on to raise the bottom plate until the actuator moves out of the slot of the lift sensor again and switches off the lift motor. This movement is repeated to maintain the correct height of the stack for paper feed.

6.3 PAPER SIZE DETECTION



The side fences [A] can be adjusted to standard and non-standard paper sizes.

Paper size is measured with the paper width switch [B] and the paper length sensor [C].

When the side fences are moved to match the paper width, four feelers inside the paper width switch [B] slide along the wiring patterns on the paper width switch terminal plate. The status of each feeler is read to determine whether it is High (in contact with a pattern wire) or Low (not in contact with a wire).

The paper length sensor [C] reading (ON or OFF) is used with the paper width reading to determine the paper size. For more details about how the paper size is determined, see the paper size detection table on the next page.

The paper end sensor [D] de-activates when the last sheet is fed, reports that the paper tray is empty, and halts the job.

Paper Size Detection Table

Paper Size			Paper Size SN				Length Sensor	Area	
			1	2	3	4		NA	Europe /Asia
A3	SEF	297 x 420 mm	H	H	H	L	L	●	●
A4	LEF	297 x 210 mm					H	●	●
DLT	SEF	11" x 17"	H	H	L	L	L	●	●
LT	LEF	11" x 8 1/2"					H	●	●
B4	SEF	257 x 364 mm	H	H	L	H	L	●	●
B5	LEF	257 x 182 mm					H	●	●
A4	SEF	210 x 297 mm	H	L	L	H	L	❍	●
LT	SEF	8 1/2" x 11"						●	❍
A5	LEF	210 x 148 mm					H	❍	●
HLT	LEF	8 1/2" x 5 1/2"						●	❍
B5	SEF	182 x 257 mm	H	L	H	H	L	❍	❍
F	SEF	8" x 13"						●	●
A5	SEF	148 x 210 mm	L	L	H	H	H	●	●
HLT	SEF	5 1/2 " x 8 1/2 "	L	H	H	H	H	●	●

Table Key

1, 2, 3, 4	The paper size switch consists of 4 feelers that slide along the wiring patterns of the paper width switch terminal plate when the side fences are manually adjusted to fit the size of the paper loaded in the tray. The H, L status of each feeler is determined by whether the feeler is in contact with the wire of a pattern.
H	High (5 V) (Inactive)
L	Low (0 V) (Active)
●	The machine determines the paper size automatically by reading the output of the paper size switch and the paper length sensor.
❍	The machine cannot detect the paper size automatically. The user must select the paper size manually before starting the job. See below.

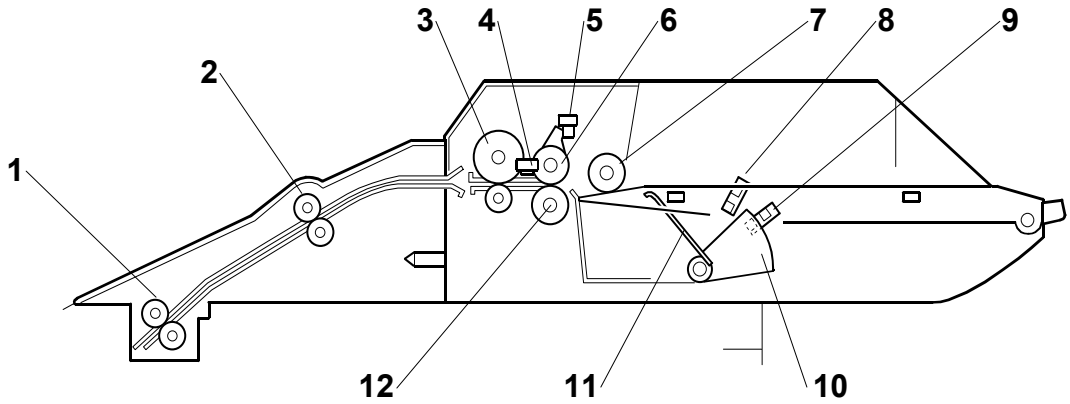
Selecting the Paper Size for Undetectable Sizes

Press the Tray Paper Settings button on the operation panel to select paper sizes that are not detected automatically by the combination of paper size and paper length sensor readings (marked "❍" in the table above and any other paper size not listed that requires pulling out the paper tray extension).

NOTE: Mixed paper sizes cannot be loaded into the bypass tray. Loading paper of different sizes will cause a paper jam.

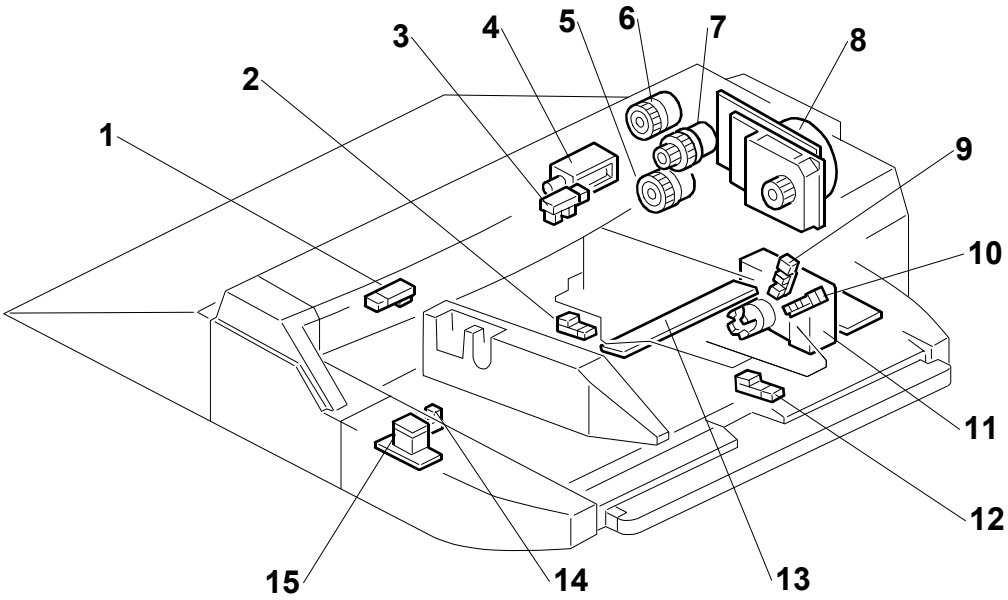
7. OVERALL MACHINE INFORMATION

7.1 MECHANICAL COMPONENT LAYOUT



1. Transport Roller 2
2. Transport Roller 1
3. Grip Roller
4. Paper Feed Sensor
5. Lift Sensor
6. Feed Roller
7. Pick-up Roller
8. Paper Height Sensor 1
9. Paper Height Sensor 2
10. Lift Plate Actuator
11. Lift Plate
12. Separation Roller

7.2 ELECTRICAL COMPONENT LAYOUT



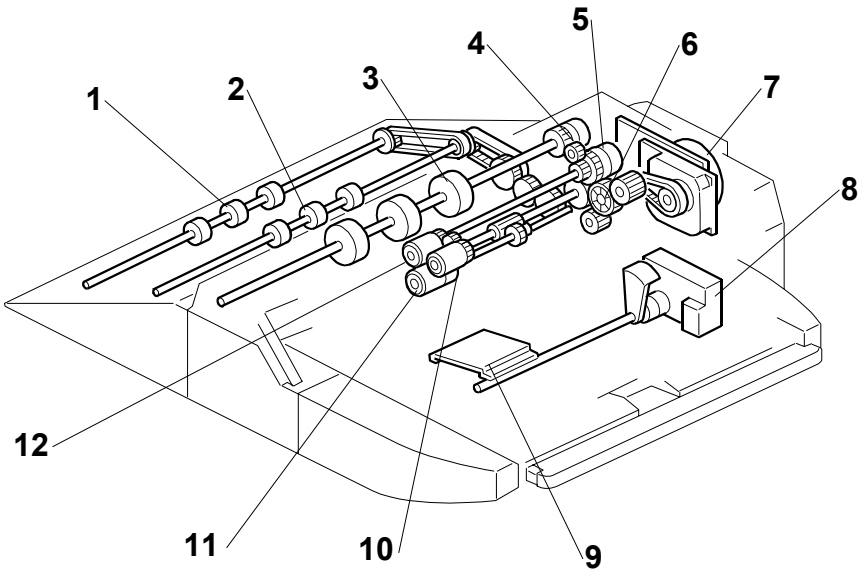
1. Paper Feed Sensor
2. Paper End Sensor
3. Lift Sensor
4. Pick-up Solenoid
5. Transport Clutch
6. Grip Clutch
7. Feed Clutch
8. Tray Motor
9. Paper Height Sensor 1
10. Paper Height Sensor 2
11. Lift Motor
12. Paper Length Sensor
13. Paper Width Switch
14. Lower Limit Sensor
15. Tray Lift Switch

7.2.1 ELECTRICAL COMPONENT DESCRIPTIONS

Symbol	Name	Function
Clutches		
MC8	Transport	Drives the transport rollers in the bypass tray.
MC9	Paper Feed	Drives the paper feed roller in the bypass tray.
MC10	Grip	Drives the grip clutch in the bypass tray.
Motors		
M5	Tray	Drives all rollers in the bypass tray.
M6	Tray Lift	Lifts and lowers the tray.
Sensors		
S23	Paper Feed	Detects the copy paper coming to the paper feed roller and checks for misfeeds.
S24	Lift	Detects when the paper in the bypass tray is at the correct paper feed height.
S25	Lower Limit	Detects when the tray is at its lowest possible position.
S26	Paper End	Informs the copier when the paper in the bypass tray has run out.
S27	Paper Length	Used with the paper width switch to determine paper size. This sensor is activated when paper is set for short edge feed. For example, when the paper width switch detects A4 width and this sensor is off, the machine determines A4 is set for long edge feed. When A4 width is detected and the paper length sensor is on, then the machine determines that A3 is loaded for short edge feed.
S28	Paper Height 1	Detects the paper height in the bypass tray.
S29	Paper Height 2	Detects the paper height in the bypass tray.
Solenoids		
SOL7	Pick-up	Controls up-down movement of the pick-up roller in the bypass tray.
Switches		
SW5	Tray Lift	Switches the tray lift motor on and off to lift and lower the bottom plate of the tray. This switch must be pressed to start paper feed.
SW6	Paper Width	A slide switch connected to the side fences. When the side fences are moved to match the paper width, four feelers inside the paper size switch slide along wiring patterns of a terminal plate. The wire pattern detected determines the paper width.

The numbering for the components does not start at 1 because the point-to-point diagram for the bypass tray is included on the diagram for the LCT. For the purpose of component numbering, they are considered together as one unit.

7.3 DRIVE LAYOUT



1. Transport Roller 2
2. Transport Roller 1
3. Grip Roller
4. Grip Clutch
5. Paper Feed Clutch
6. Transport Clutch
7. Tray Motor
8. Lift Motor
9. Lift Plate
10. Pick-up Roller
11. Separation Roller
12. Feed Roller

B580
Printer/Scanner Unit

B581
IEEE1394 Board

B596
USB

B582
IEEE802.11B (Wireless LAN)

B609
Media Link Board

MISC. BOARDS
B580/B581/B596/B582/B609
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1. CONTROLLER BOARD SPECIFICATIONS

CPU:	AMD 800 MHz
BIOS ROM:	1 MB (512 K x 2)
OS Copy Flash ROM:	16 MB
NVRAM:	128 KB
SDRAM:	128 MB
DDR-SDRAM:	Slot #1 (Standard): BASIC 128 MB Slot #2 (Option): 256 MB
PCI Option:	4 Slots (B1 to B4)
SD Card:	3 Slots (C1 to C3)
RAPI Option:	2 Slots (A1, A2)
Power Supply Voltage:	DC 5VE ± 3% DC 12VE ± 5%

2. ETHERNET BOARD (B580/B594)

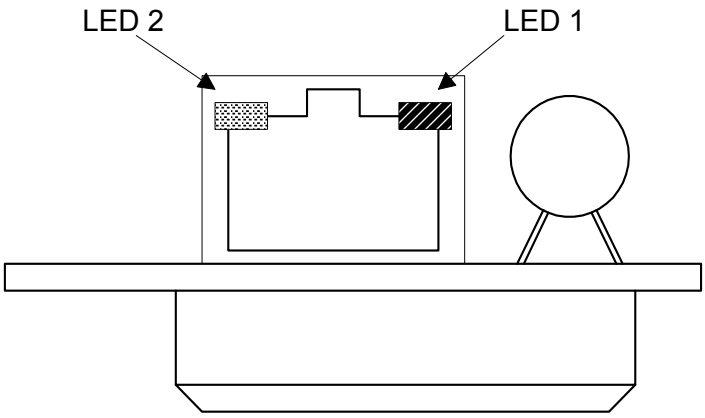
The Ethernet board is provided as a standard feature of this machine.

Function Blocks	Description
PHY (Physical Layer Device)	Completely standardized physical layer device for the functions of each device in the network.
EEPROM	Stores the MAC address.

The physical layer device, the lowest layer of the OSI reference model, refers to the physical components of the network: cables, connectors, and so on. OSI, the *Operating Standard Interface*, is a framework upon which networking standards are arranged. It is commonly diagramed as a layered cake.

2.1 ETHERNET BOARD OPERATION

The NIB is a standard IEEE802.3u type which implements 10/100Mbps auto negotiation. System initialization sets the network for 10Mbps/100Mbps.



LED 1 (Green)	Indicates the link status: ON Link Safe OFF Link Fail
LED 2 (Orange)	Indicates the operation mode: ON 100 Mbps mode OFF 10 Mbps mode

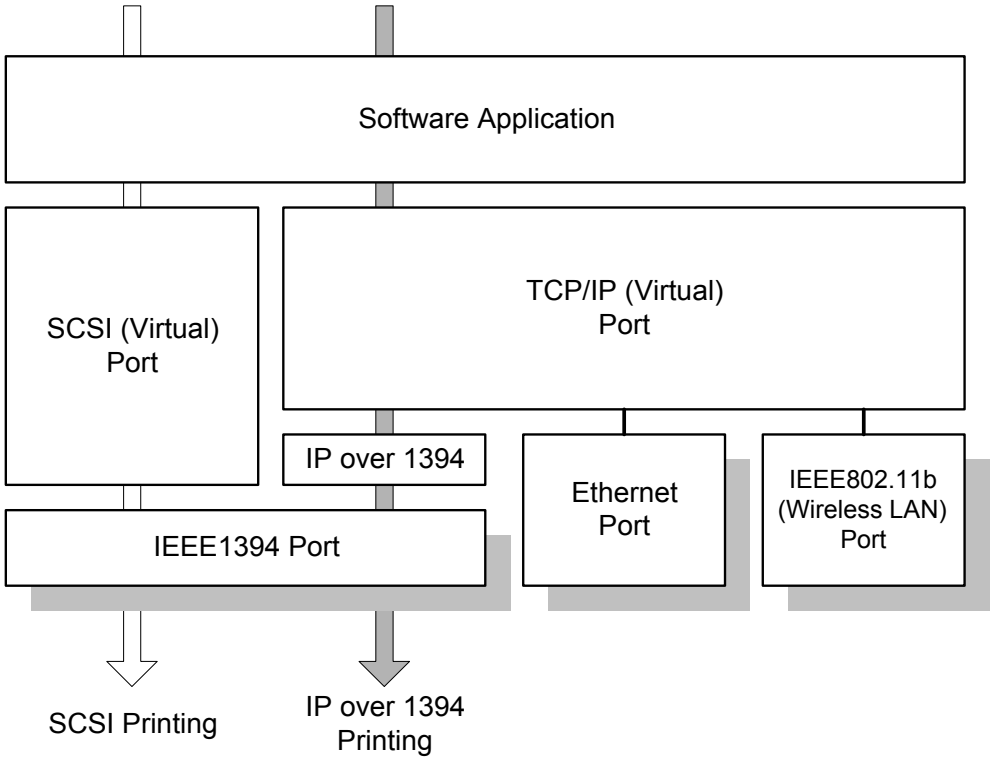
3. IEEE1394 BOARD (FIREWIRE) (B581)

3.1 OVERVIEW

An IEEE1394 interface board is available as an option for this machine to provide high speed connectivity through what is commonly called Firewire or i.LINK (Sony). Some important advantages of Firewire are:

- High speed data transmission at 400 Mbps.
- Easier connectivity (many devices can be connected without a host).
- Devices in a computer can be connected to external devices on a shared bus.

IEEE1394 supports two printing methods: 1) SCSI Print, and 2) IP Over 1394. IP Over 1394 supports printing by setting an IP address, and SCSI supports printing without an IP address.



NOTE: 1) Windows Me and Windows XP support IP over 1394.
2) Windows XP and 2000 support IEEE1394 SCSI printing.

When the host computer powers up, it queries all the devices connected to the bus and assigns each one an address, a process called enumeration. Here are some general features of Firewire:

- Firewire is Plug-and-Play.
- Firewire devices are hot pluggable (they can be plugged while the system is operating).
- Firewire uses 64-bit fixed addressing, based on the IEEE 1212 standard. There are three parts to each packet of information sent by a device over FireWire:
  - 10-bit Bus ID. Used to determine the Firewire bus where the data came from.
  - 6-bit Physical ID. Used to identify the device that sent the data.
  - 48-bit Storage Area. Capable of addressing 256 terabytes of information for each node
- The Bus ID and Physical ID comprise the 16-bit Node ID. 64,000 nodes are allowed on each system.
- Up to 16 hops are allowed (4.5 m/hop) for a total of 72 meters devices are daisy-chained.
- Firewire allows its devices to draw power from the Firewire connection. Two power connectors in the cable can supply power (8 to 40 V, 1.5 amp max.)
- An important element of Firewire is its support of isochronous devices. When isochronous devices are in the isochronous mode, data streams between the device and the host in real time with guaranteed bandwidth and no error correction. Essentially, this means that a device like a digital camcorder can request that the host computer allocate enough bandwidth for the camcorder to send uncompressed video in real time to the computer. The camera can sent data via the Firewire connection in a steady flow to the computer without anything disrupting the process. This is one of the main reasons why 1394 has been widely adopted by the consumer electronics industry.

4. USB (B596)

4.1 SPECIFICATIONS

USB connectivity is provided as an option for this machine.

Interface	USB 1.1, USB 2.0
Data rates	480 Mbps (high speed), 12 Mbps (full speed), 1.5 Mbps (low speed)
	High speed mode is only supported by USB 2.0.

4.2 USB 1.1/2.0

USB (Universal Serial Bus) offers simple connectivity for computers, printers, keyboards, and other peripherals. In a USB environment, terminators, device IDs (like SCSI), and DIP switch settings are not necessary.

USB 1.1 provides the following features:

- Plug & Play. As soon as a new device is connected via USB, the operating system recognizes it, and the appropriate driver is installed for it automatically if the driver is available. If the driver is not available, a message prompts the user for the driver disk for immediate installation.
- Hot swapping (cables can be connected and disconnected while the computer and other devices are switched on)
- No terminator or device ID required
- Data rates of 12 Mbps (full speed), and 1.5 Mbps (low speed)
- Common connectors for different devices
- Bi-directional data communication between device and host computer via a 4-byte header and DEVICE ID.

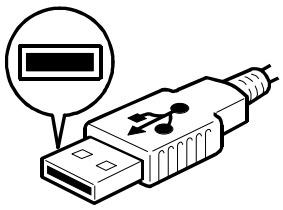
USB 2.0 is an evolution of the USB 1.1 specification. It uses the same cables, connectors, and software interfaces so the user will see no change. It provides an easy-to-use connection to a wide range of products with a maximum data rate of 480Mbps (high speed).

Up to 127 devices can be connected and 6 cascade connections are allowed. Power is supplied from the computer and the maximum cable length is 5 m.

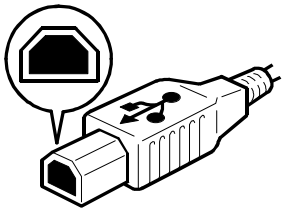
4.3 USB CONNECTORS

USB is a serial protocol and a physical link, which transmits all data on a single pair of wires. Another pair provides power to downstream peripherals. The USB standard specifies two types of connectors, type “A” connectors for upstream connection to the host system, and type “B” connectors for downstream connection to the USB device.

Type “A” connector



Type “A” connector



4.4 REMARKS ABOUT USB

- The machine does not print reports specifically for USB.
- Only one host computer is allowed for the USB connection.
- After starting a job using USB, do not switch the printer off until the job has been completed. When a user cancels a print job, if data transmitted to the printer has not been printed at the time of cancellation, the job will continue to print up to the page where the print job was cancelled
- When the controller board is replaced, the host computer will recognize the machine as a different device.

4.4.1 RELATED SP MODE

“USB Settings” in the printer engine service mode. Data rates can be adjusted to full speed fixed (12 Mbps). This switch may be used for troubleshooting if there is a data transfer error using the high speed mode (480Mbps).

Data rates can also be adjusted using the UP mode “USB Setting” in the Host Interface in the System menu. This mode can be accessed only when the “Enter”, “Escape”, then “Menu” keys are pressed to enter the UP mode.

5. IEEE802.11B (WIRELESS LAN) (B582)

5.1 WIRELESS LAN SPECIFICATIONS

The IEEE 802.11b wireless LAN interface card is available as an option for this machine.

A wireless LAN is a flexible data communication system used to extend or replace a wired LAN. Wireless LAN employs radio frequency technology to transmit and receive data over the air and minimize the need for wired connections.

- With wireless LANs, users can access information on a network without looking for a place to plug into the network.
- Network managers can set up or expand networks without installing or moving wires.
- Most wireless LANs can be integrated into existing wired networks. Once installed, the network treats wireless nodes like any other physically wired network component.
- Flexibility and mobility make wireless LANs both effective extensions of and attractive alternatives to wired networks.

Standard applied:	IEEE802.11b	
Data transmission rates:	Speed	Distance
	11 Mbps	140 m (153 yd.)
	5.5 Mbps	200 m (219 yd.)
	2 Mbps	270 m (295 yd.)
	1 Mbps	400 m (437 yd.)
Network protocols:	TCP/IP, Apple Talk, NetBEUI, IPX/SPX	
Bandwidth:	2.4GHz (divided over 14 channels, 2400 to 2497 MHz for each channel)	

NOTE: The wireless LAN cannot be active at the same time as the Ethernet LAN. The following user tool setting determines which LAN is active: System Settings – Interface Settings – Network - LAN Type.

LED Indicators

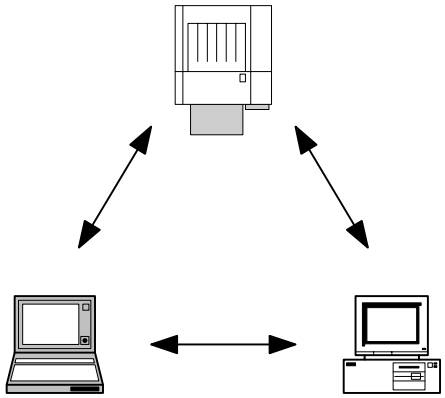
LED	Description	On	Off
LED1 (Green)	Link status	Link success	Link failure
LED2 (Orange)	Power distribution	Power on	Power off

5.2 WIRELESS LAN TRANSMISSION MODES

Wireless communication has two modes: 1) ad hoc mode, and 2) infrastructure mode.

5.2.1 AD HOC MODE

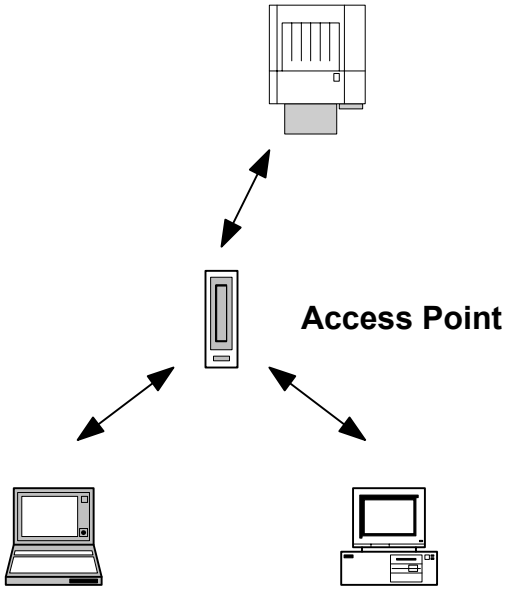
The ad hoc mode allows communication between each device (station) in a simple peer-to-peer network. In this mode, all devices must use the same channel to communicate. In this machine, the default transmission mode is ad hoc mode and the default channel is 11. First, set up the machine in ad hoc mode and program the necessary settings, even if the machine will be used in the infrastructure mode.



To switch between ad hoc and infrastructure modes, use the following user tool: Host Interface Menu - IEEE802.11b - Comm Mode

5.2.2 INFRASTRUCTURE MODE

The infrastructure mode allows communication between each computer and the printer via an access point equipped with an antenna and wired into the network. This arrangement is used in more complex topologies. The wireless LAN client must use the same SSID (Service Set ID) as the access point in order to communicate.



5.3 WIRELESS LAN SECURITY FEATURES

SSID (Service Set ID)
The SSID is used by the access point to recognize the client and allow access to the network. Only clients that share the same SSID with the access point can access the network.

NOTE: 1) If the SSID is not set, clients connect to the nearest access point.
2) The SSID can be set using the web status monitor or telnet.

5.3.1 USING THE SSID IN AD HOC MODE

When the SSID is used in ad hoc mode and nothing is set, the machine automatically uses “ASSID” as the SSID. In such a case, “ASSID” must also be set at the client.

NOTE: SSID in ad hoc mode is sometimes called “Network Name.”

Some devices automatically change from ad hoc mode to infrastructure mode when the same SSID is used in ad hoc mode and infrastructure mode. In such a case, to use the device in ad hoc mode, use a specified SSID in infrastructure mode and use “ASSID” in the ad hoc mode.

WEP (Wired Equivalent Privacy)
WEP is a coding system designed to protect wireless data transmission. In order to unlock encoded data, the same WEP key is required on the receiving side. There are 64 bit and 128 bit WEP keys. However, this machine supports only 64 bit WEP.

NOTE: The WEP key can be set using the Web Status Monitor or Telnet.

MAC Address
When the infrastructure mode is used, access to the network can also be limited at the access points using the MAC address. This setting may not be available with some types of access points.

5.4 WIRELESS LAN TROUBLESHOOTING NOTES

Communication Status

Wireless LAN communication status can be checked with the UP mode “W.LAN Signal” in the Maintenance menu. This can also be checked using the Web Status Monitor or Telnet.
The status is described on a simple number scale.

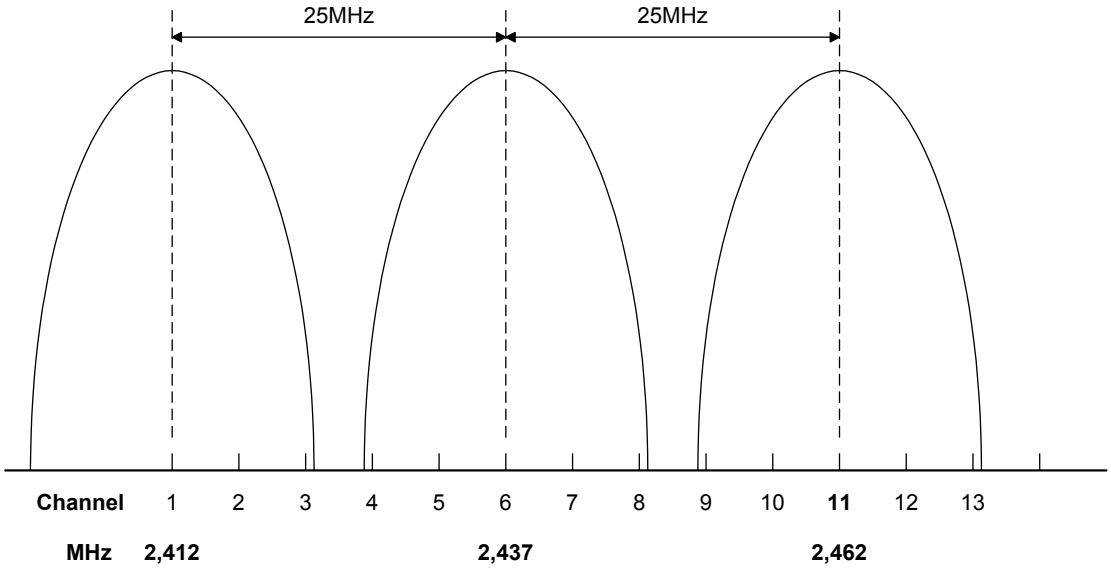
Status Display	Communication Status
Good	76 ~ 100
Fair	41 ~ 75
Poor	21 ~ 40
Unavailable	0 ~ 20

NOTE: Communication status can be measured only when the infrastructure mode is being used.

5.4.2 CHANNEL SETTINGS

If a communication error occurs because of electrical noise, interference with other electrical devices, etc., you may have to change the channel settings.

To avoid interference with neighboring channels, it is recommended to change by 3 channels. For example, if there are problems using channel 11 (default), try using channel 8.



5.4.3 TROUBLESHOOTING PROCEDURE

If there are problems using the wireless LAN, check the following.

1) Check the LED indicator on the wireless LAN card.
2) Check if “IEEE802.11b” is selected in the following user tool:
   System Setting> Interface Setting> IEEE 801.11b

NOTE: The “IEEE 801.11b tab is available only after the IEEE 801.11b card has been installed.

3) Check if the channel settings are correct.
4) Check if the SSID and WEP are correctly set.

If infrastructure mode is being used,

1) Check if the MAC address is properly set.
2) Check the communication status.
   If the communication status is poor, bring the machine closer to the access point, or check for any obstructions between the machine and the access point.
   If the problem cannot be solved, try changing the channel setting.

5.5 IEEE 802.11B SPECIFICATIONS

Standard applied	IEEE802.11b	
Data transmission rates	Speed	Distance
	11 Mbps	140 m (153 yd.)
	5.5 Mbps	200 m (219 yd.)
	2 Mbps	270 m (295 yd.)
	1 Mbps	400 m (437 yd.)
Network protocols	TCP/IP, Apple Talk, NetBEUI, IPX/SPX	
Bandwidth	2.4GHz (divided over 14 channels, 2400 to 2497 MHz for each channel)	

6. MEDIA LINK BOARD (B609)

Copy and print jobs are stored on the document server (on the copier's hard disk) in a Ricoh proprietary file format.

In previous models (such as A-C2, R-C2), DeskTopBinder could retrieve copy and print jobs from the document server and convert them to TIFF. However, this software-based conversion was slow for many users.

So, for the B070/B071, this conversion has been made hardware-based, using the optional Media Link Board. Without the Media Link Board, copy and print jobs cannot be downloaded to a PC from the document server.

Three common target formats are provided for conversion to files that can be viewed on a computer: JP2 (JPEG2000), JPEG, and TIFF.

NOTE: If the printer/scanner controller is not installed, the optional standalone NIB must be installed in the copier.

SP5847 (Net File Mag. Rate) is provided for use with this feature. For more details about these settings, see Section "5. Service Tables" in the main Service Manual.

NOTE: These SP commands are enabled for use only after the MLB has been installed. For details about installing the MLB, see Section "1. Installation" of the main Service Manual.

5847	002	Copy : Text	Changes the default settings of image data transferred externally by the Desk Top Binder page reference function via the MLB (Media Link Board).
5847	003	Copy: Others	
5847	005	Print: Binary	
5847	006	Print: Dither(1200 dpi)	Sets the default for dithered image size sent to the Document Server via the MLB (Media Link Board).
5847	021	NetFile Page Quality Default for JPEG	Sets the default for JPEG image quality of image files handled by Desk Top Binder sent via the MLB (Media Link Board).

TECHNICAL SERVICE BULLETINS

TECHNICAL SERVICE BULLETIN

BULLETIN NUMBER: B070/B071 – 001 **04/24/2003**

APPLICABLE MODEL:

GESTETNER – 9002/10512
LANIER - LD 090/LD 0105
RICOH – Aficio 2090/Aficio 2105
SAVIN – 4090/40105

SUBJECT: SC672, SLOW PRINTING SPEED, NETWARE PRINTING ERROR

FIRMWARE

SYMPTOM:

1. **SC672 (controller start-up error)**

Note: There are a total of 9 separate causes that can trigger SC672. To cover all possible causes, it is necessary to modify all the firmware.

2. **NetWare printing error**

   Machine will not accept print jobs after a certain amount have been sent via NetWare.

3. **Words missing (French/Spanish)**

   Some words are not displayed in French (missing from wording lists).

4. **Printing speed with Standard TCP/IP Port is too slow**

CAUSE:

Firmware.

SOLUTION:

Please perform the firmware upgrade. (Refer to Units Affected table for machine cut-in serial number)

- **Controller: B0705734B: V.1.04.4 or higher**
- **NIC: B0705735B: V.4.03 or higher**
- **BIOS: B0705742D: K02EL00O or higher**
- **LCDC: B0705371B (NA): V.2.07 or higher**

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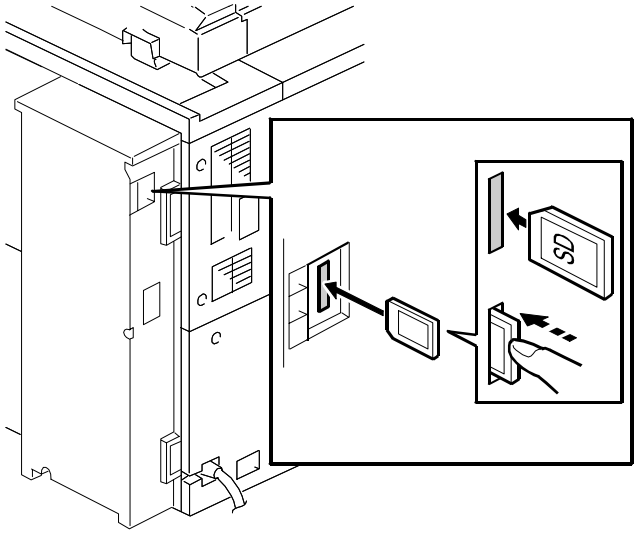
FIRMWARE UPDATE PROCEDURE

1. **Turn the main switch OFF.**
2. **Insert the SD card into the C3 slot on the right side of the controller box.**



3. **Turn the main switch ON.**
   Note: *The machine automatically displays the firmware update screen.*
4. **Select <u>"Network Support"</u>, <u>"System"</u>, <u>"Op. Panel. NA"</u> and <u>"BIOS"</u> on the operation panel at the same time.**
   Note: *With some machines, "BIOS" is not displayed at this point. In this case, continue onto the next step for the first three firmware types, and then repeat the procedure for BIOS.*
5. **Press the "Update (#)" key.**
   The firmware update will then begin, and the progress bar (*****___) will be displayed on the operation panel.
   The machine performs the firmware update in the following order:
   "Network Support" → "System" → "BIOS" → "Op Panel**"**

Note:

- While the "Op. panel" firmware is being updated, the panel display will be blank (progress bar not displayed). Also, the Power ON LED will flash as follows:
  - During the update: LED flashes on and off at **0.5s** intervals.
  - After the update is completed: LED flashes on and off at **3s** intervals.

- It takes about 4 to 4.5 minutes to complete the "Op. panel" firmware update. The total time for all four updates is approximately 9 minutes.

6. Turn the main switch OFF.

7. Remove the SD card from the C3 slot.

8. Turn the main switch ON.

9. Enter SP mode:

1. Press the Clear Modes key □.
2. Press ①⓪⑦ Keys on the operational panel keypad.
3. Hold down the Clear key Clear C for more than 3 seconds.
4. Press Copy SP.

10. Check the firmware version to confirm that the firmware has been successfully downloaded (SP7801):

Note*: As mentioned above under Step 4, if the BIOS firmware could not be updated at the same time (was not displayed), please repeat the above procedure to update the BIOS*.

Important:

If the customer does not use NetWare server, please change the "NetWare" setting to "Invalid" in User Tools.
User Tool --> System Setting --> Interface Setting --> Effective Protocol NetWare –> Select "Invalid" –> Exit –> Main SW off/on

UNITS AFFECTED:

All B070/B071 copiers manufactured after the serial numbers listed below will have the new firmware installed during production.

MODEL NAME	SERIAL NUMBER
Gestetner9002	J7030300126
Savin 4090	J7030300126
Gestetner10512	J7130300161
Savin 40105	J7130300161
Lanier LD 090	J7030300126
Lanier LD 0105	J7130300161
Ricoh Aficio 2090	J7030300126
Ricoh Aficio 2105	J7130300161

The latest Firmware version updates are listed on the first page of this bulletin under SOLUTION and can be downloaded from the Technology Solution Center FTP Site at http://tsc.ricohcorp.com. Be sure to check the README file for important notes and explanations.

NOTE: *Refer to Facts Line Bulletin # FL002 and Publication Bulletin #023 for more information about the FTP Internet Web Site and EPROM / Flash Card Exchange program.*

TECHNICAL SERVICE BULLETIN

BULLETIN NUMBER: B070/B071 – 002 **06/19/2003**

APPLICABLE MODEL:

GESTETNER – 9002/10512
LANIER – LD090/LD0105
RICOH – AFICIO 2090/2105
SAVIN – 4090/4105

SUBJECT: SERVICE MANUAL - INSERT

■ SERVICE MANUAL

The Service Manual pages listed below must be replaced with the pages supplied.

The revised areas have been highlighted by an arrow ⇒.

PAGES:

• i thru iii	Updated Information (Table of Contents)
• viii	Updated Information (Table of Contents)
• 1-20	Updated Information (Initializing Developer Supply)
• 1-86 thru 1-98	Updated Information (Copier Connection Kit)
• 3-125	Updated Information (Toner Bank Unit)
• 4-1	Updated Information (Troubleshooting)
• 4-28	Updated Information (Toner Suction Motor Replace)
• 5-23 and 5-24	Updated Information (SP-3903, 4012 and 4013)
• 5-49	Updated Information (SP-5857)
• 5-128 thru 5-131	Updated Information (Using the Debug Log)
• 6-11	Updated Information (Removed S54)
• 6-66	Updated Information (Process Control)
• 6-68	Updated Information (Grid Voltage Adjustment)

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B070/B071

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⟹ *Initializing Developer Supply*

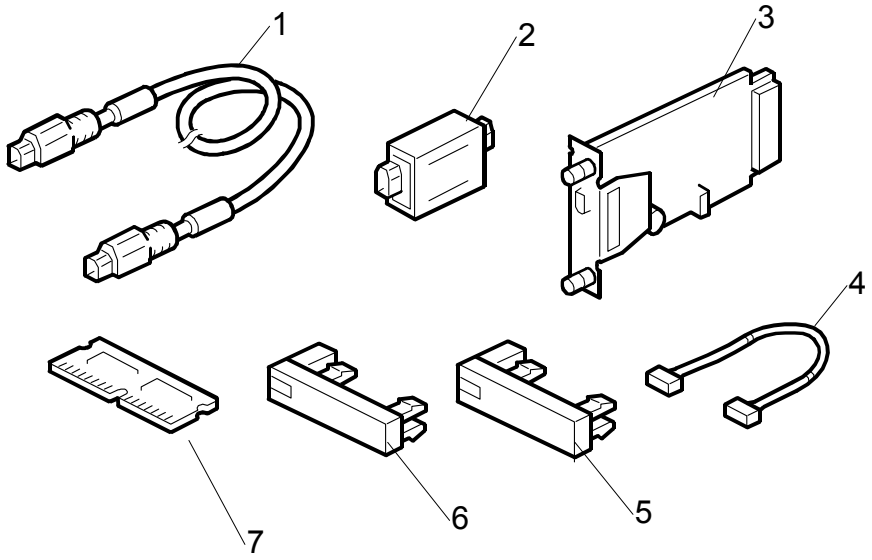
1. When the machine is ready, enter SP mode:
   1) Press C/⊘.
   2) Enter “107”.
   3) Hold down C/⊘ for more than 3 seconds.
2. Press “Copy SP” on the LCD, and perform the TD initial setting:
   1) Select SP2801 (TD Sensor Initial Setting)
⟹ 2) Use the keys displayed on the screen and the numeric keys on the LCD to enter the developer Lot No., then press #.
   NOTE: The Lot No. is embossed on the top edge of the developer packet.
   3) Press “Execute” on the LCD.
   NOTE: This executes the TD initial setting. After about 1 minute, “Completed” is displayed on the screen, and the execution stops automatically.
3. Start to supply toner from the toner bank to the toner hopper:
   1) Select SP2207 002 (Toner Bank Toner Setup).
   2) Press the “Start key” on the LCD.

   This procedure supplies toner to the toner hopper and the toner transport path. It will stop automatically in about 7 minutes. If SP2207 002 fails after SP2801 is completed (an SC code is displayed), repeat only SP2207 002.
4. Execute SP2962 (Auto Process Control Execution).
   NOTE: In step 1, if you enter SP mode immediately after switching the machine on, the system will not execute process control automatically. To ensure that process control calibrates its settings, use this SP to execute process control manually.

⇒1.12.7 COPIER CONNECTION KIT (B328)

Accessories

Check the quantity and condition of the accessories in the box against the following list:



Description	Q'ty
Interface Cable 1394	3
Repeater Hub 1394	2
Connection PCB	2
Power Repeater Cable	2
"Other Function" Keytops (NA, EU 1 ea.)	2
"Printer/Other Function" Keytops (NA, EU 1 ea.)	2
SDRAM DIMM 64 MB	2

Preparation

Before you begin the installation procedure, you must first:

- Determine the distance between the machines to be connected.
- Determine whether the printer/scanner option is installed on the machines.

Measure the distance between the machines, then decide how many cables and repeater hubs are required.

DISTANCE	POWER REPEATER HUBS	INTERFACE CABLES
Up to 4.5 m (14.8 ft.)	None	1
4.5 ~ 9.0 m (14.8 ~ 29.5 ft)	1	2
9.0 ~ 13.5 m (29.5 ~ 112.5 ft.	2	3

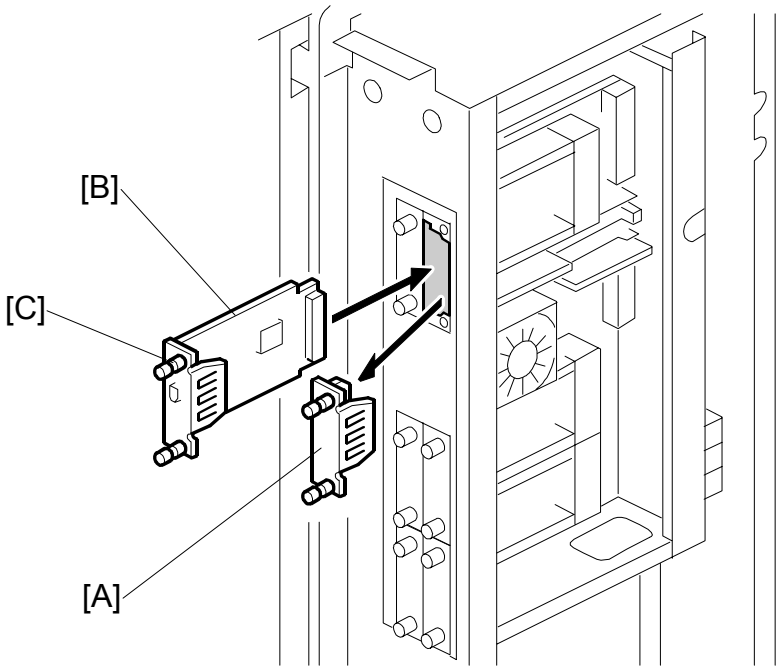
⇒

Two sets of keytops (2 per set, 1 for NA, 1 for EU) are provided for each machine, but you need to install only one keytop on each machine.

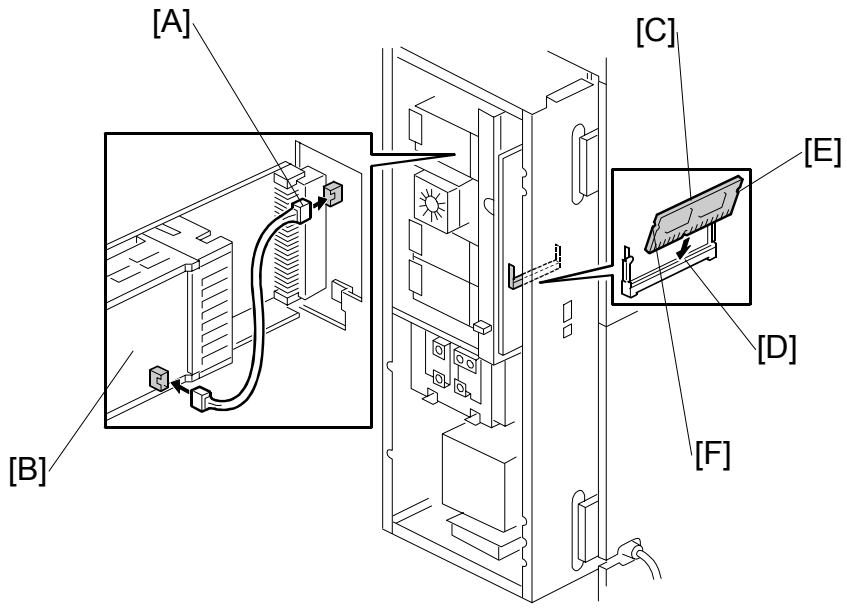
- Install the key labeled “Printer/Other Function” (or its equivalent symbol keytop for EU) on a machine with the printer/scanner option installed
- Install the key labeled “Other Function” (or its equivalent symbol keytop for EU) on a machine without the printer/scanner option.

Installation Procedure

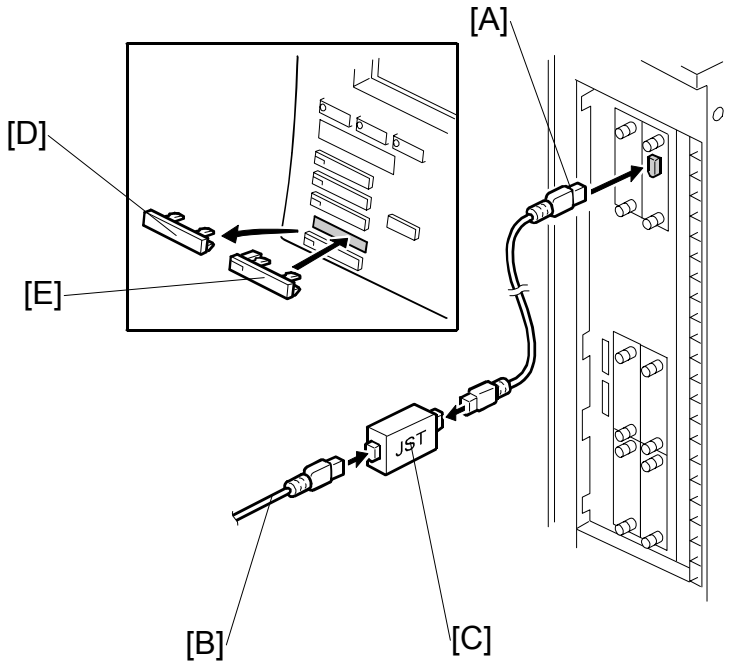
⚠CAUTION
Switch the machine off and unplug the machine before starting the following procedure.



1. Switch the main power switch off.
2. Remove the controller box cover. (🔩 x7)
3. Remove the cover [A] from slot A2.
4. Align the PCB with the bottom groove, and push the connection PCB [B] into the slot.
   NOTE: Make sure that the edge of the PCB is in the groove before you push the card into the machine.
5. Fasten the PCB with the attached screws [C].



6. Connect the power repeater cable [A] to the mother board at CN149.
7. Connect the other end of the power repeater cable the connection PCB [B].
8. Insert the 64 MB SDRAM DIMM [C] into the slot on the mother board.
   - Set the edge connector at a 45 degree angle with the slot on the edge connector [D] aligned with the post below.
   - Press down slightly then push the DIMM toward the mother board until it snaps into place.
   - Make sure that the notches on both sides of the DIMM [E] [F] engage the pawls of the spring loaded arms so the DIMM is perpendicular.
9. Re-attach the controller box cover.
10. Repeat Steps 1 to 9 to install the connection PCB and 64 MB DIMM on the slave machine.



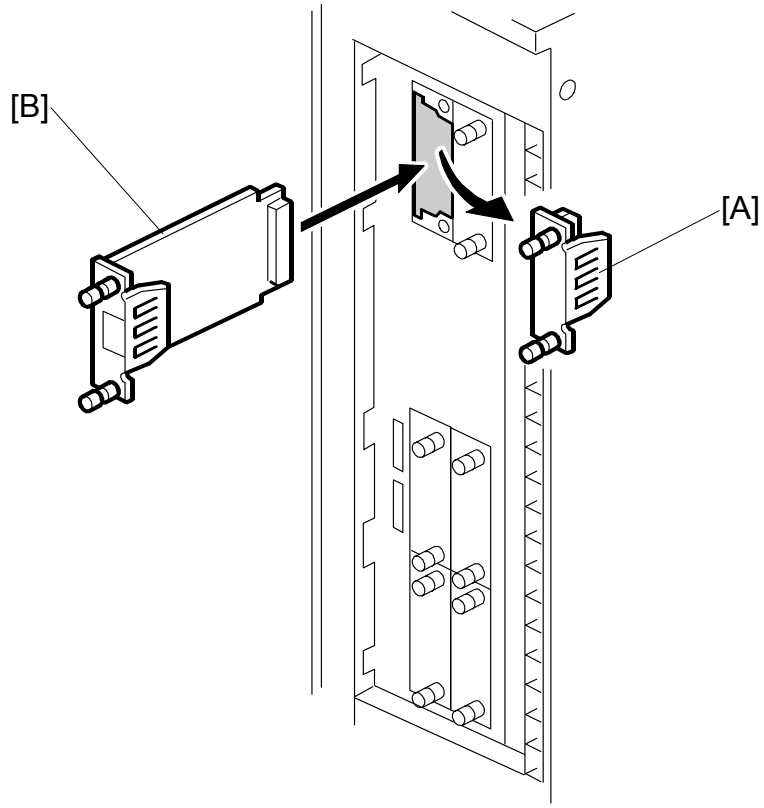
11. Insert one end of the interface cable [A] to the connection PCB inserted in slot A2.
12. If additional interface cables are required, connect the cables [B] with the repeater hubs [C].
13. On the operation panel of the both machines, remove the second cover (or Printer key) from the bottom [D].
14. Install an appropriate key for each machine:

    Attach the “Printer/Other Function” key [E] (or its equivalent symbol keytop for EU) if the printer/scanner option is installed in the machine.

    -or-

    Attach the “Other Function” key [E] (or its equivalent symbol keytop for EU) if the printer/scanner is not installed in the machine.
15. Attach the other end of the connection cable to the connection PCB installed in the other machine.

⇒1.12.8 EFI (G353)



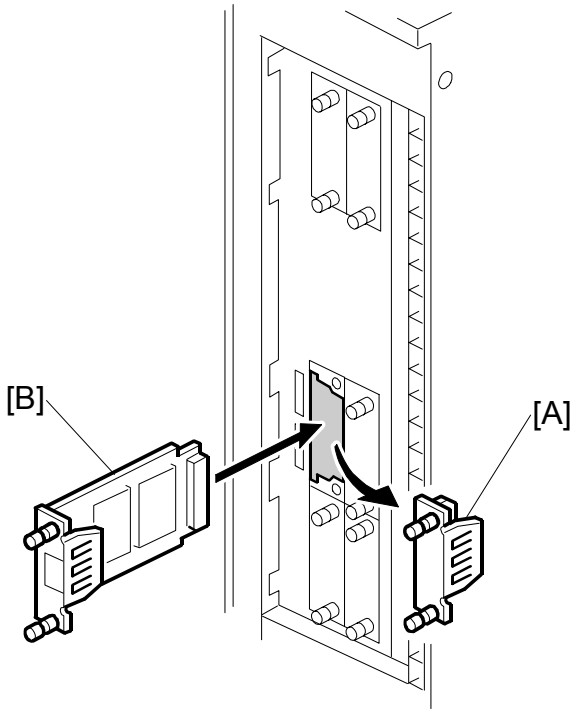
1. Switch the machine off.
2. Remove the cover [A] of Slot A1 (🔩 x 2).
3. Insert the EFI Board G353 [B] into Slot A1 and fasten it with the screws.

⇒1.12.9 MLB (B609)

Accessories

Description	Q'ty
1. MLB Board	1
2. Instructions	1

Installation



1. Switch the machine off.
2. Remove the cover [A] of Slot B1 (🔩 x 2).
3. Insert the MLB board [B] into Slot B1 and fasten it with the screws.
4. Switch the machine on.

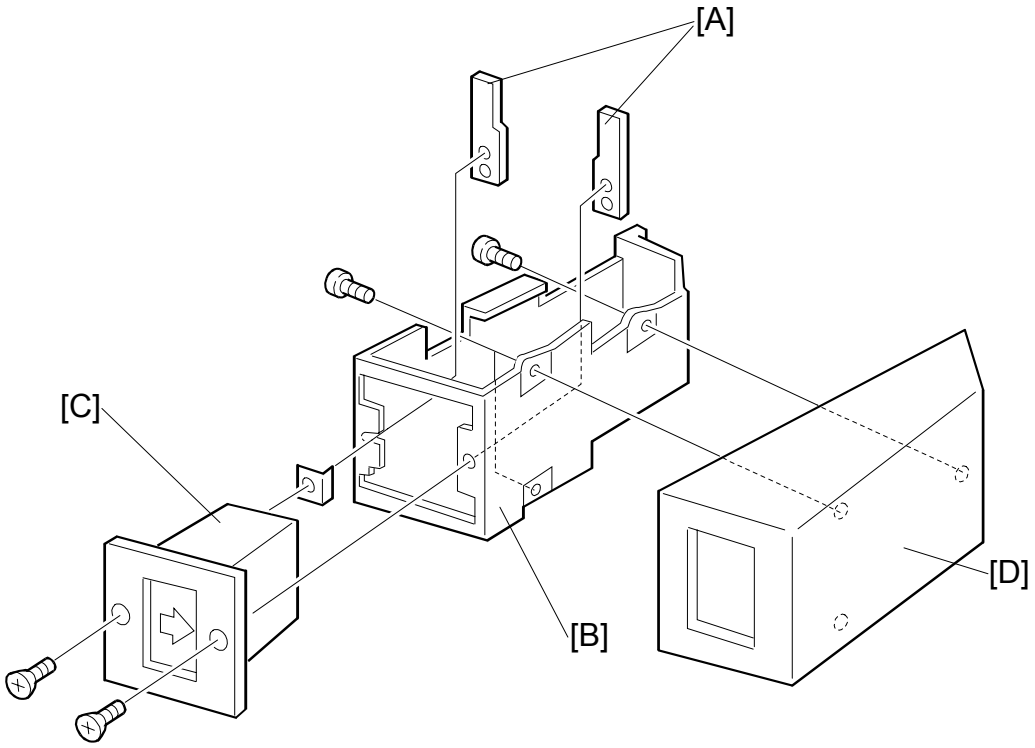
⇒1.13 KEY CARD COUNTER

1.13.1 ACCESSORIES

Description	Q'ty
1. Key Counter Cover	1
2. Key Counter Plates	2
3. Key Counter Bracket	1
4. Machine screw M3 x 6	1
5. Shoulder Screw M3 x 4	1
6. Tapping Screws M4 x 8	3
7. Machine Screws M3 x 20	2
8. External Screw M3 x 20	1
9. Machine Screw (Flathead) M4 x 16	1
10. Extension Cable (for LCT Installation)	1
11. Extension Cable Clamps (for LCT Installation)	6

⇒1.13.2 INSTALLATION

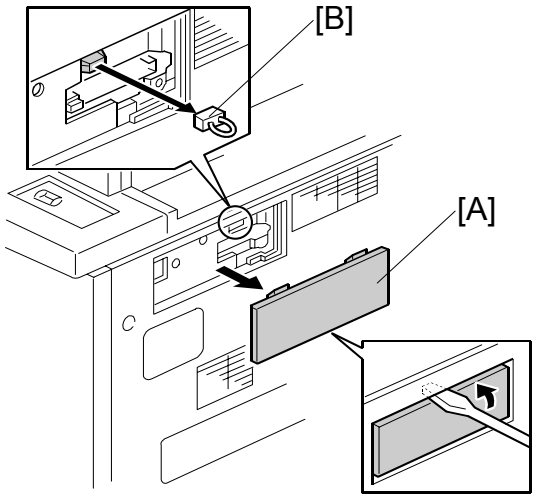
Assembling the Key Counter

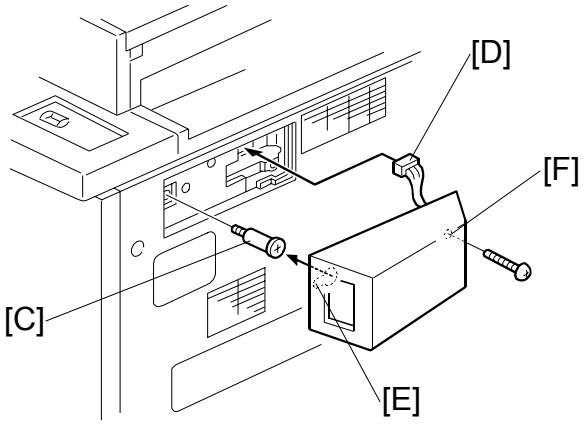


1. While holding the key counter plates [A] inside the key counter bracket [B], insert the key counter holder [C]
2. Fasten the key counter holder [C] through the bracket plate to the counter plates [A] (🔩 x 2).
3. Fasten the cover [D] to the key counter bracket [B] (🔩 x 2).

⟹ *Attaching the Key Counter to the Copier*

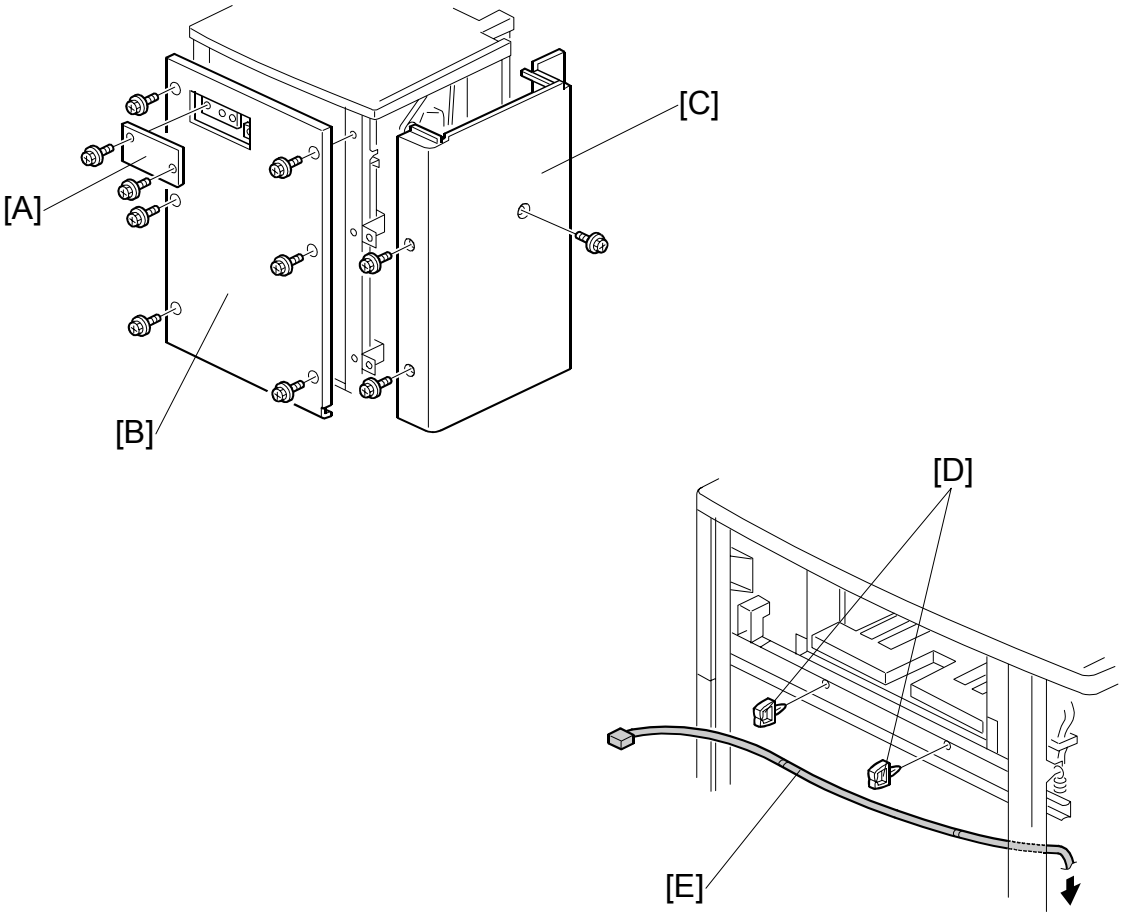
Attach the key counter to the copier if the LCT is not installed.



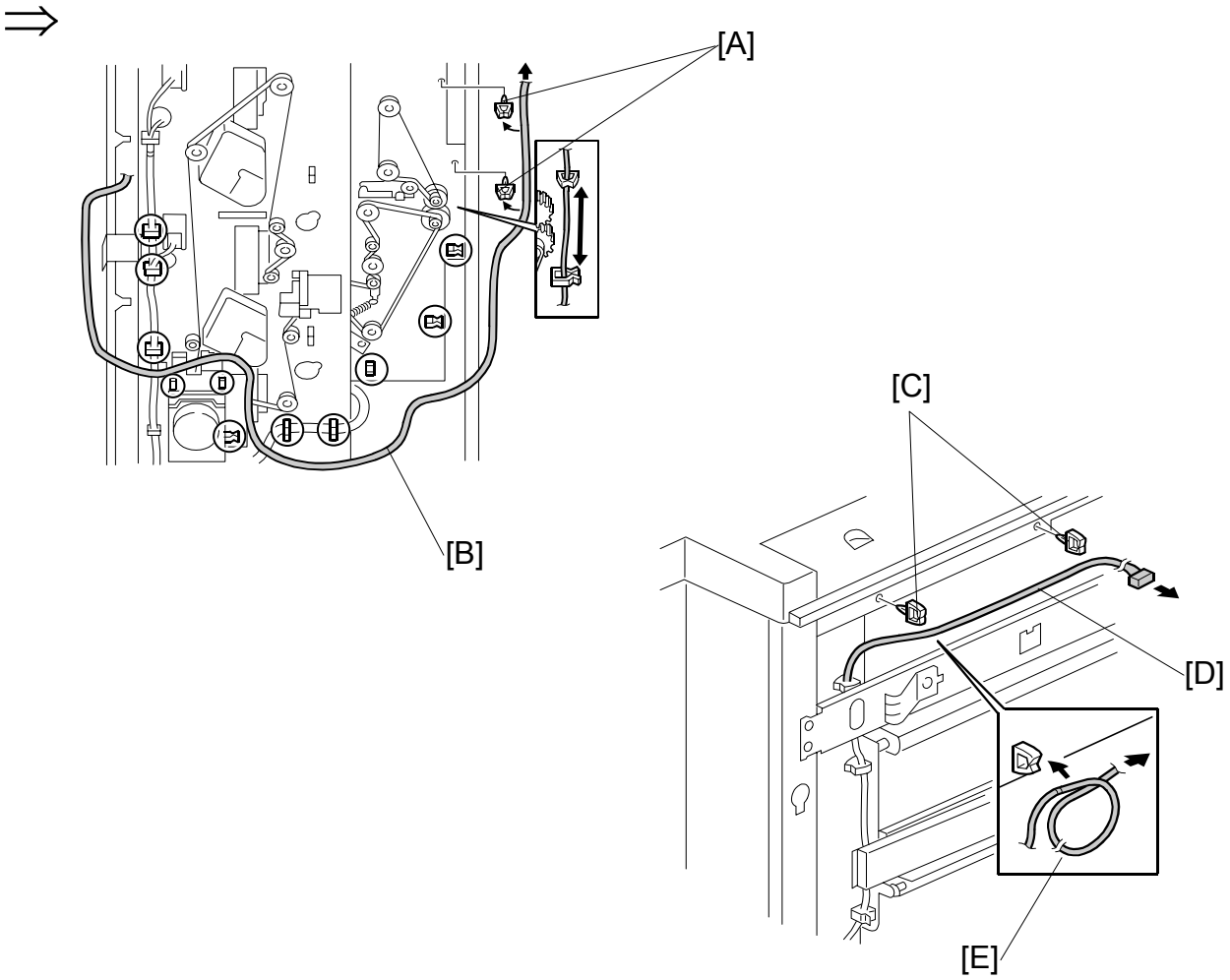


1. On the right side of the copier, remove the small cover [A].
2. Remove the jumper connector [B].
3. Fasten the shoulder screw [C] to the side of the machine.
4. Connect the key count assembly [D].
5. Fit the keyhole of the key counter bracket [E] over the head of the shoulder screw, then slide it back.
6. Fasten the key counter assembly [F] to the copier (🔩 x 1).
7. Do the User Tool and SP mode settings described at the end of this section.

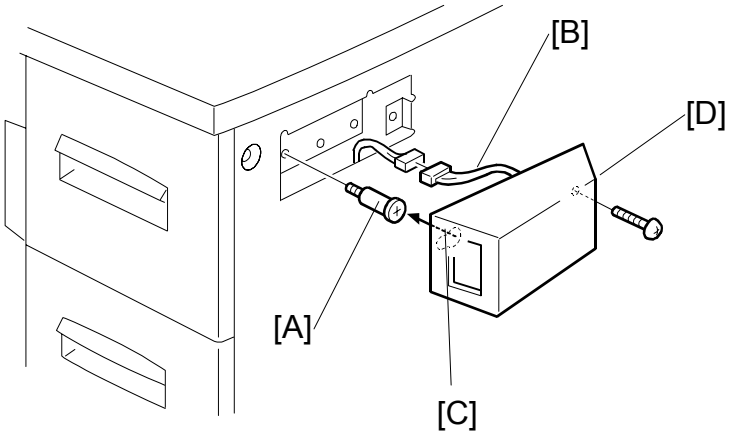
⟹ *Attaching the Key Counter to the LCT*

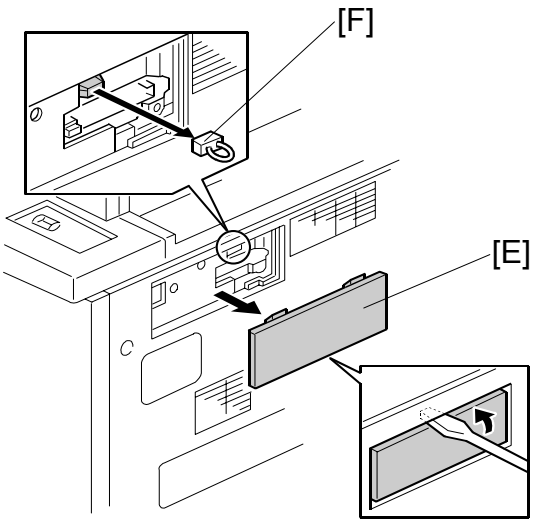


1. On the LCT right cover, remove the cover [A] (☞ x 2).
2. Remove the LCT right cover [B] (☞ x 6).
3. Remove the LCT rear cover [C] (☞ x 3).
4. On the right side of the LCT, attach 2 clamps [D].
5. Attach the extension cable [E] to the 2 clamps.

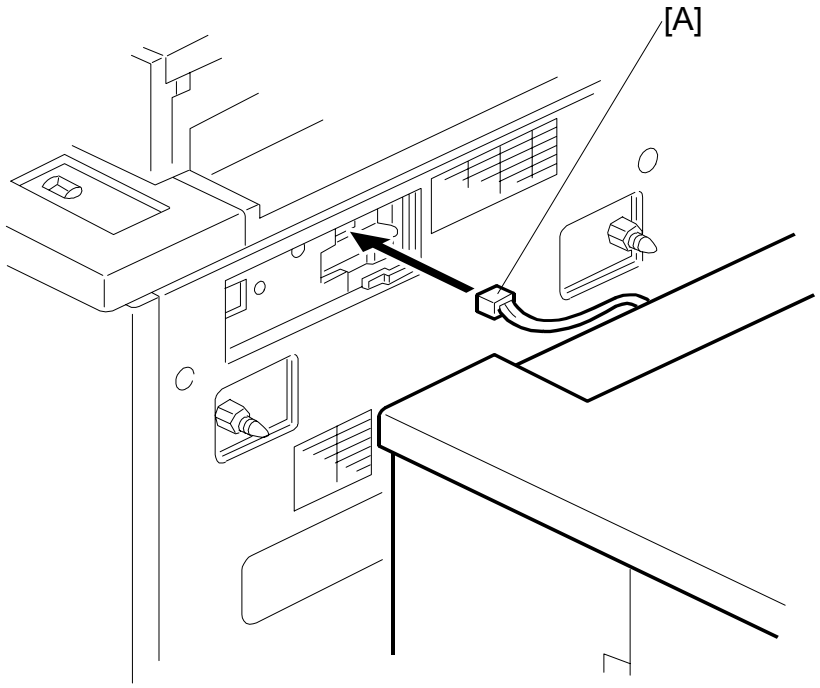


6. On the rear side of the LCT, attach 2 clamps [A].
7. Route the cable [B] as shown.
8. On the left side of the LCT, attach 2 clamps [C].
9. Route the cable [D] as shown.
10. If the cable from the right cover is too long, loop it [E] to make it shorter.





11. Re-attach the right LCT cover.
12. Fasten the shoulder screw [A] to the side of the LCT.
13. Connect the key count assembly [B].
14. Fit the keyhole of the key counter bracket [C] over the head of the shoulder screw, then slide it back.
15. Fasten the key counter assembly [D] to the LCT (🔩 x 1).
16. On the right side of the copier, remove the small cover [E].
17. Remove the jumper connector [F].

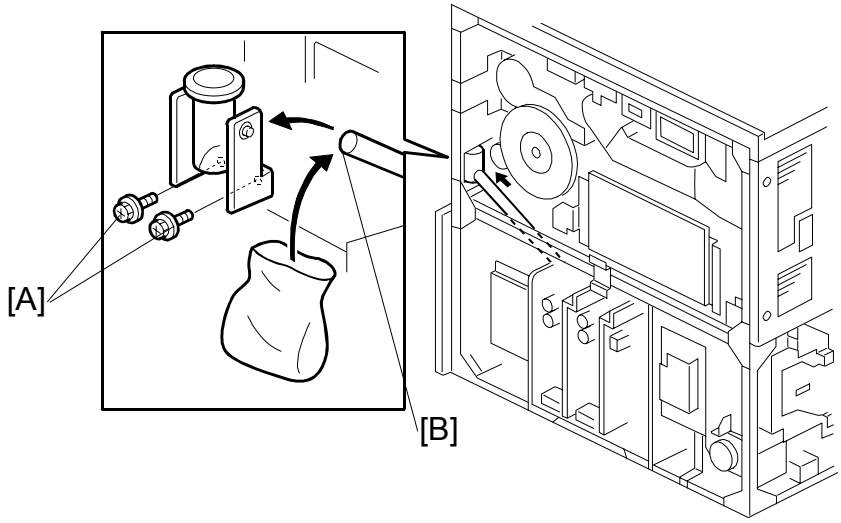


18. Connect the extension cable [A] from the LCT to the copier.
19. Dock the LCT to the copier.

User Tool and SP Mode Settings

1. Instruct the key operator to enable the key counter with the User Tools setting: User Tools> System Settings> Key Counter Management> then click the ON button for the items you want to enable for the counter (Copier, Document Server, Printer, Scanner).
2. Enter the SP mode and set SP5113 (Optional Counter Type) to 002 (Key Card (Countdown Type)) or 005 (MF Key Card).
   NOTE: If the counter is a countdown type, you must select 002.
3. Enter the SP mode and set SP5121 to “0” (Paper Feed Count) or “1” (Paper Exit Count) to determine whether the counter counts at paper feed-in or a paper exit.

3.13.2 TONER BANK UNIT



NOTE: Work carefully to avoid spilling toner during removal.

1. Execute SP5804 097 (upper bottle) and 098 (lower bottle) to close the caps, then remove the toner bottles from the bank.
2. Upper rear and lower rear covers (☛3.1.4).
3. Open the controller box door (🔩 x 3) (☛3.1.4)
4. Left lower cover, right upper cover (☛3.1.2, 3.1.3).
5. Two screws [A] of the toner supply cylinder. (🔩 x 2, tubes x 3)
   NOTE: Work carefully to avoid spilling toner.
6. Cover the end of the toner transport coil tube [B] with a plastic bag.
   NOTE: Do not to bend the toner transport coil tube [B]. If it is bent, this can cause the coil inside to be overloaded, locked, or damaged. SC592 will be displayed, and the coil (screw) inside should be replaced.

⟹ 7. Switch on the machine and execute SP2226 to discharge toner from the toner bank.

8. Turn off the main switch and unplug the power cord.
9. Toner waste bottle. (☛3.13.1)

4. TROUBLESHOOTING

4.1 SERVICE CALL CONDITIONS

4.1.1 SUMMARY

There are 4 levels of service call conditions.

Level	Definition	Reset Procedure
A	Fusing SCs displayed on the operation panel. The machine is disabled. The user cannot reset the SC.	Enter SP mode, then turn the main power switch off/on.
B	SCs that disable only the features that use the defective item. Although these SCs are not shown to the user under normal conditions, they are displayed on the operation panel only when the defective feature is selected.	Turn power off/on.
C	SCs that are not shown on the operation panel. They are internally logged.	Logging only.
D	Turning the operation switch or main power switch off then on resets SCs. Displayed on the operation panel. These are re-displayed if the error occurs again.	Turn the operation switch or main power switch off and on.

NOTE: 1) If the problem concerns electrical circuit boards, first disconnect then reconnect the connectors before replacing the PCBs.
2) If the problem concerns a motor lock, first check the mechanical load before replacing motors or sensors.
3) When a Level A or B SC occurs while in an SP mode, the display does not indicate the SC number. If this occurs, check the SC number after leaving the SP mode. This does not apply to Level B' codes.

SC591: Toner Supply Pump Motor Error

Definition [B]

The toner supply pump motor lock signal did not change within 1 s while the motor is operating.

Possible Causes

- Motor lock due to overload
- BCU defective

SC592: Toner Bank Motor Error

Definition [B]

An abnormal signal was received from the toner bank motor.

Possible Causes

- Toner bank motor defective
- Bank motor connector loose
- Too much load on the drive mechanism

⇒ *SC593: Toner Suction Motor Replace*

Definition [B]

The operation time of the motor is over 600 hours.

Possible Cause

- Service life of the toner suction motor is finished.

Note: A near-end message is displayed in the LCD when the operation time exceeds 570 hours.

SC601: Communication Error Between BCU and MCU

Definition [B]

One or more of the following occurred:

- The BCU cannot communicate with the MCU within 0.8 s after power on.
- A BREAK signal was detected after connection between the BCU and MCU.
- After a communication error, three tries to communicate with the MCU failed.

Possible Causes

- Poor connection between BCU and MCU
- BCU defective
- MCU defective

SP	Number/Name		Function/[Setting]
3902	Process Control Data Display		
	001	Auto Process Control	Displays whether auto process control is switched on or off [0:Off, 1:**On**] When auto process control is on and the potential sensor is calibrated correctly, "ON" appears on the operation panel. *Auto process control is not executed when this SP is switched off.* *After RAM is cleared*, this SP setting goes off.
	002	V D	Displays the drum potential.
	003	V H	Displays the standard halftone drum potential, used for laser power adjustment.
	004	V G	Displays the charge grid voltage resulting from the latest Vd adjustment.
	005	LD Power (Correction)	Displays the LD power correction value as a result of the latest Vh adjustment.
	006	V ID	Displays the latest drum surface voltage measured on the ID sensor pattern.
	007	V M200	Displays the acquired value when the potential sensor is calibrated after application of –200V to the drum.
	008	V M700	Displays the acquired value when the potential sensor is calibrated after application of -700V.
	009	VD Correction	Determines whether VD correction is performed. **DFU** [0~1 / **0**/ 1] 0: No Correction. Correction with value of SP2001 007 only 1: Correction with value of SP2001 007 + 50V
	010	VL (Auto Process Control)	Displays the value of VL at auto process control initialization.
	011	VL Correction (Auto Process Control)	Displays the amount of correction (ΔVLref) according to results of the VL detection at auto process control.
	012	VL	Displays the latest value of VL.
	013	VL Correction	Displays the amount of correction (ΔVLref) according to the latest VL detection results.
	014	VB	Displays the value of the current image development bias output, determined by the results of VL detection.
⇒ 3903	VD Correction Counter		Adjusts the starting point for the VD Correction. Displays whether the VD correction is being performed. The target value for VD correction is "the value of SP2-001-7 + 50". [0~999 / **200** / 1 K copies] *The counter is automatically reset to 0 (zero) when SP2-801 is performed.*

Service Tables

SP4-nnn Scanner

SP	Number/Name		Function/[Setting]
4008	Scanner Sub Scan Magnification		Adjusts the magnification in the sub scan direction for scanning. If this value is changed, the scanner motor speed is changed. (☛3-17) [-0.9~+0.9 / **0** / 0.1 percent] *Use the "• / *key to enter the minus (–) before entering the value.* *Setting a lower value reduces the motor speed and lengthens the image in the sub scan direction (paper direction). Setting a larger value increases the motor speed and shortens the image in the sub scan direction.*
4010	Scanner Leading Edge Registration		Adjusts the leading edge registration for scanning. (☛3-17) [-9.0~+9.0 / **0** / 0.1 mm] *Use the "• / *key to enter the minus (–) before entering the value.* *A minus setting moves in the direction of the leading edge. A larger value shifts the image away from the leading edge, and a smaller value shifts the image toward the leading edge.*
4011	Scanner Side-to-Side Registration		Adjusts the side-to-side registration for scanning. (☛3-17) [-3.0~+3.0 / **0** / 0.1 mm] (–): The image disappears at the left side. (+): The image appears at the left side. *Use the "• / *key to enter the minus (–) before entering the value.*
⇒ 4012	Scanner Erase Margin		Adjusts the erase margin for scanning. The leading, trailing, right and left margins can be set independently. *Do not adjust this unless the user wishes to have a scanner margin that is greater than the printer margin.* [0~9.0 / **0.5** / 0.1 mm]
	001	Leading Edge	
	002	Trailing Edge	
	003	Right	
	004	Left	
⇒ 4013	Scanner Free Run		
	001	Scanner Free Run: Lamp ON	Allows scanner free running with the exposure lamp on.
	002	Scanner Free Run: Lamp OFF	Allows scanner free running with exposure lamp off.

SP	Number/Name		Function/[Setting]
5857	Save Debug Log		
	001	On/Off (1:ON 0:OFF	Switches on the debug log feature. The debug log cannot be captured until this feature is switched on. [0 ~ 1 / **0** / 1] 0: OFF 1: ON
⇒	002	Target (2: HDD 3: SD Card)	Selects the destination where the debugging information generated by the event selected by SP5858 will be stored if an error is generated [2 ~ 3 / **2** / 1] 2: HDD 3: SD Card
	005	Save to HDD	Specifies the decimal key number of the log to be written to the hard disk. (☛5.16)
	006	Save to SD Card	Specifies the decimal key number of the log to be written to the SD Card. (☛5.16)
	009	HDD to SD Card (Latest 4 MB)	Takes the most recent 4 MB of the log written to the hard disk and copies them to the SD Card. (☛5.16) *A unique file name is generated to avoid overwriting existing file names on the SD Card. Up to 4MB can be copied to an SD Card. 4 MB segments can be copied one by one to each SD Card.*
	010	HDD to SD Card Latest 4 MB Any Key)	Takes the log of the specified key from the log on the hard disk and copies it to the SD Card. (☛5.16) *A unique file name is generated to avoid overwriting existing file names on the SD Card. Up to 4 MB can be copied to an SD Card. 4 MB segments can be copied one by one to each SD Card. This SP does not execute if there is no log on the HDD with no key specified.*
	011	Erase Debug Data From HDD	Erases all debug logs on the HDD
	012	Erase Debug Data From SD Card	Erases all debug logs on the SD Card. If the card contains only debugging files generated by an event specified by SP5858, the files are erased when SP5857 010 or 011 is executed. *To enable this SP, the machine must be cycled off and on.*

⇒5.16 USING THE DEBUG LOG

This machine provides a Save Debug Log feature that allows the Customer Engineer to save and retrieve error information for analysis.

Every time an error occurs, debug information is recorded in volatile memory but this information is lost when the machine is switched off and on.

The Save Debug Log feature provides two main features:

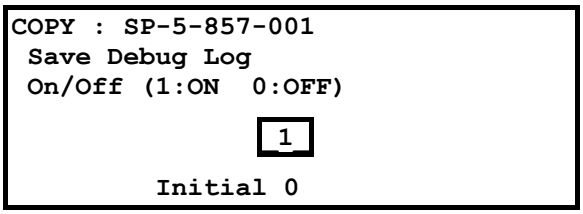
- Switching on the debug feature so error information is saved directly to the HDD for later retrieval.
- Copying the error information from the HDD to an SD card.

When a user is experiencing problems with the machine, follow the procedure below to set up the machine so the error information is saved automatically to the HDD.

5.16.1 SWITCHING ON AND SETTING UP SAVE DEBUG LOG

The debug information cannot be saved the until the “Save Debug Log” function has been switched on and a target has been selected.

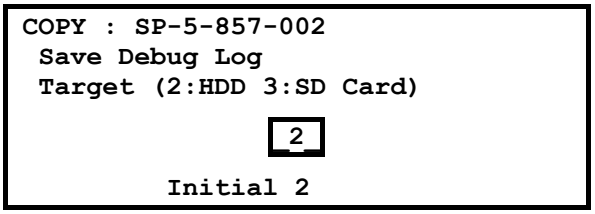
1. Enter the SP mode and switch the Save Debug Log feature on.
   - Press ⌨ then use the 10-key pad to enter ①⓪⑦.
   - Press and hold down C/⊘ for more than 3 seconds.
   - Touch “Copy SP”.
   - On the LCD panel, open SP5857.
2. Under “5857 Save Debug Log”, touch “1 On/Off”.



3. On the control panel keypad, press “1” then press ⓝ. This switches the Save Debug Log feature on.

NOTE: The default setting is “0” (OFF). This feature must be switched on in order for the debug information to be saved.

⇒ 4. Next, select the target destination where the debug information will be saved. Under “5857 Save Debug Log”, touch “2 Target”, enter “2” with the operation panel key to select the hard disk as the target destination, then press #.



NOTE: Select “3 SD Card” to save the debug information directly to the SD card if it is inserted in the service slot.

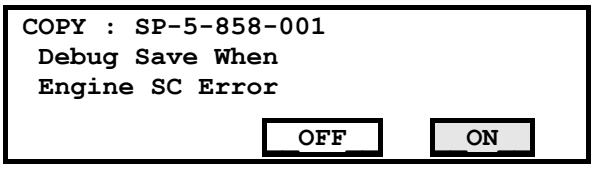
5. Now touch “5858” and specify the events that you want to record in the debug log. SP5858 (Debug Save When) provides the following items for selection.

1	Engine SC Error	Saves data when an engine-related SC code is generated.
2	Controller SC Error	Saves debug data when a controller-related SC Code is generated.
3	Any SC Error	Saves data only for the SC code that you specify by entering code number.
4	Jam	Saves data for jams.

NOTE: More than one event can be selected.

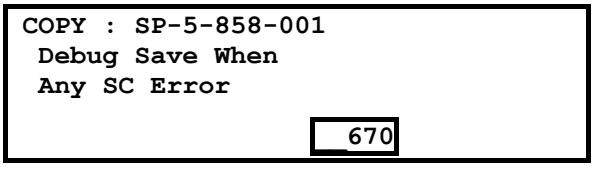
Example 1: To Select Items 1, 2, 4

Touch the appropriate items(s). Press “ON” for each selection. This example shows “Engine SC Error” selected.



Example 2: To Specify an SC Code

Touch “3 Any SC Error”, enter the 3-digit SC code number with the control panel number keys, then press #. This example shows an entry for SC670.



NOTE: For details about SC code numbers, please refer to the SC tables in Section “4. Troubleshooting”.

Service Tables

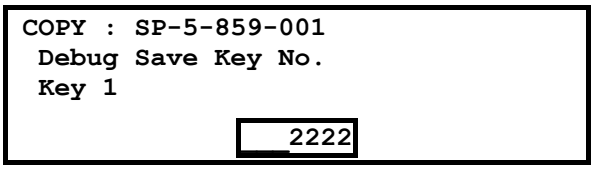
⇒6. Next, select the one or more memory modules for reading and recording debug information. Touch “5859”.

Under “5859” press the appropriate key item for the module that you want to record.

Enter the appropriate 4-digit number, then press #.

NOTE: Refer to the two tables below for the 4-digit numbers to enter for each key.

The example below shows “Key 1” with “2222” entered.



The following keys can be set with the corresponding numbers. (The initials in parentheses indicate the names of the modules.)

4-Digit Entries for Keys 1 to 10

KEY NO.	COPY	PRINTER	SCANNER	WEB
1	2222 (SCS)			
2	2223 (SRM)			
3	256 (IMH)			
4	1000 (ECS)			
5	1025 (MCS)			
6	4848 (COPY)	4400 (GPS)	5375 (Scan)	5682 (NFA)
7	2224 (BCU)	4500 (PDL)	5682 (NFA)	6600 (WebDB)
8		4600 (GPS-PM)	3000 (NCS)	3300 (PTS)
9		2000 (NCS)	2000 (NCS)	6666 (WebSys)
10		2224 (BCU)		2000 (NCS)

NOTE: The default settings for Keys 1 to 10 are all zero (“0”).

Key to Acronyms

Acronym	Meaning	Acronym	Meaning
ECS	Engine Control Service	NFA	Net File Application
GPS	GW Print Service	PDL	Printer Design Language
GSP-PM	GW Print Service – Print Module	PTS	Print Server
IMH	Image Memory Handler	SCS	System Control Service
MCS	Memory Control Service	SRM	System Resource Management
NCS	Network Control Service	WebDB	Web Document Box (Document Server)

The machine is now set to record the debugging information automatically on the HDD (the target selected with SP5-857-002) for the events that you selected SP5-858 and the memory modules selected with SP5-859.

⇒ Please keep the following important points in mind when you are doing this setting:

- Note that the number entries for Keys 1 to 5 are the same for the Copy, Printer, Scanner, and Web memory modules.
- The initial settings are all zero.
- These settings remain in effect until you change them. Be sure to check all the settings, especially the settings for Keys 6 to 10. To switch off a key setting, enter a zero for that key.
- You can select any number of keys from 1 to 10 (or all) by entering the corresponding 4-digit numbers from the table.
- You cannot mix settings for the groups (COPY, PRINTER, etc.) for 006~010. For example, if you want to create a PRINTER debug log you must select the settings from the 9 available selections for the "PRINTER" column only.
- One area of the disk is reserved to store the debug log. The size of this area is limited to 4 MB.

5.16.2 RETRIEVING THE DEBUG LOG FROM THE HDD

Retrieve the debug log by copying it from the hard disk to an SD card.

1. Insert the SD card into the service slot of the copier.
2. Enter the SP mode and execute SP5857 009 (Copy HDD to SD Card (Latest 4 MB)) to write the debugging data to the SD card.
3. After you return to the service center, use a card reader to copy the file and send it for analysis to Ricoh by email, or just send the SD card by mail.

5.16.3 RECORDING ERRORS MANUALLY

Since only SC errors and jams are recorded to the debug log automatically, for any other errors that occur while the customer engineer is not on site, please instruct customers to perform the following immediately after occurrence to save the debug data. Such problems would include a controller or panel freeze.

NOTE: In order to use this feature, the customer engineer must have previously switched on the Save Debug Feature (SP5857-001) and selected the hard disk as the save destination (SP5857-002).

1. When the error occurs, on the operation panel, press Clear Modes (Clear Modes).
2. On the control panel, enter "01" then hold down C/⊘ for at least 3 sec. until the machine beeps then release. This saves the debug log to the hard disk for later retrieval with an SD card by the service representatives.
3. Switch the machine off and on to resume operation.

   The debug information for the error is saved on the hard disk so the service representatives can retrieve it on their next visit by copying it from the HDD to an SD card.

Number	Name	Description
S39	Duplex Inverter Sensor	Detects when to turn the inverter gate and exit gate solenoids off and checks for misfeeds.
S40	Duplex Entrance Sensor	Detects the leading and trailing edges of the paper to determine the reverse roller solenoid on or off timing.
S41	Duplex Transport Sensor 1	Detects the position of paper in the duplex unit.
S42	Duplex Transport Sensor 2	Detects the position of paper in the duplex unit.
S43	Duplex Transport Sensor 3	Detects the position of paper in the duplex unit.
S44	Duplex Jogger HP Sensor	Detects whether the duplex jogger fences are at the home position.
S45	LCT Relay Sensor	Detects misfeeds.
S46	Relay Sensor	Detects misfeeds.
S47	Registration Sensor	Detects misfeeds and controls registration motor on/off timing.
S48	Guide Plate Position Sensor	Detects whether the registration guide plate is open or closed.
S49	Web End Sensor	Detects when the oil supply/cleaning web has been used up.
S50	Fusing Exit Sensor	Detects misfeeds.
S51	Exit Sensor	Detects misfeeds.
S52	Toner Suction Motor Rotation Sensor	Detects whether the development unit toner suction motor is rotating.
S53	Toner Suction Bottle Set Sensor	Detects whether the development unit waste toner bottle is set.
⇒		
Solenoids		
SOL01	Transfer Belt Lift	Controls the up-down movement of the transfer belt unit.
SOL02	1st Pick-up Solenoid	Controls the up-down movement of the pick-up roller in tray 1.
SOL03	1st Pick-up Solenoid	Controls the up-down movement of the pick-up roller in tray 2.
SOL04	3rd Pick-up Solenoid	Controls the up-down movement of the pick-up roller in tray 3.
SOL05	1st Separation Roller Solenoid	Controls the up-down movement of the separation roller in tray 1.
SOL06	2nd Separation Roller Solenoid	Controls the up-down movement of the separation roller in tray 2.
SOL07	3rd Separation Roller Solenoid	Controls the up-down movement of the separation roller in tray 3.
SOL08	Front Side Fence	Opens and closes the front side fence in the tandem tray.
SOL09	Rear Side Fence	Opens and closes the rear side fence in the tandem tray.
SOL10	Tandem Tray Connect	Connects/disconnects the two halves of the tandem tray.

6.11.8 PROCESS CONTROL

Drum potential gradually changes for the following reasons:

- Dirty optics, exposure glass
- Dirty charge corona casing, grid plate
- Deterioration of drum sensitivity

What Happens at Power On

Here is a description of what happens while the fusing temperature is below 100°C immediately after the main power switch is switched on (process control must also be enabled with SP3901 001, or this will not happen).

At any time, this process can also be executed manually by using SP2962. However, process control must be enabled with SP3901 001 and the fusing temperature must be below 100°C, or this will not work.

1. Drum potential sensor is calibrated.
2. Drum starts first rotation after fusing temperature reaches 100°C.
3. ID sensor is calibrated (Vsg).

⇒ 4. Readout from the drum potential sensor is used to adjust:
   - Grid voltage (Vg)
   - Laser diode (LD) power.

   NOTE: This step occurs only if process control is enabled with SP3901 001 (Auto Process Control On/Off Setting). If this SP is disabled, then:
   - Development bias is set to the value stored in SP2201 1
   - Grid voltage is set to the value stored in SP2001 1
   - Laser power is set to the values stored in SP2103

5. TD sensor is calibrated (Vref).

⇒

Any SC codes that are generated during auto process control are logged in the memory and do not appear. The machine will continue to operate.

Grid Voltage (Vg) Adjustment

Then, the machine determines the corona grid voltage (Vg) that will be used during copying. This is done as follows:

1. A Vd pattern is unexposed on the drum and the bias for the unexposed area is adjusted.
2. The drum potential sensor reads the Vd potential.
3. Vd should be –800 ± 20V. If it is within this range, the current value of Vg will be used for copying. If it is not within this range, - (Vd + 800)V is added to Vg, and the process starts again from Step 1.

⇒ **NOTE:** VD Correction - As the development sleeve accumulates toner over time, the gap between VD and VB decreases, which makes it easier for dirty background to occur. To compensate for this, the machine increases the target VD value to -850±20V when the number of copies exceeds the value set with SP3903: VD Correction Counter (default: 200K). As a result, VD increases and the VD-VB gap is maintained

⇒ 4. If Vd cannot be adjusted to this standard within 5 attempts, Vg is set to the value of SP2001-001 (default: –900V) and SC315 (Potential Sensor Calibration Error 3) is logged.

LD Power Adjustment

Finally, the machine determines the laser diode power that will be used during copying. This is done as follows.

1. The laser power is changed to the value needed to write a halftone pattern to the drum.
2. The drum potential sensor reads the potential, Vh, from this pattern.
   Vh: Standard halftone drum potential
3. Vh should be –260 ± 20V. If it is within this range, the current value of the laser power will be used for copying.
   - If it is not, the laser power changes by 5 units, and the process starts again from step 1.
   - The laser power cannot be adjusted within the range –70 to +185.
4. If Vh cannot be adjusted to this standard within 45 attempts, LD power is set to the most recent value and SC316 (Potential Sensor Error 7) is logged.

ID Sensor Calibration (Vsg)

After power-on, Vsg (the ID sensor output from reading the bare drum) is set to 4.00±0.2V by changing the intensity of the light from the sensor shining on the drum. This can also be done at any time with SP3001 002 (ID Initial Setting – Vsg).

⇒

NOTE: If the ID sensor output cannot be adjusted to the standard, then after 20 seconds SC353 or SC354 is issued. Toner supply during copying will then be controlled using the TD sensor only, until the machine is repaired.

TECHNICAL SERVICE BULLETIN

BULLETIN NUMBER: B070/B071 – 003 **06/19/2003**

APPLICABLE MODEL:

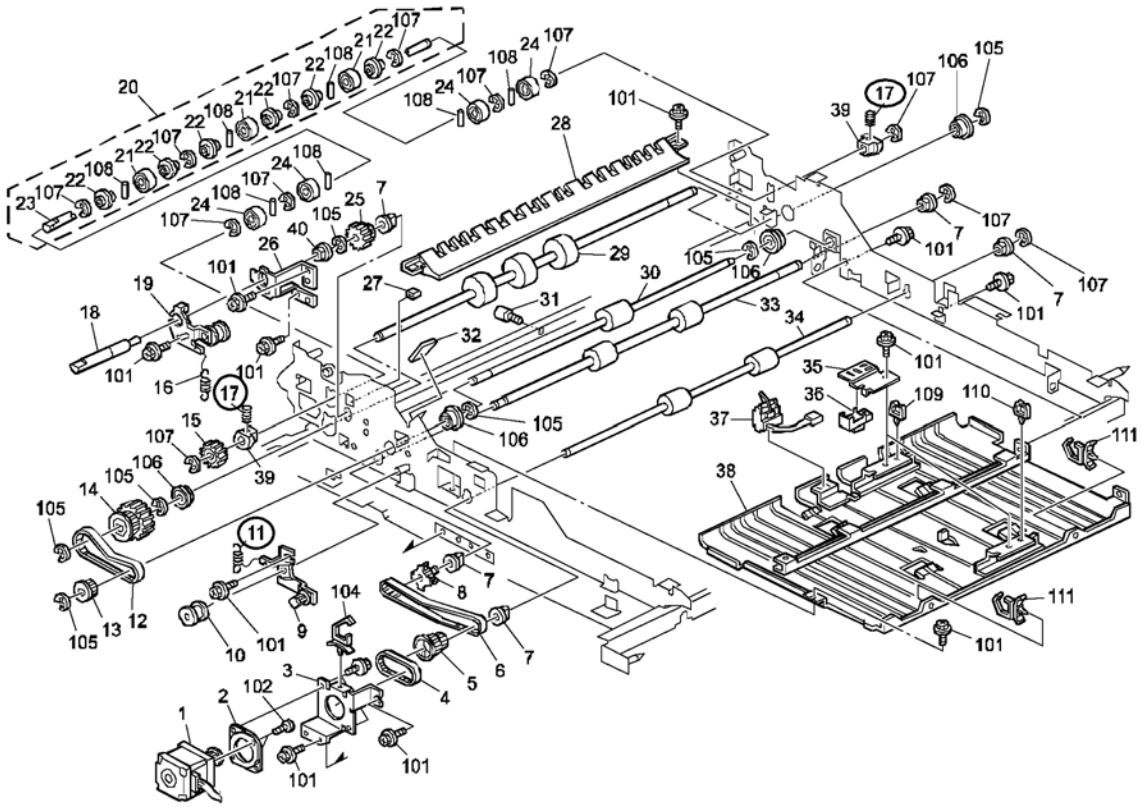
GESTETNER – 9002/10512
LANIER – LD090/LD0105
RICOH – AFICIO 2090/2105
SAVIN – 4090/4105

SUBJECT: PARTS CATALOG CORRECTIONS

PARTS

GENERAL:

The following parts were incorrectly listed in your B070/B071 Parts Catalog. Please correct your parts catalog with the following information. The following parts corrections are being issued for all B070/B071 Parts Catalogs.



INCORRECT PART NO.	CORRECT PART NO.	DESCRIPTION	QTY	REFERENCE PAGE	REFERENCE ITEM
AA060742		Tension Spring	1	129	11
	AA060806	Spring			
AA063255		Exit Roller Spring	2	129	17
	AA063666	Compression Spring: Pressure: Duplex			

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TECHNICAL SERVICE BULLETIN

BULLETIN NUMBER: B070/B071 – 004 **06/20/2003**

APPLICABLE MODEL:

GESTETNER – 9002/10512
LANIER – LD090/LD0105
RICOH – AFICIO 2090/2105
SAVIN – 4090/4105

SUBJECT: SERVICE MANUAL - INSERT

SERVICE MANUAL

The Service Manual pages listed below must be replaced with the pages supplied.

The revised areas have been highlighted by an arrow ⇒.

PAGES:

- xiii Updated Information (Table of Contents)
- 1-89 Updated Information (Installation of MFP Controller Options)
- 7-17 Updated Information (Connection Kit B328)

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FIRMWARE HISTORY

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1. MAIN MACHINE FIRMWARE MODIFICATION HISTORY 8-1

A3/DLT TRAY KIT (B331)

SEE SECTION B331 FOR DETAILED TABLE OF CONTENTS

LCT (B511)

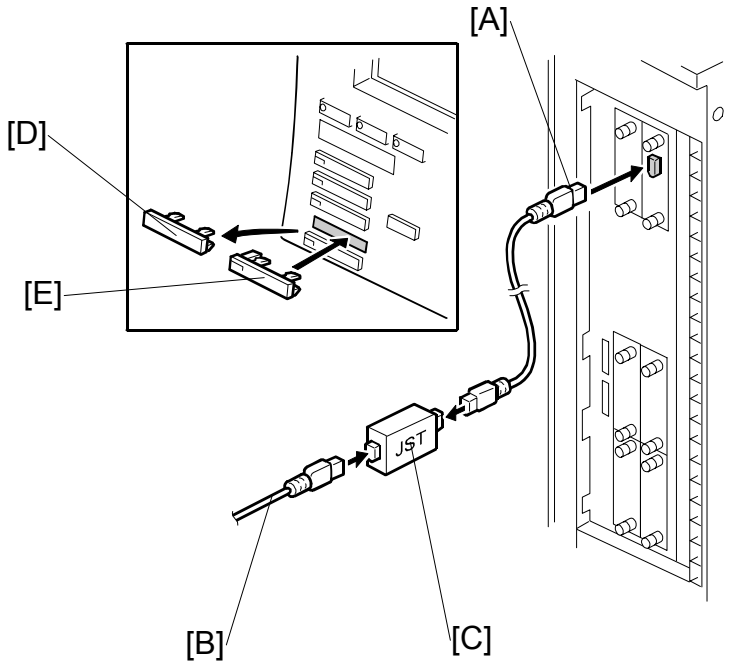
SEE SECTION B511 FOR DETAILED TABLE OF CONTENTS

3000-SHEET BOOKLET FINISHER (B468)

SEE SECTION B468 FOR DETAILED TABLE OF CONTENTS

3000-SHEET FINISHER (B478)

SEE SECTION B478 FOR DETAILED TABLE OF CONTENTS



11. Insert one end of the interface cable [A] to the connection PCB inserted in slot A2.
12. If additional interface cables are required, connect the cables [B] with the repeater hubs [C].
13. On the operation panel of the both machines, remove the second cover (or Printer key) from the bottom [D].
14. Install an appropriate key for each machine:

    Attach the “Printer/Other Function” key [E] (or its equivalent symbol keytop for EU) if the printer/scanner option is installed in the machine.

    -or-

    Attach the “Other Function” key [E] (or its equivalent symbol keytop for EU) if the printer/scanner is not installed in the machine.
15. Attach the other end of the connection cable to the connection PCB installed in the other machine.

⟹ 16. The following software must be downloaded onto both the master and slave machine.
- SYSTEM Ver. V3.04.1(install first) or later
- NCS (NIB) Ver. 4.13.3 or later
- NetFile Ver. 3.04.2 or later
- BCU (Engine) V4.01.1 or later
- LCDC (NA, EU) Ver. 2.09 or later

NOTE: For details about downloading procedures, see Section “5. Service Tables” of the Service Manual.

1.12 JOGGER UNIT B513

The Jogger Unit B513 is installed above the shift tray of the 3000 Sheet Finisher B478.

Paper Size	A3 SEF, B4 SEF, 11" x 17" SEF A4 LEF, B5 LEF, 8 1/2" x 11" LEF
Paper Weight	52 g/m^2 ~ 216 g/m^2
Weight	Less than 1.7 kg (3.7 lb.)
Dimensions (W x D x H)	125 mm x 450 mm x 100 mm 5" x 17.7" x 4"
Power Supply	DC 24 V, DC 5V (From Finisher)
Power Consumption	24 W

1.13 COVER INTERPOSER TRAY B470

Paper Separation	FRR System with Feed Belt
Paper Sizes	A3 ~ A5, 11" x 17" ~ 5 1/2" x 8 1/2"
Paper Weight	64 ~ 216 g/m^2
Capacity	200 sheets (80 g/m^2)
Power Supply (from main machine)	24 V ±10%, 5 V ±5% (From Finisher)
Power Consumption	Less than 48 W
Dimensions (W x D x H)	500 x 620 x 200 mm 19.7" x 24.4" x 7.9"
Weight	Less than 12 kg (26.4 lb.)

⇒1.14 CONNECTION KIT B328

Copy Speed		
B070 (90 cpm)	2 Connected:	180 cpm
B071 (105 cpm)	2 Connected	210 cpm
Operation		
Master Machine	Prints simultaneously with scanning, same as a stand-alone machine.	
Slave Machine	Starts printing after the 2nd set is printed on the master machine. **Note**: Start time may be slower, due to sizes of images.	
Document Server (Printing)		
Master Machine	Press the Start key to begin printing, same as a stand-alone machine.	
Slave Machine	Starts printing after the 2nd set is printed on the master machine. **Note**: Start time may be slower, due to sizes of images.	
Connection Cables		
Length (x1)	4. 5 m	1 cable, no repeater hub
Length (x2)	9 m	2 cables, 1 repeater hub for connection.
Length (x3)	13.5 m	3 cables, 2 repeater hubs for connection.