CATTLEYA 2
SERVICE MANUAL

⚠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 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 system control board has a lithium battery which can explode if replaced incorrectly. Replace the NVRAM only with an identical one. The manufacturer recommends replacing the entire NVRAM. Do not recharge or burn this battery. Used NVRAM must be handled in accordance with 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.
3. 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:

Symbols

This manual uses several symbols. The meaning of those symbols are as follows:

☛	See or Refer to
CT	Core tech manual
	Clip ring
	E-ring
	Screw
	Connector

TABLE OF CONTENTS

PERIPHERALS

ARDF (A663)

SORTER STAPLER (A831)

LCT (A683)

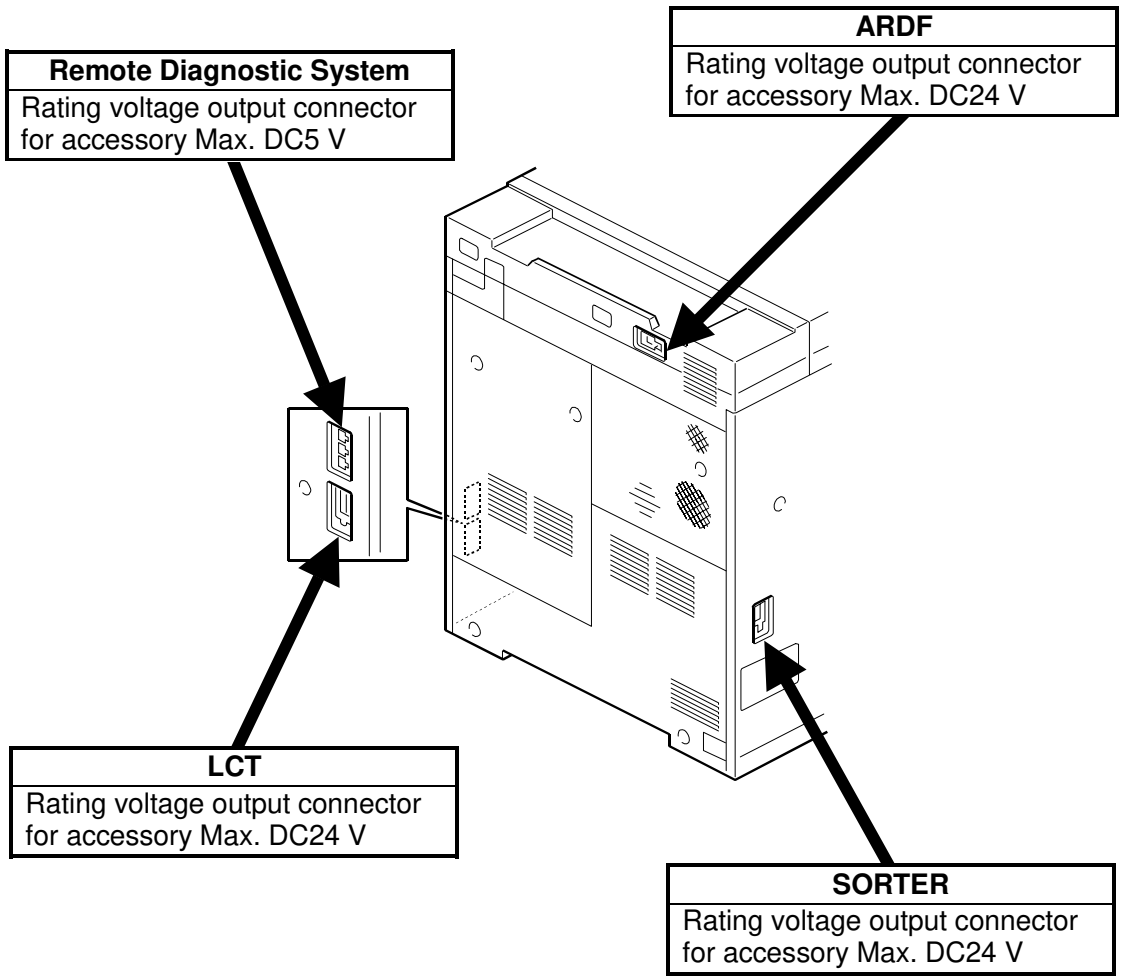
1. INSTALLATION PROCEDURES

1.1 INSTALLATION REQUIREMENTS

1.1.1 DIMENSIONS

⚠CAUTION

Rating voltage for Peripherals



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1.1.2 ENVIRONMENT

To ensure the optimum copy quality, the following environmental requirements need to be observed. When installing this copier at the customer site, make sure that the location meets the following requirements.

Environmental Requirements

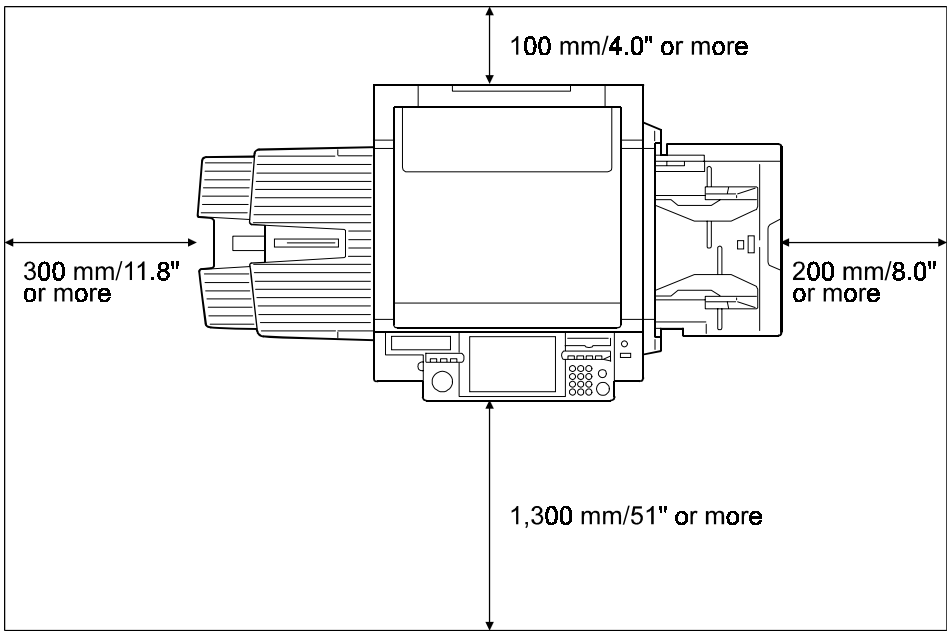
1. Avoid an area which is exposed to direct sunlight or is excessively illuminated (the illumination should not exceed 2,000 lux).
2. Avoid an area which is too hot and humid or too cold and dry.
   Standard temperature range: 10°C to 32°C
   Standard humidity range: 15% to 80%
   Limit of high temperature and humidity: 32°C/54% or 27°C/80%
3. Avoid an area near fire or heat.
4. Avoid an area which is exposed to sudden temperature changes. This includes areas where the machine will not be directly exposed to:
   1) Cool air from an air conditioner
   2) Heat from a heater.
5. Avoid a dusty area (maximum allowable amount of dust: 0.15 mg/m^3).
6. Avoid a poor-ventilated area (required minimum ventilation: 30 m^3/hr/man
7. Do not place the machine where it will be exposed to corrosive gases.
8. Place the machine on a level floor (the inclination on any side should be no more than 5 mm).
9. Do not place the machine where it may be subjected to strong vibrations.
10. Do not install the machine at any location over 2,000 m (6,500 feet) above sea level.
11. If the machine is installed close to other electronic equipment, they may interfere with each other. To avoid this problem:
    1) Keep the machine as far away as possible from television sets or radios.
    2) Reorient the receiving antenna of television sets and radios as needed.
    3) Use a separate outlet for the machine.

⚠CAUTION

1. Do not install the machine in a very humid or dusty area.
2. Do not install the machine on a shaky or inclined floor.

Minimum Space Requirements

Provide clearance for the copier, as shown below. If one or more options (such as the ARDF or sorter stapler) are added to the copier, this clearance should be provided around the entire system.



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NOTE: A space of at least 100 mm (4.0") at the rear of the machine is important for machine ventilation.

Power Requirements

⚠WARNING

1. **Install the machine as close to the outlet as possible. Firmly plug in the machine after installation.**
2. **Avoid multi-wiring.**
3. **The power cord should be placed where it cannot be stepped on or flattened by the machine. When installing the machine, route the power cord out of the way of general traffic.**
4. **Be sure to connect the power cord's grounding wire.**

1. Input voltage level:
   120 V, 60 Hz: More than 16 A (North America)
   220 V to 240 V, 50 Hz: More than 8 A (Europe, Middle Ease)
   220 V to 240 V, 50/60 Hz: More than 8 A (Asia)
2. Permissible voltage fluctuation: ±10%
3. Do not set anything on the power cord.

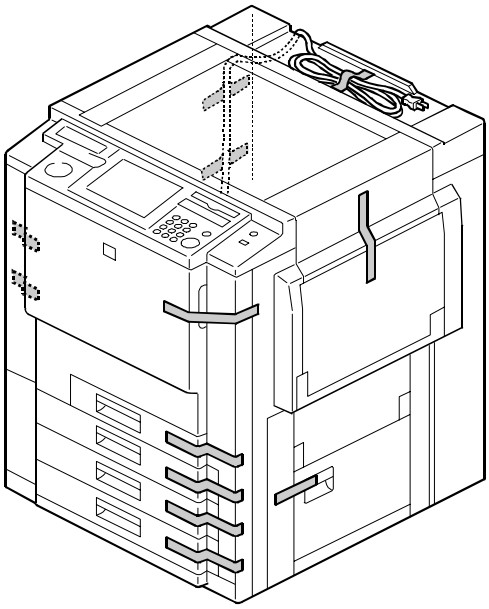
1.2 COPIER

1.2.1 ACCESSORY CHECK

Description	Qty
1. Operating Instructions Quick Reference	1
2. Operating Instructions Manual	1
3. Copy Tray	1
4. Tray Size Decal	1
5. Image Samples	1
6. Factory Data Sheet	1

1.2.2 PREPARATION

1. Remove the strips of filament tape shown in the figures to the right.



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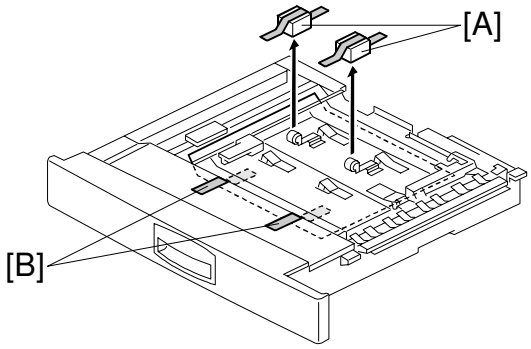
2. Pull out the duplex tray and remove the protectors [A] from the metal rollers.
3. Peel off the two strips of filament tape [B] and remove the protective sheet [C].
4. Lift the lower guide plate [D] and take out the protective sheet.



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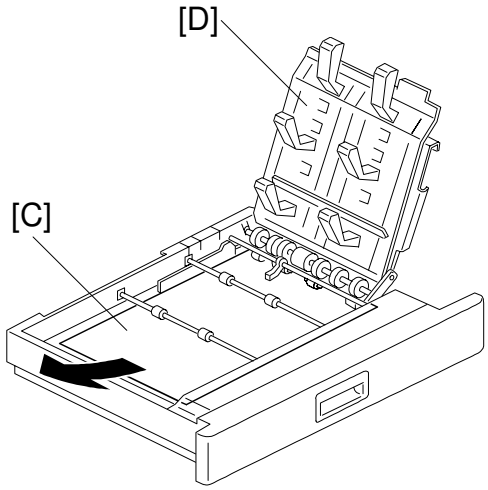

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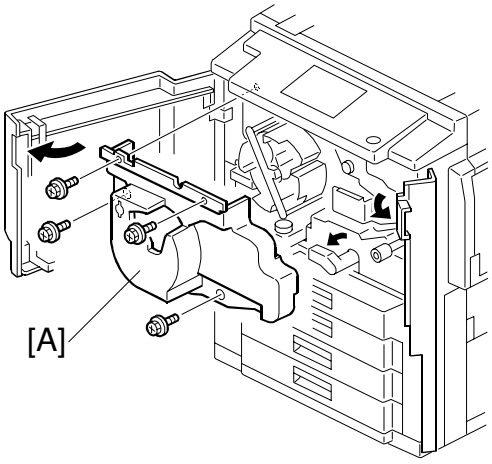
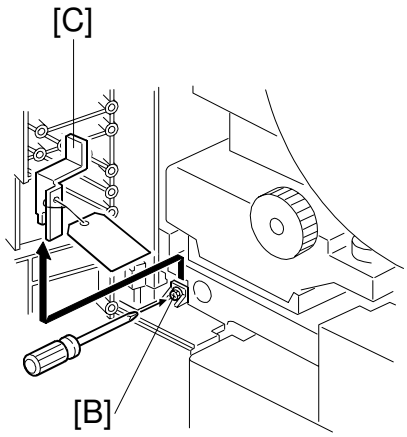
5. Open the front door and remove the revolver cover [A] (4 screws).



B023I102.WMF

6. Loosen the screw [B] (don't remove) then remove the fusing/transfer drawer clamp [C].
   NOTE: Keep the fusing/transfer drawer clamp in a safe location as it will be reused when relocating the copier.
   Part No.: A2691115
7. Tighten screw [B] again.



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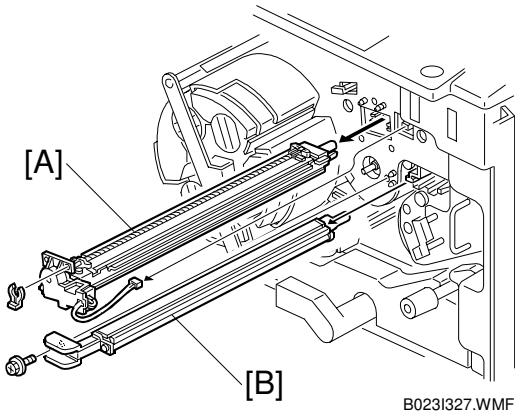
8. Remove the charge corona unit [A] (1 snap ring and 1 connector).
9. Remove the pre-cleaning corona unit [B] (1 screw).



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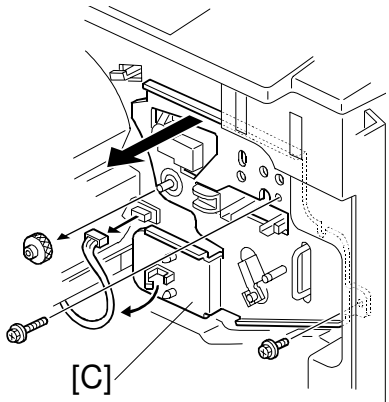
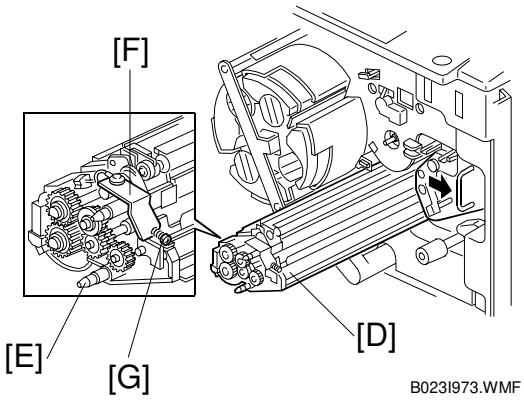
10. Remove the transfer faceplate [C] (3 long screws, 1 knob, 1 connector, and 2 clamps).



B023I390.WMF

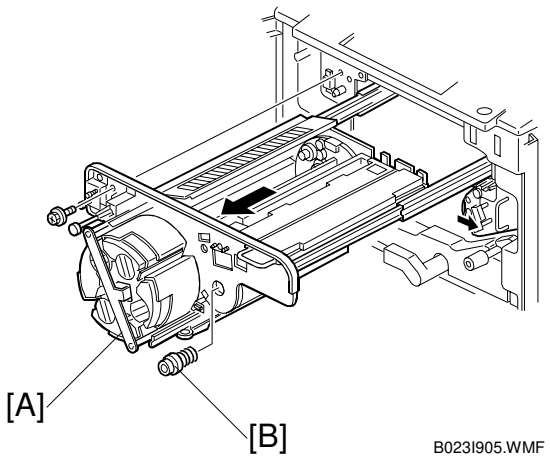
11. Remove the image transfer belt cleaning unit [D].

NOTE: 1) When removing and reinstalling the image transfer belt cleaning unit during servicing, please do so while holding the positioning pin [E].
2) Do not hold the entrance seal release lever [F]. If the lever is held, it will move and the gap will fall out of the adjustment range. This will cause the problems. (☛ 3.7.4)
3) The screw [G] that fastens the entrance seal release lever should not be loosened during servicing.



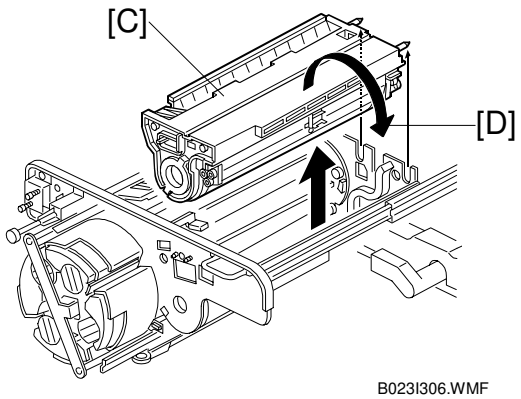
B023I973.WMF

12. Pull out the revolver/drum drawer [A] (1 long screw and a pressure spring [B]).
    NOTE: 1) Pulling out the drawer unit exposes the drum to light. Prolonged exposure can cause optical fatigue, resulting in poor image quality. Be sure to shield the drum unit with 5 or more sheets of paper.
    2) Make sure that the pressure spring [B] is in place before reinstalling the transfer faceplate.



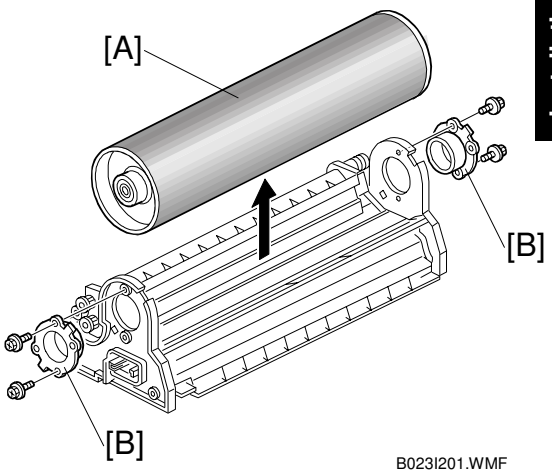
B023I905.WMF

13. Lift the drum unit [C] out of the revolver/drum drawer.
14. Rotate the drum unit clockwise as shown by the arrow [D] and set it upside-down.
    NOTE: If you do not rotate the drum unit as shown, toner might spill out.



B023I306.WMF

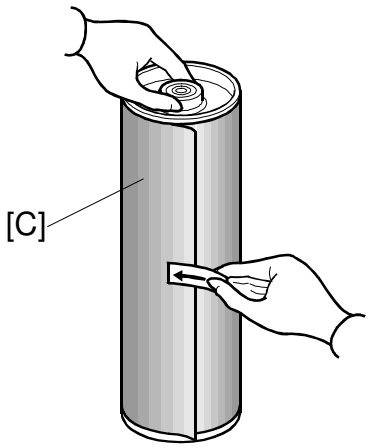
15. Remove the drum protective sheet
    [A]: Drum support bushing (🔩 x 2 each)
    [B]: Drum with the drum protective sheet.
    [C]: Drum protective sheet



B023I201.WMF

16. Apply setting powder to the entire drum surface then re-install the drum to the drum unit.
    NOTE: 1) Be sure to apply the setting powder over the entire drum. This prevents the cleaning blade from catching on the drum surface.
    2) Be sure not to spill the setting powder on the drum potential sensor.

    1) Turn the drum two or three rotations to settle the setting powder to the drum surface.
    NOTE: 1) Never remove the drum protective sheet while the drum is still in the drum unit. If you do, the drum cleaning blade will catch on the sheet. This can damage the drum surface.
    2) Only touch the edges of the drum unit. Do not touch any part further than 10 mm from the edge.
    3) Shield the drum unit with 5 or more sheets of paper after removing the drum protective sheet. Otherwise, exposure to light will cause optical fatigue, resulting in poor image quality.



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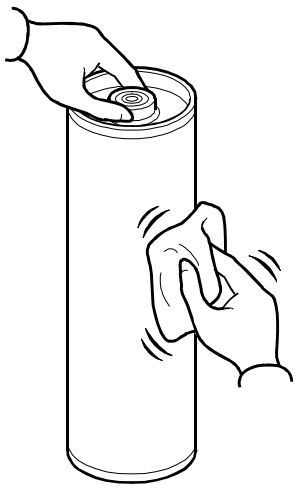
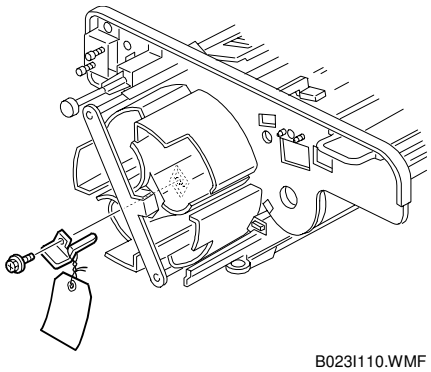


B023I960.WMF

17. Remove the revolver clamp (x 1).
    NOTE: Keep the revolver clamp in a safe location. If you ever need to relocated the printer, you can use it to hold the revolver in place.
    Part No.: A2573256

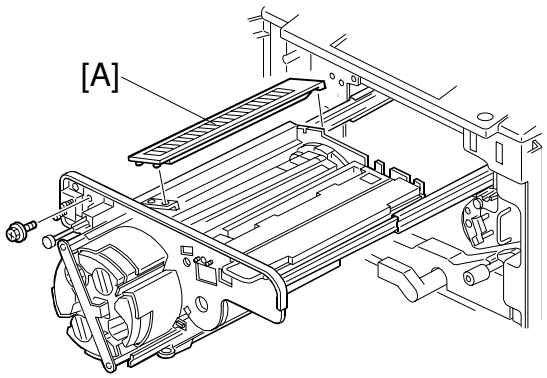


B023I110.WMF

1.2.3 DEVELOPER INSTALLATION

NOTE: Place a floor mat or other protective sheet on the floor. Take care not to contaminate the customer's floor.

1. Remove the revolver filter [A].

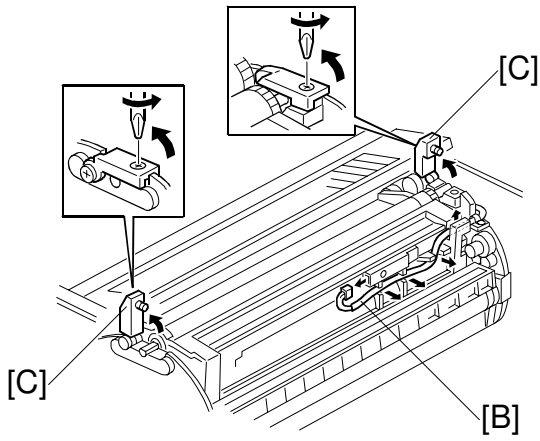


B023I325.WMF

2. Disconnect the toner density sensor connector [B] and open the development unit locks [C] at both ends of the revolver.

⚠CAUTION

Do not push the revolver/drum drawer into the copier with development locks left open. Otherwise, the revolver locks may strike the main unit frame, resulting in permanent damage to the revolver.

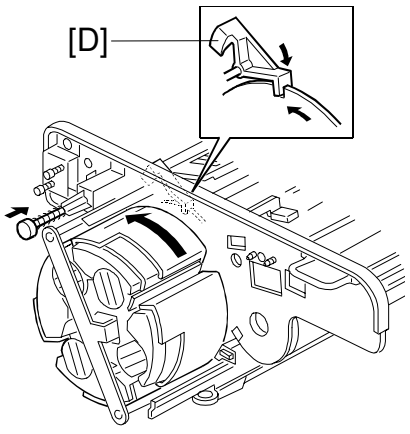


B023I308.WMF

3. Engage the revolver lock [D].

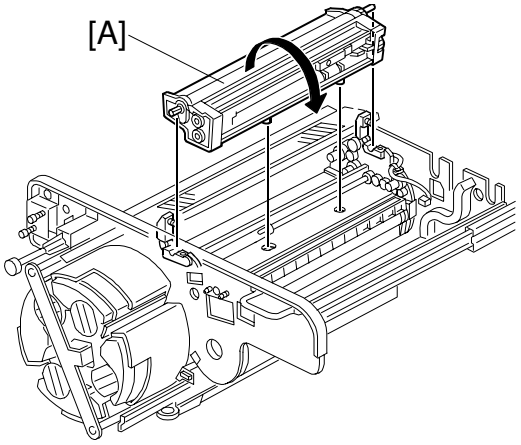
⚠CAUTION

1. **Be sure the pawl of the revolver lock [D] is engaged before removing a development unit. Failure to observe this precaution may allow the revolver to rotate, causing permanent damage to the development unit or its locks.**
2. **Always rotate the revolver counter-clockwise (as shown in the illustration). Otherwise, the developer might spill out.**



B023I357.WMF

4. Remove the development unit [A].
   NOTE: When you remove a development unit, be sure to rotate in the direction shown in the figure. Rotating a development unit in the wrong direction will spill developer.

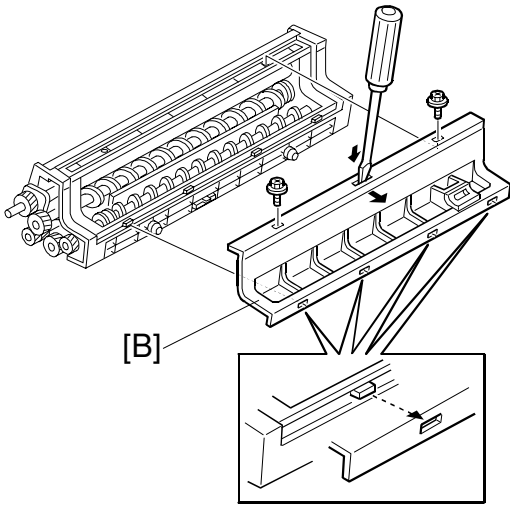


B023I309.WMF

⚠CAUTION

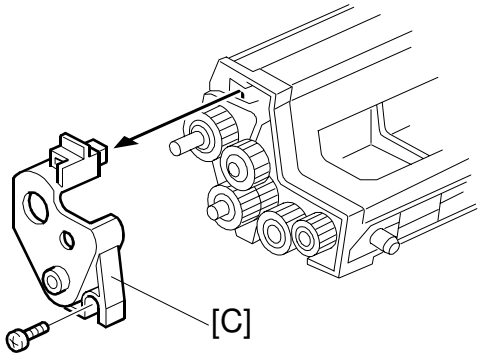
Remove only one development unit at a time. Removing two or more development units at the same time unbalances the revolver. This can cause the revolver to turn rapidly, possibly either catching your fingers, or rotating clockwise and spilling developer.

5. Remove the developer cover [B] (2 screws, 4 hooks). (Release the hooks with a screwdriver.)



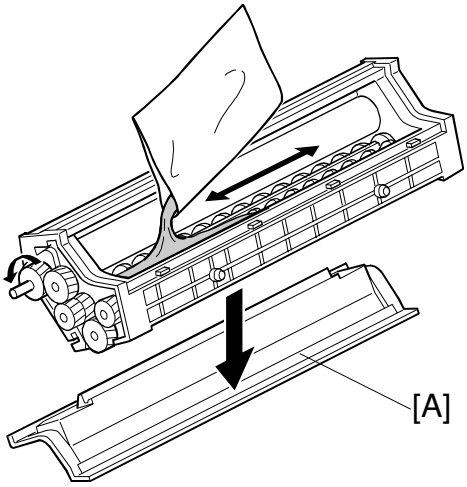
B023I151.WMF

6. Remove the development unit gear cover [C] (1 screw).



B023I908.WMF

7. Set the developer cover [A] as shown in the figure and place the development unit on it.
8. Pour 1 bag (700 g) of developer into the developer assembly.
9. Rotate the developer sleeve counter clockwise. You should turn it through several rotations, until it has a smooth coating of developer.
10. Put the development unit gear cover (1 screw) and the developer cover (2 screws) back on.

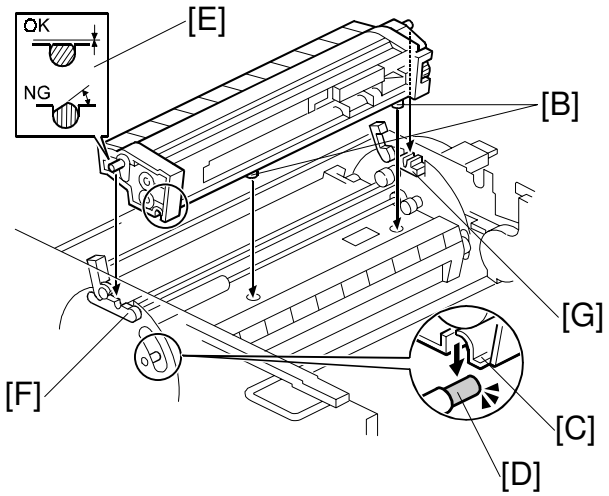


B023I351.WMF

11. Position the development unit in the revolver as shown to the right. Pins [B] fit into holes in the revolver, and positioning slots [C] fit over positioning pins [D] of the revolver. If set correctly, the flat top of the pin is level with the housing as shown [E].

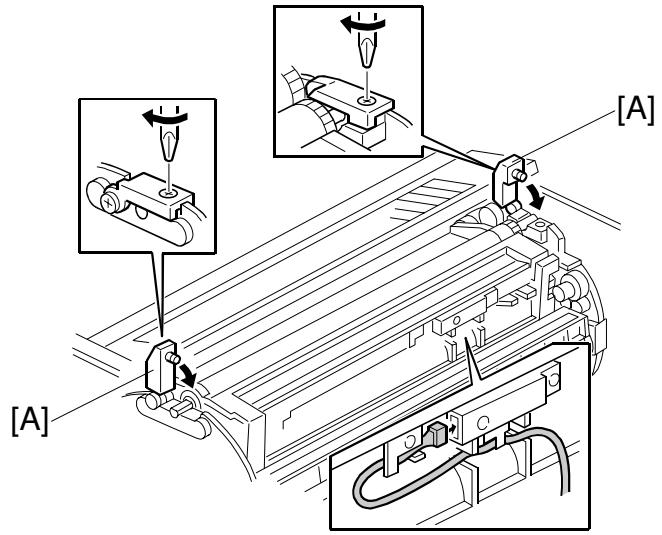
⚠CAUTION

The development unit locks can close even if the pins are set incorrectly. Be sure the pins are set properly, or developer may spill out as the revolver rotates.



B023R963.WMF

NOTE: PG seals may be located over the front [F] or rear [G] development sleev supporter. Some machines have them in both locations. Some have them only in the front or rear. This depends on the factory adjustments. Never add or remove the PG seals in the field.



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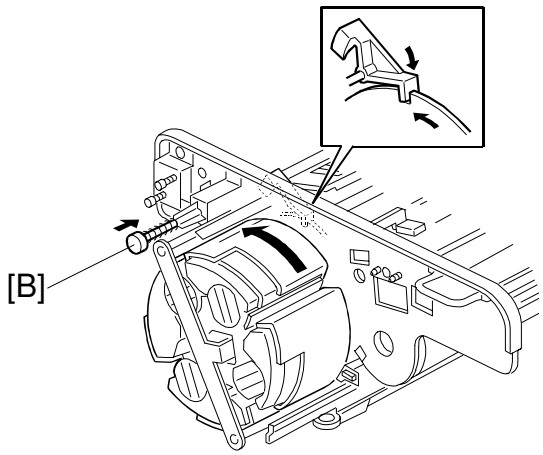


B023I357.WMF

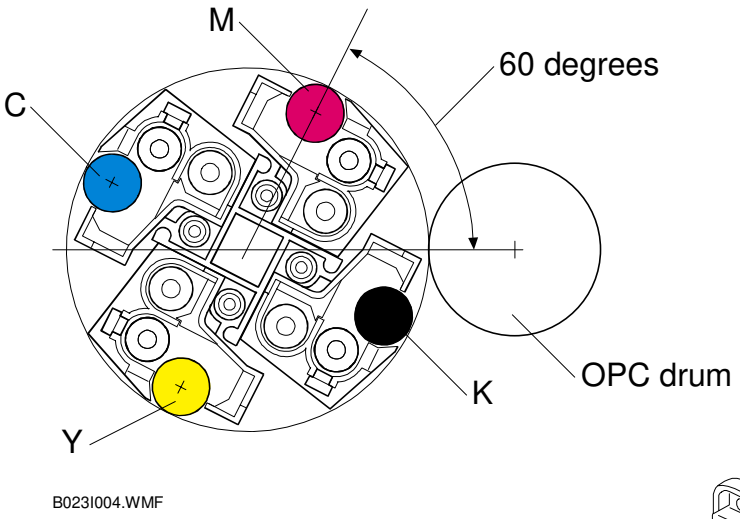
⚠CAUTION

1. **Make sure that the development locks [A] (forward and rear) are secured before rotating the revolver. This protects the development unit and locks from damage.**
2. **Make sure the development unit lock screws are tight. Loose lock screws will cause an uneven photoconductor gap**.

12. Press the revolver lock button [B] to release the revolver lock, rotate the revolver to the next color and install the new developer.

⚠CAUTION

1. **Be sure to set the revolver locks before removing the development unit. Failure to do this may allow the revolver to rotate, causing permanent damage to the development unit or its locks.**
2. **Always rotate the revolver counter-clockwise (as shown in the illustration). Otherwise, the developer might spill out.**



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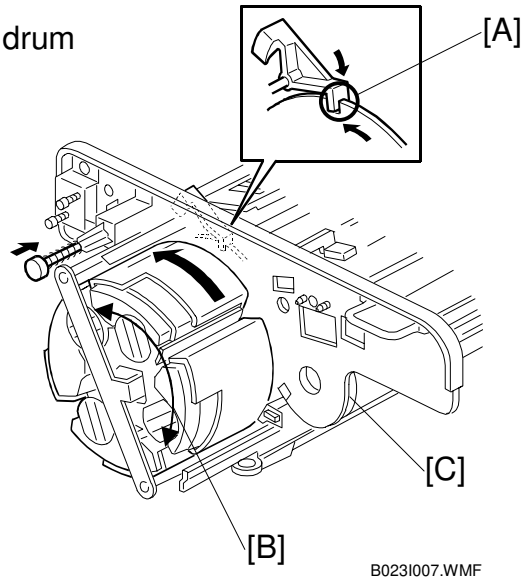


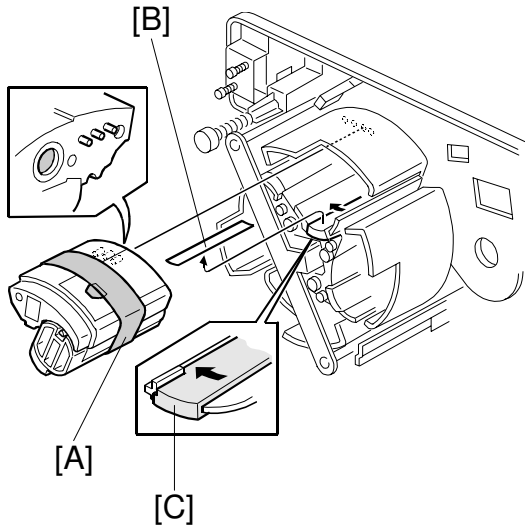
B023I007.WMF

13. Re-install the revolver filter. Then re-install the revolver drum drawer.

NOTE: 1) To prevent the drum from being damaged, the revolver unit must be set to its home position before the drum unit is set in the upper drawer unit. As shown in the above illustration, the magenta development roller should be positioned at an angle of 60 degrees (from horizontal). When rotating the revolver unit, you can see the cut-out [A] on the wheel, which locks the revolver unit in the home position.

2) If the gears on the mainframe and revolver unit are not engaged firmly, this may result in a gap between the revolver unit frame and copier frame (thus the unit will not be properly set). This also may cause the gears to be damaged when the revolver starts rotating. To ensure that the gears are properly engaged, it is necessary to manually fit (i.e. lock) the gears together by manipulating the revolver unit back and forth (slightly) as shown in the above illustration (arrow [B]). This should be done while holding the toner hoppers. To ensure that the gears between the drum and drum shaft properly engage, the flange [C] of the OPC drum must be pushed toward the back of the machine.

1.2.4 LOADING TONER CARTRIDGES



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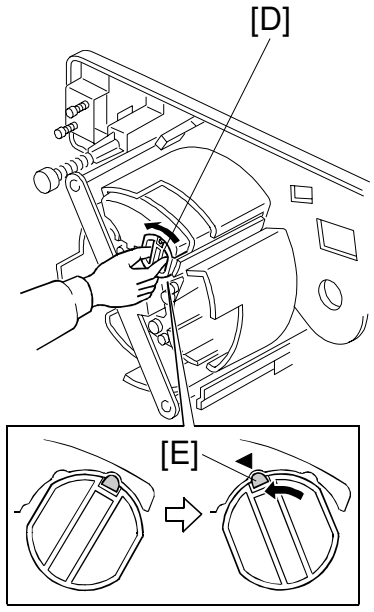


B023I119.WMF

1. Remove the tape strip [A] securing the toner cartridge.
2. Remove the tape strip [B] securing the toner supply shutter.

⚠CAUTION

Only remove the toner supply shutter tape when the toner cartridge holder is in the toner replacement position. Otherwise, you will spill toner.

3. Shift the toner supply shutter to the left [C].

⚠CAUTION

Be sure to shift the toner supply shutter after removing the tape strip.

4. Confirm that the toner cartridge has the same color as the toner supply shutter and set the toner cartridge in the cartridge holder.
5. Turn the cartridge lever to the left [D].

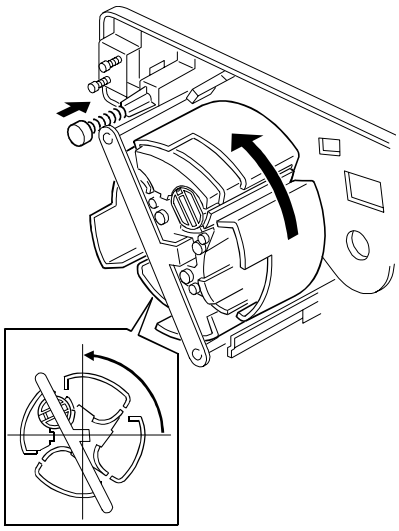
⚠CAUTION

1. **Only install the toner cartridge when the cartridge holder is in the toner replacement position.**
2. **Make sure the cartridge lever is locked, as shown in figure [E].**

⚠CAUTION

In the next step, be sure to turn the revolver counterclockwise. Otherwise, the developer might spill out.

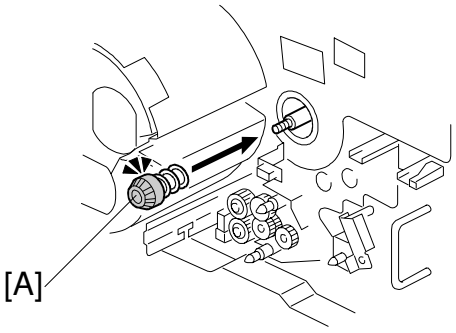
6. Press the revolver lock release lever and turn the revolver 90 degrees counterclockwise. Then install the next color's toner cartridge, following the steps above.
7. While pushing the image transfer belt to the right, reinstall the belt's cleaning unit.



B023I120.WMF

⚠CAUTION

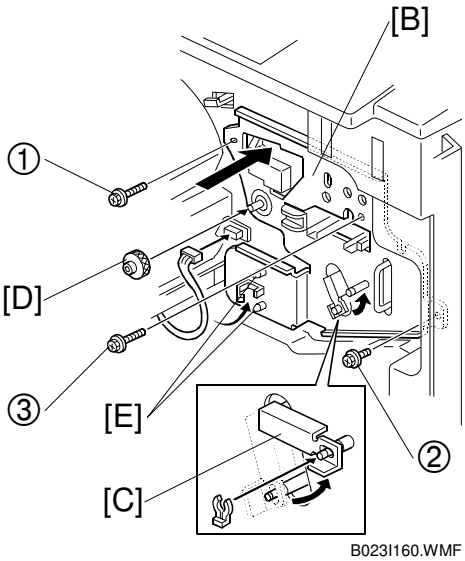
Make sure the pressure spring [A] is in place before reinstalling the transfer face plate. The pressure spring holds the drum unit in place—if it is missing, the photo conductor gap will be out of alignment. This could damage the OPC drum or development sleeves.



B023I976.WMF

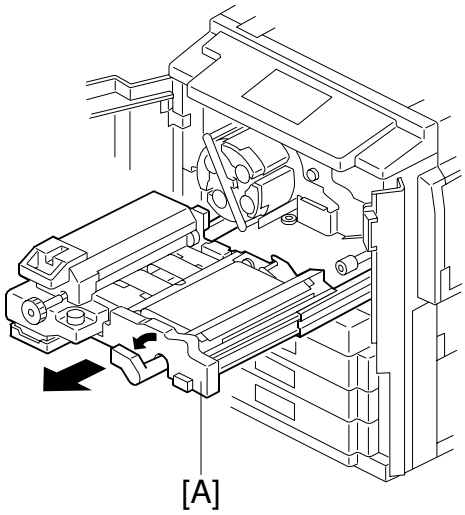
NOTE: 1) When reinstalling the transfer faceplate, tighten the knob [D] before tightening the other screws.
2) Pushing upper left part of the faceplate against the revolver/drum drawer, tighten the three screws in the following order: ① ② ③

8. Reinstall the transfer faceplate [B] (3 long screws, 1 knob, 1 connector, and 2 clamps). Raise the transfer belt tension lever [C] to the image transfer position (1 snap ring). Then reinstall the charge and PCC coronas.
   NOTE: After reinstalling the transfer face plate, press back on the two shafts [E]. This ensures that the ITB cleaning unit is set correctly.

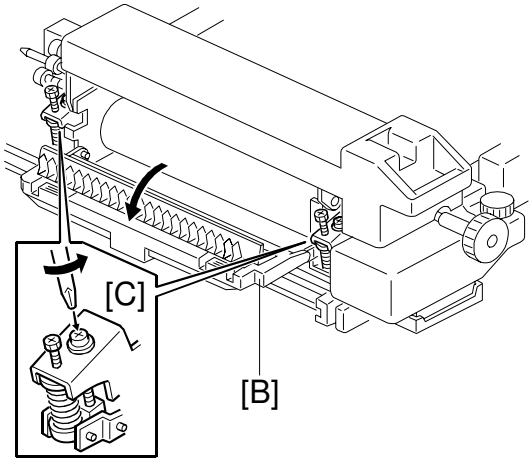


B023I160.WMF

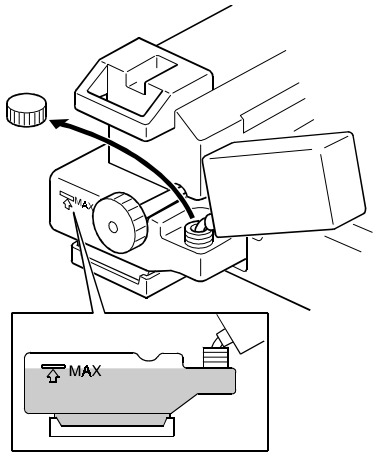
1.2.5 FUSING UNIT



B023I123.WMF



B023I125.WMF



B023I124.WMF

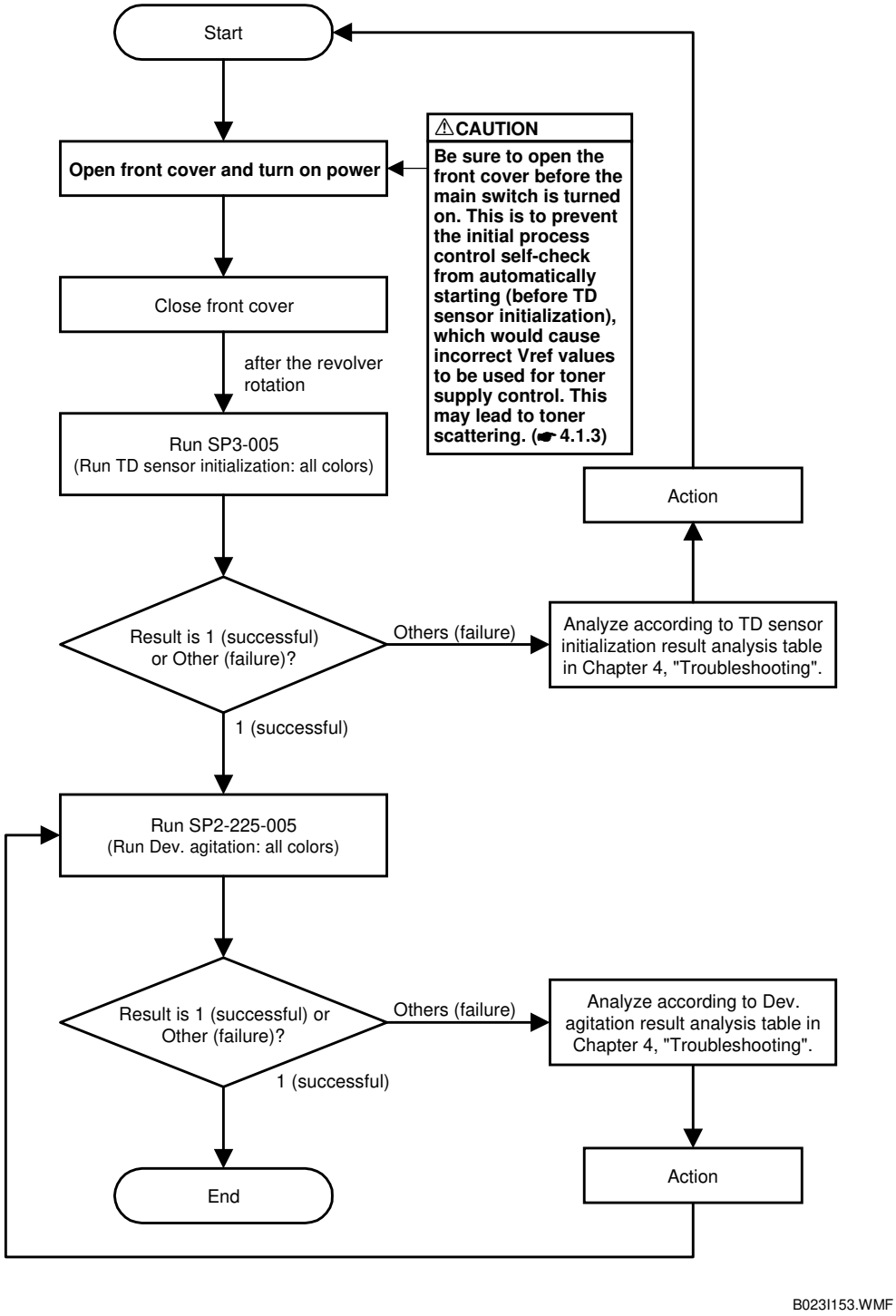
1. Pull out the fusing/transfer drawer [A].
2. Open the paper exit cover [B] and completely loosen (don't remove) the fusing pressure release screws [C] (2 black screws).
3. Fill the oil tank with silicone oil up to the "MAX" mark.

⚠CAUTION

Take care not to spill silicone oil on the floor. If silicone oil is spilled, wipe it up completely. Otherwise, the floor will get slippery and you might slip and fall.

1.2.6 DEFAULT SETTINGS AND OPERATION CHECKS

1. Install the revolver cover (4 screws).
2. Follow the procedure in the flow chart below after installing.

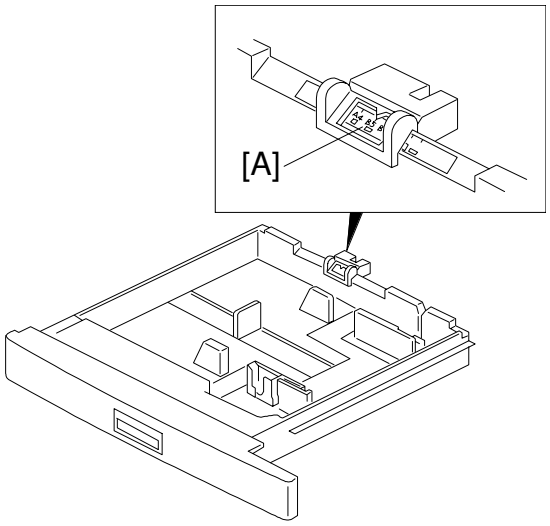


B023I153.WMF

3. Load paper in the paper trays and set the paper tray sizes.

   1st Tray
   1) Press the [User Tools/◈] key and then the [System Settings] key.
   2) Press [Next] until Tray Paper Size is displayed.
   3) Press the [Change] key corresponding to the tray you want to change.
   4) When the paper size and orientation menu appears, select the Paper Size and Orientation and press [OK].
   5) Press [Prev] to return to the [System Settings] menu screen, then press [OK] to exit the default settings mode.
   6) Make sure that the paper size and orientation you set up from the touch panel display matches the actual paper size.

   2nd and 3rd Tray
   1) Set the paper size selector [A] of each paper tray to the appropriate paper size.
   2) Make sure that the paper size displayed on the touch panel matches the actual paper size.



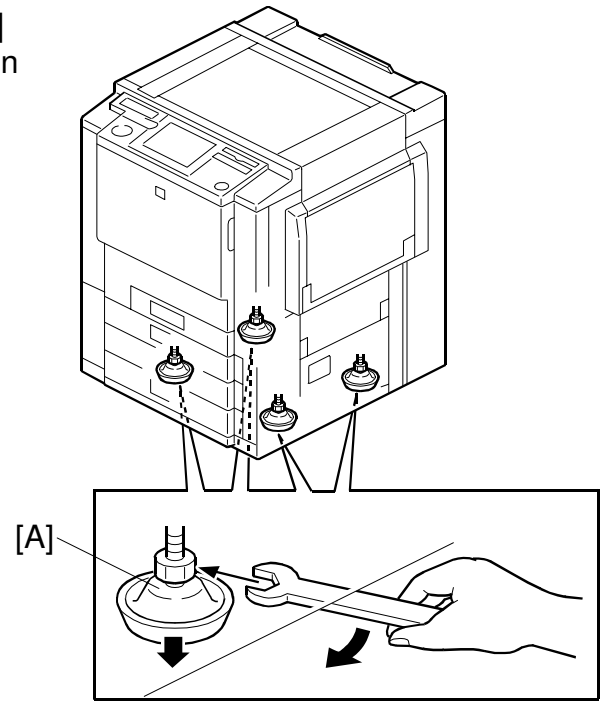
B023I159.WMF

NOTE: If you move the paper size selector [A] to the "*" position, paper size is selected through the user tools.

4. Make copies of image samples (letter, photo, and letter/photo modes).
5. Press the [User Tools/◈] key.
6. Run Automatic Color Calibration (ACC) from "Default Settings."
   NOTE: Since this unit has been subject to color adjustment using Automatic Color Calibration (ACC) at factory, there is no need to make automatic color calibration again if the customer is satisfied with the image sample he or she generated. For the detailed automatic color calibration procedure, refer to the Operating Instructions manual for the customer.
7. Make sure that the sample image has been copied normally.

1.2.7 HEIGHT ADJUSTMENT

1. First, screw down the leveling feet [A] enough to lock the machine in position
2. Next, level the machine.



B023I129.WMF

1.2.8 COUNTER DISPLAY SETTING

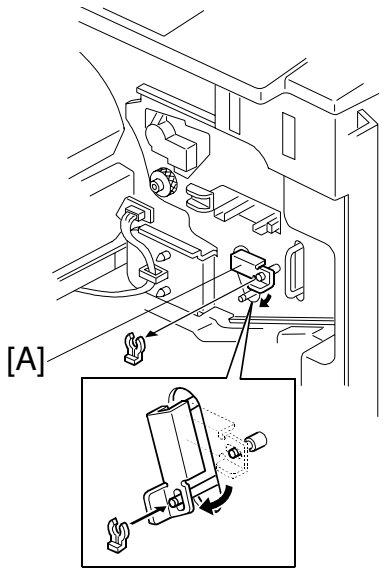
1. Enter the SP mode.
2. Run SP7-008-000, “Counter Display Setting”.
3. Select which counter to be displayed.
   1 = counter based on developments
   2 = counter based on copies/prints

NOTE: The setting can be selected only once. After you have selected a counter, it cannot be changed. If the wrong setting is selected by mistake, contact your key person.

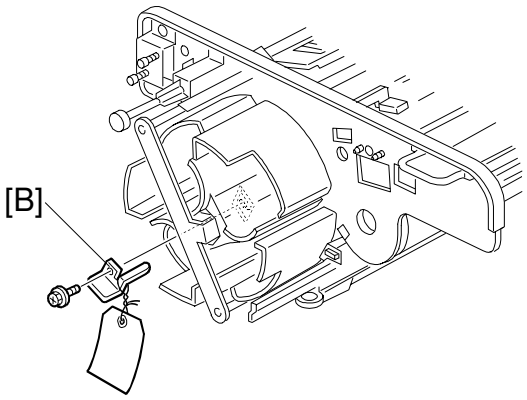
1.2.9 RESETTING THE ELECTRONIC TOTAL COUNTER

1. Enter the SP mode.
2. Run SP7-825, “Total Counter 0 Reset”.
3. Exit the SP mode and press the [Counter] key on the operation panel to confirm that the electronic total counter is set to “0”.

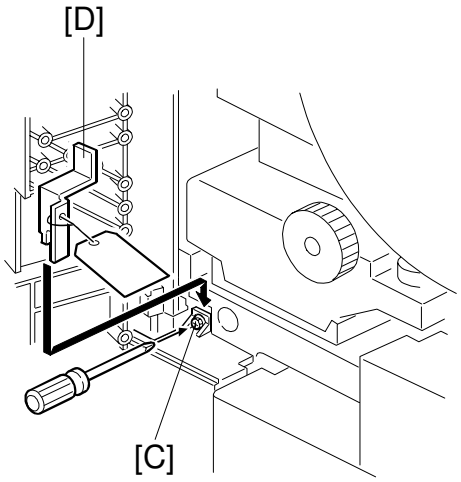
1.2.10 PREPARATION FOR TRANSPORT



B023I127.WMF



B023I110.WMF

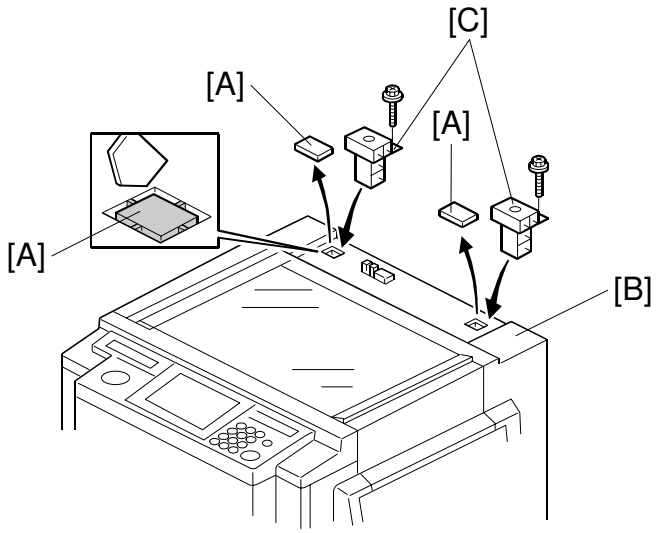


B023I191.WMF

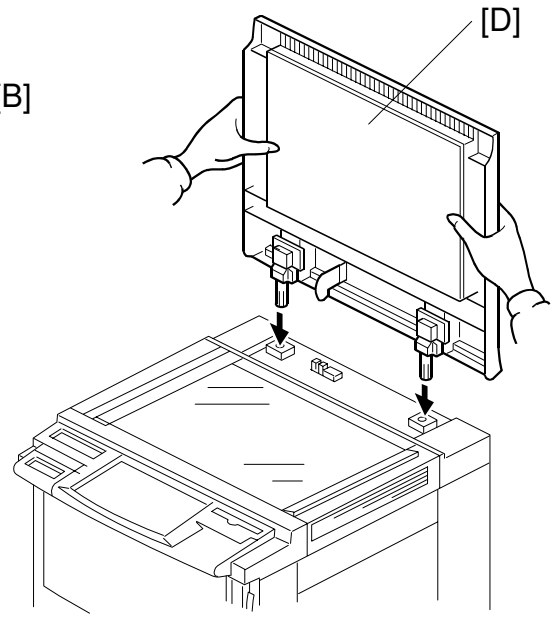
1. Remove the revolver cover and release the transfer belt tension lever [A] (one snap ring).
2. Install the revolver clamp [B]. The revolver must be at its home position.
   NOTE: Keep the revolver clamp in a safe location as it will be reused when relocating the copier.
   Part No.: A2573256
3. Loosen the screw [C] (don't remove) and re-install the fusing/transfer drawer clamp [D]. Then tighten the screw [C] again.
   NOTE: Keep the fusing/transfer drawer clamp in a safe location as it will be reused when relocating the copier.
   Part No.: A2691115

1.3 PLATEN COVER (A749-01)

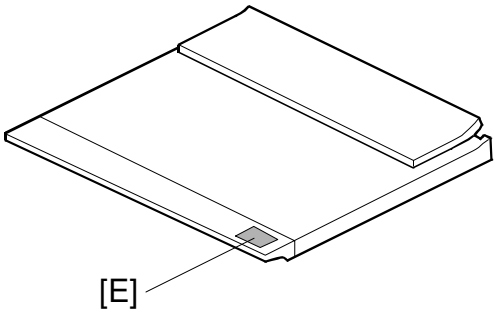
1.3.1 INSTALLATION



A749I504.WMF



A749I500.WMF



A749I503.WMF

1. Cut the platen holder cover [A] out of the upper rear cover [B] with wire cutters.
2. Insert the platen holders [C] as shown (1 screw for each).
3. Install the platen cover [D] as shown.
4. Attach the caution decal [E] that comes with the copier as shown.

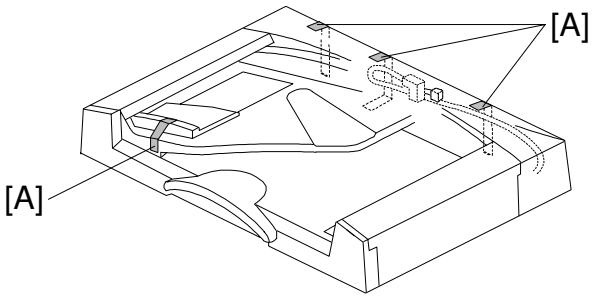
1.4 ARDF (A663)

1.4.1 ACCESSORY CHECK

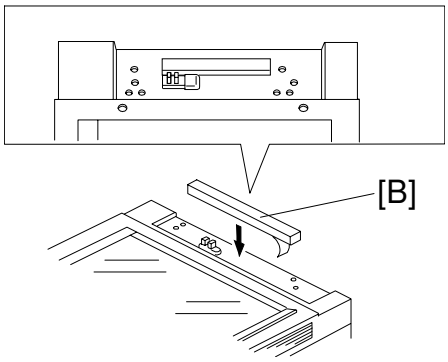
Check the quantity and condition of the accessories in the box with the following list:

Description	Qty
1. New Eequipment Condition Report	1
2. Installation Procedure	1
3. Stud Screw	1
4. Philips Screw with Flat Washer – M4x10	1
5. Sponge Retainer	1

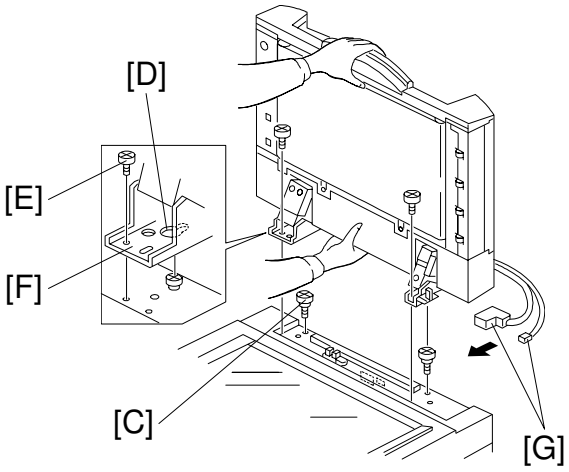
1.4.2 INSTALLATION



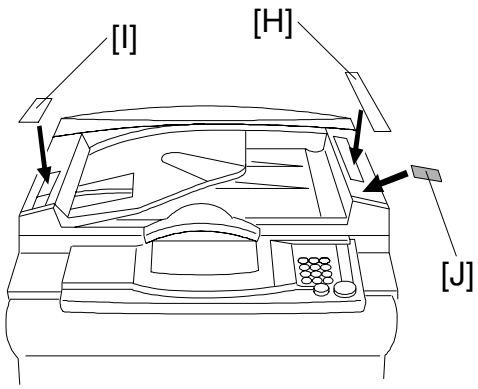
A663I500.WMF



A663I501.WMF



A663I502.WMF



A663I503.WMF

⚠CAUTION

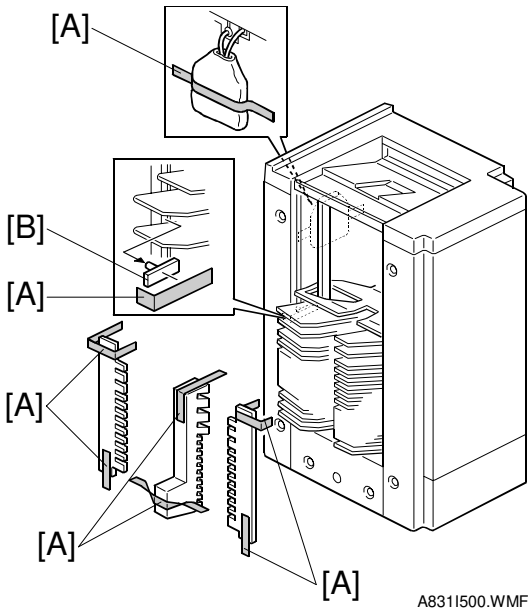
Unplug the copier power cord before starting the following procedure.

1. Remove the strips of tape [A].
2. Stick the sponge retainer [B] on the top cover of the copier as shown.
3. Tighten the two stud screws [C].
4. Mount the ARDF by aligning the holes [D] in the ARDF and the stud screws [C], then slide the ARDF to the front as shown.
   kl qbWWhen mounting the ARDF, hold it by hand as shown in the illustration. Holding it in another way may damage the ARDF.
5. Screw the two stud screws [E] into the holes [F] and tighten them.
6. Connect the connectors [G] into the socket on the rear of the copier.
7. Attach the symbol explanation decal [H], the combine originals explanation decal [I], and the caution decal [J] which comes with the copier to the ARDF as shown.

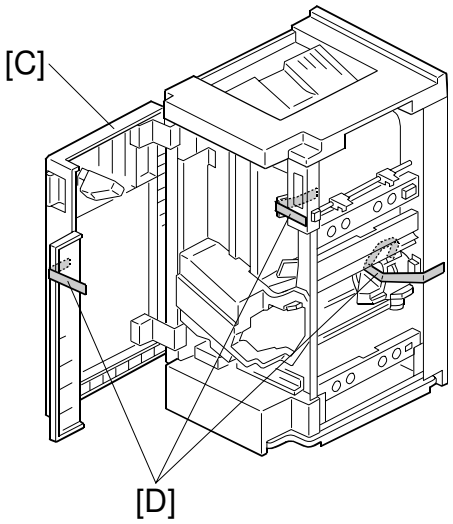
1.5 SORTER STAPLER (A831)

1.5.1 INSTALLATION

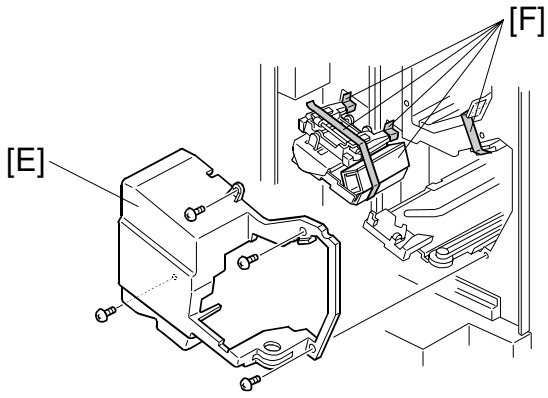
NOTE: When installing A831 sorter stapler to B023 copier, the ROM version of A831 should be “G” or later. Otherwise, paper jam may occur during the jogging function. To confirm the ROM version of A831, enter SP7-801-005. The last digit (for example “G”) means the ROM version.



A831I500.WMF



A831I501.WMF

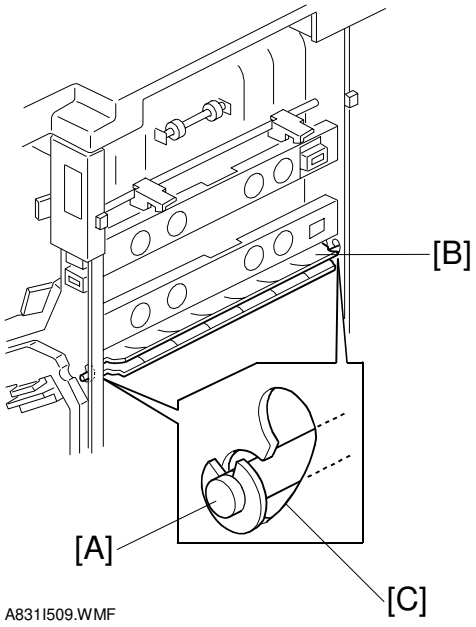


A831I502.WMF

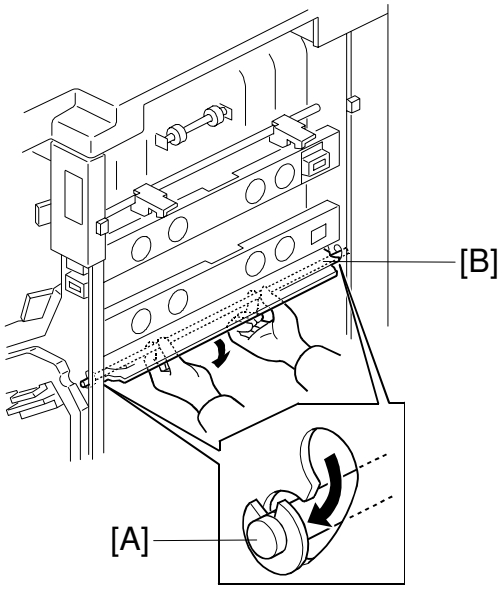
⚠CAUTION

Unplug the copier power cord before starting the following procedure.

1. Remove the strips of tape [A] and the shipping retainers [B].
2. Open the front door [C] and remove the strips of tape [D].
3. Remove the stapler cover [E] (4 screws), and remove the strips of tape and shipping retainers [F].



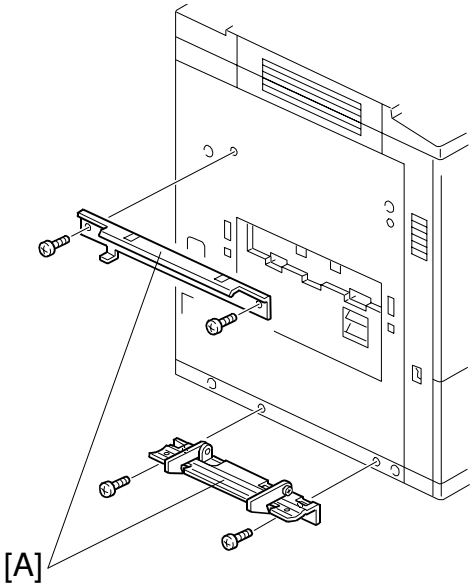
A831I509.WMF



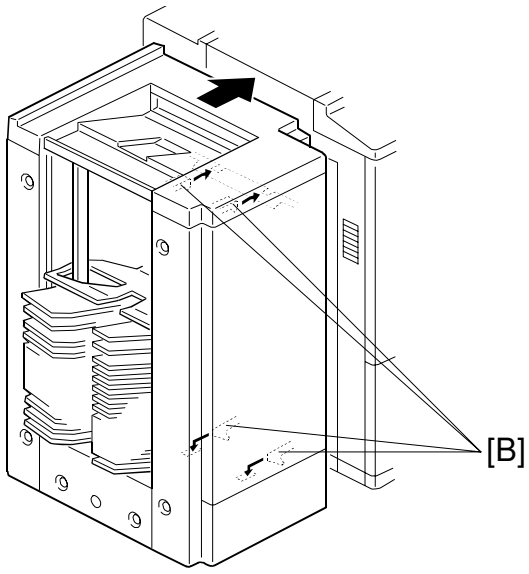
A831I508.WMF

4. Confirm that the shaft [A] of the guide plate [B] is in the lower position of the opening [C]. If it is not, move it to the lower position.

NOTE: 1) Be careful not to bend the guide plate.
2) If the position of shaft [A] is not correct, guide plate may be bent when installing the sorter stapler on the copier. A bent guide plate can cause paper jams.

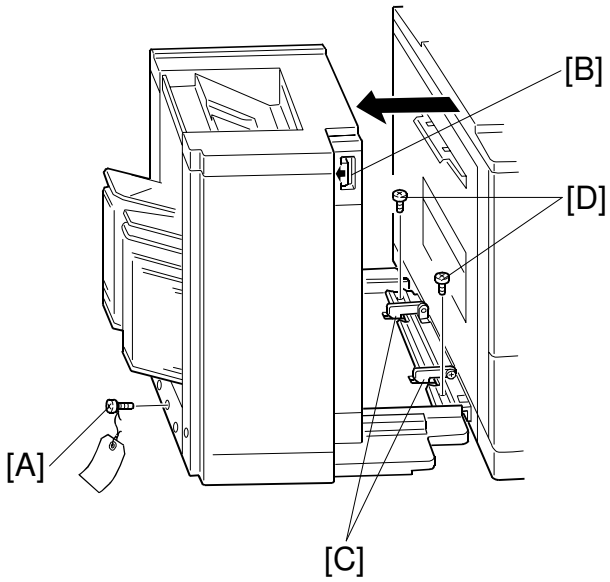


A831I503.WMF

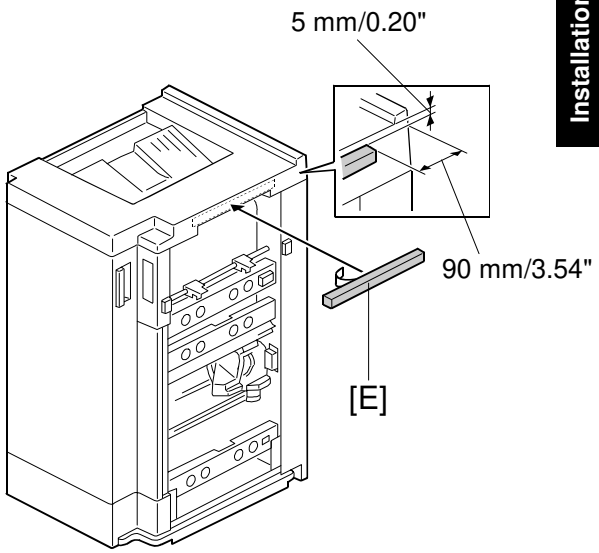


A831I504.WMF

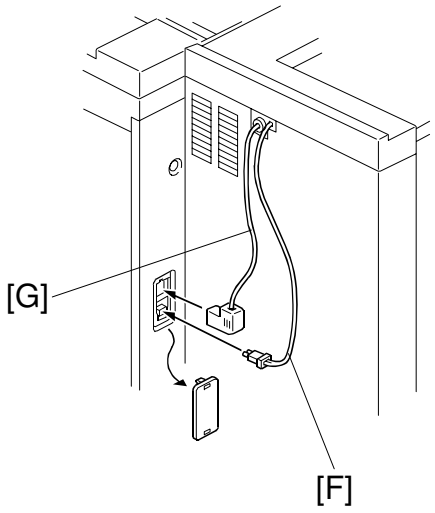
5. Mount the sorter stapler mounting brackets (2 types) [A] on the copier as shown (2 screws for each bracket).
6. Set the sorter stapler to the copier temporarily (4 hooks [B]).



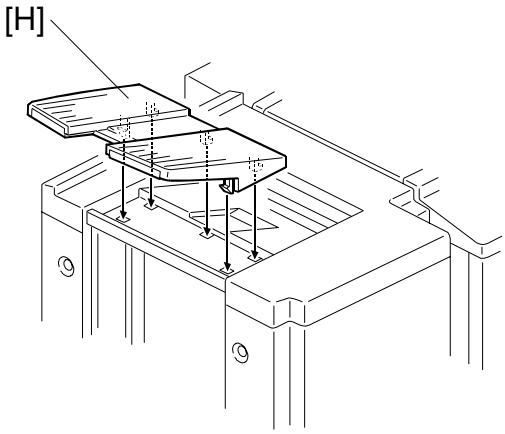
A831I505.WMF



A831I510.WMF



A831I506.WMF



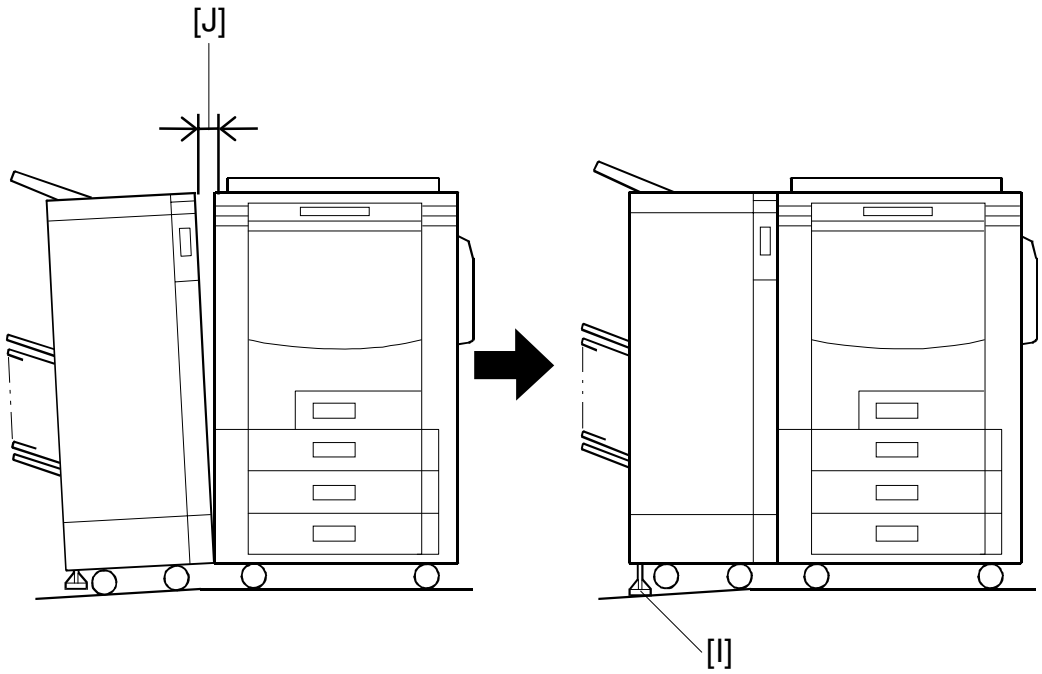
A831I511.WMF

7. Remove the screw [A], and pull out the sorter stapler half-way after releasing the lock lever [B]. Then secure the mounting bracket [C] with two screws [D].

⚠CAUTION

When pulling out the sorter stapler, make sure that the lower hooks are properly engaged in the sorter stapler's baseplate. Otherwise, the sorter stapler may fall over.

8. Affix the sponge seal [E] to the position shown in the figure.
9. After locking the sorter stapler, connect the optical fiber cable [F] and connector [G] to the copier.
10. Set the output tray [H] as shown.

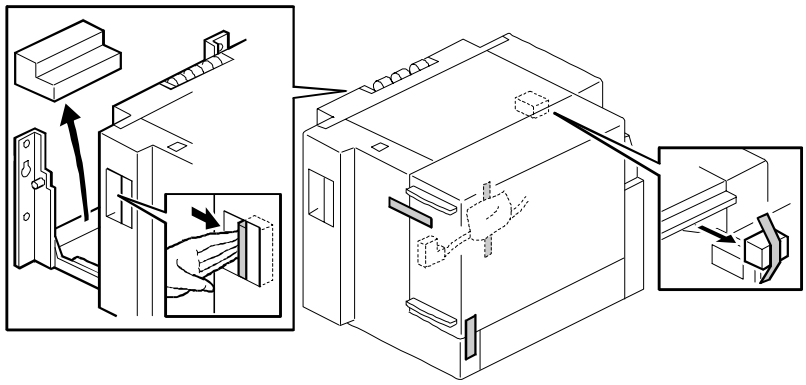


A831I507.WMF

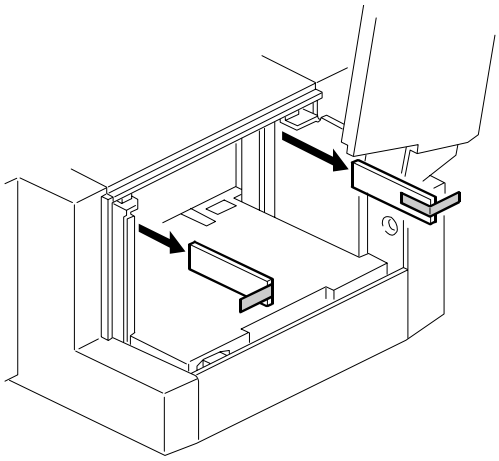
11. Use the height adjuster [I] to eliminate any gap [J] between the sorter stapler and the copier.

1.6 LCT (A683)

1.6.1 INSTALLATION



A683I501.WMF



A683I500.WMF

⚠CAUTION

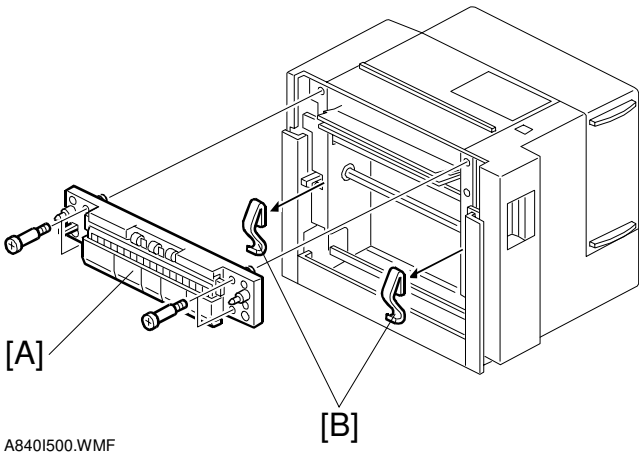
Unplug the main machine power cord before starting the following procedure.

1. Unpack the LCT and remove the tapes.

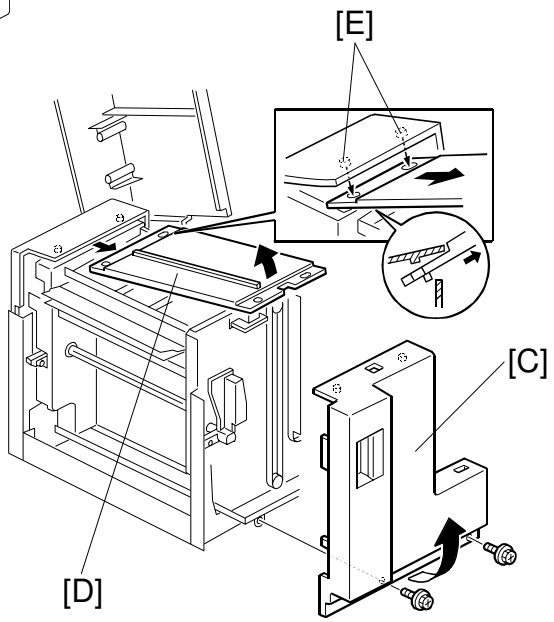
NOTE: The LCT Adapter (A840) must be installed at the same time. See the installation procedure of the LCT Adapter (A840) when installing this LCT (A683).

1.7 LCT ADAPTER (A840)

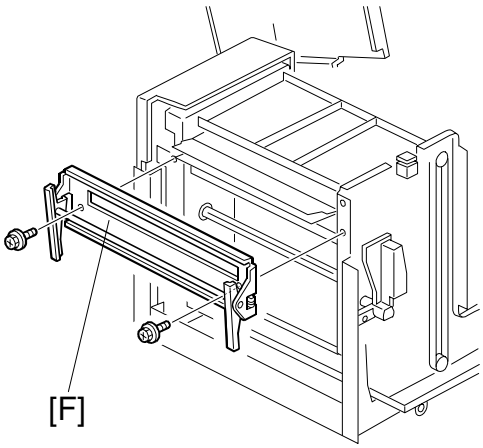
1.7.1 INSTALLATION



A840I500.WMF



A840I501.WMF



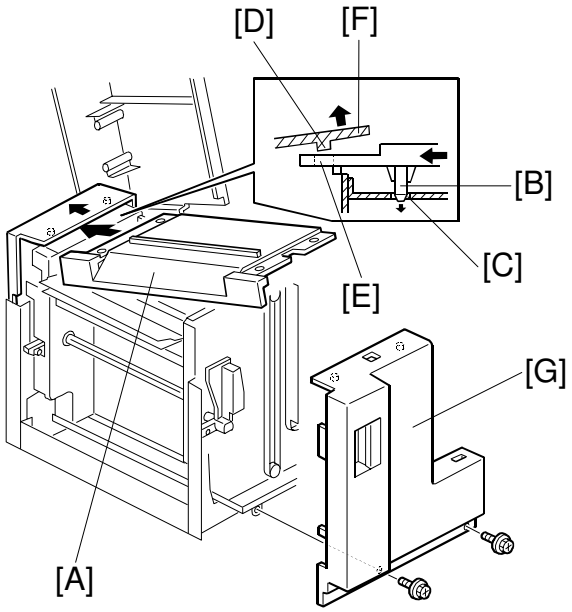
A840I502.WMF

⚠CAUTION

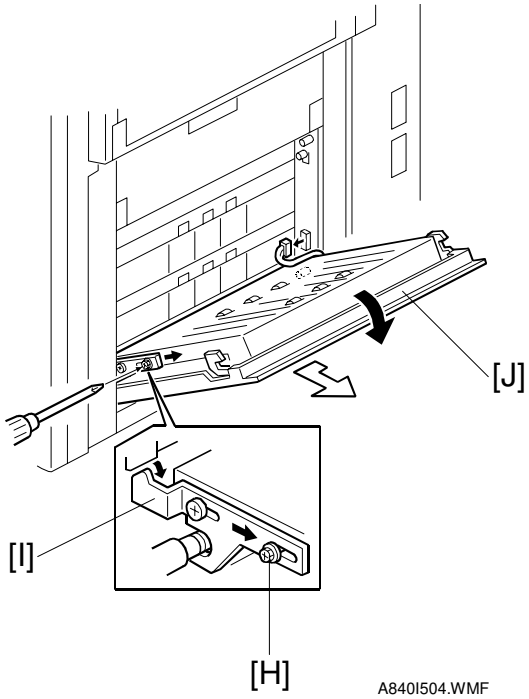
Unplug the copier power code before starting the following procedure.

NOTE: The LCT (A683) must be unpacked before starting the following procedure.

1. Remove the paper transport unit [A] (4 stud screws) and the springs [B] (adhesive tape) from the LCT.
2. Remove the LCT front cover [C] (2 screws) and remove the LCT upper cover [D] while lifting up the front side (pulling out from the bosses [E]).
3. Install the transfer unit [F] on the LCT (2 M4 x 8 screws).

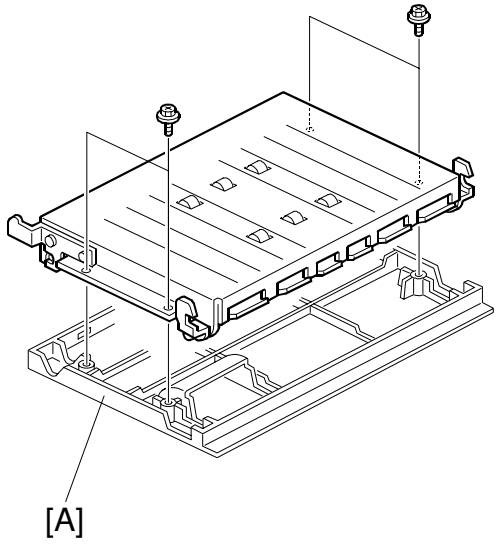


A840I503.WMF

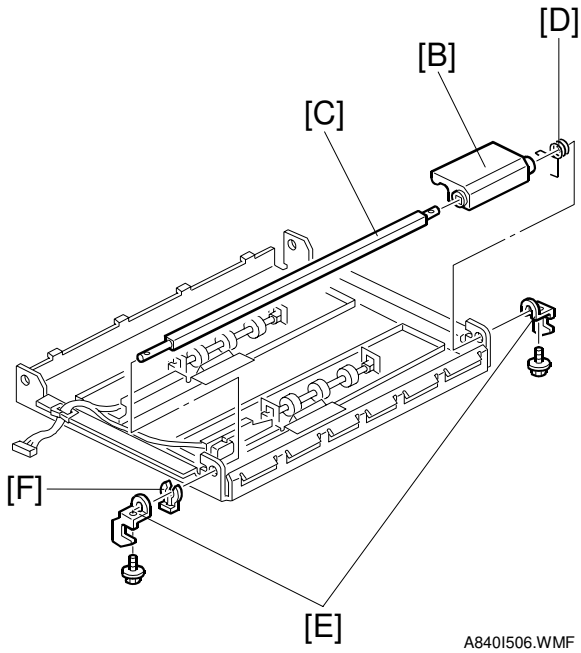


A840I504.WMF

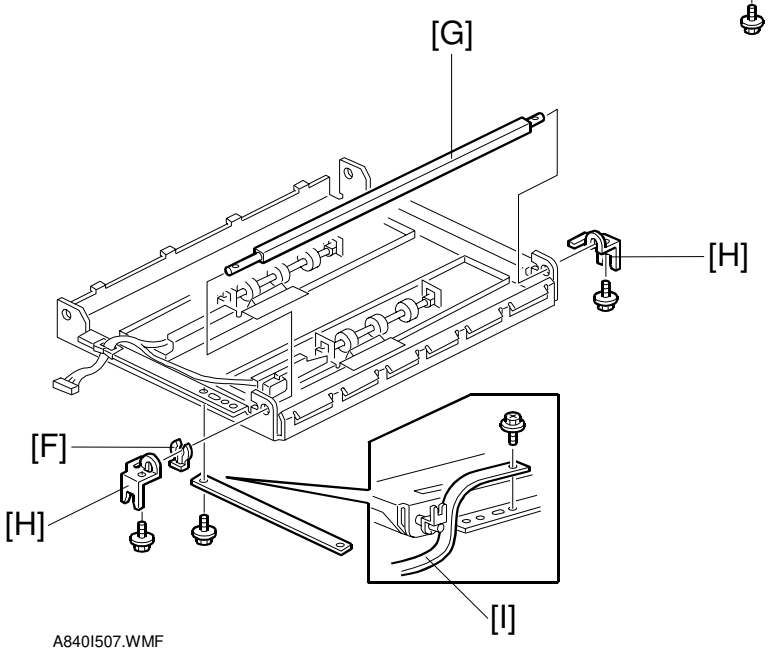
4. Install the upper cover [A], which is included in the LCT adapter kit onto the LCT while lifting up the front side (putting the bosses [B] in the opening [C] at first, then bosses [D] in the openings [E] while lifting the end of cover [F]).
5. Reinstall the LCT front cover [G] (2 screws).
6. Loosen the screw [H] and slide the lock plate [I] of the vertical transport unit [J]. Then remove the vertical transport unit from the copier (1 connector).



A840I505.WMF

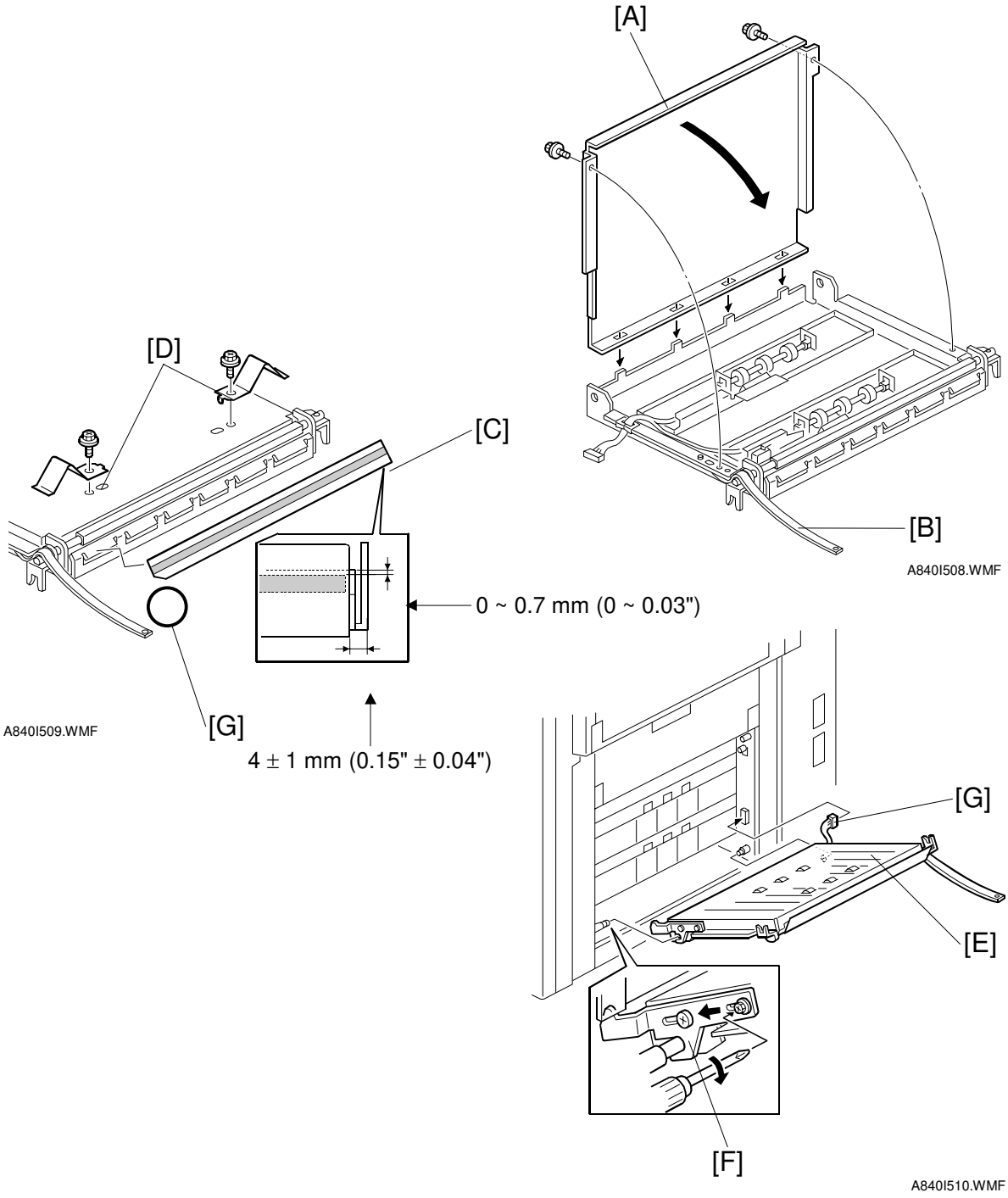


A840I506.WMF

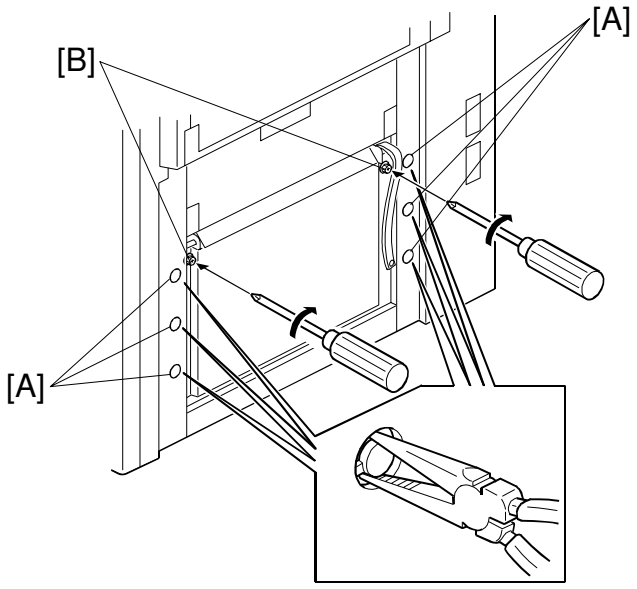


A840I507.WMF

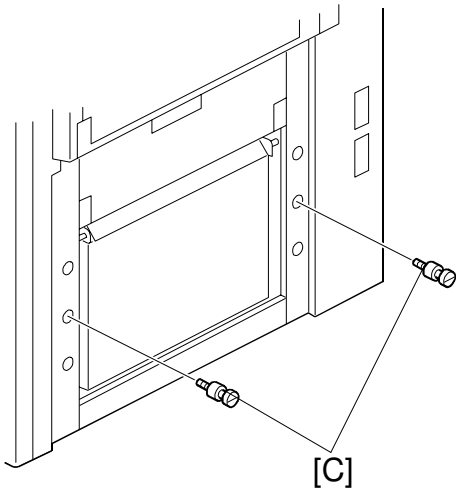
7. Remove the cover [A] from the vertical transport unit (4 screws).
8. Remove the following parts from the vertical transport unit.
   1) Release lever [B]
   2) Release lever shaft [C]
   3) Spring [D]
   4) Hooks [E] (2 screws)
   5) Snap Ring [F]
9. Re-install the release lever shaft [G] using the hooks [H] (2 screws) which are included in the LCT adapter kit. Then fix the band [I] to the vertical transport unit as shown (1 M3 x 6 screw).



10. Re-install the cover [A] to the vertical transport unit (lightly tighten the 2 screws). Then set the band [B] as shown.
11. Affix the Mylar [C] to the vertical transport unit as shown.
    Screw the springs [D] onto the vertical transport unit (1 screw for each spring).
    NOTE: The cut-out [G] of the mylar is located on the band side.
12. Re-install the vertical transport unit [D] to the copier (1 lock plate [E] and 1 connector [F]).



A840I511.WMF



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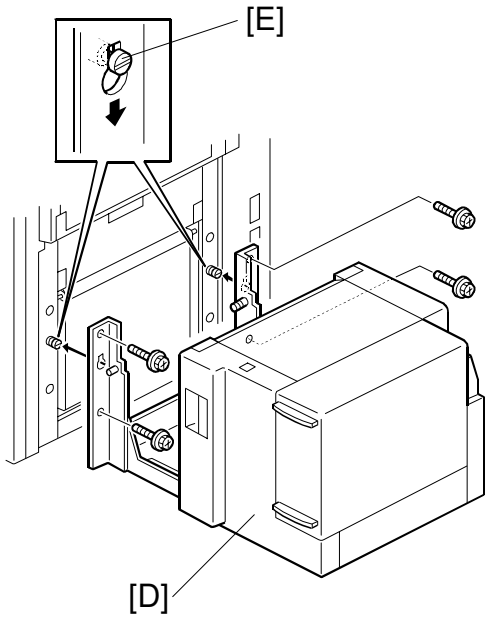
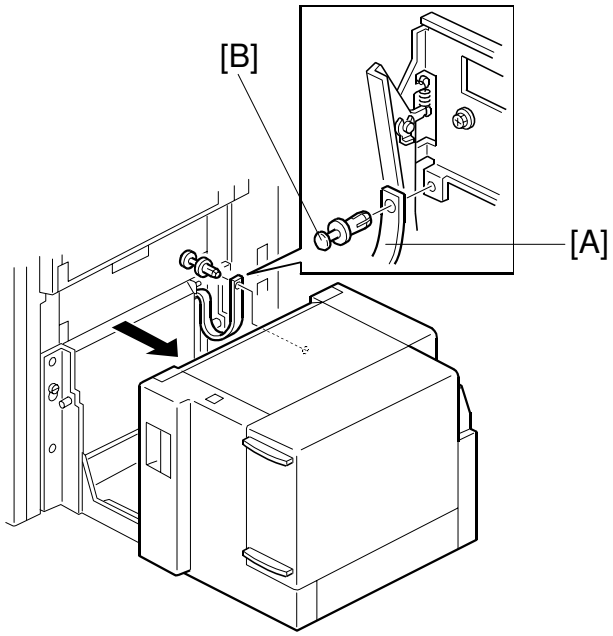


A840I513.WMF

13. Remove the 6 plastic caps [A] from the copier with pliers. Then tighten the screws [B] firmly.
14. Tighten the hooking screws [C], which are included in the LCT adapter kit, to the copier.
15. Hang the LCT [D] on the hooking screws [E]. Then secure the LCT to the copier (4 screws).



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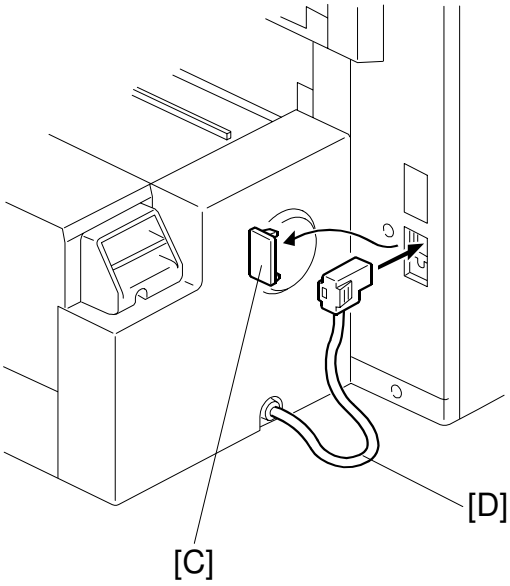


A840I514.WMF

16. Fix the band [A] to the LCT as shown by using the nylon rivet [B].
17. Remove the plastic cap [C] and connect the LCT cable [D] to the copier.

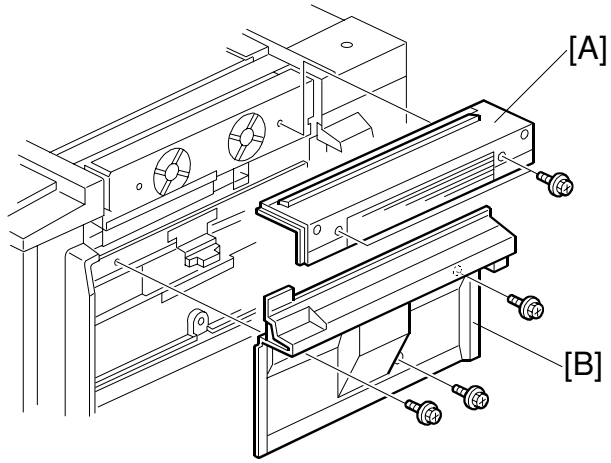
1.8 EDIT OPTION (B370-01)

1.8.1 ACCESSORY CHECK

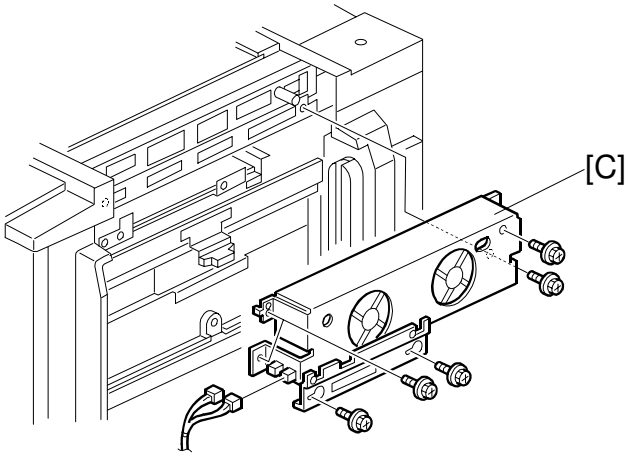
Check the quantity and condition of the accessories in the box with the following list:

Description	Qty
1. Touch Panel Pen	1
2. Edit PCB	1

1.8.2 INSTALLATION PROCEDURE



B370I901.WMF

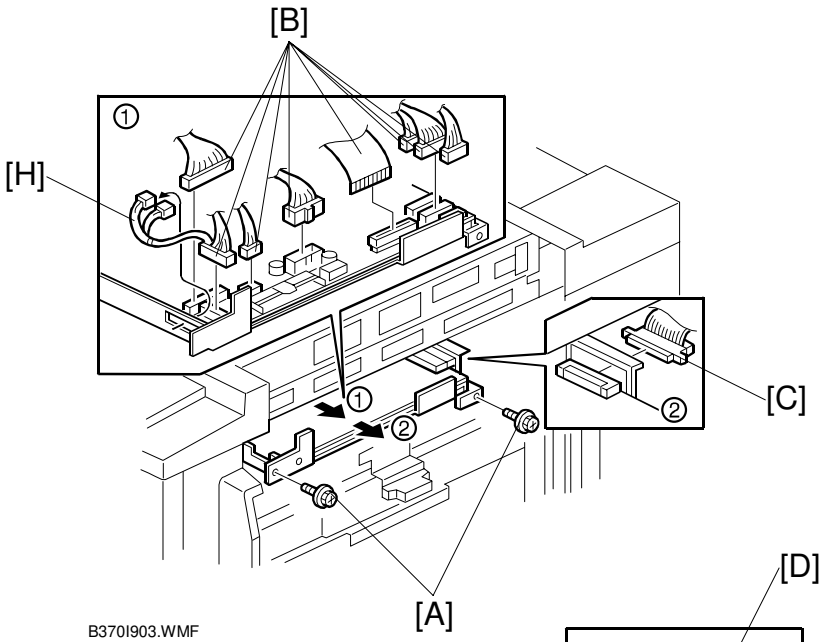


B370I902.WMF

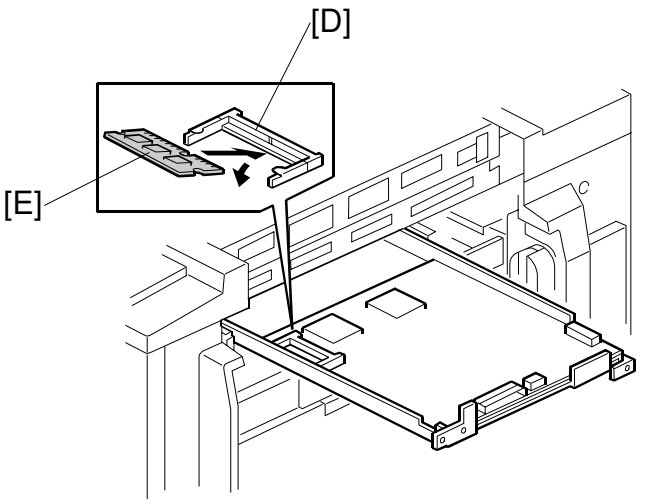
⚠CAUTION

Unplug the copier power cord before starting the following procedure.

1. Remove the upper right cover [A] (2 screws).
2. Open the by-pass feed table and remove the middle right cover [B] (3 screws).
3. Remove the bracket [C] with two fan motors (6 screws, 2 hooks, and 2 connectors).



B370I903.WMF



B370I904.WMF

4. Remove the 2 screws [A] from the IPU board.
5. Remove the 8 connectors [B] from the IPU board.
6. Slide the IPU board halfway out—until the fiber harness can be disconnected. Then, disconnect the ribbon cable [C].
7. Slide the IPU board out until you can see the edit PCB socket [D].
8. Attach the edit PCB [E] onto the socket on the IPU board.
9. Put everything back.

NOTE: 1) Run the 2 fan motor fan harnesses [H] through the hole as shown.
2) Make sure the harnesses are not pinched when putting the parts back.

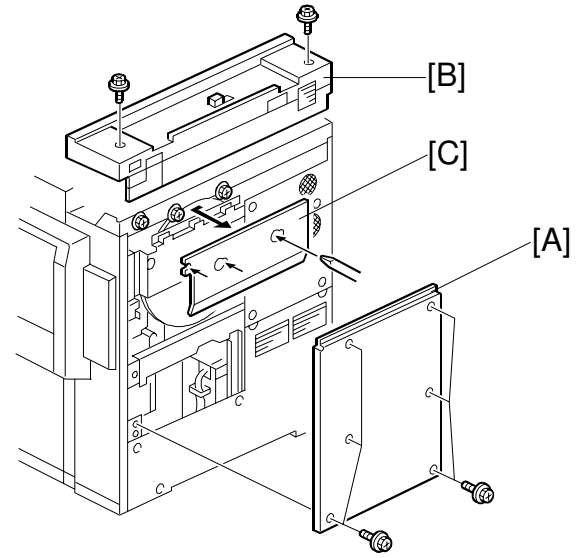
1.9 CONTROLLER INTERFACE (B371)

1.9.1 ACCESSORY CHECK

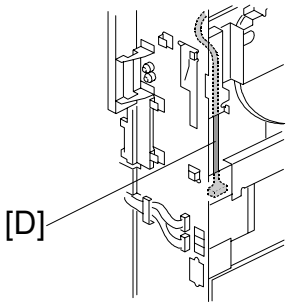
Check the quantity and condition of the accessories in the box with the following list:

Description	Qty
1. Interface Controller Case	1
2. Interface Controller Cover	1
3. Interface Support Bracket	1
4. Harness Guide Bracket	1
5. Cover Bracket	1
6. Upper Grounding Bracket	1
7. Harness Cover	1
8. Snap Ring	1
9. Harness Clamp	1
10. Ferrite Core Type-A	2
11. Ferrite Core Type-B	1
12. Printer Operation Panel	1
13. Philips Screw with Flat Washer – M3x6	3
14. Philips Screw with Flat Washer – M4x6	9
15. Philips Screw with Flat Washer – M4x8	4
16. Philips Screw with Spring Washer – M4x8	1

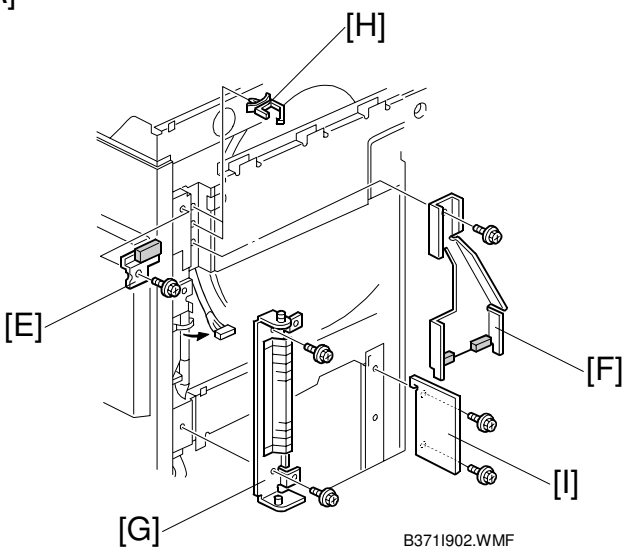
1.9.2 INSTALLATION PROCEDURE



B371I901.WMF



B371I952.WMF



B371I902.WMF

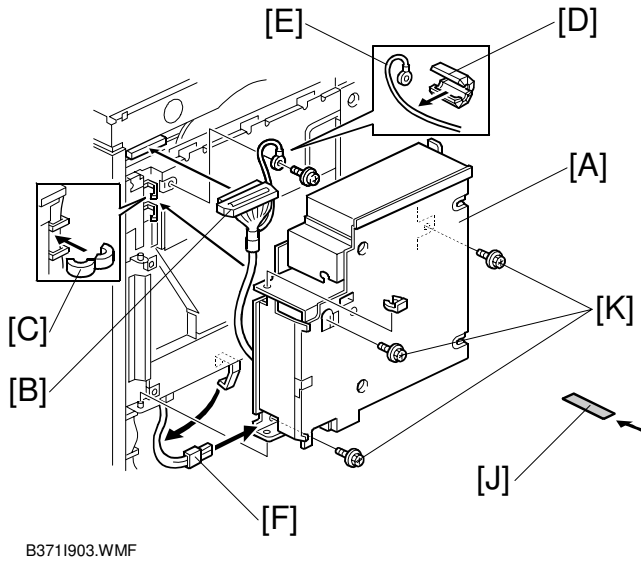
⚠CAUTION

There are two types of B371 controller interfaces:

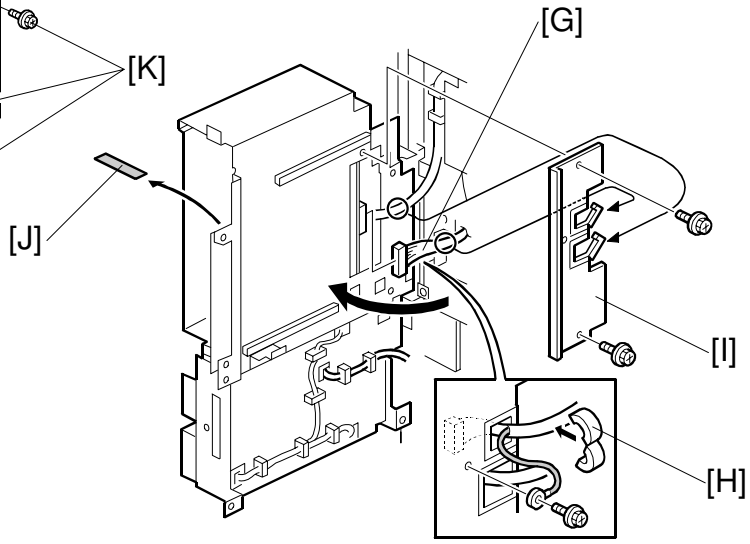
- **B371-17: for 120 V copier only**
- **B371-27: for 230 V copier only**

Be sure to confirm the type of controller interface before installation.

1. Remove the rear right cover [A] (6 screws) and rear upper cover [B] (2 screws).
2. Remove the LD control board cover plate [C] (2 screws).
3. Remove the harness [D] from the harness clamp.
   NOTE: This harness is to be connected to the controller interface later.
4. Install the upper grounding bracket [E] (1 screw).
5. Install the harness guide bracket [F] (1 screw and 2 hooks).
6. Install the interface support bracket [G] (2 screws).
7. Install the harness clamps [H].
8. Install the cover bracket [I] (2 screws).

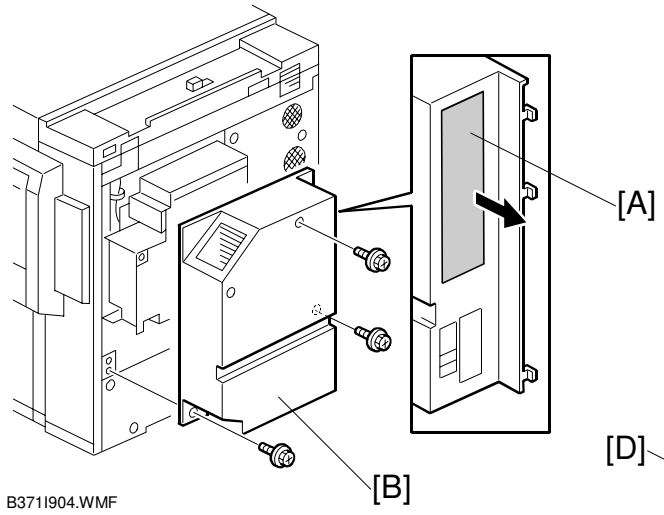


B371I903.WMF

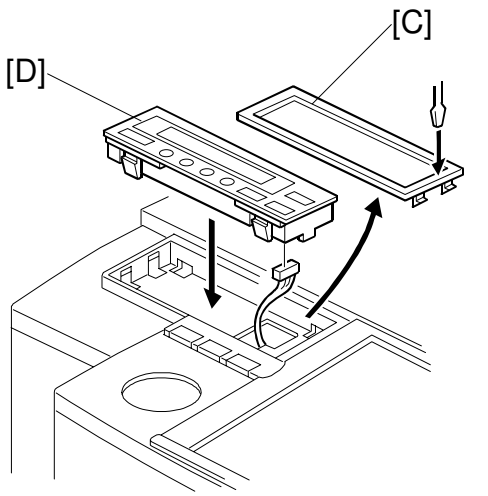


B371I906.WMF

9. Install the interface controller case [A] (2 hooks and 1 snap ring).
10. Connect the interface controller case harness [B] to the LD control board (2 clamps, 1 ground screw).
11. Attach the ferrite core type-A [C] to the interface controller harness.
12. Attach the ferrite core type-B [D] to the grounding harness [E].
13. Disconnect the harness [F] from the clamp and run the harness as shown (1 connector).
14. Connect the harness [G] removed from the clamp in step 3 to the controller interface. Attach the ferrite core type-A [H] to the harness [E]
15. Install the harness cover [I] (2 clamps, 3 screws, and 1 ground wire).
16. Put back the LD control board cover plate removed in step 2.
17. Remove the strip of filament tape [J].
18. Close the interface controller case.
19. Secure the interface controller case with 3 screws [K], as shown.
    NOTE: Do not put a screw in the oval hole at the lower-right corner. We will use this to hold the interface controller case and the interface controller cover together.
20. Connect the printer controller with the interface controller (4 screws).
    NOTE: While inserting the printer controller into the interface controller case, lift up the rear end (connector side) slightly.



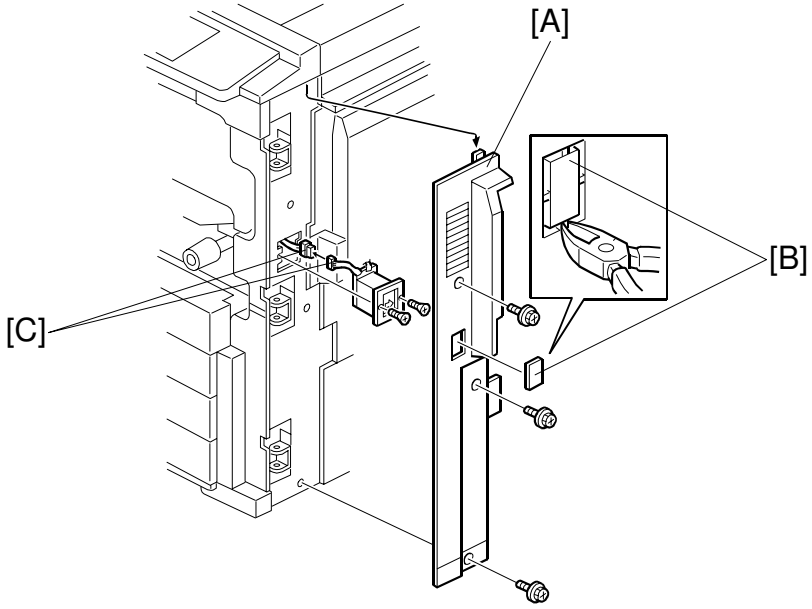
B371I904.WMF



B371I905.WMF

21. Remove the small cover [A] from the interface controller cover using pliers.
22. Install the interface controller cover [B] (4 screws).
23. Put back the rear right cover and rear upper cover.
24. Remove the small cover [C] from the left of the operation panel.
25. Install the printer operation panel [D] (1 connector).

1.10 KEY COUNTER HOLDER



B023I130.WMF

1. Remove the right-side front cover [A].
2. Remove the plastic cap [B] with clippers.
3. Plug in the connector [C] for the key counter holder.
4. Secure the key counter holder on the main unit (2 screws).
5. Replace the right-side front cover (1 screw).

1.11 USER CODE SETTING

1. Press the user tool key on the operation panel.
2. Select copier features.
3. Press next until key operator tools is displayed and selected.
4. At the top of the screen, select the accessible modes setting for full color, black and white, single color and twin color.
   NOTE: If the accessible modes are not darkened or highlighted, user code mode will not be enabled.
5. Select program and create a user code, then press the # key.
6. Select the accessible modes for the user code and press OK.
7. Select OK, cancel or next user code, then OK to exit user tools.
   NOTE: 1) User code entrance guidance appears after the main switch is turned on or copy reset is performed. Copy reset time can be set in the copier features in the user tools (10 to 990 seconds).
   2) To forcibly display the user code entrance guidance, press the clear mode key and the clear stop key at the same time.

If a key operator code is needed (required by security) perform the following.

1. Press the user tool key on the operation panel.
2. Select the system settings.
3. Press next until the key operator tools are displayed and selected.
4. Select on and register a key operator access code, then press # and OK. If on is not available, a key operator code has already been registered. Enter the key operator access code, press confirm and then OK.
   NOTE: IF the key operator access code is unknown, it can be reset with SP5-410-000

2. PREVENTIVE MAINTENANCE

2.1 REGULAR PM ITEMS

Regular PM items: To be performed every 80,000 developments, 100,000 developments, and 200,000 developments in accordance with the following table.

2.1.1 REGULAR PM TABLE

NOTE: Be sure to use a dry cloth when wiping off any residual toner. Toner will clot when mixed with alcohol.

I: Inspect L: Lubricate R: Replace C: Clean A: Adjust

Block	PM item	EM	Schedule								Remarks
			80 kD	100 kD	160 kD	200 kD	240 kD	300 kD	320 kD	400 kD	Expected life	
Scanner unit	1st, 2nd, 3rd mirrors and Reflector		C		C		C		C	C		Wipe with a silicone cloth or optics cleaning paper.
	Optical filter		C		C		C		C	C		Clean with a blower brush.
	Original sensor		C		C		C		C	C		Wipe with a dry cloth.
	Slide rail		C		C		C		C	C		Clean with a blower brush
	Exposure glass	C	C		C		C		C	C		Wipe with a dry cloth moistened with alcohol or water.
	Platen cover	C	C		C		C		C	C		Wipe with a dry cloth moistened with water, then with a dry cloth.
	Exposure lamp										800 kD (240 k scan)	
	Optics dust filter										800 kD	
Transport Unit	Transport belt					C				C		
Development unit	Toner shield glass		C		C	C	C		C	C		Wipe with a dry optics cleaning cloth (A0129111).
	Development unit toner hopper		C		C		C		C	C		Wipe with a dry cloth or vacuum-clean.
	Toner catcher		C		C		C		C	C		Wipe with a dry cloth or vacuum-clean.
	Toner cartridge unit		C		C		C		C	C		Wipe with a dry cloth or vacuum-clean.
	Developer (K)											Developer life is 60 kD. (See PM counter SP7-803) Replace K, C, M, Y at the same time.
	Developer (C, M, Y)											Developer life is 48 kD for each color. (See PM counter SP 7-803) Replace K, C, M, Y at the same time.
	Development unit (including covers and gears)		C		C	C	C		C	C		Cover: Wipe with a dry cloth. Gears: Clean with a blower brush.

Block	PM item	EM	Schedule									Remarks
			80 kD	100 kD	160 kD	200 kD	240 kD	300 kD	320 kD	400 kD	Expected life	
Development unit	Side seal, seal		I		I	I	I		I	I		Visually check. Replace if cracks, warps, or breakages are found.
	Toner set sensor		C		C	C	C		C	C		Clean with a blower brush, then wipe with a dry cloth.
	Toner end sensor		C		C	C	C		C	C		Clean with a blower brush, then wipe with a dry cloth.
	Revolver filter		R		R		R		R	R		Wipe with a dry cloth (should be free of oil or foreign matter).
	Bias terminal		C		C	C	C		C	C		Wipe with a dry cloth (should be free of oil or foreign matter).
Drum peripheral components	PCC casing and end block	C	C		C	C	C		C	C		Wipe with a damp cloth. Then wipe with a dry cloth.
	PCC wire		C		R		C		R	C		
	Cleaning blade			R		R		R		R		Apply setting powder when replacing.
	Lubricant bar		R		R		R		R	R		Replace if chips or creases are found.
	Cleaning brush			R		R		R		R		
	Bias roller blade			R		R		R		R		
	Bias roller terminal		L		L		L		L	L		Apply a small amount of KS660 silicone grease.
	Cleaning unit, entrance Mylar, and side seal	C	C		C	C	C		C	C		Clean with a blower brush, then wipe with a dry cloth.
	Drum		R		R		R		R	R		Apply setting powder when replacing.
	Drum unit (including QL and potential sensor)		C		C	C	C		C	C		Wipe with a dry cloth.
	Revolver drawer (including ID sensor and carrier catcher)	I	C		C	C	C		C	C		Wipe with a dry cloth.
	Charge corona unit casing and end blocks	C	C		C	C	C		C	C		Wipe with a dry cloth.
	Charge corona wire	C	R		R	C	R		R	R		Wipe with a damp cloth, then with a dry cloth.
	Charge corona grid	C	C	R	C	R	C	R	C	R		Wipe with a damp cloth, then with a dry cloth.
	Wire cleaner pad			R		R		R		R		
	Charge corona filter			R		R		R		R		
Image transfer unit	Belt cleaning unit (toner hopper, entrance seal, and side seal)	C	C		C	C	C		C	C		Wipe with a dry cloth or vacuum-clean.
	ITB Cleaning blade					R				R		During replacement, apply setting powder to the transfer belt.
	ITB Lubricant bar					R				R		Replace if chips or creases are found.
	ITB Lubricant brush					R				R		Clean with a vacuum cleaner if it is found to be too dirty during inspection.
	Transfer belt mark sensor		C		C	C	C		C	C		Clean with a blower brush, then wipe with a dry cloth.
	Apply grease to bias terminal, grounding terminal		L		L		L		L	L		Apply a small amount of KS660 grease.
	Transfer belt unit (with inner rollers)		C		C		C		C	C		Wipe with a dry cloth moistened with alcohol, then with a dry cotton cloth.
	Transfer belt		R		R		R		R	R		Apply setting powder when replacing.

Block	PM item	EM	Schedule								Expected life	Remarks
			80 kD	100 kD	160 kD	200 kD	240 kD	300 kD	320 kD	400 kD		
Paper transfer unit	Transfer roller coating bar					R				R		
	PTR: Cleaning blade					R				R		
	Paper discharge plate	C	R	C	R	C	R	C	R	R		
	Paper transfer section					C				C		Wipe with a dry cloth.
Fusing unit	Hot roller		R		R		R		R	R		
	Hot roller oil supply pad		R		R		R		R	R		
	Pressure roller				R				R			
	Hot roller bearing				R				R			
	Pressure roller bearing				R				R			
	Apply grease to heat insulating bushing		L		L		L		L	L		Wipe with a dry cloth, then apply grease (Barrierta A2579300).
	Apply grease to fusing drive/fusing gears		L		L		L		L	L		Apply Mobile Temp 1.
	Fusing/pressure thermistors		C		C		C		C	C		Clean with suitable solvent, then apply silicone oil to the contact surface.
	Fusing/pressure cleaning rollers	C	C		C		C		C	C		Clean with suitable solvent.
	Scraper		C		C		C		C	C		Clean with suitable solvent.
	Hot roller blade	C*	R	C	R	C	R	C	R	R		Clean with suitable solvent while taking care not to damage the edge. *Clean every 40 kD.
	Pressure roller blade								R			-22, -26, -27, -29 copier only
	Pressure roller oil supply pad				R				R			-22, -26, -27, -29 copier only
	Oil pan				C				C			Clean with a dry cloth, then wipe with a dry cloth moistened with alcohol.
	Silicone oil	I	L		L	L	L		L	L		Any precipitates in the oil tank should be removed. Then, lubricate silicone oil.
	Pre-cleaning roller	C	R	C	R	C	R	C	R	R		Wipe with a damp cloth, then with a dry cloth. Separation pawls clean every PM.
	Separation pawl	C	C	C	C	C	C	C	C	C		Clean with a dray cloth.
Paper feed unit	Paper pick-up rollers, paper feed rollers, reverse rollers					C				C	400 kD	Wipe with a damp cloth, then with a dry cloth.
	By-pass pick-up roller, by-pass feed roller, by-pass reverse roller					C				C	800 kD	Wipe with a dry cloth moistened with alcohol or water.
	Registration rollers		I		I		I		I	I		Wipe with a dry cloth moistened with alcohol or water.
	Registration sensor: vertical transport sensor		C		C		C		C	C		Clean with a blower brush, then wipe with a dry cloth.
	Relay rollers				C				C			Wipe with a dry cloth moistened with alcohol or water.

Block	PM item	EM	Schedule								Remarks
			80 kD	100 kD	160 kD	200 kD	240 kD	300 kD	320 kD	400 kD	Expected life	
Paper feed unit	Registration guide plate				C				C			Wipe with a dry cloth moistened with alcohol or water.
	Vertical transport guide plate				C				C			Wipe with a dry cloth moistened with alcohol or water.
	Vertical transport rollers				C				C			Wipe with a dry cloth moistened with alcohol or water.
	Paper dust mylar	C	C	C	C	C	C	C	C	C		
Others	Used toner tank	I	C	C	C	C	C	C	C	C		Collect used toner, then wipe the containers with a dry cloth, or replace the used toner tank.
	Exhaust dust filter		R		R		R		R	R		
	Fusing unit filter			R		R		R		R		
Duplex unit	Reverse roller		C		C		C		C	C	400 kD	Wipe with a damp cloth, then with a dry cloth.
	Paper feed roller		C		C		C		C	C	400 kD	Wipe with a damp cloth, then with a dry cloth.
	Duplex bottom plate pad		C		C		C		C	C	400 kD	Wipe with a dry cloth.
	Bottom plate lifting-up torque limiter											Apply Mobile Temp 1. Lubricate at 400 kD
	Duplex unit		C		C	C	C		C	C		Wipe with a dry cloth.

Peripherals

I: Inspect L: Lubricate R: Replace C: Clean A: Adjust

Block	PM item	EM	Schedule								Remarks
			80 kD	100 kD	160 kD	200 kd	240 kD	300 kD	320 kD	400 kd	Expected life	
LCT (A683)	Paper feed roller		I		I	I	I		I	I	320 kD	Guideline: Every 150,000 normal sheets
	Pick-up roller		I		I	I	I		I	I	320 kD	Guideline: Every 150,000 normal sheets
	Reverse roller		I		I	I	I		I	I	320 kD	Guideline: Every 150,000 normal sheets
	Tray bottom plate		C		C	C	C		C	C		Clean with a dry or damp cloth (dry cloth).
20 bin sorter stapler (A831)	Transport rollers	C										If dirty, clean with a dry cloth moistened with alcohol.
	Idle rollers	C										If dirty, clean with a dry cloth moistened with alcohol.
	Exit rollers	C										If dirty, clean with a dry cloth moistened with alcohol.
	Bins	C										If dirty, clean with a dry cloth moistened with alcohol.
	Entrance, bin, and stapler sensors	C										Clean with a blower brush.
	Bearings	L										Lubricate if abnormal sound is heard (silicone oil or Launa oil).
	Gears	L										Lubricate if abnormal sound is heard (resin grease, G-501).
	Stapler	I										Stapler life: 200,000 staples.
	Sorter section paper exit Mylar	I										Paper exit Mylar wear life: 1 million sheets

I: Inspect L: Lubricate R: Replace C: Clean A: Adjust

Block	PM item	EM	Schedule								Remarks
			80 k	100 k	160 k	200 k	240 k	300 k	320 k	400 k	Expected life	
ARDF (A663)	Transport belts	C	R		R		R		R	R		Wipe with a damp dry cloth.
	Separation belts	C	R		R		R		R	R		Wipe with a damp dry cloth.
	Feed rollers	C	R		R		R		R	R		Wipe with a damp dry cloth.
	Registration sensor		C		C		C		C	C		Clean with a blower brush.
	Size sensor		C		C		C		C	C		Clean with a blower brush.
	Paper exit sensor		C		C		C		C	C		Clean with a blower brush.

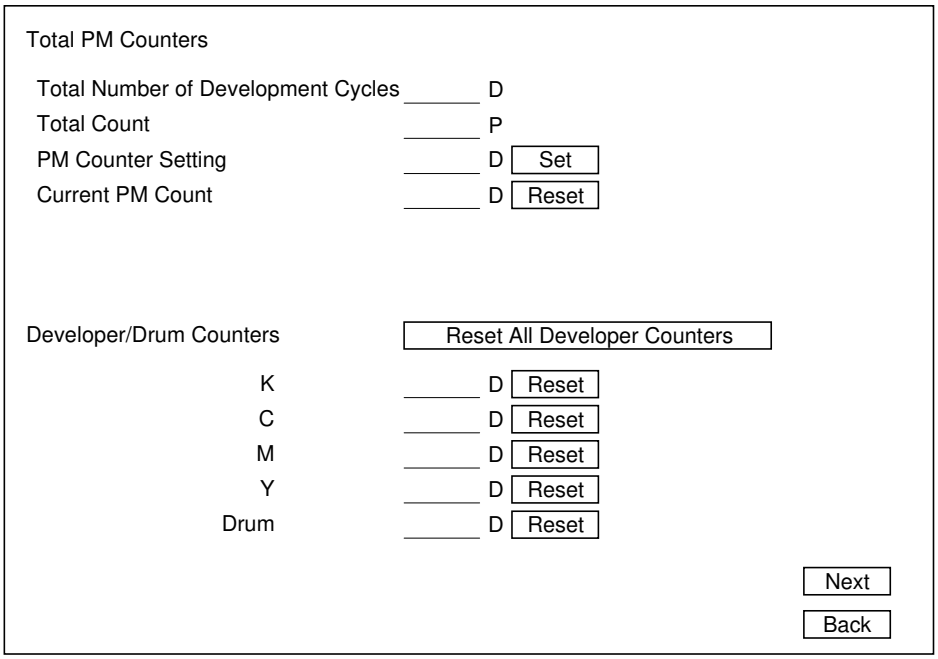
NOTE: 1) For ARDF, schedule is counted by number of originals.
2) Number of original is displayed by SP7-803.

2.2 PM PROCEDURES

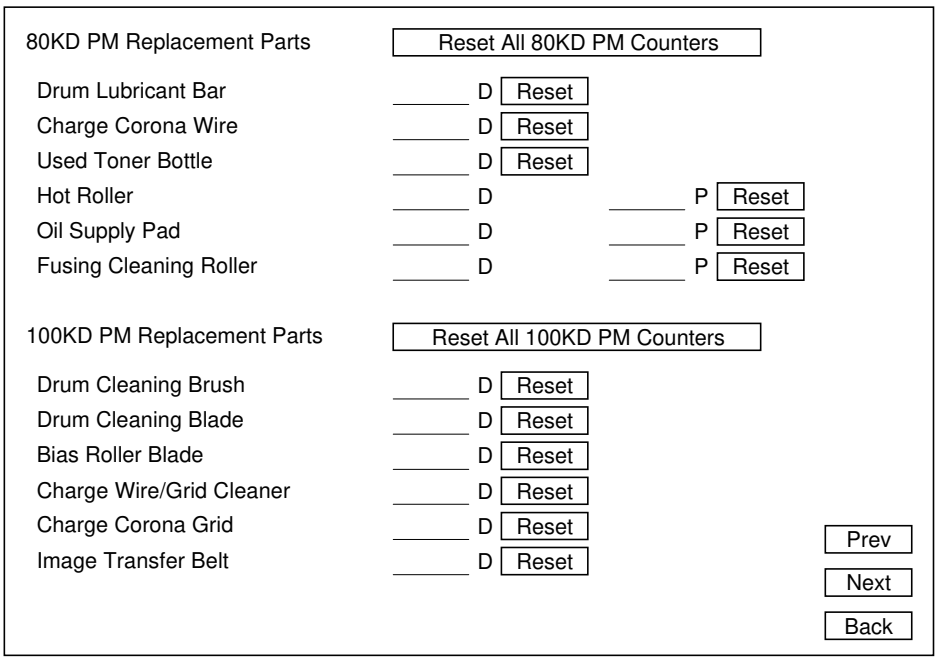
2.2.1 PM-RELATED COUNTERS

PM counters are available in the SP mode.
After performing a PM procedure, reset the PM counters.

SP7-803 (PM Counter Display)



B023P501.WMF



B023P502.WMF

100KD PM Replacement Parts (2/2)

Charge Corona Dust Filter	_____ D	Reset
Development Dust Filter	_____ D	Reset
Fusing Cleaning Roller	_____ D	Reset

160KD PM Replacement Parts — Reset All 160KD PM Counters

Pressure Roller	_____ D	_____ P	Reset
Hot Roller Bearing	_____ D	_____ P	Reset
Pressure Roller Bearing	_____ D	_____ P	Reset
Hot Roller Blade	_____ D	_____ P	Reset
Pressure Roller Oil Supply Pad	_____ D	_____ P	Reset

Prev
Next
Back

B023P503.WMF

200KD PM Replacement Parts — Reset All 200KD PM Counters

ITB: Lubricant Brush	_____ D		Reset
ITB: Cleaning Blade	_____ D		Reset
Revolver Filter	_____ D		Reset
Discharge Corona Wire	_____ D		Reset
Paper Discharge Plate	_____ D	_____ P	Reset
PTR Cleaning Blade	_____ D	_____ P	Reset
Transfer Roller Coating Bar	_____ D	_____ P	Reset

320KD PM Replacement Parts — Reset All 320KD PM Counters

Pressure Roller Cleaning Blade	_____ D	_____ P	Reset

Prev
Next
Back

B023P504.WMF

800KD PM Replacement Parts [Reset All 800KD PM Counters]

Exposure Lamp			D	[Reset]	
Optics Dust Filter			D	[Reset]	

Paper Feed Parts (1/2) [Reset All Paper Feed Parts Counters]

1st Tray	Pick-up Roller		D	P	[Reset]	
1st Tray	Feed Roller		D	P	[Reset]	
1st Tray	Reverse Roller		D	P	[Reset]	
2nd Tray	Pick-up Roller		D	P	[Reset]	
2nd Tray	Feed Roller		D	P	[Reset]	
2nd Tray	Reverse Roller		D	P	[Reset]	
3rd Tray	Pick-up Roller		D	P	[Reset]	
3rd Tray	Feed Roller		D	P	[Reset]	
3rd Tray	Reverse Roller		D	P	[Reset]	

[Prev] [Next] [Back]

B023P505.WMF

Paper Feed Parts (2/2)

Duplex Unit	Feed Roller	D	P	[Reset]	
Duplex Unit	Reverse Roller	D	P	[Reset]	
Duplex Unit	Bottom Plate Pad	D	P	[Reset]	
By-pass Tray	Pick-up Roller	D	P	[Reset]	
By-pass Tray	Feed Roller	D	P	[Reset]	
By-pass Tray	Reverse Roller	D	P	[Reset]	

Others [Reset All Counters]

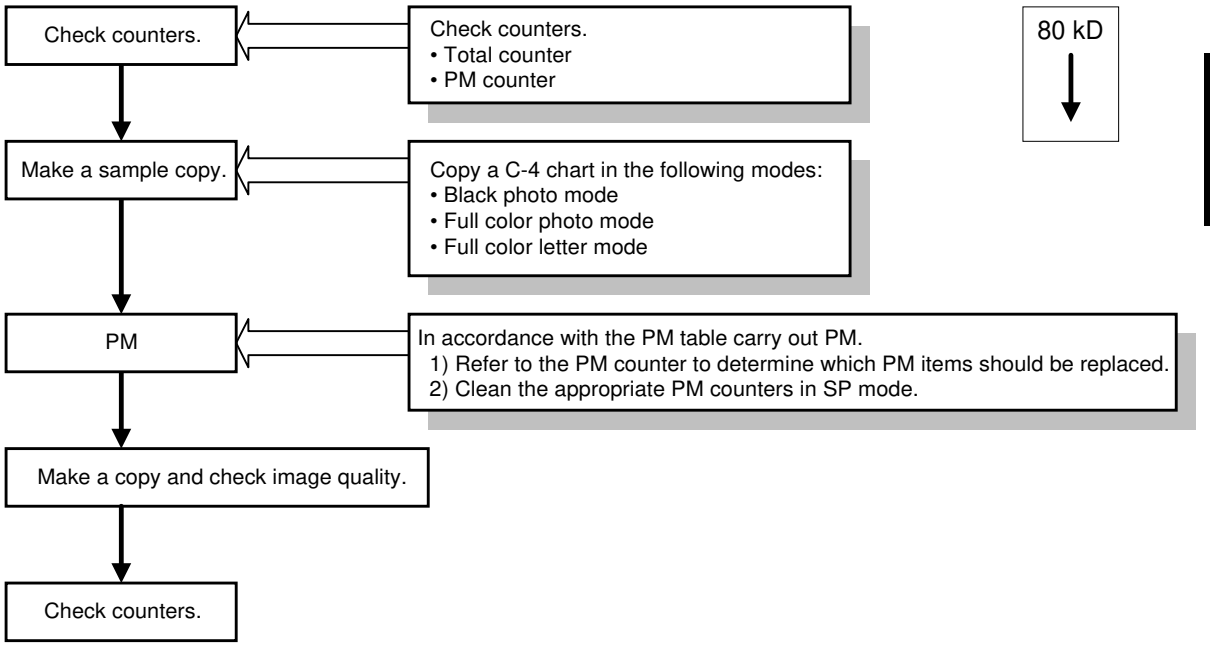
LCT	Pick-up Roller	D	P	[Reset]	
LCT	Feed Roller	D	P	[Reset]	
LCT	Reverse Roller	D	P	[Reset]	
ARDF	Transport Belt	D [Reset]	P		
ARDF	Separation Belt	D [Reset]	P		
ARDF	Feed Roller	D [Reset]	P		

[Prev]

Print PM Counters [Print] [Back]

B023P506.WMF

2.2.2 REGULAR PREVENTIVE MAINTENANCE FLOW DIAGRAM



B023P507.WMF

3. REPLACEMENT AND ADJUSTMENT

3.1 GENERAL CAUTION

⚠CAUTION

Turn off the main power switch and unplug the machine before attempting any of the procedures in this section.

NOTE: This manual uses several symbols. The meaning of those symbols are as follows:

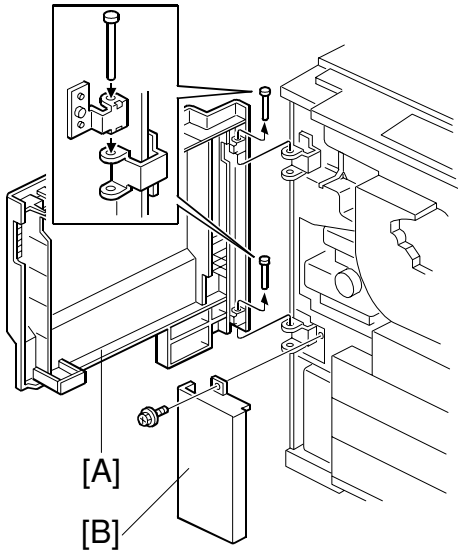
☛ : See or Refer to : screw : connector

3.2 COVERS AND FILTERS

3.2.1 FRONT DOOR AND LOWER FRONT COVER

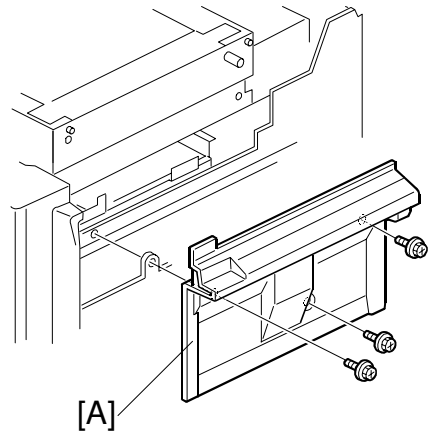
[A]: Font door (2 pins)
[B]: Lower front cover (x 1)

NOTE: Place the door's half of the hinge immediately above the main unit's half. Then insert the pin.

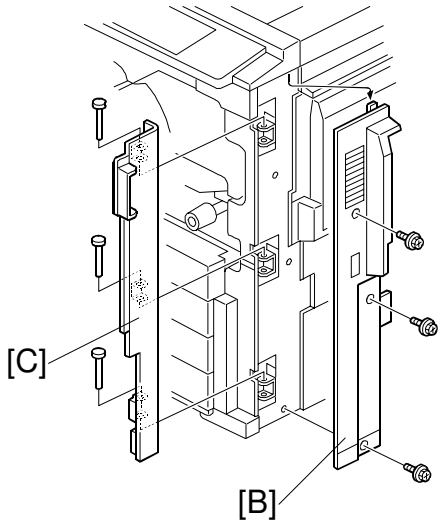


B023R951.WMF

3.2.2 RIGHT-SIDE FRONT COVER AND RIGHT EDGE COVER



B023R022.WMF

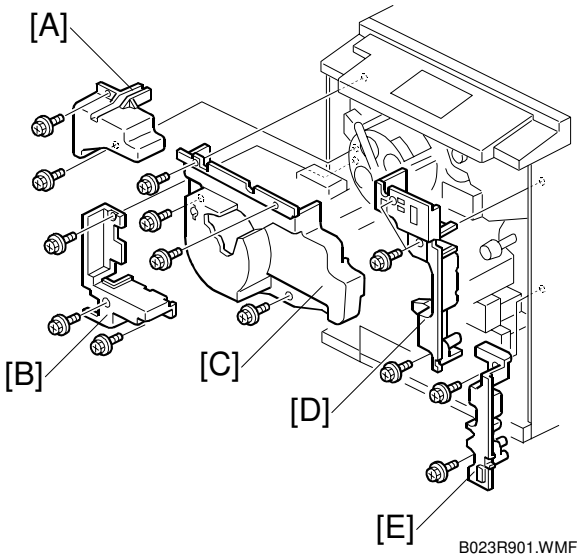


B023R952.WMF

[A]: Middle right cover (☞ x 3)
[B]: Right-side front cover (☞ x 4)
[C]: Right edge door (3 pins)

3.2.3 INNER COVERS

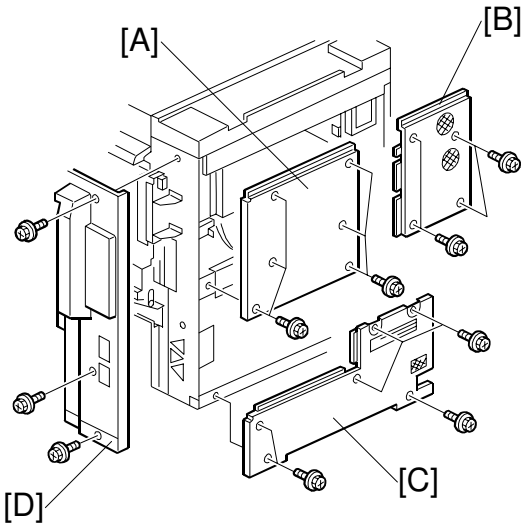
• Front door (☛ 3.4.1)
[A]: Upper left inner cover (☞ x 2)
[B]: Lower left inner cover (☞ x 3)
[C]: Revolver cover (☞ x 4)
[D]: Upper right inner cover (☞ x 3)
[E]: Lower right inner cover (☞ x 2)



B023R901.WMF

3.2.4 REAR COVERS

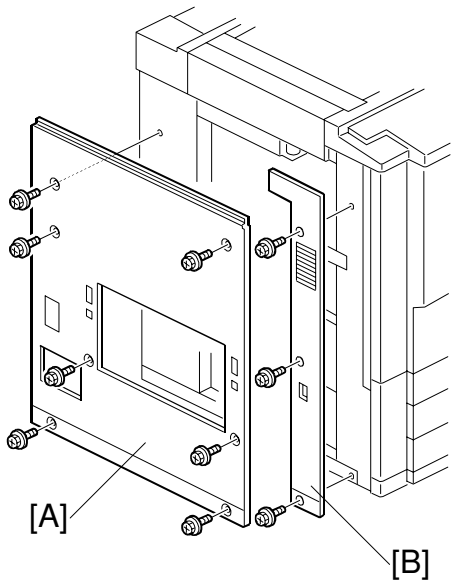
[A]: Rear right cover (☞ x 7)
[B]: Rear left cover (☞ x 4)
[C]: Rear lower cover (☞ x 6)
[D]: Right rear cover (☞ x 3)



B023R902.WMF

3.2.5 LEFT COVERS

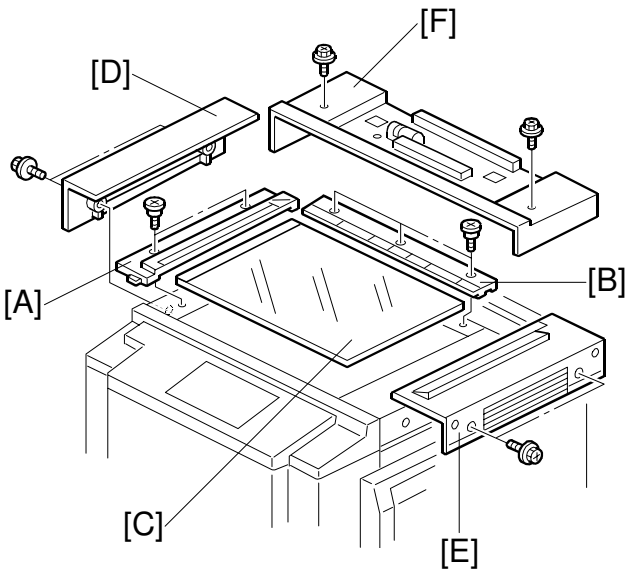
[A]: Left cover (☞ x 7)
[B]: Left front cover (☞ x 4)



B023R903.WMF

3.2.6 EXPOSURE GLASS

[A]: Vertical scale (☞ x 2)
[B]: Horizontal scale (☞ x 3)
[C]: Exposure glass
(When reinstalling the exposure glass, ensure that the white plate faces down and to the left.)



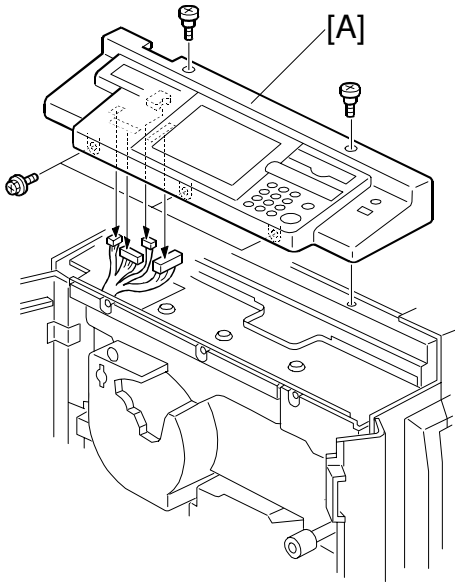
B023R904.WMF

3.2.7 UPPER COVERS

[D]: Left upper cover (☞ x 2)
[E]: Right upper cover (☞ x 2)
[F]: Rear upper cover (☞ x 2)

3.2.8 OPERATION PANEL

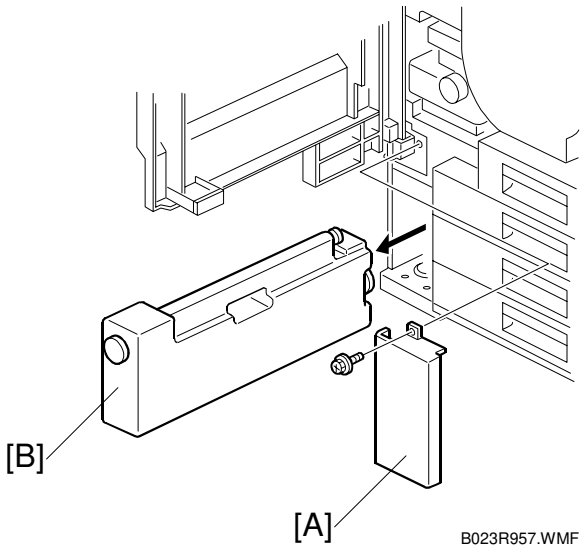
[A]: Operation panel (☞ x 5, ☞ x 4)
NOTE: Perform the touch panel calibration after replacing the operation panel.
(☛ 3.14.5)



B023R911.WMF

3.2.9 USED TONER TANK

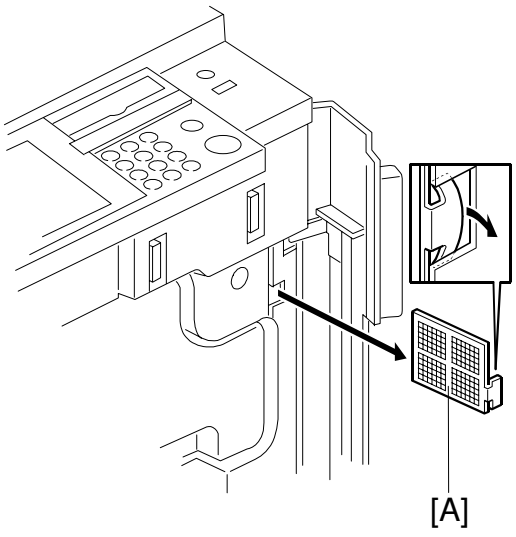
[A]: Lower front cover (x 1)
[B]: Used toner tank (x 1)



B023R957.WMF

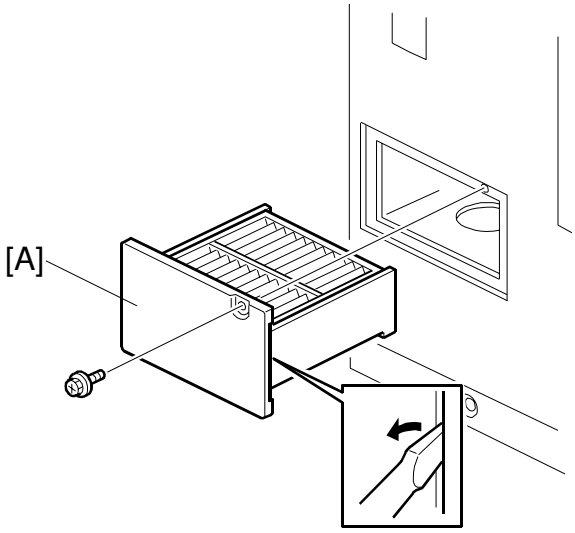
3.2.10 CHARGE CORONA FILTER

[A]: Charge corona filter

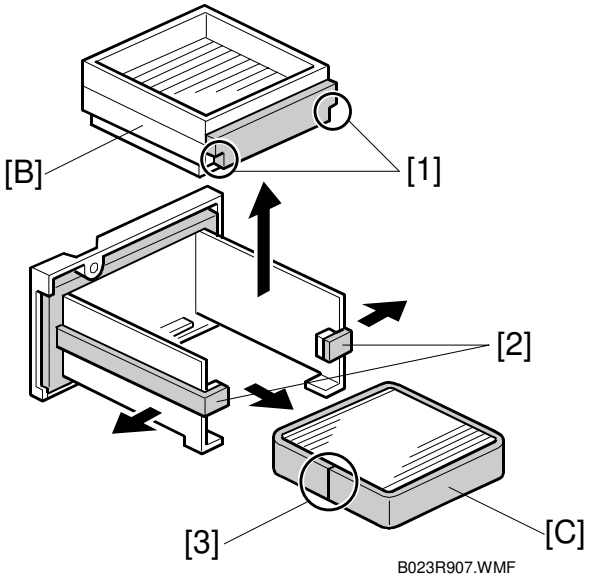


B023R908.WMF

3.2.11 DUST AND OZONE FILTERS



B023R909.WMF



B023R907.WMF

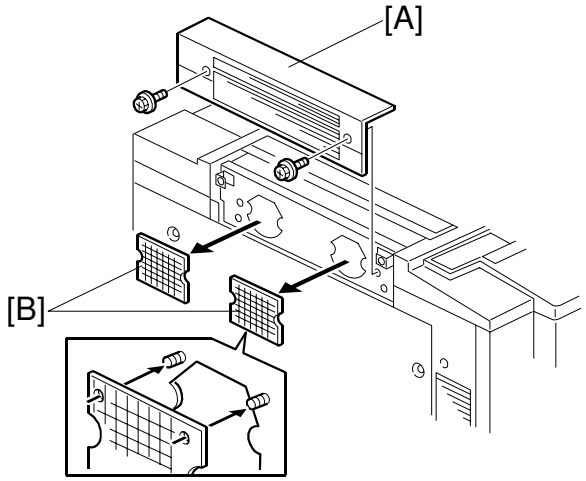
[A]: Filter box (☞ x 1)
Loosen with a screwdriver as shown.

[B]: Exhaust dust filter.
NOTE: When installing the exhaust dust filter, align the dust filter sponge seal cutouts [1] and the top line of the filter box seal [2].

[C]: Ozone filter.
NOTE: When installing the ozone filter, the parting line [3] should be at the position shown in figure.

3.2.12 OPTICS DUST FILTERS

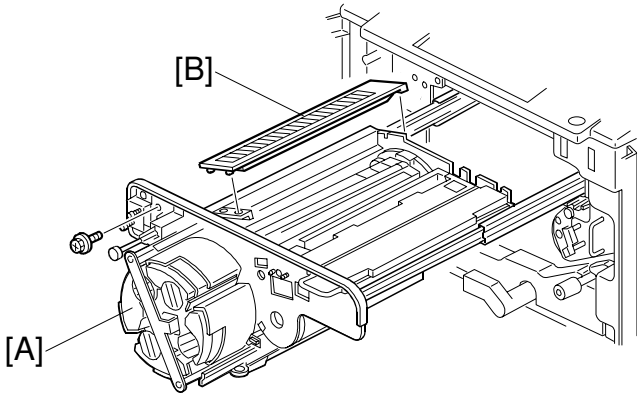
[A]: Upper right cover (🖉 x 2)
[B]: Optics dust filters



B023R948.WMF

3.2.13 REVOLVER FILTER

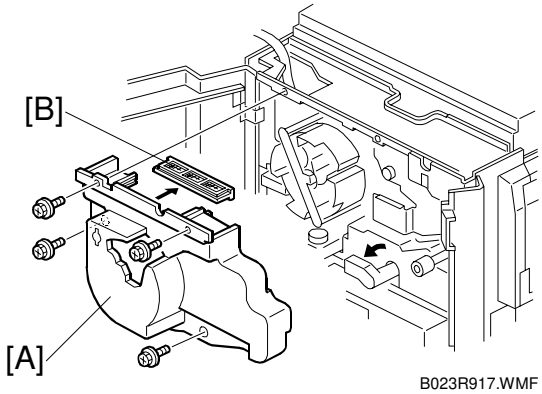
[A]: Pull out the revolver/drum drawer (☛ 3.5.1)
[B]: Revolver filter



B023R325.WMF

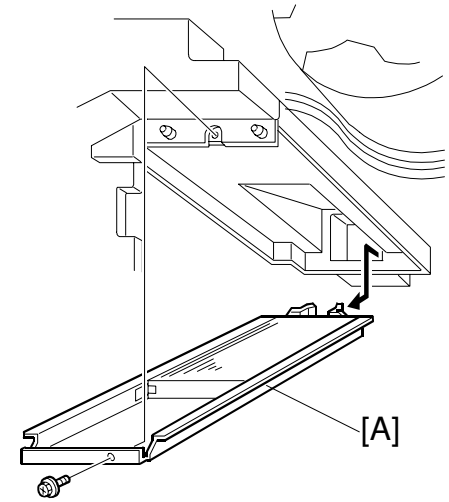
3.2.14 INNER COVER FILTER

[A]: Revolver cover (🖉 x 4)
[B]: Inner cover filter

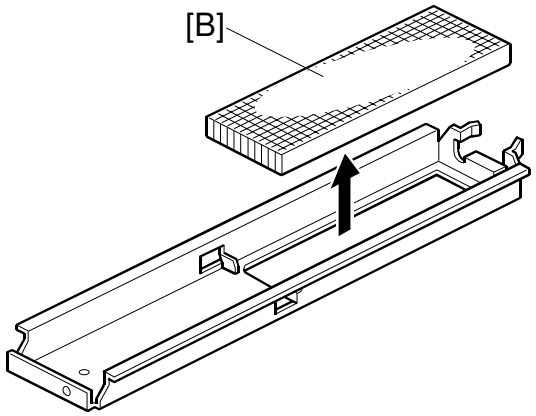


B023R917.WMF

3.2.15 FUSING UNIT FILTER



B023R968.WMF



B023R969.WMF

- Lower release lever B2 and pull out the fusing/transport unit.

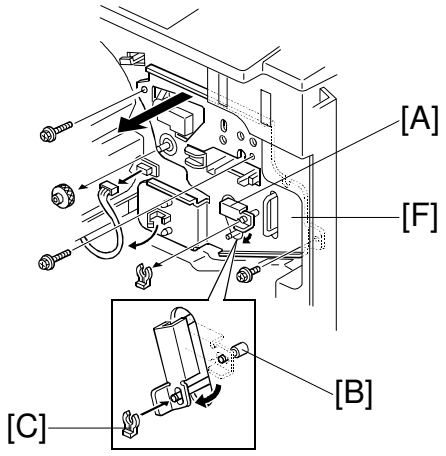
[A]: Fusing unit filter bracket (x 1, 2 hooks)
[B]: Fusing unit filter

NOTE: This filter absorbs silicone oil vapor coming off of the fusing unit.

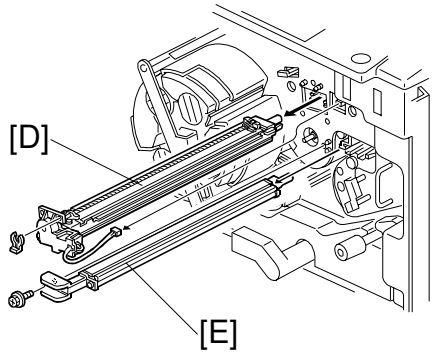
3.3 UNIT REMOVAL

NOTE: Place a mat on the floor to keep the floor clean before performing this procedure.

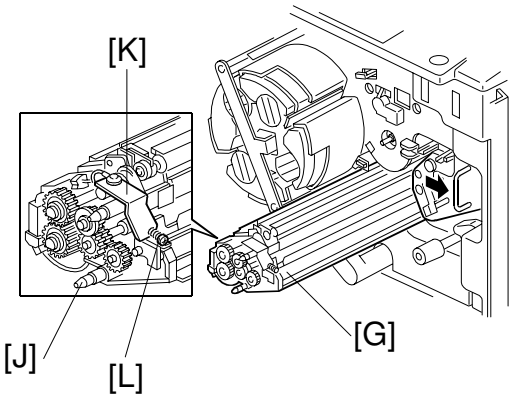
3.3.1 REVOLVER/DRUM DRAWER



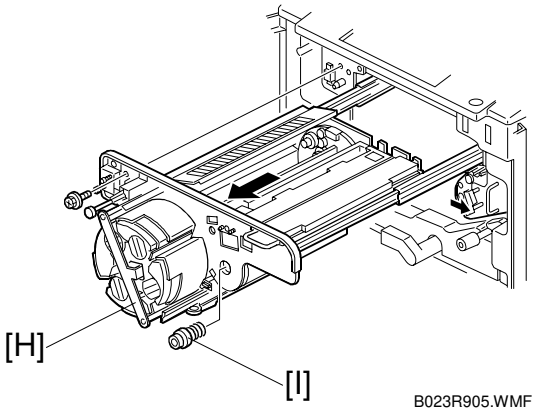
B023R326.WMF



B023R327.WMF



B023R573.WMF



B023R905.WMF

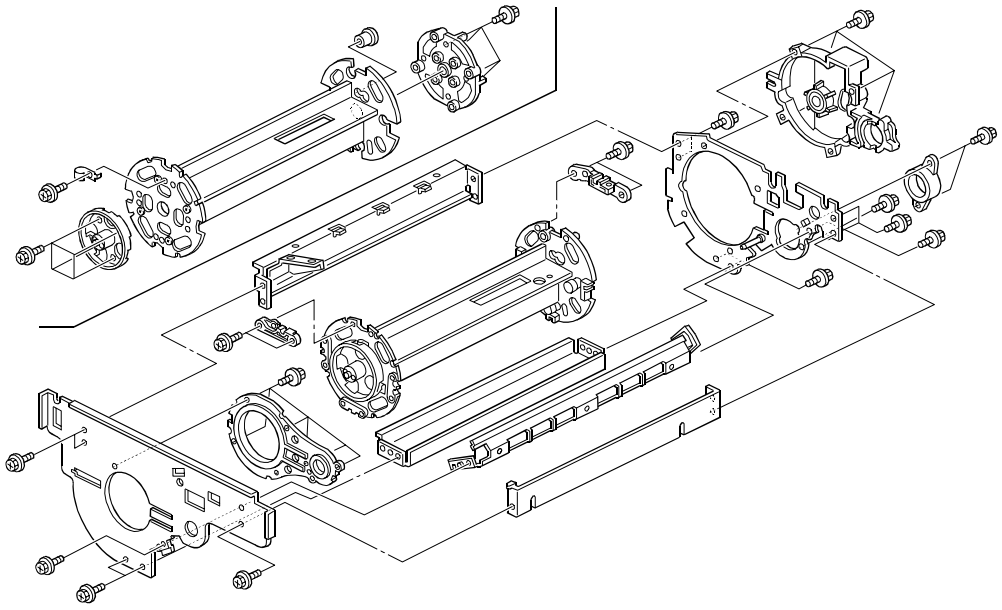
- Revolver cover (☛ 3.5.14)
- Move the transfer belt tension lever [A] from the copy position stud [B] to the tension stud [C] (1 snap ring, ✋ x 1).

[D]: Charge corona unit (1 snap ring, ✋ x 1)
[E]: Pre-cleaning corona unit (🪛 x 1)
[F]: Transfer faceplate (3 silver screws, 1 knob, ✋ x 1, 2 clamp)
[G]: Image transfer belt cleaning unit
[H]: Revolver/drum drawer—pull out (1 silver screw, green knob with spring [I])

NOTE: 1) Before reinstalling the transfer faceplate [F], make sure the pressure spring [I] is in place. Otherwise, photo conductor gap will be out of order. This leads to serious problem around the OPC drum.
2) While the drawer unit is out, shield the drum unit with 5 or more sheets of paper. (If the drum were to be exposed to light, it would cause optical fatigue, resulting in image anomalies.)
3) When removing and reinstalling the image transfer belt cleaning unit during servicing, please do so while holding the positioning pin [J].
4) Do not hold the entrance seal release lever [K]. If the lever is held, it will move and the gap will fall out of the adjustment range. This will cause the problems. (☛ 3.7.4)
5) The screw [L] that fastens the entrance seal release lever should not be loosened during servicing.

⚠CAUTION

Never remove the parts or screws shown in the following figure. These parts and screws are adjusted in factory with special jigs. If these parts or screws are removed in the field, the PG (photo conductor gap) will be out of alignment. This will lead to fatal problem with the drum and the development units.



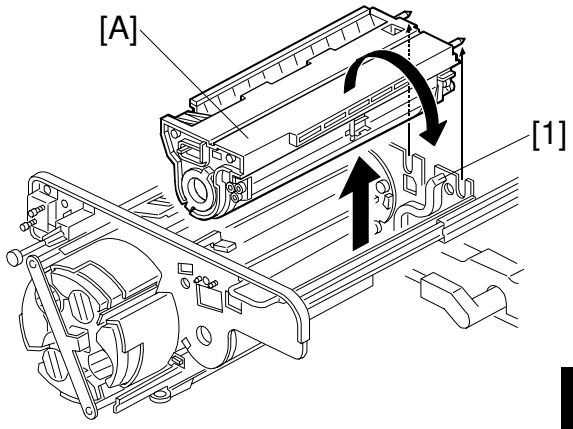
B023R002.WMF

3.3.2 DRUM UNIT REMOVAL

NOTE: Shield the drum unit with 5 or more sheets of paper. Otherwise, the drum will be exposed to light, which would cause optical fatigue, resulting in image anomalies.

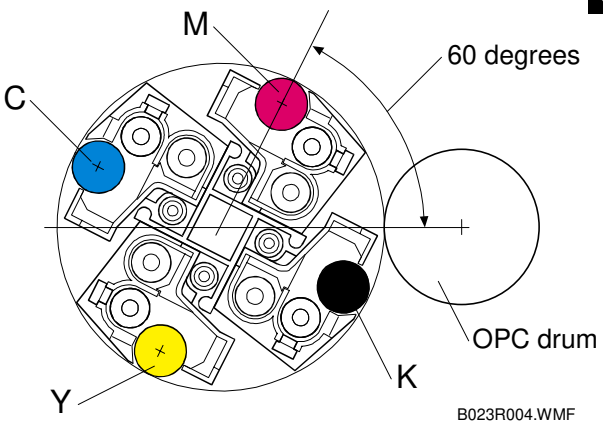
- Revolver/drum drawer (☛ 3.5.1)

[A]: Drum unit
Lift the drum out and rotate it clockwise as shown by the arrow [1] and set it upside-down.



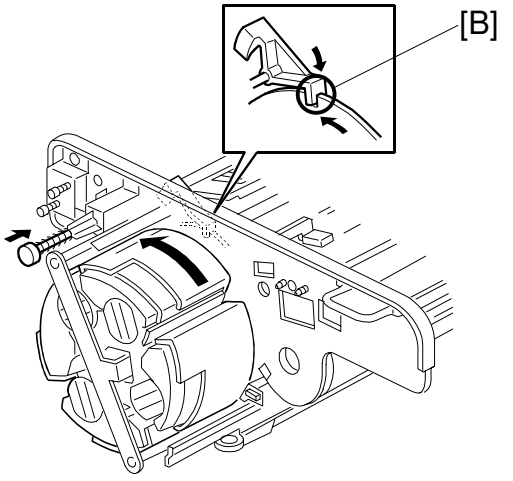
B023R306.WMF

NOTE: 1) It is important to rotate the drum unit as shown by arrow to prevent toner spillage.
2) To prevent the drum from being damaged, the revolver unit must be set to its home position before the drum unit is set in the upper drawer unit. As shown in the following illustration, the magenta development roller should be positioned at an angle of 60 degrees (from horizontal). When rotating the revolver unit, you can see the cut-out [B] on the wheel, which locks the revolver unit in the home position.



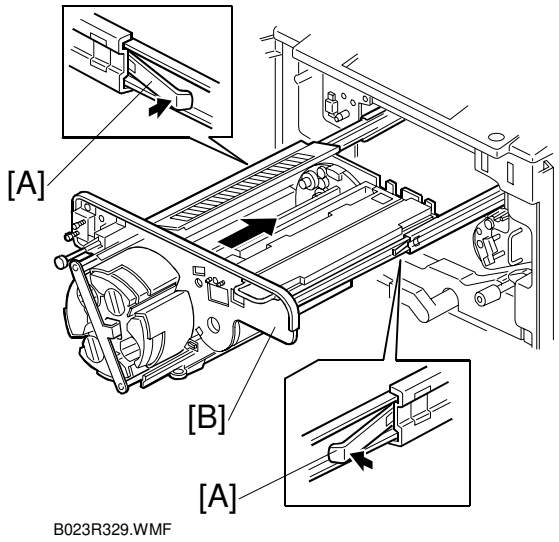
B023R004.WMF

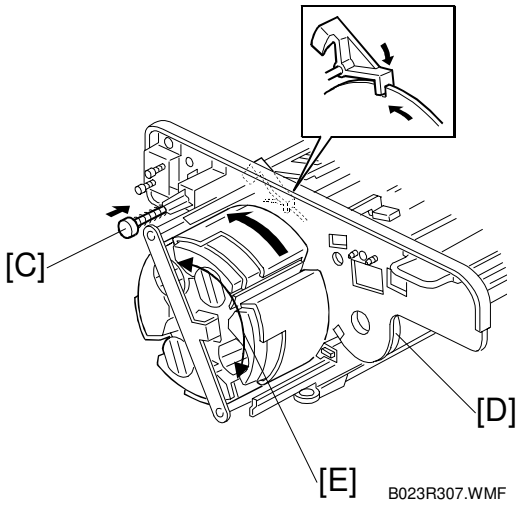
⚠CAUTION
Always rotate the revolver counter-clockwise (as shown in the illustration). Otherwise, the developer might spill out.



B023R357.WMF

3.3.3 REINSTALLING THE REVOLVER/DRUM DRAWER

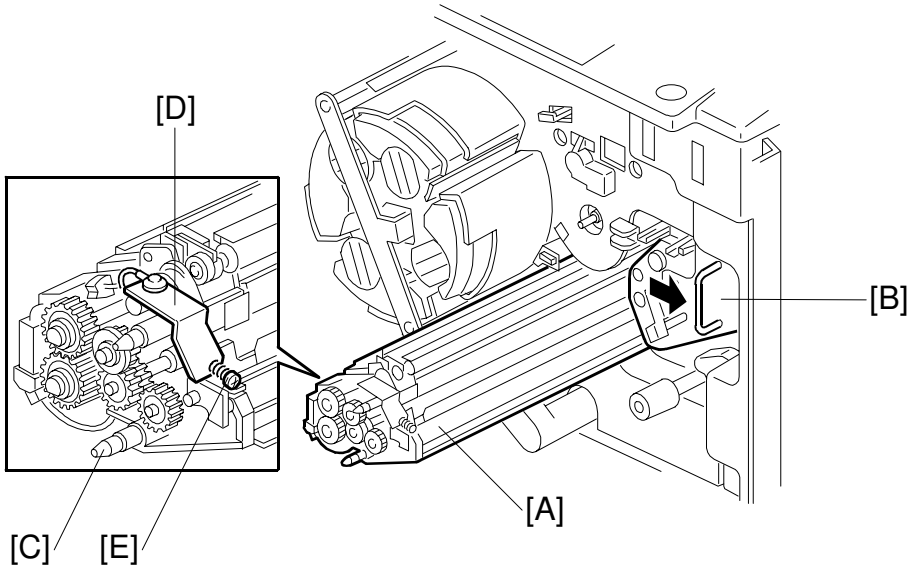




[A]: Press in the drawer rail stoppers.
[B]: Slide the revolver/drum drawer into the machine (☞ x 1).

NOTE: 1) Do not apply excessive force if the drawer does not fit in place. Press the revolver lock button [C] to release the revolver lock, turn the revolver slightly counterclockwise to release any catch in the revolver motor gear assembly and then reinsert the drawer.
2) Push the flange [D] of the OPC drum to the rear side of the copier. Then confirm that the gears between the drum and the drum shaft are engaged correctly.
3) If the gears on the mainframe and revolver unit are not engaged firmly, this may result in a gap between the revolver unit frame and copier frame (thus the unit will not be properly set). This also may cause the gears to be damaged when the revolver starts rotating. To ensure that the gears are properly engaged, it is necessary to manually fit (i.e. lock) the gears together by manipulating the revolver unit back and forth (slightly) as shown in the above illustration (arrow [E]). This should be done while holding the toner hoppers. To ensure that the gears between the drum and drum shaft properly engage, the flange [D] of the OPC drum must be pushed toward the back of the machine.

⚠CAUTION
Always rotate the revolver counter-clockwise (as shown in the illustration). Otherwise, the developer might spill out.



B023R411.WMF

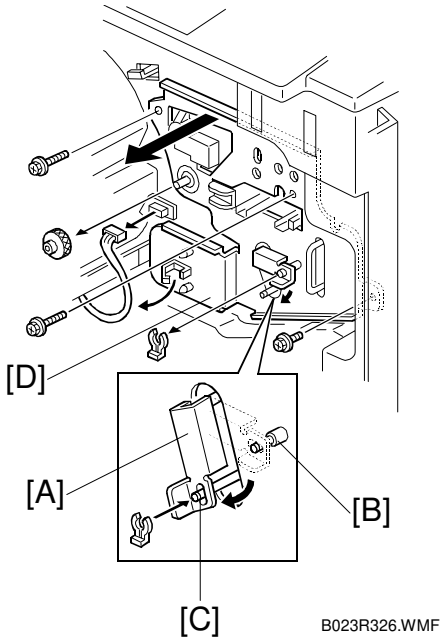
- Install the image transfer belt cleaning unit [A].
  NOTE: 1) Be sure to shift the image transfer belt unit to the right [B] before installing the cleaning unit. Failure to do so may damage the image transfer belt.
  2) When removing and reinstalling the image transfer belt cleaning unit during servicing, please do so while holding the positioning pin [C].
  3) Do not hold the entrance seal release lever [D]. If the lever is held, it will move and the gap will fall out of the adjustment range. This will cause the problems. (☛ 3.7.4)
  4) The screw [E] that fastens the entrance seal release lever should not be loosened during servicing.
- Put the transfer faceplate back. (☛ 3.3.4)
- Install the charge corona unit (1 snap ring) and PCC (🔩 x 1).
- Put the removed parts back.

3.3.4 IMAGE TRANSFER BELT UNIT REMOVAL

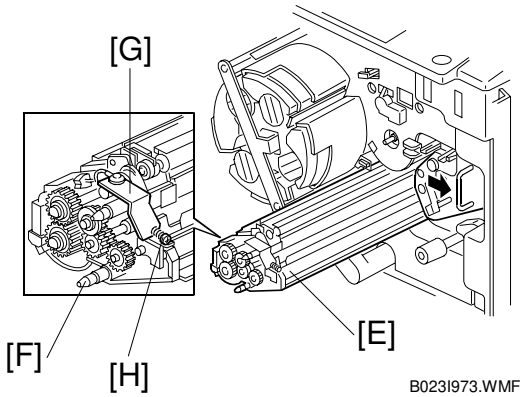
- Revolver cover (☛ 3.4.14)
- Move the transfer belt tension lever [A] from the image transfer position stud [B] to the tension stud [C] (1 snap ring, ☞ x 1).

[D]: Transfer faceplate [D] (3 silver screws, 1 knob, ☞ x 1, 2 clamp)

[E]: Image transfer belt cleaning unit
NOTE: 1) When removing and reinstalling the image transfer belt cleaning unit during servicing, please do so while holding the positioning pin [F].
2) Do not hold the entrance seal release lever [G]. If the lever is held, it will move and the gap will fall out of the adjustment range. This will cause the problems. (☛ 3.7.4)
3) The screw [H] that fastens the entrance seal release lever should not be loosened during servicing.

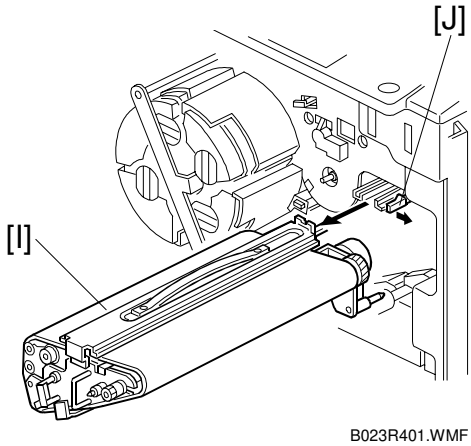


B023R326.WMF



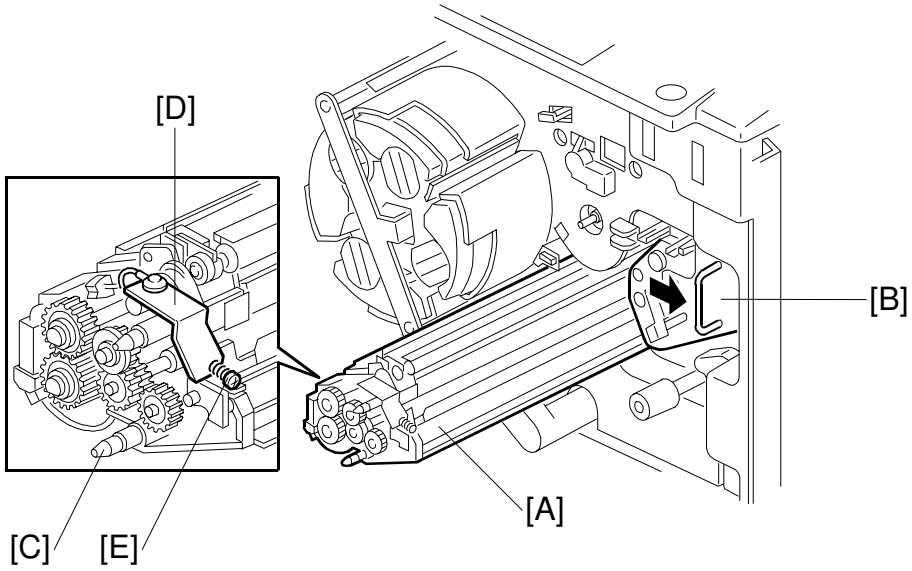
B023I973.WMF

[I]: Pull out the image transfer belt unit until it stops.
[J]: Release the stopper and remove the transfer belt unit.



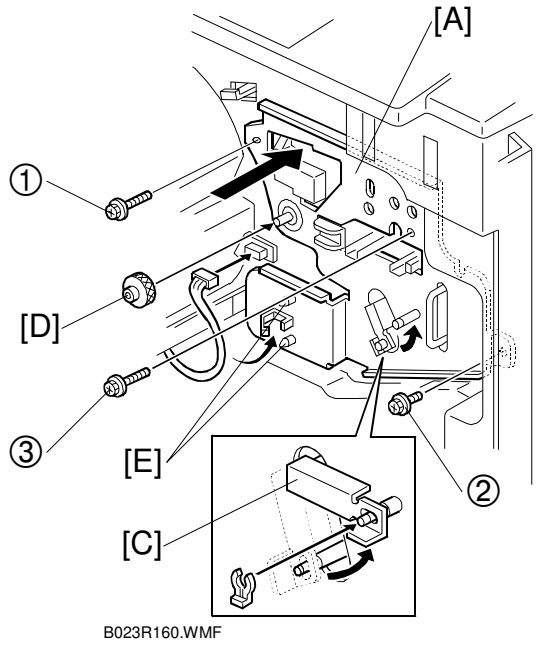
B023R401.WMF

Reinstalling the Image Transfer Belt Unit

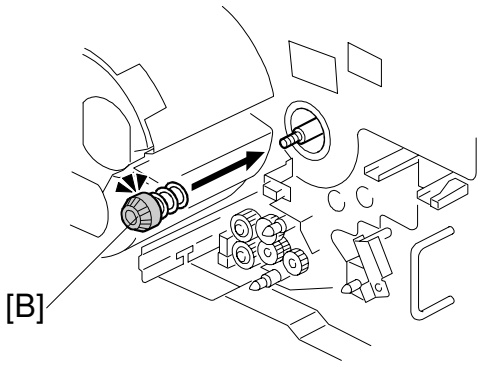


B023R411.WMF

- Set the transfer belt unit.
  NOTE: Before reinstalling the transfer belt unit, make sure the tension lever is set on the tension stud.
- Install the image transfer belt cleaning unit [A].
  NOTE: 1) Be sure to shift the image transfer belt unit to the right [B] before installing the image transfer belt cleaning unit. Failure to observe this caution may damage the image transfer belt.
  2) When installing the image transfer belt cleaning unit, please do so while holding the positioning pin [C].
  3) Do not hold the entrance seal release lever [D]. If the lever is held, it will move and the gap will fall out of the adjustment range. This will cause the problem. (☛ 3.7.4)
  4) The screw [E] that fastens the entrance seal release lever should not be loosened during the servicing.



B023R160.WMF



B023R176.WMF

- Mount the transfer faceplate [A] (1 knob, x 3, x 1, 1 clamp).

⚠CAUTION

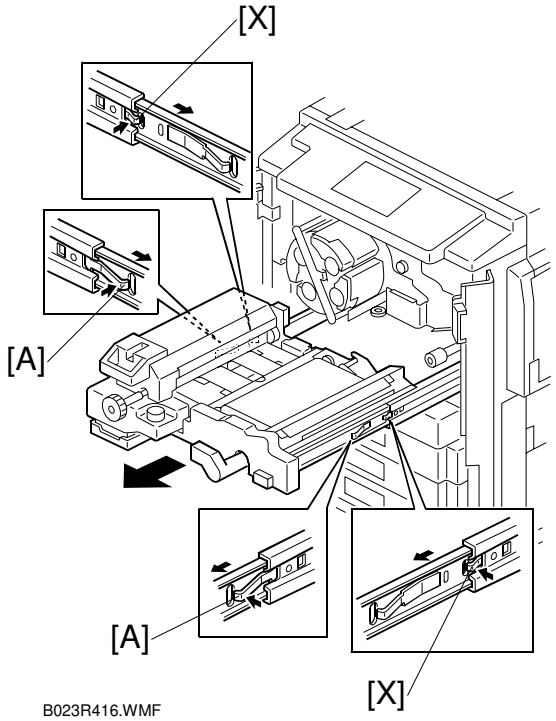
Make sure the pressure spring [B] is in place before reinstalling the transfer plate. The pressure spring holds the drum unit in place—if it is missing, the photo conductor gap will be out of alignment. This could damage the OPC drum or development sleeves.

NOTE: 1) When reinstalling the transfer faceplate, tighten the knob [D] before tightening the other screws.
2) Pushing upper left part of the faceplate against the revolver/drum drawer, tighten the three screws in the following order: ① ② ③

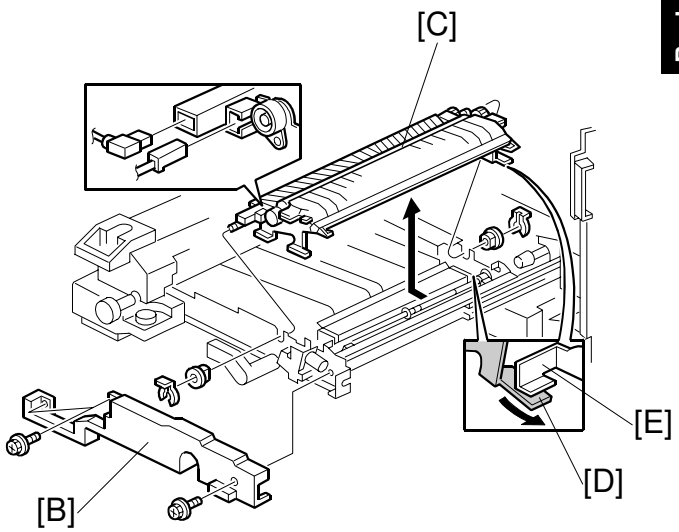
- Reinstall the transfer faceplate [A] (3 long screws, 1 knob, 1 connector, and 2 clamps). Raise the transfer belt tension lever [C] to the image transfer position (1 snap ring). Then reinstall the charge and PCC coronas.

NOTE: 1) When mounting the transfer faceplate, tighten the knob before tightening the screws. Otherwise, the transfer faceplate may not be set properly.
2) After reinstalling the transfer face plate, press back on the two shafts [E]. This ensure that the ITB cleaning unit is set correctly.

3.3.5 PAPER TRANSFER UNIT REMOVAL



B023R416.WMF



B023R906.WMF

⚠WARNING

Do not press rail release springs [X] which are just behind the rail stoppers. Pressing them may cause the fusing/transfer drawer and rails to come off. This is dangerous because the drawer is heavy.

- Press the stoppers [A] on both sides of the fusing/transfer drawer rail and pull out the drawer.

[B]: Fusing/transfer drawer cover (☞ x 3)

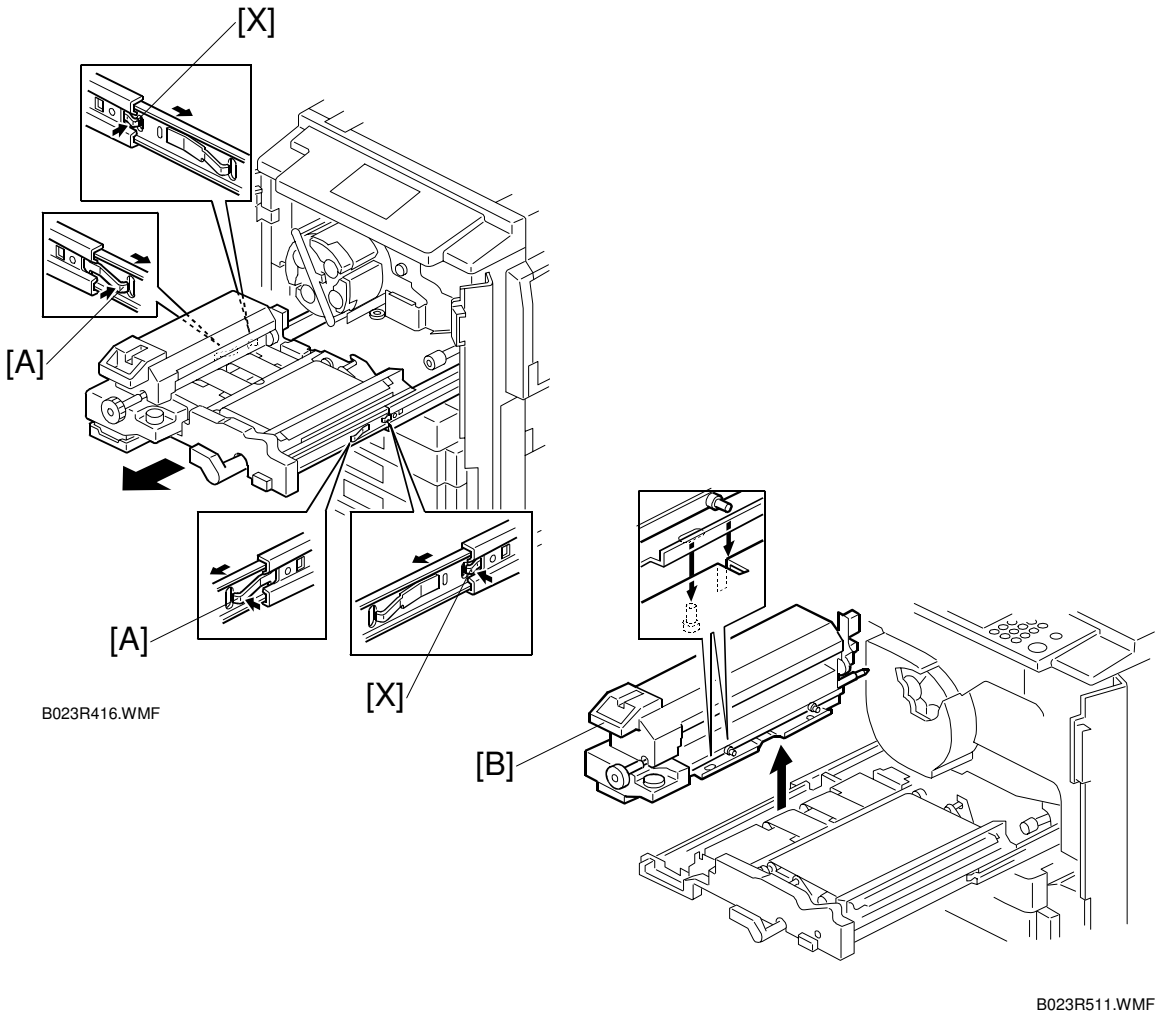
[C]: Paper transfer unit (✍ x 2, 2 snap rings, 2 bearings)

NOTE: When re-installing the paper transfer unit, make sure that the bracket [D] is under the lever [E].

3.3.6 REMOVING THE FUSING UNIT

⚠WARNING

1. **Exercise adequate care when handling the fusing unit as it may be hot.**
2. **Take care not to spill silicone oil on the customer's floor. Completely wipe up any spilled silicone oil with a silicone oil remover. Otherwise, you might slip and fall.**



⚠WARNING

Do not press rail release springs [X] which are just behind the rail stoppers. Pressing them may cause the fusing/transfer drawer and rails to come off. This is dangerous because the drawer is heavy.

- Press the stoppers [A] on both sides of the fusing/transfer drawer rail and pull out the drawer.

[B]: Fusing unit (Lift and remove)

NOTE: When reinstalling the fusing unit, align the two positioning pins with the two positioning keys.

3.4 SCANNER UNIT

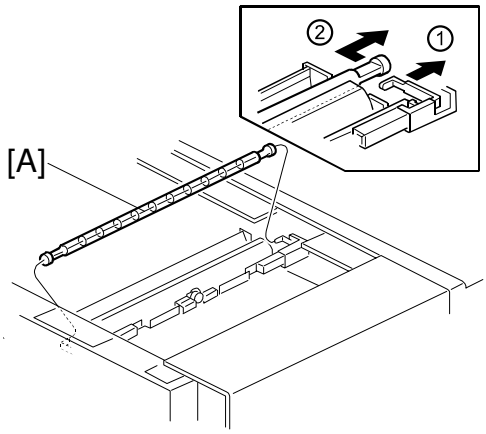
3.4.1 EXPOSURE LAMP REPLACEMENT

- Exposure glass (☛ 3.4.1)
- Move the first scanner next to the opening in the frame.

[A]: Exposure lamp (Push the exposure lamp terminal out as shown ①, and remove the lamp ②.)

- Install the new lamp in the reverse order of disassembly.

NOTE: Do not touch the glass surface of the new lamp.



B023R999.WMF

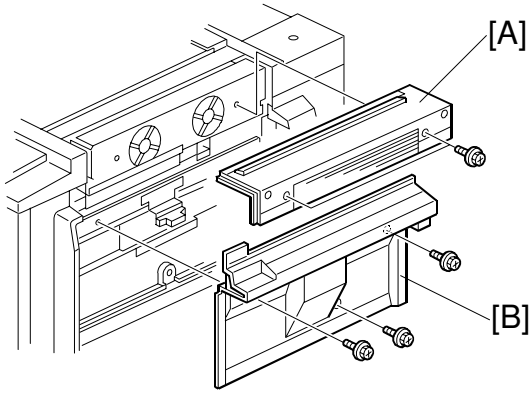
3.4.2 SBU REPLACEMENT

- Exposure glass (☛ 3.4.1)

[A]: Upper right cover (🔩 x 2)

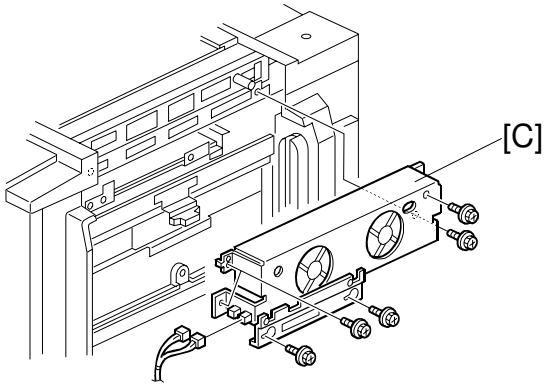
- Open the by-pass feed table.

[B]: Middle right cover (🔩 x 3)



B023R991.WMF

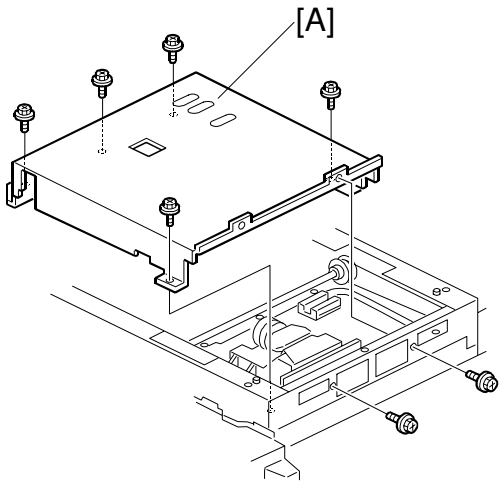
[C]: Bracket with two fan motors (🔩 x 6, 2 hooks, ✋ x 2)



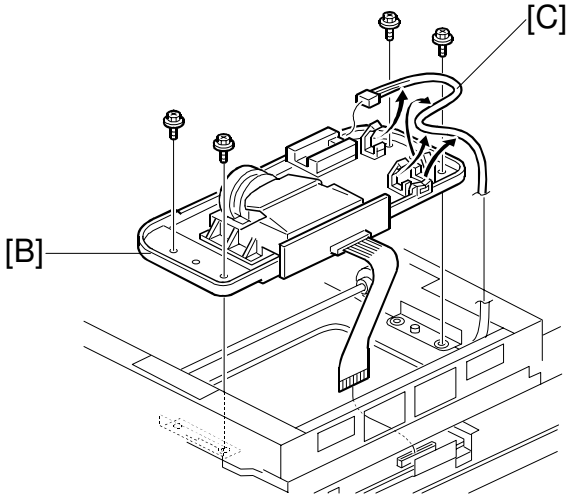
B023R992.WMF

[A]: SBU cover (x 7)
[B]: SBU (x 4, x 2, 4 clamps)

NOTE: When putting back the SBU cover, be careful not to pinch the harness [C].

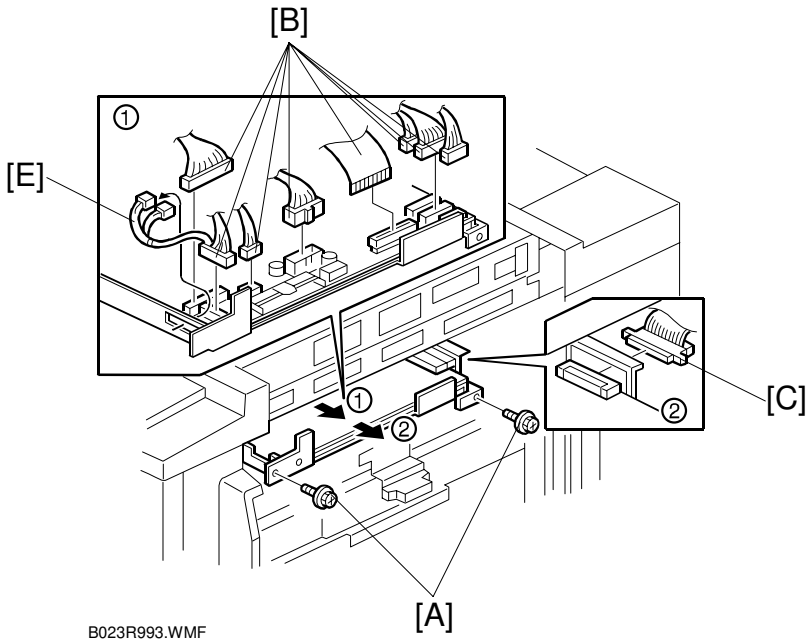


B023R920.WMF

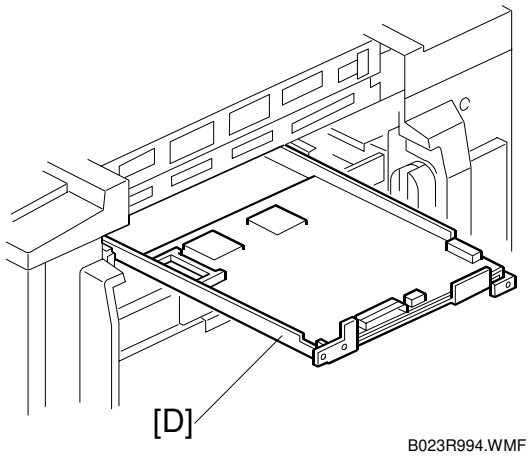


B023R921.WMF

3.4.3 SCANNER IPU BOARD REPLACEMENT



B023R993.WMF



B023R994.WMF

- Upper right cover, middle right cover, bracket with two fan motors (☛ Previous Procedure)

[A]: x 2 from the IPU board

[B]: x 8 from the IPU board

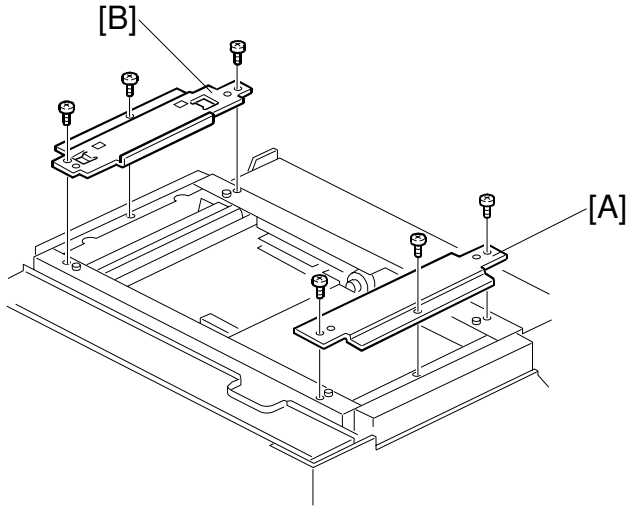
- Slide out the IPU board halfway, so that the fiber harness can be disconnected. Disconnect the fiber harness connector [C].

[D]: IPU board

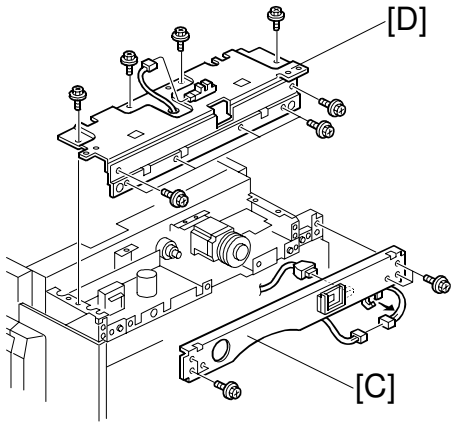
- Put all the removed parts back.

NOTE: 1) Run the 2 fan motor fan harnesses [E] through the hole as shown.
2) Make sure the harnesses are not pinched when reinstalling the parts.

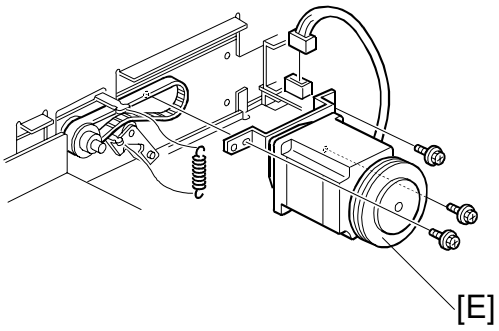
3.4.4 SCANNER WIRE/SCANNER MOTOR REPLACEMENT



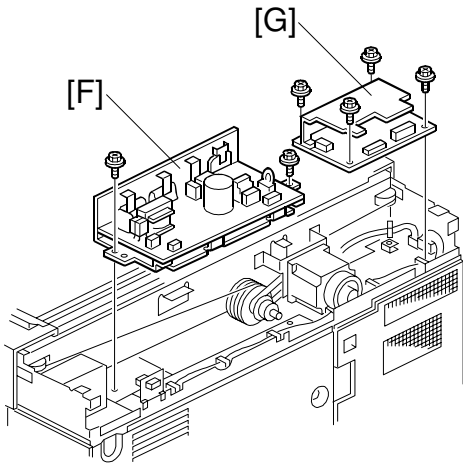
B023R926.WMF



B023R927.WMF



B023R928.WMF

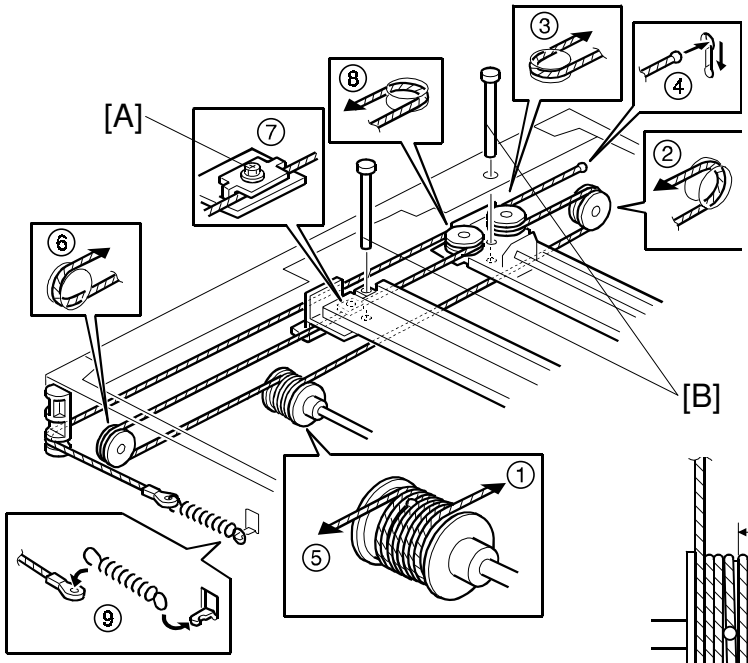


B017R009.WMF

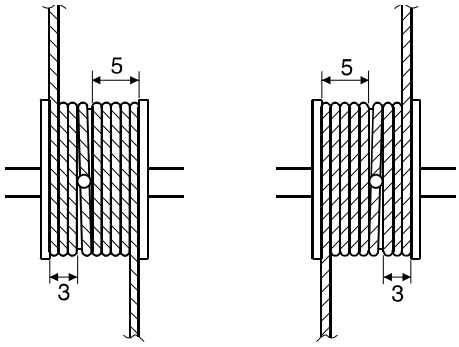
1. Exposure glass, upper covers, operation panel (☛ 3.4.6, 3.4.7, 3.4.8)
2. [A] Upper right stay (☞ x 3)
3. [B] Upper left stay (☞ x 3)

To change the rear scanner wire:

1) [C] Upper rear stay (☞ x 6, 🖑 x 2, 1 clamp)
2) [D] Platen cover frame (☞ x 10, 🖑 x 1)
3) [E] Scanner motor (☞ x 3, 🖑 x 1, 1 spring)
4) [F] Lamp regulator (☞ x 2, 🖑 x 2)
5) [G] Scanner drive board (☞ x 4, 🖑 x 3)



B023R014.WMF



B023R016.WMF

4. Loosen the screw for the first scanner wire clamp and remove the scanner wire. Also loosen the clamp screw on the other side, but do not remove the wire.
5. Route the new scanner wire as shown in the figure. Take care to orient the wire correctly before threading it on the pulleys–there is an anchor bead on one end of the wire and an eyelet on the other.
   1) Secure the first and second carriages on the scanner with locking pins [B]. Set the scanner locking pins as shown in the figure (4 locations). (When the scanner is in the correct position, the locking pins slide in and out smoothly. Locking Pin part No.: A2599010)
   2) Place the positioning bead located at the center of the wire in the groove in the pulley and wind the wire the number of turns indicated in the figure.

      Winding procedure: Wind 3 turns outward from the bead at the center of the wire (up to the red mark), then 5 turns inward (up to the black mark). There will be a total of 8 turns including the one for the center ball.
   3) Route the section of the wire with the anchoring bead on the pulleys as shown in the figure (②, ③), then fit the bead into the slot in the frame (④).
   4) Route the section of the wire with the eyelet on the pulleys (⑤, ⑥, ⑦, ⑧), then hook the ring to the tension spring and the spring to the wire tension bracket (⑨).

6. Tighten the screw permanently.
7. Clamp the wire to the scanner.
8. Remove the scanner locking pins.
9. Re-install all parts except for the exposure glass, upper covers.
10. After tensioning the wire by executing a scanner free run (SP4-013-022), reset the scanner locking pins. If the pins do not properly fit into the holes, loosen and reset the scanner wire clamp so that the pins properly fit into the holes.
11. Assemble in the reverse order of disassembly.

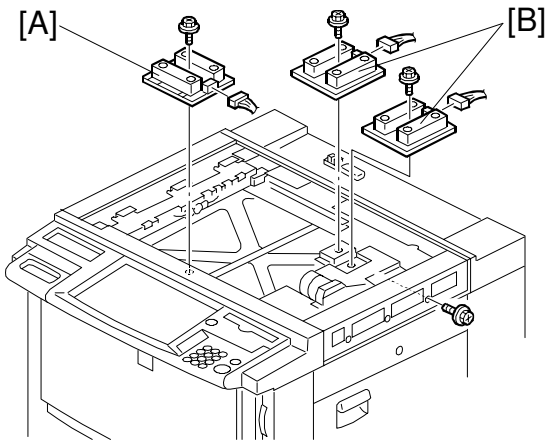
3.4.5 APS SENSORS

- Exposure glass (☛ 3.4.6)

[A]: APS sensor (x 1, x 1)

- SBU cover (☛ 3.6.2)

[B]: APS sensors (x 1, x 1)



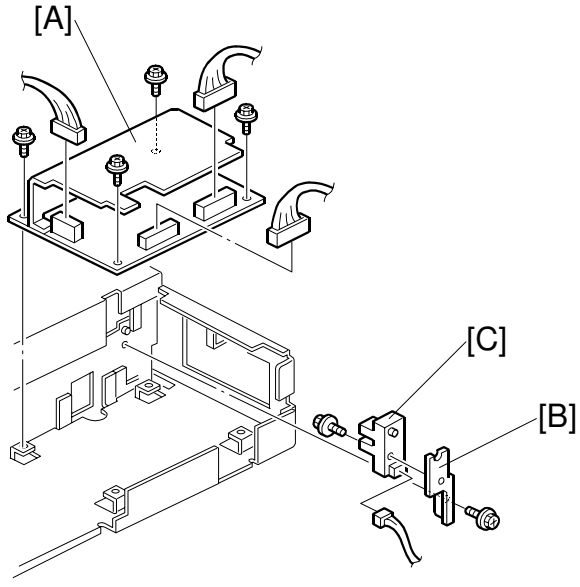
B023R514.WMF

3.4.6 SCANNER HP SENSOR

[A]: Scanner drive board (☛ 3.6.4)

[B]: Scanner H.P. sensor bracket (x 1, x 1)

[C]: Scanner H.P. sensor (x 1)

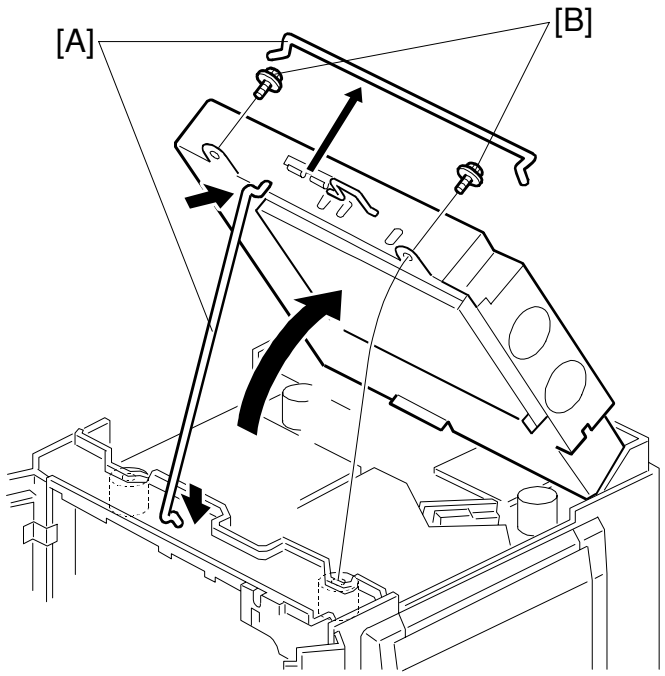


B023R943.WMF

3.5 LASER OPTICS SECTION

3.5.1 OPENING THE SCANNER UNIT

NOTE: Be sure to remove the document feeder or platen cover before starting this procedure. Otherwise, the document feeder or platen cover might fall off backwards when you open the scanner unit.



B023R923.WMF

- Operation panel (☛ 3.4.8)
- Upper rear cover (☛ 3.4.7)

[A]: Support rod
[B]: Scanner lock screws (☞ x 2)

- Lift the scanner unit and prop it up with the support rod.

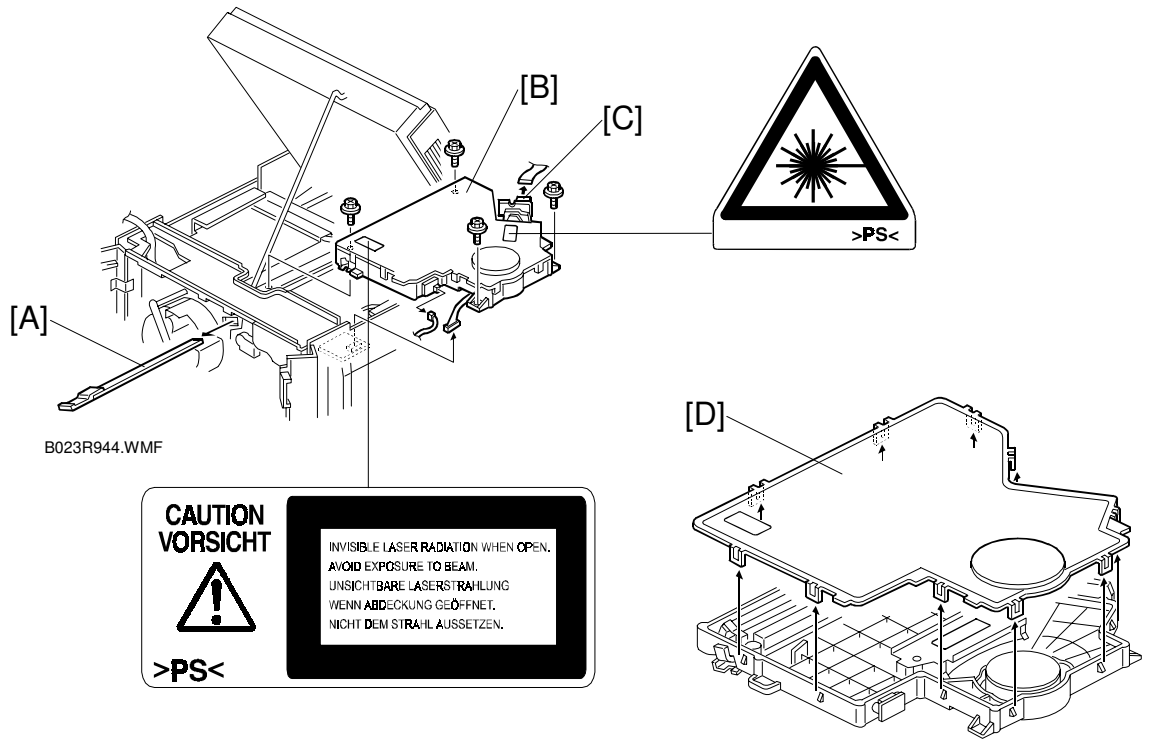
⚠CAUTION

Take care not to knock the support rod loose [A] while the scanner unit is open. If the support rod is disengaged, the scanner unit may suddenly fall.

3.5.2 POLYGON MIRROR MOTOR REPLACEMENT

⚠WARNING

Be sure to turn off the main switch and disconnect the power plug from the power outlet before attempting any disassembly or adjustment of the laser unit. This copier uses a class 3B laser beam with a wavelength of 780 nm and an output of 15 mW. Laser beams can seriously damage your eyes.



Operation panel (☛ 3.4.8)

Upper rear cover (☛ 3.4.7)

Open the scanner unit. (☛ 3.7.1)

⚠CAUTION

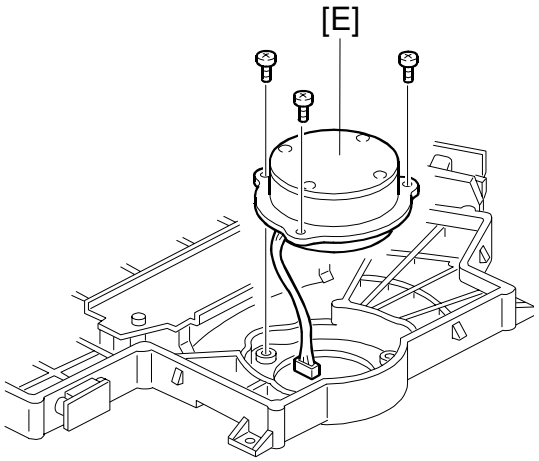
Take care not to knock the support rod loose while the scanner unit is open. If the support rod is disengaged, the scanner unit may suddenly fall.

[A]: Toner shield glass
NOTE: Remove the toner shield glass before removing the optical housing unit. This helps prevent the toner shield glass from becoming inadvertently broken.

[B]: Optical housing unit (☞ x 4, 🖑 x 2)
NOTE: To disconnect the flat cable, open the lever [C] of the connector.

[D]: Optical housing cover (10 hooks).

[E]: Polygon motor (☞ x 3)

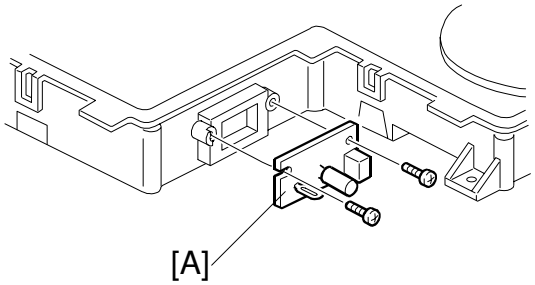


B023R107.WMF

3.5.3 LASER SYNCHRONIZING DETECTOR REPLACEMENT

- Optical housing unit (☞ 3.7.2)

[A]: Laser synchronizing detector board (☞ x 2)



B023R946.WMF

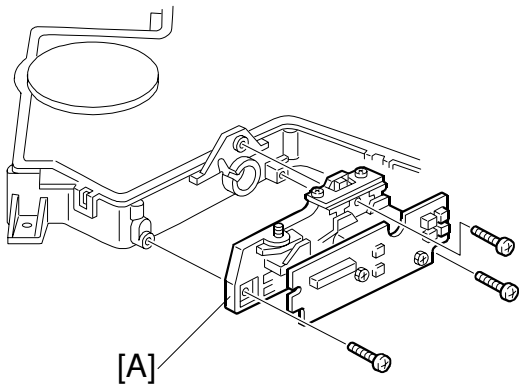
3.5.4 LD UNIT REPLACEMENT

- Optical housing unit (☞ 3.7.2)

[A]: LD unit (☞ x 3)

- Reassemble, then check and adjust the LD pitch (☞ 3.7.5).

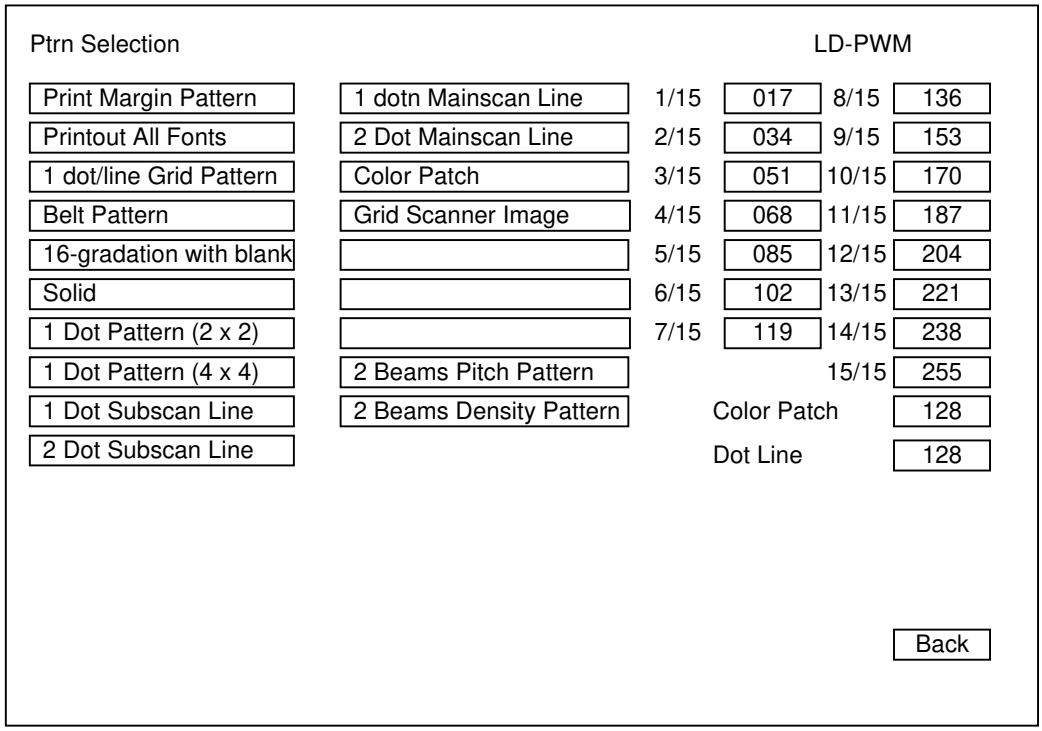
NOTE: Although the LD pitch is guaranteed by the LD unit, it may deviate from the normal value depending on the combination with the optical housing unit. Be sure to check the LD pitch after replacing the LD unit.



B023R947.WMF

3.5.5 LD PITCH CHECK AND ADJUSTMENT]

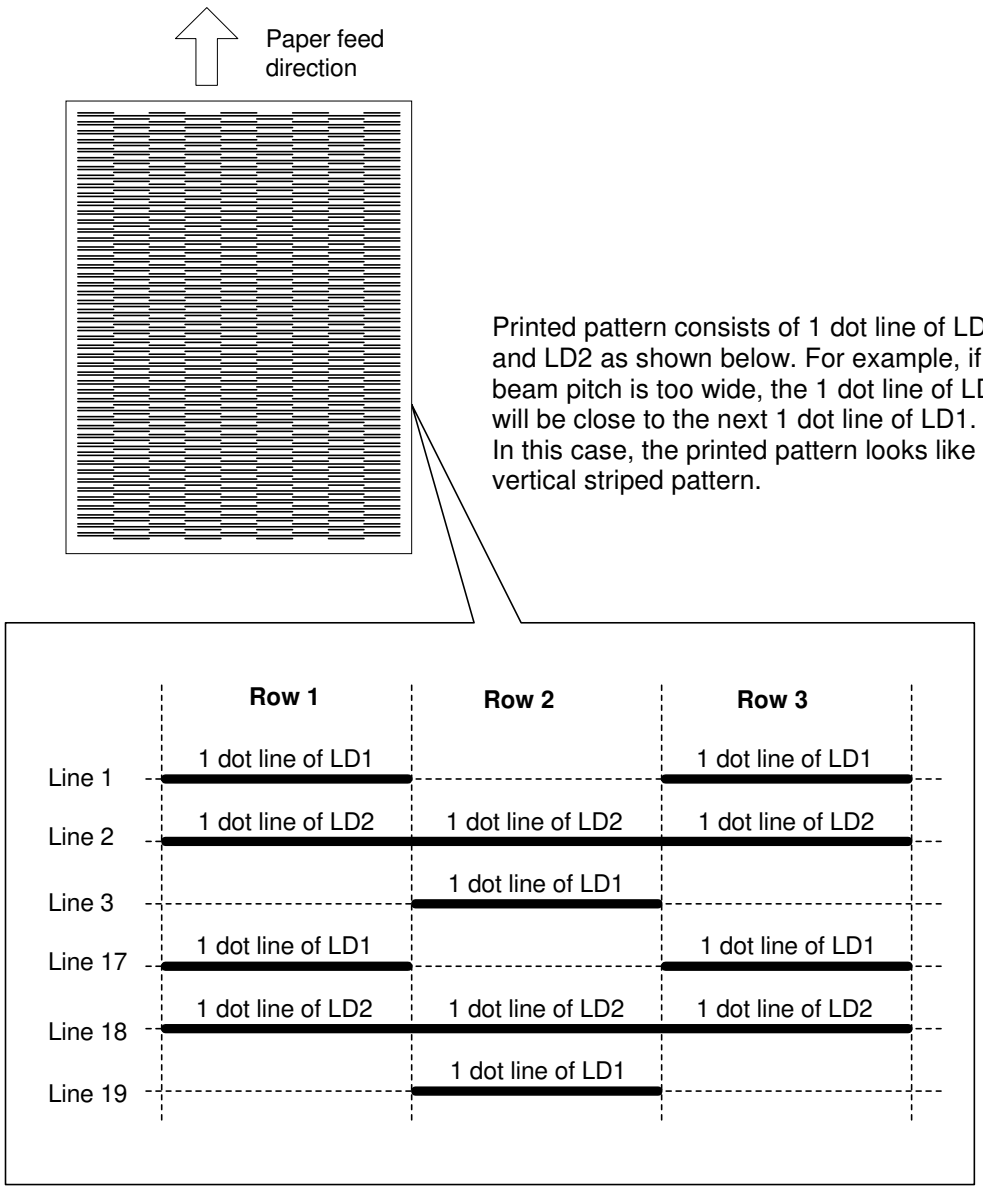
1. Enter SP5-955 (the following display will appear); then, select the “2-Beams Pitch Pattern” and enter 100 for the “Dot Line” value (default value is 128).
2. Then press the [Interrupt] key, select “Black & White”, and print on A3/11" x 17" paper.



B023R520.WMF

3. Check the vertical lines running down the page. (Actually there aren't really any vertical lines. They are an optical illusion caused by the test pattern.) There are two cases as follows:
   - If the vertical lines are prominent, the beam pitches for LD1 and LD2 do not match.
   - If the vertical lines are not prominent, the beam pitches for LD1 and LD2 match.

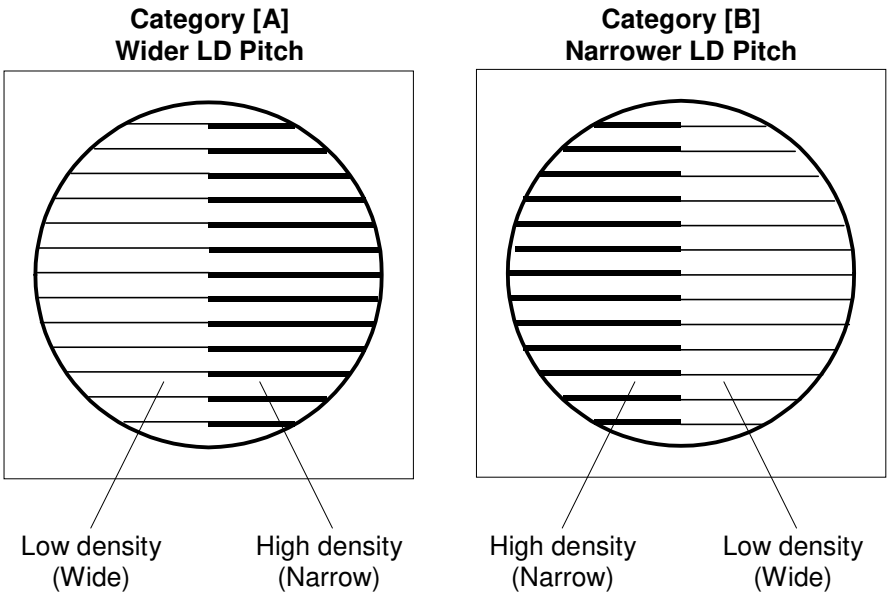
[Printed pattern]



B023R522.WMF

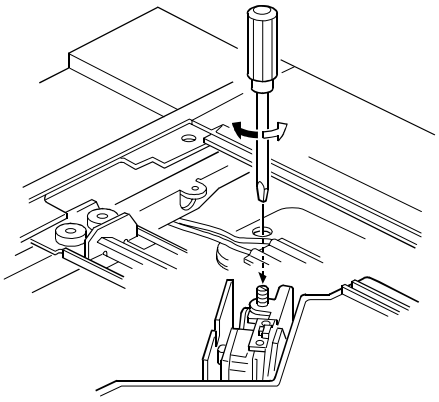
Reference: Beam pitch for LD1 and LD2 is 42.3 μm (1 dot)

4. If the vertical line pattern is clearly visible over more than 2/3 of the paper, examine the vertical line pattern with a magnifier (the adjustment is completed when the vertical stripe pattern area is smaller than 2/3 of the entire paper).



If the image that is checked with a magnifier comes under category [A], “Wider LD Pitch”:

1) Remove the exposure glass.
2) Insert an adjusting screwdriver into the scanner unit LD angle adjustment access hole and turn the screw clockwise half a turn. Then, create a new test pattern (1 turn of adjusting screw corresponds to 5 μm).
3) Write (–2.5 μm, –0.5 turn) in the sample output.
4) Turn the screw another half a turn (clockwise) and create a third test pattern.
5) Write (–5 μm, –1 turn) in the sample output.



6) Turn the screw another half a turn (clockwise) and create a fourth test pattern.
7) Write (–7.5 μm, –1.5 turn) in the sample output.
8) From the four sample output sheets, select the one in which the vertical stripes are least prominent. Turn the adjusting screw back to the position of the selected sample output.

If the image that is checked with a magnifier comes under category [B], “Narrower LD Pitch”:

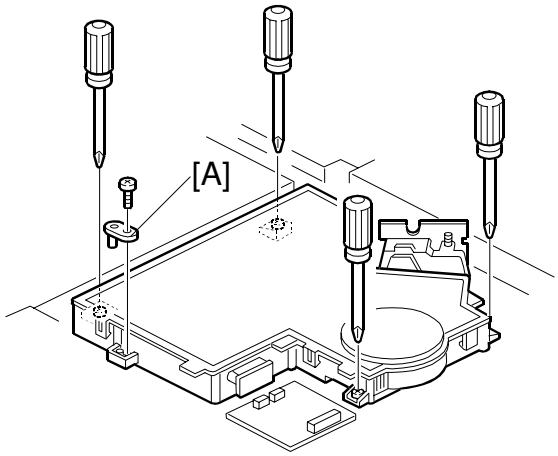
1) Remove the exposure glass.
2) Insert an adjusting screwdriver into the scanner unit LD angle adjustment access hole and turn the screw counterclockwise half a turn. Then, reprint the test pattern (1 turn of adjusting screw corresponds to 5 um).
3) Write (+2.5 μm, +0.5 turn) in the sample output.
4) Turn the screw another half a turn (counterclockwise) and create a third test pattern.
5) Write (+5 μm, +1 turn) in the sample output.
6) Turn the screw another half a turn (counterclockwise) and create a fourth test pattern.
7) Write (+7.5 μm, +1.5 turn) in the sample output.
8) From the four sample output sheets, select the one in which the vertical stripes are the least prominent. Turn the adjusting screw back to the position of the selected sample output

Paint-lock the screw.

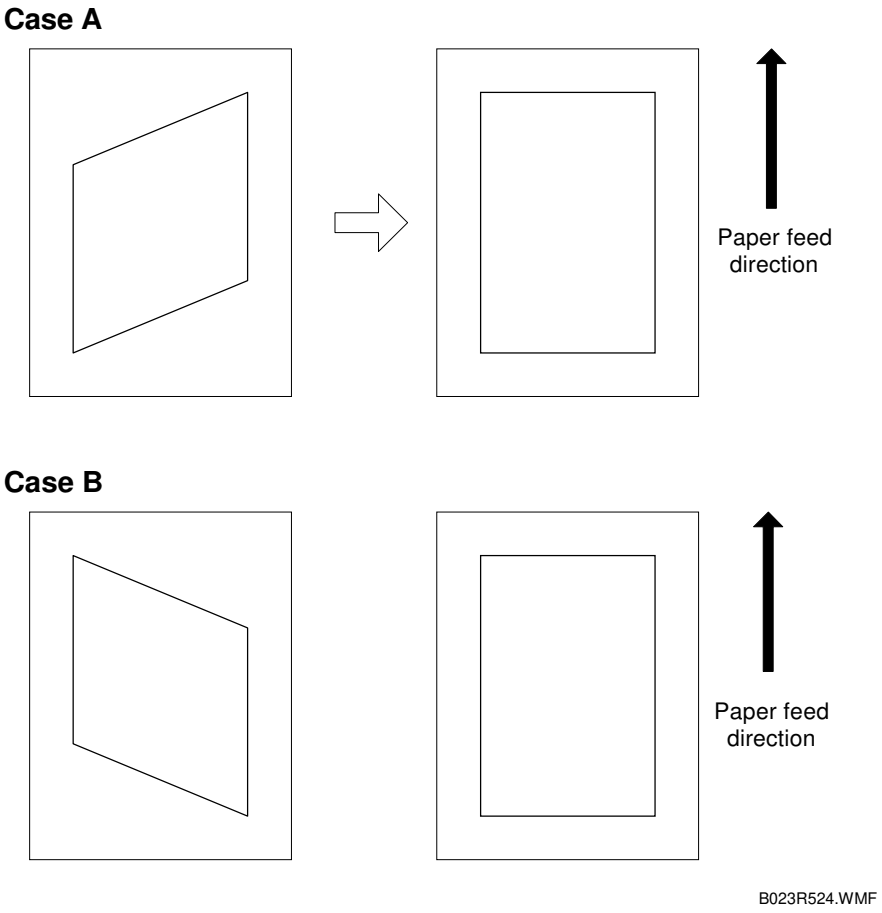
3.5.6 LASER ANGLE ADJUSTMENT

The purpose of this step is to finely adjust the angle of the laser beam. By turning the laser unit, and thereby tilting the scanning line of the laser beam, you can adjust the inclination of horizontal lines. This ensures that the image is square on the page.

1. Generate the “Print Margin Pattern” in the SP mode (SP5-955-17) and see if the image is square on the page. (When the image is not square, the lines in the horizontal scanning direction are slanted.
2. Loosen the (4) screws securing the optical housing unit.
3. Remove the Vertical reference pin [A] located on the left front side of the optical housing unit.
4. Turn the optical housing unit (clockwise or counterclockwise) according to the inclination of the lines in the horizontal scanning direction (see the figure below for guidelines).
5. Tighten the 4 screws and the vertical reference pin again.



B023R940.WMF



A. In this case, turn the unit clockwise.

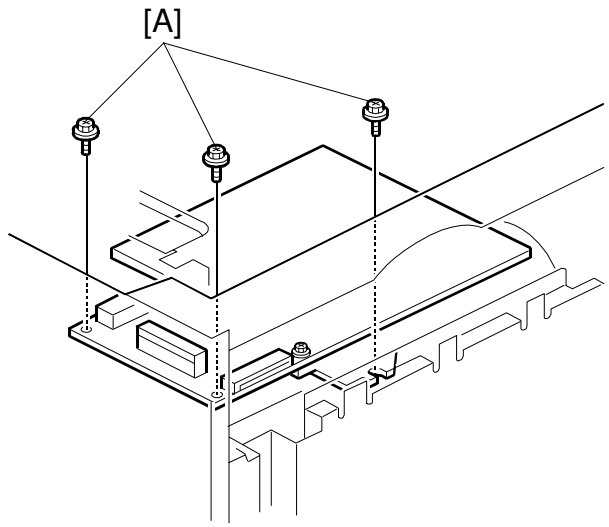
B. In this case, turn the unit counterclockwise.

Amount of inclination:
The amount that the horizontal lines are skewed is almost proportional to the angle that the optical housing unit must be turned.

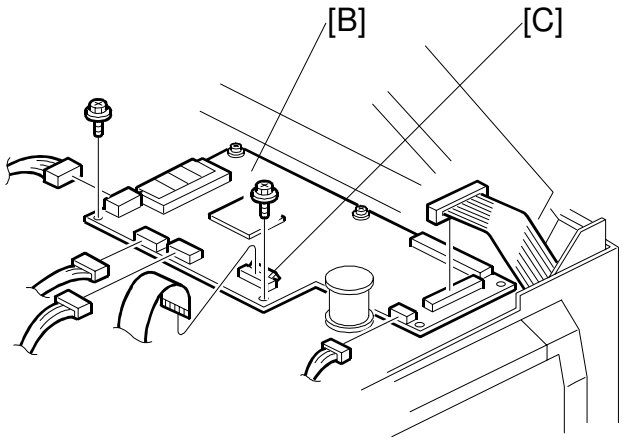
Standard value:
Inclination of the lines in the laser beam scanning direction (horizontal lines) must be within 0.5 mm maximum for the 240 mm scanning line.

You can make fine adjustments within this range.

3.5.7 LD CONTROL BOARD REPLACEMENT



B023R941.WMF



B023R942.WMF

- Upper rear cover (☛ 3.4.7)

[A]: 3 screws from the LD control board

- Open the scanner unit. (☛ 3.7.1)

⚠CAUTION

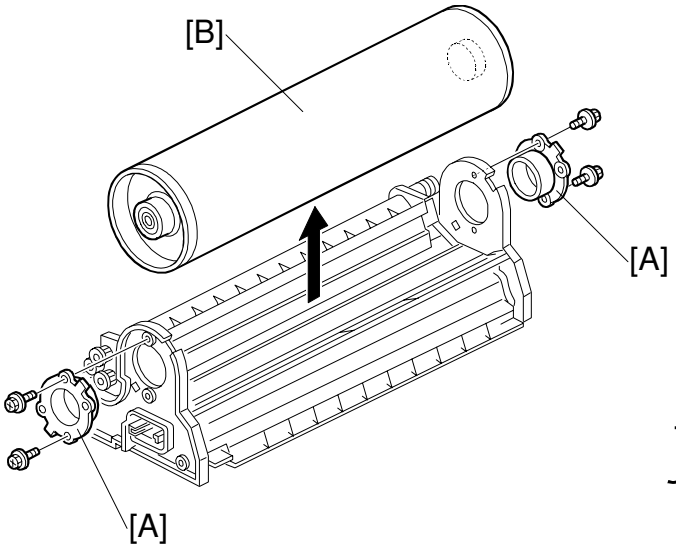
Take care not to knock the support rod loose while the scanner unit is open. If the support rod is disengaged, the scanner unit may suddenly fall.

[B]: Laser control board (1 flat cable connector, 🖐 x 5, 🪛 x 2)

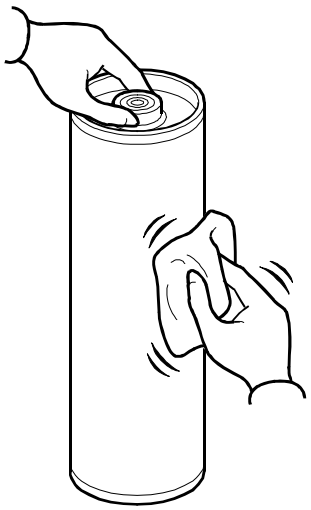
NOTE: To disconnect the flat cable connector, open the lever [C] of the connector.

3.6 DRUM UNIT

3.6.1 DRUM REPLACEMENT



B023R201.WMF



B023R960.WMF

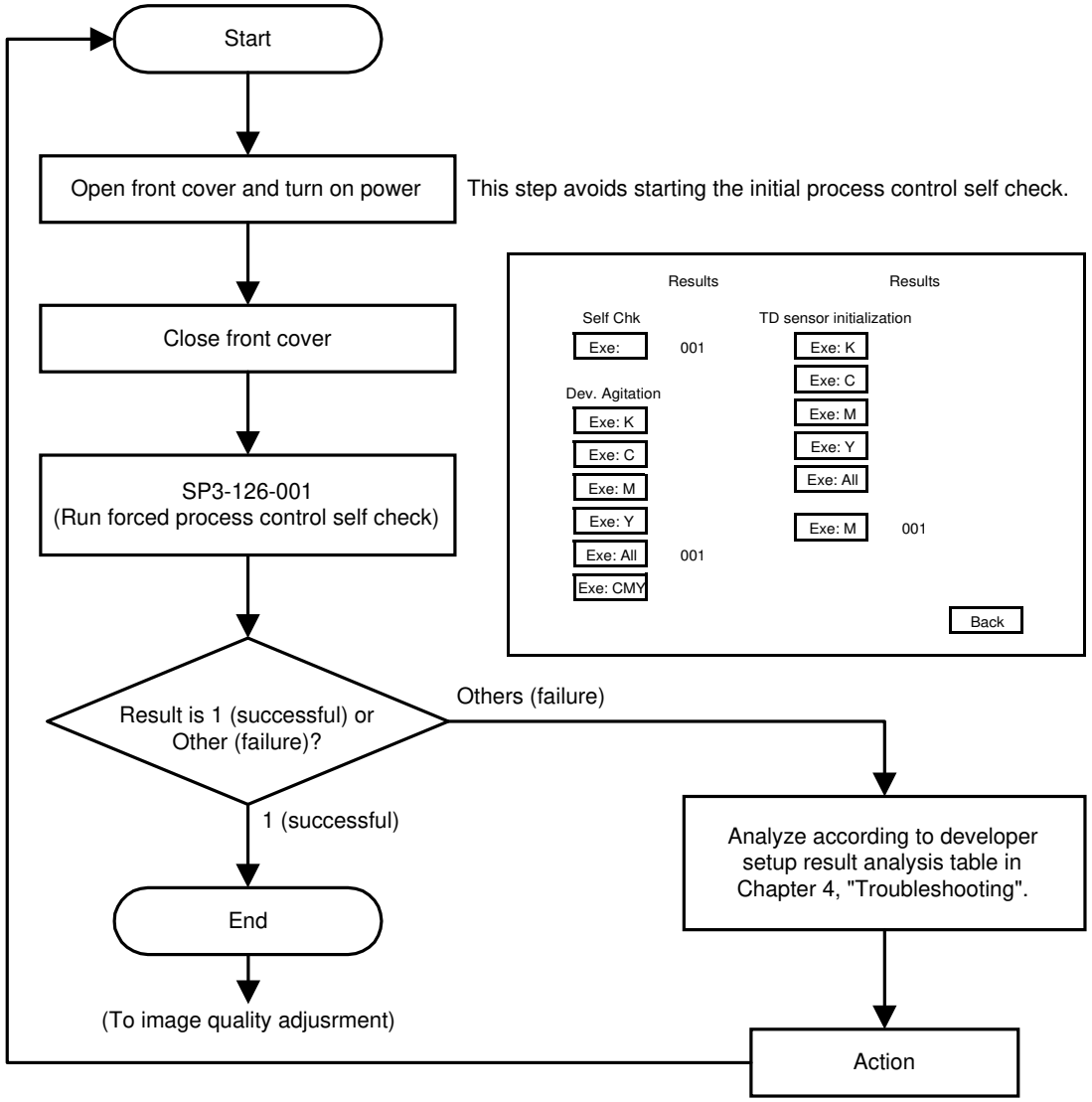
- Drum unit (☛ 3.5.2)

[A]: Drum support bushing (🔩 x 2 each)
[B]: Drum

- Install the new drum and apply setting powder to the entire drum surface.
  NOTE: 1) Be sure to apply the setting powder over the entire drum. This prevents the cleaning blade from catching on the drum surface.
  2) Be sure not to spill the setting powder on the drum potential sensor.
- Turn the drum two or three rotations to settle the setting powder to the drum surface.
  NOTE: Do not touch the drum beyond 10 mm from the edge.
- Perform the process control self-check on the new drum. (☛ Post-replacement process on the next page)

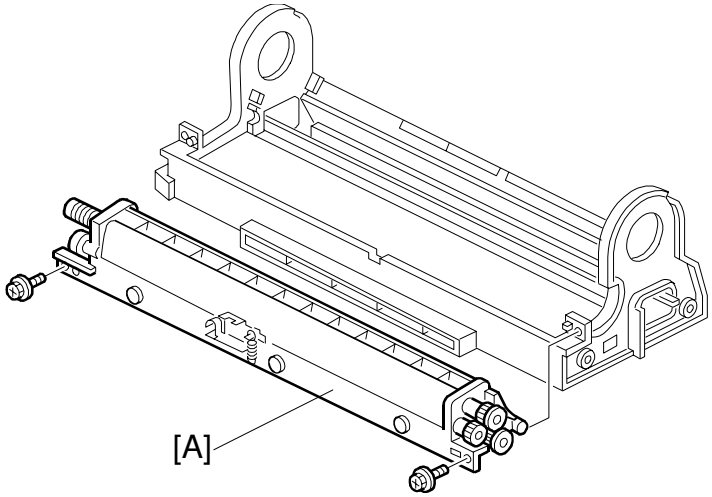
Post-replacement Procedure

NOTE: After installing a new drum, be sure to perform the procedures in the following flowchart.

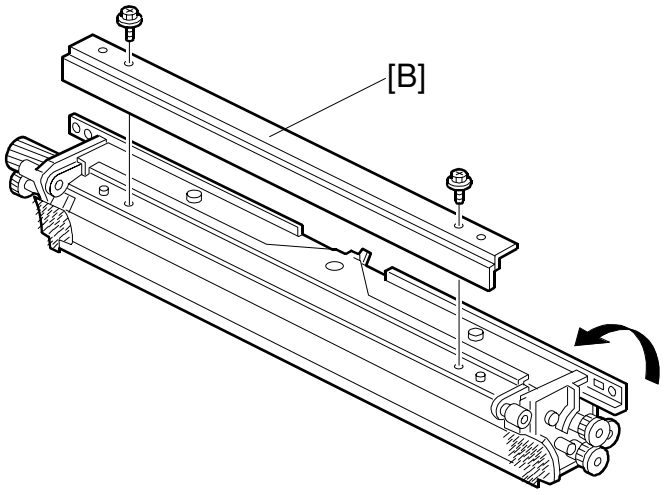


B023R552.WMF

3.6.2 CLEANING BLADE REPLACEMENT



B023R206.WMF



B023R204.WMF

Drum (☛ the previous procedure)

[A]: Cleaning unit (🔩 x 2)

[B]: Cleaning blade from the cleaning unit (🔩 x 2)

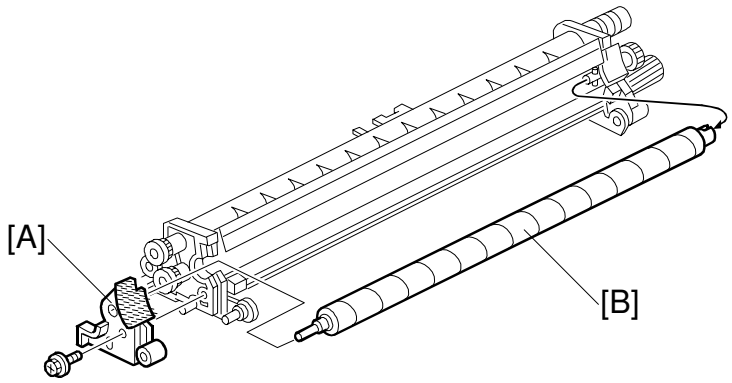
NOTE: 1) After installing a new blade, be sure to apply setting powder over the entire drum. This prevents the cleaning blade from catching on the drum surface.

2) Rotate the drum forward two or three rotations to settle the setting powder between the drum surface and cleaning blade.

3.6.3 CLEANING BRUSH REPLACEMENT

- Drum unit (☛ 3.5.2)
- Cleaning unit (☛ 3.5.2)
- Cleaning blade (☛ 3.5.2)

[A]: Brush holder (🖉 x 1)
[B]: Cleaning brush

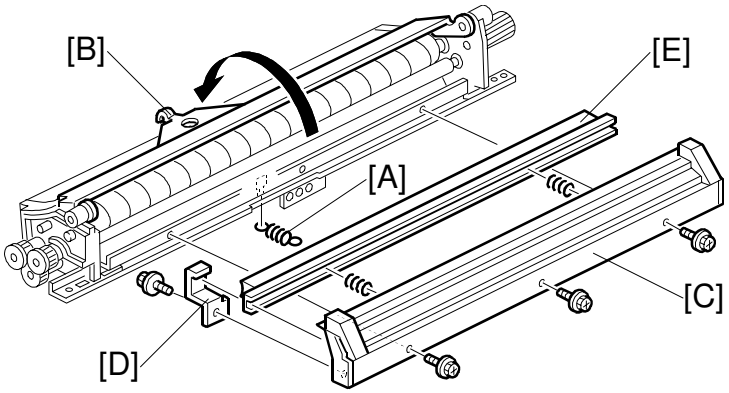


B023R203.WMF

3.6.4 LUBRICANT BAR REPLACEMENT

- Cleaning blade (☛ 3.5.2)

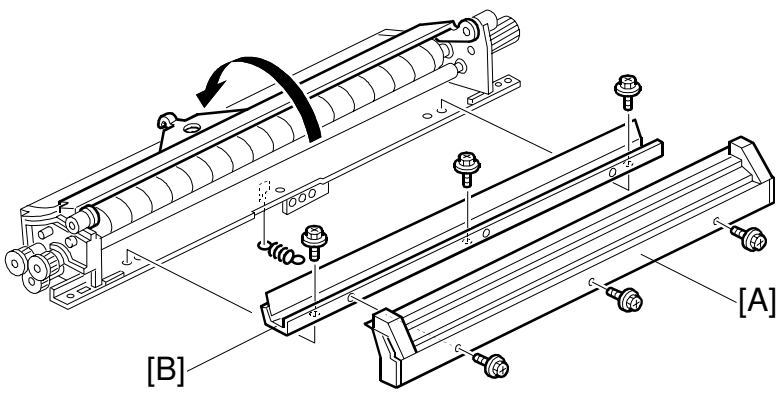
[A]: Spring
[B]: Flip the blade holder up
[C]: Lubricant bar holder (🖉 x 3)
[D]: Lubricant bar clamping bracket (🖉 x 1)
[E]: Lubricant bar



B023R214.WMF

3.6.5 BIAS ROLLER BLADE REPLACEMENT

[A]: Lubricant bar holder (🖉 x 3)
[B]: Bias roller blade (🖉 x 3)

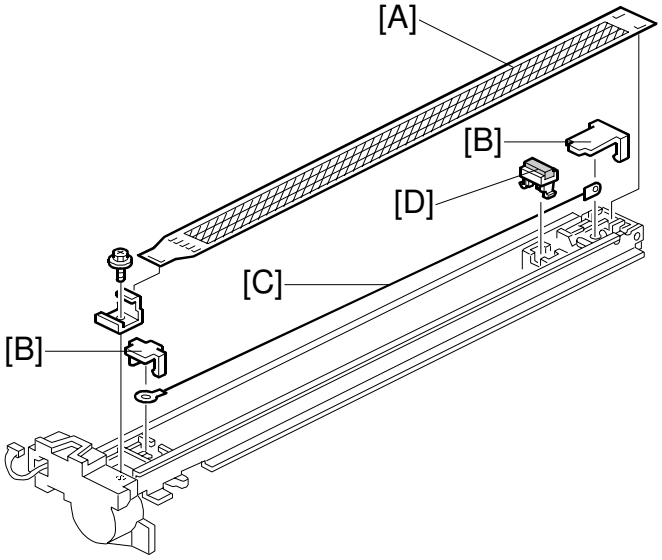


B023R211.WMF

3.6.6 CHARGE GRID AND CORONA WIRE AND CLEANER PAD REPLACEMENT

[A]: Charge grid (☞ x 1)
[B]: Front and back end block covers
[C]: corona wire
[D]: cleaner pad

NOTE: Do not touch the corona wire directly. Skin oils can deteriorate the corona wire over time, causing uneven charging.

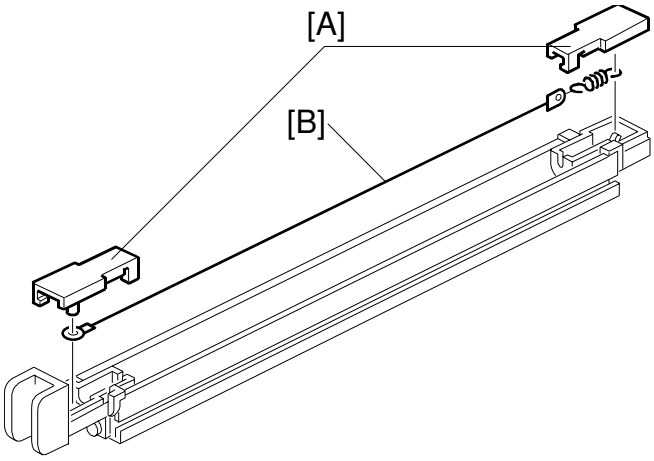


B023R210.WMF

3.6.7 PCC WIRE REPLACEMENT

• PCC from the main unit
[A]: End blocks
[B]: PCC wire.

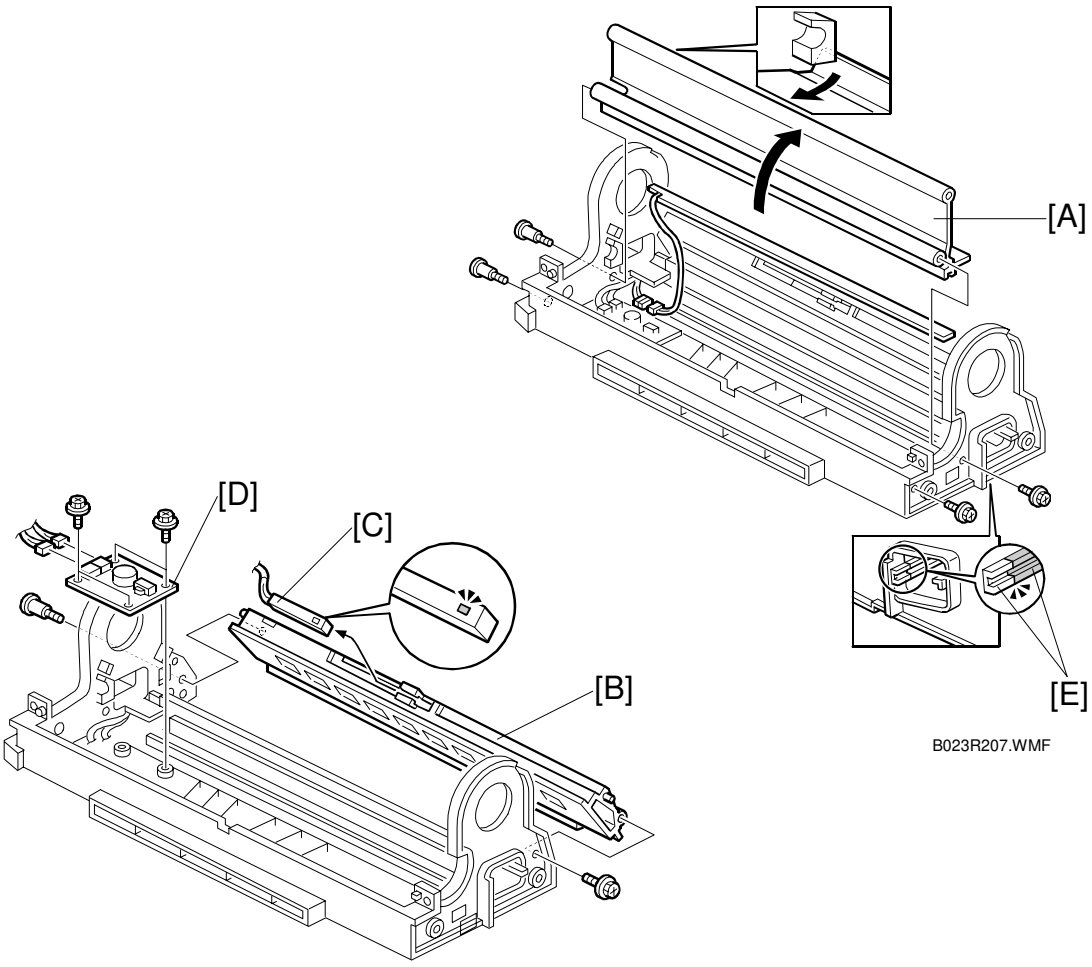
NOTE: Do not touch the PCC wire directly. Skin oils can deteriorate the corona wire over time, causing uneven charging.



B023R209.WMF

3.6.8 DRUM POTENTIAL SENSOR REPLACEMENT

NOTE: The drum potential sensor consists of a sensor element and a control board. Replace both the sensor and control board at the same time.



B023R207.WMF

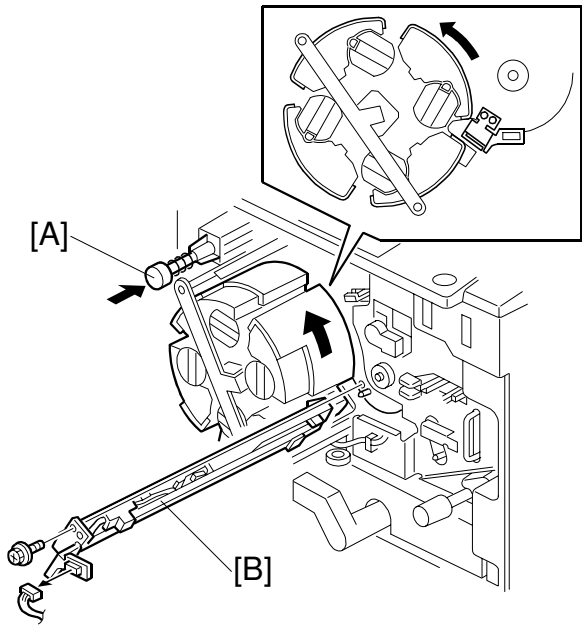
B023R961.WMF

- OPC drum (☛ 3.8.1)
- Cleaning unit from the drum unit

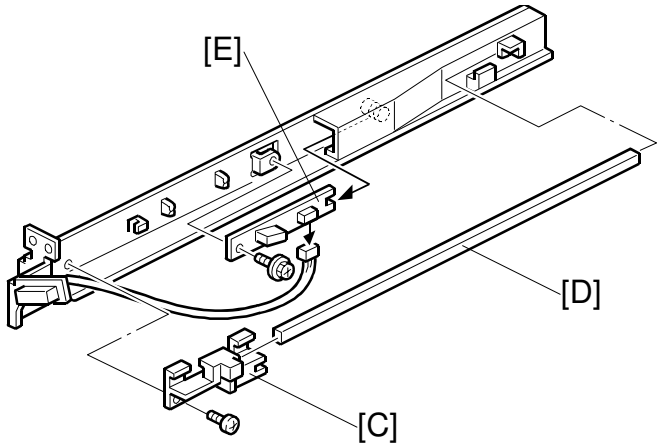
[A]: Duct cover (🔩 x 4)
[B]: Duct (🔩 x 2)
[C]: Drum potential sensor
[D]: Sensor board (🔩 x 2)

NOTE: 1) When re-installing the duct cover, be sure to align the guide rails [E] for the main charge corona unit.
2) When cleaning the metal part of the drum potential sensor, blow off dust with a blower brush, then wipe with dry cotton (do not use a vacuum cleaner). Use a vacuum cleaner to clean the non-metal parts of the potential sensor.
3) Never apply any shock to the drum potential sensor during the replacement.

3.6.9 ID SENSOR REPLACEMENT



B023R212.WMF



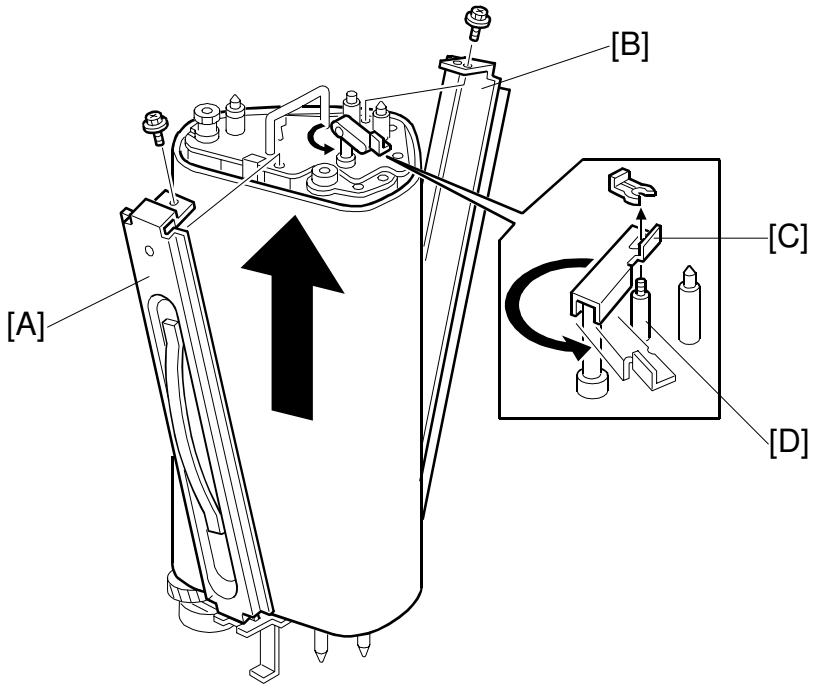
B023R213.WMF

- Press the revolver lock release button [A] and rotate the revolver to the position indicated in the figure.

[B]: ID sensor holder (x 1, x 1)
[C]: Bracket (x 1)
[D]: Developer catcher
[E]: ID sensor (x 1)

3.7 IMAGE TRANSFER SECTION

3.7.1 IMAGE TRANSFER BELT REPLACEMENT



B023R402.WMF

- Image transfer belt unit (☛ 3.5.4)
- Place the transfer belt unit upright as shown in the figure.

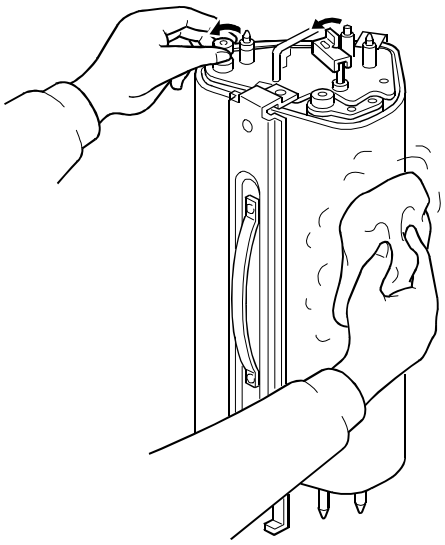
[A]: Rail (☞ x 1)
[B]: Upper entrance guide plate (☞ x 1)

- Release the transfer belt tension lever [C] from the tension stud [D] (1 snap ring) and rotate the lever completely counterclockwise as shown in the illustration. (This releases all tension from the belt so that it can be replaced.).
- Slide off the transfer belt and replace it with a new one.

NOTE: 1) Be sure to hold the transfer belt at its ends and never touch the belt surface. Any contamination on the belt might result in poor copy quality.
2) When installing a new transfer belt, make sure that the alignment ridges along both edges of the belt do not ride on the rollers. (They should fit cleanly over the ends of the rollers.)
3) After removing the transfer belt, clean each roller with water or alcohol. When using alcohol, set the rollers aside for about 10 minutes to dry. If alcohol remains on the rollers when the belt is replaced, the rollers may adhere to the belt.

- Move the transfer belt tension lever slightly to the left of the tension stud as shown in the illustration to the right (so you can turn the belt). Then apply setting powder to the entire belt surface while rotating the belt.

NOTE: After replacing the transfer belt, be sure to apply setting powder as instructed above. If this is not done, the increased friction can cause the blade to get caught on the belt and be bent out of position. This could result in an SC452 condition (belt mark detection error) or a bent blade bracket.

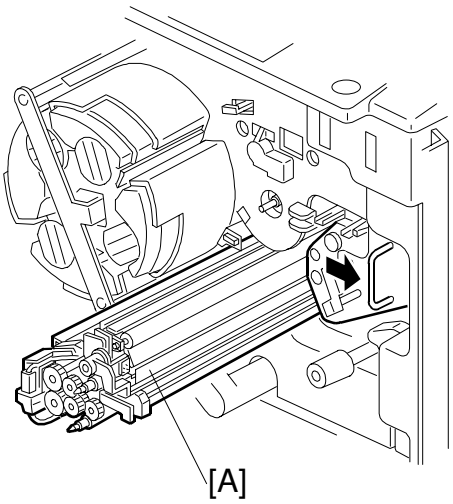


B023R412.WMF

- Reset the belt tension lever on the tension stud and install the image transfer belt unit.

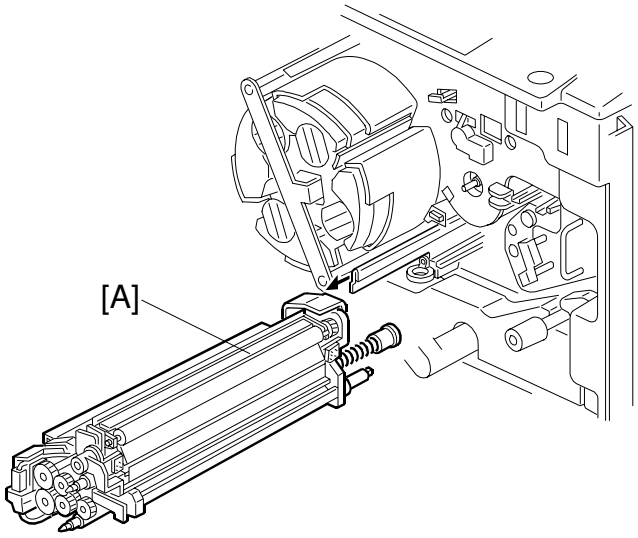
- Install the image transfer belt cleaning unit [A].

NOTE: Be sure to shift the image transfer belt unit to the right before installing the cleaning unit. Failure to do this may damage the image transfer belt.

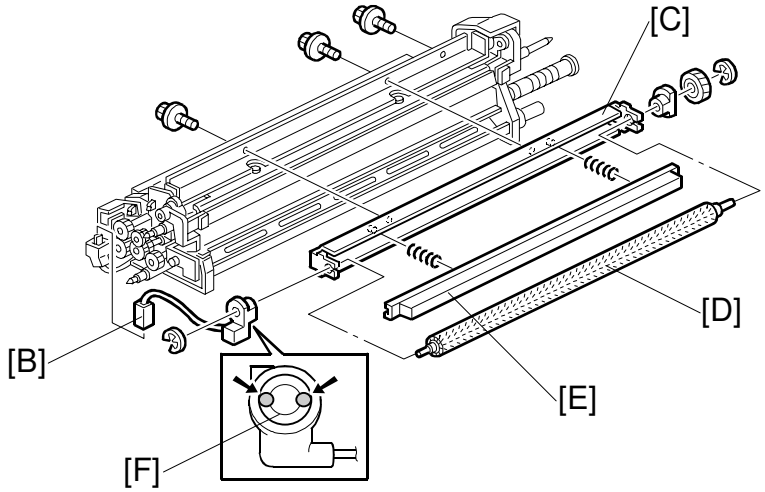


B023R411.WMF

3.7.2 TRANSFER BELT LUBRICANT BAR AND LUBRICANT BRUSH REPLACEMENT



B023R302.WMF



B023R965.WMF

- Transfer faceplate (☛ 3.5.4)

[A]: Transfer belt cleaning unit
[B]: Bias connector
[C]: Lubricant brush holder (☞ x 3)
[D]: Lubricant brush
[E]: Lubricant bar (ℂ x 2)

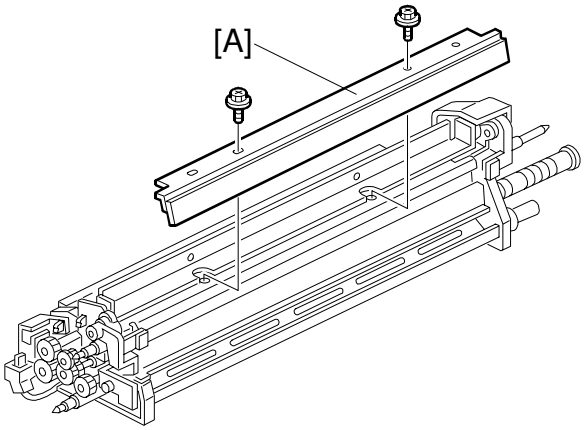
NOTE: 1) When reinstalling the lubricant bar, make sure that the springs are set properly.
2) When replacing the lubricant brush, apply small amount of Grease KS660 to the inner surface of the bushing [F].

3.7.3 IMAGE TRANSFER BELT BLADE REPLACEMENT

- Remove the lubricant brush holder. (☛ 3.9.2)

[A]: Replace the blade (🔩 x 2)

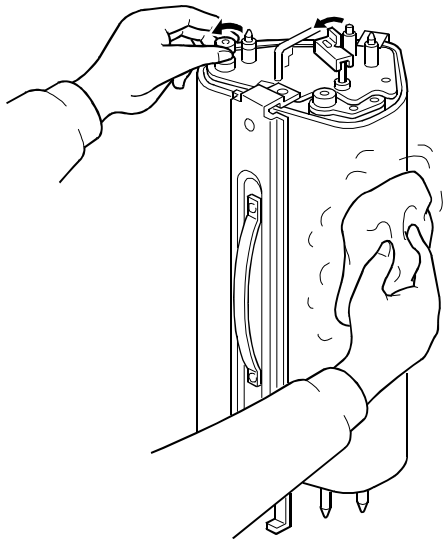
NOTE: Do not touch the rubber part of the cleaning blade assembly. Handle only the bracket.



B023R404.WMF

- After replacing the blade, remove the transfer belt unit from the main unit and apply setting powder to the entire belt surface while rotating the belt.

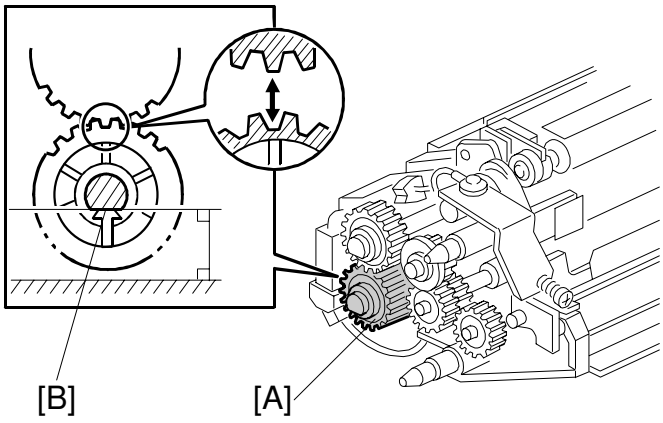
NOTE: After replacing the transfer belt, be sure to apply setting powder as instructed above. If this is not done, the increased friction can cause the blade to get caught on the belt and be bent out of position. This could result in an SC452 condition (belt mark detection error) or a bent blade bracket.



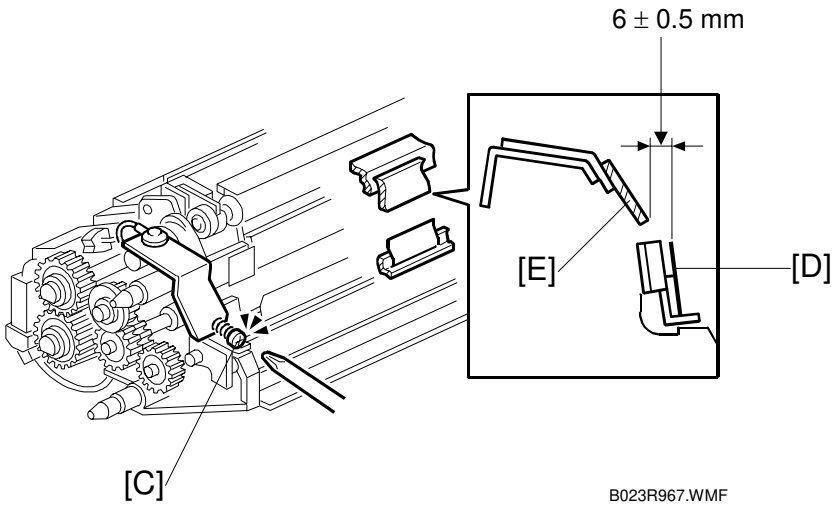
B023R412.WMF

- Reconnect the transfer belt tension lever to the tension stud and install the transfer belt unit.
- Install the image transfer belt cleaning unit.

3.7.4 ENTRANCE SEAL GAP ADJUSTMENT



B023R966.WMF



B023R967.WMF

1. Image transfer belt cleaning unit.
2. Rotate the gear [A] clockwise so that D-cut [B] of the gear faces down as shown in the figure. This moves the entrance seal to the release position.
3. Adjust the screw [C] so that the gap between the edge of the entrance seal [D] and the cleaning blade [E] is **6 ± 0.5 mm**.
4. Confirm the gap size.
5. After securing the screw, turn the gear [A] clockwise 1 revolution and confirm that the gap is still within the proper range.

NOTE: If the gap is not adjusted within the specified range (5.5 – 6.5 mm), the following problems may occur.

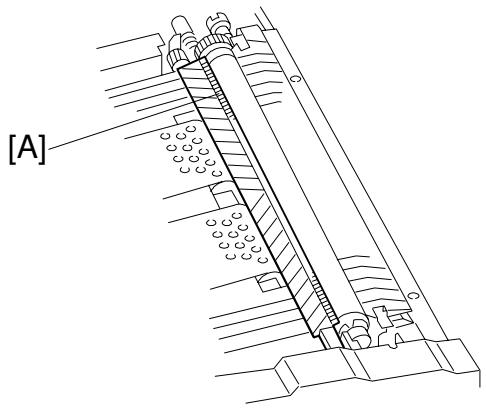
- If the gap is under 5.5 mm, the toner will tend to spill out.
- If the gap is over 6.5 mm, vertical lines will tend to appear on the outputs.

3.7.5 PAPER TRANSFER ROLLER

PTR Discharge Plate Cleaning

- Pull out the fusing/transfer drawer.

[A]: Clean the PTR discharge plate with a vacuums cleaner.

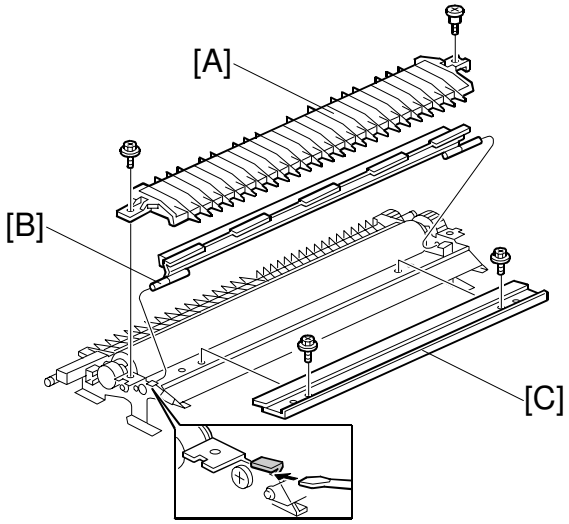


B023R984.WMF

PTR Coating Bar and Cleaning Blade Replacement

- Pull out the fusing/transfer drawer.

[A]: Guide plate
[B]: PTR coating bar
[C]: While releasing the blade pressure using a flat-head screwdriver, remove the PTR cleaning blade (x 2).

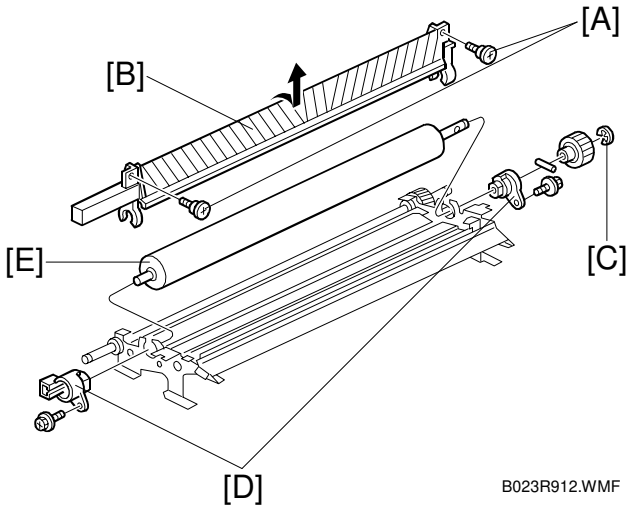


B023R001.WMF

Transfer Roller Replacement

- Pull out the fusing/transfer drawer.

[A]: x 2 from the paper discharge plate
[B]: Paper discharge plate—Rotate as shown.
[C]: Gear (x 1, 1 parallel pin)
[D]: Bushings (x 2, x 1)
[E]: Transfer roller



B023R912.WMF

3.8 DEVELOPMENT UNIT

3.8.1 DEVELOPER REPLACEMENT

⚠CAUTION

When replacing a given developer color, first check to see if the same toner color has reached End or Near End. If it has, be sure to replace this toner first and then proceed with the developer replacement (otherwise, the wrong Vref values will be used for TD sensor initialization, which can lead to toner scattering).

There are two ways to confirm the toner status:

1) Check to see if "Add toner"or "Toner near end" is displayed on the LCD, or
2) Open the front cover while the machine is in the Ready condition. If the toner you wish to replace has reached End or Near End, that color will be at the cartridge replacement position.

If the toner has not reached either of these conditions, proceed with the developer replacement.

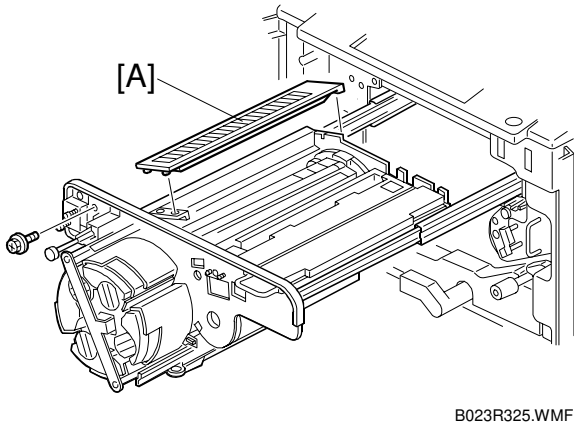
Collecting Old Developer

NOTE: Place a floor mat or other protective sheet on the floor. Take care not to contaminate the customer's floor.

- Pull out the revolver/drum drawer. (☛ 3.5.1)

[A]: Revolver filter

- Drum unit (☛ 3.5.2)



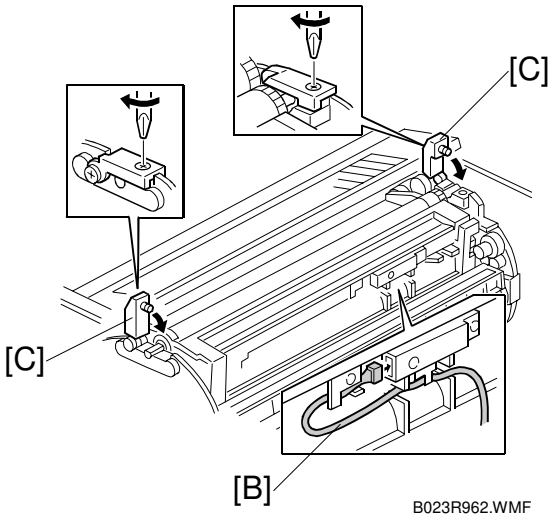
B023R325.WMF

[B]: Toner density sensor harness (two clamps, ☞ x 1).

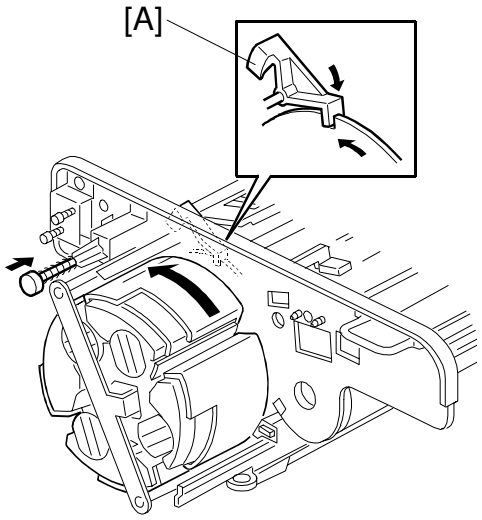
[C]: Development unit locks at both ends of the revolver (☞ x 2).

⚠CAUTION

Do not push the revolver/drum drawer into the copier with development unit locks left open. Otherwise, the development unit locks may strike against the main unit frame, resulting in permanent damage to the revolver.



B023R962.WMF



B023R357.WMF

- Engage the revolver lock [A].

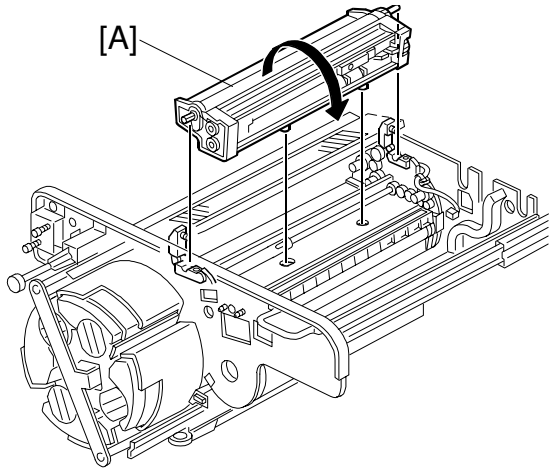
⚠CAUTION

1. **Be sure the pawl of the revolver lock [A] is engaged before removing a development unit. Failure to observe this precaution may allow the revolver to rotate, causing permanent damage to the development unit or its locks.**
2. **Always rotate the revolver counter-clockwise (as shown in the illustration). Otherwise, the developer might spill out.**

[A]: Development unit

⚠CAUTION

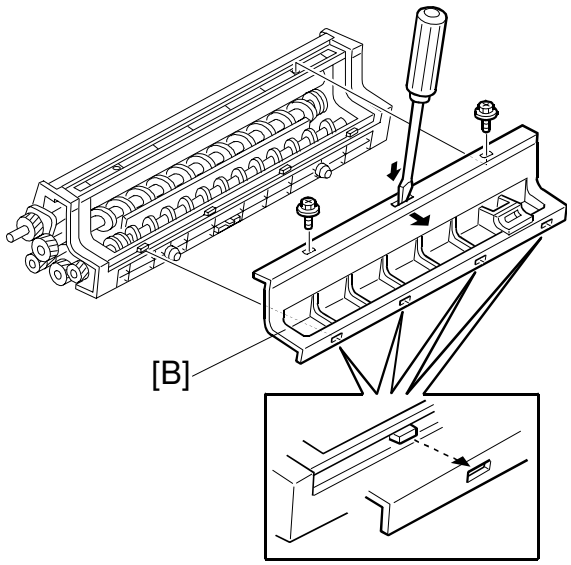
1. **When you remove a development unit, be sure to rotate in the direction shown in the figure. The development unit is not sealed. Rotating the development unit in the wrong direction will spill developer.**
2. **Remove the development units for one color at a time. Removing two or more development units at the same time may unbalance of the revolver. This will cause the revolver to turn clockwise, spilling developer and possibly catching your fingers.**



B023R309.WMF

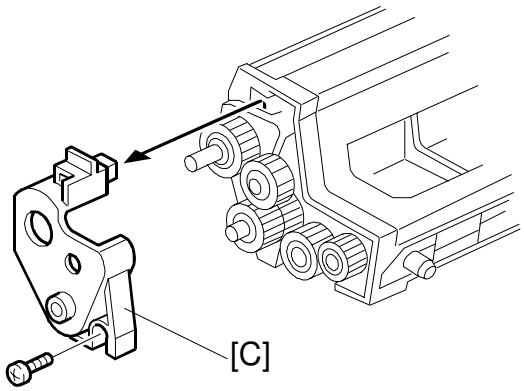
[B]: Developer cover (🖉 x 2, 4 hooks). (Release the hooks with a screwdriver.)

- Collect the developer from the developer cover.

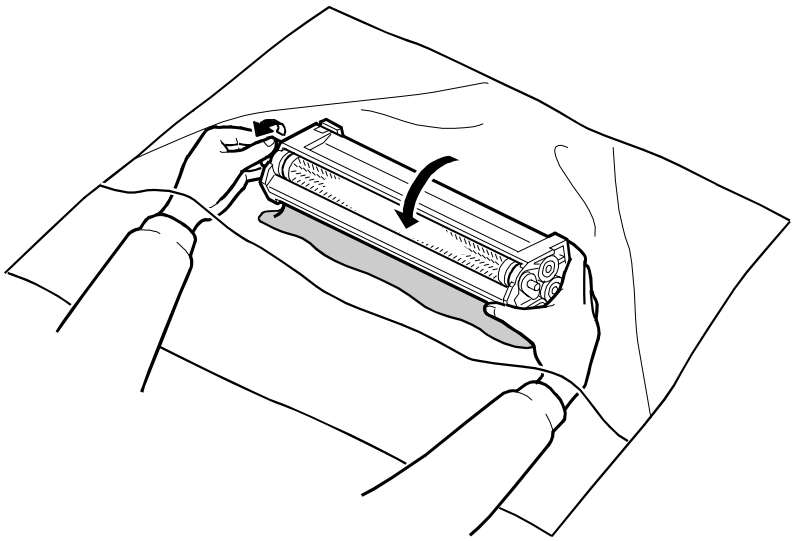


B023R151.WMF

[C]: Development gear cover (🖉 x 1)



B023R958.WMF



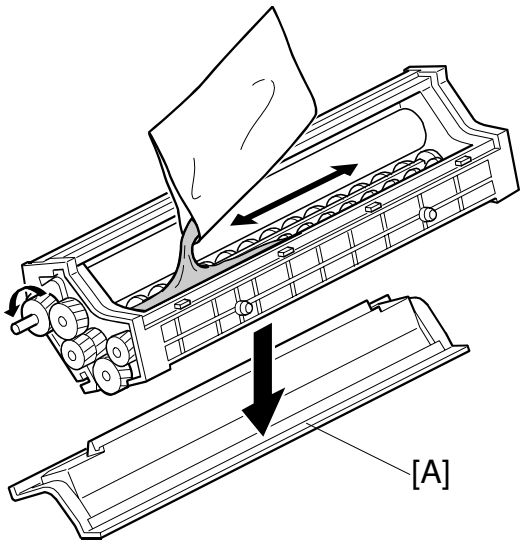
B023R310.WMF

- Remove the old developer as follows:

  1) Hold the development unit inside a collection bag, rotate the unit until the opening faces downward, and shake the unit slightly to dump the developer.
  2) When the agitator section gets almost empty, orient the development sleeve face up and rotate the sleeve in the reverse direction.
  3) When no more developer falls down, rotate the sleeve in the forward direction several turns while maintaining the sleeve's orientation.
  4) Tilt the developer assembly so that its bottom faces upward to dump the remaining developer out of the agitator section.
  5) Repeat steps 1 to 4 until no more developer is collected. (A small amount of developer will remain in the development unit—about 10 grams. This is all right.)

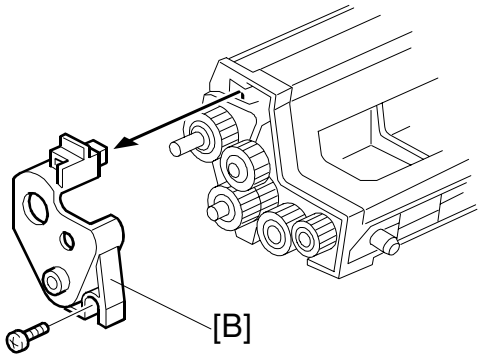
Loading New Developer

- Load new developer as follows:
  1) Set the developer cover [A] as shown in the figure and place the development unit on it.
  2) Pour 1 bag (700 g) of developer into the development unit.
  3) Turn the development roller in the forward direction several rotations to give it a smooth layer of developer.

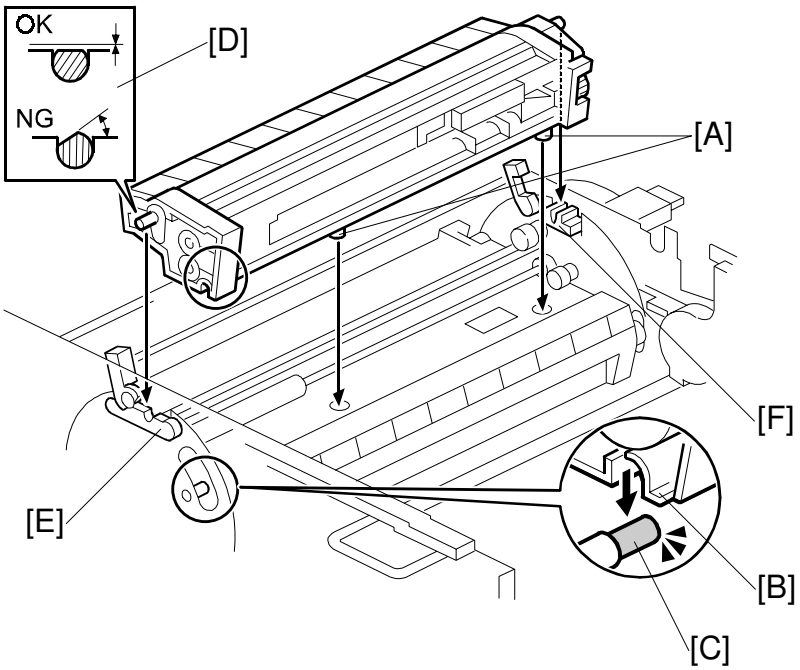


B023R351.WMF

- Mount the development gear cover [B] (🔩 x 1) and the developer cover (🔩 x 2).



B023R958.WMF



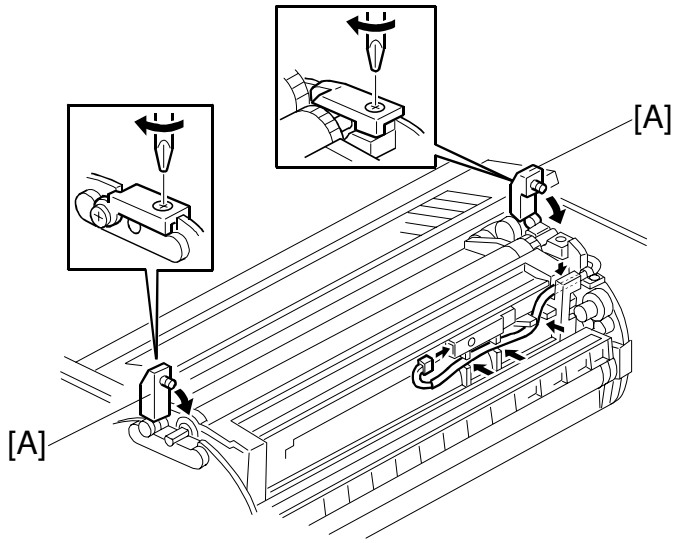
B023R963.WMF

- Position the development unit in the revolver as shown to the right. Pins [A] fit into holes in the revolver, and positioning slots [B] fit over positioning pins [C] of the revolver. If set correctly, the flat top of the pins are level with the housing as shown [D].

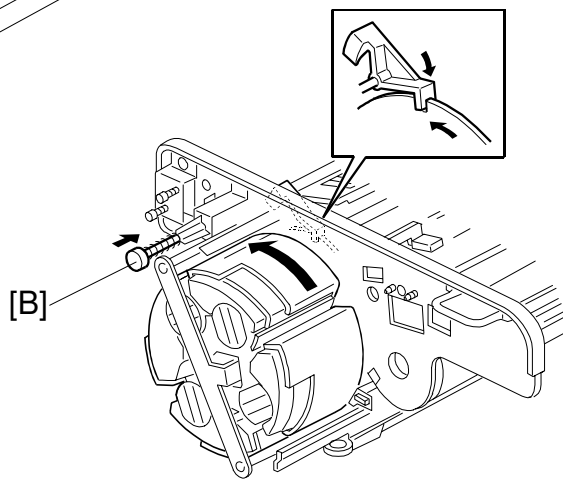
⚠CAUTION

The development unit locks can close even if the pins are set incorrectly. Be sure the pins are set properly, or developer may spill out as the revolver rotates.

NOTE: PG seals may be located over the front [E] or rear [F] development sleev supporter. Some machines have them in both locations. Some have them only in the front or rear. This depends on the factory adjustments. Never add or remove the PG seals in the field.



B023R353.WMF



B023R357.WMF

⚠CAUTION

1. **Make sure that the development locks [A] (forward and rear) are secured before rotating the revolver. This is required to protect the development unit and locks from damage.**
2. **Make sure the development unit lock screws are tight. Loose lock screws will cause an uneven photoconductor gap**.

- Press the revolver lock button [B] to release the revolver lock, rotate the revolver to the next color and install the new developer.

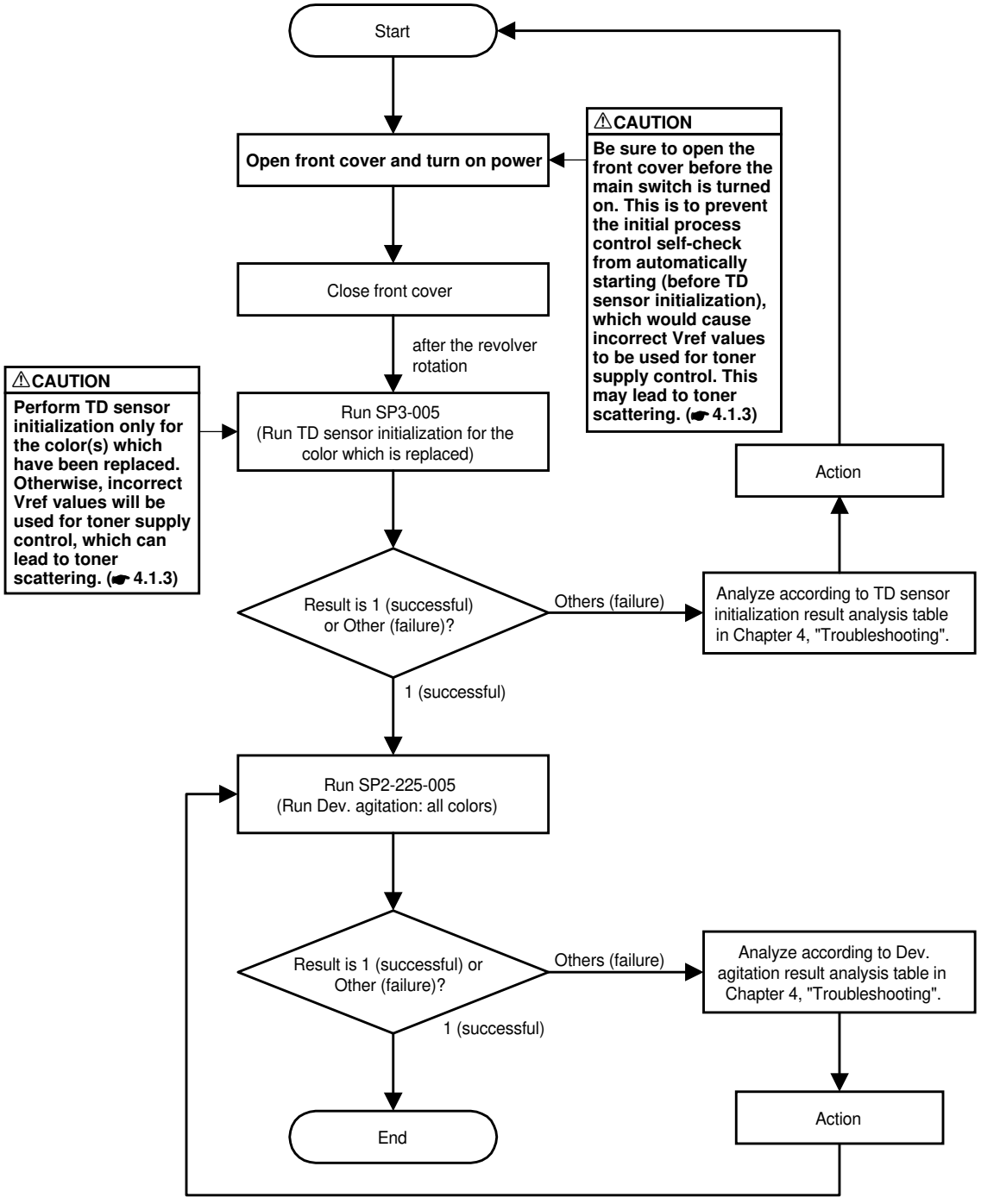
⚠CAUTION

1. **Be sure to set the revolver locks before removing the development unit. Failure to observe this precaution may allow the revolver to rotate, causing permanent damage to the development unit or its locks.**
2. **Always rotate the revolver clockwise as shown in the figure. Otherwise, the developer might spill out of the developer assembly.**

- Re-install the revolver filter. Then re-install the revolver drum drawer.

Initialization

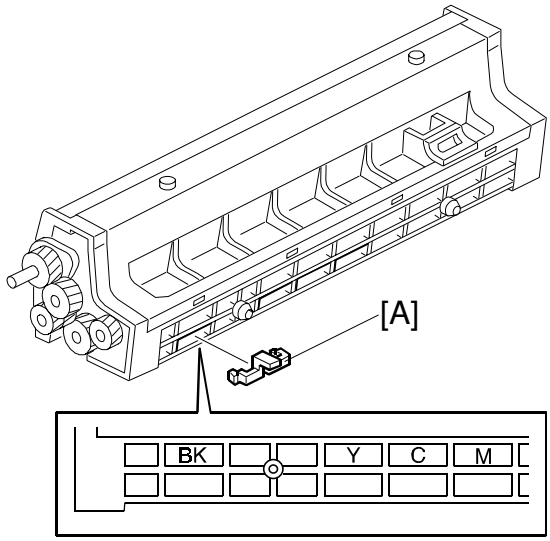
Follow the flow chart below.



B023R153.WMF

3.8.2 SETTING THE DEVELOPMENT UNIT COLOR

- The development unit supplied as a service part is used for all colors (K, Y, C, and M). Install an actuator pin [A] according to the toner color.

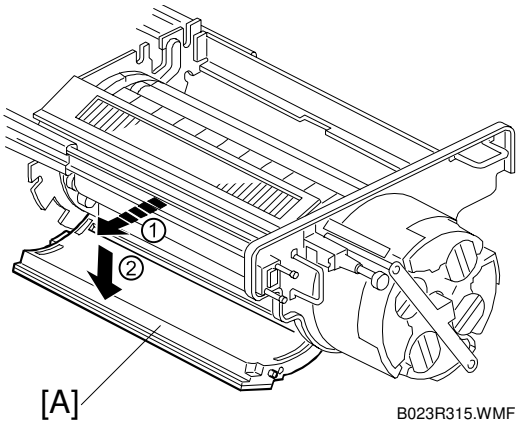


B023R312.WMF

3.8.3 CLEANING THE TONER CATCH COVER

- Pull out the revolver/drum drawer.
- Remove the drum unit and cover the OPC drum with 5 or more sheets of paper.

  NOTE: Failure to observe this precaution may expose the drum to external or reflected light and cause optical fatigue.
- Open the toner catch cover [A] by the releasing lever and clean it.

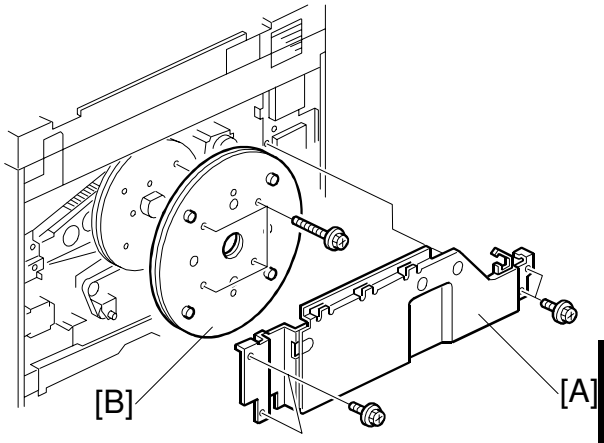


B023R315.WMF

3.8.4 REVOLVER MOTOR REPLACEMENT

- Rear right and left covers. (☛ 3.4.4, 3.4.5)

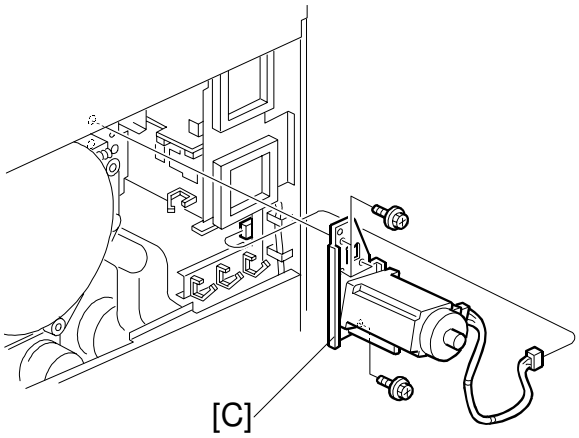
[A]: Rear stay (🔩 x 4)
[B]: Larger flywheel (4 gold color screws)



B023R959.WMF

[C]: Revolver motor with the motor bracket (🔩 x 4, 🖐 x 1, 5 clamps)

NOTE: Be sure to remove the revolver motor with the bracket. The warranty applies only for the combination of the motor and the bracket.



B023R910.WMF

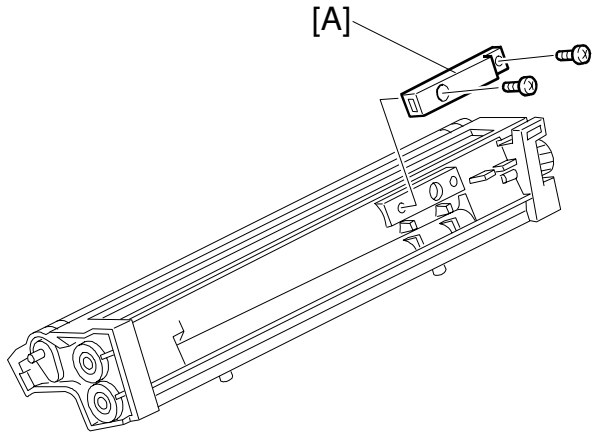
3.8.5 TONER DENSITY SENSOR REPLACEMENT

- Collect the developer. (☛ 3.10.1)

[A]: Toner density sensor (🔩 x 2)

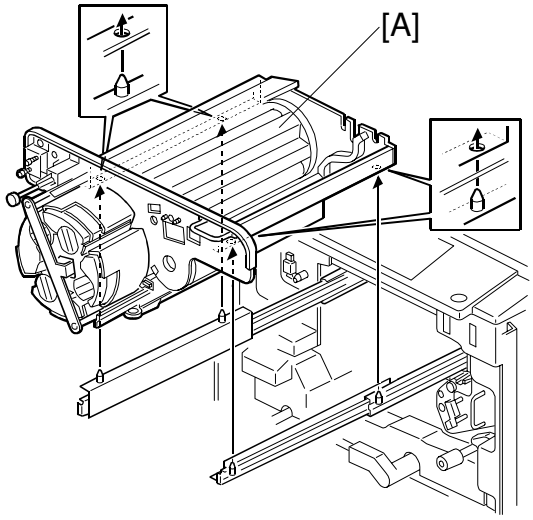
- Install new developer.
- Follow the flow chart at the end of the developer installation procedure. (☛ 3.10.1)

NOTE: In this case, “TD sensor initialization” and “Developer agitation” are required only for the color whose TD sensor and developer are replaced.

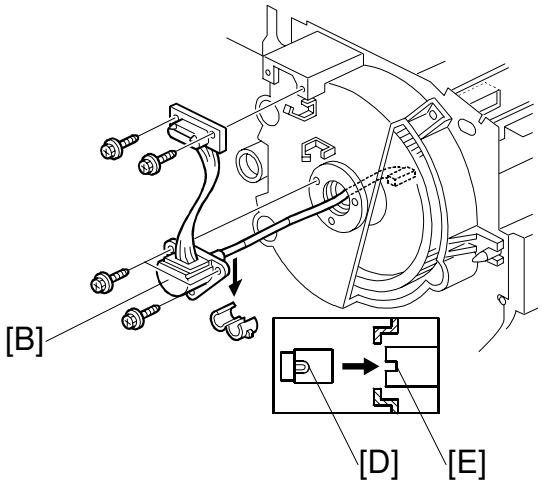


B023R318.WMF

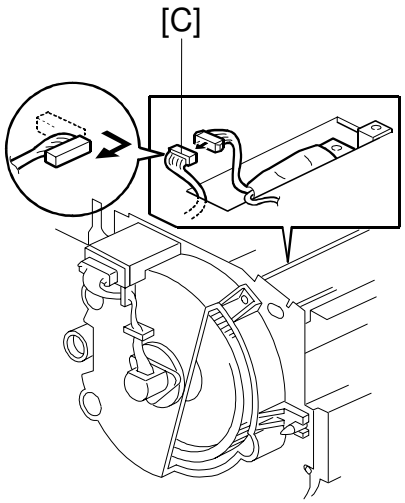
3.8.6 TD SENSOR INTERFACE (I/F) BOARD REPLACEMENT



B023R321.WMF



B023R983.WMF



B023R988.WMF

- Remove the drum unit. (☛ 3.5.2)

[A]: Revolver/drum drawer - Lift the off of the slide rails.

⚠CAUTION

Be sure to push the slide rails back into the copier after removing the drawer.

- Place the revolver/drum drawer on a flat surface.
- Remove the cyan development unit. (☛ 3.10.1)

[B]: TD sensor I/F board (🔧 x 5, 1 harness bushing, ✋ x 1 [C])

NOTE: When putting back the TD sensor I/F board, align the projections [D] on the harness bushing to the cutout [E] of the holder.

3.9 PAPER FEED AND REGISTRATION SECTION

3.9.1 BY-PASS FEED TABLE REMOVAL

- Right-middle cover (x 2) (☛ 3.4.2).
- Right-side front cover (☛ 3.4.2).
- Right-side rear cover (☛ 3.4.4).

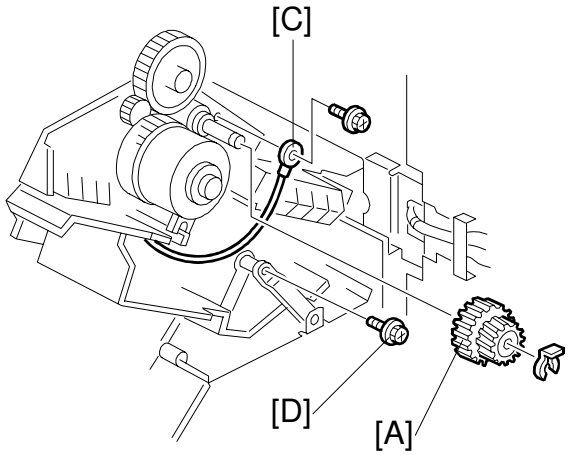
[A]: Gear (x 1).
[B]: x 2
[C]: Grounding wire (x 1).
[D]: x 1
[E]: Hinge (x 1).

NOTE: Before removing the hinge snap ring, be sure to support the hinge with your hand. Otherwise, the spring will cause the hinge to snap up.

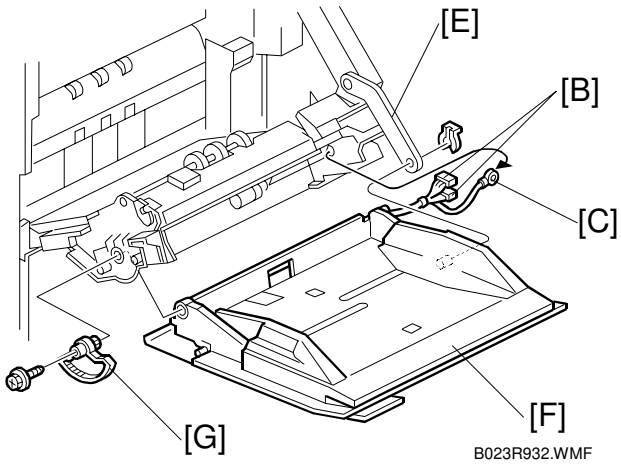
[F]: Cover (x 2).
[G]: Sectorial gear (x 1).

NOTE: Before removing the sectorial gear, support the by-pass feed table with your hand. Otherwise, the by-pass feed table will fall down after removing the sectorial gear.

- Remove the by-pass feed table.



B023R931.WMF

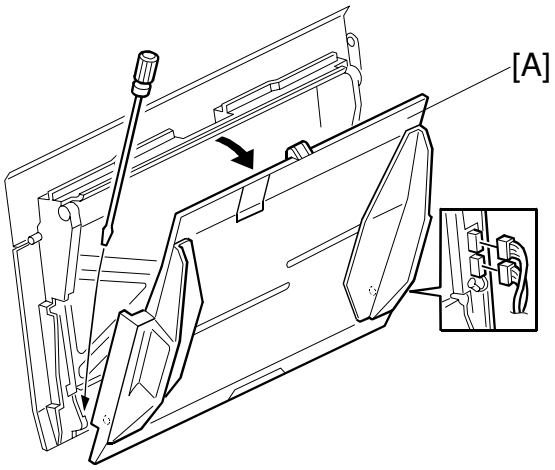


B023R932.WMF

3.9.2 BY-PASS FEED PAPER WIDTH/PAPER LENGTH/PAPER END SENSOR REPLACEMENT

- By-pass feed table (☛ 3.11.1)

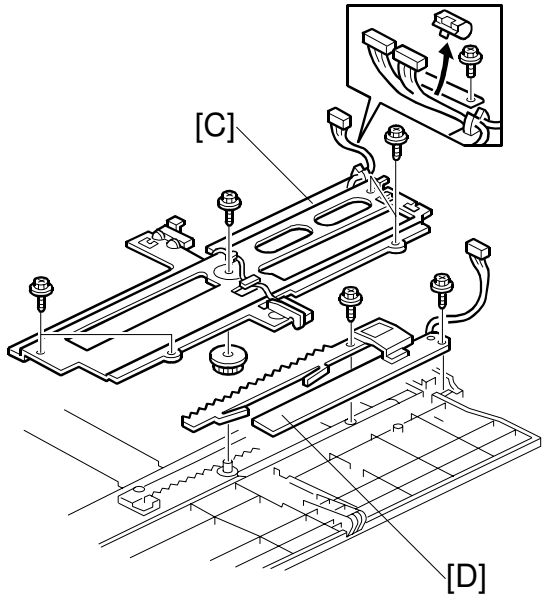
[A]: Remove the by-pass feed table cover [A] by twisting the hinge with a small screw driver (x 2)



B023R934.WMF

[B]: By-pass paper length sensor bracket. This includes the paper length sensor and paper end sensor (x 5).

- By-pass paper width sensor (x 2).

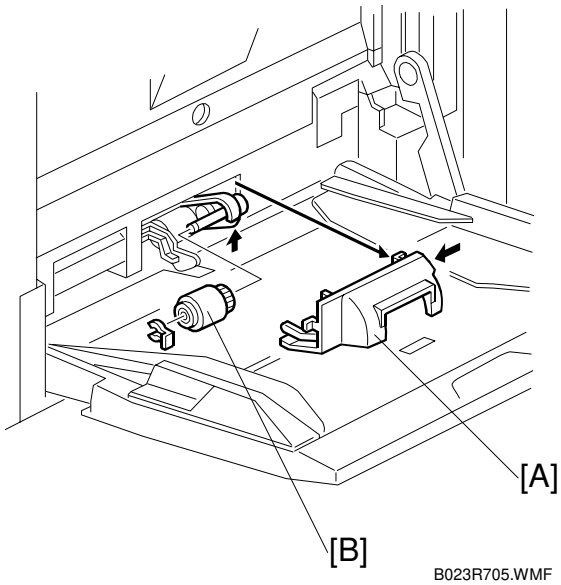


B023R933.WMF

3.9.3 BY-PASS PICK-UP ROLLER REPLACEMENT

- Open the by-pass feed table.

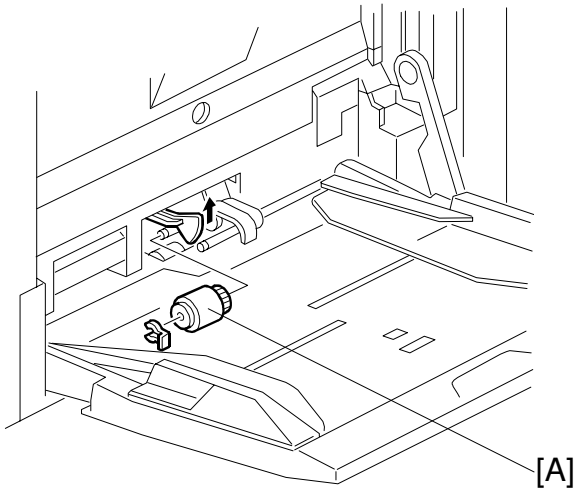
[A]: Roller cover (squeeze and pull).
[B]: By-pass pick-up roller (x 1).



B023R705.WMF

3.9.4 BY-PASS FEED ROLLER REPLACEMENT

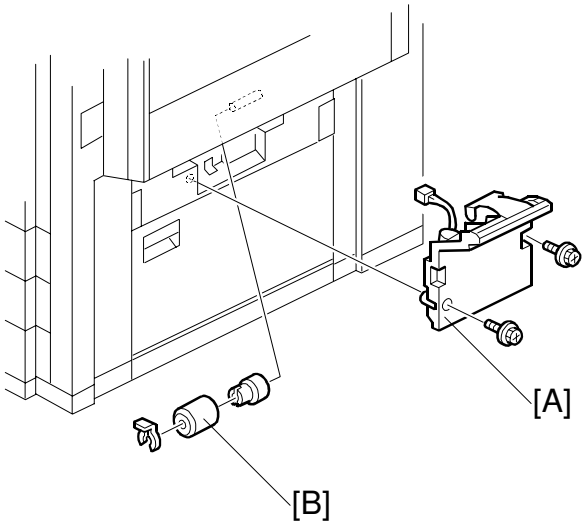
- Open the by-pass feed table.
- Roller cover. (☛ 3.11.3)
- By-pass feed roller [A] (x 1).



B023R706.WMF

3.9.5 BY-PASS SEPARATION ROLLER/BY-PASS TABLE LIFT MOTOR ASSEMBLY REPLACEMENT

[A]: By-pass table lift motor assembly (beneath the by-pass feed table) (x 2, x 1).
[B]: By-pass separation roller (x 1).

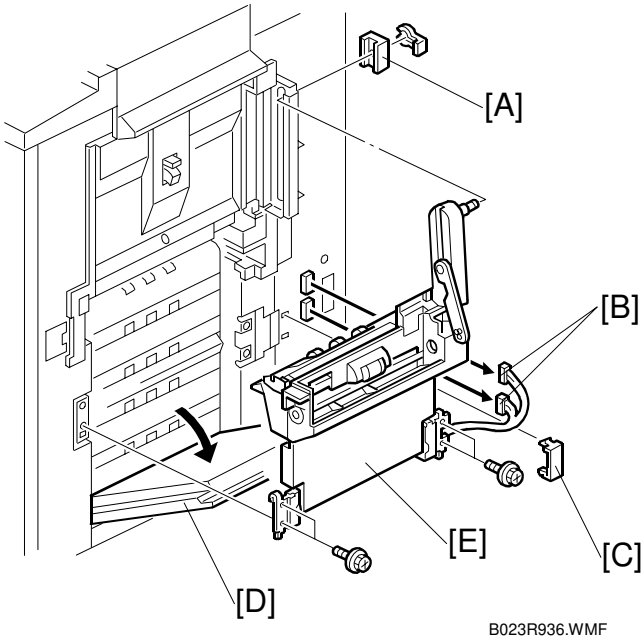


B023R935.WMF

3.9.6 BY-PASS PAPER FEED UNIT REMOVAL

- Remove the by-pass feed table. (☛ 3.11.1)

[A]: Slider from the by-pass paper feed unit (x 1).
[B]: x 2
[C]: Harness holder from the rear of the copier.
[D]: Open the copier's vertical transport unit.
[E]: By-pass paper feed unit (x 4).



B023R936.WMF

3.9.7 BY-PASS PAPER FEED UNIT INSTALLATION

- Open the vertical transport unit.

[A]: Fit the 2 lower hooks into the mating holes in the copier.

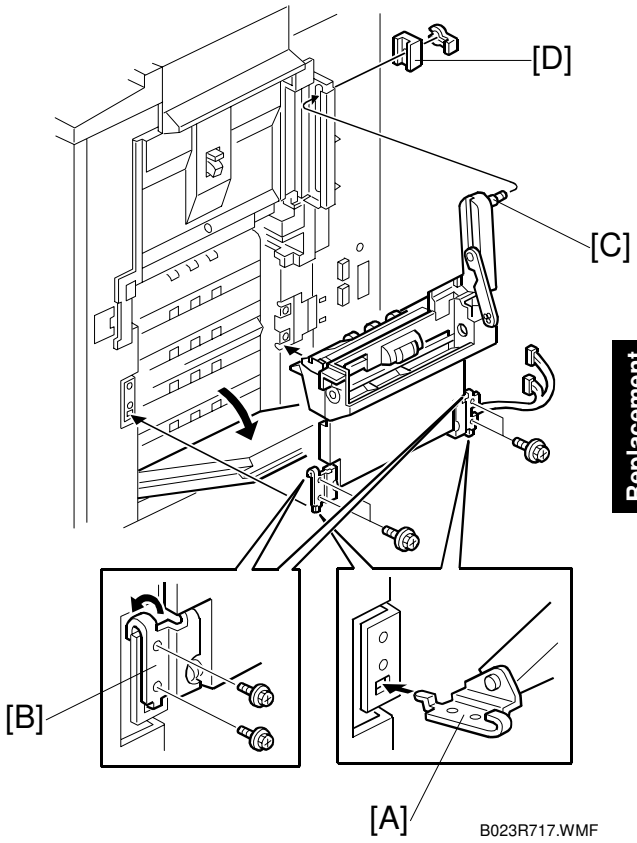
- Close the by-pass unit (need not set completely).

[B]: Fit the 2 upper hooks in the copier's structure.

- Temporarily secure the supporting plate with two screws on each side.

[C]: Thread the link's shaft into the hole in the slide bracket.

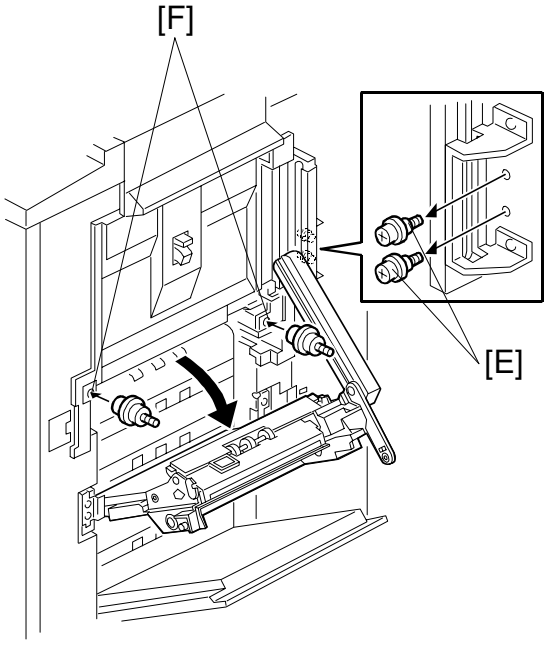
[D]: Fit the slider on the shaft and secure it (⌀ x 1).



B023R717.WMF

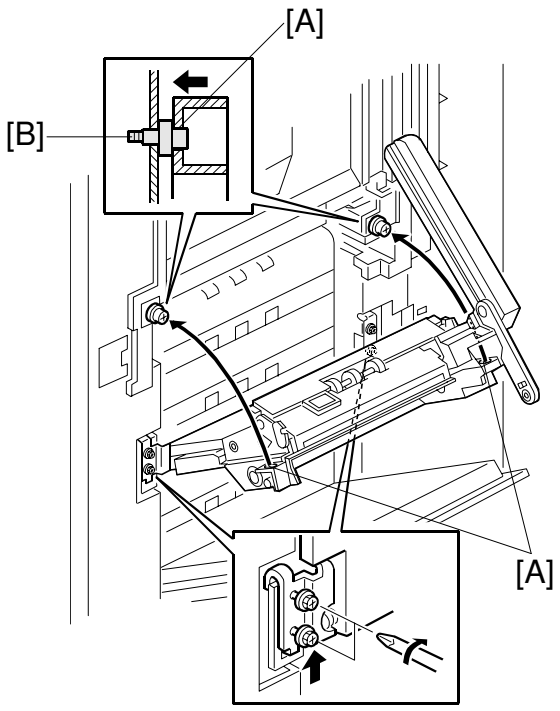
[E]: Two positioning pins. These are threaded in the copier's frame (see illustration).

[F]: Open the by-pass unit and insert the positioning pins into the holes.



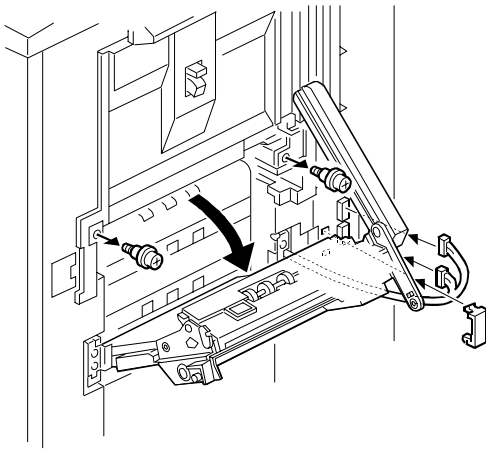
B023R718.WMF

- Close the by-pass unit again.
- Align the holes [A] with the positioning pins [B].
- Tighten the four screws while lifting the front and rear supporting plates slightly.



B023R719.WMF

- Open the by-pass unit.
- Front and rear positioning pins (store them in the original locations).
- Connect the two harness connectors and the ground wire
- Install the harness holder.

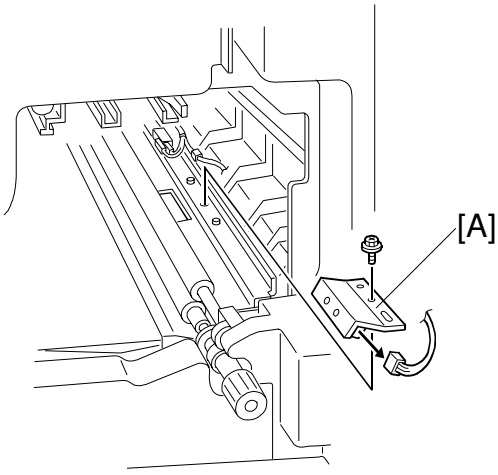


B023R720.WMF

3.9.8 REGISTRATION SENSOR REPLACEMENT

- Image transfer belt unit. (☛ 3.9.1)

[A]: Registration sensor from the front of the copier using a stubby screwdriver (x 1, x 1)

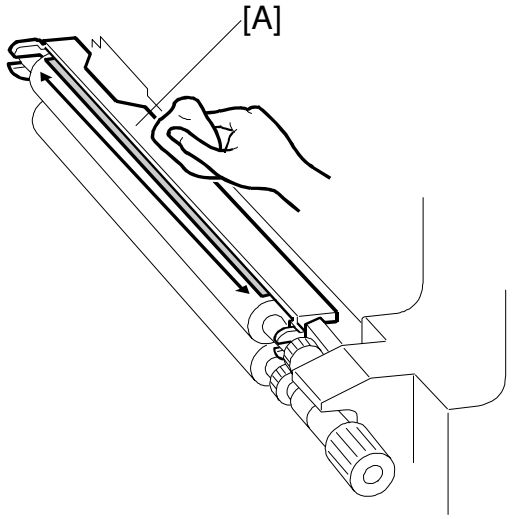


B023R714.WMF

3.9.9 PAPER DUST CATCHING MYLAR CLEANING

[A]: Paper dust catching Mylar with bracket

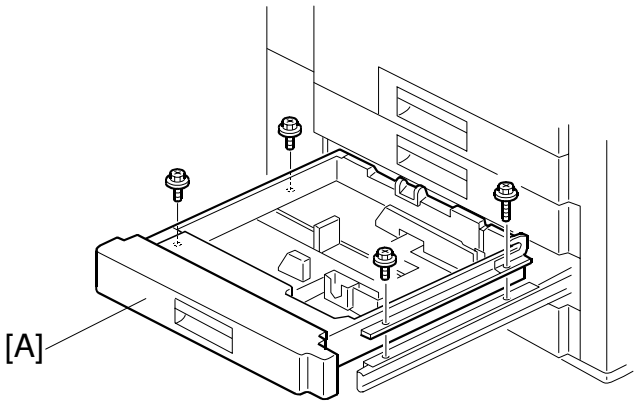
- Clean the dust catching Mylar with a dry cloth.



B023R964.WMF

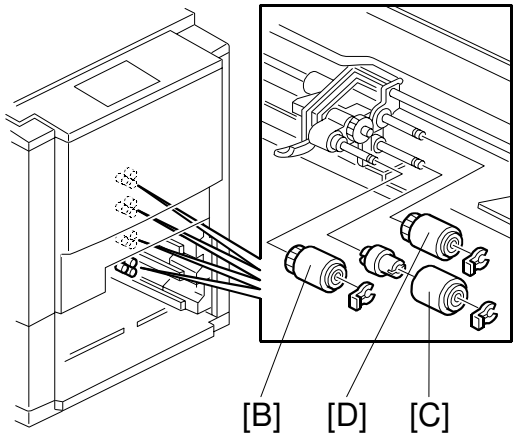
3.9.10 PAPER TRAY ROLLER REPLACEMENT

[A]: Paper feed tray (☞ x 4)



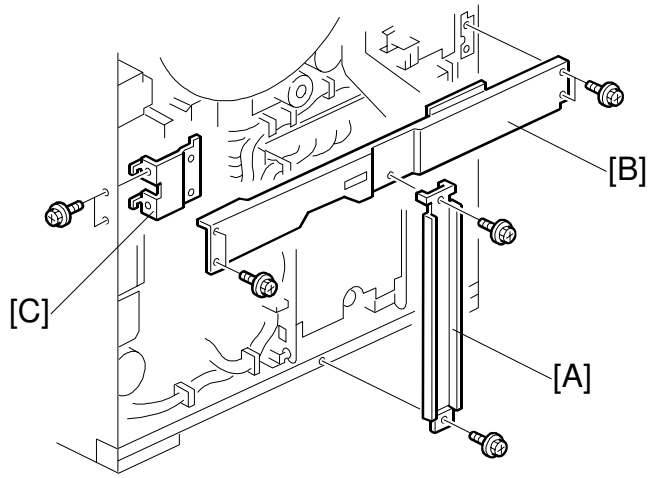
B023R716.WMF

[B]: Pick-up roller (☞ x 1).
[C]: Feed roller (☞ x 1).
[D]: Separation roller (☞ x 1).

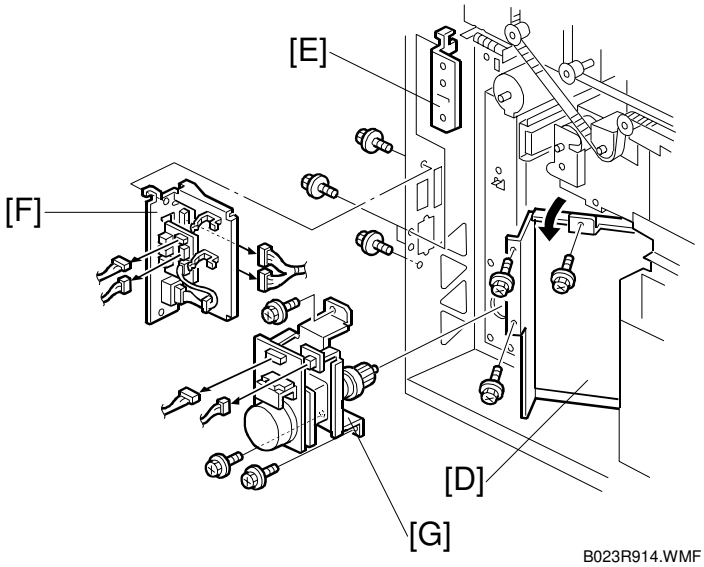


B023R710.WMF

3.9.11 PAPER FEED UNIT AND PAPER FEED CLUTCH REPLACEMENT



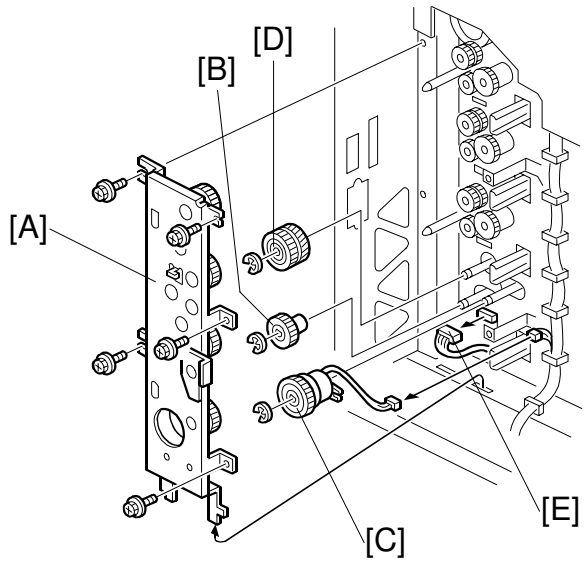
B023R915.WMF



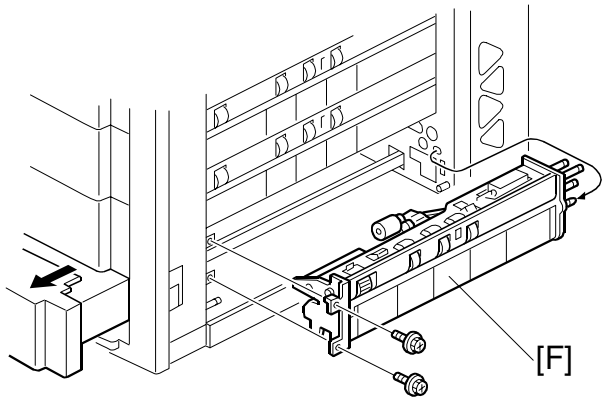
B023R914.WMF

- Rear covers (☛ 3.4)
- Right rear cover (☛ 3.4)

[A]: Vertical support plate (☞ x 2)
[B]: Horizontal support plate (☞ x 4)
[C]: Upper harness bracket (☞ x 2, 2 hooks)
[D]: Open the I/O control board (☞ x3)
[E]: Lower harness bracket (☞ x 2)
[F]: CSS/LCT board (✋ x 6, 2 hooks, ☞ x 2)
[G]: Paper feed drive motor (☞ x 3, ✋ x 2)



B023R916.WMF



B023R713.WMF

[A]: Paper feed unit drive gear assembly (☞ x 5, 2 hooks)
[B]: Separation roller drive gear (ℂ x 1)
[C]: Paper feed clutch (ℂ x 1)
[D]: Vertical transport drive gear (ℂ x 1)
[E]: Disconnect the paper feed unit connector.
- Pull out the paper feed tray of the unit to be removed.

[F]: Paper feed unit (☞ x 2)

3.9.12 COPY IMAGE AREA ADJUSTMENT

- Adjust the leading edge registration for each paper type and line speed (normal paper, OHP, thick paper 1, thick paper 2).
- Adjust the side to side registration for each paper feed station.

Adjustment standards:
Leading edge margin: 4 ±2 mm
Side to side: 1.5 ±0.5 mm for each side (total margin of 4 mm or less)

1. Place the type paper for which you want to perform the registration adjustment in the paper feed tray.
2. Enter the SP2-101 mode and set all settings to "0.0" (default value).
3. Generate a trim pattern.
   1) Enter the SP5-955 mode and select "Print Margin" from the list of internal patterns shown in the popup window.
   2) Press the Interrupt key to temporarily exit the SP mode screen, select the "Black & White" and the paper feed tray to be adjusted, then press the Start key to generate the crop mark trim pattern.
   3) Press the Interrupt key again to return to the SP mode screen.
4. Perform the leading edge registration adjustment.
   Standard value: 4 ± 1 mm
   1) Enter the SP1-1 mode (Lead Edge Regist).
   2) Select the adjustment conditions.
      a) Nrml Paper (Normal paper)
      b) OHP
      c) Thk (Thick paper 1)
      d) Super Thk (Thick Paper 2)
   3) Type a number in "Data Input" on the screen from the numeric keypad on the operation panel. Input a larger value to increase the leading edge margin [A] or a smaller value to decrease the leading edge margin.

      Input value range: –4.9 to 4.9

      - To enter a negative number, press the [•/*] key before typing the value.
      - You need not enter a decimal point. For example, to enter " –1.4," type:

        [•/*] → [1] → [4]

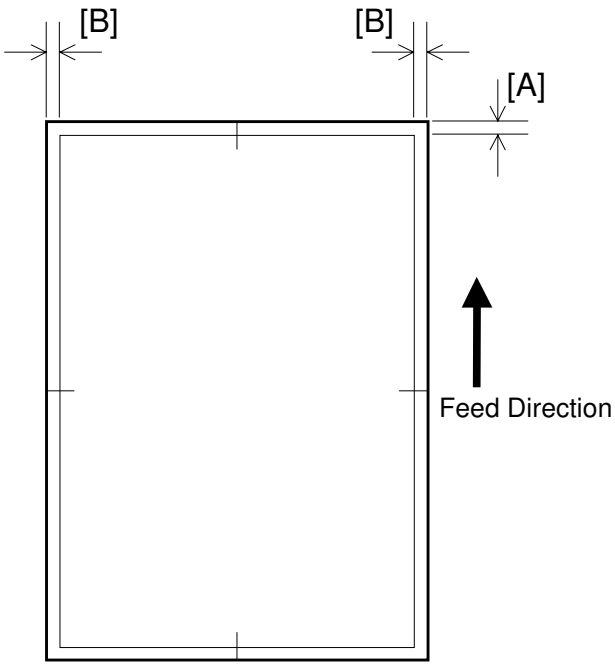
   4) After entering a number, press (#) (Enter key) to save the number in "Set Data".

5) Check the leading edge adjustment by generating the crop mark trim pattern (step 3).
6) Repeat until margin [A] of the trim pattern is within the standard value.

5. Perform the side to side registration adjustment.

   Standard value: 1.5 ± 0.5 mm

   1) Enter the SP1-2 mode (side to side edge registration adjustment).
   2) Select the paper feed unit to be adjusted.
      a) By-ps (By-pass table)
      b) Tray1
      c) Tray2 (**NOTE**)
      d) Tray3
      e) Tray4
      f) Dplx (Duplex unit)
      g) LCT



B023R003.WMF

NOTE: 1) Any value entered for Tray2 is ignored (this is for nonduplex models).
- Tray 3 on the SP popup screen → Tray 2 on the operation panel screen
- Tray 4 on the SP popup screen → Tray 3 on the operation panel screen

2) Type a number in "Data Input" on the screen from the numeric keypad on the operation panel. Input a larger value to shift right or a smaller value shift left (when viewing in the direction of paper feed).
   Input value range: –4.9 to 4.9
   - To enter a negative number, press the [•/*] key before typing the value.
   - You need not enter a decimal point. For example, to enter " –1.4," type:

     [•/*] → [1] → [4]

3) After entering a number, press [#] (Enter key) to save the number in "Set Data".
4) Check the side-to-side registration adjustment by generating the crop mark trim pattern (step 3).
   - Repeat until margin [B] in the trim pattern is within the standard value.

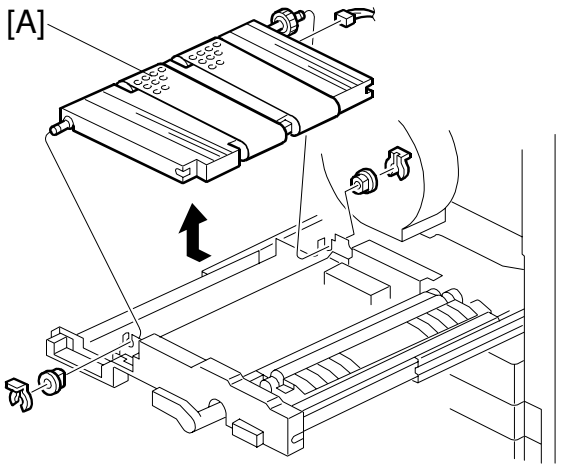
NOTE: After the registration adjustment, press the pattern that is selected in the SP5-955's popup window (identified by highlight) to restore the original state. Otherwise, normal copy operation cannot be resumed. You may restore the original copy state by switching off and on the main power switch.

3.10 PAPER TRANSPORT, FUSING, AND PAPER EXIT

3.10.1 TRANSPORT UNIT REMOVAL

- Fusing unit from the copier's main unit (☛)

[A]: Transport unit (☞ x 1, 1 bearing, and 1 snap ring)



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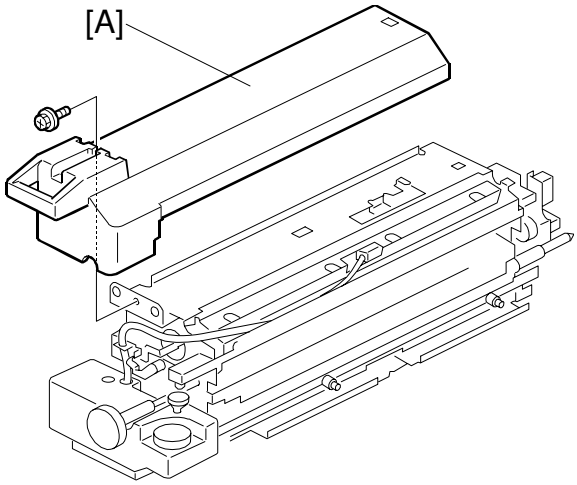
3.10.2 FUSING UNIT TOP COVER REMOVAL

- Fusing unit from the copier's main unit (☛)

[A]: Fusing unit top cover (☞ x 1)



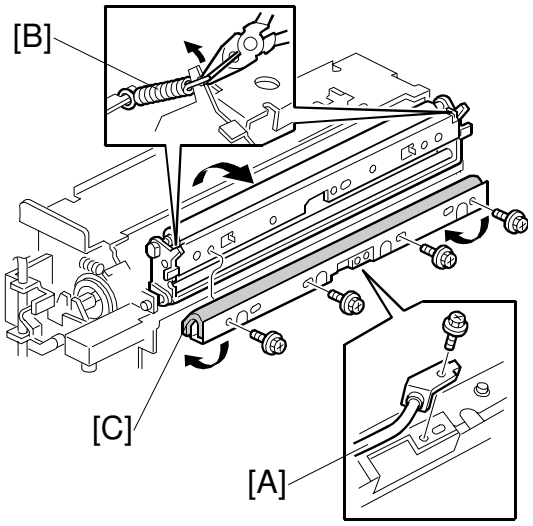
B023R501.WMF

3.10.3 OIL SUPPLY UNIT REPLACEMENT AND CLEANING

- Fusing unit top cover (☛ 3.12.2)

[A]: Oil supply tube (☞ x 1)
[B]: 2 Oil supply unit pressure springs

- Remove four lock screws and remove the oil supply pad [C] while turning it in the direction shown by the arrows.



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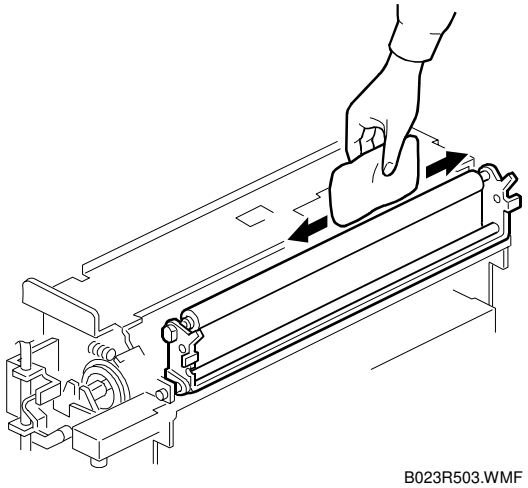
- Clean the oil application roller with cotton.



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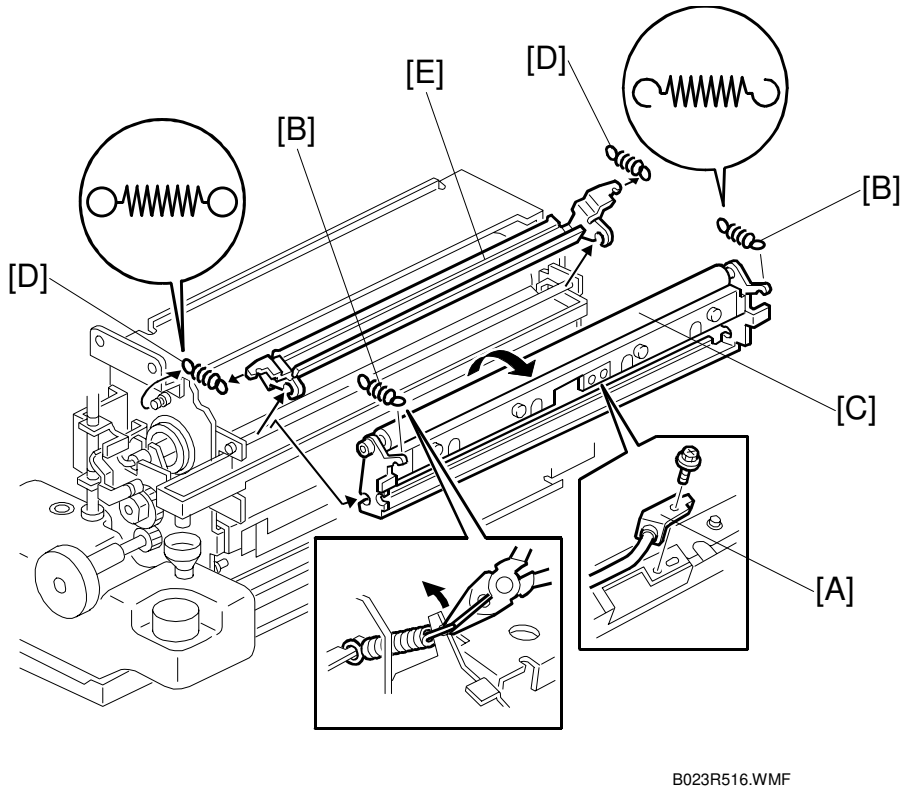
3.10.4 HOT ROLLER BLADE REPLACEMENT



B023R516.WMF

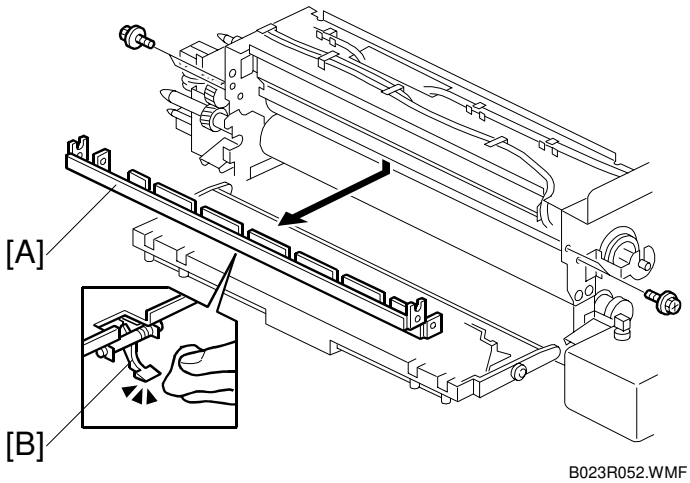
- Fusing unit top cover (☛ 3.12.2)

[A]: Oil supply tube (☞ x 1)
[B]: 2 Oil supply pressure springs
[C]: Oil supply assembly
[D]: 2 Hot roller blade pressure springs
[E]: Hot roller blade

3.10.5 HOT ROLLER SEPARATION PAWL CLEANING

- Fusing top cover (☛ 3.12.2)
- Open the paper exit unit.

[A]: Hot roller separation pawl bracket (☞ x 4)
[B]: Clean the hot roller stripper with clean cloth.



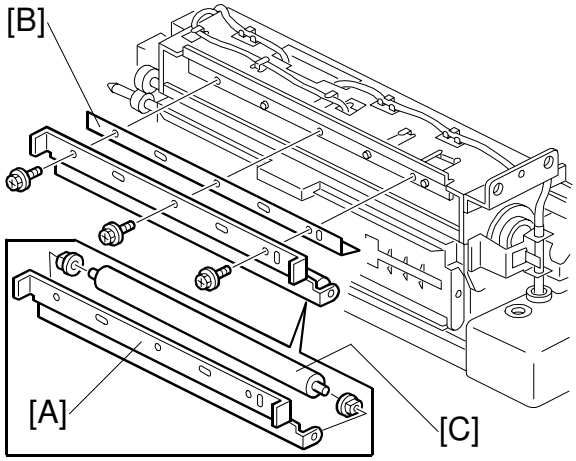
B023R052.WMF

3.10.6 CLEANING THE CLEANING ROLLER SCRAPER AND PRE-CLEANING ROLLER REPLACEMENT

- Fusing unit top cover (☛ 3.12.2)
- Hot roller separation pawl bracket (☛ 3.12.5)

[A]: Bracket (☞ x 3)
[B]: Cleaning roller scraper
[C]: Pre-cleaning roller

- Wipe the cleaning roller scraper with clean cloth.
- Replace the pre-cleaning roller.

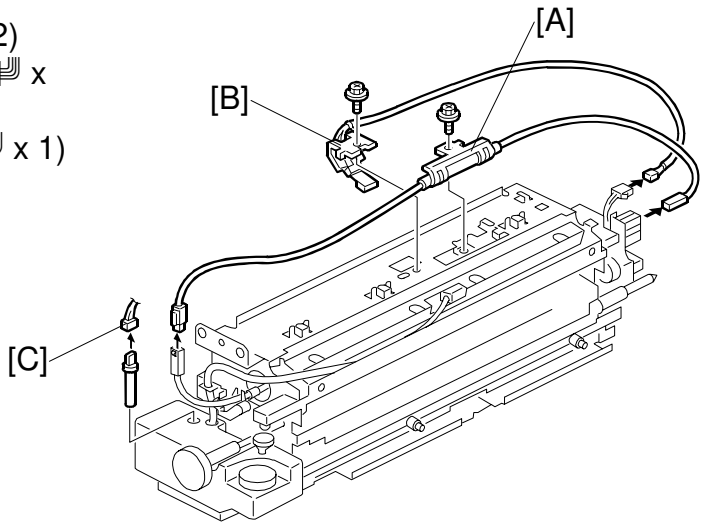


B023R050.WMF

3.10.7 FUSING THERMOFUSE AND THERMISTOR REPLACEMENT

- Fusing unit top cover (☛ 3.12.2)

[A]: Fusing thermofuse (x 1, x 2)
[B]: Fusing thermistor (x 1, x 1)
[C]: Oil end sensor (x 1)

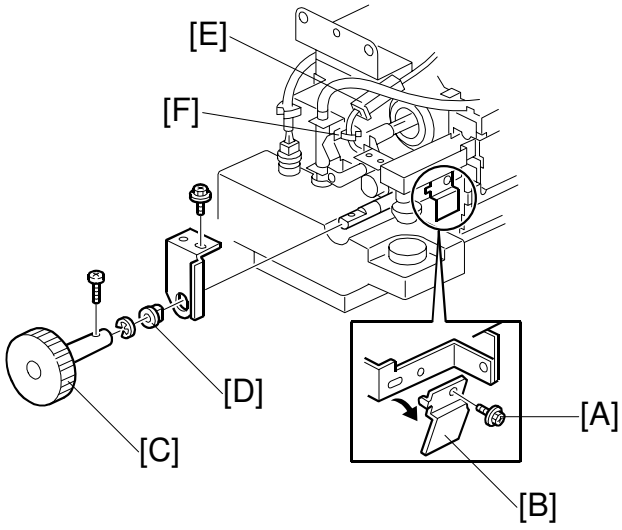


B023R051.WMF

3.10.8 OIL TANK REMOVAL

- Fusing unit top cover (☛ 3.12.2)
- Oil supply tube and the oil supply pad assembly (☛ 3.12.3)
- Hot roller blade (☛ 3.12.4)

[A]: x 1
[B]: Bracket
[C]: using knob (x 1).
[D]: Bushing (x 1).
[E]: Fusing lamp harness (from the bracket).
[F]: Oil pump assembly (x 2).



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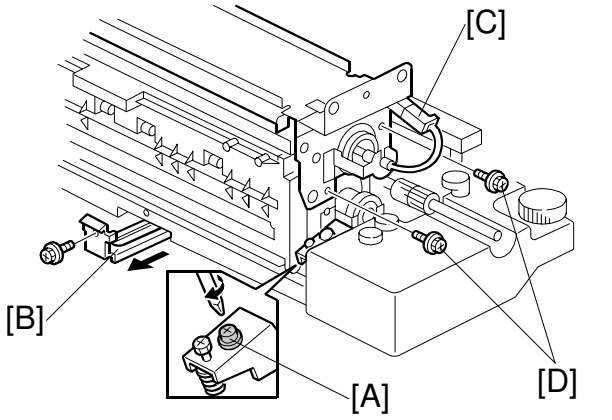
3.10.9 FUSING UNIT DISASSEMBLY

- Remove the oil tank and oil pump assembly.
- Remove the hot roller separation pawl bracket (x 4).
  NOTE: This prevents damaging the hot roller when the fusing unit is disassembled.

[A]: Turn the pressure release screw on the front of the fusing unit (black screw) clockwise to release the fusing roller pressure.
[B]: Pull out the unit support stay (x 1).
[C]: Hot roller lamp connector.
[D]: Lock screws x 2.
[E]: x 4.
[F]: Turn the pressure release screw in rear of the fusing unit (black screw) clockwise to release the fusing roller pressure.
[G]: Gear and spring (x 1).
[H]: Lock screws x 3.

- Disassemble the fusing unit.



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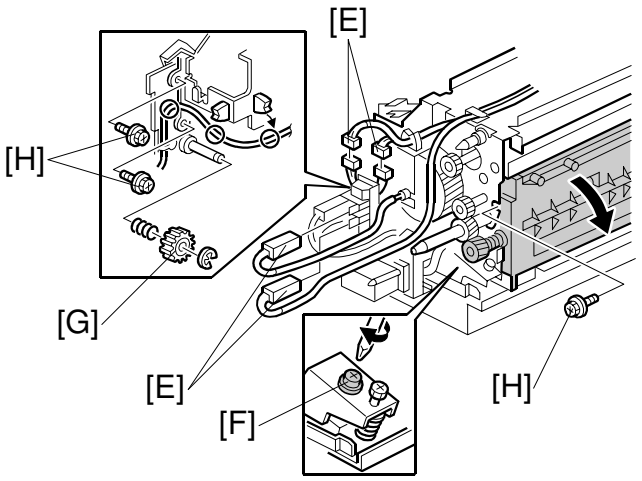
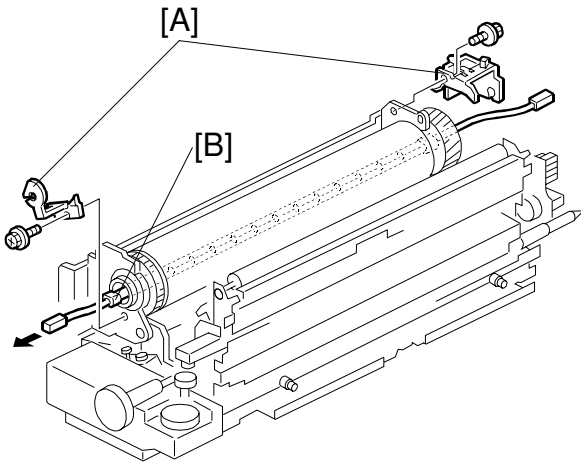


B023R055.WMF

3.10.10 FUSING LAMP REPLACEMENT

- Hot roller separation pawl assembly.
- Disassemble the fusing unit into two parts (☛ 3.10.9)

[A]: Front and rear fusing lamp holders (x 1 each).
[B]: Fusing lamp.



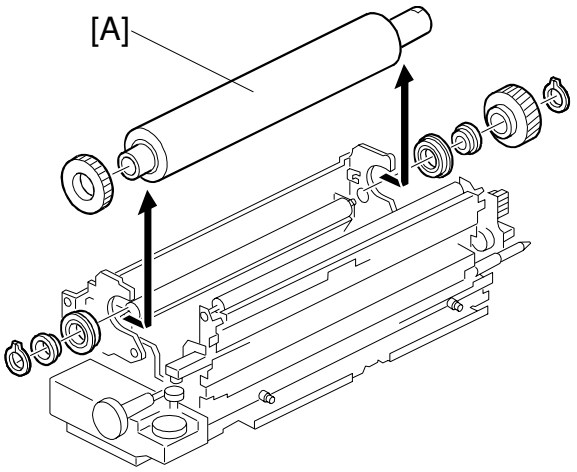
B023R506.WMF

3.10.11 HOT ROLLER REPLACEMENT

- Hot roller separation pawl assembly (☛ 3.10.5)
- Disassemble the fusing unit into two parts (☛ 3.10.9)

[A]: Hot roller (C-rings x 2, heat-insulating bushings x 2, gears x 2, and ball bearings x 2).

NOTE: Apply Barrierta S552R grease to the inner and outer surfaces of the front and rear hot roller bushings every 80K scans. (Barrierta grease: A2579300)



B023R507.WMF

⚠CAUTION

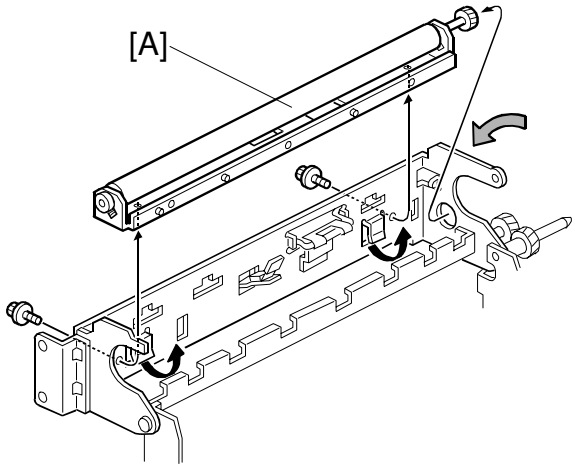
Take care with the Barrierta grease as it will vaporize when heated. The resulting gas is harmful if inhaled.

3.10.12 CLEANING THE HOT ROLLER CLEANING ROLLER

- Disassemble the fusing unit into two parts (☛ 3.10.9)
- Hot roller (☛ 3.12.11)

[A]: Fusing cleaning roller assembly (☞ x 2)

- Clean the surface of the hot roller cleaning roller.

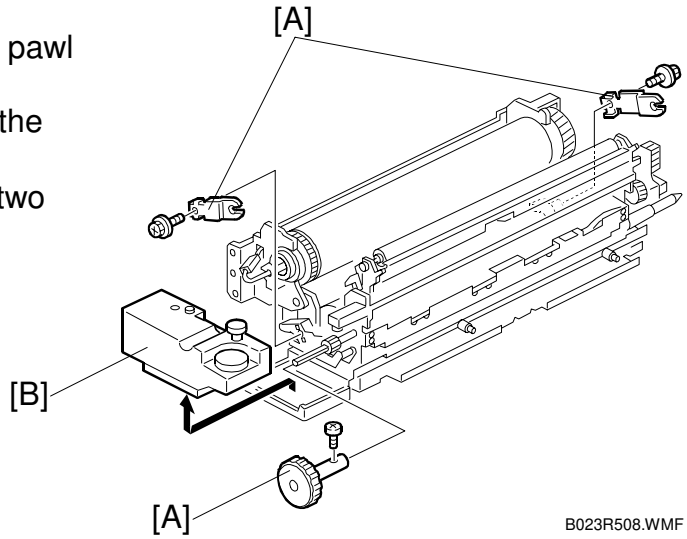


B023R554.WMF

3.10.13 PRESSURE ROLLER LAMP/ROLLER REPLACEMENT

- Remove the hot roller separation pawl bracket.
  NOTE: This prevents damaging the surface of the hot roller.
- Disassemble the fusing unit into two parts (☛ 3.10.9)

[A]: Fusing knob (☞ x 1)
[B]: Oil tank (☛ 3.12.8)
[C]: Pressure roller lamp holders (☞ x 1 each).

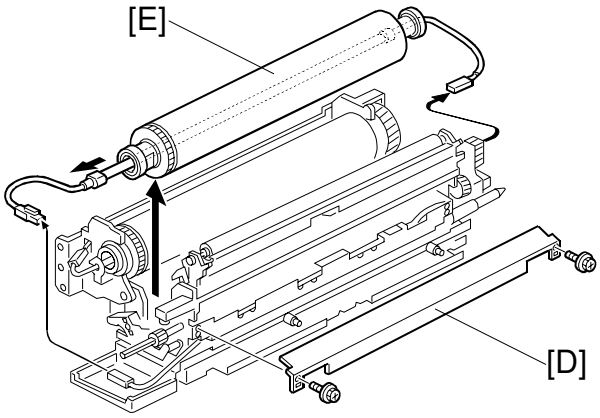


B023R508.WMF

- Uncouple the front and rear connectors of the pressure roller lamp.

[D]: Lower entrance guide plate (☞ x 2)
[E]: Pressure roller (with the pressure roller lamp)

- Take out the lamp.
- Replace the pressure roller (1 gear and 2 ball bearings).

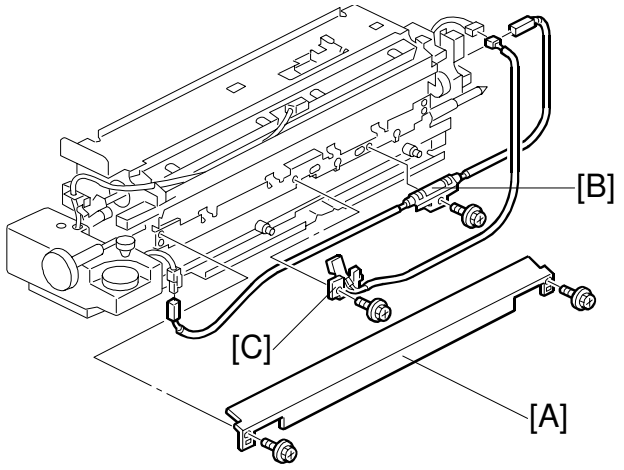


B023R509.WMF

3.10.14 PRESSURE THERMOFUSE AND THERMISTOR REPLACEMENT

- Fusing unit top cover (☛ 3.12.2)

[A]: Fusing unit lower entrance guide plate (☞ x 2)
[B]: Pressure thermofuse (☞ x 2)
[C]: Pressure thermistor (☞ x 2)

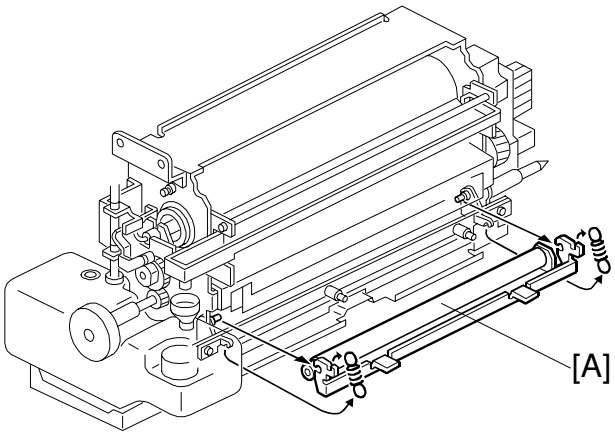


B023R510.WMF

3.10.15 CLEANING THE PRESSURE CLEANING ROLLER

[A]: Pressure cleaning roller assembly (springs x 2).

- Clean the pressure cleaning roller.

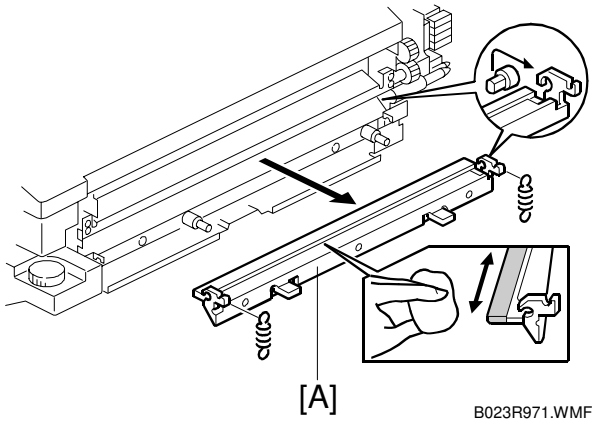


B023R515.WMF

3.10.16 PRESSURE ROLLER BLADE CLEANING (230 V MACHINES ONLY)

[A]: Pressure roller blade (2 springs)

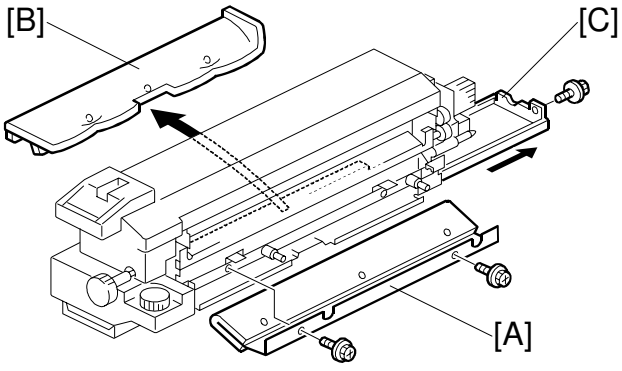
- Clean the pressure roller blade with clean cloth.



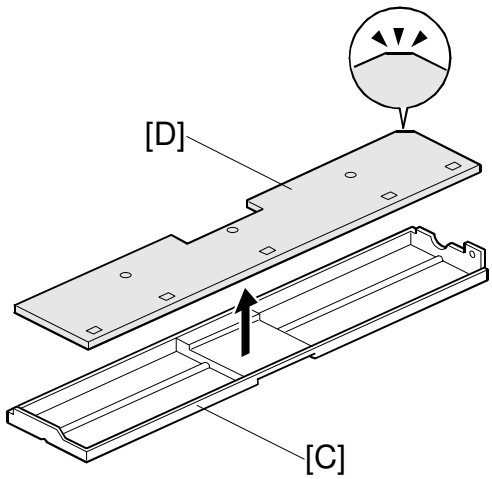
B023R971.WMF

3.10.17 PRESSURE ROLLER OIL SUPPLY PAD REPLACEMENT (230 V MACHINES ONLY)

1. Paper exit unit (🔩).
2. Remove and replace the oil supply pad [A] (🔩 x 2).
3. Remove the fusing unit bracket and oil pan felt [B].
4. Remove the oil pan [C] and the oil pan felt [D] (🔩 x 1).
   Check to see if there is an excessive amount of fusing oil in the oil pan. If there is, replace the oil pan felt [D].

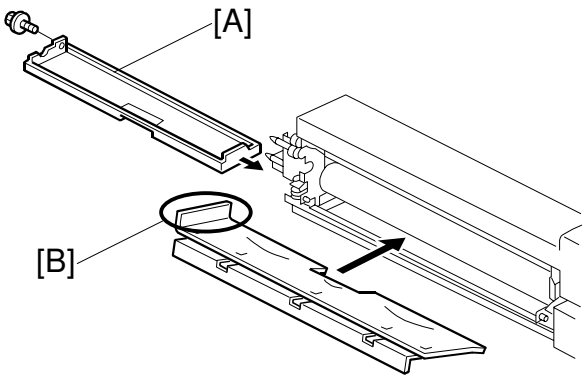


B023R972.WMF

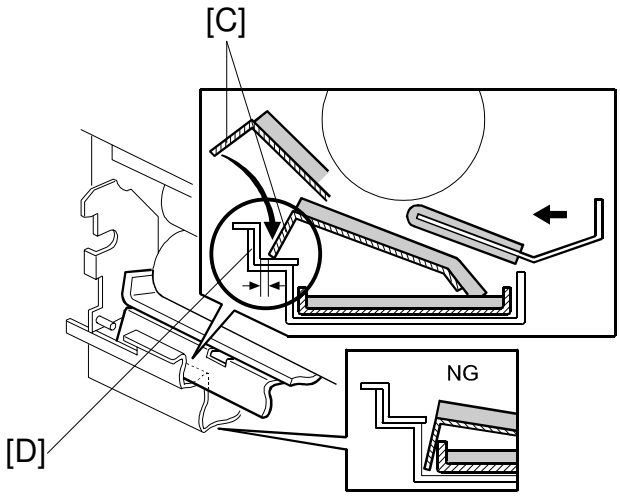


B023R973.WMF

5. Re-install the oil pan and the oil pan felt [A] (🔩 x 1).
6. Re-install the bracket in the fusing unit and the oil pan felt.
   NOTE: 1) Fold up the end of the felt [B] as shown.
   2) The edge of the bracket [C] with the oil pan felt should be resting on the fusing frame [D].
7. Re-install the oil supply pad. (🔩 x 2)

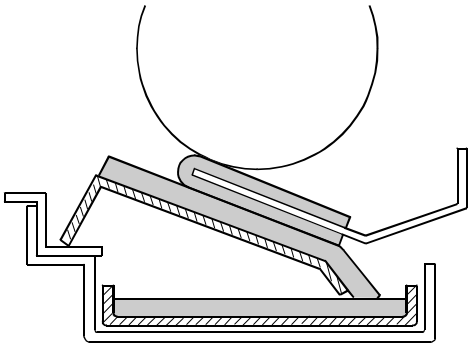


B023R974.WMF



B023R975.WMF

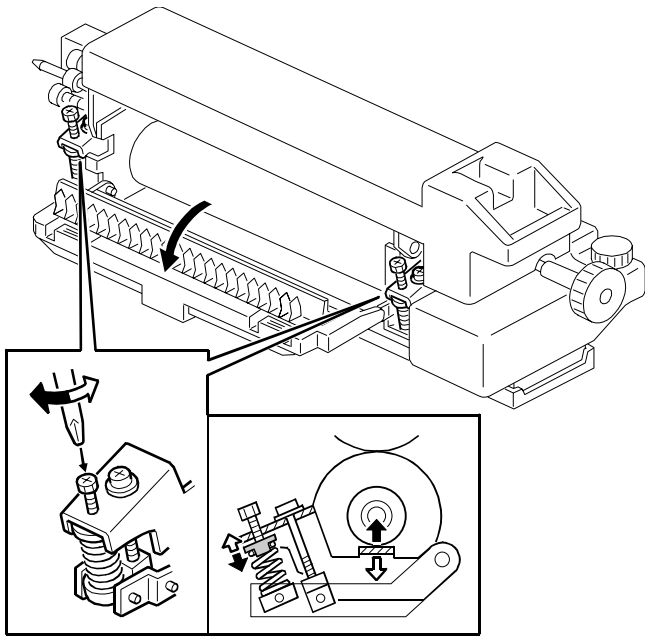
8. After re-installing these parts, the layout should be as follows.



B023R976.WMF

3.10.18 NIP BAND WIDTH ADJUSTMENT

NOTE: 1) Be sure to perform the nip band width adjustment only when the fusing unit is at the operating temperature.
2) Place an OHP sheet on the by-pass feed table before starting this procedure.
3) Use only A4/LT oriented sideways (other sizes of OHP sheet may cause a paper jam).
4) If the copier is connected to a sorter, a paper jam will occur after the OHP sheet is ejected.



B023R551.WMF

1. Enter the SP mode and measure the fusing nip band width (SP1-109-00).
2. When the OHP sheet is ejected, measure the width of the nip band. (The nip band is the opaque stripe across the OHP sheet.)
   1) If the band has irregular boundaries, measure the narrowest width.
   2) For both edges of the OHP sheet, measure the width 10 mm away from the edge.
3. Check that the average of the width of the three bands (front, rear, and center) matches the standard value.

   Standard value
   Center: 10.25 ± 0.25 mm
   Edges: Nip width within 0.5 mm of the same value on both edges (0.5 mm maximum deviation)
4. If the measured nip width does not correspond to the standard value, correct the nip width using the pressure adjustment screw.

3.10.19 CAUTIONS TO BE TAKEN WHEN USING A FUSING UNIT THAT HAS BEEN IN STOCK FOR A LONG PERIOD

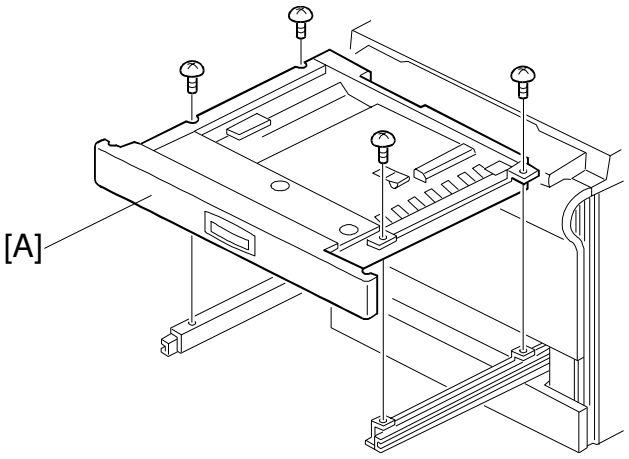
NOTE: When using a fusing unit hat has been in stock for an extended period, press the pump with fingers to check whether adequate amount of oil is pumped up.

Reason: A fusing unit that has been stocked unused for a long time may have a clogged pump or valve in the oil supply unit. Such a fusing unit will not work properly. This may result in an oil supply shortage and consequently an earlier than usual deterioration of the hot roller.

3.11 DUPLEX UNIT

3.11.1 DUPLEX UNIT REMOVAL

[A]: Open the duplex unit.
- Duplex unit (x 4).



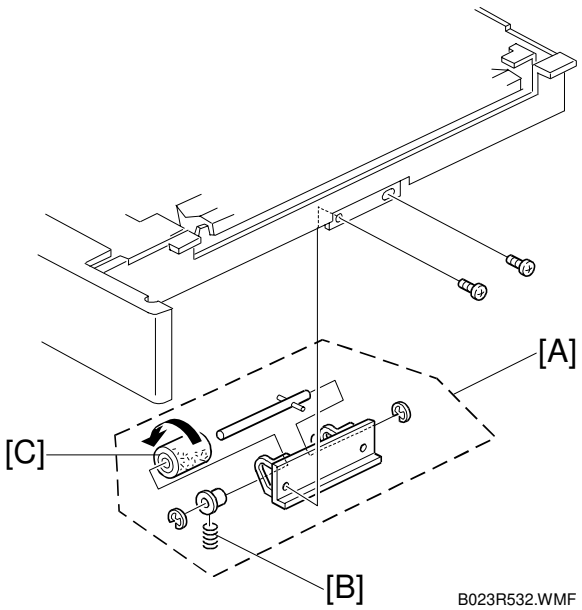
B023R531.WMF

3.11.2 SEPARATION ROLLER REPLACEMENT

- Duplex unit. (☛ 3.13.1)

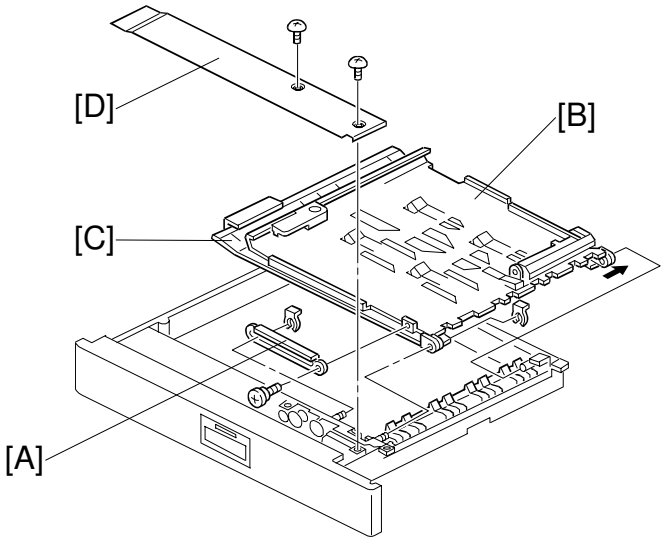
[A]: Separation roller assembly (x 2).
[B]: Spring
[C]: Separation roller (x 2, Bearings x 2).

NOTE: Be sure to install the separation roller (one-way clutch) so that the clutch is visible.

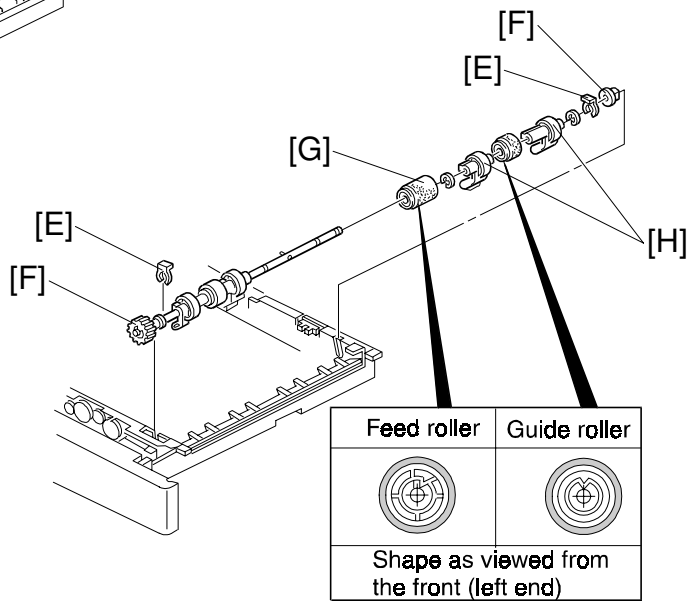


B023R532.WMF

3.11.3 FEED ROLLER REPLACEMENT



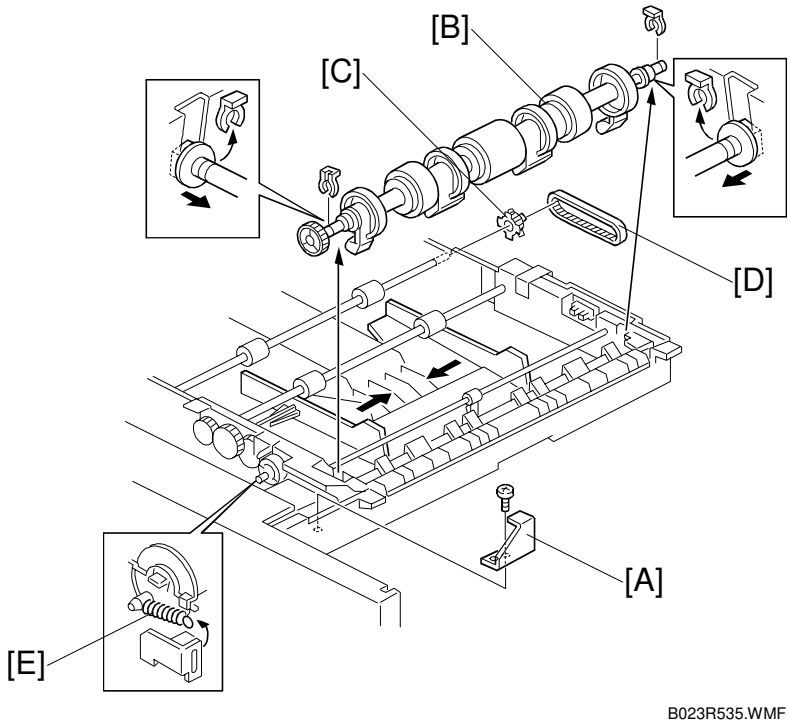
B023R533.WMF



B023R534.WMF

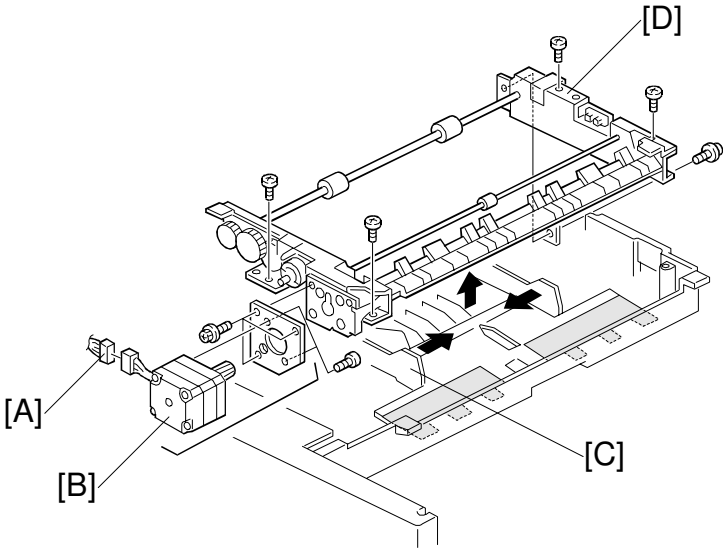
1. Open the duplex unit.
2. Guide rail [A] (x 1, x 1).
3. Upper guide plate [B] (x 1).
4. Lower guide plate [C] (x 1).
5. Inner cover [D] (x 2).
6. x 2 [E] from the both ends of the feed roller shaft.
7. Slide the bearings [F] inward.
8. Replace the feed roller [G] (x 2, Paper flatteners [H] x 2, Guide roller [I] x 1).
   NOTE: 1) Be sure to install the feed and guide rollers correctly.
   2) The feed roller is made of silicone rubber and is not compatible with the non-silicone rubber feed rollers used in some previous models.

3.11.4 DUPLEX FEED MOTOR REPLACEMENT



- Perform steps 1 through 4 in procedure 3.13.3.

[A]: Bracket (x 1).
[B]: Feed roller shaft assembly (x 2).
[C]: Pulley
[D]: Timing belt.
[E]: Pressure spring.



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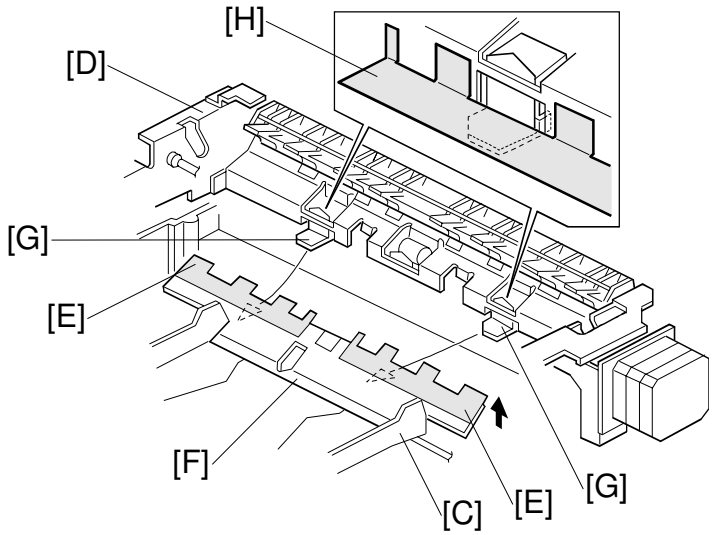


B023R537.WMF

1. Disconnect the connector [A] of the duplex feed motor [B].
2. Close the side fences [C] and remove the duplex feed assembly [D] (☞ x 5).
3. Duplex feed motor assembly (☞ x 3).
4. Duplex feed motor (☞ x 2).
   NOTE: 1) When installing the duplex feed assembly [D] on the base unit, place the bottom plate [F], with the mylar strip [E], above the bracket tabs [G].
   2) Ensure the base unit's mylar strip [H] is placed on the guide plate [I], as shown.

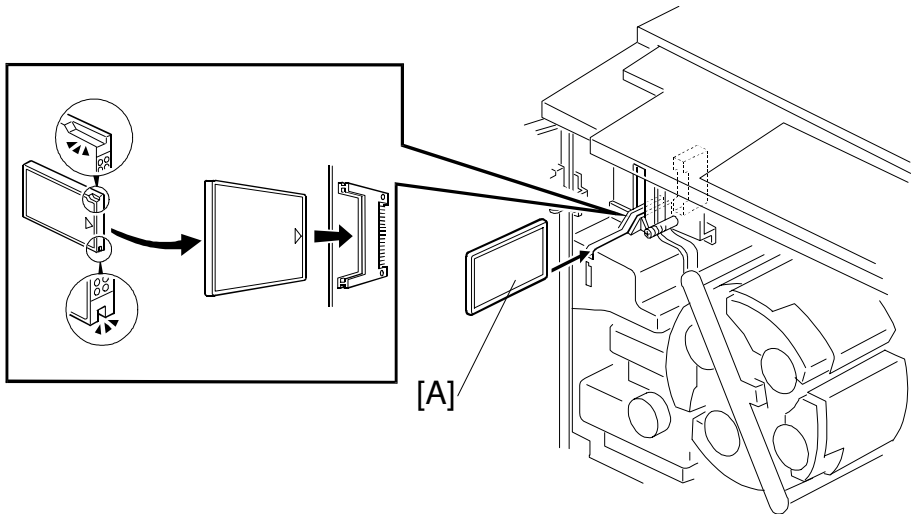
3.12 SYSTEM AND ELECTRONICS

3.12.1 SOFTWARE UPDATE USING AN IC CARD

Care of the IC Card

- Never insert or remove an IC card while the main power switch is turned on.
- Do not turn off the main power switch during the software update process.
- Do not expose the IC card to high temperature, humidity, or direct sunlight.
- Never bend, scratch, or apply excessive shock to an IC card.

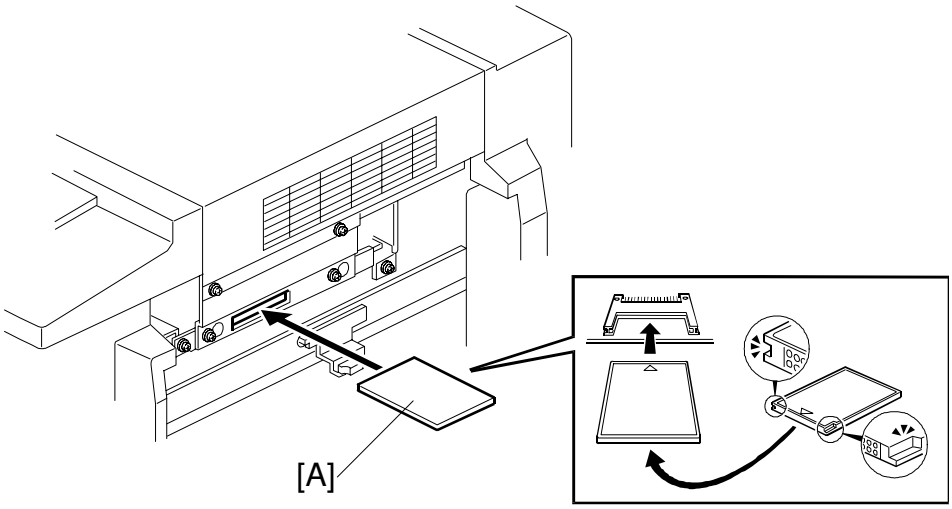
Upgrading the Main Control Board Software



B023R152.WMF

1. Enter SP7-801 and check the current version of main control board.
2. Turn off the main power switch on the copier.
3. Insert the required IC card [A] as shown.
   NOTE: Confirm the direction of IC card.
4. Turn on the main power switch. The system starts from the IC card.
5. Run the main program download function from SP5-827.
6. After confirming the “End” message displayed on the screen, turn off the main power switch and remove the IC card.
   NOTE: Never remove the IC card before turning off the main power switch.
7. Turn on the main power switch again and check the version of main control board software using SP7-801.

Upgrading the Scanner IPU Software



B023R929.WMF

1. Enter SP7-801 and check the current version of scanner IPU software.
2. Turn the main power switch off.
3. Middle right cover (☛ 3.4)
4. Insert the required IC card [A] as shown in figure.
   NOTE: Confirm the direction of IC card.
5. Turn on the main power switch.
   NOTE: Do not attempt to remove the IC card or turn off the main power switch while the program is downloading.
6. Access SP5-827-02.
7. Run the scanner IPU software program download funciton.
8. After confirming the “End” message displayed on the screen, turn off the main power switch and remove the IC card.
   NOTE: Never remove the IC card before turning off the main power switch.
9. Turn on the main power switch again. Then enter the SP7-801 and verify that the software has been upgraded properly.

NV-RAM Uploading and Downloading

This copier can upload and download copier settings from and into its NV-RAM in SP modes using an IC card.

SP5-824: Upload
Executing an upload saves the copier settings (including the main counter value and serial number) onto the flash ROM on the main control board.

SP5-825: Download
Executing a download loads copier settings (excluding the main counter value and serial number) from the flash ROM on the main control board.

Upload/download procedure

1. Print the copier settings using the SP7-902 mode.
2. Turn off the main power switch and insert an IC card containing the main control board software into the main control board.
3. Turn on the main power switch and select either SP5-824 (to upload) or SP5-825 (to download).
4. Start uploading or downloading.
5. Wait until end of processing is indicated on the screen (approximately 1 to 3 minutes, depending on the size of the software).
6. When the end of processing message appears, turn off the main power switch and remove the IC card.
   NOTE: Never remove the IC card before turning off the main power switch.
7. Turn on the main power switch again.
8. In the case of a download, display the settings in the SP7-902 mode and compare them against the old values to verify that the downloading was successful.

3.12.2 RAM CLEAR

RAM Clear Procedure

NOTE: Clearing the RAM resets SP and UP values to their defaults. It does not affect the serial number and main counter value. To prevent the loss of important data, you must follow the steps listed below.

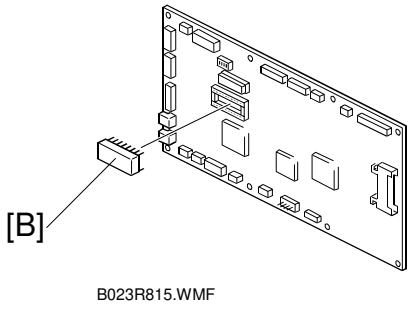
1. Before clearing the RAM, either:
   execute SP7-902 to output the SP mode values that have been changed from their default values;
   or
   Upload the settings from the NV-RAM onto the flash ROM on main control board using the SP5-824 mode (☛ "NV-RAM uploading and downloading").
   NOTE: After carrying out the NV-RAM uploading, turn off the main switch and remove the IC card.
2. Use the SP5-801 mode to clear the NV-RAM.
3. Perform the touch panel calibration.
   NOTE: After the NV-RAM clearing, the touch panel is not effective. Therefore, the "Touch Panel Calibration" is required (☛ Touch Panel Calibration).
4. Run the forced process control self-check (SP3-126). (Potential table optimization is required since RAM clearing also initializes the process control data.)
5. Enter the SP mode changes that were output in step (1), or download the NV-RAM values from the flash ROM on main control board. (☛ "NV-RAM Uploading and Downloading".)
6. Perform the ACC procedure.
7. If the color balance after the ACC is not correct, adjust the ACC target using SP4-501 (for copier mode) and SP4-502, 3 (for printer mode).

NOTE: To clear (zero) the counter log data, run the SP7-808 (Clear All Counters).

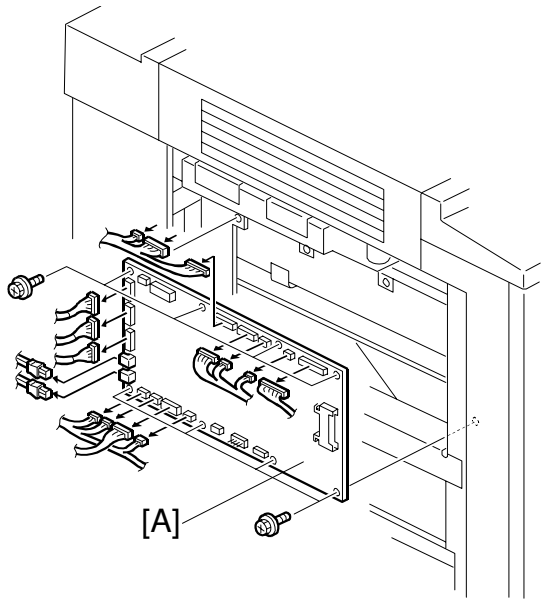
3.12.3 MAIN CONTROL BOARD

Main Control Board Replacement Procedure

The NV-RAM on the main control board stores the device number information, counter information, and other settings. When you replace the main control board, you must transfer the NV-RAM from the old control board to the new one. (Main control boards that are supplied as service parts do not have a NV-RAM.)



B023R815.WMF



B023R814.WMF

1. If possible, record the device number information, counter information, and other default values.
2. Turn off the main power switch and unplug the power cord.
3. Left cover (☛ 3.4)
4. Main control board [A] (🖑 x 14, fiber-optics connectors x 2, and 🪛 x 8).
5. Remove the NV-RAM (IC115) [B] from the old main control board.
6. Install the NV-RAM on the new main control board.
7. Install the board and covers in the reverse order of disassembly.
8. Plug in the power cord and turn on the main power switch.
9. Verify the default values and program version in the appropriate SP mode.
10. Output a copy and check it for any errors.

3.12.4 COUNTERS

About the Total Counter

The total counter value is stored in the NV-RAM on the main control board. It cannot be reset with RAM clear. Consequently, the NV-RAM in this copier corresponds to the conventional electronic or mechanical counters and must be handled as such. (See the following procedure–"Precautions to be Observed When Replacing the Total Counter (NV-RAM).")

The factory-set counter value is a negative value. When the total counter has a negative value, it may be reset using SP7-825. However, resetting is disabled if the counter value is positive. The counter value can be monitored using the counter key located on the right side of the operation panel.

Mechanical Counter

This copier is also provided with a mechanical counter. This mechanical counter is covered with a seal because it normally isn't used. This counter has no reset function, and no service code will display if it becomes faulty. The mechanical counter is set to "0" at the factory. It starts counting when the total counter is reset using the SP7-825 mode. (If the total counter isn't reset using SP7-825, the mechanical counter starts when the total counter reaches "0".)

NOTE: Normally you shouldn't ever need to peel the seal off of the mechanical counter.

NV-RAM Replacement Procedure

Make sure you have the factory settings that come with the copier before beginning the following procedure:

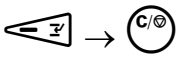
1. Use the SP7-902 mode to output the SP mode values that have been modified from their default value.
2. Set the main power switch to OFF and unplug the power cord.
3. Replace the NV-RAM (IC115) on the main board. (☛ "Main Control Board Replacement Procedure".)
4. Reassemble the machine. Then, turn on the main power and enter the machine's device number in the factory set mode (consult with your manager for details).
5. Execute SP5-801 (RAM Clear).
6. Enter the SP mode changes you output in step (1).
7. Perform the auto color calibration procedure.
8. If the image needs adjustment after being subject to auto color calibration, calibrate the target using the SP4-501/502/503 modes.

- The factory-set value of the total counter NV-RAM supplied as a part is –2000 ± 20 for K (development cycles) and –3000 ± 20 for CMY (development cycles).

3.12.5 TOUCH PANEL CALIBRATION

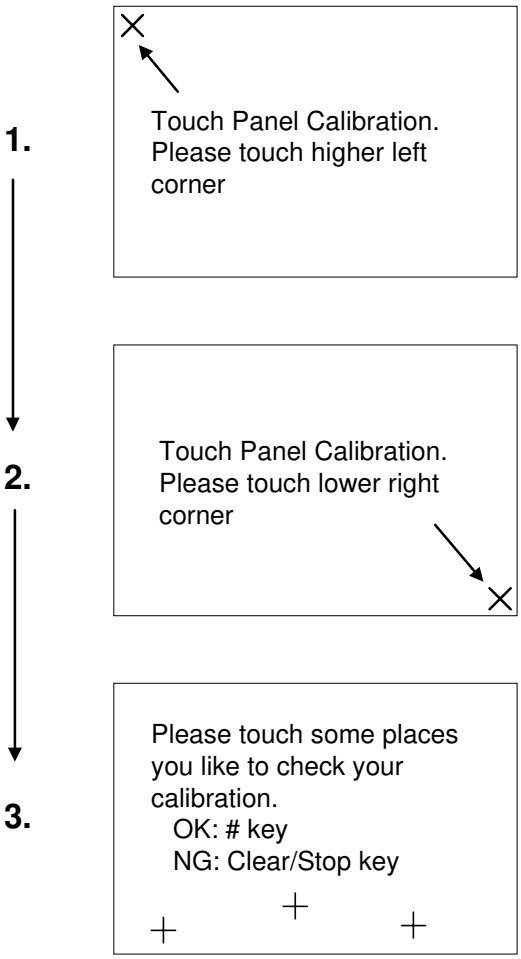
NOTE: It is necessary to calibrate touch panel in the following cases:
- When the operation panel is replaced.
- When NV-RAM clear (SP5-801) has been performed.

1. Press the [Interrupt] key, then press and hold the [Clear Stop] key for 3 seconds. The calibration screen will appear.



2. Gently touch the screen with the tip of editor pen in sequence as indicated by the arrow marks which appears on the screen (from upper left to lower right).
3. Touch any location with the editor pen to verify the current coordinates.
4. Terminate the calibration with the [#] key if the coordinates of the X mark almost match the point you touched. If the coordinates disagree, rerun the calibration with the [Clear/Stop] key.

NOTE: Do not use a sharp object such as a normal pen or mechanical pencil for this procedure. The touch panel might be damaged.



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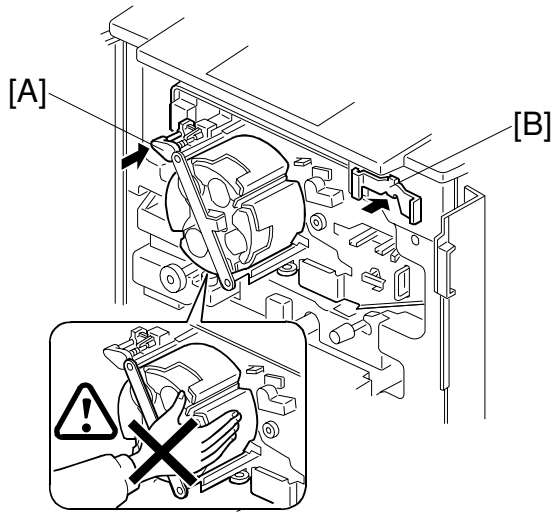
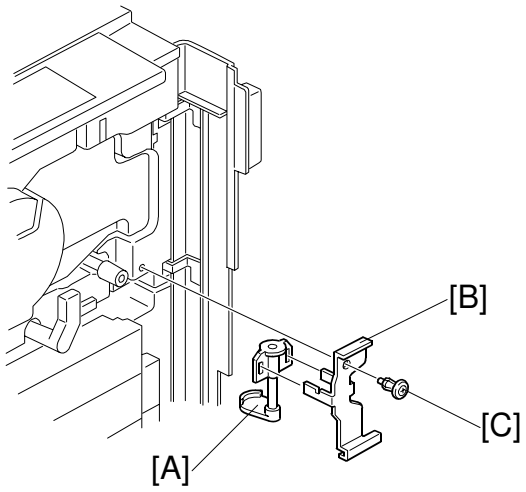
3.12.6 DOOR SAFETY SWITCH LOCK TOOLS



B023R330.WMF



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There are two service tools are initially secured on the upper right inner cover. These tools can be used to hold the front door safety switches when the front doors are opened.

Set the revolver lock release tool [A] and the safety switch actuator [B].

⚠WARNING

1. **Turn the copier main switch off when setting the revolver lock release tool [A] and door safety switch actuator [B].**
2. **Set the revolver lock release tool [A] first when setting the revolver lock release tool and door safety switch actuator [B]. If the copier starts without the revolver lock release tool [A], revolver will be locked and SC361 (Revolver H.P. sensor error) will display.**
3. **Never touch the area around the revolver after turning on the copier main switch while using the door safety switch actuator and revolver lock release tool. In case of rotation of revolver, your hands may be injured.**
4. **Check and note down the setting of "Timed Process Control Self Check" (SP3-972-01) before using release tools. If the "Timed Process Control Self Check" starts suddenly, your hands may be injured. Enter the value 0 in SP3-972-000 (Entering a value of 0 surpresses the execution this self check). The default interval of "Timed Process Control Self Check" is 6 hours.)**
5. **After using these tools [A], [B], secure them to the upper right inner cover with a plastic screw [C] as shown.**
6. **Enter the previous setting of "Timed Process Control Self Check" (SP3-972-01) again.**

4. TROUBLESHOOTING

4.1 PROCESS CONTROL ERROR CONDITIONS

4.1.1 PROCESS CONTROL SELF CHECK RESULTS (SP3-975-00)

Self Check Results 03-975-00

Displayed Value	Item	Related SP No.	Major Cause	Remarks
1	Successful	None		
89	Process control self-check cannot be performed	3-125-00	Toner end or toner near end condition occurs, or SP3-125-000 is set to "1" (fixed potential control)	
99	Forced termination (door opened, etc.)	None	Power is turned off during self-check. Temporary main power failure	
100	ID sensor offset error		ID sensor disconnected	SC385 is indicated.
110	V_{SG} adjustment error	3-2-xx	Dirty ID sensor, dirty drum, foreign materials or flaws on the drum	SC385 is indicated.
120	Coating weight calculation error	None	ID sensor noise, defective development unit, charge control unit setup incorrectly, development bias error	
130	V_{MIN} error	3-910-xx	ID sensor noise, low K toner density	
20✱	γ calculation error, invalid γ or V_K value	3-121-xx 3-122-xx	Development unit error, mixed colors	
300	Residual potential error	3-111-00	Drum anomaly, faulty LD unit, poor grounding	
31✱	V_D adjustment error	None	Drum deterioration, optical fatigue	
32✱	V_{PL} adjustment error	None	Drum anomaly, faulty LD unit	
40✱	Self check process control γ error (unable to calculate)			
41✱	Self check process control γ error (out of range condition)			

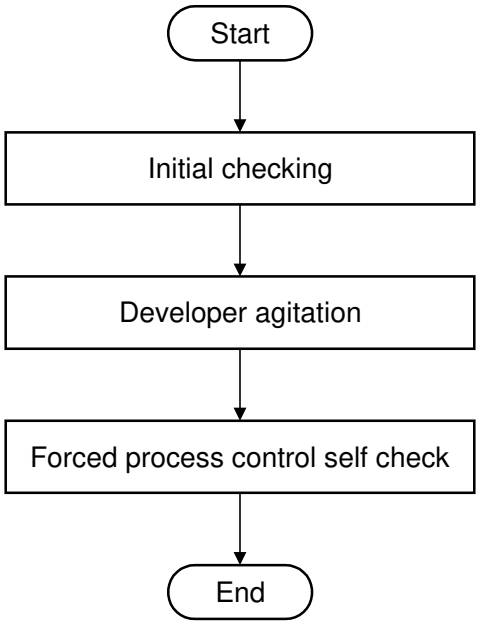
NOTE: 1: K, 2: Y, 3: C, and 4: M are displayed for the respective colors for items identified by "✱" in the "Displayed value" column of the table.

4.1.2 DEVELOPER SETUP RESULTS (SP3-964-00)

Displayed Value	Item	Related SP No.	Major Cause	Remarks
1	Successful			
20✱	Unable to perform calculation, invalid γ or VK value		Development unit error, mixed colors	
31✱	VD adjustment error		Drum deterioration, optical fatigue	
32✱	VPL adjustment error		Drum anomaly, faulty LD unit	
40✱	Self check process control γ error (unable to calculate)		Same as process control self-check result.	
41✱	Self check process control γ error (out of range condition)		Same as process control self-check result.	
50✱	Toner end condition, etc. (before toner is replenished)		Toner end sensor actuated, toner end condition	Toner end condition detected during developer setup.
51✱	Toner supply error (γ value will not go up when toner is replenished.)		Developer/toner supply mechanism error, toner supply motor cable disconnected	Rerun.
530	TD sensor initialization error			
54✱	VREF adjustment error			
59*	Forced termination during the developer agitation.		SC or door open.	
596	Toner end during the developer agitation.		Toner end or toner near end is detected during the developer agitation.	
597	Incorrect setting of process control method.	3-125-000	Incorrect process control method is selected by SP3-125-000. Change the setting to 0 (Process control ON).	
599	Forced termination after the developer agitation.		SC or door open.	
89	Developer setup cannot be performed	3-125-000	Toner end or toner near end condition occurs, or SP3-125-000 is set to “1” (fixed potential control).	
99	Forced termination (before the developer agitation.)		Power turned off during self-check, temporary main power failure. Door open or SC.	
100	ID sensor offset error		ID sensor cable disconnected	
110	VSG adjustment error		Dirty ID sensor, dirty drum, foreign materials or flaws on the drum	
120	Error calculating the amount of toner on the drum.		ID sensor noise, defective development unit, charge control unit setup incorrectly, development bias error	
130	VMIN error		ID sensor noise interference, BK toner density too low	
300	Residual potential error		Drum anomaly, faulty LD unit, poor grounding	

NOTE: 1: K, 2: Y, 3: C, and 4: M are displayed for the respective colors for items identified by “✱” in the “Displayed value” column of the table.

"Developer Agitation (SP2-225)" Operation Flow



- Toner end?
- TD sensor is correctly initialized?

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4.1.3 TD SENSOR INITIALIZATION RESULTS (SP3-960-000)

Displayed Value	Item	Related SP No.	Major Cause	Remarks
1	Successful			
1✱	TD sensor output error		TD sensor output cannot be adjusted within 3.0 ± 0.1 V. TD sensor disconnected.	
3✱	TD sensor gain value lower limit error	3-941-xx	• Value of the TD sensor gain is lower than the set lower limit. • TD sensor initialization was performed for non-fresh developer. • Abnormalities in the development unit.	
4✱	TD sensor gain value upper limit error	3-942-xx	• Value of the TD sensor gain is higher than the set upper limit. • TD sensor initialization was performed for non-fresh developer. • Not enough developer present. • Abnormalities in the development unit.	
20	TD sensor initialization error			
2✱	TD sensor communication error			

NOTE: 1: K, 2: Y, 3: C, and 4: M are displayed for the respective colors for items identified by "✱" in the "Displayed value" column of the table.

How to Avoid the Abnormal TD Sensor Initialization

If TD sensor initializations performed under one of the following conditions, Vref will **NOT** be adjusted properly, and may results in toner supply control at a higher level eventually causing toner scattering. This is because under any of the below conditions, the toner concentration of the developer is already shifted from that of the fresh developer, which is factory controlled at 5wt% and using such developer for TD sensor initialization results in wrong Vref setting.

1) Toner end or toner near end condition
2) After developer replacement, main switch is turned on without opening the front cover, so process control self check is performed.
3) TD sensor initialization is performed for color(s) that the developer is not replaced.

Countermeasure

During the TD sensor initialization, TD sensor output is automatically adjusted to 3.0 ± 0.1 V by changing the TD sensor gain value stored in SP3-944. If the TD sensor initialization is performed under conditions such as mentioned above, the gain value will become abnormal. If the gain value is lower than the lower limit stored in SP3-941, the new gain value will be canceled, and the previous gain value will be maintained. Also, value 3✱ (1: K, 2: Y, 3: C, 4: M, for ✱) will be displayed for TD sensor initialization results (SP3-960-000). If the gain value is higher than the higher limit stored in SP3-942, the new gain value will be canceled, and the previous gain value will be maintained. Also, value 4✱ (1: K, 2: Y, 3: C, 4: M, for ✱) will be displayed for TD sensor initialization results (SP3-960-000). If the previous gain value is also out of the range, default gain value stored in SP3-006 is used. The default gain value is optimized with this modification as follows.

SP3-006 TD Sensor Gain Setting

SP Mode No.	Item	Default Value	Value Range
SP3-006-001	TD sensor gain setting (K)	165	0-225
SP3-006-002	TD sensor gain setting (C)	175	0-225
SP3-006-003	TD sensor gain setting (M)	175	0-225
SP3-006-004	TD sensor gain setting (Y)	175	0-225

The upper and lower limit for the gain values are stored in the following SP modes. The values in these SP modes can be adjusted manually, **however it is not recommended to change the setting in the field.**

SP3-941, 942 TD Sensor Initial Gain Lower and Upper Limits

SP Mode No.	Item	Default	Range
SP3-941-001	TD sensor initial gain lower limit (K)	150	100-300
SP3-941-002	TD sensor initial gain lower limit (C)	160	100-300
SP3-941-003	TD sensor initial gain lower limit (M)	160	100-300
SP3-941-004	TD sensor initial gain lower limit (Y)	160	100-300
SP3-942-001	TD sensor initial gain upper limit (K)	180	100-300
SP3-942-002	TD sensor initial gain upper limit (C)	190	100-300
SP3-942-003	TD sensor initial gain upper limit (M)	190	100-300
SP3-942-004	TD sensor initial gain upper limit (Y)	190	100-300

These two errors will not results in error code 530 (TD sensor initialization error) for developer set up results displayed by SP3-964-00.

Action in the Field

When performing TD sensor initialization, always be careful that abnormal conditions such as mentioned above do not exist. In case 3✱ or 4✱ is displayed in SP3-960-000 TD sensor initialization results, do not repeat the initialization as this will results in another error. The toner density will be controlled within normal range even if TD sensor initialization results in 3✱ or 4✱ since previous or default value will be used for TD sensor gain value. Therefore, the machine can be used temporary. However, the toner scattering may occur under this condition. To avoid this, perform the TD sensor initialization again using brand-new developer.

4.1.4 TONER SCATTERING

The following table is series of check items that are sometimes overlooked in the field. If these items are not confirmed, this can lead to toner scattering. So if your answer is No to any of these items, please refer to the action to be taken (right column).

No.	Check items	Technical background	Action in case your answer is "No".
1	Did you open the front cover before turning on the main switch at machine installation or after replacing the developer?	Without opening the front cover, the machine starts the initial process control self-check automatically after the main switch is turned on. If the initial process control self-check is performed before the TD sensor initialization, the actual toner wt% will be greater than the calculated value by the TD sensor out put. This may lead to toner scattering (SC452, SC385).	At machine installation: Replace the developer for all colors. Then, perform TD sensor initialization again according to the correct procedure. (☛ 1.2.6)
			After the developer replacement: Replace again the developer color(s) that you just replaced. Then perform TD sensor initialization according to the correct procedure. (☛ 3.8.1)
2	Did you replace the toner cartridge before the developer replacing color which was at toner end or toner near end condition? (☛ 3.8.1)	If the toner end recovery process is performed with the new developer before the TD sensor initialization, the actual toner wt% for the Vref value will be greater than estimated. This will cause incorrect Vref values to be used for toner supply control. This may lead to toner scattering (SC452, SC385).	At first, replace the toner cartridge with new one. Then replace again the developer color for the toner that was at end or near end condition. Then perform the TD sensor initialization again, according to the correct procedure. (☛ 3.8.1)
3	Did you perform the TD sensor initialization only for the color(s) that the developer is replaced? (☛ 3.8.1)	If the TD sensor initialization is performed for the color(s) that the developer is NOT replaced, Vref will be incorrect value. If the incorrect Vref value is used for toner supply control, toner scattering problem may occur.	Replace the developer color(s) that you did not replaced. Then perform TD sensor initialization only for the color(s) that you replaced just now. (☛ 4.13)
4	Are the following values are at default ssetting? • Vref (SP3-950, SP3-949) • Vref lower limit (SP3-947) • Vref upper limit (SP3-948) • Vcnt (SP3-944) • Vcnt lower limit (SP3-941) • Vcnt upper limit (SP3-942)	Vref and Vcnt (TD sensor gain) are used for the TD sensor initialization and the toner supply control. If these are changed from the default values, incorrect values will be used for the toner supply control.	• Reset the values to the default value. • If Vcnt (SP3-944) has been changed, replace the developer and perform the TD sensor initialization.

4.1.5 SELF-CHECK PROCESS CONTROL RELATED SC's

SC385: VSG Adjustment Error

The LCD displays SC385 when the output from the ID sensor is found to be outside 1.8 ± 0.05 V during VSG adjustment.
Turning the power off then on resets this condition. However, SC385 is lit again after the end of each copy job. Toner is still supplied, but using the fixed supply mode. This continues until a successful VSG adjustment is performed.

NOTE: VSG adjustment timing:

- During the process control self-check (forced, power-on time, or fixed interval).
- During developer initialization (SP2-225-1 to SP2-225-5).
- When the output differs from the previously measured VSG value by more than ±0.05 V.

Other Self-check Process Control Related SC's

SC370	SC371	SC372	SC373	SC387

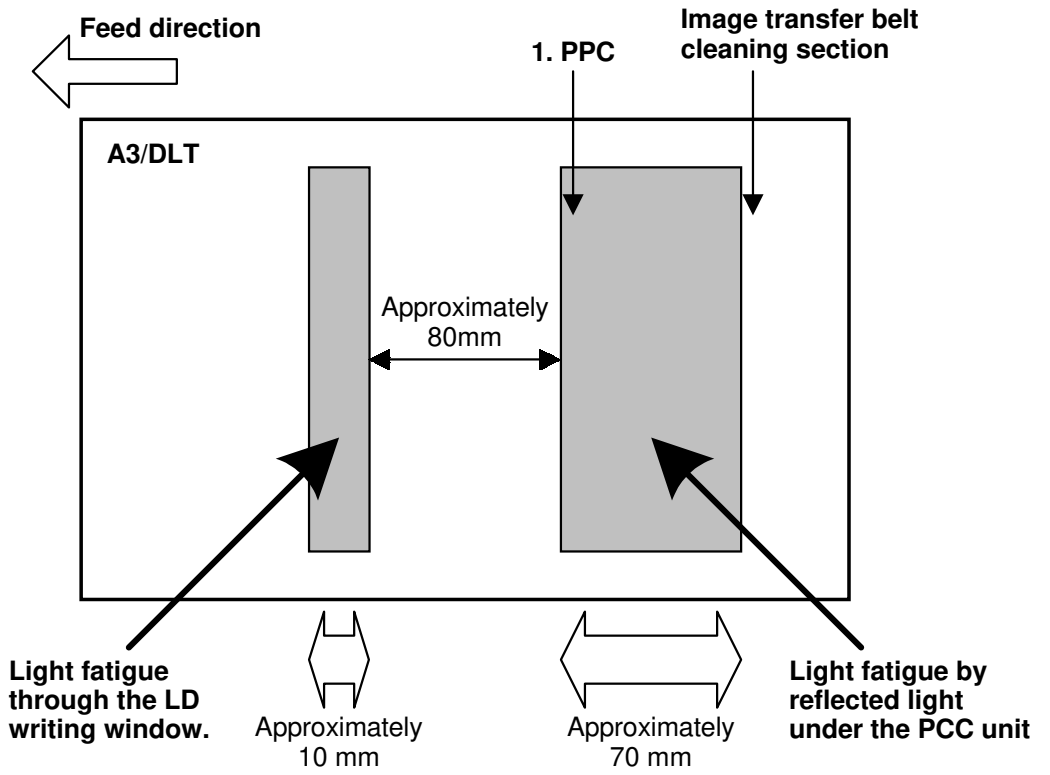
- ☛ SC code table

4.2 DRUM LIGHT FATIGUE

Leaving the drum exposed to light can cause optical fatigue. When the drawer unit is slid out, even if the drum remains in the drawer unit, it will be exposed to direct and reflected light. Optical fatigue will occur if the drum is exposed for more than 2 minutes. This optical fatigue will result in image anomalies on the print outs.

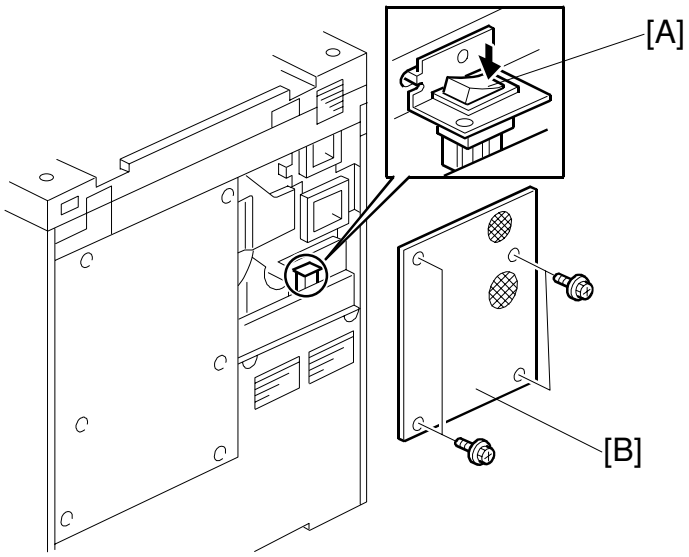
Making a print test pattern with SP mode 5-955-18 enables you to determine whether the drum has light fatigue. Follow this procedure to make a test pattern with A3 (DTL) in 1C (single color) mode using the SP mode.

1. Enter SP mode 5-955.
2. Set SP 5-955-018 to 6 to select the Solid test pattern.
3. Set SP 5-955-001 to 51 to select the LD writing value, 51.
4. Press the key to change the LD.
5. Select A3 (DTL) size and B/W mode (or another 1C mode).
6. Press the key to make a test pattern in 1 to 1 copy mode.
7. Check whether the image has a dark uneven area.
8. If the darker area location is similar to the following figure, replace the drum.
9. After replacing the drum, set SP5-955-001 10 128 and 5-955-018 to 0.



B023T001.WMF

4.3 ANTI-CONDENSATION HEATERS



B023T901.WMF

The heater switch is turned off by default. If the machines are installed under the following conditions, please turn the heaters on.

Condition

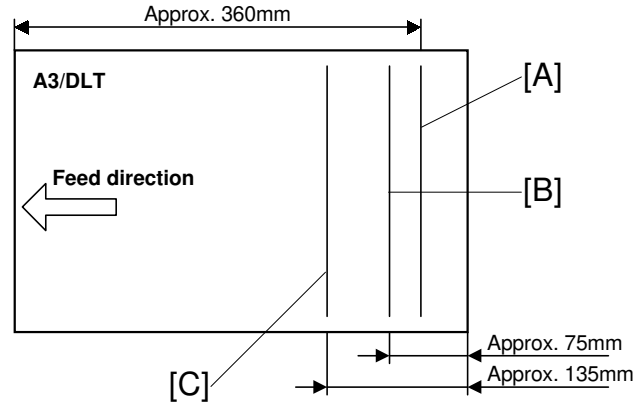
If there is a large difference in room temperature between when the machine is running and when the machine is off, turn on the heaters.

- Temperature difference is greater than 10 degrees.

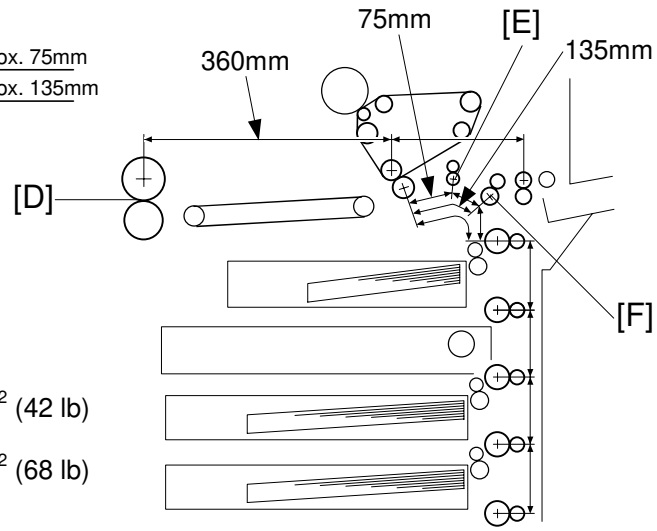
NOTE: If the heater switch is turned on, following heaters will be turned on while the copier main switch is off.
- Optics anti-condensation heater
- Transfer belt heater
- Paper transfer unit heater

4.4 JITTER IN THICK OR EXTRA THICK PAPER MODE

If the jitter appears in thick or extra thick paper mode at the position shown in figure [A], [B] and [C], please confirm the followings.



B023T002.WMF



B023T023.WMF

NOTE:
1) Thick paper (Thick paper 1):
   105 g/m^2 (28 lb) < paper weight ≤ 157 g/m^2 (42 lb)
2) Extra thick paper (Thick paper 2):
   157 g/m^2 (42 lb) < paper weight ≤ 256 g/m^2 (68 lb)

1) Jitter [A]: Approx. 360 mm from the leading edge
   - This jitter occurs by the shock when paper leading edge goes into the fusing nip position [D].
   - Confirm the condition of fusing entrance area.
2) Jitter [B]: Approx. 75 mm from the trailing edge
   - This jitter occurs by the shock when the trailing edge of the paper leaves the registration roller [E].
   - Adjust the following SP modes
     SP1-801-011 (Registration motor speed for thick paper)
     SP1-801-012 (Registration motor speed for extra thick paper)
     default: – 0.2, value range: –5.0 to +5.0, step 0.1
3) Jitter [C]: Approx. 135 mm from the trailing edge
   - This jitter occurs by the shock when the trailing edge of the paper leaves the paper feeding roller [F].
   - Adjust the following SP modes
   - SP1-801-005 (Paper feeding motor speed for thick paper)
     SP1-801-008 (Paper feeding motor speed for extra thick paper)
     default: –2.0, value range: –5.0 to +5.0, step 0.1

4.5 SC CODE TABLE

4.5.1 SC TYPES AND RESETTING PROCEDURES

The SC code table (Appendix-1) refers to SC code types. These types and the procedures to reset them are explained in the following table.

Type	Display Method	How to Reset
A	Fusing unit SCs displayed on the operation panel. The machine is disabled. The user cannot reset the SC.	Turn the main switch off then on before entering SP mode. Reset the SC (set SP5-810 to 1), then turn the main switch off then on again.
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.

- All SCs are logged.
- To reset the SC related to the fusing unit, enter SP5-810-000 and set the value to 1. Then turn the main switch off and on.

SC CODE TABLE

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Related SP	Troubleshooting Procedure	Type
SC101	Exposure lamp failure	- Timing & Condition - • The lamp output check signal (LAMPDET) is still HIGH 250 ms after the lamp turns on (the ON check is canceled if the lamp goes off within 250 ms). • The lamp output check signal is still LOW 30ms after the lamp turns off (the OFF check is canceled if the lamp turns on within 30 ms).	• Blown lamp • Blown thermostat • Blown fuse (FU301) • Defective lamp regulator • Poor connection • Defective harnesses • Defective AC drive board • Defective sub/main scanner IPU board			1. Visually check the lamp element or check both ends of the lamp terminals with a multi-meter. 2. Check the current at the ends of the thermostat terminals with a multi-meter. 3. Check if the connectors (CN1, CN2, and CN3) on the lamp regulator are properly connected. 4. Check the current through the 3 harnesses. 5. If 100Vac is provided from the AC drive board (check CN3-1 and 5 on the lamp regulator) replace the lamp regulator. 6. If 100Vac is not supplied at CN3, Replace the AC drive board. 7. Replace the sub scanner IPU board and/or main scanner IPU board [Signal Check] • LAMPDET: CN2-2 on the lamp regulator/ CN403-A10 on the sub scanner IPU board • LAMPTRIG: CN403-A9 on the sub scanner IPU board/CN2-3 on the lamp regulator	D

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Related SP	Troubleshooting Procedure	Type
SC120	Scanner HP sensor does not turn on	- Timing & Condition - • The scanner H.P. sensor does not turn on when the scanner moves back to the home position or at the home position check. • The sensor output at CN403-A1 stays HIGH (5V).	• Scanner motor out of synchronization (drive error) • Poor connection of connectors • Defective scanner HP sensor • Defective sub/main scanner IPU board • Defective main control board	SC121		1. In SP 5-804-104, stop supplying the current to the scanner motor. Check the output signal from the scanner H.P. sensor in SP 5-803-100 by moving the scanner manually. (0: Not actuated; 1: Actuated - at H.P.) 2. If the result of step 1 is OK; 1) Check the tension of the timing belt. 2) Check if the pulley is firmly secured. 3) Check if the scanner wire is properly wired 4) Check the connection of CN700, CN701, and CN702 on the scanner motor drive board. 5) Check a current through the harnesses. 6) Replace the scanner motor drive board. 7) Replace the scanner motor. 3. If the result of step 1 is not OK; 1) Make sure the harness is properly connected. 2) Check a current through the harnesses. 3) Replace the sensor. 4) Replace the sub and/or main scanner IPU board(s). 5) Replace the main control board. [Signal Check] • Scanner HP: CN403-A1 on the sub scanner IPU board	D

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Related SP	Troubleshooting Procedure	Type
SC121	Scanner HP sensor does not turn off	- Timing & Condition - • The sensor does not turn off when the scanner moves to the home position after scanning an original. • The sensor output at CN403-A1 stays LOW (0V).	Same as SC120	SC120		Same as SC120.	D
SC130	Scanner start error	- Timing - • Scanning start • During scanner motor ON - Condition - • The scanning start signal is generated while the motor is moving. • Total number of steps calculated based on the signal from the stepping motor is out of range. • The H.P. sensor stays OFF when the scanner starts moving.	Same as SC120 or sequence error			Same as SC120 or Replace the sub and/or main scanner IPU board(s).	D
SC150	Scanner ROM mismatch	- Timing - After software installation or when the main switch is turned on - Condition - Main scanner IPU detects that the incorrect software is installed.	• An invalid IC card used (such as a different model IC card) • Main scanner IPU board was replaced.			Reinstall the correct IC card. Replace the main scanner IPU board.	D

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Related SP	Troubleshooting Procedure	Type
SC170	Video processing error 1	- Timing - When the main switch is turned on (after auto gain control at scanner IPU board) - Condition - The black level corrected between the Odd and Even (O/E) of the CCD is outside the proper range.	• Poor connection of CCD flat cable • Defective Scanner IPU board • Defective CCD			1. Make sure the flat cable is firmly connected at CN501 and CN404 on the CCD board and main scanner IPU board. 2. Test the current through the flat cable. 3. Replace main scanner IPU board. 4. Replace CCD board as the lens unit assembly.	D
SC171	Video processing error 2	- Timing - When the main switch is turned on (after auto gain control at scanner IPU board) - Condition - The black level corrected is outside the proper range.	Same as SC170			Same as SC170.	D
SC172	Video processing error 3	- Timing - When the main switch is turned on (after auto gain control at scanner IPU board) - Condition - The white level corrected is outside the proper range.	• Poor connection of CCD harness • Dirty optics • Defective lamp regulator • Defective main scanner IPU board • Defective CCD			1. Check SP4-426-001 to 006 (RGB Gain). If their value is close to “255”, clean the optics section (exposure glass, white plate, mirrors, and lens). 2. Visually check that the exposure lamp turns on during warming-up after the main switch is turned on. If not, replace the lamp regulator. 3. Make sure the CCD flat cable is firmly connected at CN501 and CN404 on the CCD and scanner main IPU board. 4. Check the continuity of the flat cable. 5. Replace the main scanner IPU board. 6. Replace the CCD board and the lens unit.	D

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Related SP	Troubleshooting Procedure	Type
SC191	Bar code scan error	- Timing - When the main switch is turned on - Condition - The main scanner IPU board detects that the pattern of the bard code scanned in is not appropriate.	• Non-standard bar code label • Improper location of bar code • Dirty bar code • Defective main scanner IPU board • Defective main control board			1. Check if the bar code is damaged or scratched. 2. Clean the optics section such as mirrors and lens and bar code. 3. Check if the mirrors are properly set on the 1st and 2nd scanners. If the spring plate, which is fix the position of mirrors, is out of position, it causes the light axis to change. 4. Replace the main scanner IPU board. 5. Replace the main control board.	D
SC192	Bar code number mismatch	- Timing - When the main switch is turned on - Condition - The main control board detects that the bar code data scanned in does not match to the machine identification number stored in the RAM.	• Defective RAM board • Defective main scanner IPU board • Defective main control board			1. Check if the serial number stored in the RAM is correct. **NOTE:** Contacts your product specialist for the detailed procedure. 2. Replace the main scanner IPU board. 3. Replace the main control board.	D
SC193	IDU error	- Timing - When the main switch is turned on - Condition - The IDU runs a diagnostic at power-on. Any hardware errors are detected during the diagnostics.	• Defective IDU • Defective sub/main scanner IPU board			1. Perform the scanner IPU board test (SP4-904-001 and 002). If not OK, replace the main and/or scanner IPU board. SP4-904-001 or 002 0: OK 25 or 35: Replace sub scanner IPU board. Others: Replace main scanner IPU board. 2. Replace the IDU board.	D

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Related SP	Troubleshooting Procedure	Type
SC195	Serial number error	- Timing - When the main switch is turned on - Condition - The serial number entered or stored in RAM is not correct.	• Improper serial number • RAM board is replaced. • Defective RAM			1. Check and re-enter the serial number properly. **NOTE:** Contacts your product specialist for the detailed procedure.	D
SC301	Charge current leak	- Timing - When the main charge is ON in the printing process or process control mode - Condition - The current leak is detected for 2 seconds.	• Charge corona unit not installed properly • Poor connection of harnesses • Defective high voltage supply board (C/G/B) • Defective I/O control board • Defective main control board.			1. Reinstall the charge corona unit properly or replace the charge corona unit. 2. Reconnect the connectors on the high voltage supply board (C/G/B), I/O control board, and main control board, or check the harnesses. 3. Check and clean the charge corona unit receptacle. 4. Replace the high voltage supply board (C/G/B). 5. Replace the I/O control board. 6. Replace the main control board. [Signal Check] • Leak detection: CN217-7 or TP120 on the I/O control board	D
SC302	Charge corona grid voltage error	- Timing - When the main charge grid is ON in the printing process or process control mode - Condition - The feedback voltage is 4.8V or higher, or PMW value is 50% or higher for 500msec continuously.	Same as SC301			Same as for SC301 [Signal Check] • Feedback signal: CN217-5, TP173, or CN211-A6 on the I/O control board or CN302-A4 or TP107 on the main control board • PWM: CN217-6 or TP140 on the I/O control board	D

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Related SP	Troubleshooting Procedure	Type
SC303	Charge cleaner motor error	- Timing - When the charge cleaner starts - Condition - • Over-current is detected for 10 seconds when the cleaner pads start moving from rear to front. • Over-current is still not detected 1 minute after the cleaner motor turns on.	• Poor connection • Defective cleaner motor • Cleaner pad locked • Defective I/O control board • Defective main control board			1. Make sure the connectors (CN861 & CN829) are firmly connected. 2. Make sure the charge corona unit is properly installed. 3. Clean the screw shaft if it is dirty. 4. See if the cleaner pad is mechanically locked. 5. Make sure the connector is firmly connected on the I/O control board (CN219). 6. Replace the I/O control board. 7. Replace the main control board.	D
SC320	Polygon motor error	- Condition - • The polygon motor rotation speed stays out of the range 22 seconds after the main switch is turned on. • The polygon motor rotation speed changes while the main power switch is ON. (Polygon motor should keep rotating with constant speed while the main switch is ON.)	• Poor connection • Defective polygon motor • Defective LD control board • Defective main scanner IPU board			1. Make sure the connector (CN602-5) on the LD control board is properly connected. 2. Test the current through the harness. 3. Replace the polygon motor. 4. Replace the LD control board. 5. Replace the main scanner IPU board. [Signal Check] • Motor OK: CN602-2 on the LD control board.	D

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Related SP	Troubleshooting Procedure	Type
SC322	Laser synchronizing signal error	- Timing & Condition - While the polygon motor keeps running and LD is ON, the LD control board does not receive the laser synchronizing signal.	• Poor connection • Defective laser synchronizing detector board • Improper laser beam axis • Defective LD control board • Defective main control board • Defective optic housing unit			1. Make sure the connectors (CN3 & CN 602) are properly connected on the laser synchronizing detector board and LD control board 2. Remove and clean the synchronizing detector board. 3. Check if anything (such as the Barrel Toroidal lens label in the optic housing unit) interferes with the laser axis. 4. Replace the synchronizing detector board. 5. Make sure the harness connectors (CN1 & CN603) on the LD unit and LD control board are properly connected or check a current through the harness. 6. Make sure the connectors (CN604 & CN306) on the LD control board and main control board are properly connected or check the current through the harness. 7. Replace the LD control board. 8. Replace the main control board 9. Check the optical housing unit or replace it.	D
SC323	LD error	- Timing - During LD writing - Condition - LD control boards detects the over-current, or there is no feedback signal from LD unit.	• Poor connection • Defective LD unit • Defective LD control board • Defective main control board			1. Make sure the connectors (CN1 & CN603) on the LD unit and LD control board are properly connected. 2. Check the continuity of the harness. 3. Make sure the harness connectors (CN604 & CN306)on the LD control board and main control board are properly connected. 4. Replace the LD unit. 5. Replace the LD control board 6. Replace the main control board.	D

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Related SP	Troubleshooting Procedure	Type
SC326	FGATE1 error	- Timing & Condition - The main control board does not receive the FGATE signal from the LD control board. This can occur after the Start key is pressed (the image transfer belt makes 3 revolutions) or at certain timing points during the copy cycle. - FAGTE signal - This signal is generated at the LD control board after the board receives the belt mark signal from the main control board. This signal is used to synchronize laser writes for the different colors.	• Belt mark detection error • Electrical noise • Poor connection of connectors • Defective LD control board • Defective Main control board			1. Clean the belt mark (located back side of the image transfer belt) or replace the belt if the belt mark is dirty or has peeled off. 2. Clean the belt mark detection sensor. 3. Clean the development units' bias terminals. 4. Make sure the harness connectors (CN605 & NC406) on the LD control board and main scanner IPU board are properly connected. 5. Make sure the harness connectors (CN604 & CN306) on the LD control board and main control board are properly connected. 6. Replace the LD control board. 7. Replace the main control board. [Signal Check] • FGATE: CN604-A2 or TP22 on LD control board / CN306-A9 on main control board • Belt mark: CN220-A12, TP106, or CN212-B11 on I/O control board / CN303-B1, TP108, or CN306-B2 on main control board /CN604-B9 or TP31 on LD control board If the machine is equipped with the controller, 1. Make sure the connectors (CN606 & CN101) on the LD control board and controller I/F board are properly installed. 2. Make sure the controller I/F board is properly connected. 3. Replace the interface board.	D

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Related SP	Troubleshooting Procedure	Type
SC327	FGATE2 error	- Timing & Condition - In the double image mode, the main control board does not receive the FGATE signal from the LD control board. This can occur after the Start key is pressed (the image transfer belt makes 3 revolutions) or at certain timing points during the copy cycle.	Same as SC326	SC326		Same as SC326.	D
SC350	TD sensor communication error	- Timing - When the main switch is turned on, during printing process, or process control self-check - Condition - The main control board cannot communicate with the TD sensors	• Poor connection • Defective TD sensor interface boards 1 and/or 2 • Defective I/O control board • Defective main control board			1. Check if the connectors on the TD sensor interface board 1 (copier) and the main control board (CN353) are properly connected. 2. Make sure 5V and 12V are provided to the TD sensor interface board 1 from the main control board (CN353). 3. Check if the harnesses are damaged. 4. Make sure TD sensor interface boards 1 and 2 are properly installed. 5. Replace TD sensor interface board s1, 2, main control board, and/or the I/O control board.	D
SC351	TD Sensor Failure	- Timing - During the printing process or the process control self-check - Condition - The main control board does not receive the TD sensor output or receive wrong data 4 times continuously.	• Poor connection • Defective TD sensor • Defective TD sensor interface board 2 • Defective main control board			1. Make sure the connectors on the TD sensor interface board 2 (revolver) and the TD sensor and slip ring are properly connected. 2. Check if the harnesses is damaged. 3. Replace the TD sensor. 4. Replace the TD sensor interface board 2. 5. Replace the TD sensor interface board 1. 6. Replace the main control board.	D

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Related SP	Troubleshooting Procedure	Type
SC360	Development bias error	- Timing - When the development DC bias turns ON during printing process or process control - Condition - The feedback voltage is 4.8V or higher, or PWM value becomes 80% or higher for 500 ms continuously.	• Poor connections • Dirty terminals • Defective high voltage supply (C/G/B) • Defective I/O control board • Defective main control board			1. Clean the development roller shaft (terminal). 2. Clean the bias terminal. 3. Replace the bias terminal if it does not move smoothly. 4. Make sure the connectors of high voltage supply cable and trigger lines are properly connected on the high voltage supply board (C/G/B), I/O control board, and main control board. 5. Replace the high voltage supply board (C/G/B) 6. Replace the I/O control board. 7. Replace the main control board. [Signal Check] • Feedback signal: CN217-2, TP171, or CN211-A5 on the I/O control board / CN302-A5 or TP111 on the main control board • PWM: CN217-3 or TP141 on the I/O control board	D

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Related SP	Troubleshooting Procedure	Type
SC361	Revolver HP sensor error	- Timing & Condition - The home position is not detected during 3 revolution of the revolver unit after the revolver motor turns on.	Poor connection of connector Dirty sensor Defective sensor Defective revolver motor Defective revolver drive board Defective I/O control board Defective main control board			1. Make sure the sensors are properly connected. 2. Replace the revolver H.P. sensor if the voltage at CN216-B5 on the I/O control board does not change when covering the sensor with a piece of paper. **NOTE:** Make sure that the revolver unit is locked in this step. 3. If the revolver unit does not rotate; 1) Replace the revolver motor. 2) Replace revolver motor drive board. 3) Replace the I/O control board. 4) Replace the main control board. [Signal Check] • Revolver H.P.: CN216-B5 or TP107 on the I/O control board	D
SC370	Abnormal TD sensor information (K)	- Timing - When communicating with TD sensors, during printing process, or process control self-check - Condition - TD sensor output exceeds 4.5V or drops below 0.5V.	• Poor connection • Dirty sensor surface • Defective TD sensor • Toner density is out of range • Not enough developer		3-007-001	1. Make sure the TD sensor is properly connected. 2. Check if the connectors on the TD sensor interface board 1 and the slip ring and the TD sensor interface board 2 are properly connected. 3. Clean the surface of the TD sensor. 4. Replace the TD sensor. If it becomes OK after the sensor is replaced, replace the developer of color related to the problem. If the problem is related to the toner density (too low or high), find the cause and fix it.	D
SC371	Abnormal TD sensor information (Y)	Same as SC370			3-007-004	Same as SC370	
SC372	Abnormal TD sensor information (C)	Same as SC370			3-007-002	Same as SC370	
SC373	Abnormal TD sensor information (M)	Same as SC370			3-007-003	Same as SC370	

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Related SP	Troubleshooting Procedure	Type
SC385	ID sensor V_{SG} adjustment error	- Timing - During process control self check, the main control board detects an out-of-range V_{SG} signal from the ID sensor.	• Dirty ID sensor • Poor connection • Defective ID sensor • Poor cleaning of the OPC drum			1. Clean the ID sensor. 2. Make sure the sensor is properly connected. 3. Replace the ID sensor. 4. Check the drum cleaning unit. [Signal Check] • ID sensor LED: CN216-B7 or TP103 on I/O control board • ID sensor 1 (K): CN216-B8 or TP188 on I/O control board / TP115 on main control board. • ID sensor 2 (CMY): CN216-B9 or TP187 on the I/O control board / TP114 on the main control board.	D
SC387	Drum potential error	- Timing - During initial process control check or interval (number of copies) process control check - Condition - While the revolver unit returns to the home position, the following condition is detected. $V_D < V_G - 200V$ $V_D > V_G + 200V$	• Uneven charge • Deterioration of the drum • Defective potential sensor			1. Clean the charge unit or replace the charge wire and grid plate. 2. Reinstall the drum unit. 3. Check the drum counter (SP7-803) and replace the drum if necessary. 4. Replace the potential sensor.	D

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Related SP	Troubleshooting Procedure	Type
SC400	Image transfer belt bias error	- Timing - While the image transfer belt bias is ON - Condition - The feedback voltage is 4.8V or higher, or PWM value is 50% or higher for 500ms continuously.	• Poor connections • Defective high voltage supply board (T1/PCC/BR) • Defective I/O control board • Defective main control board			1. Make sure the high voltage cable and trigger lines are properly connected to the high voltage supply board, I/O control board, and main control board. 2. Replace the high voltage supply board (T1/PCC/BR). 3. Replace the I/O control board. 4. Replace the main control board. [Signal Check] • Feedback signal: CN209-9, TP264, or CN211-A4 on I/O control board / CN302-A6 or TP106 on main control board. • PWM: CN209-10 or TP272 on the I/O control board.	D
SC401	Locked image transfer belt motor	- Timing & Condition - • The feedback signal from the motor is still out of range 2 seconds after the trigger signal was sent. • The feedback signal goes out of range for 2 seconds while the trigger signal is ON.	• Defective image transfer belt motor • Defective image transfer belt motor drive board • Mechanical problem (drive transmission)			1. Make sure the connectors on the image transfer belt drive board (CN740 and 741) and I/O control board (CN220) are properly connected. 2. Check if the harnesses are damaged. 3. Replace the image transfer belt motor control board. 4. Replace image transfer belt motor. 5. See if anything has caused the belt motor's load to increase. [Signal Check] • Motor OK: CN220-A2 or TP153 on the I/O control board	D

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Related SP	Troubleshooting Procedure	Type
SC402	Current leak from the image transfer belt lubricant brush	- Timing & Condition - A current leak is detected more than 2 seconds.	• Defective high voltage supply board (Q1) • Defective I/O control board • Defective main control board			1. Make sure the terminal and high voltage supply board (Q1) are properly connected and that the harnesses are not damaged. 2. Clean the contacts. 3. Replace the high voltage supply board (Q1). 4. Replace the I/O control board. 5. Replace the main control board. [Signal Check] • Leak detection: CN215-B7 or TP137 on the I/O control board	D
SC410	Paper separation current leak	- Timing & Condition - When a current leak is detected for 2 seconds and the leak detection started 1 second after the paper separation corona turned on. This leak signal is monitored twice a second. If it is detected twice in a row, this SC is displayed.	• Discharge unit not properly installed • Broken corona wire • Defective high voltage supply board (D) • Defective I/O control board • Defective main control board			1. Make sure the discharge corona unit is properly installed. 2. If the discharge corona wire is broken, replace it. 3. Make sure the terminal and high voltage supply board (D) are properly connected and that the harnesses are not damaged. 4. Clean the contacts. 5. Replace the high voltage supply board (D). 6. Replace the I/O control board. 7. Replace the main control board. [Signal Check] • Leak detection: CN208-1 or TP276 on the I/O control board	D

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Related SP	Troubleshooting Procedure	Type
SC422	PCC leak	- Timing & Condition - When the current leak is detected for 2 seconds, and the leak detection started 1 second after the PCC turned on. This leak signal is monitored twice a second. If it is detected twice in a row, this SC is displayed.	• PCC unit not properly installed • Broken corona wire • Defective high voltage supply board (T1/PCC/BR) • Defective I/O control board • Defective main control board			1. Make sure the PCC unit is properly installed. 2. If the discharge corona wire is broken, replace it. 3. Make sure the terminal and high voltage supply board (T1/PCC/BR) are properly connected and that the harnesses are not damaged. 4. Clean the contacts. 5. Replace the high voltage supply board (T1/PCC/BR). 6. Replace the I/O control board. 7. Replace the main control board. [Signal Check] • Leak detection: CN209-6 or TP275 on the I/O control board	D
SC440	Drum motor error	- Timing & Condition - • The feedback signal from the motor is still out of range 1 second after the trigger signal was sent. • The feedback signal goes out of range for 2 seconds while the trigger signal is ON.	• Poor connection • Defective drum motor • Defective I/O control board • Defective main control board			1. See if the drum is locked in place by the cleaning blade. If it is, replace the cleaning blade. 2. Make sure that connector CN215 on the I/O control board is properly connected. 3. See if the drum motor works properly in SP5-804-001 to 003. If not, replace the drum motor. 4. Replace the I/O control board. 5. Replace the main control board. [Signal Check] • Motor OK: CN215-A7 or TP135 on the I/O control board	D

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Related SP	Troubleshooting Procedure	Type
SC441	Locked drum peripheral component motor	- Timing & Condition - • The feedback signal from the motor is still out of range 1 second after the trigger signal was sent. • The feedback signal goes out of range for 2 seconds while the trigger signal is ON.	• Defective motor • Defective motor dive board • Mechanical problem (drive transmission problem)			1. Make sure that connector CN220 on the I/O control board is properly connected. 2. Check for any mechanical problem by rotating the motor manually. 3. Replace the drum peripheral component motor. 4. Replace the I/O control board. 5. Replace the main control board. [Signal Check] • Motor OK: CN220-B9 or TP123 on the I/O control board	D
SC450	Paper transfer bias current error	- Timing - When the paper transfer bias turns on during printing process - Condition - The feedback voltage is 4.8V or higher, or the PWM value is 50% or higher for 500ms continuously.	• Defective high voltage supply board (T2) • Defective I/O control board • Defective main control board • If the paper transfer belt does not touch the image transfer belt and the paper transfer belt bias is ON			1. Make sure the paper transfer belt unit rises to touch the image transfer belt during the copy cycle. 2. Make sure the high voltage cable and trigger lines are properly connected to the high voltage supply board (T2), I/O control board, and main control board. 3. Replace the high voltage supply board (T2). 4. Replace the I/O control board. 5. Replace the main control board. [Signal Check] • Feedback signal: CN221-A1, TP172, or CN211-A3 on I/O control board / CN302-A7 or TP105 on the main control board • PWM: CN221-A2 or TP138 on the I/O control board	D

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Related SP	Troubleshooting Procedure	Type
SC452	Belt mark detection error	- Timing & Condition- The main control board does not receive the belt mark detection signal from the belt mark detection sensor.	• Dirty or damaged belt mark • Belt mark out of position • Defective sensor • Defective I/O control board • Defective main control board			1. Make sure the image transfer release lever is properly set. 2. Clean the belt mark. 3. Replace the transfer belt if the belt mark peels off or is damaged. 4. Clean the belt mark sensor. 5. Replace the belt mark detection sensor. 6. Replace the I/O control board. 7. Replace the main control board. [Signal Check] • Belt mark: CN220-A12, TP106, or CN212-B11 on the I/O control board / CN303-B1 or TP108 on the main control board.	D
SC457	Position error for the image transfer belt's cleaning unit	- Timing & Condition • When the belt cleaning section touches the image transfer belt, but the belt cleaning sensor signal remains LOW. • When the belt cleaning section releases from the image transfer belt, but the belt cleaning sensor remains HIGH.	• Dirty Sensor • Defective sensor • Defective belt cleaning shift clutch • Defective drum peripheral component motor • Defective I/O control board • Defective main control board			1. Pull out and re-insert the image transfer belt unit. 2. Clean the image transfer belt cleaning H.P. sensor. 3. Replace the sensor. (Input Check: 5-803-012) 4. Replace the belt cleaning shift clutch. (Output Check: SP5-804-036) 5. Replace the drum peripheral component motor. 6. Replace the I/O control board. 7. Replace the main control board. [Signal Check] • H.P.: CN219-B2 or TP108 on the I/O control board	D

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Related SP	Troubleshooting Procedure	Type
SC458	PTR pressure mechanism H.P. detection error	• When the PTR pressure mechanism does not stop its H.P. after 15 seconds from the PTR lift motor starts to return to its H.P. • H.P. detection sensor does not on within 7 seconds after the PTR pressure movement starts. • H.P. detection sensor does not off within 7 seconds after the PTR pressure release starts.	• Defective PTR lift motor • Defective H.P. sensor • Dirty H.P. sensor • Defective H.P. sensor feeler • Defective main control board			1. Make sure that sensor harness is properly connected. 2. Clean the sensor, replace it if necessary. 3. If the sensor feeler is broken, replace it. 4. Replace the PTR lift motor. 5. Replace main control board.	D
SC495	Humidity sensor - temperature detection error	- Timing & Condition - The humidity sensor's temperature output is higher than 2.75V or less than 0.25V.	• Poor connections • Defective humidity sensor • Defective I/O control board • Defective main control board			1. Make sure that connectors CN210, 211 & CN302 are properly connected to the I/O control board and the main control board. 2. Replace the humidity sensor. 3. Replace the I/O control board. 4. Replace the main control board. [Signal Check] • Temperature: CN210-1, TP247, or CN211-A9 on the I/O control board/CN302-A1 or TP112 on the main control board	C
SC496	Humidity sensor - humidity detection error	- Timing & Condition - The humidity sensor's humidity output is higher than 2V or less than 0.125V.	• Poor connections • Defective humidity sensor • Defective I/O control board • Defective main control board			1. Make sure that connectors CN210, 211 & CN302 are properly connected to the I/O control board and the main control board. 2. Replace the humidity sensor. 3. Replace the I/O control board. 4. Replace the main control board. [Signal Check] • Humidity: CN201-4, TP236, or CN211-A8 on the I/O control board/CN302-A2 or TP113 on the main control board	C

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Related SP	Troubleshooting Procedure	Type
SC500	Fusing motor error	- Timing & Condition - • The feedback signal from the motor is still out of range 1 second after the trigger signal was sent. • The feedback signal goes out of range for 2 seconds while the trigger signal is ON.	• Poor connections • Defective fusing motor • Defective I/O control board • Defective main control board			1. Make sure that connector CN218 is properly connected to the I/O control board. 2. Replace the fusing motor. (Output check: SP 5-804-005) 3. Replace the I/O control board. 4. Replace the main control board. 5. Check for anything that might overload the fusing unit drive. [Signal Check] • Motor OK: CN218-7 or TP104 on the I/O control board	D
SC501	1st paper tray error	- Timing & Condition - • The upper limit sensor stays HIGH when the pick-up solenoid turns off. • The upper limit sensor stays LOW 1.5 seconds after the tray bottom plate begins to lower. • The upper limit sensor stays HIGH 10 seconds after the tray bottom plate starts to rise. • The upper limit sensor stays HIGH 3 seconds after the tray bottom plate starts to rise again.	• Pick-up solenoid spring has come off • Defective upper limit sensor • Defective tray bottom plate • Defective tray lift motor • Defective I/O control board • Defective main control board	SC502 SC503	SC504	1. See if the spring of pick-up solenoid has come off. 2. Make sure the sensor harness is properly connected. 3. Clean the sensor, replace it if necessary (Input Check: SP5-803-014 to 017). 4. If the tray bottom lever is broken, replace it. 5. Pull out the paper tray and make sure the tray lift motor works properly (Output Check: SP5-804-75 to 82) 6. Replace the I/O control board. 7. Replace the main control board. [Signal Check] • Limit sensor H.P.: CN224-A8 or TP215 on the I/O control board	B
SC502	2nd paper tray error	Not used				Not used	B
SC503	3rd paper tray error	Same as SC501		SC501 SC502	SC504	Same as SC501 [Signal Check] • Limit sensor H.P.: CN226-A8 or TP282 on the I/O control board	B

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Related SP	Troubleshooting Procedure	Type
SC504	4th paper tray error	Same as SC501		SC501 SC502	SC503	Same as SC501 [Signal Check] • Limit sensor H.P.: CN226-B8 or TP280 on the I/O control board	B
SC505	LCT: Upper limit detection error	- Timing & Condition - While the paper tray is being lifted, the upper limit sensor does not activate within 2.5 seconds after the paper end sensor activates.	• Poor connections • Defective paper end sensor • Paper is not properly loaded in the LCT • Paper is curled			1. Open the LCT cover and reload the paper properly. 2. Make sure the paper end sensor is properly connected. 3. Replace the paper end sensor.	B
SC506	By-pass feed table upper limit detection error	• When the by-pass feed table upper limit is not detected after 6.5 seconds or more from the by-pass feed table lift motor starts lift up.	• Defective by-pass table upper limit sensor • Dirty by-pass table upper limit sensor • Defective by-pass lift motor • Defective I/O control board			1. Make sure that sensor harness is properly connected. 2. Clean sensor, replace it if neccesary. 3. Replace by-pass lift motor. 4. Replace I/O control board.	D
SC507	By-pass feed table lower limit detection error	• When the by-pass feed table lower limit is not detected after 6.5 seconds or more from the by-pass feed table lift motor starts lift down.	• Defective by-pass table lower limit sensor • Dirty by-pass table lower limit sensor • Defective by-pass lift motor • Defective I/O control board			1. Make sure that sensor harness is properly connected. 2. Clean sensor, replace it if necessary. 3. Replace by-pass lift motor. 4. Replace I/O control board.	D

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Related SP	Troubleshooting Procedure	Type
SC510	Paper feed motor error	- Timing & Condition - • The feedback signal from the motor is still out of range 1 second after the trigger signal was sent. • The feedback signal goes out of range for 2 seconds while the trigger signal is ON.	• Poor connections • Defective paper feed motor • Defective I/O control board • Defective main control board • Mechanical overload			1. Make sure it is properly connected to the I/O control board (CN230). 2. Replace the paper feed motor. (Output check: SP5-804-008 to 009) 3. Replace the I/O control board. 4. Replace the main control board. 5. Check the feed unit drive section for anything that might cause an overload. [Signal Check] • Motor OK: CN230-A1 or TP269 on the I/O control board	D
SC522	Duplex side fence jogger--H.P. error	- Timing & Condition - • The home position is still detected a few seconds after the side fence leaves the home position. • The home position is not detected 12 seconds after the side fence moves back into the home position.	• Duplex unit not installed properly • Excessive load • Poor connections • Defective side fence motor • Defective I/O control board	SC524		1. Pull out and re-insert the duplex unit. 2. Check that connector CN488 is properly connected to the duplex control board. 3. Check for anything that might cause the motor to overload. 4. Replace the side fence motor (Output Check: SP5-804 093 and 094). 5. Replace the I/O control board. [Signal Check] • Duplex Side Fence H.P.: CN207-B6 or TP293 on the I/O control board	B
SC524	Duplex end fence jogger--H.P. error	- Timing & Condition - • The home position is still detected a few seconds after the end fence leaves the home position. • The home position is not detected 24 seconds after the end fence moves back into the home position.	• Duplex unit not installed properly • Excessive load • Poor connections • Defective end fence motor • Defective I/O control board	SC522		1. Pull out and re-insert the duplex unit. 2. Check that connector CN484 is properly connected to the duplex control board. 3. Check for anything that might cause the motor to overload. 4. Replace the end fence motor (Output Check: SP5-804 095 and 096). 5. Replace the I/O control board. [Signal Check] • Duplex End Fence H.P.: CN207-B7 or TP288 on the I/O control board	B

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Related SP	Troubleshooting Procedure	Type
SC541	Hot roller thermistor open	- Timing - Checked second when the fusing unit is installed - Condition - The hot roller thermistor output is approximately 5V (0°C) for 6 seconds in a row.	• Fusing unit not installed properly • Poor connections • Defective thermistor • Defective I/O control board • Defective main control board			1. Make sure the fusing unit is properly installed. 2. Make sure the thermistor is properly connected. 3. Replace the thermistor if it is deformed. 4. Measure the thermistor's resistance. If it is open, replace it. (Refer to the attached Temperature/ Resistance Conversion Reference Table.) 5. Replace the I/O control board. 6. Replace the main control board. [Signal Check] • Thermistor: CN214-A4, TP234, or CN211-B1 on I/O control board/CN302-B9 or TP117 on the main control board.	A
SC542	Hot roller warm-up error	- Timing & Condition - The hot roller thermistor does not register the ready temperature within 12 minutes of the main switch being turned on.	• Poor connections • Blown hot roller fusing lamp • Opened hot roller thermofuse • Power fluctuations • Defective main control board • Defective I/O control board • Defective AC drive board			1. Make sure the following are properly connected: • Hot roller fusing lamp • CN303 on the main control board • CN212 and CN229 on the I/O control board • CN7 on the AC drive board 2. Replace the hot roller fusing lamp if it is blown. 3. Replace the hot roller thermofuse if it is opened. 4. Check for power fluctuations from the outlet. 5. Test the main control board, I/O control board, or AC drive board by checking the trigger signal at each pin. [Signal Check] • Hot roller fusing trigger: CN303-B6 on main control board/CN212-B6, TP248, or CN229-5 on the I/O control board/CN7-6 on the AC drive board.	A

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Related SP	Troubleshooting Procedure	Type
SC543	Overheating hot roller fusing lamp	- Timing - Checked once a second when the fusing lamp is installed. - Condition - The hot roller thermistor output is lower than 0.3V (220°C) for 3 seconds in a row.	• Fusing unit not installed properly • Poor connections • Defective thermistor • Defective I/O control board • Defective main control board • Defective AC drive board			1. Make sure the fusing unit is installed properly. 2. Make sure the thermistor is properly connected. 3. Replace the thermistor if it is deformed. 4. Measure the thermistor's resistance. If it is open, replace it. (Refer to the attached Temperature/ Resistance Conversion Reference Table.) 5. Test the main control board, I/O control board, or AC drive board by checking output from the thermistor and the trigger signal at each pin. [Signal Check] • Thermistor: CN214-A4, TP234, or CN211-B1 on the I/O control board/CN302-B9 or TP117 on the main control board. • Hot roller fusing trigger: CN303-B6 on the main control board/CN212-B6, TP248, or CN229-5 on the I/O control board/CN7-6 on the AC drive board.	A
SC544	Hot roller fusing lamp–low temperature reading	- Timing - Checked every second after warm-up is complete. - Condition - The hot roller thermistor output is higher than 3V (87°C) for 8 seconds in a row.	Same as SC543			Same as SC543	A

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Related SP	Troubleshooting Procedure	Type
SC545	Abnormal hot roller ready temperature	- Timing - Checked every second after the ready temperature is reached. - Condition - If the temperature drops below the ready temperature and does not rise again within 7 minutes.	Same as SC543			Same as SC543	A
SC547	Hot roller temperature does not increase	- Timing - Checked every second, starting two minutes after the main switch is turned on and ending when the hot roller reaches the ready temperature. - Condition - Over one minute, the fusing roller temperature does not increase by more than 3°C.	Poor connections • Blown hot roller fusing lamp • Opened hot roller thermofuse • Defective main control board • Defective I/O control board • Defective AC drive board			1. Make sure the following are connected properly: • Hot roller fusing lamp • CN303 on the main control board • CN212 and CN229 on the I/O control board • CN7 on the AC drive board 2. Replace the hot roller fusing lamp if it is blown. 3. Replace the hot roller thermofuse if it is opened. 4. Test the main control board, I/O control board, or AC drive board by checking the trigger signal at each pin. [Signal Check] • Hot roller fusing trigger: CN303-B6 on the main control board/CN212-B6, TP248, or CN229-5 on the I/O control board/CN7-6 on the AC drive board.	A

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Related SP	Troubleshooting Procedure	Type
SC551	Pressure roller thermistor open	- Timing - Checked every second when the fusing unit is installed. - Condition - The pressure roller thermistor output is approximately 5V (0°C) for 6 seconds in a row.	• Fusing unit not installed properly • Poor connections • Defective thermistor • Defective I/O control board • Defective main control board			1. Make sure the fusing unit is properly installed. 2. Make sure the thermistor is properly connected. 3. Replace the thermistor if it is deformed. 4. Measure the thermistor's resistance. If it is open, replace it. (Refer to the attached Temperature/Resistance Conversion Reference Table.) 5. Replace the I/O control board. 6. Replace the main control board. [Signal Check] • Thermistor: CN214-A9, TP232, or CN211-B2 on the I/O control board/CN302-B8 or TP118 on the main control board.	A
SC552	Pressure roller warm-up error	- Timing & Condition - The pressure roller thermistor does not register the ready temperature within 12 minutes of turning on the main switch.	• Poor connections • Blown pressure roller fusing lamp • Pressure roller thermofuse opened • Blown fuse • Power fluctuation • Defective main control board • Defective I/O control board • Defective AC drive board			1. Make sure the following are connected properly: • Pressure roller fusing lamp • CN303 on the main control board • CN212 and CN229 on the I/O control board • CN7 on the AC drive board 2. Replace the hot roller fusing lamp if it is blown. 3. Replace the hot roller thermofuse if it is opened. 4. Check for power fluctuations from the outlet. 5. Test the main control board, I/O control board, or AC drive board by checking the trigger signal at each pin. [Signal Check] • Pressure roller fusing trigger: CN303-B7 on the main control board/CN212-B5, TP240, or CN229-4 on the I/O control board/CN7-7 on the AC drive board.	A

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Related SP	Troubleshooting Procedure	Type
SC553	Overheating pressure roller	- Timing - Checked every second when the fusing unit is installed. - Condition - The pressure roller thermistor output is lower than 0.3V (220°C) for 3 seconds in a row.	• Fusing unit not installed properly • Poor connections • Defective thermistor • Defective I/O control board • Defective main control board • Defective AC drive board			1. Make sure the fusing unit is properly installed. 2. Make sure the thermistor is properly connected. 3. Replace the thermistor if it is deformed. 4. Measure the resistance across the thermistor. If it is open, replace it. (Refer to the attached Temperature/Resistance Conversion Reference Table.) 5. Test the main control board, I/O control board, or AC drive board by checking the output from the thermistor and the trigger signal at each pin. [Signal Check] • Thermistor: CN214-A9, TP232, or CN211-B2 on the I/O control board/CN302-B8 or TP118 on the main control board. • Pressure roller fusing trigger: CN303-B7 on the main control board/CN212-B5, TP240, or CN229-4 on the I/O control board/CN7-7 on the AC drive board.	A
SC554	Pressure roller–low temperature readings	- Timing - Checked every second after the warm-up is completed - Condition - The pressure roller thermistor output is higher than 3V (87°C) for 8 seconds in a row.	Same as SC553			Same as SC553	A

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Related SP	Troubleshooting Procedure	Type
SC555	Abnormal pressure roller ready temperature	- Timing - Checked every second after the temperature reaches the ready condition - Condition - The pressure roller thermistor output does not reach the ready temperature within 7 minutes.	Same as SC553			Same as SC553	A
SC557	Pressure roller temperature does not increase	- Timing - Checked every second, starting two minutes after the main switch is turned on and ending when the ready temperature is reached. - Condition - For one minute, the pressure roller temperature does not increase by more than 3°C .	• Poor connections • Blown pressure roller fusing lamp • Opened pressure roller thermofuse • Defective main control board • Defective I/O control board • Defective AC drive board			1. Make sure the following are connected properly: 2. Pressure roller fusing lamp 3. CN303 on the main control board 4. CN212 and CN229 on the I/O control board 5. CN7 on the AC drive board 6. Replace the pressure roller fusing lamp if it is blown. 7. Replace the hot roller thermofuse if it is opened. 8. Test the main control board, I/O control board, or AC drive board by checking the trigger signal at each pin. [Signal Check] • Pressure roller fusing trigger: CN303-B7 on the main control board/CN212-B5, TP240, or CNCN229-4 on the I/O control board/ CN7-7 on the AC drive board.	A

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Related SP	Troubleshooting Procedure	Type
SC558	Abnormal zero cross signal	- Timing & Condition - Zero cross signals generated within certain period do not reach a predetermined target value.	• Poor connections • Blown fuse • Defective AC drive board • Defective main control board • Defective I/O control board			1. Make sure the following are connected properly: • CN212 and CN229 on the I/O control board • CN303 on the main control board • CN7 on the AC drive board 2. Check the current through the signal lines in the above harnesses. 3. Replace the fuse (FU101) if it is blown. 4. Test the AC drive board, I/O control board, or main control board by checking the signal line at each pin. [Signal Check] • Zero cross: CN7-5 on the AC drive board/ CN229-6, TP216, or CN212-B8 on the I/O control board/CN303-B4 or TP120 on the main control board	A
SC601	Scanner IPU communication error	- Timing & Condition - After the main control board communicates successfully with the scanner IPU board once, and a communication error is detected.	• Poor connections • Defective sub/main scanner IPU board • Defective main control board			1. Check that connectors CN355 and CN407 are properly connected on the sub control board and scanner IPU board. 2. Replace the sub and/or main scanner IPU board. 3. Replace the main control board.	D
SC604	IDU communication error	- Timing & Condition - No response is received from the IDU within 200 ms after the scanner IP board sends a command signal. (this must occur three times before the error is displayed).	• Poor connection between the IDU and scanner control boards • Defective IDU board • Defective sub/main scanner IPU board			1. Make sure the IDU board is properly connected to the sub scanner IPU board. 2. Replace the IDU board. 3. Replace the scanner sub and/or main IPU board.	D

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Related SP	Troubleshooting Procedure	Type
SC620	ADF communication error	- Timing & Condition - After the main control board communicates successfully with the ARDF once, and a communication error is detected.	• Poor connection or damaged optical-fiber cable • Defective ARDF main board • Defective main control board			1. Make sure the optical-fiber cable is properly connected to the ADF main board and the main control board. 2. Check for damage to the cable. 3. Replace the ARDF main board. 4. Replace the main control board.	D
SC621	Sorter communication error	- Timing - When the main switch is turned on or while Sorter is running - Condition - The main control board detects a communication error with the Sorter main board.	• Poor connection or damaged optical-fiber cable • Defective Sorter main board • Defective main control board			1. Make sure the optical-fiber cable is properly connected to the Sorter main board and main control board. 2. Check for damage to the cable. 3. Replace the sorter main board. 4. Replace the main control board.	D
SC626	LCT communication error	- Timing - When the main switch is turned on or while LCT is running - Condition - The main control board detects a communication error with the LCT main board.	• Poor connection or damaged harness • Defective I/F board RDS/LCT • Defective LCT main board • Defective main control board			1. Make sure the harness is properly connected to the main control board, I/F board RDS/LCT, and the LCT main board. 2. Check for damage to the harness. 3. Replace the I/F board RDS/LCT. 4. Replace the LCT main board. 5. Replace the main control board.	B
SC630	RDS communication error	- Timing & Condition - The main control board receives no response from RDS when accessing it. Even when this error is detected, the copier does not show the SC code and this SC code is not logged. (the copier is still functional)	• Poor connections. • Damaged harness or optical-fiber cable. • Defective line adapter • Defective I/F board RDS/LCT • Defective main control board			1. Make sure the harness and optical-fiber cable are connected properly to the I/F board RDS/LCT and the main control board. 2. Check for damage to the harness or optical-fiber cable. 3. Check and/or change the line adapter settings. 4. Replace the line adapter. 5. Replace the I/F board RDS/LCT. 6. Replace the scanner IPU board.	

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Related SP	Troubleshooting Procedure	Type
SC690	Application selection error	- Timing & Condition - When the main CPU communicates with CPUs on other PCBs, but the main CPU does not receive response from the others.	• Scanner IPU firmware upgrade • Poor connections • Defective main scanner IPU board • Defective main control board • Defective TD sensor I/F board 1 • Main board options			• This SC code will be displayed when the scanner IPU firmware is changed. Turn off the main switch and disconnect the IC card. Then turn on the main switch. 1. Check the connectors on the main control board, sub scanner IPU board, TD sensor I/F board 1, and the main board for each option. 2. Replace the defective board(s).	B
SC720	Sorter: Main motor error	- Timing & Condition - • The pulse signal output does not change 300 ms after the sorter is turned on. • The pulse signal output does not change 100 ms during operation.	• Poor connections • Defective main motor			• Check the connection. • Replace the main motor, if necessary.	D
SC721	Sorter: Bin motor error	- Timing & Condition - The signal from the wheel sensor does not change as expected. When this error is detected twice, this SC code is displayed.	• Poor connections • Defective sensor • Defective motor • Bin position error • Defective main board			1. Make sure the wheel H.P. sensor and bin motor are properly connected. 2. Replace the wheel sensor (Input check: SP5-803-124/125). 3. See if the bins are properly positioned. 4. Replace the bin motor (Output check: SP5-804-124). 5. Replace the main board.	D
SC722	Sorter: Jogger motor error	- Timing & Condition - The jogger H.P. sensor does not activate as expected. When this error is detected twice, this SC code is displayed.	• Poor connections • Defective jogger H.P. sensor • Defective jogger motor • Defective main board			1. Make sure the jogger H.P. sensor and jogger motor are properly connected. 2. Replace the jogger H.P. sensor. (Input check: SP5-803-128) 3. Replace the jogger motor. (Output check: SP5-804-131) 4. Replace the main board.	D

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Related SP	Troubleshooting Procedure	Type
SC724	Sorter: Grip motor error	- Timing & Condition - The grip H.P. sensor does not activate as expected. When this error is detected twice, this SC code is displayed.	• Poor connections. • Defective grip H.P. sensor/grip unit H.P. sensor • Defective grip motor • Defective main board			1. Make sure the grip H.P. sensor, grip unit H.P. sensor, and grip motor are properly connected. 2. Replace the sensor(s). (Input check: SP5-803-129/137) 3. Replace the grip motor. (Output check: SP5-804-127) 4. Replace the main board.	D
SC725	Sorter: Stapler motor error	- Timing & Condition - The stapler H.P. sensor does not activate as expected. When this error is detected twice, this SC code is displayed.	• Staple jam • Excessive sheets of paper stapled • Poor connections • Defective stapler H.P. sensor • Defective staple motor • Defective main board			1. Remove any staple jams. 2. Instruct the user on how many sheets may be stapled safely. 3. Make sure the staple H.P. sensor and staple unit motor are properly connected. 4. Replace the stapler H.P. sensor. (Input check: SP5-803-131) 5. Replace the stapler motor. (Output check: SP5-804-129) 6. Replace the main board.	D
SC726	Sorter: End release motor error	- Timing & Condition - The bin end open or close sensor does not activate as expected. When this error detected twice, this SC code is displayed.	• Poor connections. • Defective bin end open or close sensor • Defective end release motor • Defective main board			1. Make sure the bin end open and close sensors and end release motor are properly connected. 2. Replace the bin end open or close sensor. (Input check: SP5-803-126/127) 3. Replace the end release motor. (Output check: SP5-804-125) 4. Replace the main board.	D
SC727	Grip shift motor error	- Timing & Condition - The grip H.P. sensor does not activate as expected. When this error is detected twice, this SC code is displayed.	• Poor connections. • Defective grip H.P. sensor • Defective grip shift motor • Defective main board			1. Make sure the grip H.P. sensor and grip shift motor are properly connected. 2. Replace the grip H.P. sensor. (Input check: SP5-803-129) 3. Replace the grip shift motor. (Output check: SP5-804-126) 4. Replace the main board.	D

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Related SP	Troubleshooting Procedure	Type
SC731	Sorter: Staple unit motor error	- Timing & Condition - The staple unit H.P. sensor does not activate as expected. When this error is detected twice, this SC code is displayed.	• Poor connections. • Defective staple unit H.P. sensor • Defective grip shift motor • Defective main board			1. Make sure the staple unit H.P. sensor and staple unit motor are properly connected. 2. Replace the staple unit motor H.P. sensor. (Input check: SP5-803-130) 3. Replace the staple unit motor. (Output check: SP5-804-128) 4. Replace the main board.	D
SC741	LCT: Main motor error	- Timing & Condition - LCT main motor speed is out of range for more than 0.5 seconds a rotation.	• Poor connections • Defective LCT main motor • Defective LCT main board			1. Make sure it is properly connected. 2. Replace the LCT main motor.	D
SC742	LCT: Tray lift error	- Timing & Condition - • The upper limit sensor does not activate within 18 seconds of the lift motor being turned on (in UP direction), when the main switch is turned on, or when the LCT cover is closed. • The lower limit sensor does not activate within 18 seconds of the lift motor being turned on (in DOWN direction), when paper runs out (paper end), or when the Down key is pressed.	• Poor connections • Defective lift motor • Defective upper limit sensor • Defective pick-up solenoid • Defective LCT main board			1. Make sure the lift motor, upper limit sensor, and pick-up solenoid are properly connected. 2. Replace the lift motor. 3. Replace the upper limit sensor. 4. Replace the pick-up solenoid. 5. Replace the LCT main board.	D
SC901	Upper total counter error (Black)	- Timing & Condition - • Feedback signal stays LOW when the main switch is turned on. • Feedback signal stays LOW just before the trigger signal goes ON. • Feedback signal stays HIGH just before the trigger signal goes OFF.	• Poor connections • Defective counter			1. Make sure the counter is connected properly. 2. Replace the total counter. [Signal Check] • Trigger line: CN230-B8 on the I/O control board • Counter OK signal: TP227 on the I/O control Board	D

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Related SP	Troubleshooting Procedure	Type
SC902	Lower total counter error (Color)	Same as SC901				Same as SC901 [Signal Check] • Trigger line: CN230-B10 on the I/O control board • Counter OK signal: TP228 on the I/O control board	D

Temperature/Resistance Conversion Reference Table

Relationship between the fusing thermistor resistances and temperatures

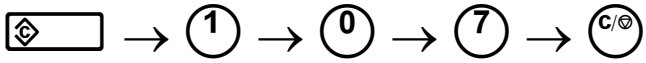
Temperature	Lower-limit Value	Standard Value	Upper-limit Value
0	211.7	329.3	398.9
10	166.8	198.9	236.9
20	105.4	123.7	145.1
30	68.4	79.11	91.44
40	45.45	51.86	59.14
50	30.88	34.78	39.16
60	21.4	23.833	26.51
70	15.12	16.64	18.3
80	10.87	11.83	12.88
90	7.935	8.554	9.216
100	5.881	6.281	6.703
110	4.42	4.678	4.948
120	3.365	3.531	3.703
130	2.593	2.699	2.807
140	2.021	2.087	2.154
150	1.592	1.632	1.672
160	1.249	1.289	1.33
170	0.9849	1.0228	1.068
180	0.7912	0.8276	0.8652
190	0.6834	0.6719	0.7067
200	0.5184	0.5499	0.5818

5. SERVICE TABLES

5.1 SERVICE PROGRAM (SP) MODES

5.1.1 HOW TO ENTER AN SP MODE

Use the following procedure to enter the SP mode.



Clear Modes Press and hold down for 3 seconds

How to make copies from SP mode:

While in SP mode, you can temporarily switch to the copy mode by pressing the Interrupt key ( ). After the copy job is finished, press the interrupt key again to return to SP mode.

A service program number is composed of the 3 levels (first, second and third).

Example; 5-009-002

5 (1 digit): First level
009 (3 digits): Second level
002 (3 digits): Third level

There are three ways to access a desired SP mode.

Method 1. Enter the specific number (first, second, and third levels) of a SP mode using the numeral keys; and then, press the Enter (#) key. This will take you directly to a specific SP mode.

(Example)
Input “5009002” using the numeral keys and press the Enter (#) key.

Method 2. Browse through the SP modes. Use the Next and Prev buttons to scroll through the current level. OK to move up a level, and Back move to down.

(Example)

Select “5” by pressing the Next key; then press OK. Press the Next key until “009” is selected, then press OK again. Press the Next key once more to select “002”.

Method 3. Enter the specific number of a SP mode up to the second level, then press the Enter (#) key. Scroll through the third level using the Next or Previous keys.

(Example)
Input “5009” using the numeral keys and press the Enter (#) key. Scroll up or down and select “002”.

Pop-up Screen

Groups of related SP modes are sometimes displayed in pop-up screens. When the SP mode is selected (directly or by browsing), the pop-up screen is displayed.

In total, there are 11 different pop-up screens. Each screen allows you to adjust one or more SP modes. Not all SP modes can be accessed this way. See the following table for the complete list.

Screen	SP modes displayed	
	SP Mode No.	Function
A	1-001	Lead edge registration adjustment
	1-002	Side-to-side registration adjustment
	1-003	Paper feed timing adjustment
	4-012	Scanning blank margin adjustment
B	1-105	Hot/pressure roller temperature setting
C	2-101	Sub-scan/Main-scan blank margin adjustment
D	2-112	Main-scan magnification adjustment
	2-113	Sub-scan magnification adjustment
E	2-225	Developer initialization
	3-005	Toner density initial setting
	3-126	Forced self-check
	3-964	Developer initialization result
	3-975	Self-check result
F	2-310	PTB bias adjustment
G	4-505	ACC target level adjustment: High light area
	4-506	ACC target level adjustment: Shadow area
H	4-910	Gamma adjustment: Copy: Letter: K
	4-911	Gamma adjustment: Copy: Letter: C
	4-912	Gamma adjustment: Copy: Letter: M
	4-913	Gamma adjustment: Copy: Letter: Y
	4-914	Gamma adjustment: Copy: Letter, single color: K
	4-915	Gamma adjustment: Copy: Photo: K
	4-916	Gamma adjustment: Copy: Photo: C
	4-917	Gamma adjustment: Copy: Photo: M
	4-918	Gamma adjustment: Copy: Photo: Y
	4-919	Gamma adjustment: Printer: K
	4-920	Gamma adjustment: Printer: C
	4-921	Gamma adjustment: Printer: M
	4-922	Gamma adjustment: Printer: Y
I	4-932	Main scan dot position correction
J	5-955	Print internal pattern
K	7-202	Developer counter
	7-203	PM parts counter (Image development)
	7-207	PM parts counter (Cleaning section)
	7-210	PM parts counter (Fusing section)
	7-803	PM counter
	7-804	PM counter clear
	7-818	Developer counter clear
	7-905	PM counter print
	7-910	PM parts counter (PTB section)
	7-911	PM parts counter (Duplex unit)

See Appendix for the pop-up screen of the above SP modes.

5.1.2 SP MODE TYPES

The SP modes of this copier are divided into the following eight groups:

Screen Name	Group
Feed	Paper feed/transport/fusing
Drum	Drum unit
Process	Process control
Scanner	Scanner unit
Mode	Operating mode/system
Periphs	Peripherals
Log	Logged data
Special Mode	Others (special modes)

5.1.3 SERVICE PROGRAM MODE TABLES

NOTE: 1) In the Function/[Setting] column:
- The related pop-up screen and SP7 function (if any) are in parenthesis after the function description,
- Comments are in italics.
- The “Setting” range is in brackets and the default “Setting” value is in bold.

2) Clearing the RAM resets SP and UP values to their defaults. It does not affect the serial number and main counter value, however.

3) **DFU** Designer or Factory Use only. Do not change these values.

4) **USM** This SP is ignored unless the user selects ‘Service Mode’ in UP mode.

5) **IAJ** See “Replacement and Adjustment - Copy Image Area Adjustments” for details.

6) **RA** See “Replacement and Adjustment” for details.

SP1-XXX (Feed)

1	Mode Number/Name		Function / [Setting]	
001	Leading Edge Registration			
	1	Normal paper	Adjusts the leading edge registration by changing the timing of the registration clutch. (Screen A, SP7-903) [+7 to –7 / **0.0** / 0.1 mm/step] **IAJ** *Specification: 4 ± 1 mm* *Thick paper 1 is listed as Thk on the screen.* *Thick paper 2 is listed as Super Thk.*	
	2	OHP		
	3	Thick paper 1		
	4	Thick paper 2		
	5	Duplex		
	6	Second sheet, Half speed		
	7	Second sheet, 1/3rd speed		
002	Side-to-Side Registration			
	1	By-pass	Adjusts the side-to-side registration by changing the starting position for the laser's main scan. (Screen A, SP1-236) [+9 to –9 / **0.0** / 0.1 mm/step] **IAJ** Specification: 1.5 ± 0.5 mm. < 4 mm total	
	2	Tray 1		
	3	Tray 2		
	4	Tray 3		
	5	Tray 4		
	6	2nd side		
	7	LCT		
003	Paper Feed Timing			
	1	Normal paper, by-pass	**[5.0]**	Adjusts the amount of paper buckle by changing the timing of the relay clutch. A positive setting creates more buckling. (Screen A, SP7-903) [+9 to –9 / 0.1 mm/step] +7 to –5 for by-pass: thick paper
	2	Tray paper feed	**[5.0]**	
	3	By-pass OHP	**[3.0]**	
	4	By-pass: Thick paper 1	**[1.5]**	
	5	2nd side	**[5.0]**	
	6	By-pass: Thick paper 2	**[–3.0]**	
	7	Tray: Thick paper 1	**[1.5]**	
	8	Tray: Thick paper 2	**[–3.0]**	
010	By-pass Up Time			
			Not used. **NOTE**: This SP is displayed and data can be input. However, this function is not available.	
101	Oil End Sensor			
			Turns the oil end sensor ON or OFF. (SP9-703) [**1 = ON**, 0 = OFF]	
104	Fusing Control			
			Selects the fusing temperature control mode. [**1 = ON/OFF control**, 0 = Phase control] *Phase control should be selected only if the user has a problem with the fluorescent lamps flickering. The main switch must be turned off and on when this setting is changed.*	
105	Hot/Pressure Roller Temperature Setting (Screen B) *This SP sets the temperature of the hot and pressure rollers in various modes.*			
	1	Single side: Hot: Reload	[100 to 200 / **185** / 1°C/step] Once the copier reaches this temperature, the ready light comes on and copies can be made. The temperature continues to increase until the ready state is reached.	
	2	Single side: Hot: Idling	[100 to 200 / **195** / 1°C/step] *Idling starts at 170°C. If the temperature is higher than 50°C when the power is turned on, idling is not executed*	
	3	Single side: Hot: Normal paper: FC	[100 to 200 / **180** / 1°C/step]	
	4	Single side: Hot: Normal paper : 1C	[100 to 200 / **170** / 1°C/step]	
	5	Single side: Hot: OHP/Thick paper: FC	[100 to 200 / **180** / 1°C/step]	

1	Mode Number/Name		Function / [Setting]
105	6	Single side: Hot: OHP/Thick paper: 1C	[100 to 200 / **180** / 1°C/step]
	7	Single side: Pressure: Idling	[100 to 200 / **160** / 1°C/step]
	8	Single side: Pressure: Normal paper: FC	[100 to 200 / **155** / 1°C/step]
	9	Single side: Pressure: Normal paper: 1C	[100 to 200 / **145** / 1°C/step]
	10	Single side: Pressure: OHP/Thick paper: FC	[100 to 200 / **155** / 1°C/step]
	11	Single side: Pressure: OHP/Thick paper: 1C	
	12	2nd side: Hot: Idling	[100 to 200 / **195** / 1°C/step]
	13	2nd side: Hot: Normal paper: FC	[100 to 200 / **180** / 1°C/step]
	14	2nd side: Hot: Normal paper: 1C	[100 to 200 / **170** / 1°C/step]
	15	2nd side: Hot: OHP/Thick paper: FC	[100 to 200 / **180** / 1°C/step]
	16	2nd side: Hot: OHP/Thick paper: 1C	
	17	2nd side: Pressure: Idling	[100 to 200 / **160** / 1°C/step]
	18	2nd side: Pressure: Normal paper: FC	[100 to 200 / **155** / 1°C/step]
	19	2nd side: Pressure: Normal paper: 1C	[100 to 200 / **145** / 1°C/step]
	20	2nd side: Pressure: OHP/Thick paper: FC	[100 to 200 / **155** / 1°C/step]
	21	2nd side: Pressure: OHP/Thick paper: 1C	
106	Fusing Temperature Display		
	1	Pressure roller	Displays the temperature of the pressure roller.
	2	Hot roller	Displays the temperature of the hot roller.
108	Fusing Unit Set		Disables fusing unit set detection. Keep at 0 for normal operation. [**0 = Detect**, 1 = Do not detect] - Procedure - Turn off the main switch. Remove the fusing unit. Keep the front door open and turn on the main switch. Access the SP mode and set the data to 1. Close the front cover.
109	Fusing Nip Band Check		
			Use to check the width of the fusing nip band. **RA**
112	Fusing Temperature Correction for Environment Temperature		
	1	High temperature	**DFU [0°C]**
	2	Low temperature	**DFU [5°C]**
801	Motor Speed Adjustment		
	1	Fusing motor: Normal speed	**DFU** [–5.0% to 5.0% / **0.0%** / 0.1%/step]
	2	Paper feed motor: Normal speed	**DFU** [–5.0% to 5.0% / **0.1%** / 0.1%/step]
	3	Drum motor: Normal speed	**DFU** [–3.0% to 3.0% / **0.0%** / 0.1%/step]
	4	Fusing motor: Half speed	**DFU** [–5.0% to 5.0% / **0.2%** / 0.1%/step]
	5	Paper feed motor: Half speed	**DFU** [–5.0% to 5.0% / **–2.0%** / 0.1%/step]

1	Mode Number/Name		Function / [Setting]
801	6	Drum motor: Half speed	**DFU** [–3.0% to 3.0% / **0.2%** / 0.1%/step]
	7	Fusing motor: 1/3rd speed	**DFU** [–5.0% to 5.0% / **0.2%** / 0.1%/step]
	8	Paper feed motor: 1/3rd speed	**DFU** [–5.0% to 5.0% / **–0.2%** / 0.1%/step]
	9	Drum motor: 1/3rd speed	**DFU** [–3.0% to 3.0% / **0.2%** / 0.1%/step]
	10	Registration motor: Normal speed	**DFU** [–5.0% to 5.0% / **0.0%** / 0.1%/step]
	11	Registration motor: Half speed	**DFU** [–5.0% to 5.0% / **–0.2%** / 0.1%/step]
	12	Registration motor: 1/3rd speed	
	20	New motor/Old motor	**DFU** [0 to 1 / **0** /] 1: New motor 0: Old motor
901	Duplex Unit Side/End Fence Adjustment		
	1	Side fence	Adjusts the duplex side fence stop position. [–5.0 to 5.0 mm / **0** / 0.1 mm/step]
	2	End fence	Adjusts the duplex end fence stop position. [–5.0 to 5.0 mm / **0** / 0.1 mm/step]

SP2-XXX (Drum)

2	Mode Number		Function / [Setting]
10	MChgCrrnt		
	1	MChgCrrnt EnvLmt [g/m^3]	**DFU** [0.6 to 50.0 / **11.0** / 0.1]
	2	MChgCrrnt [μA]: EnvHigh	**DFU** [400 to 850 / **700** / 1.0]
	3	MChgCrrnt [μA]	**DFU** [400 to 850 / **560** / 1.0]
	5	MChgCrrnt [μA]: Half	**DFU** [400 to 850 / **0** / 1.0]
	6	MChgCrrnt [μA]: 1/3rd	
11	MchgFanONTime		
	1	Mchg FanONTime EnvLmt [g/m^3]	**DFU** [0.6 to 50.0 / **4.3** / 0.1]
	2	MchgFanONTime [min]	**DFU** [0.0 to 900.0 / **0.5** / 0.1]
	3	MChgFanONTime [min]: EnvLow	**DFU** [0.0 to 900.0 / **20.0** / 0.1]
101	Sub-scan/Main-scan margin adjustment		
	1	Sub-scan: Leading edge: Normal	Adjusts the margin along the front edge. (Screen C, SP9-703) [–4.0 to 4.0 mm / **0** / 0.1 mm/step]
	2	Sub-scan: Leading edge: Thick 1	
	3	Sub-scan: Leading edge: Thick 2	
	4	Sub-scan: Leading edge: OHP	
	5	Sub-scan: Trailing edge: Normal	Adjusts the margin along the back edge. (Screen C, SP9-703) [–3.0 to 10.0 mm / **0** / 0.1 mm/step]
	6	Sub-scan: Trailing edge: Thick 1	
	7	Sub-scan: Trailing edge : Thick 2	
	8	Sub-scan: Trailing edge: OHP	
	9	Main-scan: Leading edge	Adjust leading margin. (operator side). (Screen C, SP9-703) [–2.0 to 5.0 mm / **0** / 0.1 mm/step]
	10	Main-scan: Trailing edge	Adjusts the trailing margin. (Screen C, SP9-703) [–2.0 to 5.0 mm / **0** / 0.1 mm/step]
	11	Sub-scan: Auto 2nd side: Trailing edge of 1st side	Adjusts the trailing margin for the first side of duplex copies. (Screen C, SP9-703) [–3.0 to 10 mm / **0** / 0.1 mm/step]
111	Fax Print Gamma Parameter		
	000	Fax Print Gamma Parameter	**Japan Only** [0 to 255 / **192** / 1 per step]
112	Main scan magnification adjustment		
	1	Copy mode	DFU [0] (Screen D, SP9-703)
	2	Print mode	Adjusts the magnification in the main scan direction for printer mode. (Screen D, SP9-703) [–1.0% to +1.0% / **0** / 0.1/step]
113	Sub-scan magnification adjustment		
	1	Copy mode	Adjusts the magnification in the sub-scan direction for copy mode. (Screen D, SP9-703) [–1.0% to +1.0% / **0** / 0.1/step]
	2	Print mode	Adjusts the magnification in the sub-scan direction for printer mode. (Screen D, SP9-703) [–1.0% to +1.0% / **0** / 0.1/step] *The screen displays "FsynchMagAdj PRINTER".*

2	Mode Number		Function / [Setting]
207	Forced toner supply positioning		
	1	K	Moves the selected development unit to the development position and forces toner to be supplied in according to the setting in SP2-208. Press ON key to start after selecting the color.
	2	C	
	3	M	
	4	Y	
208	Forced toner supply cycle count		
	1	K	Sets the number of forced toner supply cycles. [1 to 50 / **10** / cycles] *The toner supply clutch turns on and off for 1 second. This cycle repeats a number of times equal to the value selected. (Approximately 0.5g of toner is supplied each cycle. Therefor, about 5g of toner is supplied using the default setting. This increases the toner density by about 0.7wt%.)*
	2	C	
	3	M	
	4	Y	
	5	Toner supply ratio: Fixed mode: K	Sets the toner supply ratio for each color in fixed mode. [0% to 100% / **5%** / 1%/step]
	6	Toner supply ratio: Fixed mode: C	
	7	Toner supply ratio: Fixed mode: M	
	8	Toner supply ratio: Fixed mode: Y	
	9	Toner supply method	Selects the toner supply method. 0 = Fixed supply 1 = Proportional control supply (with TD sensor output) **2 = Fuzzy control supply**
225	Developer initialization		
	1	Exe: K	Initializes the developer and performs a forced self check on the selected colors. Press the Execution key to start. The results are displayed on the operation panel. (Screen E) 0 = failure, 1 = success *The execution sequence is: Aging → Initial Vref check → Forced process control self-check.*
	2	Exe: C	
	3	Exe: M	
	4	Exe: Y	
	5	Exe: All	
	6	Exe: CMY	
301	ITB bias adjustment		
	1	4C: 1st color	DFU Adjusts the image transfer belt bias in standard speed mode for each transfer process (1C - 4C) and color mode selected. [5 to 50 μA / **22 μA** / 1 μA/step]
	2	4C: 2nd color	[5 to 50 μA / **25 μA** / 1 μA/step]
	3	4C: 3rd color	[5 to 50 μA / **27 μA** / 1 μA/step]
	4	4C: 4th color	[5 to 50 μA / **29 μA** / 1 μA/step]
	5	2C: 1st color	[5 to 50 μA / **22 μA** / 1 μA/step]
	6	2C: 2nd color	[5 to 50 μA / **25 μA** / 1 μA/step]
	7	3C: 1st color	[5 to 50 μA / **22 μA** / 1 μA/step]
	8	3C: 2nd color	[5 to 50 μA / **25 μA** / 1 μA/step]
	9	3C: 3rd color	[5 to 50 μA / **27 μA** / 1 μA/step]
	10	1C : 1st color	[5 to 50 μA / **22 μA** / 1 μA/step]
	11	Non-image areas	**DFU** Adjusts the image transfer belt bias for the non-image areas. [5 to 50 μA / **6 μA** / 1 μA/step]

2	Mode Number		Function / [Setting]
301	12	Half-speed	**DFU** Adjusts the image transfer belt bias for OHP/Thick paper modes (Half speed). Before transferring to the paper in these modes, the developed image on the transfer belt passes the drum to synchronize the registration. [5 to 50 μA / **6 μA** / 1 μA /step]
	24	V_D Bias correction ON/OFF	**DFU** Sets the correction mode to ON or OFF. If ON, the transfer belt bias for image area is corrected by V_D (process control potential table). [**0 = ON**, 1 = OFF]
	25	4C : 2nd side : 1st color	**DFU** Adjusts the image transfer belt bias for the second side copy in duplex mode for each transfer process (1C - 4C) and color mode selected. [5 to 50 μA / **22 μA** / 1 μA/step] [5 to 50 μA / **25 μA** / 1 μA/step] [5 to 50 μA / **27 μA** / 1 μA/step] [5 to 50 μA / **29 μA** / 1 μA/step] [5 to 50 μA / **22 μA** / 1 μA/step] [5 to 50 μA / **25 μA** / 1 μA/step] [5 to 50 μA / **22 μA** / 1 μA/step] [5 to 50 μA / **25 μA** / 1 μA/step] [5 to 50 μA / **27 μA** / 1 μA/step] [5 to 50 μA / **22 μA** / 1 μA/step] *These appear on the operation panel in the following format, "1st 4C-mode NrmlBack".*
	26	4C : 2nd side : 2nd color	
	27	4C : 2nd side : 3rd color	
	28	4C : 2nd side : 4th color	
	29	2C : 2nd side : 1st color	
	30	2C : 2nd side : 2nd color	
	31	3C : 2nd side : 1st color	
	32	3C : 2nd side : 2nd color	
	33	3C : 2nd side : 3rd color	
	34	1C : 2nd side : 1st color	
	35	Lubricant brush 1	**DFU** Adjusts the image transfer belt bias during lubricant brush cleaning mode. [5 to 50 μA / 6 μA / 1 μA/step] *These appear as "Q1_Brush CLN1" and "Q1_Brush CLN2"*
	36	Lubricant brush 2	
	37	1/3rd Speed	**DFU** [5.0 to 50.0 μA / 5.0 μA / 1 μA/step]
	40	V_D correction coefficient	**DFU** [0 to 2.5 / 1.0 / 0.01/step]
302	PTR bias - Humidity range threshold		
	1	Threshold 1	**DFU** Changes the thresholds for absolute humidity adjustment. TH1 TH2 TH3 TH4 | | | | Environment: LL L Normal H HH LL: Very low humidity [0.6 to 50 g/m^3 / 4.3 g/m^3 / 0.1] L : Low humidity [0.6 to 50 g/m^3 / 11.3 g/m^3/ 0.1] H : High humidity [0.6 to 50 g/m^3 / 18.0 g/m^3/ 0.1] HH: Very high humidity [0.6 to 50 g/m^3 / 24.0 g/m^3/ 0.1] *These appear as "EnvLmt [0]" through "EnvLmt [3]."*
	2	Threshold 2	
	3	Threshold 3	
	4	Threshold 4	

Service Tables

2	Mode Number		Function / [Setting]
310	PTR bias adjustment		
	1	Humidity range set-up	Specifies which humidity range is used for paper transfer bias. Change the value only if the humidity sensor fails. 0 = fixed humidity range (normal condition) **1 = changed by humidity sensor** 2 = fixed humidity range (LL) 3 = fixed humidity range (L) 4 = fixed humidity range (H) 5 = fixed humidity range (HH) *The screen displays "EnvChoise".*
	SP2-310-2 to SP2-310-29 adjust the PTR bias for the type of paper and the copy mode. *(Screen F, SP9-703)*		
	2	Image area: Normal: 1C	**DFU** [5 to 100 μA / **40 μA** / 1 μA /step]
	3	Image area: Normal: 2C	**DFU** [5 to 100 μA / **47 μA** / 1 μA /step]
	4	Image area: Normal: 3C	**DFU** [5 to 100 μA / **55 μA** / 1 μA /step]
	5	Image area: Normal: 4C	
	6	Image area: Thick 1: 1C	**DFU** [5 to 100 μA / **16 μA** / 1 μA /step]
	7	Image area: Thick 1: 2C	**DFU** [5 to 100 μA / **18 μA** / 1 μA /step]
	8	Image area: Thick 1: 3C	**DFU** [5 to 100 μA / **24 μA** / 1 μA /step]
	9	Image area: Thick 1: 4C	
	10	Image area: OHP:1C	
	11	Image area: OHP:2C	**DFU** [5 to 100 μA / **30 μA** / 1 μA /step]
	12	Image area: OHP:3C	**DFU** [5 to 100 μA / **36 μA** / 1 μA /step]
	13	Image area: OHP:4C	
	14	Image area: Thick 2: 1C	**DFU** [5 to 100 μA / **12 μA** / 1 μA /step]
	15	Image area: Thick 2: 2C	**DFU** [5 to 100 μA / **14 μA** / 1 μA /step]
	16	Image area: Thick 2: 3C	**DFU** [5 to 100 μA / **16 μA** / 1 μA /step]
	17	Image area: Thick 2: 4C	
	18	Image area: Normal: 2nd side: 1C	**DFU** [5 to 100 μA / **40 μA** / 1 μA /step]
	19	Image area: Normal: 2nd side: 2C	**DFU** [5 to 100 μA / **42 μA** / 1 μA /step]
	20	Image area: Normal: 2nd side: 3C	**DFU** [5 to 100 μA / **45 μA** / 1 μA /step]
	21	Image area: Normal: 2nd side: 4C	
	22	Image area: Thick 1: 2nd side: 1C	**DFU** [5 to 100 μA / **16 μA** / 1 μA /step]
	23	Image area: Thick 1: 2nd side: 2C	**DFU** [5 to 100 μA / **19 μA** / 1 μA /step]
	24	Image area: Thick 1: 2nd side: 3C	**DFU** [5 to 100 μA / **22 μA** / 1 μA /step]
	25	Image area: Thick 1: 2nd side: 4C	
	26	Image area: Thick 2: 2nd side: 1C	**DFU** [5 to 100 μA / **12 μA** / 1 μA /step]
	27	Image area: Thick 2: 2nd side: 2C	**DFU** [5 to 100 μA / **14 μA** / 1 μA /step]
	28	Image area: Thick 2: 2nd side: 3C	**DFU** [5 to 100 μA / **16 μA** / 1 μA /step]
	29	Image area: Thick 2: 2nd side: 4C	

2	Mode Number		Function / [Setting]
310	SP2-310-30 to SP2-310-37 adjust the PTR bias used for the ID sensor pattern. (Screen F, SP9-703)		
	30	ID pattern: Normal: 1C	**DFU** [5 to 100 μA / **20 μA** / 1 μA /step]
	31	ID pattern: Normal: 2C	**DFU** [5 to 100 μA / **50 μA** / 1 μA /step]
	32	ID pattern: Normal: 3C	*30 – 33 labeled as "P:Nrml"*
	33	ID pattern: Normal: 4C	
	34	ID pattern: All others: 1C	**DFU** [5 to 100 μA / **12 μA** / 1 μA /step]
	35	ID pattern: All others: 2C	**DFU** [5 to 100 μA / **14 μA** / 1 μA /step]
	36	ID pattern: All others: 3C	*34 – 37 labeled as "P:ElseNrml"*
	37	ID pattern: All others: 4C	
	38	Lubricant brush (Belt cleaning mode)	**DFU** Adjusts the paper transfer roller bias during lubricant brush cleaning. (Screen F, SP9-703) [5 to 100 μA / **35 μA** / 1 μA /step]
311	1	Forced belt cleaning	Lubricates the image transfer roller. Press the ON key to start. *This mode may help alleviate partial blank areas or insufficient roller cleaning.*
313	PTR bias: Paper size correction		
	1	Normal: LT (S) or larger	**DFU** Corrects the PTR bias for the paper type and size. The paper transfer roller bias times the percentage selected in this SP mode is applied to the bias roller. (S = sideways, L = lengthwise) [50 to 500% / **100%** / 1%/step] (except for SP2-313-008) [50 to 500% / **200%** / 1%/step] (SP2-313-008)
	2	Normal: B4 or larger	
	3	Normal: A5 (L) or larger	
	4	Normal: Less than A5 (L)	
	5	Thick 1: LT (S) or larger	
	6	Thick 1: B4 or larger	
	7	Thick 1: A5 (L) or larger	
	8	Thick 1: Less than A5 (L)	
	9	OHP:LT (S) or larger	
	10	OHP:B4 or larger	
	11	OHP:A5 (L) or larger	
	12	OHP: Less than A5 (L)	
	13	Thick 2: LT (S) or larger	
	14	Thick 2: B4 or larger	
	15	Thick 2: A5 (L) or larger	
	16	Thick 2: Less than A5 (L)	
314	PTR bias: Leading edge correction		
	DFU Corrects the PTR bias for the paper leading edge area for the type of paper and copy mode. The paper transfer belt bias times the percentage selected in this SP mode is applied to the bias roller. (SP9-703)		
	1	Normal: 1C	[50 to 200% / **110%** / 1%/step]
	2	Normal: 2C	
	3	Normal: 3C	
	4	Normal: 4C	
	5	Thick 1: 1C	
	6	Thick 1: 2C	
	7	Thick 1: 3C	
	8	Thick 1: 4C	[50 to 200% / **79%** / 1%/step]
	9	OHP: 1C	[50 to 200% / **100%** / 1%/step]
	10	OHP: 2C	
	11	OHP: 3C	
	12	OHP: 4C	
	13	Thick 2: 1C	
	14	Thick 2: 2C	
	15	Thick 2: 3C	
	16	Thick 2: 4C	

2	Mode Number		Function / [Setting]
314	17	Normal: 2nd side: 1C	[50 to 200% / **100%** / 1%/step]
	18	Normal: 2nd side: 2C	
	19	Normal: 2nd side: 3C	
	20	Normal: 2nd side: 4C	
	21	Thick 1: 2nd side: 1C	
	22	Thick 1: 2nd side: 2C	
	23	Thick 1: 2nd side: 3C	
	24	Thick 1: 2nd side: 4C	[50 to 200% / **68%** / 1%/step]
	25	Thick 2: 2nd side: 1C	[50 to 200% / **100%** / 1%/step]
	26	Thick 2: 2nd side: 2C	
	27	Thick 2: 2nd side: 3C	
	28	Thick 2: 2nd side: 4C	
315	PTR bias: Trailing edge correction		
	DFU Corrects the PTR bias for the paper trailing edge based on the type of paper and copy mode. The paper transfer roller bias times the percentage selected in this SP mode is applied to the bias roller. (SP9-703)		
	1	Normal: 1C	[50 to 200% / **100%** / 1%/step]
	2	Normal: 2C	
	3	Normal: 3C	
	4	Normal: 4C	
	5	Thick 1: 1C	
	6	Thick 1: 2C	
	7	Thick 1: 3C	
	8	Thick 1: 4C	[50 to 200% / **79%** / 1%/step]
	9	OHP: 1C	[50 to 200% / **100%** / 1%/step]
	10	OHP: 2C	
	11	OHP: 3C	
	12	OHP: 4C	
	13	Thick 2: 1C	
	14	Thick 2: 2C	
	15	Thick 2: 3C	
	16	Thick 2: 4C	
	17	Normal: 2nd side: 1C	
	18	Normal: 2nd side: 2C	
	19	Normal: 2nd side: 3C	
	20	Normal: 2nd side: 4C	
	21	Thick 1: 2nd side: 1C	
	22	Thick 1: 2nd side: 2C	
	23	Thick 1: 2nd side: 3C	
	24	Thick 1: 2nd side: 4C	[50 to 200% / **68%** / 1%/step]
	25	Thick 2: 2nd side: 1C	[50 to 200% / **100%** / 1%/step]
	26	Thick 2: 2nd side: 2C	
	27	Thick 2: 2nd side: 3C	
	28	Thick 2: 2nd side: 4C	
316	PTR bias: Humidity correction		
	DFU Corrects the PTR bias for the humidity condition based on the type of paper and copy mode. The paper transfer belt bias times the percentage selected in this SP mode is applied. LL = Very low humidity, L = Low humidity, H = High humidity, HH = Very high humidity		
	1	LL: Normal : 1C	[50 to 200% / **100%** / 1%/step]
	2	LL: Normal: 4C	
	3	L: Normal: 1C	[50 to 200% / **120%** / 1%/step]
	4	L: Normal: 4C	[50 to 200% / **100%** / 1%/step]
	5	H: Normal: 1C	
	6	H: Normal: 4C	

2	Mode Number		Function / [Setting]
316	7	HH: Normal: 1C	[50 to 200% / **100%** / 1%/step]
	8	HH: Normal: 4C	
	9	LL: Thick 1: 1C	[50 to 200% / **125%** / 1%/step]
	10	LL: Thick 1: 4C	[50 to 200% / **108%** / 1%/step]
	11	L: Thick 1: 1C	[50 to 200% / **100%** / 1%/step]
	12	L: Thick 1: 4C	
	13	H: Thick 1: 1C	
	14	H: Thick 1: 4C	
	15	HH: Thick 1: 1C	
	16	HH: Thick 1: 4C	
	17	LL: OHP: 1C	[50 to 200% / **125%** / 1%/step]
	18	LL: OHP: 4C	[50 to 200% / **89%** / 1%/step]
	19	L: OHP: 1C	[50 to 200% / **100%** / 1%/step]
	20	L: OHP: 4C	
	21	H: OHP: 1C	[50 to 200% / **67%** / 1%/step]
	22	H: OHP: 4C	
	23	HH: OHP: 1C	
	24	HH: OHP: 4C	
	25	LL: Thick 2: 1C	[50 to 200% / **117%** / 1%/step]
	26	LL: Thick 2: 4C	50 to 200% / **113%** / 1%/step]
	27	L: Thick 2: 1C	50 to 200% / **100%** / 1%/step]
	28	L: Thick 2: 4C	
	29	H: Thick 2: 1C	
	30	H: Thick 2: 4C	
	31	HH: Thick 2: 1C	
	32	HH: Thick 2: 4C	[50 to 200% / **88%** / 1%/step]
	33	LL: Normal: 2nd side:1C	[50 to 200% / **100%** / 1%/step]
	34	LL: Normal: 2nd side: 4C	[50 to 200% / **130%** / 1%/step]
	35	L: Normal: 2nd side:1C	[50 to 200% / **100%** / 1%/step]
	36	L: Normal: 4C	
	37	H: Normal: 2nd side:1C	
	38	H: Normal: 2nd side:4C	
	39	HH: Normal: 2nd side: 1C	[50 to 200% / **75%** / 1%/step]
	40	HH: Normal : 2nd side: 4C	[50 to 200% / **89%** / 1%/step]
	41	LL: Thick 1: 2nd side: 1C	[50 to 200% / **125%** / 1%/step]
	42	LL: Thick 1: 2nd side: 4C	[50 to 200% / **155%** / 1%/step]
	43	L: Thick 1: 2nd side: 1C	[50 to 200% / **100%** / 1%/step]
	44	L: Thick 1: 2nd side: 4C	
	45	H: Thick 1: 2nd side: 1C	
	46	H: Thick 1: 2nd side: 4C	
	47	HH: Thick 1: 2nd side: 1C	
	48	HH: Thick 1: 2nd side: 4C	
	49	LL: Thick 2: 2nd-side: 1C	[50 to 200% / **167%** / 1%/step]
	50	LL: Thick 2: 2nd-side: 4C	[50 to 200% / **127%** / 1%/step]
	51	L: Thick 2: 2nd-side: 1C	[50 to 200% / **100%** / 1%/step]
	52	L: Thick 2: 2nd-side: 4C	
	53	H: Thick 2: 2nd-side: 1C	
	54	H: Thick 2: 2nd-side: 4C	
	55	HH: Thick 2: 2nd-side: 1C	[50 to 200% / **83%** / 1%/step]
	56	HH: Thick 2: 2nd-side: 4C	[50 to 200% / **88%** / 1%/step]

2	Mode Number		Function / [Setting]
402	Paper separation voltage adjustment: Image area		
	DFU Adjusts the separation voltage for the different copy modes.		
	1	Normal: 1C	[500 to 3000 V / **3000 V** / 1 V/step]
	2	Normal: 4C	
	3	Thick 1: 1C	[500 to 3000 V / **1000 V** / 1 V/step]
	4	Thick 1: 4C	
	5	OHP: 1C	
	6	OHP: 4C	
	7	Thick 2: 1C	
	8	Thick 2: 4C	
	9	Normal: 2nd side: 1C	[500 to 3000 V / **3000 V** / 1 V/step]
	10	Normal: 2nd side: 4C	
	11	Thick 1: 2nd side: 1C	[500 to 3000 V / **1000 V** / 1 V/step]
	12	Thick 1: 2nd side: 4C	
	13	Thick 2: 2nd side: 1C	
	14	Thick 2: 2nd side: 4C	
403	Paper separation voltage adjustment: Leading edge		
	1	Normal	**DFU** Adjusts the paper separation voltage for the paper leading edge. The voltage of the image area times the percentage selected in this mode is applied. [50 to 200% / **100%** / 1%/step]
	2	Thick 1	
	3	OHP	
	4	Thick 2	
	5	2nd side: Normal	
	6	2nd side: Thick 1	
	7	2nd side: Thick 2	
404	Paper Separation Voltage: Humidity correction		
	1	LL: Normal: 1C	**DFU** Corrects the paper separation voltage based on the humidity and copy mode. LL: Very low humidity L : Low humidity H : High humidity HH: Very high humidity [50 to 200% / **100%** / 1%/step]
	2	LL: Normal: 4C	
	3	L: Normal: 1C	
	4	L: Normal: 4C	
	5	H: Normal: 1C	
	6	H: Normal: 4C	
	7	HH: Normal: 1C	
	8	HH: Normal: 4C	
	9	LL: Thick 1: 1C	
	10	LL: Thick 1: 4C	
	11	L: Thick 1: 1C	
	12	L: Thick 1: 4C	
	13	H: Thick 1: 1C	
	14	H: Thick 1: 4C	
	15	HH: Thick 1: 1C	
	16	HH: Thick 1: 4C	
	17	LL: OHP: 1C	
	18	LL: OHP: 4C	
	19	L: OHP: 1C	
	20	L: OHP: 4C	
	21	H: OHP: 1C	
	22	H: OHP: 4C	
	23	HH: OHP: 1C	
	24	HH: OHP: 4C	
	25	LL: Thick 2: 1C	
	26	LL: Thick 2: 4C	
	27	L: Thick 2: 1C	
	28	L: Thick 2: 4C	
	29	H: Thick 2: 1C	

2	Mode Number		Function / [Setting]
404	30	H: Thick 2: 4C	**DFU** Corrects the paper separation voltage based on the humidity and copy mode. LL: Very low humidity L : Low humidity H : High humidity HH: Very high humidity [50 to 200% / **100%** / 1%/step]
	31	HH: Thick 2: 1C	
	32	HH: Thick 2: 4C	
	33	LL: Normal: 2nd side: 1C	
	34	LL: Normal: 2nd side: 4C	
	35	L: Normal: 2nd side: 1C	
	36	L: Normal: 2nd side: 4C	
	37	H: Normal: 2nd side: 1C	
	38	H: Normal: 2nd side: 4C	
	39	HH: Normal: 2nd side: 1C	
	40	HH: Normal: 2nd side: 4C	
	41	LL: Thick 1: 2nd side: 1C	
	42	LL: Thick 1 : 2nd side: 4C	
	43	L: Thick 1: 2nd side: 1C	
	44	L: Thick 1: 2nd side: 4C	
	45	H: Thick 1: 2nd side: 1C	
	46	H: Thick 1: 2nd side: 4C	
	47	HH: Thick 1: 2nd side: 1C	
	48	HH: Thick 1: 2nd side: 4C	
	49	LL: Thick 2: 2nd side: 1C	
	50	LL: Thick 2: 2nd side: 4C	
	51	L: Thick 2: 2nd side: 1C	
	52	L: Thick 2: 2nd side: 4C	
	53	H: Thick 2: 2nd side: 1C	
	54	H: Thick 2: 2nd side: 4C	
	55	HH: Thick 2: 2nd side: 1C	
	56	HH: Thick 2: 2nd side: 4C	
405	Paper separation voltage: AC Component ON/OFF		
	1	Normal - Normal: 1C	**DFU** Turns the paper separation ON or OFF for each mode. 0 = OFF 1 = ON Defaults: 2-405-001 to 042 = 1 2-405-043 to 050 = 0 2-405-051 to 052 = 1 2-405-053 to 064 = 0 2-405-065 to 066 = 1 2-405-067 to 070 = 0 LL: Very low humidity L : Low humidity H : High humidity HH: Very high humidity *For the second side, the operation panel uses the following format: "NRML B_NRML"*
	2	Normal - Normal: 4C	
	3	Normal - Thick 1: 1C	
	4	Normal - Thick 1: 4C	
	5	Normal - OHP: 1C	
	6	Normal - OHP: 4C	
	7	Normal - Thick 2: 1C	
	8	Normal - Thick2: 4C	
	9	Normal - Normal: 2nd side: 1C	
	10	Normal - Normal: 2nd side: 4C	
	11	Normal - Thick 1: 2nd side: 1C	
	12	Normal - Thick 1: 2nd side: 4C	
	13	Normal - Thick 2: 2nd side: 1C	
	14	Normal - Thick 2: 2nd side: 4C	
	15	LL: Normal: 1C	
	16	LL: Normal: 4C	
	17	LL: Thick 1: 1C	
	18	LL: Thick 1: 4C	
	19	LL: OHP: 1C	
	20	LL: OHP: 4C	
	21	LL: Thick 2: 1C	

2	Mode Number		Function / [Setting]
405	22	LL: Thick 2: 4C	**DFU** Turns the paper separation ON or OFF for each mode. 0 = OFF 1 = ON Defaults: 2-405-001 to 042 = 1 2-405-043 to 050 = 0 2-405-051 to 052 = 1 2-405-053 to 064 = 0 2-405-065 to 066 = 1 2-405-067 to 070 = 0 LL: Very low humidity L : Low humidity H : High humidity HH: Very high humidity *For the second side, the operation panel uses the following format: "NRML B_NRML"*
	23	LL: Normal: 2nd side: 1C	
	24	LL: Normal: 2nd side: 4C	
	25	LL: Thick 1: 2nd side: 1C	
	26	LL: Thick 1: 2nd side: 4C	
	27	LL: Thick 2: 2nd side: 1C	
	28	LL: Thick 2: 2nd side: 4C	
	29	L: Normal: 1C	
	30	L: Normal: 4C	
	31	L: Thick 1: 1C	
	32	L: Thick 1: 4C	
	33	L: OHP: 1C	
	34	L: OHP: 4C	
	35	L: Thick 2: 1C	
	36	L: Thick 2: 4C	
	37	L: Normal: 2nd side: 1C	
	38	L: Normal: 2nd side: 4C	
	39	L: Thick 1: 2nd side: 1C	
	40	L: Thick 1: 2nd side: 4C	
	41	L: Thick 2: 2nd side: 1C	
	42	L: Thick 2: 2nd side: 4C	
	43	H: Normal: 1C	
	44	H: Normal: 4C	
	45	H: Thick 1: 1C	
	46	H: Thick 1: 4C	
	47	H: OHP: 1C	
	48	H: OHP: 4C	
	49	H: Thick 2: 1C	
	50	H: Thick 2: 4C	
	51	H: Normal: 2nd side: 1C	
	52	H: Normal: 2nd side: 4C	
	53	H: Thick 1: 2nd side: 1C	
	54	H: Thick 1: 2nd side: 4C	
	55	H: Thick 2: 2nd side: 1C	
	56	H: Thick 2: 2nd side: 4C	
	57	H-H: Normal: 1C	
	58	H-H: Normal: 4C	
	59	H-H: Thick 1: 1C	
	60	H-H: Thick 1: 4C	
	61	H-H: OHP: 1C	
	62	H-H: OHP: 4C	
	63	H-H: Thick 2: 1C	
	64	H-H: Thick 2: 4C	
	65	H-H: Normal: 2nd side: 1C	
	66	H-H: Normal: 2nd side: 4C	
	67	H-H: Thick 1: 2nd side: 1C	
	68	H-H: Thick 1: 2nd side: 4C	
	69	H-H: Thick 2: 2nd side: 1C	
	70	H-H: Thick 2: 2nd side: 4C	
	101	Sep On Timing: Normal	[–50 to 50 / **0** / 1/step]
	102	Sep On Timing: Half	
	103	Sep On Timing: 1/3rd	
	104	Sep Off Timing: Normal	[–50 to 50 / **7** / 1/step]
	105	Sep Off Timing: Half	[–50 to 50 / **0** / 1/step]
	106	Sep Off timing: 1/3rd	

2	Mode Number		Function / [Setting]
601	ITB lubricant brush bias adjustment		
	SP2-601-001 to -008 adjust the bias for the image transfer belt's lubricant brush. The bias is applied after the image development is completed for each speed in 1C, 2C, and 4C modes.		
	1	Normal speed: 1C	**DFU** [0 to 1000 V / **450 V** / 1 V/step]
	2	Normal speed: 2C	**DFU** [0 to 1000 V / **50 V** / 1 V/step]
	3	Normal speed: 4C	**DFU** [0 to 1000 V / **250 V** / 1 V/step]
	4	Half speed: 1C	**DFU** [0 to 1000 V / **50 V** / 1 V/step]
	5	Half speed: 2C	
	6	Half speed: 4C	**DFU** [0 to 1000 V / **250 V** / 1 V/step]
	7	Normal speed: Others	**DFU** [0 to 1000 V / **100 V** / 1 V/step]
	8	Half speed: Others	
	SP2-601-009 to -025 shift the image transfer belt lubricant brush bias set by SP2-601-001 to 008 for each environment condition. LL = Low temp./low humidity conditions, HH = High temp./high humidity conditions *Listed on the operator panel using the following format "ENV_LL SPEED_STD 1C"*		
	9	Normal speed: LL: 1C	[–500 to 500 V / **–250 V** / 1 V/step]
	10	Normal speed: LL: 2C	[–500 to 500 V / **0 V** / 1 V/step]
	11	Normal speed: LL: 4C	[–500 to 500 V / **50 V** / 1 V/step]
	12	Half speed: LL: 1C	[–500 to 500 V / **0 V** / 1 V/step]
	13	Half speed: LL: 2C	
	14	Half speed: LL: 4C	[–500 to 500 V / **50 V** / 1 V/step]
	15	Normal speed: LL: Others	
	16	Half speed: LL: Others	
	17	Normal speed: HH: 1C	[–500 to 500 V / **0 V** / 1 V/step]
	18	Normal speed: HH: 2C	
	19	Normal speed: HH: 4C	
	20	Half speed: HH: 1C	
	21	Half speed: HH: 2C	
	22	Half speed: HH: 4C	
	23	Normal speed: HH: Others	
	24	Half speed: HH: Others	
	25	Lubricant brush (Belt cleaning mode)	[–500 to 500 V / **100 V** / 1 V/step] *Listed as "Q1_Brush CLN"*
	26	1/3rd speed: 1C	[–500 to 500 V / **50 V** / 1 V/step]
	27	1/3rd speed: 2C	
	28	1/3rd speed: 4C	[–500 to 500 V / **250 V** / 1 V/step]
	29	1/3rd speed: Others	[–500 to 500 V / **50 V** / 1 V/step]
	30	1/3rd speed: LL: 1C	[–500 to 500 V / **250 V** / 1 V/step]
	31	1/3rd speed: LL: 2C	
	32	1/3rd speed: LL: 4C	[–500 to 500 V / **50 V** / 1 V/step]
	33	1/3rd speed: LL: Others	[–500 to 500 V / **250 V** / 1 V/step]
	34	1/3rd speed: HH: 1C	[–500 to 500 V / **0 V** / 1 V/step]
	35	1/3rd speed: HH: 2C	
	36	1/3rd speed: HH: 4C	
	37	1/3rd speed: HH: Others	
	100	Image belt clean reset	[–50 to 5 / **0** / 1]
603	Voltage adjustment for the PTR discharge corona		
	DFU Adjusts the voltage for the paper separation belt discharge corona based on the type of paper and copy mode. Non transfer area = The voltage which is applied to the discharge corona after the trailing edge of paper passes it until next sheet of paper arrives.		
	1	Normal: 1C	[100 to 1500 V / **900 V** / 1 V/step]
	2	Normal: 2C	[100 to 1500 V / **1100 V** / 1 V/step]

2	Mode Number		Function / [Setting]
603	3	Normal: 3C	100 to 1500 V / **1100 V** / 1 V/step]
	4	Normal: 4C	
	5	Normal: Non transfer area	[100 to 1500 V / **800 V** / 1 V/step]
	6	Thick 1: 1C	[100 to 1500 V / **900 V** / 1 V/step]
	7	Thick 1: 2C	[100 to 1500 V / **1100 V** / 1 V/step]
	8	Thick 1: 3C	
	9	Thick 1: 4C	
	10	Thick 1: Non transfer area	[100 to 1500 V / **800 V** / 1 V/step]
	11	OHP: 1C	[100 to 1500 V / **900 V** / 1 V/step]
	12	OHP: 2C	[100 to 1500 V / **1100 V** / 1 V/step]
	13	OHP: 3C	
	14	OHP: 4C	
	15	OHP: Non transfer area	[100 to 1500 V / **800 V** / 1 V/step]
	16	Thick 2: 1C	[100 to 1500 V / **900 V** / 1 V/step]
	17	Thick 2: 2C	[100 to 1500 V / **1100 V** / 1 V/step]
	18	Thick 2: 3C	
	19	Thick 2: 4C	
	20	Thick 2: Non transfer area	[100 to 1500 V / **800 V** / 1 V/step]
	21	Lubricant brush (Belt cleaning mode)	[100 to 1500 V / **1100 V** / 1 V/step] *Labeled as "Q1_Brush CLN."*
604	PTR discharge corona voltage: Humidity correction		
	1	LL: Normal: 1C	**DFU** Adjusts the paper transfer belt discharge corona voltage based on the humidity and copy mode. [50 to 200% / **100%** / 1%/step] LL: Very low humidity L : Low humidity H : High humidity HH: Very high humidity
	2	LL: Normal: 4C	
	3	L: Normal: 1C	
	4	L: Normal: 4C	
	5	H: Normal: 1C	
	6	H: Normal: 4C	
	7	HH: Normal: 1C	
	8	HH: Normal: 4C	
	9	LL: Thick 1: 1C	
	10	LL: Thick 1: 4C	
	11	L: Thick 1: 1C	
	12	L: Thick 1: 4C	
	13	H: Thick 1: 1C	
	14	H: Thick 1: 4C	
	15	HH: Thick 1: 1C	
	16	HH: Thick 1: 4C	
	17	LL: OHP: 1C	
	18	LL: OHP: 4C	
	19	L: OHP: 1C	
	20	L: OHP: 4C	
	21	H: OHP: 1C	
	22	H: OHP: 4C	
	23	HH: OHP: 1C	
	24	HH: OHP: 4C	
	25	LL: Thick 2: 1C	
	26	LL: Thick 2: 4C	
	27	L: Thick 2: 1C	
	28	L: Thick 2: 4C	
	29	H: Thick 2: 1C	
	30	H: Thick 2: 4C	
	31	HH: Thick 2: 1C	
	32	HH: Thick 2: 4C	

2	Mode Number		Function / [Setting]
802	Forced corona wire/grid cleaning		Starts charge wire/grid cleaning. Press the ON key to perform the wire cleaning.
803	Corona wire/grid auto-cleaning		
	1	Power ON cleaning	Starts charge wire/grid cleaning after the main switch or operation switch is turned on and if the hot roller temperature is less than 100ºC. 0 = OFF **1 = ON** 2 = Cleaning takes place based on the interval set using SP2-803-002
	2	Counter setting *Listed as "cintvCHCln [kdev]"*	Tracks development cycles. Automatic wire/grid cleaning starts after a number of cycles equal to the value set in this SP. If there is a copy job in progress, cleaning starts after the job is completed. 0 = Disable the function [0 to 80 K / **0 K** / 1 K /step]
	3	Time setting *Listed as "tintvCHCln [hour]"*	Automatic wire/grid cleaning starts after a time period set by this SP. If there is a copy job in progress, cleaning starts after the job is completed. 0 = Disable the function [0 to 999 H / **0 H** / 1 H/step]
	4	FagingCHCln	**DFU** Corona wire/grid cleaning performed before the developer initialization (SP2-222). 0 = ON **1 = OFF**
912	Environment display		
	1	Temperature	Displays temperature detected.
	2	Relative humidity	Displays relative humidity detected.
	3	Absolute humidity	Displays absolute humidity calculated using the temperature and relative humidity.
	4	Humidity sensor selection	Selects the manufacture of the humidity sensor. **0**: Shinei, 1: TDK
913	Toner overflow detection setting		Turns the toner overflow sensor detection on or off. 0 = OFF **1 = ON**
951	Toner end detection setting		Turns the toner end sensors for all colors on or off. 1 = OFF **0 = ON** ***NOTE:*** *Make sure to reset the data to ON if it is set to OFF temporarily for servicing.*
953	Maximum toner supply ratio adjustment		
	1	K	Adjusts the maximum toner supply ration (upper limit) in the continuous supply mode. [0 to 100% / 100% / 1%/step] *Listed using the following format "MaxRtoBKTnAdd."*
	2	CMY	
955	Counting method for the toner end detection		Selects the method for counting the number of copies that can be made between toner near-end and toner end. **0** = Count the number of copies and monitor image coverage ratio (number of pixels). 1 = Number of copies If 0 is selected (default), at least 10 copies can be made. If 1 is selected, 10 copies can be made.

SP3-XXX (Process Control)

3	Mode Number/Name		Function / [Setting]
005	TD sensor initialization		
	1	Exe: K	Adjusts Vref for new developer. (Screen E) Do not make a copy with new developer before TD sensor initialization. This mode is required when the developer or TD sensor is replaced. Press the ON key to start.
	2	Exe: C	
	3	Exe: M	
	4	Exe: Y	
	5	Exe: All	
	6	Toner density initial setting result	Not used. **NOTE:** 1) This SP name is displayed however the results is not displayed. To see the TD sensor initialization result, enter SP3-960-000. 2) On the screen E, you can also see the result.
006	TD sensor: Vcnt (gain) setting		
	1	K	**DFU** Adjusts the TD sensor gain data. (SP9-703) [0 to 255 / **165** / 1] [0 to 255 / **175** / 1] [0 to 255 / **175** / 1] [0 to 255 / **175** / 1]
	2	C	
	3	M	
	4	Y	
007	TD sensor output display		
	1	K	Displays the TD sensor output. Output is in volts. Step = 0.01
	2	C	
	3	M	
	4	Y	
103	V_{SP} display		
	1	K	Displays V_{SP}. (ID sensor output for the sensor pattern.) (SP9-703) Output is in volts. Step = 0.01
	2	C	
	3	M	
	4	Y	
107	V_{SG} display		
	1	K	Displays V_{SG}. (ID sensor output for the bare drum.) (SP9-703) *Output is in volts. Step = 0.01*
	2	Color	
111	Residual voltage display		Displays the residual voltage (VR). The drum is charged and then exposed by full laser power. The voltage remaining on the drum (residual voltage) is used for process control. (SP9-703) *Output is in volts. Step = 1*
121	Development gamma		
	1	K	Displays the development gamma value. (SP9-703)
	2	C	
	3	M	
	4	Y	
122	V_K		
	1	K	Displays V_K (SP9-703)
	2	C	
	3	M	
	4	Y	
125	Process control		**DFU** Sets process control to ON or OFF. (SP9-703) **0 = ON**, 1 = OFF
126	Forced process control self check		The Self Check key is the top-left key on the screen (Screen E). Press the "Exe" key to start the check.
127	Process control gamma: Toner Max. M/A adjustment		
	1	K	**DFU** Adjusts the target of the maximum toner M/A used for the process control self check. [0.5 to 1.5 mg/cm^2 / **0.7 mg/cm^2** / 0.001]
	2	Color	

3	Mode Number/Name		Function / [Setting]
128	Toner density automatic adjustment		**DFU** Sets the toner density automatic adjustment to ON or OFF. If ON, the toner density is automatically adjusted during forced or initial automatic process control. **0 = ON,** 1 = OFF, 2 = All colors ON
129	ID sensor pattern: Toner Target (M/Aref)		
	1	Target: K	**DFU** Adjusts the target toner M/A for the ID sensor pattern for black toner. [0.1 to 1.5 mg/cm^2 / **0.3 mg/cm^2** / 0.001]
	2	Target: Color	**DFU** Adjusts the target toner M/A for the ID sensor pattern for color toner. [0.1 to 1.5 mg/cm^2 / **0.7 mg/cm^2** / 0.001]
	3	Correction: K	**DFU** Sets the correction value for the target set in 3-129-001 or 002. [–0.100 to 0.100 / **0.000** / 0.001]
	4	Correction: Color	
131	Toner Density: Forced toner supply counter		
	1	K counter	Tracks the usage of the forced toner supply mode during the process control self-check. Forced toner supply mode adds toner based on the development gamma calculated during the process control self check. These counters are automatically reset when the TD sensor initialization is performed.
	2	C counter	
	3	M counter	
	4	Y counter	
132	Toner Density: Forced toner consumption counter (mode 1)		
	1	K counter	Tracks the usage of the forced toner consumption mode during the process control self-check. Forced toner consumption mode removes excess toner based on the development gamma calculated during the process control self check. These counters are automatically reset when the TD sensor initialization is performed.
	2	C counter	
	3	M counter	
	4	Y counter	
133	Toner Density: Forced toner consumption counter (mode 2)		
	1	K counter	If the TD sensor output is more than 0.2 V lower than V_{REF}, Forced toner consumption creates a pattern across the whole width of the drum, consuming the excess toner. This mode continues until the TD rises above the 0.2 V limit. These counters track the usage of the forced toner consumption mode. They are automatically reset when the TD sensor initialization is performed.
	2	C counter	
	3	M counter	
	4	Y counter	
902	Selected pointer table display		
	1	K	**DFU** Displays the pointer table for V_D, V_B, and V_L used during the self-check. (SP9-703) [1 to 20 / 1]
	2	C	
	3	M	
	4	Y	
907	ID Sensor Pattern M/A Display		
	1	K	Displays the actual (current) toner M/A. (SP9-703)
	2	C	
	3	M	
	4	Y	
940	Vcnt: Correction steps		
	1	K	**DFU** Adjusts the correction steps for the Vcnt (gain). [0 to 255 / **5** / 1]
	2	C	
	3	M	
	4	Y	

Service Tables

3	Mode Number/Name		Function / [Setting]
941	Vcnt: Lower limit		
	1	VcontMin: K	**DFU** Sets the lower limit of the shift range of Vcnt (gain). [–128 to 0 / **–20** / 1]
	2	VcontMin: C	
	3	VcontMin: M	
	4	VcontMin: Y	
	5	TSInitVcontMin: K	[0 to 255 / **150** / 1]
	6	TSInitVcontMin: C	[0 to 255 / **160** / 1]
	7	TSInitVcontMin: M	
	8	TSInitVcontMin: Y	
942	Vcnt: Upper limit		
	1	VcontMax: K	**DFU** Sets the upper limit of the shift range of Vcnt (gain). (SP9-703) [0 to 128 / **20** / 1]
	2	VcontMax: C	
	3	VcontMax: M	
	4	VcontMax: Y	
	5	TSInitVcontMax: K	[0 to 255 / **180** / 1]
	6	TSInitVcontMax: C	[0 to 255 / **190** / 1]
	7	TSInitVcontMax: M	
	8	TSInitVcontMax: Y	
944	Vcnt: Display		
	1	K	Displays the Vcnt (gain) data. [0 to 255 / **165** / 1]
	2	C	[0 to 255 / **175** / 1]
	3	M	[0 to 255 / **165** / 1]
	4	Y	[0 to 255 / **165** / 1]
946	VREF: Correction steps (V)		
	1	K	**DFU** Adjusts the correction steps of VREF. (SP9-703) [0.00 to 5.00 / **0.05** / 0.01]
	2	C	
	3	M	
	4	Y	
947	VREF: Lower limit		
	1	K	**DFU** Sets the lower limit of the shift range of VREF. [0.00 to 5.00 / **1.50** / 0.01]
	2	C	
	3	M	
	4	Y	
948	VREF: Upper limit		
	1	K	**DFU** Sets the upper limit of the shift range of VREF. [0.00 to 5.00 / **3.50** / 0.01]
	2	C	
	3	M	
	4	Y	
949	VREF: Initial data display		
	1	K	Displays the VREF value detected during the TD sensor initialization. (SP9-703)
	2	C	
	3	M	
	4	Y	
950	VREF: Actual (current) data display		
	1	K	Displays the actual (current) VREF value. (SP9-703)
	2	C	
	3	M	
	4	Y	
960	TD sensor initialization result		Displays the result of TD sensor initialization. The result is displayed after DATA. For example, DATA: 1 = successful. (☛ 4.1.3) **NOTE:** MIN: 0, MAX: 999, SET DATA are also displayed, however these are for the factory use. You cannot input any data in the field.

3	Mode Number/Name		Function / [Setting]
964	Developer initialization result		Displays the result of the developer initialization. (Screen E, SP9-703)
972	Interval settings for the Timed process control self-check		
	1	Timed initial process control self-check interval setting-1 (Timer Z)	Sets the interval of the process control self-check based on time. (SP9-703) [0 to 240 H / **6 H** / 1 H] (H = hours) 0 = Disable the function
	2	Timed initial process control self-check interval setting-1 (Timer X)	The machine will perform the timed initial process control self-check X hours after the previous initial process control self-check. [0 to 240 H / **0 H** / 1 H] (H = hours) 0 = Disable the function
	3	Timed initial process control self-check interval setting-2 (Timer Y)	The machine will perform the timed initial process control self-check Y hours after the end of a job. [0 to 240 H / **0 H** / 1 H] (H = hours) 0 = Disable the function
973	Copy count interval adjustment for the process control self-check		Adjusts the interval of process control self-check based on the number of copies/prints. (SP9-703) [0 to 500 sheets / **150 sheets** / 1] 0 = Disable the function
974	Potential Control—Toner Max. M/A target		
	1	K	**DFU** Adjusts the target of the maximum toner M/A used for the potential control (normal copy process). [0.5 to 1.5 mg/cm^2 / **0.7 mg/cm^2** / 0.001]
	2	Color	
975	Self-check result		Displays the result of the self-check. (Screen E, SP9-703) 1 = success others = failure (See troubleshooting.)
977	Process Control Gamma: Interval setting (copies/prints)		**DFU** Under normal operation, the process control gama check (SP9-703) takes place immediately after the process control self-check. This SP allows the check to be run independently, based on the entered interval. [0 to 999 sheets / **0** / 1] 0 = Disable the function

SP4-XXX (Scanner Unit)

4	Mode Number/Name		Function / [Setting]
008	Scanner sub-scan magnification adjustment		**DFU** Adjusts the sub-scan magnification by changing the scanner motor speed. (SP7-903) [–0.9 to 0.9% / **0**% / 0.1%]
010	Scanner leading edge registration adjustment		Adjusts the leading edge registration by changing the laser exposure timing in sub-scan direction. (SP7-903) [–3.0 to 3.0 mm / **0 mm** / 0.1mm]
011	Scanner side-to-side registration adjustment		Adjusts the side-to-side registration by changing the laser exposure timing in main-scan direction. (SP7-903) [–2.5 to 2.5 mm / **0 mm** / 0.1mm]
012	Scanning blank margin adjustment		
	1	Rear	Sets a blank margin at each side. This helps prevent shadows caused by the gap between the edge of the paper and the scale. (Screen A) [0 to 3.0 mm / **0 mm** / 0.1mm]
	2	Front	
	3	Left	
	4	Right	
013	Scanner free run		
	1	Lamp ON	Runs the scanner with the exposure lamp ON or OFF. Press the ON or OFF key to start or stop.
	2	Lamp OFF	
205	**ADS level (B/W mode)**		Adjusts the background level in ADS/B&W copy mode. [0 to 50 / **18** / 1 step / N] Increasing: Background density becomes lighter. Decreasing: Background density becomes darker.
301	APS operation check: Size display		Displays the paper size detected by the original sensors. ☛ S/M 5.1.4 for details.
417	IPU test pattern selection		**0 = No pattern (normal copy operation mode)** 1 = Grid pattern 2 = Slanted Grid Pattern 3 = 256 gradation (Horizontal) 4 = 256 gradation (Vertical) 5 = Color patch 6 = RGB gray scale (16 gradation steps) 7 = YMCK-RGB 16 gradation 8 = YMCK 16 gradation 9 = YMCK 128 gradation 10 = No pattern 11 = Uneven check 12 = Banding check (1) 13 = Banding check (2) Set back to 0 when leaving the SP mode. (The data is not reset to the default automatically.)
426	RGB gain display		
	1	R: ODD	**DFU** Displays the gain value of the amplifiers on the scanner IPU. (SP7-903) [0 to 255 / **0** / 1]
	2	R: EVEN	
	3	G: ODD	
	4	G: EVEN	
	5	B: ODD	
	6	B: EVEN	
427	RGB reference setup		
	1	R: 0	**DFU** Sets or displays the reference voltage for the A/D converters on the scanner IPU for each RGB color. (SP7-903) 1 to 3 [0 to 255 / **116** / 1] 4 to 6 [0 to 255 / **148** / 1]
	2	G: 0	
	3	B: 0	
	4	R: 1	
	5	G: 1	
	6	B: 1	

4	Mode Number/Name		Function / [Setting]
435	White level adjustment		Adjusts the white level. Press the ON key to perform the adjustment.
440	**Saturation**		Adjusts the level of saturation. [0 to 5 / **3** / 1 step / N] 0: Linear 1: Highest 2: Low 3: Default 4: High 5: Higher
501	ACC target density level adjustment: Copy mode		
	1	Letter: K	**DFU** Adjusts the target density level of ACC for each mode and color in copy mode. (The adjustable range is 0 to 50; but the effective range is 0 to 10. Even when it is set to 50, it is the same level as for 10.) The middle of printer gamma is shifted by this SP. (SP7-904) [0 to 50 / **5** / 1]
	2	Letter: C	
	3	Letter: M	
	4	Letter: Y	
	5	Photo: K	
	6	Photo: C	
	7	Photo: M	
	8	Photo: Y	
502	ACC target density level adjustment: Print mode 1		
	1	Letter: K	**DFU** Adjusts the target density level of ACC for each mode and color in the print mode. (The adjustable range is 0 to 50; but the effective range is 0 to 10. Even when it is set to 50, it is the same level as for 10.) The middle of printer gamma is shifted by this SP. (SP7-904) [0 to 50 / **5** / 1]
	2	Letter: C	
	3	Letter: M	
	4	Letter: Y	
	5	Photo: K	
	6	Photo: C	
	7	Photo: M	
	8	Photo: Y	
503	ACC target density level adjustment: Print mode 2		
	1	Letter: K	**DFU** Adjusts the target density level of ACC for each mode and color in the print mode. (The adjustable range is 0 to 50; but the effective range is 0 to 10. Even when it is set to 50, it is the same level as for 10.) The middle of printer gamma is shifted by this SP. (SP7-904) [0 to 50 / **5** / 1]
	2	Letter: C	
	3	Letter: M	
	4	Letter: Y	
	5	Photo: K	
	6	Photo: C	
	7	Photo: M	
	8	Photo: Y	
505	ACC target level adjustment: Highlight area		
	1	K	**DFU** Adjusts scanner gamma for highlight areas. (Screen G, SP7-904) [–128 to 127 / **0 (FA)** / 1]
	2	C	
	3	M	
	4	Y	
506	ACC target level adjustment: Shadow area		
	1	K	**DFU** Adjusts scanner gamma for highlight areas. (Screen G, SP7-904) [–128 to 127 / **0 (FA)** / 1]
	2	C	
	3	M	
	4	Y	
507	ACC Process Control ON/OFF		Specifies whether the copy interval process control is performed during ACC. 0 = OFF 1 = ON (Printer ACC only) 2 = ON (Copy ACC only) **3 = ON** (Both Copy/Printer ACC) Change the data only when a user does not want to wait for a few minutes at ACC.

4	Mode Number/Name		Function / [Setting]
540	Printer vector correction		
	1	R: K	**DFU** Adjust the parameter of the 6 hues (R, Y, G, C, B, and M) and 4 colors (K, C, M, and Y) for the printer vector correction. Do not change the data in the field. [–128 to 127 / **0** / 1]
	2	R: C	
	3	R: M	
	4	R: Y	
	5	Y: K	
	6	Y: C	
	7	Y: M	
	8	Y: Y	
	9	G: K	
	10	G: C	
	11	G: M	
	12	G: Y	
	13	C: K	
	14	C: C	
	15	C: M	
	16	C: Y	
	17	B: K	
	18	B: C	
	19	B: M	
	20	B: Y	
	21	M: K	
	22	M: C	
	23	M: M	
	24	M: Y	
904	Scanner IPU board test		
	1	Scanner IPU board test 1	Performs the IPU board test 1. The test 1 program diagnoses problems with reading and writing to the ASIC register on the IPU board. Press the ON key to start. 0 = OK Others: Defective
	2	Scanner IPU board test 2	Performs the IPU board test 2. The test 2 program diagnoses problems with patterns generated from ASICs on the IPU board. Press the ON key to start. 0 = OK Others: Defective
905	**Dither selection**		**DFU** Selects the dither pattern for copying or for test print. [0 to 255 / **0** / 1 step / N] 0: Default setting Letter/Photo 1: RC-200-like dither (170 lines/inch) Photo 2: RC-210-like dither (2 bit mode) Photo 16: 1 x 1 dither (applied to whole image) Letter 32: 1 x 1 dither (applied only to letter/lines) Letter 64: 2 x 2 dither Photo 128: 2 x 2 dither (less than 33% reduction) Photo 255: 1 x 1 dither Letter/Photo **NOTE:** When you change the data from the default setting, copies are made by using the selected dither pattern.

4	Mode Number/Name		Function / [Setting]
907	LD control board: Test pattern selection		Selects the a test pattern. The analog video ASIC makes test patterns without any image data sent from CCD. **0 = No pattern** 1 = Black pattern 2 = White pattern 3 = 16 gradation pattern 4 = 4 dot grid pattern 5 = 2 dot grid pattern Set back to 0 when leaving the SP mode. (The data is not reset to the default automatically.)
909	Gamma adjustment: Copy: Photo, Single color: K		
	1	Offset - Highlight	Adjusts the offset data of the printer gamma for black in the copy/letter mode. (Screen H, SP7-904) [0 to 30 / **15** / 1]
	2	Offset - Middle	
	3	Offset - Shadow	
	4	Offset - IDmax	
	5	Option - Highlight	**DFU** (SP7-904) [0 to 255 / **0** / 1]
	6	Option - Middle	
	7	Option - Shadow	
	8	Option - IDmax	
910	Gamma adjustment: Copy: Letter: K		
	1	Offset - Highlight	Adjusts the offset data of the printer gamma for black in the copy/letter mode. (Screen H, SP7-904) [0 to 30 / **15** / 1]
	2	Offset - Middle	
	3	Offset - Shadow	
	4	Offset - IDmax	
	5	Option - Highlight	**DFU** (SP7-904) [0 to 255 / **0** / 1]
	6	Option - Middle	
	7	Option - Shadow	
	8	Option - IDmax	
911	Gamma adjustment: Copy: Letter: C		
	1	Offset - Highlight	Adjusts the offset data of the printer gamma for cyan in the copy/letter mode. (Screen H, SP7-904) [0 to 30 / **15** / 1]
	2	Offset - Middle	
	3	Offset - Shadow	
	4	Offset - IDmax	
	5	Option - Highlight	**DFU** (SP7-904) [0 to 255 / **0** / 1]
	6	Option - Middle	
	7	Option - Shadow	
	8	Option - IDmax	
912	Gamma adjustment: Copy: Letter: M		
	1	Offset - Highlight	Adjusts the offset data of the printer gamma for magenta in the copy/letter mode. (Screen H, SP7-904) [0 to 30 / **15** / 1]
	2	Offset - Middle	
	3	Offset - Shadow	
	4	Offset - IDmax	
912	5	Option - Highlight	**DFU** (SP7-904) [0 to 255 / **0** / 1]
	6	Option - Middle	
	7	Option - Shadow	
	8	Option - IDmax	
913	Gamma adjustment: Copy: Letter: Y		
	1	Offset - Highlight	Adjusts the offset data of the printer gamma for yellow in the copy/letter mode. (Screen H, SP7-904) [0 to 30 / **15** / 1]
	2	Offset - Middle	
	3	Offset - Shadow	
	4	Offset - IDmax	
	5	Option - Highlight	**DFU** (SP7-904) [0 to 255 / **0** / 1]
	6	Option - Middle	
	7	Option - Shadow	
	8	Option - IDmax	

4	Mode Number/Name		Function / [Setting]
914	Gamma adjustment: Copy: Letter, Single color: K		
	1	Offset – Highlight	Adjusts the offset data of the printer gamma for black in the copy/letter/single color mode. (Screen H, SP7-904) [0 to 30 / **15** / 1]
	2	Offset - Middle	
	3	Offset - Shadow	
	4	Offset - IDmax	
	5	Option - Highlight	**DFU** (SP7-904) [0 to 255 / **0** / 1]
	6	Option - Middle	
	7	Option - Shadow	
	8	Option - IDmax	
915	Gamma adjustment: Copy: Photo: K		
	1	Offset - Highlight	Adjusts the offset data of the printer gamma for black in the copy/photo mode. (Screen H, SP7-904) [0 to 30 / **15** / 1]
	2	Offset - Middle	
	3	Offset - Shadow	
	4	Offset - IDmax	
	5	Option - Highlight	**DFU** (SP7-904) [0 to 255 / **0** / 1]
	6	Option - Middle	
	7	Option - Shadow	
	8	Option - IDmax	
916	Gamma adjustment: Copy: Photo: C		
	1	Offset - Highlight	Adjusts the offset data of the printer gamma for cyan in the copy/photo mode. (Screen H, SP7-904) [0 to 30 / **15** / 1]
	2	Offset - Middle	
	3	Offset - Shadow	
	4	Offset - IDmax	
	5	Option - Highlight	**DFU** (SP7-904) [0 to 255 / **0** / 1]
	6	Option - Middle	
	7	Option - Shadow	
	8	Option - IDmax	
917	Gamma adjustment: Copy: Photo: M		
	1	Offset - Highlight	Adjusts the offset data of the printer gamma for magenta in the copy/photo mode. (Screen H, SP7-904) [0 to 30 / **15** / 1]
	2	Offset - Middle	
	3	Offset - Shadow	
	4	Offset - IDmax	
	5	Option - Highlight	**DFU** (SP7-904) [0 to 255 / **0** / 1]
	6	Option - Middle	
	7	Option - Shadow	
	8	Option - IDmax	
918	Gamma adjustment: Copy: Photo: Y		
	1	Offset - Highlight	Adjusts the offset data of the printer gamma for yellow in the copy/photo mode. (Screen H, SP7-904) [0 to 30 / **15** / 1]
	2	Offset - Middle	
	3	Offset - Shadow	
	4	Offset - IDmax	
	5	Option - Highlight	**DFU** (SP7-904) [0 to 255 / **0** / 1]
	6	Option - Middle	
	7	Option - Shadow	
	8	Option - IDmax	
919	Gamma adjustment: Printer: K		
	1	Offset - Highlight	Adjusts the offset data of the printer gamma for black in the printer/photo mode. (Screen H, SP7-904) [0 to 30 / **15** / 1]
	2	Offset - Middle	
	3	Offset - Shadow	
	4	Offset - IDmax	
	5	Option - Highlight	**DFU** (SP7-904) [0 to 255 / **0** / 1]
	6	Option - Middle	
	7	Option - Shadow	
	8	Option - IDmax	

4	Mode Number/Name		Function / [Setting]
920	Gamma adjustment: Printer: C		
	1	Offset - Highlight	Adjusts the offset data of the printer gamma for cyan in the printer/photo mode. (Screen H, SP7-904) [0 to 30 / **15** / 1]
	2	Offset - Middle	
	3	Offset - Shadow	
	4	Offset - IDmax	
	5	Option - Highlight	**DFU** (SP7-904) [0 to 255 / **0** / 1]
	6	Option - Middle	
	7	Option - Shadow	
	8	Option - IDmax	
921	Gamma adjustment: Printer: M		
	1	Offset - Highlight	Adjusts the offset data of the printer gamma for magenta in the printer/photo mode. (Screen H, SP7-904) [0 to 30 / **15** / 1]
	2	Offset - Middle	
	3	Offset - Shadow	
	4	Offset - IDmax	
	5	Option - Highlight	**DFU** (SP7-904) [0 to 255 / **0** / 1]
	6	Option - Middle	
	7	Option - Shadow	
	8	Option - IDmax	
922	Gamma adjustment: Printer: Y		
	1	Offset - Highlight	Adjusts the offset data of the printer gamma for yellow in the printer/photo mode. (Screen H, SP7-904) [0 to 30 / **15** / 1]
	2	Offset - Middle	
	3	Offset - Shadow	
	4	Offset - IDmax	
	5	Option - Highlight	**DFU** (SP7-904) [0 to 255 / **0** / 1]
	6	Option - Middle	
	7	Option - Shadow	
	8	Option - IDmax	
932	Main scan dot position correction		
	1	R left	Corrects the left or right side alignment of the red or blue filter line on the CCD. (Screen I) [0 to 9 / **5** / 1]
	2	R right	
	3	B left	
	4	B right	
990	Scanner data access setting		
	1	Address	**DFU**
	2	Data	**DFU**

SP5-XXX (Operation Modes/System)

5	Mode Number/Name		Function / [Setting]
001	Operation panel all on		Turns on all the indicators on the operation panel. Press the ON or OFF key to toggle the indicators on/off.
005	Copy mode selection (default setting) *Copy mode selections can also be made with the User Tools.*		
	8	Standard mode	Selects the default setting of the B&W copy mode. **0 = Default User Tool setting** 1 = Text mode
009	Operation panel display		
	1	Language selection	Selects the language used for the LCD. After changing the data, turn the main switch off and on. 0 = Japanese **1 = English** 2 = French 3 = German 4 = Spanish 5 = Italian 6 = Portuguese 7 = Dutch 8 = Danish 9 = Swedish 10 = Norwegian 11 = Czech 12 = Polish 13 = Russian 14 = Brazilian 15 = Taiwan *This SP mode selects the desired language when the main software is updated for the additional languages. When a language which is not available in the version of firmware is selected, English is automatically selected*
	2	Metric/inch selection	Selects metric or inch. After changing the data, turn the main switch off and on. 0 = metric 1 = inch
104	A3/DLT double count		Specifies whether the counter is doubled for A3/DLT size paper. **0 = Normal count** 1 = Double count
113	Key counter (User code)/Key card/Coin Lock Set		Specifies whether the key counter, key card, or coin lock is installed or not. **0 = None (default)** 1 = Key card (used in Japan only) 2 = Key counter (User code) 3 = Coin lock (used in Japan only)
114	Key card mode		**Used in Japan only**. Selects the mode for the key card. [1 to 15 / **15** / 1]
120	Key counter (User code): Mode clear ON/OFF		Specifies whether the current mode is cleared or not when the key counter is removed. 0 = Mode not cleared **1 = Mode cleared**
121	Key card count timing setup		**Used in Japan only**. Selects the update timing for the key card. 0 = Paper feed-in **1 = Paper feed-out**

5	Mode Number/Name		Function / [Setting]
126	F size original setting		Specifies which original size the machine selects when the APS sensors detect F size. **0 = F4 (8 1/2" x 13")** 1 = F (8" x 13") 2 = Folio (8 1/4" x 13")
127	Coin lock: Mode On/OFF **Used in Japan only**.		
	1	APS	Specifies whether APS is ON when the machine is equipped with a coin lock. **0 = ON** 1 = OFF
	2	ACS	Specifies whether ACS is ON when the machine is equipped with a coin lock. **0 = ON** 1 = OFF
128	User code + Coin lock		**Used in Japan only**. Selects whether both User Code and Coin Lock can be used. **0 = one of them** 1 = both
410	Reset password		Resets the key operator access code to 000000. Press the ON key to clear.
501	PM counter Set		Sets the PM interval. When the PM counter reaches this value, “PM call. Please call service,” is displayed on the operation panel (Screen K). [1 to 999999 / **80000** / 1] 0 = PM counter is not used.
504	Jam alarm level		Sets the jam alarm level. 0 = Not function 1 = 250 sheets 2 = 500 sheets **3 = 1,000 sheets**
505	SC alarm level		Sets the SC alarm level. [0 to 30 / **15** / 1]
507	Supply alarm level		
	1	Toner End	Specifies whether supply alarm is ON or not. **0 = OFF** 1 = ON
	2	Copy count by paper size	
	3	Staple end	
	131	A2	SP 5-507-002 enables SP5-507-131 to 166. [250 to 10000 / **1000** / 1]
	132	A3	
	133	A4	
	134	A5	
	140	B3	
	141	B4	
	142	B5	
	143	B6	
	160	DLT	
	164	LG	
	166	LT	
508	CC auto call		**Used in Japan only**. Specifies whether or not the CC auto call is ON. 0 = OFF, **1 = ON**
610	ACC Factory setting		
	4	Recall	Resets the current ACC data with the default gamma values (factory settings) Press the ON key to reset the data.

5	Mode Number/Name		Function / [Setting]
610	5	Overwrite	Overwrites the default gamma values (factory settings) with the current ACC data. Press the ON key to overwrite the data. If this is done, the factory data is gone. To recall the factory setting, a RAM clear must be performed.
611	Color ratio adjustment in single color mode Sets the amount of toner used for a primary color.		
	1	C ratio in Blue	[0 to 100 / **90** / 1]
	2	M ratio in Blue	[0 to 100 / **80** / 1]
	3	C ratio in Green	[0 to 100 / **90** / 1]
	4	Y ratio in Green	[0 to 100 / **80** / 1]
	5	M ratio in Red	[0 to 100 / **100** / 1]
	6	Y ratio in red	[0 to 100 / **80** / 1]
612	Scanner gamma copy quality		**DFU** Changes the color correction coefficient for the text/photo, text, and photo modes. **0 = OFF** 1 = Not fixed 2 = Not fixed
801	RAM clear		Resets the NV-RAM to the factory settings. This does not change the machine serial No., the main counter value, or the counting method. Press the ON key to clear. (☛ 3.12.2 for the details.)
802	Free Run		
	1	Printer	Press the ON or OFF key to start or stop this mode.
	2	System	
803	Input check		☛ Section 5.1.6 SP5-803 INPUT CHECK for the details.
804	Output check		☛ Section 5.1.7 SP5-804 OUTPUT CHECK for the details.
810	Fusing SC reset		Resets a type 1 service call caused by the fusing section. Press the ON key to reset. After resetting SC code, the main switch must be turned off and on.
811	Serial number display		Displays the serial number.
812	Service Telephone Number		Use to enter the service representative's telephone number. Use the ⊛ key for "-". (This number is displayed when a service call occurs or when the PM counter reaches a set value.)
816	RDS ON/OFF		Activates the RDS function. **0 = not activate,** 1 = activate
817	Service start/finish time		Reports service starting and finishing times to the RDS center. Press the ON or OFF key to activate.
824	NV-RAM upload		Uploads the data of the NV-RAM to the flash ROM on the main board. Press the ON key to upload. An IC card must be plugged into the machine.
825	NV-RAM download		Downloads data from an IC card. This data must be uploaded from the NV-RAM using SP 5-824. Press the ON key to download. An IC card must be plugged into the machine.
827	Program download:		
	01	Main	Downloads the program from IC card to the flash ROM. Press the ON key to download. An IC card must be plugged into the machine.
	02	Scanner	

5	Mode Number/Name		Function / [Setting]
955	Printer internal pattern ☛ 3.5.5 (Screen J, SP7-903)		
	1	Dot line: LD PM setup	Dot line [0 to 255 / **128** / 1]
	2	Print margin pattern	
	3	Print out all fonts	
	4	1 dot/line grid pattern	
	5	Belt pattern	
	6	16-gradation with blank	
	7	solid	
	8	1 dot patter (2 x 2)	
	9	1 dot pattern (4 x 4)	
	10	2 dot sub scan line	
	11	1 dot main scan line	
	12	2 dot main scan line	
	13	Color patch	
	14	Grid: scanning image	
	15	2 beams pitch pattern	
	16	2 beams density pattern	
	17	16 grayscales-16: LD_PWM setup	
	18	Printer internal pattern selection	Selects the test pattern. 0: No pattern 1: Print margin pattern 2: Print out all fonts 3: 1 dot/line grid pattern 4: Belt pattern 5: 16-gradation with blank 6: Solid 7: 1 dot pattern (2 x 2) 8: 1 dot pattern (4 x 4) 9: 1 dot sub scan line 10: 2 dot sub scan line 11: 1 dot main scan line 12: 2 dot main scan line 13: Color patch 14: Grid: scanner image 18: 2 beams pitch pattern 19: 2 beams density pattern No. 15 to 17, 20, and 21 are not used.
979	2	SC detection ON/OFF	Disables the self-diagnostic function. It functions only for the following SCs. SC3XX SC4XX SC5XX except for SCs related to fusing section 0 = SC detection ON 1 = SC detection OFF
985		Pre-heating fusing temperature	0 = Stand by mode temperature 1 = Stand by mode temperature –5°C 2 = Stand by mode temperature –10°C
986		Controller availability in night mode	**Used in Japan Only**. Specifies weather or not the controller is available while in night mode (night mode is only available with the fax option). 0 = **Not Available** 1 = Available

Service Tables

SP6-XXX (Peripherals)

6	Mode Number/Name		Function / [Setting]
006	ADF registration adjustment		
	1	Main Scan	Adjusts the registration of the main scan. [–3.0 to 3.0 mm / **0** / 0.1 mm]
	2	No switch-back: Front side	Adjusts the thin-paper scanning position. [–15 to 15 steps / **0** / 1]
	3	Switch-back: Front side	Adjusts the thick-paper scanning position. [–15 to 15 steps / **0** / 1]
	4	Switch-back: Back side	Adjusts the reverse side scanning position. [–15 to 15 steps / **0** / 1]
102	Sorter bin: maximum stack amount		Enables or disables the limit to the number of sheets that can be stacked in the sorter. 0 = Disable **1 = Enable**
104	Stabled sheet count limit		Enables or disables the limit to the number of sheets that can be stapled. 0 = Disabled **1 = Enabled**
107	Sorter free run		Press the ON or OFF key to start and stop.
910	Printer/Scanner key setting		Switches the touch panel display from the Standard (copy screen) to the Scanning screen. **0 = Standard (copy) screen** 1 = Scanning screen In scanning mode: When the Print/Scan key is pressed, the touch panel screen displays a message and coping is prohibited until the scan is finished.

SP7-XXX (Logging Data)

7	Mode Number/Name		Function / [Setting]
008	Counter display setting		Selects which counters to display. 1 = counter based on developments 2 = counter based on copies/prints This data can only be set once. After it has been set, it cannot be changed through this SP mode. If this is set by mistake, please contact your key person. This setting is not cleared by the NV-RAM clear function. Development counter: Color XXXXX Black XXXXX Copies/Prints counter: Copy Printer Total Color XXXXX XXXXX XXXXX Black XXXXX XXXXX XXXXX
202	Developer counter		
	1	Total	Shows the development count—both the total and for each color. (Screen K)
	2	K	
	3	C	
	4	M	
	5	Y	
203 207 210	PM parts counter		Shows the development count for components from the Image Development, Cleaning and Fusing sections.(Screen K)
401	Total SC counter		Shows the total number of SC conditions detected.
402	Recent SC history		
	1	Latest	Shows the SC codes most recently detected in order. SCXXX - AAAA –BBBB XXX = SC code number AAAA = Counter of CMY BBBB = Counter of K Last 4 digits of the electrical counters are displayed.
	2	Latest–1	
	3	Latest–2	
	4	Latest–3	
	5	Latest–4	
	6	Latest–5	
	7	Latest–6	
	8	Latest–7	
	9	Latest–8	
	10	Latest–9	
502	Paper jam total counter		Shows the total number of paper jams.
503	Original jam total counter		Shows the total number of original jams.
504	Paper jam count at each location		
	1	By-pass	Shows the number of paper jam at each location.
	2	1st paper tray	
	3	2nd paper tray	
	4	3rd paper tray	
	5	4th paper tray	
	6	Duplex: Entrance	
	7	Duplex: Paper feed	
	8	Paper transport	
	9	Registration	
	10	Paper transfer	
	11	Fusing unit	
	12	Paper feed	
	13	Duplex: Turn guide	

7	Mode Number/Name		Function / [Setting]
504	14	Sorter	Shows the number of paper jam at each location.
	15	Staple jam	
	16	Proof	
505	Original Jam count at feed and exit		
	1	Original feed	Shows the number of original feed jams.
	2	Original exit	Shows the number of original exit jams.
801	ROM version display		
	1	Main	Shows the ROM versions
	2	Scanner IPU	
	3	IDU	
	4	ADF	
	5	Sorter	
	6	LCT	
803	PM counter		Shows the number of developments on the PM parts. (Screen K)
804	PM counter clear		Clears PM counters. Press the ON key to clear the counter. (Screen K)
807	SC/Jam counter clear		Clears the SC and Jam counters. Press the ON key to clear the counter.
808	Counter all clear		Clears all the counters except for PM, SC, and Jam counters. Press the ON key to clear the counter.
809	Print logging data		
	1	Logging data	Prints out logging data. Press the ON key to print. When selecting “003” (All logging data), “001” and “003” are automatically executed.
	2	SC/Jam counter	
	3	All logging data	
810	Copy counter clear: All		Clears the copy counter. Press the ON key to clear the counter.
816	Copy counter clear: Paper trays		Clears the copy counter of each paper tray. Press the ON key to clear the counter.
818	Developer counter clear		Clears the development unit counters for all or individual color. Press the ON key to clear the counter. (Screen K)
819	Copy counter clear: Paper size		Clears the copy counter counted for paper size. Press the ON key to clear the counter.
825	Total counter clear		Sets the total counter to 0. This mode is available only when the number shown by the counter is below 0.
826	MK1 error counter		Used in Japan only.
827	Clear MK1 error counter		Used in Japan only.
902	Data print: Non-default		Prints data values that have been changed from the default value. Press the ON key to print.
903	Data print: All		Prints all SP data. Press the ON key to print.
904	Printer gamma data print		
	1	Copy mode	Prints out the gamma data in the Copy mode.
	2	Printer mode	Prints out the gamma data in the Print mode.
905	PM counter print		Prints out the PM counter data. Press the Print key to print. (Screen K)
910 911	PM parts counter (PTR section)		Shows usage of components related to paper transfer belt and Duplex unit. Count is based on sheets of paper or developments. (Screen K)

SP8-XXX (Special Mode)

8	Mode Number/Name		Function / [Setting]
115	Fusing temperature SP1 Fusing temperature SP2 Fusing temperature SP3		Set the temperature of each condition for special operation modes.
	02	H: Standby (1st)	[–20 to 20°C / 0 / 1 step / N]
	03	H: Copy (1st) Norma FC	
	04	H: Copy (1st) Normal 1C	
	07	P: Standby (1st)	
	08	P: Copy (1st) Norma FC	
	09	P: Copy (1st) Normal 1C	
124 224 324	PTR AC ON/OFF SP1 PTR AC ON/OFF SP2 PTR AC ON/OFF SP3		Turns off or on the AC component applied to the paper separation. [0 or 1 / 1 / - / N] 0: OFF, 1: ON
130 230 330	PTR bias SP1 PTR bias SP2 PTR bias SP3		Specifies the paper transfer roller (PTR) bias settings for special operation modes.
	130		
	02	Normal [1C]	[5 to 100 μA / 25 / 1 step]
	04	Normal [3C]	[5 to 100 μA / 35 / 1 step]
	05	Normal [4C]	
	18	Normal [1C] (2nd)	[5 to 100 μA / 30 / 1 step]
	20	Normal [3C] (2nd)	[5 to 100 μA / 35 / 1 step]
	21	Normal [4C] (2nd)	
	230		
	02	Normal [1C]	[5 to 100 μA / 14 / 1 step]
	04	Normal [3C]	[5 to 100 μA / 18 / 1 step]
	05	Normal [4C]	
	18	Normal [1C] (2nd)	[5 to 100 μA / 14 / 1 step]
	20	Normal [3C] (2nd)	[5 to 100 μA / 20 / 1 step]
	21	Normal [4C] (2nd)	
	330		
	02	Normal [1C]	[5 to 100 μA / 25 / 1 step]
	05	Normal [4C]	[5 to 100 μA / 35 / 1 step]
	18	Normal [1C] (2nd)	[5 to 100 μA / 30 / 1 step]
	21	Normal [4C] (2nd)	[5 to 100 μA / 35 / 1 step]
134 234 334	PTR leading edge SP1 PTR leading edge SP2 PTR leading edge SP3		Specifies the correction value for the paper transfer roller (PTR) bias for the leading edge area depending on the paper type and mode for special operation modes.
	134		
	01	Normal [1C]	[5 to 200 μA / 110 / 1 step]
	03	Normal [3C]	
	04	Normal [4C]	
	17	Normal [1C] (2nd)	
	17	Normal [3C] (2nd)	
	20	Normal [4C] (2nd)	
	234		
	01	Normal [1C]	[5 to 200 μA / 100 / 1 step]
	03	Normal [3C]	
	04	Normal [4C]	
	17	Normal [1C] (2nd)	
	17	Normal [3C] (2nd)	
	20	Normal [4C] (2nd)	

8	Mode Number/Name		Function / [Setting]
134 234 334	334		
	01	Normal [1C]	[5 to 200 μA / 110 / 1 step]
	04	Normal [4C]	
	17	Normal [1C] (2nd)	
	20	Normal [4C] (2nd)	
135 235 335	PTR trailing edge SP1 PTR trailing edge SP2 PTR trailing edge SP3		Specifies the correction value for the paper transfer roller (PTR) bias for the trailing edge area depending on the paper type and mode for special operation modes.
	135		
	01	Normal [1C]	[5 to 200 μA / 90 / 1 step]
	03	Normal [3C]	
	04	Normal [4C]	
	17	Normal [1C] (2nd)	
	19	Normal [3C] (2nd)	
	20	Normal [4C] (2nd)	
	235		
	01	Normal [1C]	[5 to 200 μA / 100 / 1 step]
	03	Normal [3C]	
	04	Normal [4C]	
	17	Normal [1C] (2nd)	
	19	Normal [3C] (2nd)	
	20	Normal [4C] (2nd)	
	335		
	01	Normal [1C]	[5 to 200 μA / 90 / 1 step]
	04	Normal [4C]	
	17	Normal [1C] (2nd)	
	20	Normal [4C] (2nd)	
138 238 338	PTR discharge corona SP1 PTR discharge corona SP2 PTR discharge corona SP3		Adjust the voltage for the paper transfer roller (PTR) discharge corona based on the copy mode. Non transfer area = The voltage which is applied to the discharge corona after the trading edge of paper passes it until next sheet of paper arrives.
	138, 238		
	01	Normal [1C]	[5 to 1500 V / 900 / 1 step]
	03	Normal [3C]	[5 to 1500 V /1100 / 1 step]
	04	Normal [4C]	[5 to 1500 V / 1100 / 1 step]
	05	Normal (Non transfer area)	[5 to 1500 V / 800 / 1 step]
	338		
	01	Normal [1C]	[5 to 1500 V / 900 / 1 step]
	04	Normal [4C]	[5 to 1500 V /1100 / 1 step]
	05	Normal (Non transfer area)	[5 to 1500 V / 800 / 1 step]
140 240	Gamma adjustment: Copy: Letter: K		
	1	Offset - Highlight	Adjusts the offset data of the printer gamma for black in the copy/letter mode. [0 to 30 / **15** / 1]
	2	Offset - Middle	
	3	Offset - Shadow	
	4	Offset - IDmax	
	5	Option - Highlight	**DFU** (SP7-904) [0 to 255 / **0** / 1]
	6	Option - Middle	
	7	Option - Shadow	
	8	Option - IDmax	
141 241	Gamma adjustment: Copy: Letter: C		
	1	Offset - Highlight	Adjusts the offset data of the printer gamma for cyan in the copy/letter mode. [0 to 30 / **15** / 1]
	2	Offset - Middle	
	3	Offset - Shadow	
	4	Offset - IDmax	

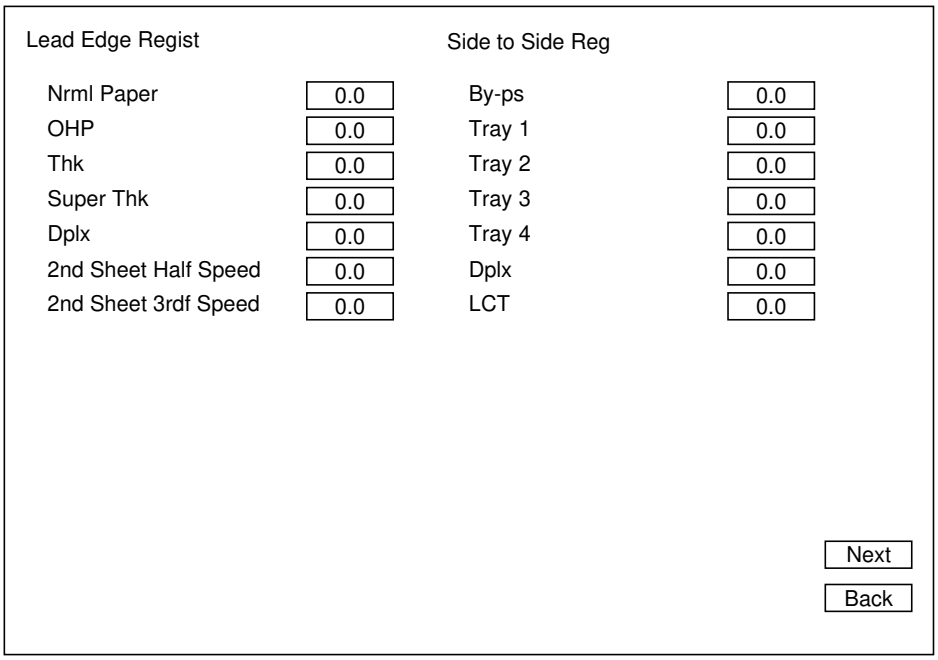
8	Mode Number/Name		Function / [Setting]
141 241	5	Option - Highlight	**DFU** (SP7-904) [0 to 255 / **0** / 1]
	6	Option - Middle	
	7	Option - Shadow	
	8	Option - IDmax	
142 242	Gamma adjustment: Copy: Letter: M		
	1	Offset - Highlight	Adjusts the offset data of the printer gamma for magenta in the copy/letter mode. [0 to 30 / **15** / 1]
	2	Offset - Middle	
	3	Offset - Shadow	
	4	Offset - IDmax	
	5	Option - Highlight	**DFU** (SP7-904) [0 to 255 / **0** / 1]
	6	Option - Middle	
	7	Option - Shadow	
	8	Option - IDmax	
143 243	Gamma adjustment: Copy: Letter: Y		
	1	Offset - Highlight	Adjusts the offset data of the printer gamma for yellow in the copy/letter mode. [0 to 30 / **15** / 1]
	2	Offset - Middle	
	3	Offset - Shadow	
	4	Offset - IDmax	
	5	Option - Highlight	**DFU** (SP7-904) [0 to 255 / **0** / 1]
	6	Option - Middle	
	7	Option - Shadow	
	8	Option - IDmax	
144 244	Gamma adjustment: Copy: Letter, Single color: K		
	1	Offset - Highlight	Adjusts the offset data of the printer gamma for black in the copy/letter/single color mode. (Screen H, SP7-904) [0 to 30 / **15** / 1]
	2	Offset - Middle	
	3	Offset - Shadow	
	4	Offset - IDmax	
	5	Option - Highlight	**DFU** (SP7-904) [0 to 255 / **0** / 1]
	6	Option - Middle	
	7	Option - Shadow	
	8	Option - IDmax	
145 245	Gamma adjustment: Copy: Photo: K		
	1	Offset - Highlight	Adjusts the offset data of the printer gamma for black in the copy/photo mode. (Screen H, SP7-904) [0 to 30 / **15** / 1]
	2	Offset - Middle	
	3	Offset - Shadow	
	4	Offset - IDmax	
	5	Option - Highlight	**DFU** (SP7-904) [0 to 255 / **0** / 1]
	6	Option - Middle	
	7	Option - Shadow	
	8	Option - IDmax	
146 246	Gamma adjustment: Copy: Photo: C		
	1	Offset - Highlight	Adjusts the offset data of the printer gamma for cyan in the copy/photo mode. (Screen H, SP7-904) [0 to 30 / **15** / 1]
	2	Offset - Middle	
	3	Offset - Shadow	
	4	Offset - IDmax	
	5	Option - Highlight	**DFU** (SP7-904) [0 to 255 / **0** / 1]
	6	Option - Middle	
	7	Option - Shadow	
	8	Option - IDmax	
147 247	Gamma adjustment: Copy: Photo: M		
	1	Offset - Highlight	Adjusts the offset data of the printer gamma for magenta in the copy/photo mode. (Screen H, SP7-904) [0 to 30 / **15** / 1]
	2	Offset - Middle	
	3	Offset - Shadow	
	4	Offset - IDmax	

8	Mode Number/Name		Function / [Setting]
147 247	5	Option - Highlight	**DFU** (SP7-904) [0 to 255 / **0** / 1]
	6	Option - Middle	
	7	Option - Shadow	
	8	Option - IDmax	
148 248	Gamma adjustment: Copy: Photo: Y		
	1	Offset - Highlight	Adjusts the offset data of the printer gamma for yellow in the copy/photo mode. (Screen H, SP7-904) [0 to 30 / **15** / 1]
	2	Offset - Middle	
	3	Offset - Shadow	
	4	Offset - IDmax	
	5	Option - Highlight	**DFU** (SP7-904) [0 to 255 / **0** / 1]
	6	Option - Middle	
	7	Option - Shadow	
	8	Option - IDmax	
149 249	Gamma adjustment: Copy: Photo, Single color: K		
	1	Offset - Highlight	Adjusts the offset data of the printer gamma for black in the copy/letter/single color mode. (Screen H, SP7-904) [0 to 30 / **15** / 1]
	2	Offset - Middle	
	3	Offset - Shadow	
	4	Offset - IDmax	
	5	Option - Highlight	**DFU** (SP7-904) [0 to 255 / **0** / 1]
	6	Option - Middle	
	7	Option - Shadow	
	8	Option - IDmax	
340	Gamma adjustment: Printer: Letter: K		
	1	Offset - Highlight	Adjusts the offset data of the printer gamma for black in the printer/photo mode. (Screen H, SP7-904) [0 to 30 / **15** / 1]
	2	Offset - Middle	
	3	Offset - Shadow	
	4	Offset - IDmax	
	5	Option - Highlight	**DFU** (SP7-904) [0 to 255 / **0** / 1]
	6	Option - Middle	
	7	Option - Shadow	
	8	Option - IDmax	
341	Gamma adjustment: Printer: Letter: C		
	1	Offset - Highlight	Adjusts the offset data of the printer gamma for cyan in the printer/photo mode. (Screen H, SP7-904) [0 to 30 / **15** / 1]
	2	Offset - Middle	
	3	Offset - Shadow	
	4	Offset - IDmax	
	5	Option - Highlight	**DFU** (SP7-904) [0 to 255 / **0** / 1]
	6	Option - Middle	
	7	Option - Shadow	
	8	Option - IDmax	
342	Gamma adjustment: Printer: Letter: M		
	1	Offset - Highlight	Adjusts the offset data of the printer gamma for magenta in the printer/photo mode. (Screen H, SP7-904) [0 to 30 / **15** / 1]
	2	Offset - Middle	
	3	Offset - Shadow	
	4	Offset - IDmax	
	5	Option - Highlight	**DFU** (SP7-904) [0 to 255 / **0** / 1]
	6	Option - Middle	
	7	Option - Shadow	
	8	Option - IDmax	
343	Gamma adjustment: Printer: Letter: Y		
	1	Offset - Highlight	Adjusts the offset data of the printer gamma for yellow in the printer/photo mode. (Screen H, SP7-904) [0 to 30 / **15** / 1]
	2	Offset - Middle	
	3	Offset - Shadow	
	4	Offset - IDmax	

8	Mode Number/Name		Function / [Setting]
343	5	Option - Highlight	**DFU** (SP7-904) [0 to 255 / **0** / 1]
	6	Option - Middle	
	7	Option - Shadow	
	8	Option - IDmax	
344	Gamma adjustment: Printer: Photo: K		
	1	Offset - Highlight	Adjusts the offset data of the printer gamma for black in the printer/photo mode. (Screen H, SP7-904) [0 to 30 / **15** / 1]
	2	Offset - Middle	
	3	Offset - Shadow	
	4	Offset - IDmax	
	5	Option - Highlight	**DFU** (SP7-904) [0 to 255 / **0** / 1]
	6	Option - Middle	
	7	Option - Shadow	
	8	Option - IDmax	
345	Gamma adjustment: Printer: Photo: C		
	1	Offset - Highlight	Adjusts the offset data of the printer gamma for cyan in the printer/photo mode. (Screen H, SP7-904) [0 to 30 / **15** / 1]
	2	Offset - Middle	
	3	Offset - Shadow	
	4	Offset - IDmax	
	5	Option - Highlight	**DFU** (SP7-904) [0 to 255 / **0** / 1]
	6	Option - Middle	
	7	Option - Shadow	
	8	Option - IDmax	
346	Gamma adjustment: Printer: Photo: M		
	1	Offset - Highlight	Adjusts the offset data of the printer gamma for magenta in the printer/photo mode. (Screen H, SP7-904) [0 to 30 / **15** / 1]
	2	Offset - Middle	
	3	Offset - Shadow	
	4	Offset - IDmax	
	5	Option - Highlight	**DFU** (SP7-904) [0 to 255 / **0** / 1]
	6	Option - Middle	
	7	Option - Shadow	
	8	Option - IDmax	
347	Gamma adjustment: Printer: Photo: Y		
	1	Offset - Highlight	Adjusts the offset data of the printer gamma for yellow in the printer/photo mode. (Screen H, SP7-904) [0 to 30 / **15** / 1]
	2	Offset - Middle	
	3	Offset - Shadow	
	4	Offset - IDmax	
	5	Option - Highlight	**DFU** (SP7-904) [0 to 255 / **0** / 1]
	6	Option - Middle	
	7	Option - Shadow	
	8	Option - IDmax	

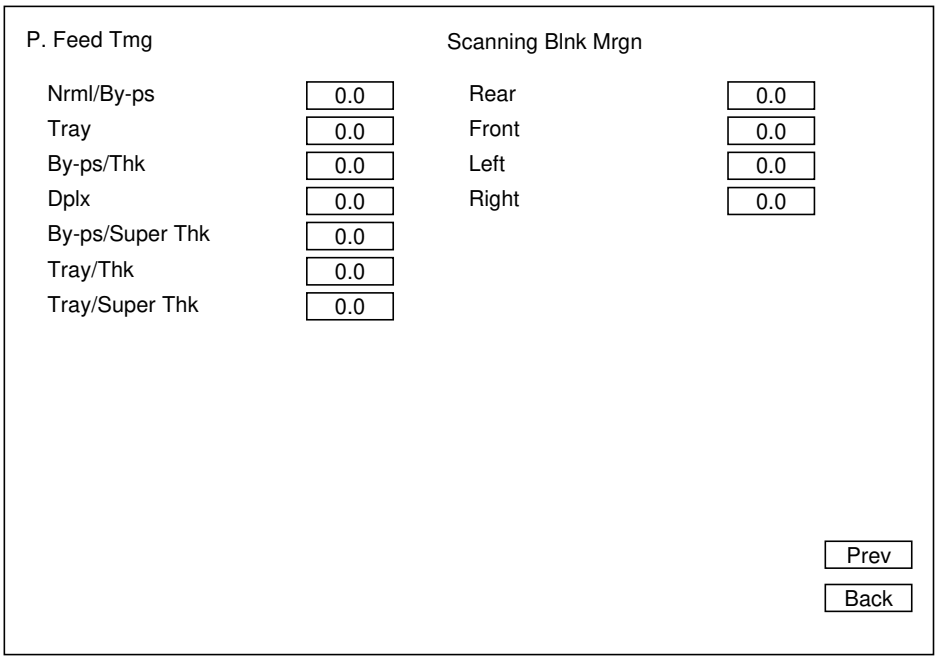
5.1.4 POP-UP SCREEN

SCREEN-A (1/2)



B023S501.WMF

SCREEN-A (2/2)



B023S502.WMF

SCREEN-B

Hot Rllr Temp	Single		Dplx
Hot: Reload	183	Hot: Idling	193
Hot: Idling	193	Hot: Nrml: FC	178
Hot: Nrml: FC	178	Hot: Nrml: 1C	168
Hot: Nrml: 1C	168	Hot: OHP/Thk: FC	178
Hot: OHP/Thk: FC	178	Hot: OHP/Thk: 1C	178
Hot: OHP/Thk: 1C	178	Pressure: Idling	160
Pressure: Idling	160	Pressure: Nrml: FC	155
Pressure: Nrml: FC	155	Pressure: Nrml: 1C	145
Pressure: Nrml: 1C	145	Pressure: OHP/Thk: FC	155
Pressure: OHP/Thk: FC	155	Pressure: OHP/Thk: 1C	155
Pressure: OHP/Thk: 1C	155		

Back

B023S503.WMF

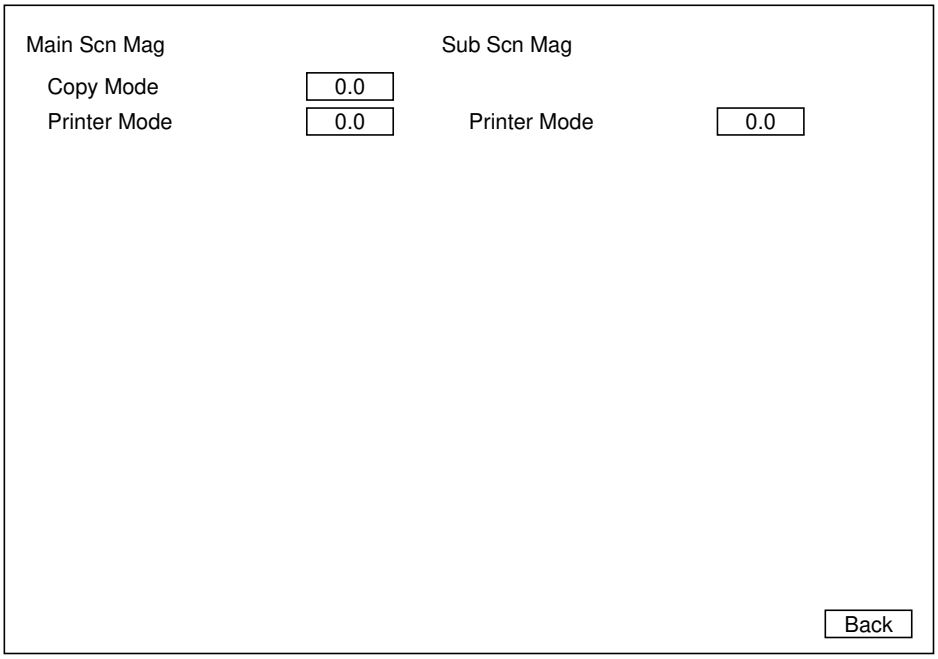
SCREEN-C

Lead Edge/SubScn		Trail/SubScn	
Nrml Paper	0.0	Nrml Pap Thk	0.0
Thk	0.0	Thk	0.0
Super Thk	0.0	Super ThOHP	0.0
OHP	0.0	OHP	0.0
		Auto Dplx: up	0.0
Main Scan			
Lead Edge	0.0		
Trail Edge	0.0		

Back

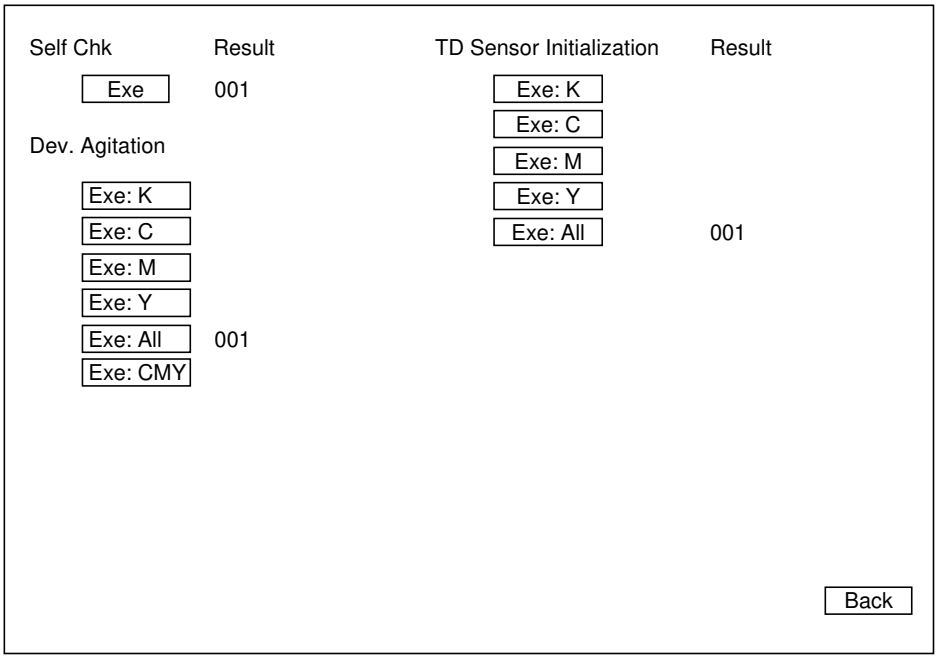
B023S504.WMF

SCREEN-D



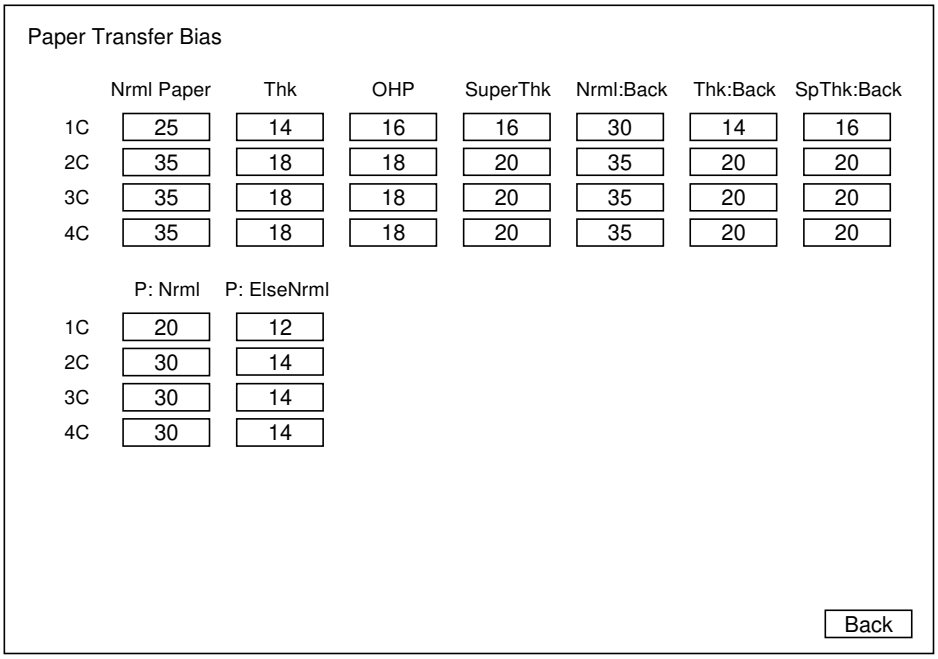
B023S505.WMF

SCREEN-E



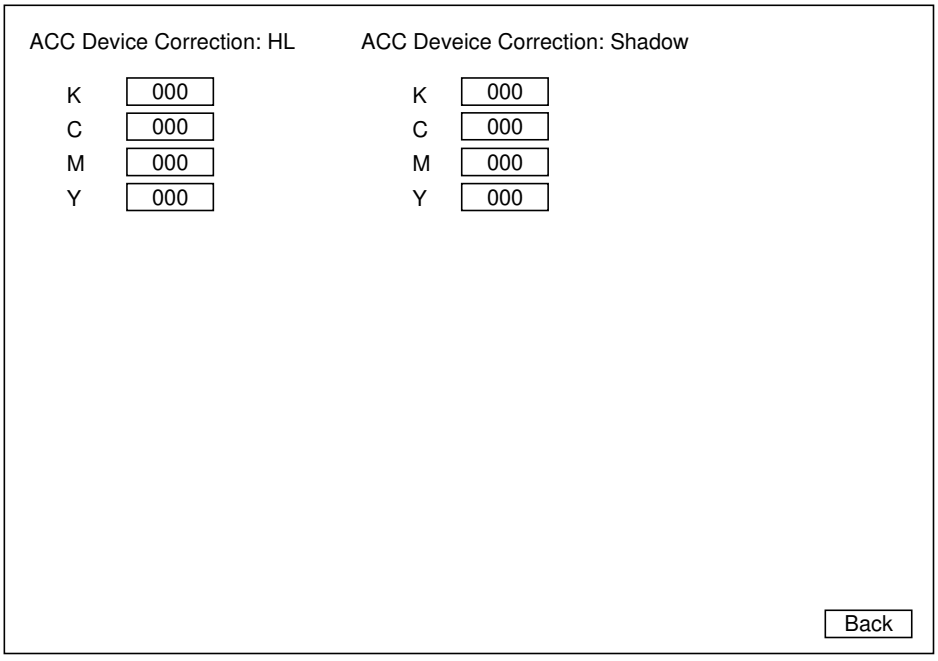
B023S506.WMF

SCREEN-F



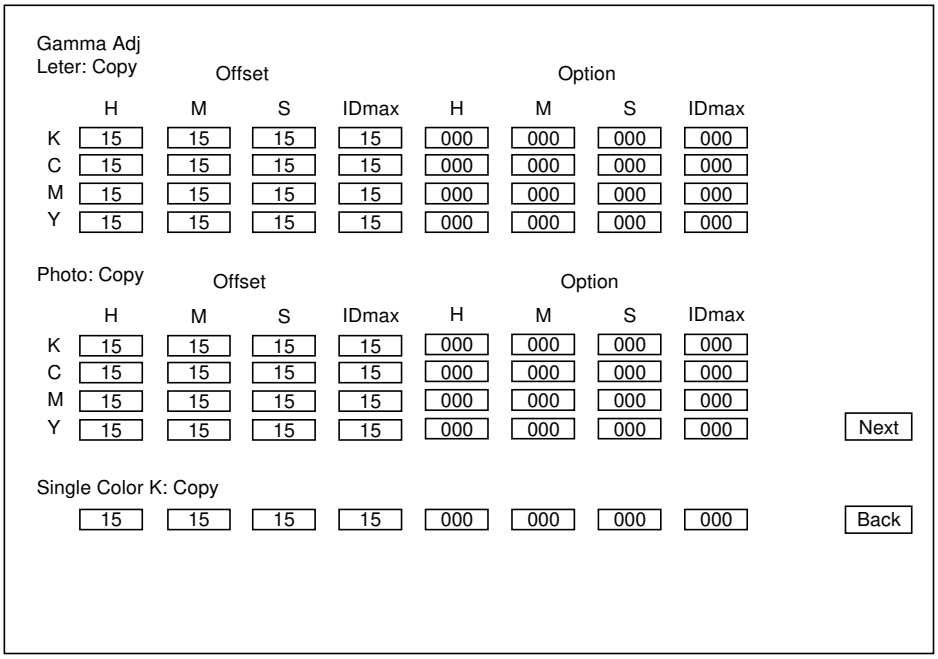
B023S507.WMF

SCREEN-G



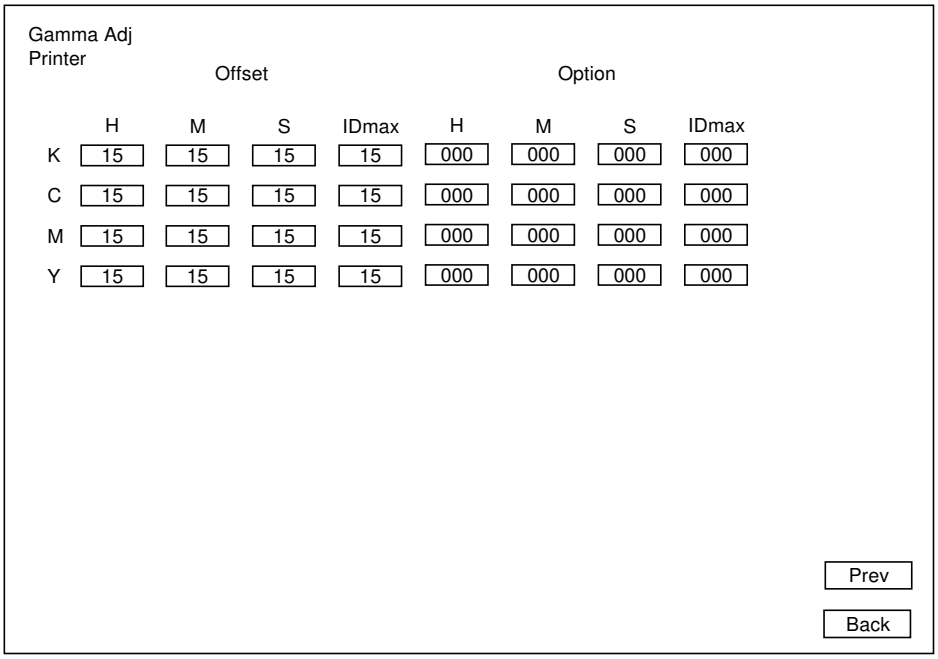
B023S508.WMF

SCREEN-H (1/2)



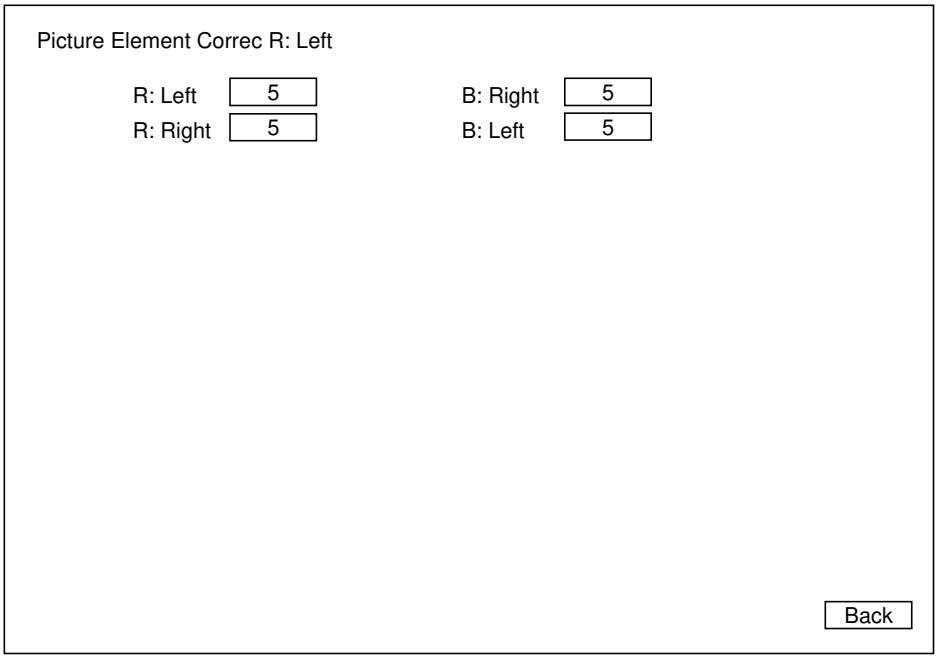
B023S509.WMF

SCREEN-H (2/2)



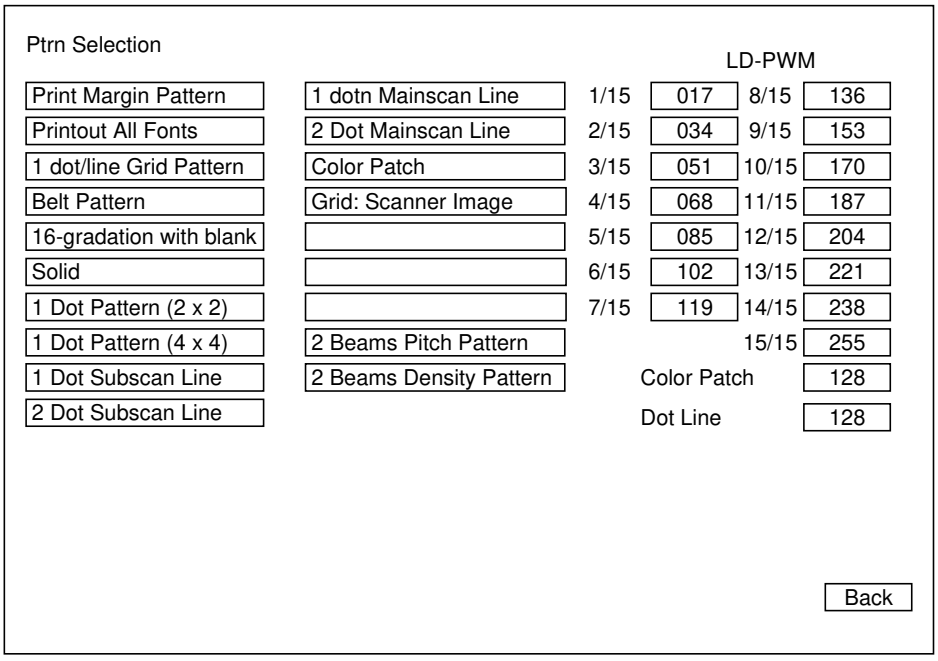
B023S510.WMF

SCREEN-I

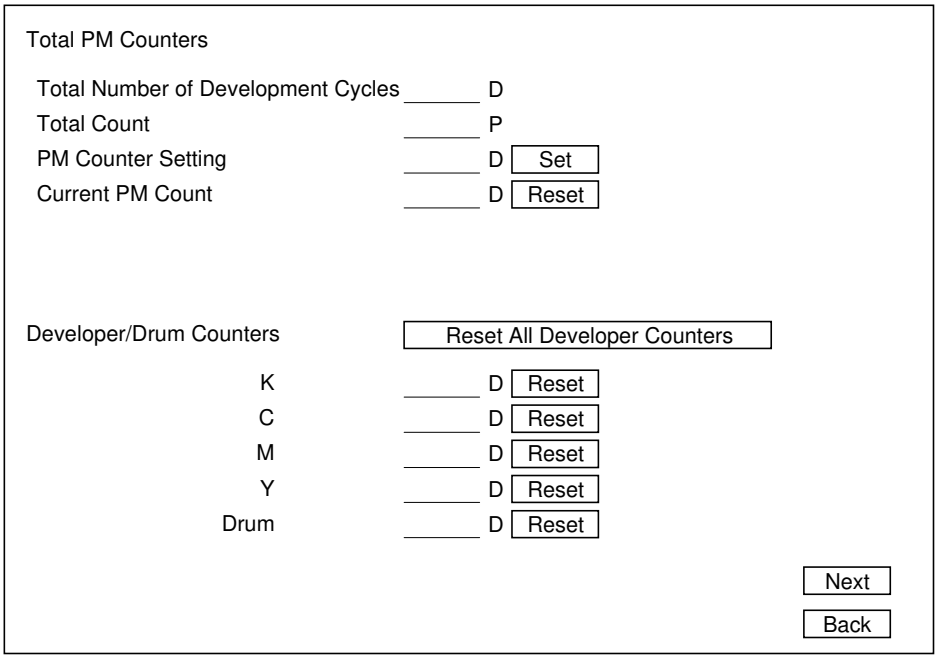


B023S511.WMF

SCREEN-J

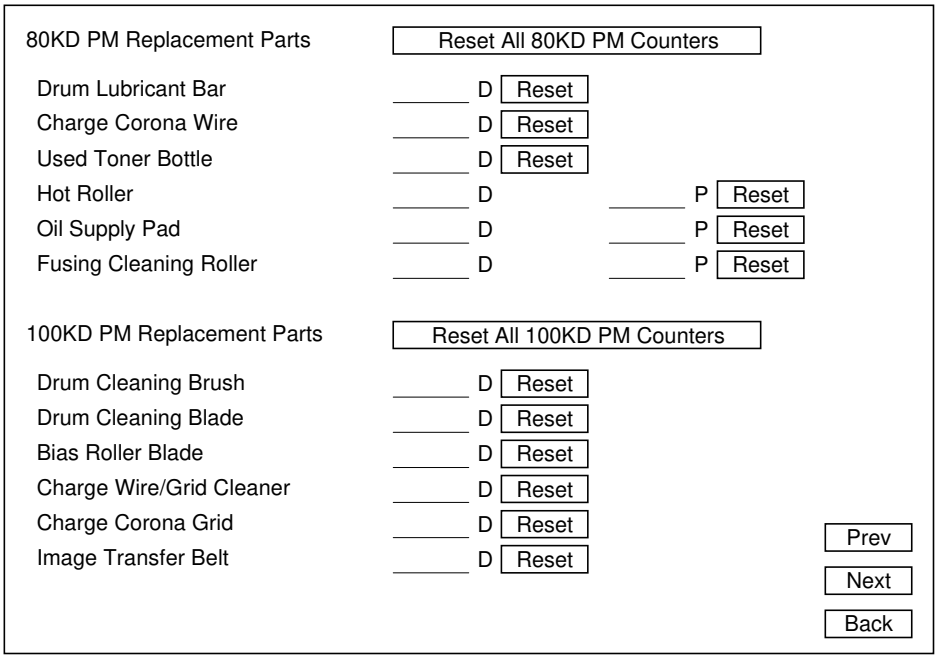


SCREEN-K (1/6)



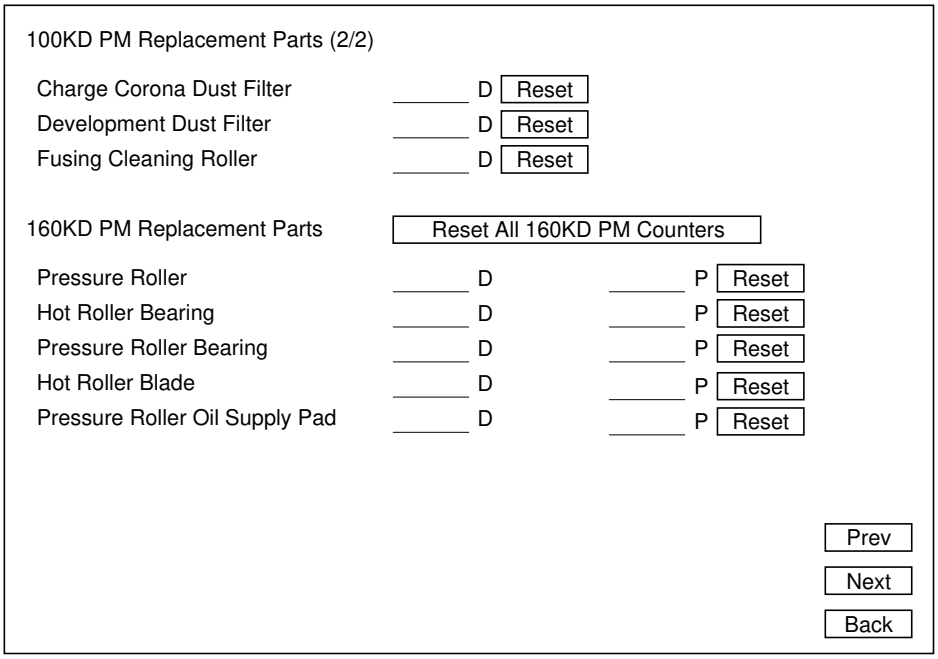
B023S512.WMF

SCREEN-K (2/6)



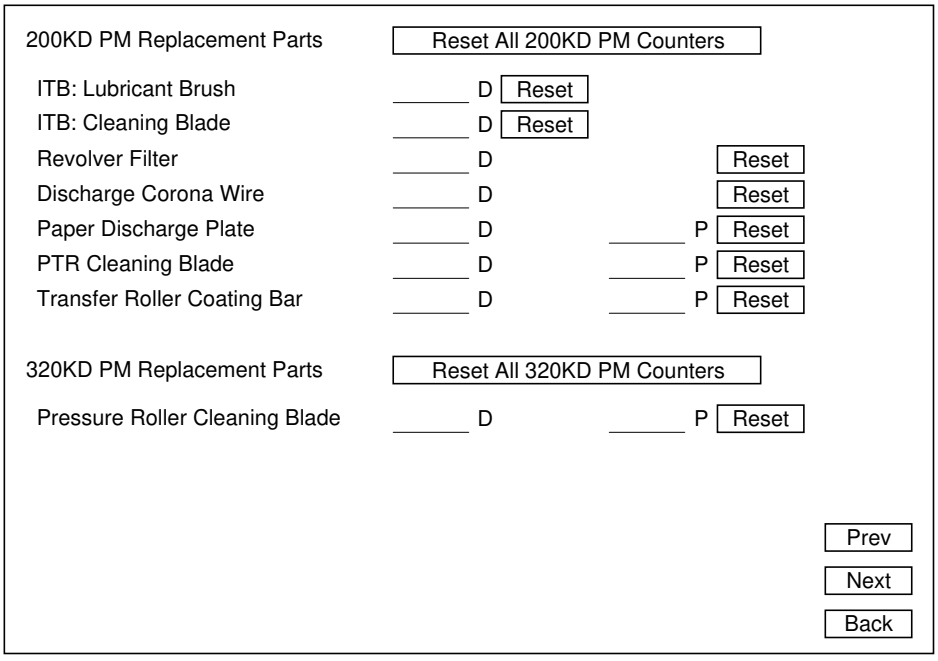
B023S513.WMF

SCREEN-K (3/6)



B023S514.WMF

SCREEN-K (4/6)



B023S515.WMF

SCREEN-K (5/6)

800KD PM Replacement Parts [Reset All 800KD PM Counters]

Exposure Lamp			D			[Reset]
Optics Dust Filter			D			[Reset]

Paper Feed Parts (1/2) [Reset All Paper Feed Parts Counters]

1st Tray	Pick-up Roller		D		P	[Reset]
1st Tray	Feed Roller		D		P	[Reset]
1st Tray	Reverse Roller		D		P	[Reset]
2nd Tray	Pick-up Roller		D		P	[Reset]
2nd Tray	Feed Roller		D		P	[Reset]
2nd Tray	Reverse Roller		D		P	[Reset]
3rd Tray	Pick-up Roller		D		P	[Reset]
3rd Tray	Feed Roller		D		P	[Reset]
3rd Tray	Reverse Roller		D		P	[Reset]

[Prev] [Next] [Back]

B023S516.WMF

SCREEN-K (6/6)

Paper Feed Parts (2/2)

Duplex Unit	Feed Roller		D		P	[Reset]
Duplex Unit	Reverse Roller		D		P	[Reset]
Duplex Unit	Bottom Plate Pad		D		P	[Reset]
By-pass Tray	Pick-up Roller		D		P	[Reset]
By-pass Tray	Feed Roller		D		P	[Reset]
By-pass Tray	Reverse Roller		D		P	[Reset]

Others [Reset All Counters]

LCT	Pick-up Roller		D		P	[Reset]
LCT	Feed Roller		D		P	[Reset]
LCT	Reverse Roller		D		P	[Reset]
ARDF	Transport Belt		D	[Reset]	P	
ARDF	Separation Belt		D	[Reset]	P	
ARDF	Feed Roller		D	[Reset]	P	

[Prev]

Print PM Counters [Print] [Back]

B023S517.WMF

5.1.5 SP4-301 APS OPERATION CHECK DETAILS

The table below shows the relationship between the codes that are displayed when you run "Check APS Operation (Size Display)" in SP4-301 and the paper sizes.

Code	Paper Size
0	No Original
1	A0, Sideways
2	A1, Sideways
3	A2, Sideways
4	A3, Sideways
5	A4, Sideways
6	A5, Sideways
7	A6, Sideways
8	A7, Sideways
9	B0, Sideways
10	B1, Sideways
11	B2, Sideways
12	B3, Sideways
13	B4, Sideways
14	B5, Sideways
15	B6, Sideways
16	B7, Sideways
17	Double postcard, Sideways (200 mm x 148 mm)
18	Postcard, Sideways (A6)
19	Line slider 1, Sideways (210 mm x 170 mm)
20	Line slider 2, Sideways (300 mm x 250 mm)
21	Book card 1 (six-folded), Sideways (276 mm x 225 mm)
22	Book card 2 (six-folded), Sideways (300 mm x 250 mm)
23to31	Not used
32	17" x 11"
33	14" x 11"
34	15" x 10"
35	14" x 10"
36	14" x 8 1/2"
37	13" x 8 1/2"
38	11" x 8 1/2"
39	14" x 8 1/2"
40	13" x 8 1/2"
41	13" x 8"
42	10 1/2" x 8"
43	10" x 8"
44	8 1/2" x 5 1/2"
45to127	Not used
128	Unidentifiable size
129	A0, Lengthwise
130	A1, Lengthwise
131	A2, Lengthwise
132	A3, Lengthwise
133	A4, Lengthwise
134	A5, Lengthwise
135	A6, Lengthwise
136	A7, Lengthwise
137	B0, Lengthwise
138	B1, Lengthwise

Code	Paper Size
139	B2, Lengthwise
140	B3, Lengthwise
141	B4, Lengthwise
142	B5, Lengthwise
143	B6, Lengthwise
144	B7, Lengthwise
145	Double postcard, Lengthwise (148 mm x 200 mm)
146	Postcard, Lengthwise (A6)
147	Line slider 1, Lengthwise (170 mm x 210 mm)
148	Line slider 2, Lengthwise (210 mm x 340 mm)
149	Book card 1 (six-folded), Lengthwise (225 mm x 276 mm)
150	Book card 2 (six-folded), Lengthwise (250 mm x 300 mm)
151to159	Not used
160	11" x 17"
161	11" x 14"
162	10" x 15"
163	10" x 14"
164	8 1/2" x 14"
165	8 1/2" x 13"
166	8 1/2" x 11"
167	8 1/4" x 14"
168	8 1/4" x 13"
169	8" x 13"
170	8" x 10 1/2"
171	8" x 10"
172	5 1/2" x 8 1/2"
173to191	Not used
192	FPU MAX SIZE (145 mm x 217.2 mm)
193	35 mm film S
194	35 mm film M
195	4" x 5"
196	60 mm x 45 mm
197	60 mm x 60 mm
198	60 mm x 70 mm
199	60 mm x 80 mm
200	60 mm x 90 mm

NOTE: The table shows the relationship between the registered code numbers and the available paper sizes. This does not mean that all of the above paper sizes can be recognized by APS. For the paper sizes that APS can recognize, see "Basic Specifications" and "Scanner" section descriptions.

5.1.6 TEST PATTERN

NOTE: The data selected for the test pattern in the following SP modes will not be automatically reset to the default "000" when you exit the SP mode. Make sure you reset the data to "000" after the test is finished.

IPU Test Pattern (SP4-417)

3rd level	Description
000	No pattern
001	Grid pattern
002	Slanted grid pattern
003	256 gradation (Horizontal)
004	256 gradation (Vertical)
005	Color patch
006	RGB gray scale (16 gradation steps)
007	YMCK-RGB 16 gradation
008	YMCK 16 gradation
009	YMCK 128 gradation
010	No pattern
011	Uneven check
012	Banding check 1
013	Banding check 2

LD Control Board Test Pattern (SP4-907)

3rd level	Description
000	No pattern
001	Black pattern
002	White pattern
003	16 gradation pattern
004	4 dot grid pattern
005	2 dot grid pattern

5.1.7 SP5-803 INPUT CHECK

The table below lists the items of the main unit input check.

COPIER

No.	Sensor/Switch/Signal	Status	
		0	1
1	Drum motor: Motor OK signal	OK	NG
2	Fusing motor: Motor OK signal	OK	NG
3	Paper feed motor: Motor OK signal	NG	OK
4	ITB motor: Motor OK signal	OK	NG
5	PTR motor: Motor OK signal	OK	NG
6	Polygon motor: Motor OK signal	NG	OK
7	Wire cleaner motor: Motor OK signal	OK	NG
8	Drum peripheral component motor: Motor OK signal	OK	NG
9	Toner cartridge set sensor	Detected (Set)	Not detected
10	Toner end sensor	Detected (End)	Not detected
11	PTR contact/release sensor	Touch	Release (at H.P.)
12	ITB cleaning H.P. sensor	Release (at H.P.)	Touch
13	Toner overflow sensor	Not detected	Detected
14	1st paper tray upper limit sensor	Detected	Not detected
15	Not used	—	—
16	2nd paper tray upper limit sensor	Detected	Not detected
17	3rd paper tray upper limit sensor	Detected	Not detected
18	1st paper feed sensor	Detected (paper)	Not detected
19	Not used	—	—
20	2nd paper feed sensor	Detected (paper)	Not detected
21	3rd paper feed sensor	Detected (paper)	Not detected
22	Not used	—	—
23	1st paper end sensor	Not detected	Detected (End)
24	Not used	—	—
25	2nd paper end sensor	Not detected	Detected (End)
26	3rd paper end sensor	Not detected	Detected (End)
27	By-pass paper end sensor	Not detected	Detected (End)
28	2nd tray paper size switch - SW1	Actuated	Not actuated
29	2nd tray paper size switch - SW2	Actuated	Not actuated
30	2nd tray paper size switch - SW3	Actuated	Not actuated
31	2nd tray paper size switch - SW4	Actuated	Not actuated
32	2nd tray paper size switch - SW5	Actuated	Not actuated
33	3rd tray paper size switch - SW1	Actuated	Not actuated
34	3rd tray paper size switch - SW2	Actuated	Not actuated
35	3rd tray paper size switch - SW3	Actuated	Not actuated
36	3rd tray paper size switch - SW4	Actuated	Not actuated
37	3rd tray paper size switch - SW5	Actuated	Not actuated
38	By-pass paper width detection board - SW1	Actuated	Not actuated
39	By-pass paper width detection board - SW2	Actuated	Not actuated
40	By-pass paper width detection board - SW3	Actuated	Not actuated
41	By-pass paper width detection board - SW4	Actuated	Not actuated
42	By-pass paper length sensor	Not actuated	Actuated
43	1st paper height sensor	Actuated	Not actuated
44	Not used	—	—
45	2nd paper height sensor	Actuated	Not actuated
46	3rd paper height sensor	Actuated	Not actuated
47	Not used	—	—
48	Not used	—	—
49	1 tray set switch	Actuated	Not actuated
50	Not used	—	—
51	By-pass table sensor	Open	Close
52	Registration sensor	Not detected	Detected (paper)
53	Duplex side fence H.P. sensor	Detected (H.P.)	Not detected

No.	Sensor/Switch/Signal	Status	
		0	1
54	Duplex end fence H.P. sensor	Detected (H.P.)	Not detected
55	Duplex entrance sensor	Detected (paper)	Not detected
56	Duplex turn sensor	Not detected	Detected (paper)
57	Duplex paper end sensor	Not detected	Detected (End)
58	Duplex unit set detection	Detected (set)	Not detected
59	Paper exit sensor	Detected (paper)	Not detected
60	Oil end sensor	Detected (End)	Not detected
61	Duplex turn guide sensor	Detected (paper)	Not detected
62	Front door switch	Open	Close
63	Vertical transport door switch - SW1	Open	Close
64	Vertical transport door switch - SW2	Open	Close
65	Paper Exit door switch	Open	Close
66	PCC current leak detection	Detected (Leak)	Not detected
67	Paper separation corona current leak detection (D)	Detected (Leak)	Not detected
68	Charge corona current leak detection (C)	Detected (Leak)	Not detected
69	ITB lubricant brush current leak detection (Q1)	Detected (Leak)	Not detected
70	PTR discharge corona current leak detection (Q2)	Detected (Leak)	Not detected
71	Paper separation sensor	Not detected	Detected (paper)
72	Key counter OK detection	OK	NG
73	Key card OK detection (Used in Japan market only)	OK	NG
74	Total counter check 1	Not activated	Activated
75	Total counter check 2	Not activated	Activated
100	Scanner H.P. sensor	Not detected	Detected (H.P.)
101	Platen cover position sensor	Open	Close

LCT

Input No.	Sensor/Switch/Signal	Status	
		0	1
110	Tray cover switch	Close	Open
111	LCT set sensor	Close	Open
112	Lift sensor	Not detected	Detected (limit)
113	Lower limit sensor	Not detected	Detected (limit)
114	Relay sensor	Not detected	Detected (paper)
115	Paper end sensor	Not detected	Detected (paper end)

SORTER

Input No.	Sensor/Switch/Signal	Status	
		0	1
120	Entrance sensor	Not detected	Detected (paper)
121	Proof exit sensor	Not detected	Detected (paper)
122	Bin jam sensor (at entrance area of bins)	Not detected	Detected (paper)
123	Bin jam sensor (on the bins)	Not detected	Detected (paper)
124	Bin H.P. sensor	Not detected	Detected (H.P.)
125	Wheel sensor	Not detected	Detected (H.P.)
126	Bin: rear plate open sensor	Not detected	Detected (open)
127	Bin: rear plate close sensor	Not detected	Detected (close)
128	Jogger H.P. sensor	Not detected	Detected (H.P.)
129	Grip H.P. sensor	Not detected	Detected (H.P.)
130	Stapler unit H.P. sensor	Not detected	Detected (H.P.)
131	Stapler H.P. sensor	Not detected	Detected (H.P.)
132	Staple end switch	Not detected	Detected (End)
133	Paper sensor	Not detected	Detected (paper)
134	Door safety switch	Close	Open
135	Not used	—	—
136	Inverter sensor	Not detected	Detected (H.P.)
137	Grip unit H.P. sensor	Not detected	Detected (H.P.)
138	Cartridge set switch	Not detected	Detected (Set)
139	Staple unit set detection	Not detected	Detected (Set)
140	Staple unit pull-out position sensor	Detected (H.P.)	Not detected

ADF

Input No.	Sensor/Switch/Signal	Status	
		0	1
150	Original width sensor 3	Not activated	Activated
151	Original width sensor 2	Not activated	Activated
152	Original width sensor 1	Not activated	Activated
153	Registration sensor	Not detected	Detected (original)
154	Feed-out sensor	Not detected	Detected (original)
155	DF position sensor	Open	Close
156	ADF position sensor	Close	Open
157	Feed-in: cover open sensor	Open	Close
158	Feed-out: cover open sensor	Open	Close

5.1.8 SP5-804 OUTPUT CHECK

The table below lists the items of the main unit output check.

COPIER

No.	Electrical Component
1	Drum motor (standard speed, forward)
2	Drum motor (half speed, forward)
3	Drum motor (standard speed, reverse)
4	Not used
5	Fusing motor (standard speed)
6	Fusing motor (half speed)
7	Not used
8	Paper feed motor (standard speed)
9	Paper feed motor (half speed)
10	Not used
11	Drum peripheral component motor
12	Wire cleaner motor (forward)
13	Wire cleaner motor (reverse)
14	PCC
15	QL
16	Main charge corona & grid (C & G)
17	Development bias (AC)
18	Development bias (DC)
19	Development bias (AC + DC)
20	Drum cleaning brush bias (BR)
21	ID sensor LED
22	Development clutch
23	PTR shift clutch
24	Not used
25	Toner supply clutch
26	Revolver motor current (rotation)
27	Revolver motor current (development)
28	Revolver motor current (stand-by)
29	Revolver rotation (90o)
30	Not used
31	Not used
32	ITB motor (standard speed, forward)
33	ITB motor (half speed, forward)
34	ITB motor (standard, reverse)
35	ITB bias (T1)
36	ITB cleaning drive clutch
37	ITB cleaning shift clutch
38	ITB lubricant brush bias (Q1)
39	PTR motor (standard, forward)
40	PTR motor (half speed, forward)
41	PTR bias
42	PTR discharge (Q2)
43	Not used
44	Power relay (printer)
45	Hot roller fusing lamp
46	Pressure roller fusing lamp
47	Charge fan
48	Transport fan
49	Exhaust fan
50	Fusing fan (standard speed)
51	Fusing fan (half speed)
52	ID sensor fan
107	Not used

No.	Electrical Component
53	Not used
54	Development cooling fan (standard speed)
55	Development cooling fan (half speed)
56	Fusing fan (upper)
57	Not used
58	Paper feed drive clutch
59	By-pass feed clutch
60	Main by-pass pick-up solenoid
61	Sub by-pass pick-up solenoid
62	By-pass reverse roller solenoid
63	1st paper feed clutch
64	1st pick-up solenoid
65	1st reverse roller solenoid
66	Not used
67	Not used
68	Not used
69	2nd paper feed clutch
70	2nd pick-up solenoid
71	2nd reverse roller solenoid
72	3rd paper feed clutch
73	3rd pick-up solenoid
74	3rd reverse roller solenoid
75	1st tray lift motor (forward)
76	1st tray lift motor (reverse)
77	Not used
78	Not used
79	2nd tray lift motor (forward)
80	2nd tray lift motor (reverse)
81	3rd tray lift motor (forward)
82	3rd tray lift motor (reverse)
83	Registration motor (providing power)
84	Registration motor (standard speed)
85	Registration motor (half speed)
86	Not used
87	Not used
88	Junction gate solenoid
89	Duplex feed motor (forward)
90	Not used
91	Duplex feed motor (reverse)
92	Not used
93	Side fence jogger motor (forward)
94	Side fence jogger motor (reverse)
95	End fence jogger motor (forward)
96	End fence jogger motor (reverse)
97	Not used
100	Optics exhaust fan
101	Optics cooling fan 1
102	Optics cooling fan 2
103	IPU cooling fan
104	Scanner motor (provide power)
105	Exposure lamp
106	Power relay (scanner)

To activate the revolver motor 45 or 90 degree, No. 26 “Revolver motor current (rotation)” needs to be ON.

OPTIONS (SORTER, ADF)

No.	Electrical Component
120	Sorter: Transport motor (Proof mode)
121	Sorter: Transport motor (Sort mode)
122	Sorter: Exit motor
123	Sorter: Turn gate solenoid
124	Sorter: Bin Motor
125	Sorter: Bin rear plate motor
126	Sorter: Grip motor
127	Sorter: Grip shift motor
128	Sorter: Staple unit motor
129	Sorter: Stapler motor

No.	Electrical Component
130	Sorter: Reverse solenoid
131	Sorter: Jogger Motor
133	Same as 131
150	ADF: Feed-in motor (forward)
151	ADF: Feed-in motor (reverse)
152	ADF: Belt drive motor (forward)
153	ADF: Belt drive motor (reverse)
154	ADF: Feed-out motor
155	ADF: Inverter solenoid
156	ADF: Indicators ON

5.1.9 SP5-955 PRINTER INTERNAL PATTERN

5-955-018: Internal Pattern Types

The default values and printer internal patterns, which are generated in the LD control board, are listed below.

0: No pattern
1: Print margin pattern
2: Print out all fonts
3: 1 dot/line grid pattern
4: Belt pattern
5: 16-gradation with blank
6: Solid
7: 1 dot pattern (2x2)
8: 1 dot pattern (4x4)
9: 1 dot sub scan line
10: 2 dot sub scan line
11: 1 dot main scan line
12: 2 dot main scan line
13: Color patch
14: Grid scanner image
18: 2 beams pitch pattern
19: 2 beams density pattern

5-955-001 LOAD_PWM (dot, line):
Specifies the LD output level (determines the test pattern gradations for SP5-955-1 through -4, -6 through -14, and -18 through -19).

5-955-002 to 5-955-016 LD_PWM (16 gradations):
Specifies the LD output level (determines the output levels (gradations) of 16 grayscales in SP5-955-5, -16, and -17).

002: 1/15: 2nd level setting
•
•
016: 15/15: 16th level setting

5-955-17 LD_PWM (trailing edge color patch half tone):
Specifies the LD output level (determines the half-tone gradations of the trailing edge color patch in SP5-955-13).

5.2 USER TOOLS

5.2.1 HOW TO ENTER USER TOOLS

Press the “User Tools” key to enter user tools mode

5.2.2 DETAILED DESCRIPTION OF USER TOOLS

See “User Tools” in “Changing the machine setting” of Operating Instructions.

5.3 TP/SW/LED/FUSE

5.3.1 MAIN CONTROL BOARD TEST PINS

TP NO.	Signal Name	Description	Stand-by (V)	Remarks
TP101	GND	Ground terminal	0	
TP102	GND	Ground terminal	0	
TP103	BLTPTN	Transfer belt mark detection signal	0 to 5.0	
TP104	/FGATE	/BFGATE signal from the LD control	0 to 5.0	Active L
TP105	/Z_CROSS	Zero-cross signal	0 to 5.0	Active L
TP106	FB_T2	PTR bias (T2) feedback signal	0 to 5.0	
TP107	FB_T1	ITB bias (T1) feedback signal	0 to 5.0	
TP108	FB_G	Grid bias (G) feedback signal	0 to 5.0	
TP109	FB_C	Charge corona bias (C) feedback signal	0 to 5.0	
TP110	ENGY	Save Energy mode	0 to 5.0	Active H
TP111	FB_BDC	Development bias (DC) feedback signal	0 to 5.0	
TP112	TMP	Temperature	0 to 5.0	
TP113	HUM	Humidity	0 to 5.0	
TP114	P_SEN2	ID sensor: YMC	0 to 5.0	
TP115	P_SEN1	ID sensor: K	0 to 5.0	
TP116	V_SEN	Potential sensor	0 to 5.0	
TP117	UPHT_TH	Hot roller thermistor	0 to 5.0	
TP118	LWHT_TH	Pressure roller thermistor	0 to 5.0	
TP119	ANGND	Analog ground terminal	0	
TP120	+5V	5V line	5	
TP121	CLK	System clock	0 to 5.0	Set to 20 MHz when the CPU starts.
TP122	/AS	**Factory use**		
TP123	/RESET	**Factory use**		
TP124	–INT G3	Factory use		
TP125	–ING G1	Factory use		
TP126	–ING G2	Factory use		
TP127	/IACK	**Factory use**		
TP128	/DSACK1	**Factory use**		
TP129	/DSACK0	**Factory use**		
TP130	+5VB	5V line	5.0	(Held off in the Energy Star mode)
TP131	GND	Ground terminal	0	
TP132	/DME	This signal is generated when the IPU sends all lines of the image data used in the editing function to the main control board.	0 to 5.0	If the screen is blank after scanning the image, check this point. Active L
TP133	X–	Touch Panel X-axis: Ground	0 to 5.0	
TP134	Y–	Touch panel Y-axis: Ground	0 to 5.0	
TP135	X+	Touch Panel X-axis: Power source	0 to 5.0	
TP136	Y+	Touch panel Y-axis: Power source	0 to 5.0	
TP137	/VRAM	**Factory use**		
TP137	YD	**Factory use**		
TP138	LP	**Factory use**		
TP139	XCK	**Factory use**		
TP140	GND	Ground terminal	0	
TP141	GND	Ground terminal	0	

5.3.2 LD MAIN CONTROL BOARD TEST PINS

Pin No.	Signal Level	Signal	Function
TP14	0V	Signal ground	Signal ground (can be used as GND during test)
TP31	0 to 5V	FGATE signal based on belt mark	Frame gate (FGATE) signal is generated by the LD control based on the belt mark signal
TP36	0 to 5V	Laser synchronizing signal	When beam reaches to the detector, it outputs 0 V. The detector outputs 2 signals at 346 μsec frequency during image writing.
TP37	0 to 5V	Printer line synchronizing signal	Low (0V) pulses are generated at 173 μsec frequency during image writing.
TP41	0 to 5V	Belt mark detection signal	Belt mark signal from the image transfer belt
TP47	0V	Signal ground	Signal ground (can be used as GND during test)

5.3.3 I/O CONTROL BOARD TEST PINS

Location	TP No.	IN/OUT	Name	Stand-by(V)	Remarks
A-1	TP101	IN	Toner end sensor	0 to 5.0	ON: Low, OFF: High
C-1	TP102	IN	Potential sensor	0 to 5.0	
B-1	TP103		GND (5V)	0	
C-1	TP104	IN	ITB cleaning unit H.P. sensor	0 to 5.0	Unit contact: High, Unit released: Low
B-1	TP105	IN	Fusing motor: OK signal	0 to 5.0	Constant-speed motor rotation: Low
A-1	TP106	IN	Toner cartridge set sensor	0 to 5.0	Cartridge present: Low, No cartridge: High
B-1	TP107	IN	Registration sensor	0 to 5.0	Paper present: High, No paper: Low
D-2	TP108	IN	Drum peripheral component motor: OK signal	0 to 5.0	ON: Low
C-2	TP109	IN	Registration motor: clock	5V pulse	
A-2	TP110	IN	Discharge sensor	0 to 5.0	Not used.
B-2	TP111		(ID sensor LED)		
B-2	TP112	OUT	Wire cleaner motor: trigger	0 to 5.0	
A-2	TP113	IN	Revolver H.P. sensor	0 to 5.0	H.P. position: High
C-2	TP114	IN	Registration motor: trigger	0 to 5.0	
C-2	TP115	OUT	Wire cleaner motor: current	0 to 5.0	
D-2	TP116	OUT	Paper separation corona (D): PWM	5V pulse	
B-2	TP117	IN	Development bias (DC): feedback	0 to 5.0	
B-2	TP118	OUT	Wire cleaner motor: forward/reverse	0 to 5.0	Forward: High Reverse: Low
D-2	TP119	OUT	Drum peripheral component motor: trigger	0 to 5.0	ON: Low
D-2	TP120	OUT	Transport fan	0 to 5.0	ON: Low
E-2	TP121	OUT	PTR pressure motor	0 to 5.0	
A-2	TP122	IN	ID sensor: YMC		
A-2	TP123	IN	ID sensor: K		
D-2	TP124		Drum motor gain	0 to 5.0	
B-2	TP125	OUT	PTB bias (T2): trigger	0 to 5.0	
B-2	TP126	OUT	ITB bias (T2): PWM	5V pulse	

Location	TP No.	IN/OUT	Name	Stand-by(V)	Remarks
D-2	TP127	OUT	Drum peripheral component motor gain.	0 to 5.0	
D-2	TP128	OUT	PTR shift clutch	0 to 5.0	ON: Low
E-2	TP129	IN	Paper separation corona (D): leak detection	0 to 5.0	Leak sensed: Low, Normal: 5V
C-2	TP130	OUT	Development bias (DC): trigger	0 to 5.0	
D-2	TP131	OUT	Drum motor: forward/backward	0 to 5.0	
D-2	TP132	OUT	Wire cleaner motor: power up	0 to 5.0	
D-2	TP133	OUT	GND (5V)		
E-2	TP134	IN	PTR unit H.P. sensor	0 to 5.0	Unit up (contact): Low, Down (release): High
E-2	TP135		5V		
C-2	TP136	OUT	Development bias (DC): PWM	0 to 5.0	
D-2	TP137	OUT	By-pass feed table lift motor: forward	0 to 5.0	
C-2	TP138	OUT	Fusing fan (upper): half speed	0 to 5.0	
D-2	TP139	OUT	Drum peripheral component motor clock	0 to 5.0	
B-2	TP140	IN	Charge grid (G): feedback	0 to 5.0	
B-2	TP141	IN	PTR bias (T2): feedback	0 to 5.0	
C-2	TP142	OUT	Charge grid (G): trigger	0 to 5.0	
D-2	TP143	OUT	By-pass feed table lift motor: reverse	0 to 5.0	
B-2	TP144	IN	Charge current feedback	0 to 5.0	
C-2	TP145	OUT	ID sensor fan	0 to 5.0	ON: Low
D-2	TP146	OUT	By-pass paper feed clutch	0 to 5.0	ON: Low
E-2	TP147	OUT	By-pass reverse roller Solenoid	0 to 5.0	ON: Low
D-2	TP148	IN	Wire cleaner motor: over current detection	0 to 5.0	
B-2	TP149	OUT	Charge (C): trigger	0 to 5.0	ON: Low, OFF: 5V
B-2	TP150	OUT	Charger PWM	0 to 5.0	
C-2	TP151	OUT	Charge grid (G): PWM	0 to 5.0	
C-2	TP152	OUT	Charge corona fan	0 to 5.0	
D-3	TP153		GND (24V)	0	
E-3	TP154	OUT	By-pass pick-up solenoid	0 to 5.0	ON: Low
D-3	TP155	OUT	Sub by-pass pick-up solenoid	0 to 5.0	ON: Low
B-3	TP156	OUT	ITB cleaning shift CL	0 to 5.0	ON: Low
B-3	TP157	OUT	ITB cleaning drive clutch	0 to 5.0	ON: Low, OFF: 5V
C-3	TP158	IN	Drum motor: OK signal	0 to 5.0	Motor constant-speed rotation: Low
C-3	TP159	OUT	Fusing fan (bottom)	0 to 5.0	ON: Low, OFF: 5V
B-3	TP160	OUT	Toner supply CL	0 to 5.0	ON: Low, OFF: 5V
B-3	TP161	OUT	Development CL	0 to 5.0	ON: Low, OFF: 5 V
D-3	TP162	IN	By-pass feed unit switch	0 to 5.0	
B-3	TP163	IN	ITB lubricant brush bias (Q1): leak detection	0 to 5.0	
C-3	TP164	OUT	Junction gate SOL	0 to 5.0	ON: Low, OFF: 5V
C-3	TP165	OUT	Fusing motor clock	0 to 5.0	
D-3	TP166	IN	By-pass feed table lift motor upper limit	0 to 5.0	
E-3	TP167	IN	By-pass feed table open/close	0 to 5.0	Low: Open High: Close
B-3	TP168		GND (24V)	0	
C-3	TP169	OUT	Drum motor: trigger	0 to 5.0	ON: Low, OFF: 5V
C-3	TP170	OUT	Fusing motor: trigger	0 to 5.0	ON: Low, OFF: High
B-3	TP171	OUT	ID sensor LED (PWM)	0 to 5.0	
B-3	TP172	OUT	Revolver motor current switch: 2A	0 to 5.0	High: 2A
D-3	TP173	IN	By-pass feed table lift motor lower limit	0 to 5.0	
E-3	TP174	IN	By-pass paper length sensor	0 to 5.0	Sensed: High

Location	TP No.	IN/OUT	Name	Stand-by(V)	Remarks
C-3	TP175	OUT	Fusing motor: speed 2	0 to 5.0	
C-3	TP176	OUT	Fusing motor: speed 1	0 to 5.0	Low: Standard speed High: Half speed
B-3	TP177	OUT	Revolver motor current switch: 1A	0 to 5.0	High: 1A
E-3	TP178	IN	1st paper feed sensor	0 to 5.0	Paper present: High, No paper present: Low
B-3	TP179	OUT	Development bias (AC): trigger	0 to 5.0	ON: Low, OFF: 5V
A-5	TP180	IN	Paper exit sensor	0 to 5.0	Paper present: High, No paper present: Low
C-3	TP181	OUT	Development cooling fan (front)	0 to 5.0	
C-3	TP182	OUT	Fusing fan (upper)	0 to 5.0	
B-3	TP183	OUT	ITB lubricant brush bias (Q1): PWM	0 to 5.0	
E-3	TP184	IN	By-pass paper end sensor	0 to 5.0	Paper present: Low, No paper present: High
E-5	TP185	IN	Duplex paper feed sensor	0 to 5.0	Paper present: High, No paper present: Low
A-5	TP186	IN	Fusing unit set detection	0 to 5.0	
E-3	TP187	IN	PTR pressure H.P.	0 to 5.0	
B-3	TP188	IN	Belt mark detection	0 to 5.0	Mark detection: High
C-4	TP189	OUT	Fusing fan half speed	0 to 5.0	
C-4	TP190	OUT	QL	0 to 5.0	ON: Low
B-4	TP191	OUT	ITB lubricant brush bias (Q1): trigger	0 to 5.0	
A-5	TP192	IN	Oil end sensor	0 to 5.0	Oil present: High, Empty: Low
B-4	TP193	OUT	Drum motor clock	0 to 5.0	
D-4	TP194	IN	By-pass paper width sensor: 4	0 to 5.0	Open: High Detection: Low
D-4	TP195	OUT	1st tray lift motor: reverse	0 to 5.0	
E-4	TP196	IN	By-pass: paper width sensor: 2	0 to 5.0	Open: High Detection: Low
E-4	TP197	IN	Bypass: paper width sensor: 1	0 to 5.0	Open: High Detection: Low
D-4	TP198	IN	By-pass paper width sensor: 3	0 to 5.0	Open: High Detection: Low
D-4	TP199	OUT	1st tray lift motor: forward	0 to 5.0	ON: High
E-4	TP200		—		
D-4	TP201	IN	Registration motor: power down	0 to 5.0	
D-4	TP202	OUT	Duplex power supply (24V)	0 to 5.0	
E-4	TP203		—		
D-4	TP204	OUT	ITB pressure release solenoid: set	0 to 5.0	
D-4	TP205	OUT	ITB pressure release solenoid: reset	0 to 5.0	
C-4	TP206	IN	PTR pressure	0 to 5.0	
D-4	TP207	IN	Registration motor: power down	0 to 5.0	
B-5	TP208		5V		
C-4	TP209	IN	Registration motor: current	0 to 5.0	
D-5	TP210		—		
D-5	TP211	OUT	1st paper feed clutch	0 to 5.0	ON: Low
D-5	TP212		—		
E-5	TP213	OUT	Paper feed clutch		
D-5	TP214	OUT	1st reverse roller solenoid	0 to 5.0	ON: Low
D-5	TP215	IN	1st upper limit sensor	0 to 5.0	Lift sensed: Low
E-5	TP216	OUT	1st pickup solenoid	0 to 5.0	ON: Low
D-5	TP217	IN	1st paper end sensor	0 to 5.0	Paper present: Low, No paper present: High
D-5	TP218	OUT	2nd tray lift motor forward	0 to 5.0	ON: High

Location	TP No.	IN/OUT	Name	Stand-by(V)	Remarks
D-5	TP219		—		
C-5	TP220	OUT	Paper separation corona (D): trigger	0 to 5.0	ON: Low OFF: 5V
C-5	TP221	OUT	2nd reverse roller solenoid	0 to 5.0	ON: Low
B-5	TP222	OUT	2nd tray lift motor reverse	0 to 5.0	ON: High
E-5	TP223	OUT	2nd paper feed clutch	0 to 5.0	ON: Low
D-5	TP224		—		
B-6	TP225	IN	ITB bias (T1): feedback		
D-6	TP226	OUT	3rd tray lift motor: forward	0 to 5.0	ON: High
D-6	TP227	OUT	3rd tray lift motor: reverse	0 to 5.0	ON: High
A-6	TP228	IN	Pressure roller thermistor		
D-6	TP229		—		
D-6	TP230	IN	Total counter: 2 (CMY): OK	0 to 5.0	
A-6	TP231	IN	Hot roller thermistor		
D-6	TP232	OUT	Pressure roller fusing lamp: trigger	0 to 5.0	
A-6	TP233	IN	Temperature sensor	0 to 5.0	
D-6	TP234	IN	Total counter: 1 (K): OK	0 to 5.0	
D-6	TP235	OUT	Hot roller fusing lamp: trigger	0 to 5.0	
C-6	TP236	OUT	Paper feed motor: trigger	0 to 5.0	ON: Low
A-6	TP237	IN	Humidity sensor		
D-6	TP238	OUT	Total counter: 2	0 to 5.0	ON: Low
D-6	TP239	OUT	Key counter	0 to 5.0	Key counter connected: Low
C-6	TP240	OUT	Paper feed motor: clock	5V pulse	
D-6	TP241	OUT	Key card count signal	0 to 5.0	ON: Low
D-6	TP242	OUT	Total counter: 1	0 to 5.0	ON: Low
D-6	TP243	IN	Paper feed motor: OK signal	0 to 5.0	
C-7	TP244	OUT	Drum cleaning bias roller (BR): trigger	0 to 5.0	
C-7	TP245	OUT	Paper feed motor: gain	0 to 5.0	
D-7	TP246		GND (5V)		
D-7	TP247	IN	Key counter: OK	0 to 5.0	OK: Low
B-7	TP248	OUT	ITB bias (T1): PWM	5V pulse	
C-7	TP249	OUT	ITB bias (T1): trigger	5V pulse	
A-7	TP250	IN	Toner overflow sensor	0 to 5.0	Toner full: Low
B-7	TP251	IN	Paper exist door open/close	0 to 5.0	
C-7	TP252	OUT	PCC (DC): trigger	0 to 5.0	
D-7	TP253	IN	1st paper height sensor	0 to 5.0	Many: Low, Few: High
A-7	TP254	OUT	Power relay: printer	0 to 5.0	
B-7	TP255	IN	Zero-cross signal	5V pulse	
C-7	TP256	OUT	PCC (AC): trigger	0 to 5.0	
D-7	TP257	OUT	2nd reverse roller solenoid	0 to 5.0	ON: Low
E-7	TP258	OUT	3rd pick-up solenoid	0 to 5.0	ON: Low
B-6	TP259		—		
B-7	TP260	OUT	Sleep Mode ON	0 to 5.0	
E-7	TP261	OUT	3rd reverse roller solenoid	0 to 5.0	ON: Low
C-7	TP262	IN	Key card: OK	0 to 5.0	Key card connected: Low
D-7	TP263	OUT	3rd feed clutch	0 to 5.0	ON: Low
A-7	TP264	IN	Duplex entrance sensor	0 to 5.0	Paper present: Low
D-7	TP265	IN	2nd paper height sensor	0 to 5.0	Many: Low, Few: High
B-6	TP266	OUT	Power relay: scanner	0 to 5.0	
D-7	TP267	IN	3rd paper height sensor	0 to 5.0	Many: Low, Few: High
A-7	TP268	IN	PCC: leak detection	0 to 5.0	
E-7	TP269	IN	3rd paper end sensor	0 to 5.0	Paper present: Low, No paper: High
A-7	TP270	OUT	Exhaust fan	0 to 5.0	
E-8	TP271	IN	3rd upper limit sensor	0 to 5.0	Lift sensed: Low

Location	TP No.	IN/OUT	Name	Stand-by(V)	Remarks
C-6	TP272	IN	Vertical transport door open/close	0 to 5.0	
D-6	TP273	IN	Front door open/close	0 to 5.0	
B-8	TP274	IN	Duplex turn sensor	0 to 5.0	Paper present: High, No paper: Low
B-9	TP275	OUT	Side fence jogger motor: phase XA	5V pulse	
B-8	TP276		Duplex side fence phase A	0 to 5.0	
E-8	TP277	IN	2nd upper limit sensor	0 to 5.0	Lift sensed: Low
B-8	TP278	IN	Duplex entrance sensor	0 to 5.0	Paper present: Low, No paper: High
C-8	TP279		+12V	12V	
B-8	TP280	IN	Duplex paper end sensor	0 to 5.0	Paper present: Low, No paper: High
B-8	TP281	OUT	End fence jogger motor: phase XA	5V pulse	
E-8	TP282	IN	2nd paper end sensor	0 to 5.0	Paper present: Low, No paper: High
B-8	TP283	IN	Duplex end fence H.P. sensor	0 to 5.0	HP: Low
C-8	TP284		–12V	12V	
B-8	TP285	IN	Duplex side fence H.P. sensor	0 to 5.0	HP: Low
B-8	TP286	OUT	End fence jogger motor: phase A	5V pulse	
B-8	TP287	IN	Duplex set detection	0 to 5.0	Set sensed: Low, Not set: 5v
B-8	TP288	OUT	Side fence jogger motor: phase B	5V pulse	
B-8	TP289	OUT	Side fence jogger motor: phase XB	5V pulse	
E-8	TP290	IN	3rd paper feed sensor	0 to 5.0	Paper present: High, No paper: Low
B-8	TP291	IN	1st tray set switch	0 to 5.0	Set: Low
B-8	TP292	IN	2nd tray paper size switch: 5	0 to 5.0	ON: Low OFF: 5V
B-8	TP293	OUT	End fence jogger motor: phase B	5V pulse	
E-8	TP294	IN	2nd paper feed sensor	0 to 5.0	Paper present: High, No paper present: Low
C-7	TP295		GND (5V)	0	
B-8	TP296	IN	2nd tray paper size switch: 4	0 to 5.0	ON: Low OFF: 5V
B-8	TP297	IN	2nd tray paper size switch: 3	0 to 5.0	ON: Low OFF: 5V
B-8	TP298	OUT	End fence jogger motor: phase XB	5V pulse	
B-8	TP299	IN	2nd tray paper size switch: 2	0 to 5.0	ON: Low OFF: 5V
D-8	TP300		38V	38	
B-9	TP301	IN	2nd tray paper size switch: 1	0 to 5.0	ON: Low OFF: 5V
B-9	TP302	OUT	Duplex feed motor: clock	5V pulse	
B-9	TP303	OUT	Duplex feed motor: forward/reverse	0 to 5.0	Forward: Low (open collector), Reverse: High
B-9	TP304	OUT	Duplex feed motor: trigger	0 to 5.0	ON: Low (open collector)
C-9	TP305		24V (VAA1)	24V	
B-9	TP306		—		
C-9	TP307		5V (VCC1A)	5V	
B-9	TP308	IN	3rd tray paper size switch: 5	0 to 5.0	ON: Low OFF: 5V
B-9	TP309	OUT	Duplex feed motor: power down	0 to 5.0	
B-9	TP310	IN	3rd tray paper size switch: 4	0 to 5.0	ON: Low OFF: 5V
B-9	TP311	IN	3rd tray paper size switch: 3	0 to 5.0	ON: Low OFF: 5V
B-9	TP312	IN	3rd tray paper size switch: 2	0 to 5.0	ON: Low OFF: 5V
C-9	TP313		GND (5VA)	0	
B-9	TP314	IN	3rd tray paper size switch: 1	0 to 5.0	ON: Low OFF: 5V
B-9	TP315		5VE	5V	

5.3.4 FUSE SPECIFICATIONS

Fuse No.	NA	EU AA	Line	Rating	Major Load	Condition	Fusing Lamps	Exposure Lamp
101	Used	Not used	AC	250V/15A	Fusing lamps	SC558 is displayed.	OFF	OFF
102	Used	Used	AC	NA: 125V/10A EU: 250V/6.3A	Main switch	Copier does not function at all.	OFF	OFF
301	Used	Used	AC	NA: 125V/5A EU: 250V/4A	Scanner lamp, anti-condensation heater	SC101 is displayed after the warm-up of the development unit is completed.	Normal function	OFF
1	Used	Used	DC 24V	NA: 125V/6.3A EU: 250V/6.3A	Drum motor, revolver motor	SC440 is displayed after the machine warm-up starts.	OFF	OFF
2	Used	Used	DC 24V	NA: 125V/6.3A EU: 250V/6.3A	High-voltage power supply boards, ITB/PTR motors	Front door open stays ON.	OFF	OFF
3	Used	Used	DC 24V	NA: 125V/6.3A EU: 250V/6.3A	Solenoid, fan, clutches, sensors. Etc.	Door open (By-pass feed unit and vertical transport doors) stays ON.	OFF	OFF
4	Used	Used	DC 24V	NA: 125V/6.3A EU: 250V/6.3A	S/S, ADF, LCT	S/S and ADF are not detected. SC505 is detected when LCT is equipped.	Normal function	Normal function
5	Used	Used	DC 24V	NA: 125V/6.3A EU: 250V/6.3A	Scanner, printer	SC101 is displayed after the warm-up of the development unit is completed.	Normal function	OFF
6	Used	Used	DC 38V	NA: 125V/6.3A EU: 250V/6.3A	Revolver motor, fusing motor, etc.	Power goes down just after the scanner starts moving.	OFF	OFF
7	Used	Used	DC 17V	NA: 125V/2A EU: 250V/2A	Main scanner IPU	SC172 is displayed.	OFF	OFF
81	Used	Used	5V, 5VE	NA: 250V/3.15A EU: 250V/2A	All 5V, 5VE	Copier does not function at all.	OFF	OFF
31	Used	Used	DC –12V	250V/2A	Operation panel, I/O	SC302 is displayed just after the warm-up starts.	OFF	OFF
71	Used	Used	DC 12V	NA: 125V/3.15A EU: 250V/3.15A	Operation panel, I/O, etc.	No indicators on the operation panel lit. Copier stops just after the warm-up starts.	OFF	OFF
71, 81	When both the fuses are blown					Same as Fuse 81	OFF	OFF
3, 7						Same as Fuse 3	OFF	OFF
3, 31						Same as Fuse 31	OFF	OFF
3, 71						Same as Fuse 3	OFF	OFF
3, 81						No indicators on the operation panel lit and the copier does not start warm-up.	OFF	OFF
Vcc1	When the power line is opened				5V lines for normal copy	Copier does not function at all.	OFF	OFF
Vcc2					5V line for sleep mode		OFF	OFF

NOTE: When Fuse 4 is opened, copy can be made. However, paper jam occurs at the sorter stapler if it is installed since the machine cannot detect the sorter stapler.

5.3.5 LED/SW SPECIFICATIONS OF SCANNER IPU BOARD

LED Specifications

LED	Condition at check timing		
	Software Up-grade from IC card	**After scanner startup**	**AGC (at shading)**
LED1	—	• Blinking: Normal operation • ON (or OFF): Scanner functioning error	—
LED3	• IFGATE signal monitor: LED is ON when receiving the FGATE signal from the LD control board to control the image output timing.		
LED4	• MFGATE signal monitor: Monitors the FGATE signal from the VIDEO board to the IPU board. LED turns on when the signal is LOW.		
LED5	• VDATA (15) signal monitor: Monitors the 8th bit of the image data sent from IPU to the VIDEO board. LED turns on when the signal is LOW.		
LED6	• VFGATE signal monitor: Monitors the FGATE signal from the IPU board to the VIDEO board. LED turns on when the signal is LOW.		
LED7	• Blinking: IC card/flash memory verification error	—	• Blinking (400 ms intervals): Black level O/E difference correction error (1st NG) • Blinking (1.6 s intervals): Black level O/E difference correction error (2nd NG)
LED8	• Blinking: Data polling error	—	• Blinking (400 ms intervals): Black level correction error (1st NG) • Blinking (1.6 s intervals): Black level correction error (2nd NG)
LED9	• Light: Installation in progress • Blinking: Flash memory erase error	—	• Blinking (400 ms intervals): NG condition on white level correction error
LED10	—	• Blinking: Normal operation • ON (or OFF): Scanner functioning error	—

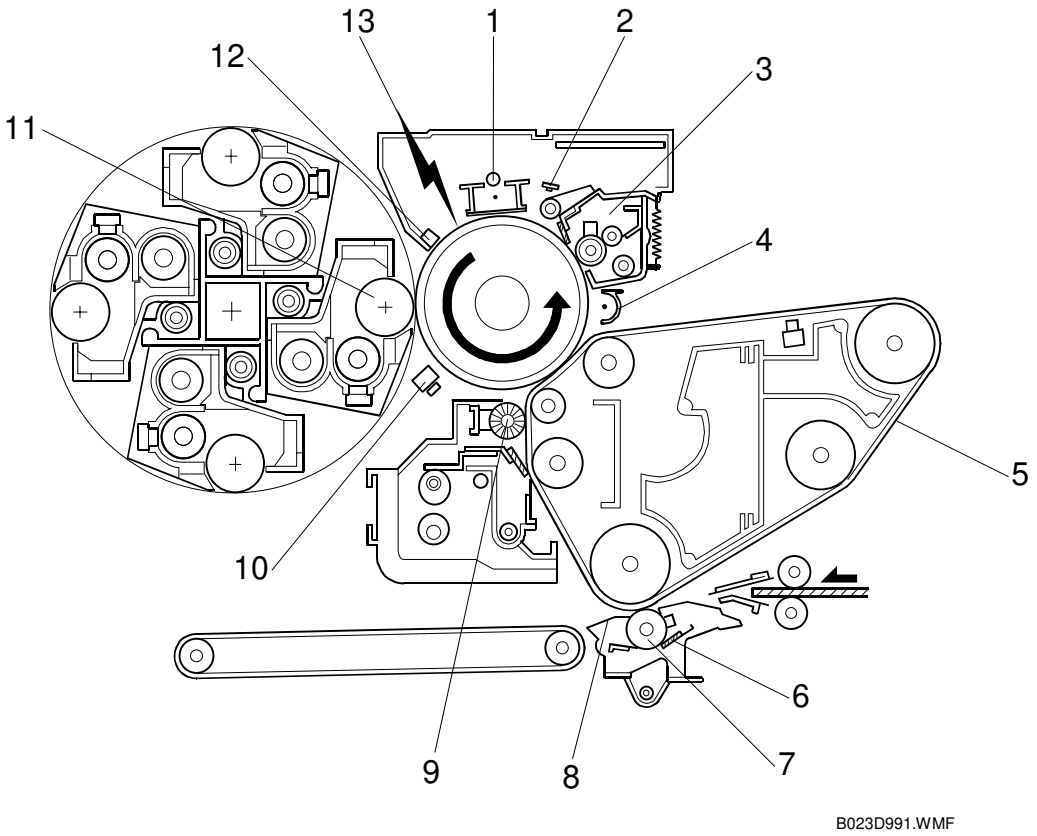
SW Specifications

DIP-SW	Normal mode	
SW1	OFF	OFF to ON: 1 scan
SW2	OFF	OFF to ON: Scanner motor current off ON to OFF: Scanner motor current on → H.P. check
SW3	OFF	OFF to ON: Lamp on (scanner fan on) ON to OFF: Lamp off (scanner fan off)
SW4	OFF	OFF to ON: Scanner free run starts ON to OFF: Scanner free run stops Main switch is turned on if this switch is ON: AGC → Shading → 1 scan
SW5	OFF	Factory use
SW6	OFF	Not used

6. DETAILED SECTION DESCRIPTIONS

6.1 MECHANISM OVERVIEW

6.1.1 IMAGE GENERATION PROCESS



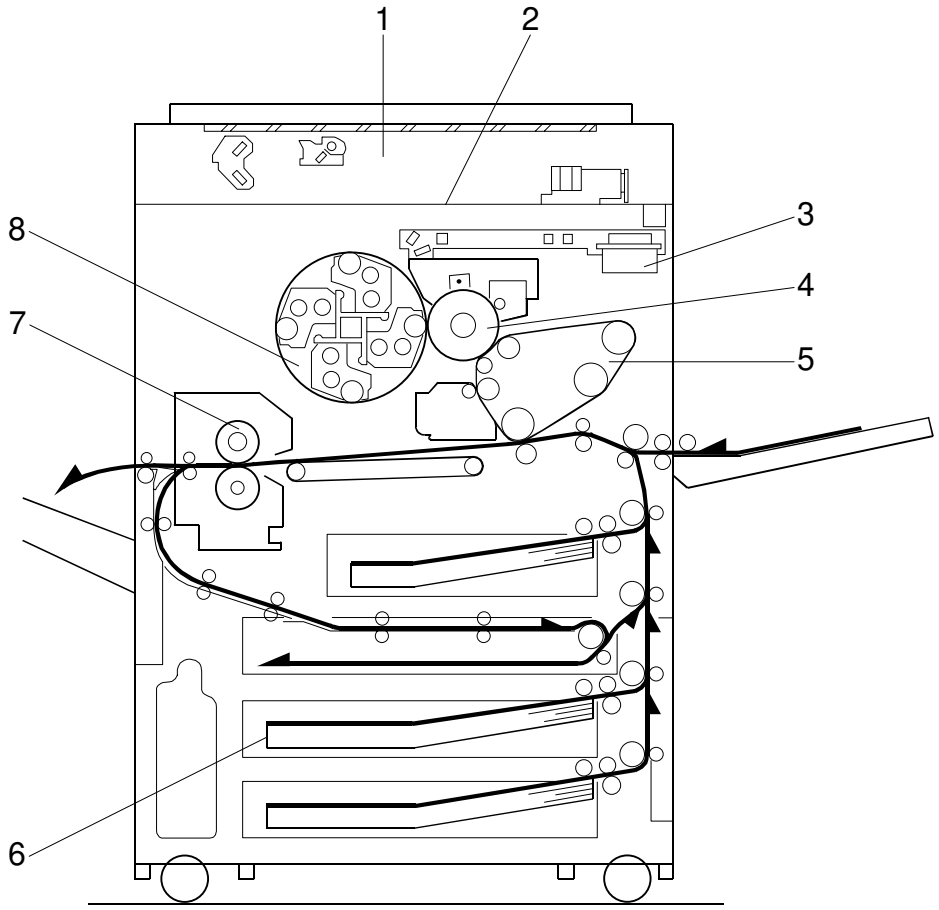
1. Drum charge
- Charge corona applies a negative charge to the OPC drum.
- Grid ensures an even charge.

2. Quenching
- After cleaning, the OPC is fully exposed to light from an array of red LEDs.
- Removes any residual charge on the OPC drum in preparation for the next copy cycle.
- Red LEDs are used to protect the drum from optical fatigue.

3. Drum cleaning
- Cleaning brush increases the drum cleaning efficiency by applying lubricant to the OPC drum.
- Cleaning blade scrapes the residual toner off the OPC drum.

4. **PCC (Pre-cleaning corona)**
   - PCC discharges the photoconductor drum and applies AC and negative DC currents.
   - Reduces the charge holding the residual toner to the drum, thereby improving the cleaning efficiency.
5. **Image transfer to image transfer belt**
   - Positive charge applied to the back of the image transfer belt.
   - Transfers the toner image from the OPC drum to the belt.
6. **Paper transfer roller cleaning**
   - Paper transfer roller blade and brush always contact the paper transfer roller.
   - Cleans the roller's surface.
7. **Image transfer to paper**
   - Positive charge applied to the back of the paper.
   - Transfers negatively charged toner from the image transfer belt to the paper.
8. **Paper separation discharging**
   - Paper discharge plate unit removes the charge from the paper transfer belt.
9. **Image transfer belt cleaning and lubricant application**
   - Brush applies lubricant.
   - Makes it easier for the counter blade to scrape off excess toner.
   - Improves toner transfer ability and reduces partial blanking in the image.
10. **ID sensor**
    - ID sensor measures the density of the test patch patterns developed on the OPC drum.
11. **Development**
    - Latent image on the drum attracts the negatively charged toner.
    - Toner is attracted to those places on the drum surface where the laser reduced the negative charge.
    - Development units for each color are included in the revolver unit.
12. **Drum potential sensor**
    - Sensor monitors the potential of the OPC drum.
    - Used by the process control.
13. **Laser exposure**
    - Laser beam emitted from the laser assembly is reflected by the polygon mirror and projected onto the drum through the fθ lens, drum mirror, and toner shield glass.
    - Laser output varies in intensity to correspond to the image data.
    - Forms a latent image on the drum.

6.1.2 MAJOR UNITS AND PAPER PATH



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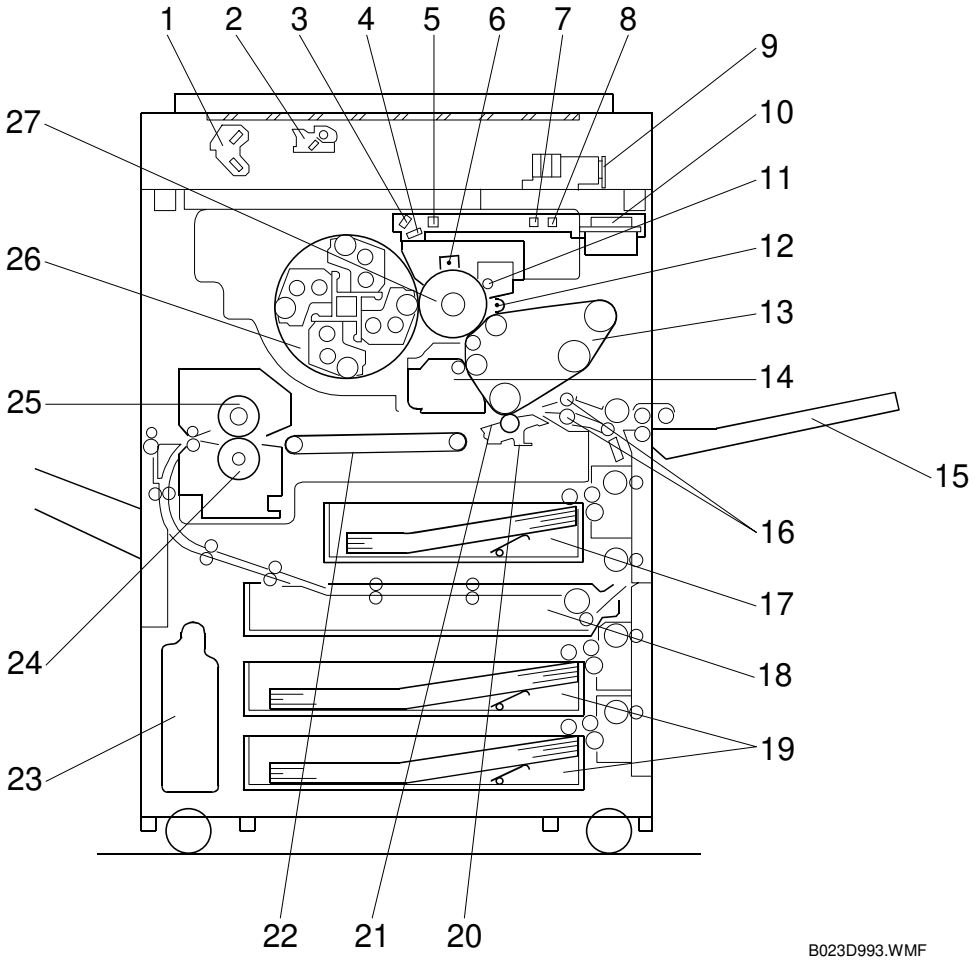
1. Scanner
2. Operation Panel
3. Laser Exposure Unit
4. Drum Unit
5. Image Transfer and Belt Drive
6. Paper Feed/Transport System
7. Fusing and Paper Exit Section
8. Development and Toner Supply

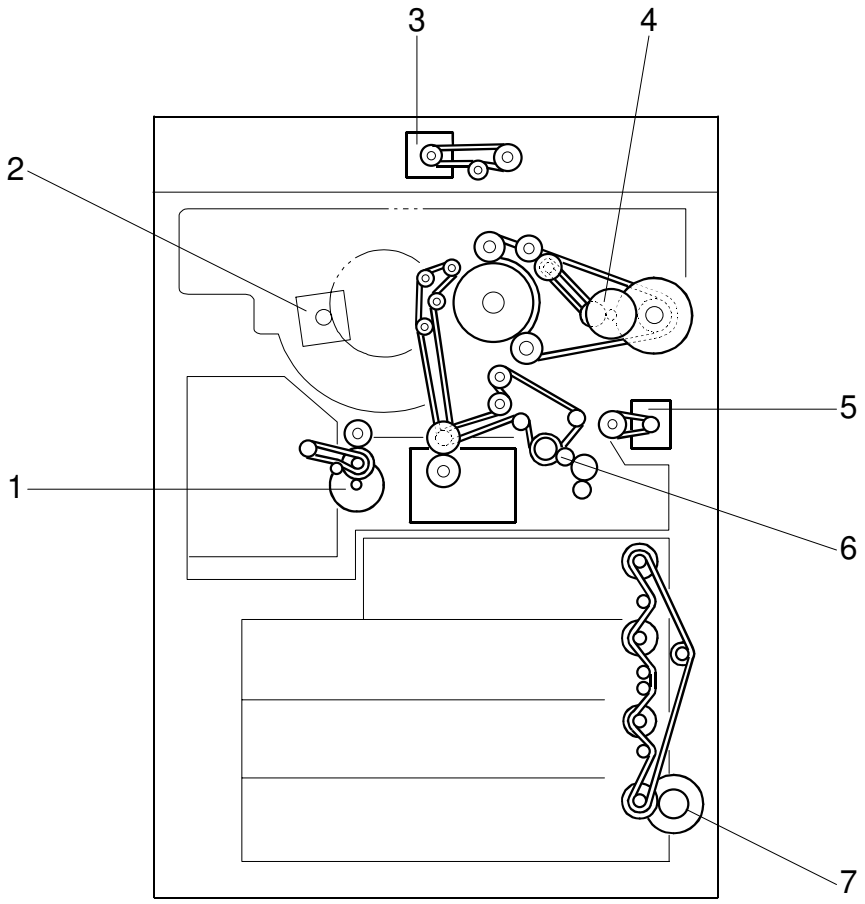
6.2 PARTS LAYOUT

6.2.1 MAJOR UNIT LAYOUT DIAGRAM



1. 2nd Scanner
2. 1st Scanner
3. Drum Mirror
4. Toner Shield Glass
5. Barrel Toroidal Lens (BTL)
6. Charge Corona Unit
7. 2nd fθ Lens
8. 1st fθ Lens
9. Sensor Board Unit (SBU)
10. Polygon Mirror
11. Drum Cleaning Unit
12. Pre-Cleaning Corona (PCC)
13. Image Transfer Unit
14. Image Transfer Belt Cleaning Unit
15. By-pass Feed Table
16. Registration Rollers
17. 1st Paper Tray
18. Duplex Unit
19. 2nd/3rd Paper Trays
20. Paper Transfer Roller Unit
21. Separation Discharge Plate
22. Transport Belt
23. Used Toner Tank
24. Pressure Roller
25. Hot Roller
26. Revolver (Development Units)
27. OPC Drum

6.3 DRIVE LAYOUT



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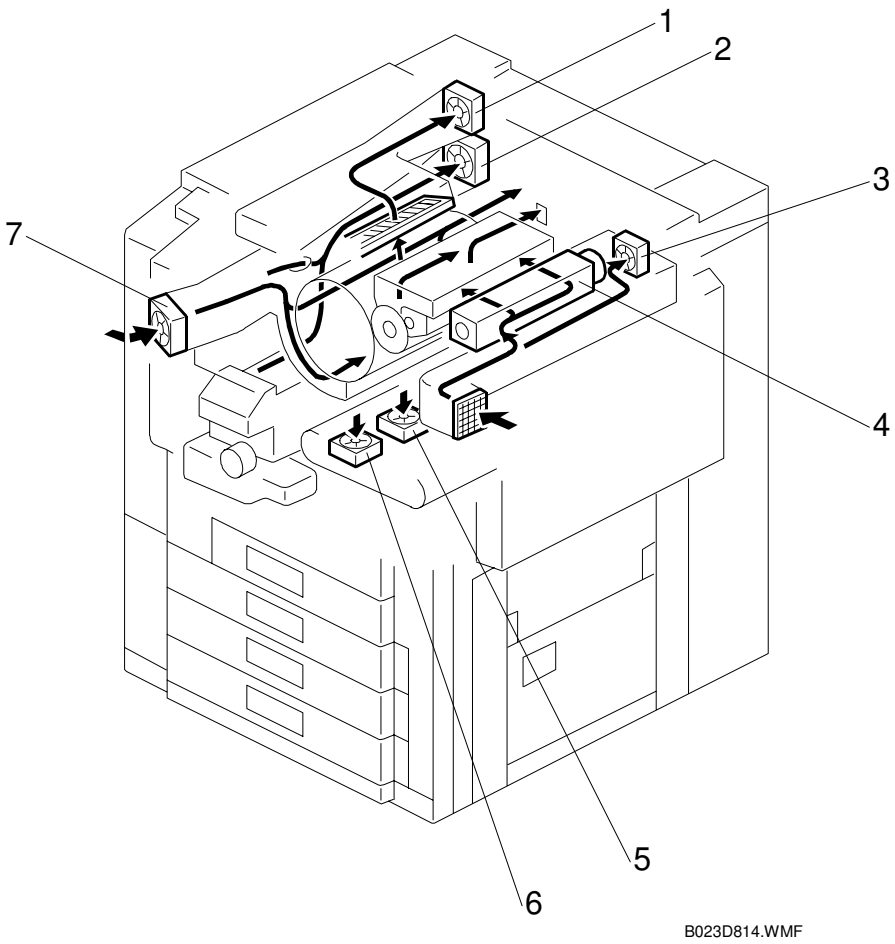
1. Fusing Transport Drive
2. Revolver Drive
3. Scanner Drive
4. Drum Drive
5. Registration Drive
6. Drum Peripheral Drive
7. Paper Feed Drive

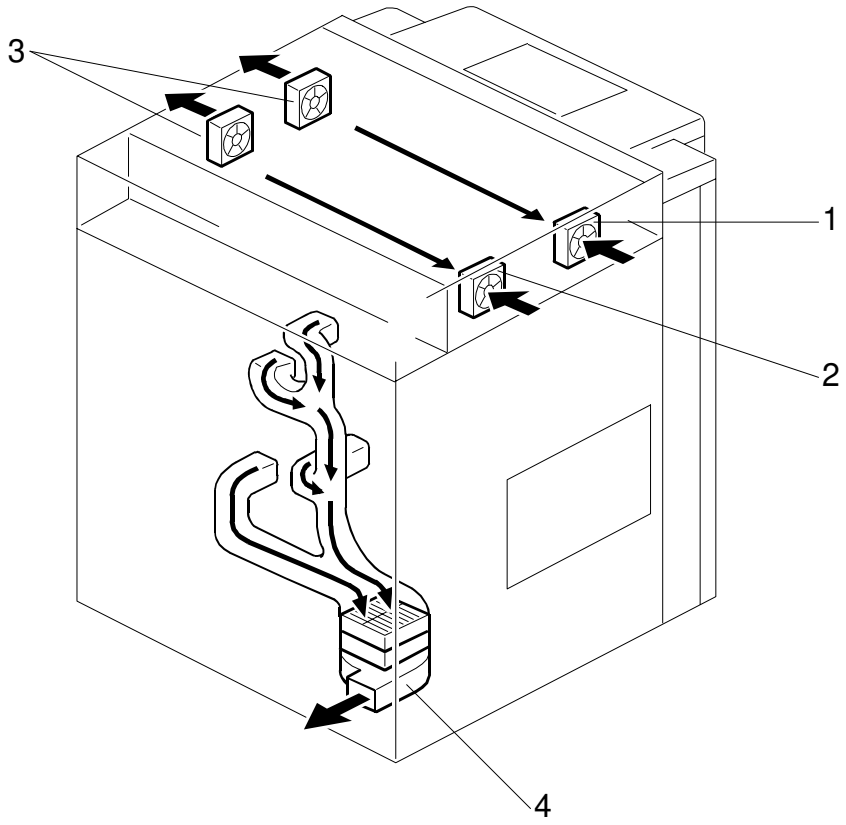
6.4 AIR FLOW

6.4.1 AIR FLOW SYSTEM 1



1. Fusing Fan (Upper)
2. Fusing Fan (Bottom)
3. ID Sensor Fan
4. Charge Fan
5. Transport Fan (Rear)
6. Transport Fan (Front)
7. Development Cooling Fan

6.4.2 AIR FLOW SYSTEM 2



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1. Optics Cooling Fan (Front)
2. Optics Cooling Fan (Rear)
3. Exhaust Fans
4. Exhaust Fan

6.5 PROCESS CONTROL

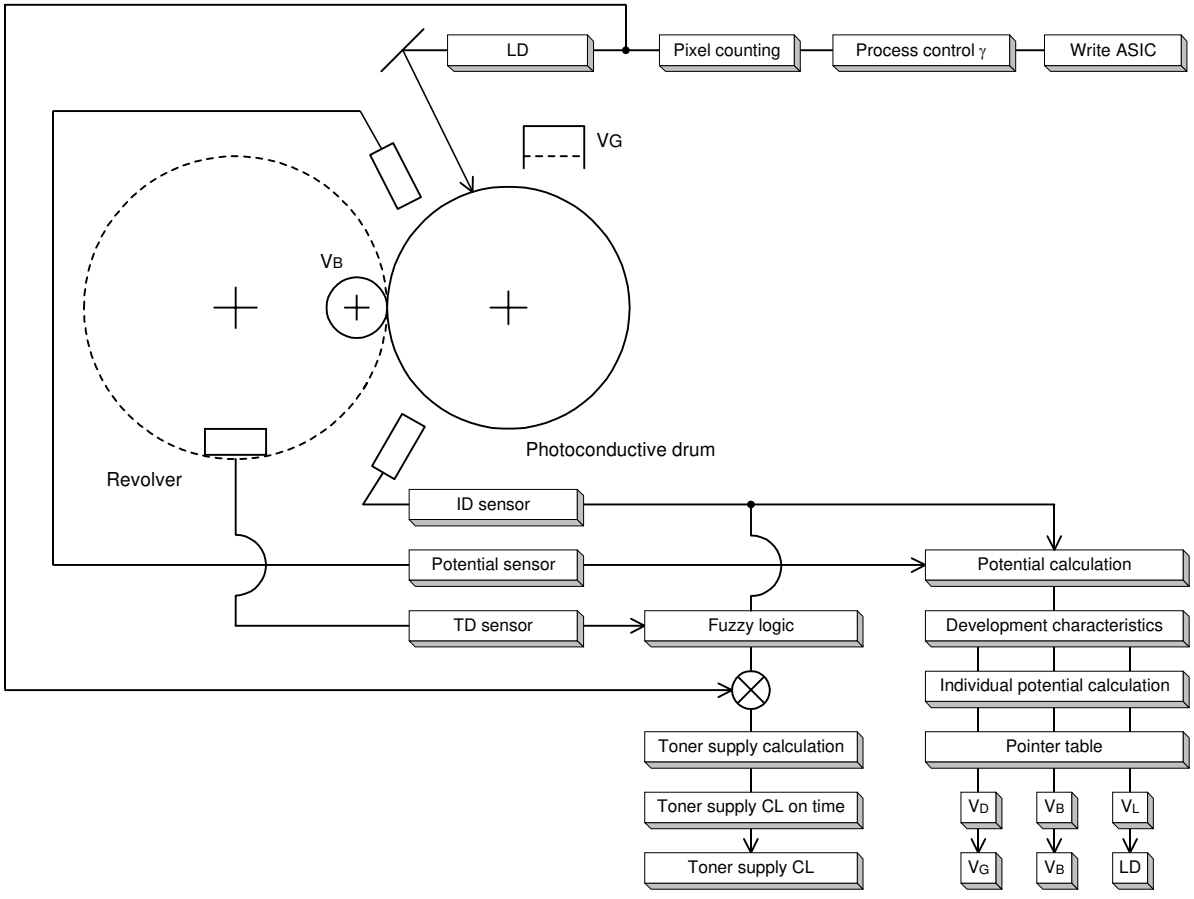
6.5.1 OVERVIEW

This copier provides the following three forms of process control:

- Potential control (every process control self check)
- Toner supply control (every copy)
- Process control gamma calibration (after every process control self check).

The process control has the following features:

- Drum potential sensor (a feedback measurement sensor).
- Diffused reflection image density (ID) sensor. This sensor detects the amount of toner on the drum.



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Acronym	Description
V_B	The development bias charge.
V_D	The dark potential—the charge on unexposed portions of the drum.
V_{DP}	The development potential is the ability to attract toner to the drum. This is calculated as $V_B - V_L$
V_G	The bias voltage applied to the charge corona grid.
V_L	Light potential—the drum potential after laser exposure.
I_{LD}	The strength of the current sent to the laser diode.
LD output	The intensity of the light from the laser diode.
ID sensor	A diffused reflection sensor which measures the density of the toner on the drum.
V_{SG}	The ID sensor output when checking a blank drum. Used for calibration.
V_{SP}	The output of the ID sensor when measuring toner densities on the drum.
TD sensor	A sensor which measures the density of the toner in the developer.
V_T	The current output of the TD sensor
V_{REF}	The target output for the TD sensor. The machine always tries to adjust the toner WT% in the developer, to bring the V_T closer to the V_{REF}
Gain (Vcnt)	The gain value is calculated during TD sensor initilization. It is used to adjust the TD sensor output (Vt). Large gains increase the Vt, while small gains decrease it. It is also used to calibrate the TD sensor output (V_T) during the TD sensor initialization.

6.5.2 POTENTIAL CONTROL

Overview

Development potential (V_{DP}) is the difference between the development bias voltage (V_B) and the voltage of areas discharged by the laser (V_L). Potential control maintains the V_{DP} at a constant level.

- Compensates for variations in the drum and the toner's ability to hold a charge due to wear, environmental changes and other factors.
- Corrections are necessary to maintain an accurate color balance.

Measurements

The following measurements are performed during the process control self check:

1. 16 grade standard sensor pattern is written to the drum.
   - Drum potential sensor measures the V_B and V_L.
2. Sensor pattern developed.
   - ID sensor measures the sensor pattern's potential (V_{SP}).
3. V_{DP} calculated based on these readings.

Adjustments

- Development potential is compared to a look-up table in memory (called a pointer table). V_D, V_L and V_B are adjusted accordingly.
- V_D is adjusted by varying the charge corona grid voltage (V_G).
- V_L is adjusted by varying the laser diode input current (I_{LD})

NOTE: Potential control ensures that the maximum amount of toner applied to the drum is kept at a constant level. A new process called 'process control gamma correction' has been introduced to manage the grayscale qualities. It is performed after the potential control, and defines LD output for all 256 grades. (☛ 6.5.3)

Potential Control Timing

- Uses a procedure called the 'process control self check'.
- These self checks are grouped into 5 categories, based on how and when they execute.
- Process control self check takes approximately 3 minutes.
- Process control gamma correction (☛ 2.1.3) is done immediately after the process control self check.

(1) Forced Process Control Self Check

After replacing the developer or drum, the technician must perform the forced process control procedure (SP3-126).

(2) Initial Process Control Self Check

This check runs automatically when the power is turned on (or when the machine returns to standby mode from sleep mode).

- Only runs if the hot roller in the fusing unit is less than 100 degrees centigrade.
- Only runs when SP3-125 (Set Potential Control Method) is set to "0 (Auto)".

(3) Interval Process Control Self Check

The copy interval process control starts automatically after a copy job in which the total number of copies exceeds a preset value.

- This value can be defined using SP3-973 (Set Process Control Self-Check Interval).
- Factory setting is 150 sheets.
- Maximum is 500 sheets.
- Using a shorter interval reduces the machine's average copying speed.
- Using a longer interval may lead to low toner concentrations after copying an original with a high image ratio.
- Setting the process control interval to 0 disables the interval process control.

(4) Timed Process Control Self-Check

This Check activates after a preset number of hours. This self-check should be used for copy shops and other places where the machine stays on for very long periods.

- Identical to the interval process control self-check.
- Interval is set by entering a value (defaulting to 6 hours) in SP3-972-00.
- Range is 0 to 240. Entering a value of 0 suppresses the execution of this self check.
- The timer is reset by the following conditions:
  1) At the finish of any other process control self-check
  2) At the finish of image processing (copying or printing)
  3) When the main switch or the operation switch is turned OFF/ON.
  4) When any door or cover is opened and closed.
  5) At the end of toner end recovery.

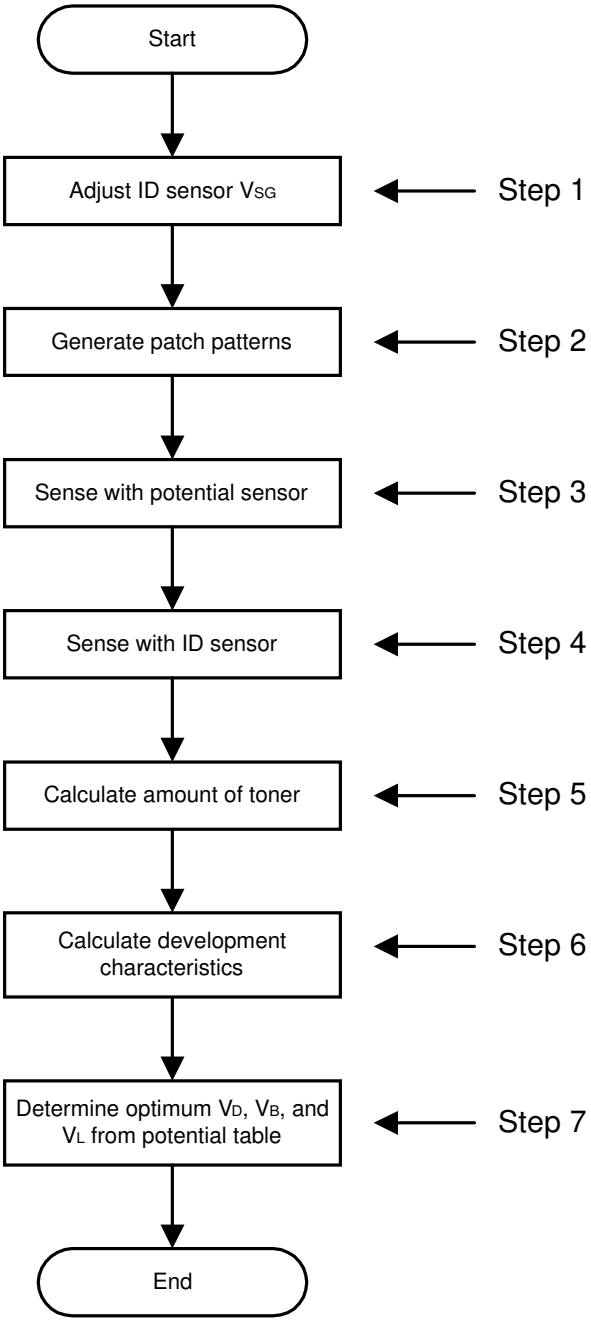
  NOTE: Just pressing operation panel keys does not reset the timer.

(5) ACC Run-Time Process Control Self Check

This check activates before the execution of the auto color calibration (ACC).

- Identical to the interval process control self check.
- SP4-507 settings determine weather the ACC run-time process control is performed. (☛ SP4-507)
- If a value of 0 is entered, this process control self check is not done.

6.5.3 PROCESS CONTROL SELF-CHECK OPERATION FLOW



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Step 1: V_{SG} Adjustment

- Diffused reflection ID sensor used in this machine responds differently for black and color toner.
- Two V_{SG} values need to be calculated (one for black toner, one for CMY toner).

Offset

- The ID sensor outputs voltage when it does not emit any light. This voltage is defined as offset.
- Black and color values are calculated using different circuitry. Offset is about 1 V for black and 0.2 V for color.

V_{SG} Calculation

The ID sensor checks the bare drum's reflectivity and the machine calibrates the output of the ID sensor as follows. This voltage is known as V_{SG}:

$$(1.8 + \text{offset}) \pm 0.05 \text{ V}$$

- Compensates for the drum's condition (due to aging or dirt on the surface of the drum).
- Compensates for the ID sensor condition, such as dirt on the surface of the ID sensor.

Step 2: Generating ID Sensor Patch Patterns

- The machine makes a 16-grade pattern on the drum for each toner color.
- Each grade of the pattern is made by changing the LD power.
- At this stage, the patterns are not developed; they remain as latent images.

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Step 3: Sensor Pattern Potential Detection

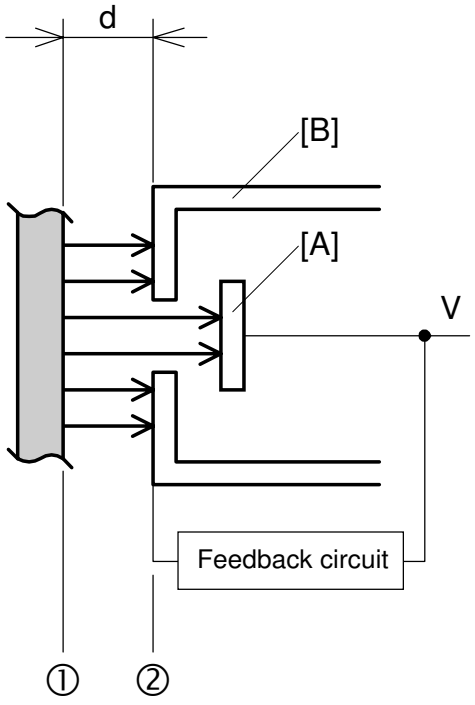
Process

The drum potential sensor measures the potential for each of the sensor pattern's latent images.

- Output stored in memory.

Feedback Drum Potential Sensor

Detector
Probe
d: Separation distance
①: Drum
②: Drum potential sensor



B023D553.WMF

Uses a feedback drum potential sensor.

- Detector measures the strength of electric fields emitted from the drum surface.
- Electric fields vary depending on the surface potential of the drum.
- Feedback circuit applies voltage to the probe until the detector's electric field strength is offset.
- This voltage determines the magnitude of the potential on the drum surface and is output as Voltage (V_B and V_L).

Major features

- Provides an accurate measurement of the drum surface potential, even if the distance between the drum and the drum potential sensor varies (i.e. after removal/replacement the separation distance does not need to be exactly the same).

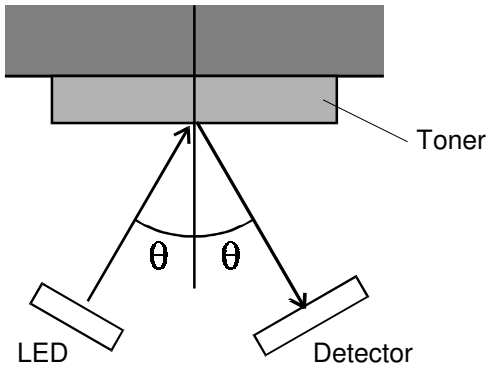
Step 4: Sensor Pattern Density Detection

Process

- Development rollers of the respective colors develop the latent sensor patterns for K, Y, C, and M generated in Step (2).
- ID sensor detects the densities of the 16 patch patterns for each color.
- This data is stored in memory.

Diffused Reflection ID Sensor

Direct Reflection Type ID Sensor



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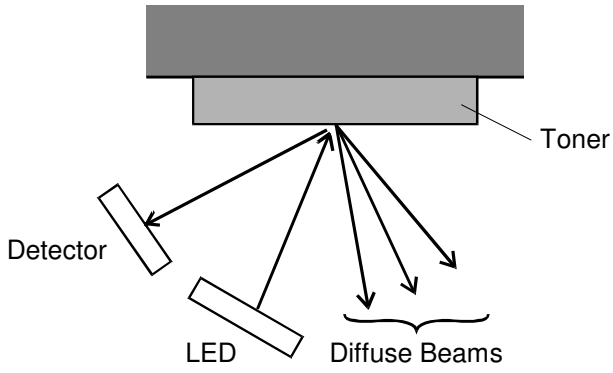
Diffuse Reflection Type ID Sensor

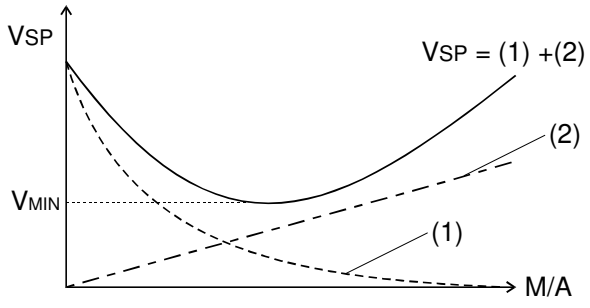


B023D057.WMF

- Uses a diffused reflection ID sensor.
- When a beam is reflected off toner, diffuse beams are scattered at all angles.
- This sensor detects image density by measuring some of these diffuse beams.
- Does not measure beams reflected directly.
- This sensor improves the measurement accuracy for the sensor pattern densities, particularly for Y, C, and M toners.

Color (Y, C, M) Toners

Direct Reflection Type ID Sensor



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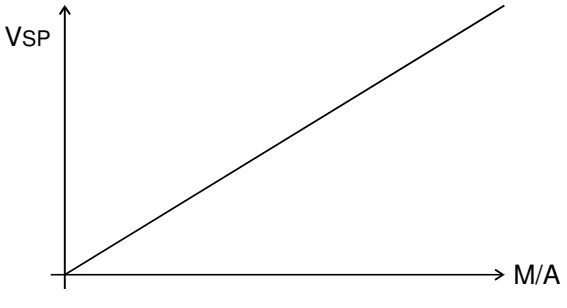
Diffuse Reflection Type ID Sensor



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(1): Component of light reflected from the drum
(2): Component of light reflected from C, M, or Y toner

[Figure A]

Relationship between the output of the normal reflection type ID sensor and the amount of toner on the drum for C, M, and Y toners

[Figure B]

Relationship between the output of the diffused reflection ID sensor and the amount of toner on the drum for C, M, and Y toners

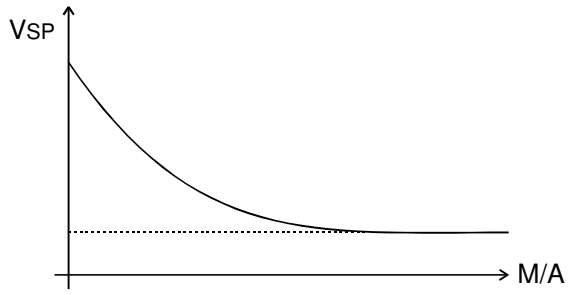
[Figure A]

- Shows the relationship between the amount of Y, C or M toner attached to the drum and the output of the normal reflection ID sensor.
- ID sensor output (V_{SP}) results from not only the light reflected from the toner but also the component of light reflected from the drum.
- High densities of colored toner (i.e., to the right of the minimum point, V_{MIN}, in the V_{SP} curve) cannot be measured.

[Figure B]

- Diffused reflection ID sensor, on the other hand, picks up the little light that is reflected from the drum.
- Relationship between the diffused reflection ID sensor output and the amount of toner attached to the drum is linear.
- High densities of colored toner can be measured accurately.

K Toner:



[Figure C]
Relationship between the output of the diffused reflection ID sensor and the amount of toner on the drum for K toner

The relationship between the ID sensor output and the amount of K toner on the drum is shown in Figure C.

Step 5: Toner Amount Calculation

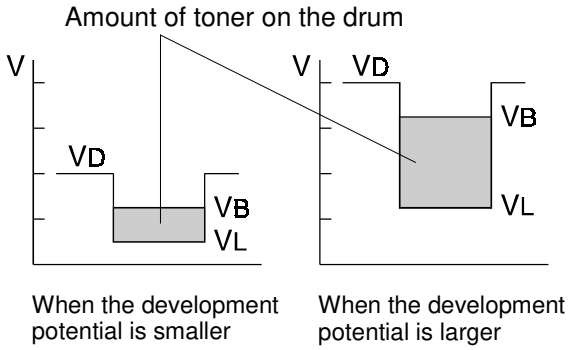
- Amount of toner on the drum (M/A, mass per unit area, mg/cm^2) is calculated based on the ID sensor output value (V_{SP}).
- Each of the 16 grades is calculated.

Step 6: Development Potential Calculation

The development potential (V_{DP}) is the capability to attract toner to the drum and can be shown as: V_B - V_L

- V_B: Development bias
- V_L: Drum potential after laser exposure

See the figure on the right for two examples.



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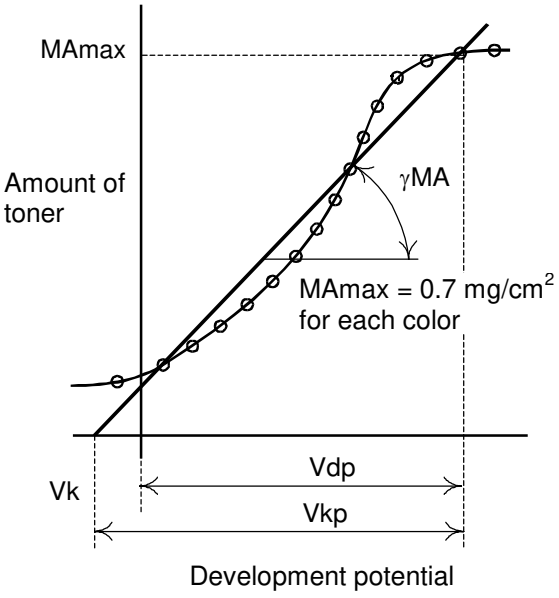
The machine determines the relationship between the drum potential (measured in step 3) and the amount of toner on the drum (calculated in step 5) for each of the 16 grades.

- When plotted, these values form a curve (shown to the right).
- The CPU then calculates a straight line through these points.
- The Angle formed by this line is known as the development gamma factor, or γ M/A.
- The CPU uses the gamma factor to calculate the V_{DP} necessary to obtain the ideal toner density on an area of the drum exposed with full laser power under the machine's present conditions.



B023D062.WMF

For Y, C, and M toners, the diffused reflection ID sensor allows higher densities of toner to be measured accurately. (☛ Step 4, Sensor Pattern density Detection)

- This allows a more accurate calculation of γ M/A.
- The measurements at higher densities (M/A values) are more reliable.

Detailed Descriptions

Step 7: Selecting the Optimum V_D, V_B, V_L

The machine adjusts V_D, V_B, and V_L to try to create the ideal development potential V_{DP}.

- Uses a pointer table (a look-up table in ROM showing various V_{DP} values and the corresponding V_D, V_B, and V_L values).
- Finds the V_{DP} in the pointer table that is closest to the value calculated in step 6.
- Reads the V_D, V_B and V_L values for that row.
- The machine will use those V_D, V_B and V_L values until the next process control check.
- These values are designed to bring the actual V_{DP} to the optimum value for the machine's current condition.

Settings

- V_D: Drum potential without exposure—to adjust this, the machine adjusts the charge corona grid voltage (V_G)
- V_L: Drum potential with the strongest exposure—to adjust this, the machine adjusts the laser diode input current (I_{LD})
- V_B: Development bias

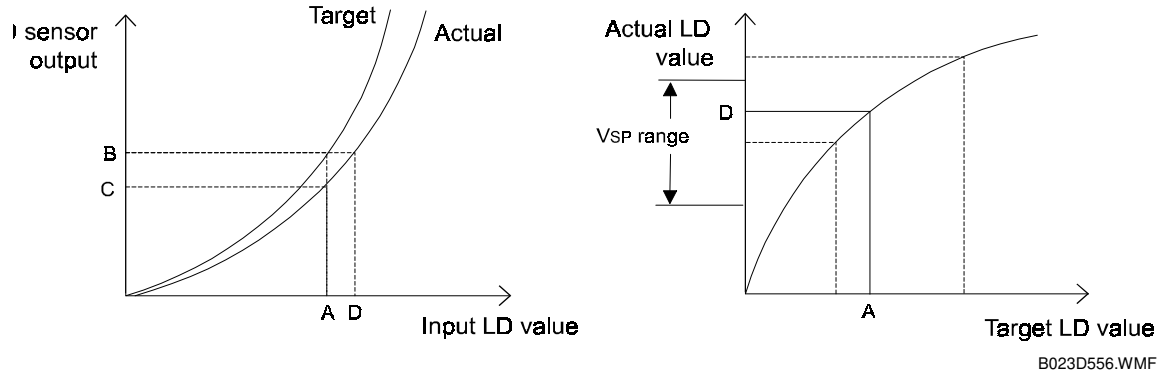
6.5.4 PROCESS CONTROL γ CORRECTION

What is process control γ?

Process control defines appropriate V_D, V_B, and V_L values for the higher density (M/A value) only. It does not calibrate the medium (grayscale) range. To improve image quality in the medium range, a new process called “process control gamma correction’ is performed.

- Defines suitable LD outputs for all 256 gradients.
- Takes about 30 seconds.

How is it done?



- Based on the maximum LD output defined during the process control self check, the machine writes another 16-grade sensor pattern on the drum.
  NOTE: Power levels for this 16-grade pattern are calculated based on the process control self-check’s I_{LD} value. This is different from the earlier 16-grade pattern, which used fixed power levels.
- ID sensor detects the density developed on these patterns and compares them with the target densities stored in the ROM.
- Target densities and the actual densities can be plotted as shown in the upper-left diagram.
  NOTE: To make the curve of actual densities, the machine draws a curve (interpolates values) through the density points read from the 16-grade pattern made for process control gamma.
- By comparing these curves, the machine can calculate the adjustments to the LD output necessary to write each of the 256 gradations.
- In the example from the diagrams:
  1) When using LD output A, the machine expected an ID output of B.
  2) Actual output C is less than the desired output B.
  3) To get the correct output, this machine increases the LD output to level D.
- Process control γ target is stored in the NV-RAM on the main control board.
- CPU calculates the process control γ on the main board.
- Results of the process control γ calculations are sent to the LD main control board where they adjust the I_{LD}.
- The values obtained through the process control gamma correction cannot be adjusted in SP mode.

Detailed Descriptions

Process Control γ Correction Timing

The machine automatically runs the process control gamma correction at the end of every process control self check.

Relationship Between Process Control γ Correction, ACC, and Other γ Corrections

- Process control γ correction and ACC have different scopes.
  1) Process control γ correction ensures that for each LD output, the correct amount of toner attaches to the drum. It is not concerned with any processes outside the LD output and development section.
  2) ACC encompasses everything from scanning to image generation (including the scope covered by the process control γ correction)
- Potential control and process control γ correction have different goals.
  1) Ultimate purpose of potential control is to adjust the maximum amount of toner attached to the drum against the development potential to a certain target value.
  2) Process control γ correction, however, adjusts the amount of toner at all levels of the 16 gradation patterns to the target characteristics and interpolates between the 16 adjusted levels to make all 256 grayscale grades.
  3) Process control γ correction is used to make the image characteristics in low ID sections closer to the target value.

6.5.5 TONER SUPPLY CONTROL

This machine uses fuzzy logic to control the amount of toner supplied to the development unit.

- Maintains a constant toner density in the developer.
- Accommodates changes in the development conditions through the potential control mechanism.
- Ensures that the development capacity does not fluctuate due to toner consumption, toner supply, agitation or extended periods of disuse.
- Uses sensor data from the ID sensor (V_{SP} for toner supply control) and TD sensor (V_T).
- Amount of toner supplied is determined by the toner supply clutch on time.

The basic input/output parameters are listed below.

1. Targets to be sensed
   1) Pixel count
   2) Density of the toner in the developer (V_T)
   3) Amount of toner attracted to the drum (V_{SP} for toner supply control)
2. Target to be controlled
   Toner supply clutch on time.

Toner Supply Control Modes

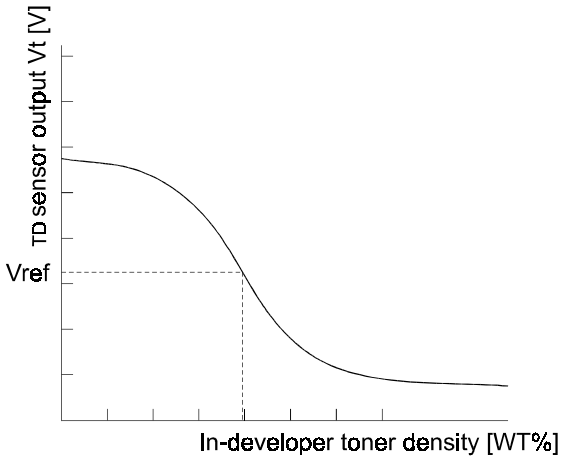
This copier controls the supply of toner in three modes.

1. Fuzzy logic Control Mode
   Default toner supply control mode. The TD sensor, ID sensor, and pixel count are used in this mode.
2. Proportional Control Mode
   This mode is used when an ID sensor becomes faulty. Only the TD sensor is used to control toner supply.
3. Fixed Supply Mode
   This mode is used when both the TD sensor and ID sensor become faulty.

NOTE: The toner supply mode must be changed using SP 2-208-009. The machine will not automatically change modes.

TD Sensor Output

- Relationship between the TD sensor output (V_T) and the toner density in the developer is shown in the figure to the right.
- Target toner density is 5 WT%.
- V_{REF} is the TD sensor's target output.
- When new developer is installed, it is necessary to initialize the TD sensor using SP3-005-1 through SP3-005-5.
- During the TD sensor initialization for brand-new developer, V_{REF} for a toner density of 5% WT is set at 3.0 ± 0.1V by changing the gain value.



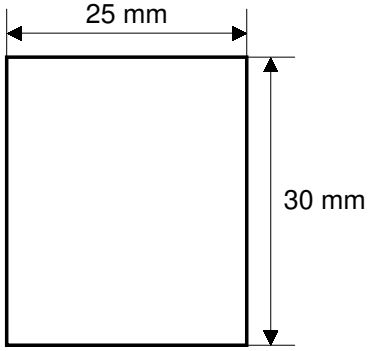
Relationship between toner density and TD sensor output

B023D063.WMF

- This copier does not use a constant V_{REF} value. Instead, V_{REF} varies between the upper and lower limit. These limits are 3.5 V (SP3-948) and 1.5 V (SP3-947) respectively.
  NOTE: Do not change these values in the field.
- V_T is the TD sensor's current output. If V_T is different than V_{REF}, the machine always tries to adjust the toner WT% in the developer to bring the V_T closer to the V_{REF} by changing the tone supply clutch on time.

Detecting V_{SP} for Toner Supply Control

- Generates a V_{SP} ID sensor pattern (right illustration) using preset laser diode settings.
- Patterns are generated after the K, Y, C and M images. One pattern after each color.
- Density detected using the ID sensor.
- The result is known as 'V_{SP} for toner supply control', or to distinguish it from the other V_{SP} measurements.
- Depending on the calculated amount of toner on the drum (based on the V_{SP}), the V_{REF} will be adjusted to bring the amount of toner on the drum closer to the target value. Then machine always tries to adjust the toner WT% in the developer to bring the V_T closer to the V_{REF}.
- Checked every ten copies.



B023D065.WMF

Calculating the Amount of Toner on the Drum

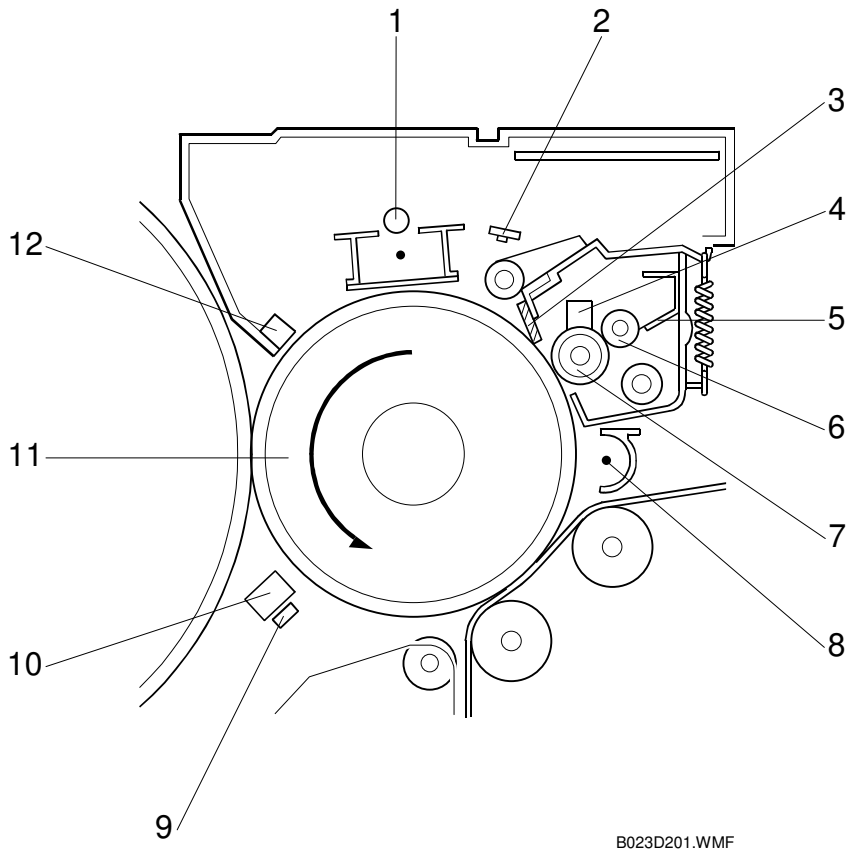
- Target for the ID sensor pattern is 0.7 mg/cm^2 for the C, M, and Y toners and 0.3 mg/cm^2 for the K toner.
- For details on calculating the amount of toner on the drum,
  ☛ 6.5.4 (Steps 4 and 5).

Summery of Toner Supply Control

- VREF can vary within the upper and lower limit (3.5 V to 1.5 V).
- The M/A of the toner on the sensor pattern is calculated every 10th copy.
- The target M/A is:
  0.7 mg/cm^2 for CMY toners
  0.3 mg/cm^2 for K toner
- If the pattern is too dark (too much toner):
  1) VREF is increased
  2) VT < VREF
  3) The toner supply control always tries to bring Vt closer to Vref, by changing the toner supply clutch ON time.
  4) Toner supply drops
- If the pattern is too light (not enough toner):
  1) VREF is reduced
  2) VT > VREF
  3) The toner supply control always tries to bring VT closer to VREF, by changing the toner supply clutch ON time.
  4) Toner supply increases

6.6 DRUM UNIT

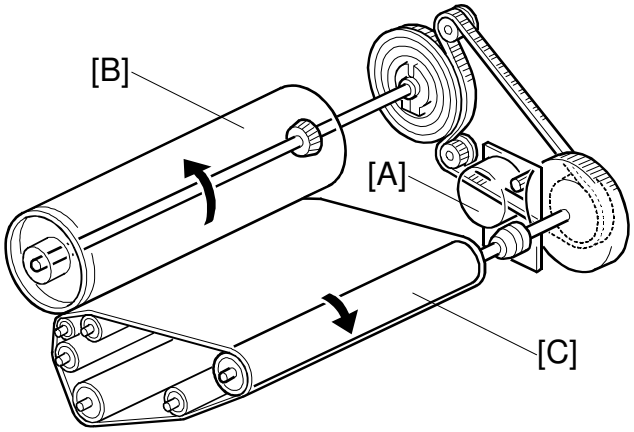
6.6.1 MAJOR COMPONENTS



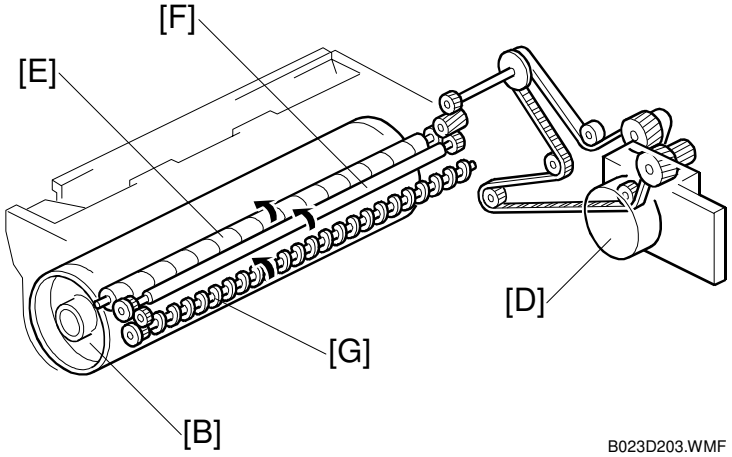
1. Charge Corona Unit
2. Quenching Lamp
3. Cleaning Blade
4. Lubricant Bar
5. Bias Roller Blade
6. Bias Roller
7. Cleaning Brush
8. Pre-cleaning Corona (PCC)
9. Carrier Catcher
10. ID Sensor
11. OPC Drum
12. Drum Potential Sensor

- Drum unit located to the right of the revolver/drum drawer.
- Cleaning unit integrated into the drum unit. This prevents toner from spilling when the drum unit is removed or installed.
- Drum motor rotates the drum and drives the image transfer belt.

6.6.2 DRUM UNIT DRIVE



B023D014.WMF



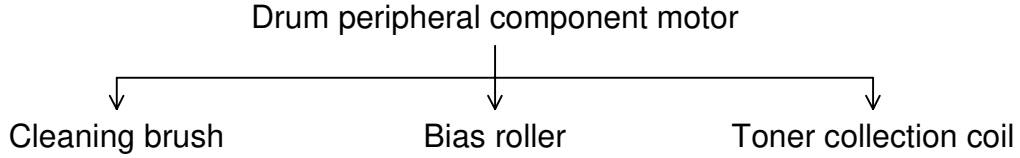
B023D203.WMF

Drum motor
OPC drum
Image transfer belt
Drum peripheral component motor
Cleaning brush
Bias roller
Toner collection coil

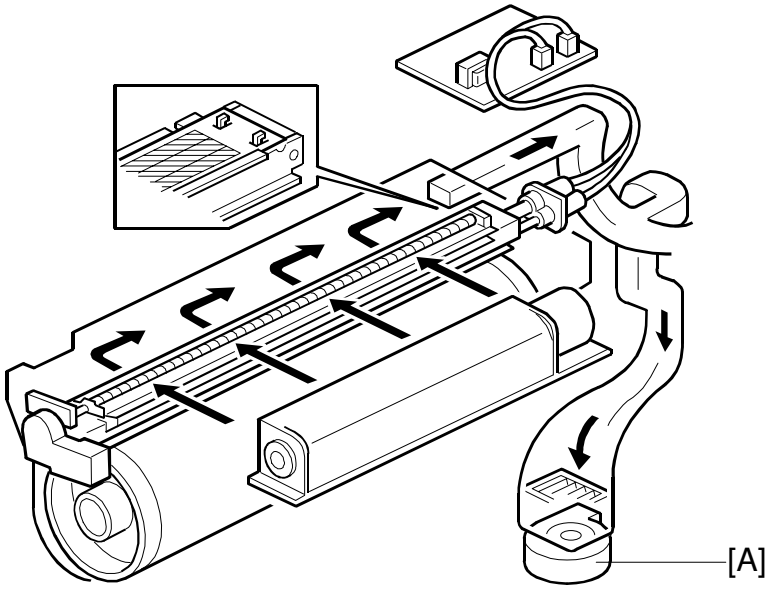
Drum Drive

- The drum motor turns both the OPC drum and the image transfer belt.
- A timing belt reduces rotational fluctuations, stabilizing image quality
- The rotational speed control circuit monitors the drum motor's speed. If the motor does no reach the rated speed, it sends a drum motor error (SC440) and stops the copier.
- At the end of the initial auto process control check, the drum rotates in reverse for 0.05 second (about 10 mm) to remove toner from the tip of the drum cleaning blade (☛CT).

Cleaning Drive



6.6.3 CHARGE CORONA UNIT



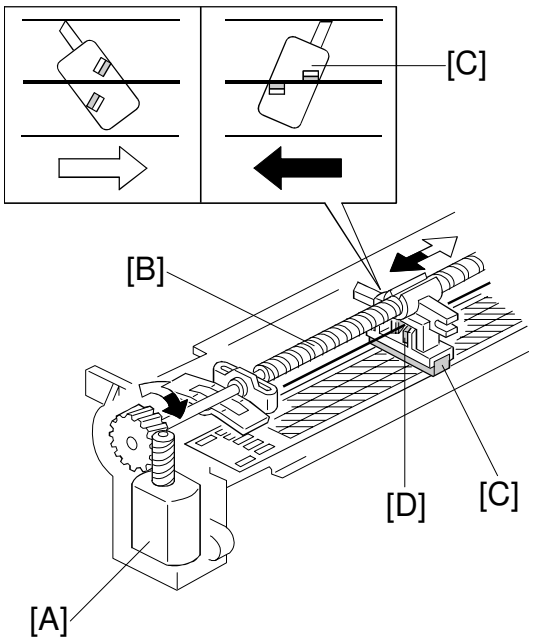
B023D204.WMF

- Uses a single wire scorotron system (☛ CT).
- Grid evens out the charge.
- Drum potential sensor adjusts the grid bias voltage, ensuring the drum receives a consistent charge.
- Exhaust fan [A] creates air flow through the corona unit. This prevents uneven charging.

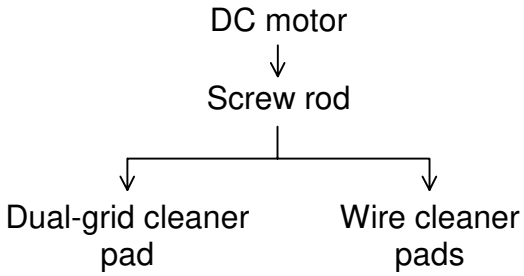
6.6.4 CHARGE CORONA UNIT CLEANER

The charge corona unit cleaner keeps the corona wire from becoming contaminated with toner and paper dust.

[A]: Dc motor
[B]: Screw rod
[C]: Dual-grid cleaner pad
[D]: Wire cleaner pads



Drive



Cleaning Conditions

- Main power is on and the hot roller is less than 100°C.
- Manually using SP mode (SP2-802).

Related SP modes

- SP2-802: Manual cleaning
- SP2-803-001: Enable cleaning when the main power switch/operation switch is turned on (default is ON).
- SP2-803-002: Enable cleaning after a specified development cycle count (default is ON).
- SP2-803-003: Enable cleaning after a specified number of hours (default is OFF).

Home Position

- Copier front

Cleaning Path (front → rear → front)

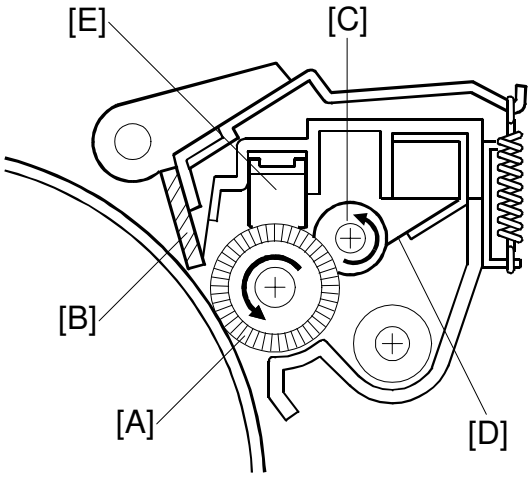
- Front→Rear: Only cleans the charge corona grid (white arrow).
- Rear→Front: Cleans both the charge corona grid and wire (black arrow).

Position Detection

- No sensor is used.
- When the cleaner reaches the rear of the copier, there's a sudden change in the current through the motor. The I/O control board senses this change and reverses the motor.
- If the current does not rise in 60 seconds, the I/O control board stops the motor and displays error message SC303.

6.6.5 CLEANING MECHANISM

[A]: Cleaning brush
[B]: Blade
[C]: Rotating bias roller
[D]: Scraper blade
[E]: Lubricant bar



B023D205.WMF

Cleaning

Residual toner is removed using a straight fiber brush, a bias roller and a cleaning blade (☛ CT).

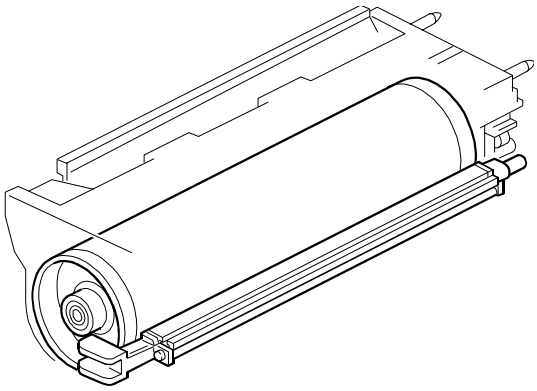
- Bias roller and brush rotate opposite to each other.
- Uses a counter blade. This is held against the drum by a spring.

Lubricant

- Lubricant (Zinc stearate) applied to the OPC drum via the cleaning brush (☛ CT).
- Lubricant bar uses both its own weight and a spring to hold itself against the cleaning brush.

6.6.6 PRE-CLEANING CORONA (PCC)

- PCC discharges the photoconductor drum, improving the cleaning efficiency (☛ CT).

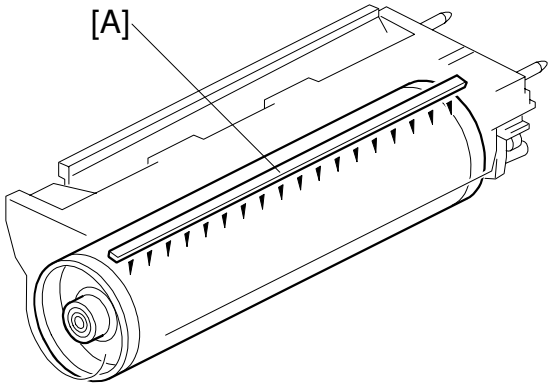


B023D206.WMF

6.6.7 QUENCHING

This copier employs optical quenching using LEDs (☛ CT).

- The quenching lamp [A] turns on when the Start key is pressed.
- Red LEDs are used to protect the drum from optical fatigue.

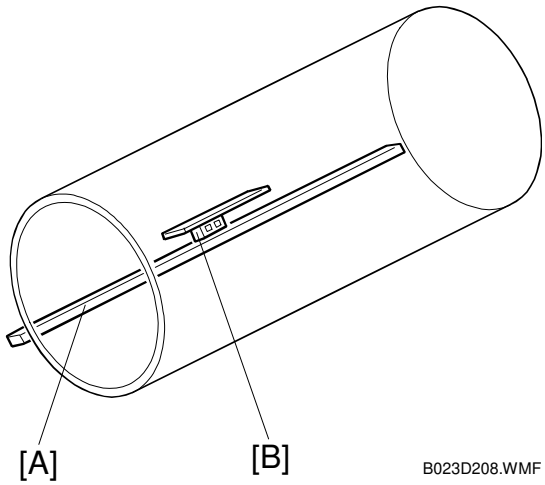


B023D207.WMF

6.6.8 CARRIER CATCHER

[A]: Magnet
[B]: ID sensor

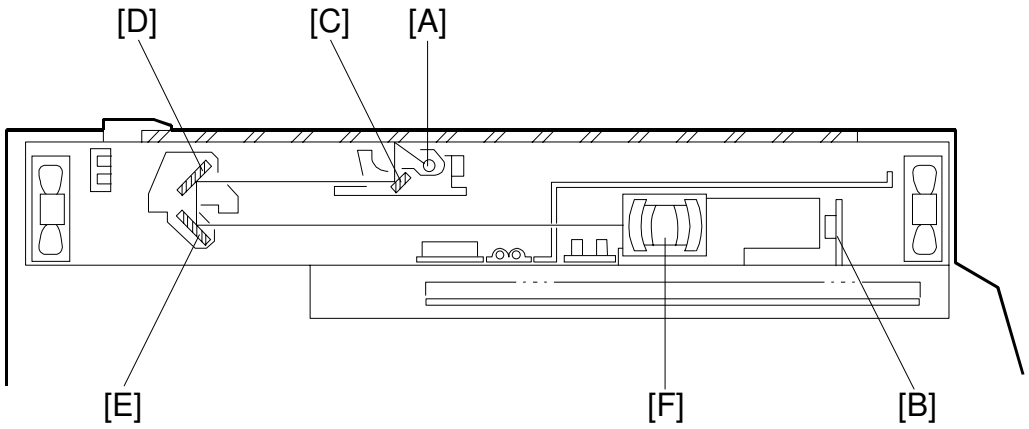
This magnet, installed below the ID sensor, removes carrier from the drum.



B023D208.WMF

6.7 SCANNER UNIT

6.7.1 OVERVIEW

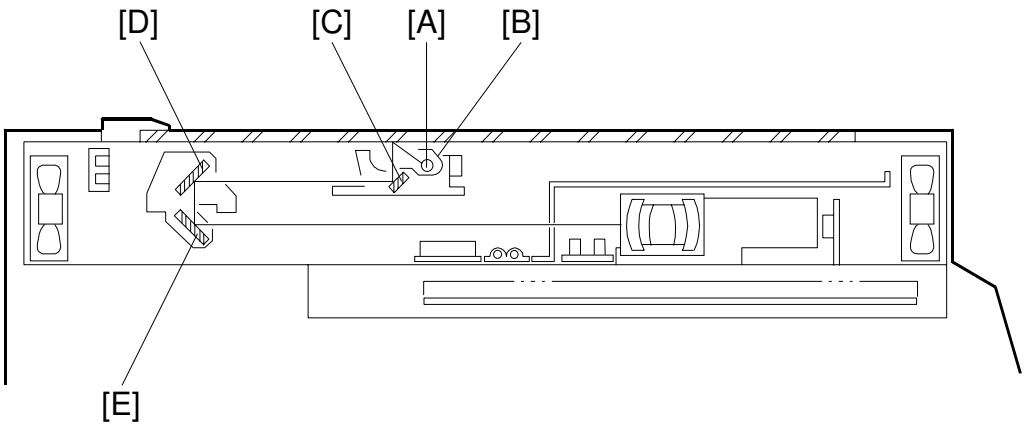


B023D001.WMF

[A]: Exposure lamp
[B]: Charge coupled device (CCD)
[C]: First mirror
[D]: Second mirror
[E]: Third mirror
[F]: Filter and lens

- Scanner uses a halogen lamp
- Light reflected off the original is directed into a color CCD via the mirrors, filter and lens.
- Filter removes reflected infrared light. Particularly important with glossy photos, whose dark areas might otherwise develop a reddish tint.
- Uses a one-chip color CCD with RGB color filters.
- Makes a single scan in all modes except the “Auto Original Type” mode.
- Scanning resolution is 600 dpi.

6.7.2 SCANNER



B023D001.WMF

[A]: Exposure lamp
[B]: Sub reflectors
[C]: First mirror
[D]: Second mirror
[E]: Third mirror

First Scanner

- Consists of the exposure lamp, main and sub reflectors and the first mirror.
- Sub reflector shaped so that the light will expose the original evenly. This reduces shadows on past-up originals.
- A thermoswitch prevents the first scanner from overheating. It opens at around 140°C and cannot be reset.

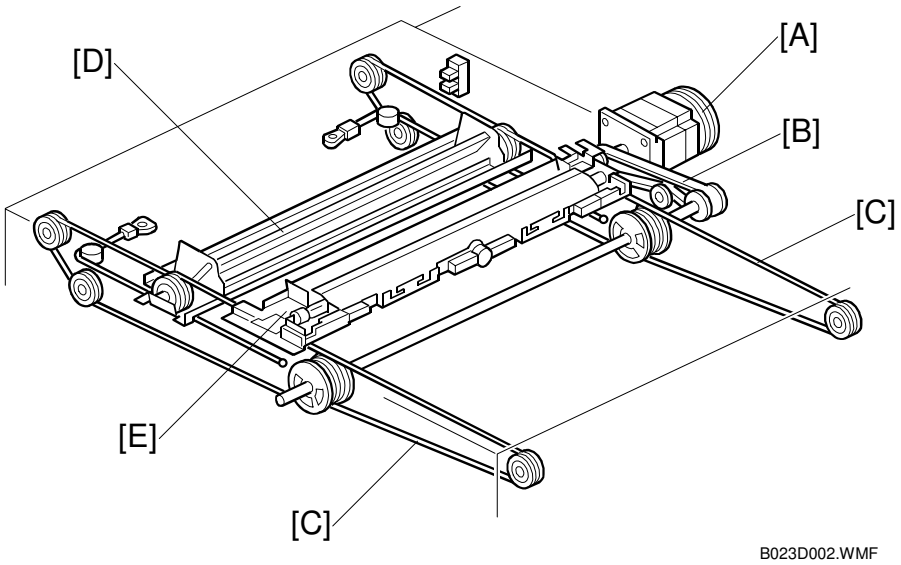
Exposure Lamp

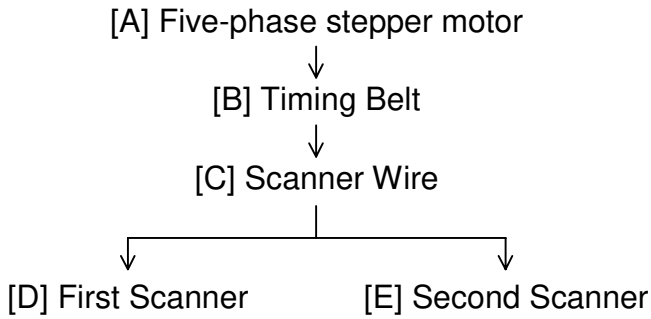
- The frosted surface ensures an even exposure in the main scan direction.
- Powered by a dc supply. This prevents uneven lighting if the power fluctuates while scanning.

Mirrors

- First, second and third mirrors have glass on the reverse side. This increases their weight and prevents vibrations.

6.7.3 SCANNER DRIVE





Full Size mode

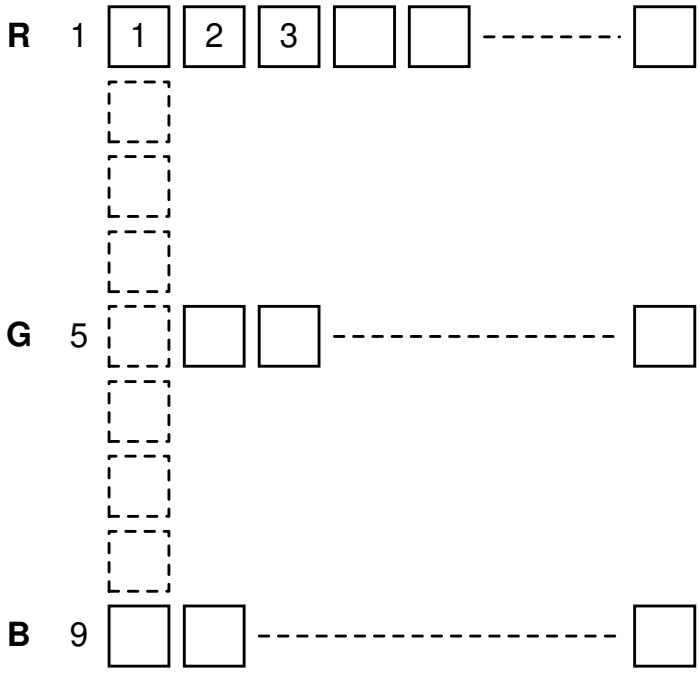
- During scanning, the first scanner's speed matches the drum rotation speed.
- Second scanner's speed is half the first scanner speed.
- Speed increases when the scanner returns.

Reduction/Enlargement modes

- First scanner's speed equals the drum rotation speed divided by the magnification ratio (0.25 to 4.0).
- Varying the scanner speed changes the sub-scan's image size.
- Image processing on the scanner IPU board changes the main scan's image size.
- Return speed is the same as in the full size mode.

NOTE: This machine makes a single scan for all copy modes except the Auto Original Type.

6.7.4 COLOR CCD



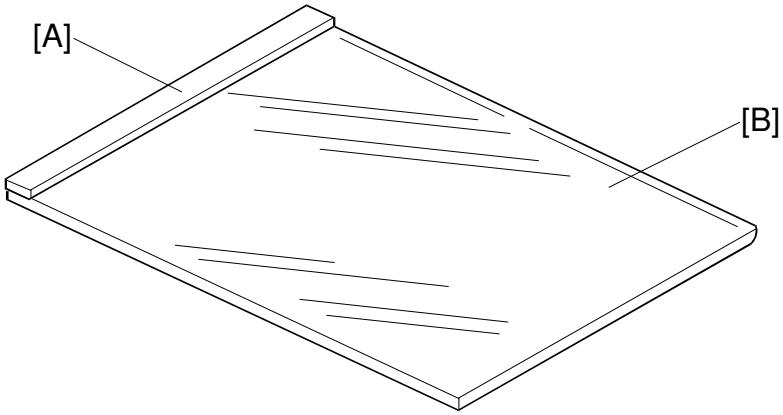
B023D150.WMF

The color CCD converts light reflected from the original into three analog signals, one for each of the three basic colors—red, green and blue (☛ CT).

- Single scan generates all three signals.
- The color lines are spaced 4 pixels apart at full size magnification.
- To replace the CCD, you must replace the entire Sensor Board Unit (SBU).

Detailed Descriptions

6.7.5 WHITE PLATE SCANNING



B023D851.WMF

[A]: White plate
[B]: Exposure glass

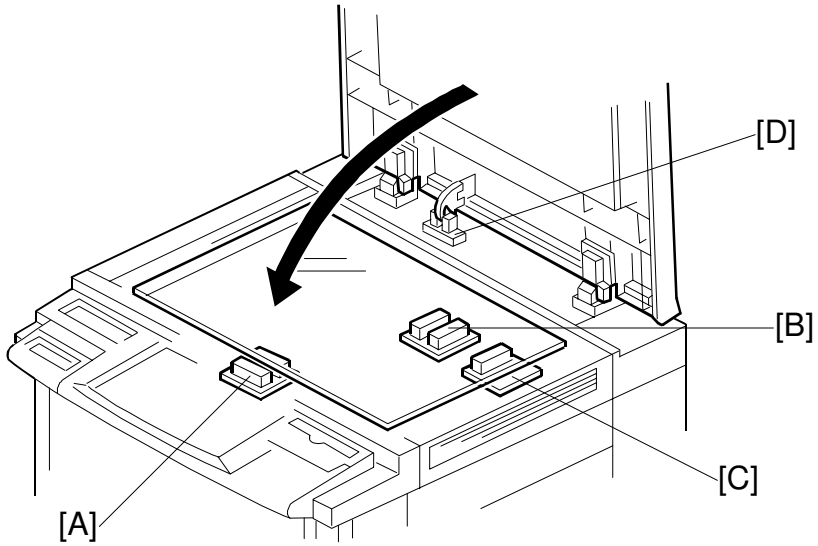
- Used for auto shading (☛ CT).
- White plate located under the left scale.
- Scanned every copy cycle.

6.7.6 SCANNER IPU

The scanner IPU processes the RGB signal received from the CCD board. It also controls the following:

1. Turns the exposure lamp on and off
2. Adjusts the speed of the scanner drive motor
3. Detects the size of the original
4. Turns the scanner exhaust and optics cooling fans on and off
5. Supplies the clock signals for the CCD board
6. Detects when the scanner is in the home position

6.7.7 ORIGINAL SIZE DETECTION



B023D053.WMF

[A]: Width sensor
[B]: First length sensor
[C]: Second length sensor
[D]: Platen cover position sensor

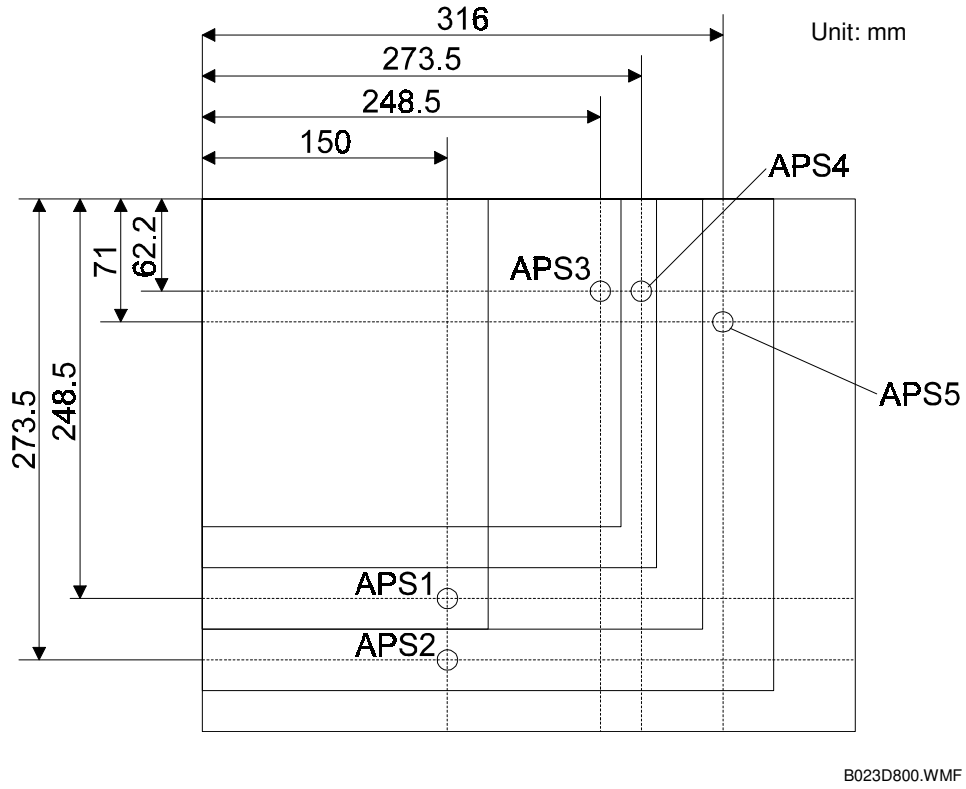
- Original size is detected using three APS sensors (reflective photosensors).
- Sensors [A] and [B] both have two beams. Each beam scans a different point on the exposure glass.
- Sensor [C] has only a single beam.
- Sensor activates when the original (or platen cover) covers the beam.

Original Size		APS1	APS2	APS3	APS4	APS5	
A4/A3 Version (metric)	LT/DLT Version (inch)						
A3	11" x 17"	—	1	1	—	—	
B4	10" x 14"	1	0	1	—	—	
F4	8 1/2" x 14"	0	—	—	—	1	Metric: F4, F, or Folio, depending on SP5-126-001
A4-L	8 1/2" x 11"	0	—	—	1	—	
A4-S	11" x 8 1/2"	—	1	0	—	—	
B5-S	11" x 8 1/2"	1	0	0	—	—	
B5-L	8 1/2" x 11"	0	—	1	—	—	
A5-L	5 1/2" x 8 1/2"	0	—	0	—	—	See Note

L: Lengthwise S: Sideways
0: No paper, 1: Paper present, —: Don't care

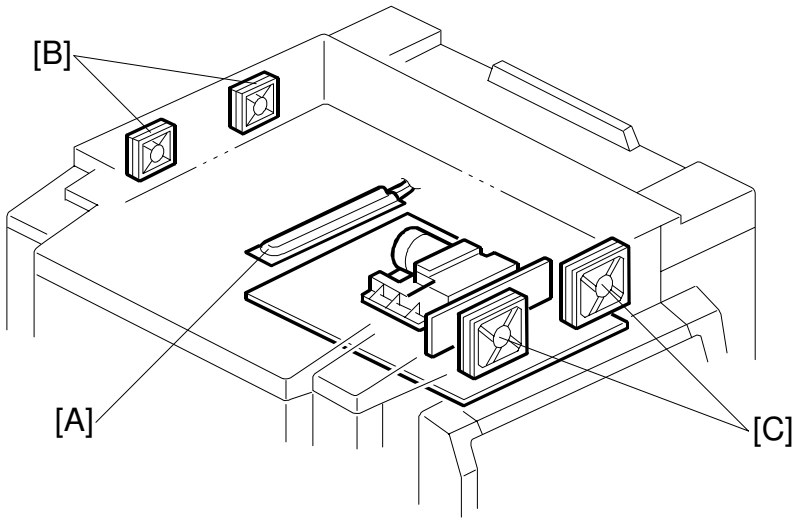
The diagram on the next page shows the location of the APS sensors on the glass.

NOTE: This machine cannot detect originals that are A5 lengthwise/HLT or smaller. If all the sensors are off, the machine either assumes it is A5 lengthwise/HLT, or simply displays a message stating that it cannot detect the original size (this depends on SP4-303).



- Original size sensors come on with the main switch.
- Main CPU checks the sensors as the platen cover is closed (when the position sensor activates).
- Platen cover position sensor activates when the platen is about 15 cm above the exposure glass.
- When making copies with the platen open, the original size is calculated when the start key is pressed.
- This original size detection method increases productivity by eliminating the need for pre-scanning.

6.7.8 OTHERS



B023D004.WMF

[A]: Anti-condensation heater
[B]: Optic cooling fans
[C]: Optics exhaust fans

Anti-condensation Heater

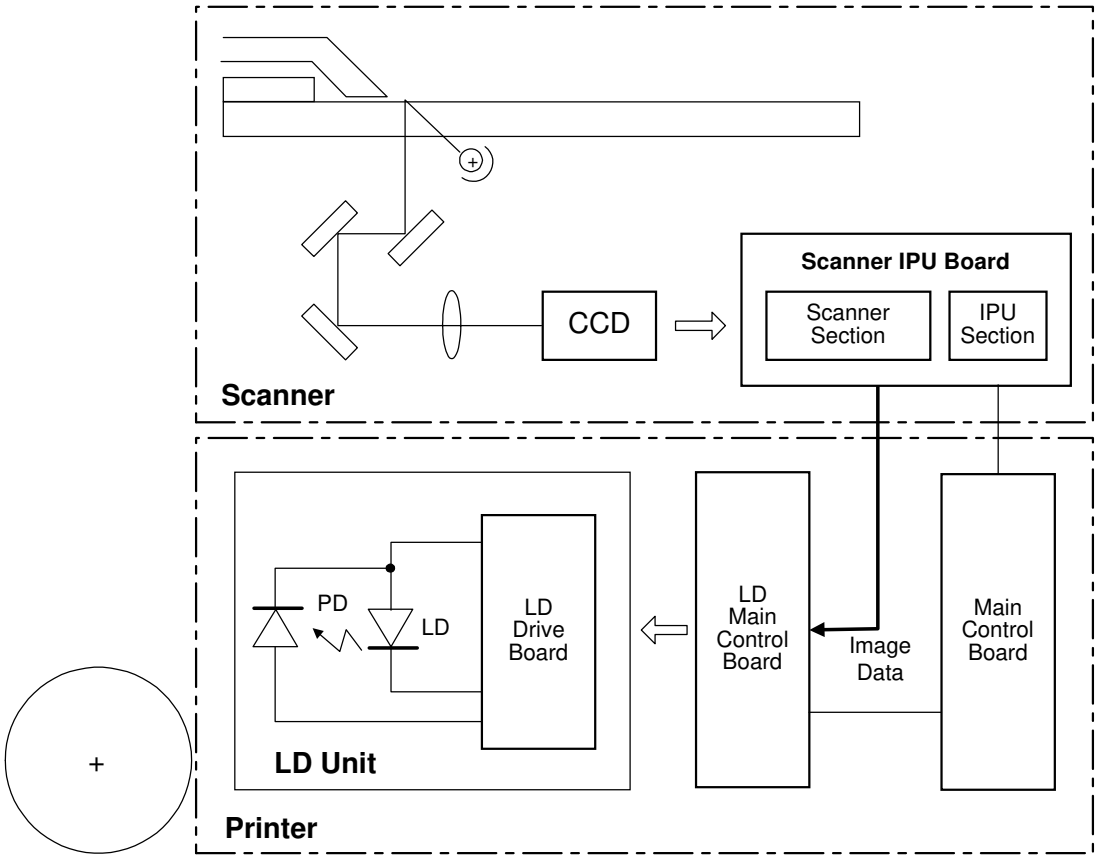
- Located on the left side of the SBU.
- Turns on when the heater switch is on and either the main switch or the operation switch is off.
- Prevents moisture from forming on the optics when not in use.
- Heater switch also controls the paper transfer heater and the paper tray heaters.
- The heater switch is turned off for shipping from the factory.

Fans

1. Optics Cooling Fans
   - Located on the left side of the optics cavity
   - Draw air into the optics cavity to prevent the exposure lamp and optics cavity from overheating.
   - Turn on with the exposure lamp.
   - Turn off ten seconds after the exposure lamp.
2. Optics Exhaust Fans
   - IPU cooling fans, located on the right side of the optics cavity.
   - Move air out of the optics cavity.
   - Come on with the operation switch.
   - Runs at half-speed until the exposure lamp turns on.
   - Stays at full speed for ten seconds after the exposure lamp turns off.

6.8 IMAGE PROCESSING

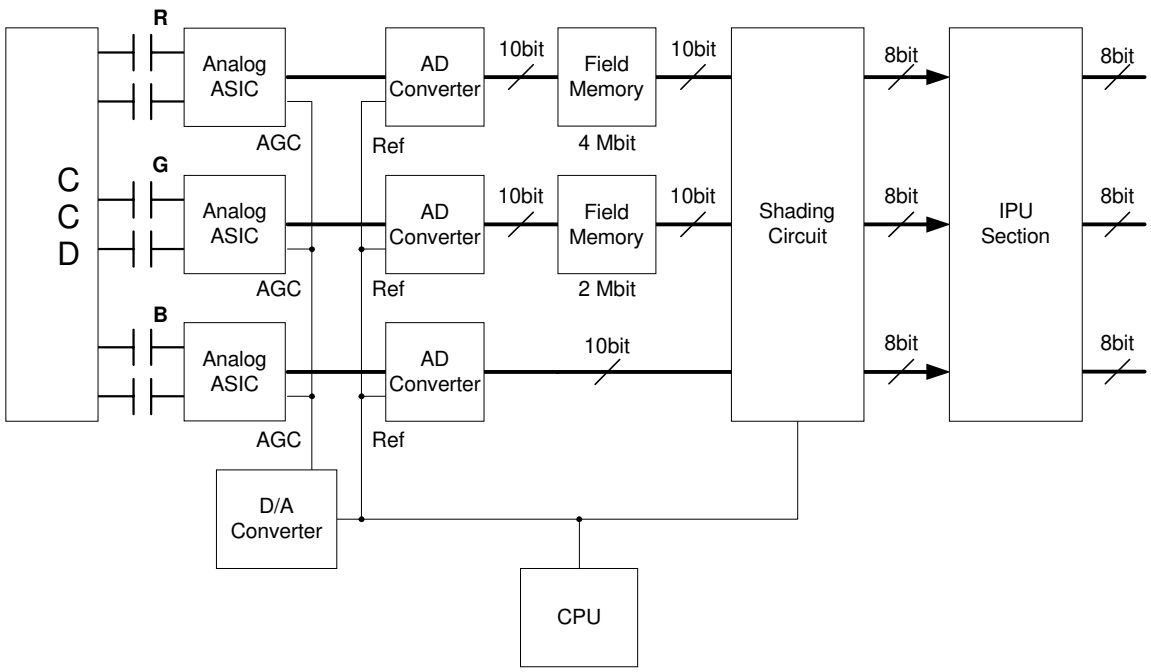
6.8.1 OVERVIEW



B023D066.WMF

1. Reflected light from the original enters the CCD via the mirrors and lens.
2. CCD board has a CCD chip that is provided with a filter for each of the R, G, and B colors.
3. Reflected signal is converted to analog signals (photoelectric conversion) and sent to the scanner IPU board as image data.
4. Scanner IPU board performs signal processing:
   - A-to-D conversion
   - Shading compensation
   - D-to-A conversion
   - Line correction
   - Image processing on the image data.
5. Image data is finally supplied to the printer section as digital signals (8 bits per pixel).

6.8.2 SCANNER SECTION BLOCK DIAGRAM



B023D067.WMF

RGB analog signals from the CCD are combined and amplified by analog ASIC chips.

↓

Converted to 10-bit digital signals by A/D converters.

↓

Digital signals undergo shading compensation and line correction.

↓

Signals sent to the IPU section.

6.8.3 SCANNER FUNCTIONS

Photoelectric Conversion

- Resolution: 600 dpi (23.4 pixels/mm).

For more details (☛ CT).

Signal Processing (Analog ASIC)

This analog ASIC provides the following three analog signal processing functions (for more details ☛ CT):

1. Signal Amplification
   - Odd-pixel and even-pixel RGB analog signals from the CCD are amplified by operational amplifiers.
2. Signal Composition
   - The amplified signals (even-pixel and odd-pixel for each RGB color) are combined by the MPX before A/D conversion.
3. Feedback
   - CPU on the scanner IPU board receives the feedback data for white level and black level from the shading circuits and feeds it to the ASICs through the D/A converter.
   - Feedback data from the CPU is updated every time the main switch is turned on.

A/D Conversion

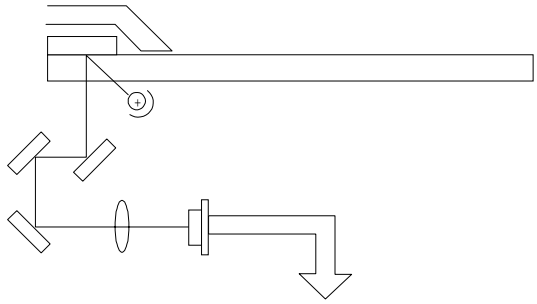
Converts the analog signals (CCD output) to 10-bit (1024 gradations) digital signals.

Shading Compensation Circuit

Shading Compensation

White Level Correction:

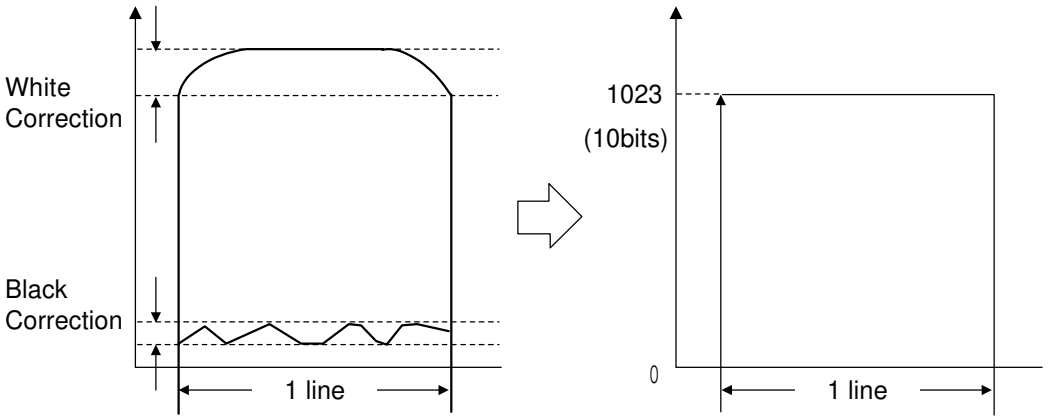
- White reference plate scanned before the original.
- Data is updated before each scan.
- 5mm scanned (79 lines at 100% magnification).
- Corrects for variations in the white level across the page, including irregularities in the CCD and the optics across the main scan.
- For more details (☛ CT).



B023D068.WMF

Black Level Correction:

- Improves image reproduction for high-density areas.
- Reads the black video level at the first 4 pixels of the CCD.
- These pixels are masked off, and should produce a pure black signal.
- Average output of the 4 pixels is used as the black level. This is subtracted from the value of each pixel.
- Calculated for each scan line.
- Corrects the image data for any changes in black level with time, as the machine scans down the page.
- For more details (☛ CT).



B023D069.WMF

The video signal for each pixel obtained during image scanning is corrected by the shading circuit as follows:

$$\frac{\text{(Data scanned for each pixel) - (Black correction data)}}{\text{(White correction data for each pixel) - (Black correction data)}} \times 1{,}023$$

D/A Conversion

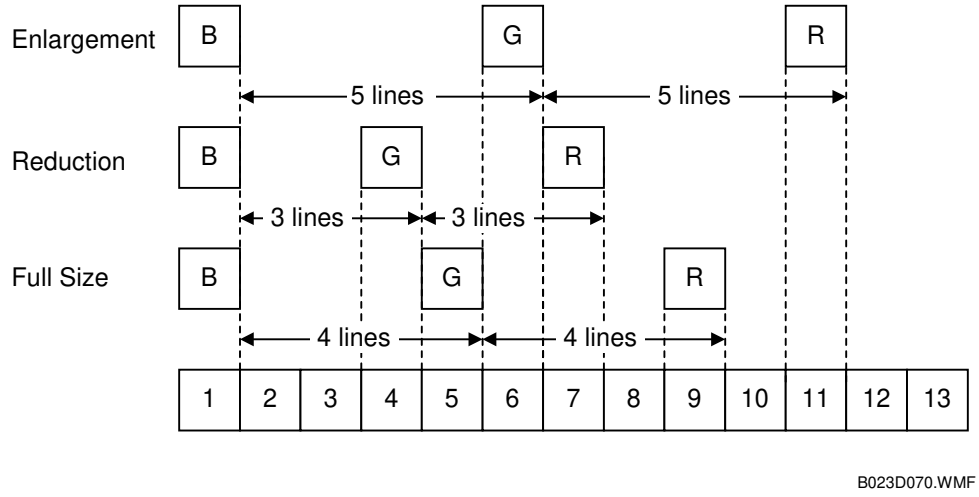
CPU monitors the digital feedback signals from the shading circuits and calculates correction factors.

- D/A circuit converts the signals from the CPU into analog signals.
- Feeds the analog signals back to the analog ASIC chips.

The CPU also feeds black shading data back to the AD converters as the reference black level.

- Done every CCD pixel to calibrate the black level.
- Prevents drifts in the signal over time.

Scan Line Correction Circuit



B023D070.WMF

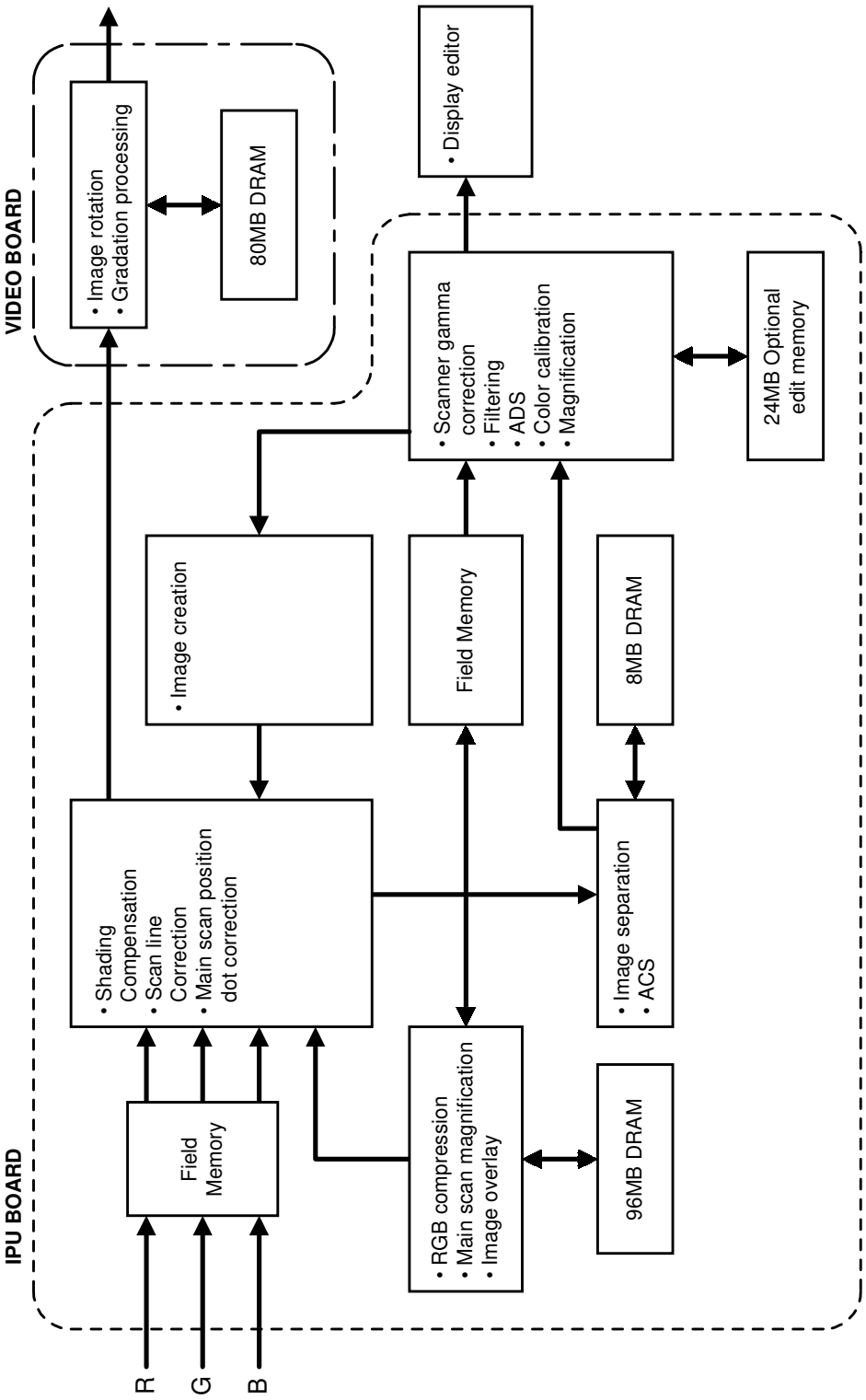
R, G and B CCD lines are spaced 4 lines apart (8 lines total) when full size magnification is used.

- Scan line correction synchronizes these signals by storing each line in memory.
- Discrepancies between the R, G and B signals change depending on the magnification ratio. The correction data for different magnifications is calculated as follows:

Synchronization calculations
B: Standard (No correction)
G: (4 lines) x (Magnification ratio)
R: (8 lines) x (Magnification ratio)

- If this calculation does not result in an integer, the correction data is set to the closest integer, but further correction is needed (☛ "Picture Element Correction" (6.8.5) and CT).

6.8.4 IPU SECTION BLOCK DIAGRAM



• This copier holds RGB color image data in 96MB DRAM memory so that a full-color copy can be generated in a single scan. The image in this memory is also used in the continuous copy mode.

• 80MB DRAM in video board is used to enable image rotation for full color mode.

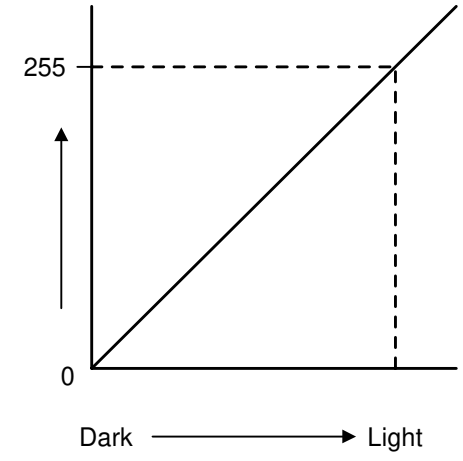
B023D071.WMF

Detailed Descriptions

6.8.5 IPU FUNCTIONS

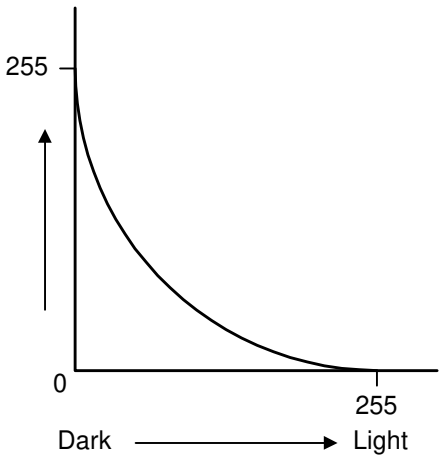
Scanner γ Conversion and Picture Element Correction

Scanner γ Conversion (RGB γ Conversion)



[Fig. 1]

B023D072.WMF



[Fig. 2]

B023D073.WMF

The RGB video signals from the CCD (8-bit signal) are sent to the IPU section. This signal is proportional to the intensity of light reflected from the original image (Fig. 1). The scanner gamma (γ) correction inverts the video signals. The shading circuit converts the signal from 10-bit to 8-bit.

- IPU section converts the signal levels as shown in Fig. 2.
- Improve the accuracy of RGB to CMY color conversion (conversion done later in the image process).
- Same table used for R, G, and B signals.

	Dark (Black) → Light (White)	
Scanner Input (RBG)	0 →	255
After γ Correction (RGB)	255 →	0
↓		
Color Conversion		
↓		
Printer Output (CMYK)	255 →	0

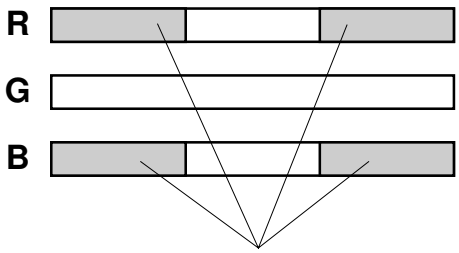
Picture Element Correction

The Picture Element Correction circuit does two things.

1. Completion of the scan line correction process.
   - Performed if the scan line correction process did not result in an integer.
2. Correction if the CCD is not perpendicular to the light.
   - In this case, the positioning of the pixels in the image data will be different from the original.
   - This difference becomes more obvious near the edges.
   - As a result, vertical black lines (in the sub-scan direction) at the left and right edges may develop a colored fringe.

Picture element correction adjusts the CCD line spacing—this fixes both problems. The target areas for this correction are shown to the right.

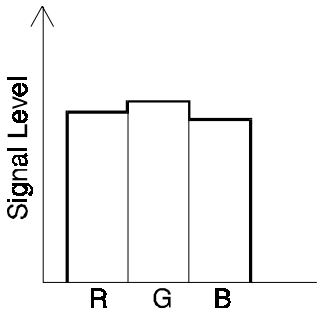
- Green CCD line is taken as a standard.
- Both ends of the red and blue lines are adjusted to match.
- Use SP modes 4-932-001 to 4-932-004 to change the vertical line correction level. (☛ 6.7.2 Main Scan Position Dot Correction)



Picture Element Correction

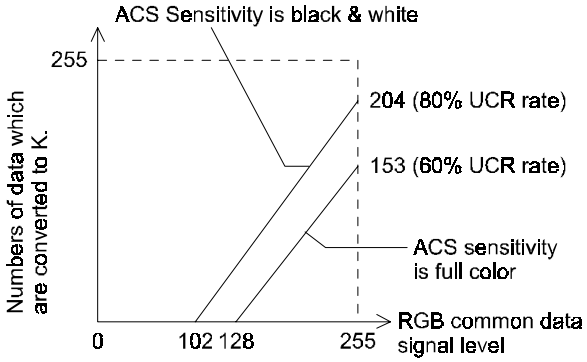
B023D074.WMF

ACS (Auto Color Selection)



RGB Signal After Scanner γ Correction

B023D075.WMF



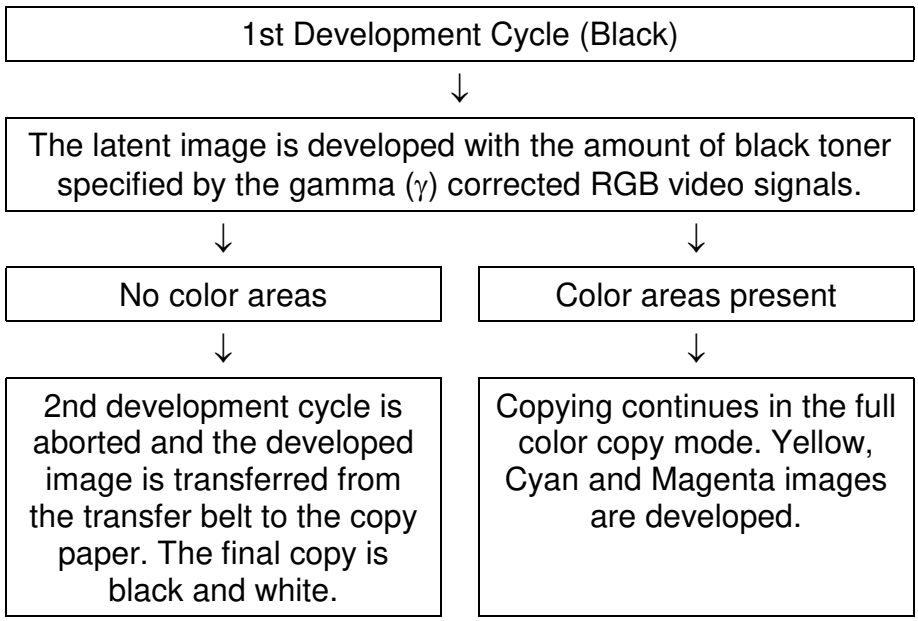
B023D076.WMF

The auto color selection function determines if an original is black/white or color. Black copy mode or full color mode is automatically selected to match.

Selection made based on the difference between the RGB signal levels (for more details ☛ CT).

RGB video signals are compared.

If the maximum difference among RGB signal is within a certain range, the original is considered black and white.



Automatic Original Type Selection

If this function is selected, the copier starts a pre-scan when the Start key is pressed. During the pre-scan, the copier detects two or more image features and identifies the type of original.

- Copier selects the mode most suited to the original.
- Selected mode may not match the specified mode (the copier may not copy text originals in text mode).

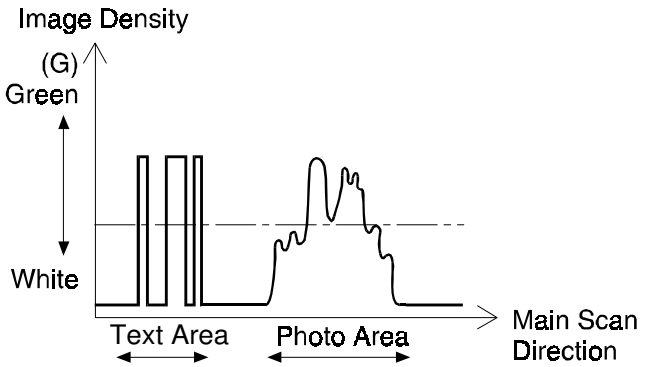
The copier automatically selects from the following 9 original modes:

Original Modes
Text mode
Printed text/photo
Glossy text/photo
Copied text/photo
Printed photo
Glossy photo
Copied photo
Marker pen
Ink jet

NOTE: Mixed-type originals are disallowed because the copier cannot select an appropriate mode for such originals (they may be copied, however).

Image Separation

The copier senses and separates the original image into text and photo (dot screen) areas.



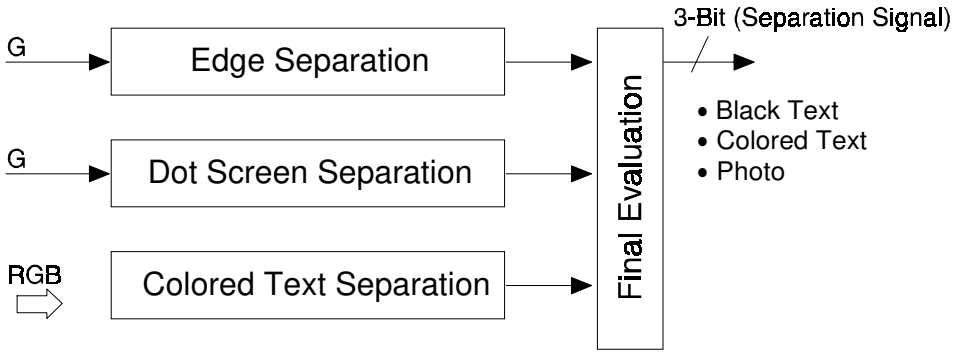
B023D077.WMF

Area Features

- Text: Sharp difference in contrast between the background and image.
- Photo: Many levels of gradation.

Separations

- Black text
- Colored text
- Photo areas.



B023D078.WMF

Edge Separation

- Used to locate text and line diagrams
- Locates areas of strong contrast.
- Looks for continuity of black or colored pixels.
- Looks for continuity of white pixels around the black or colored pixels.
- Only uses data from the green CCD.

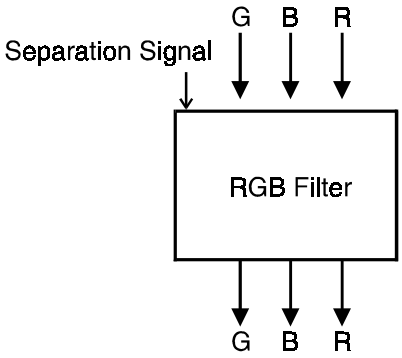
Dot Screen Separation

- If white pixels are not detected around the non-white pixels, it is a dot screen area.

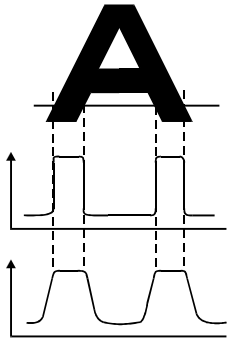
Colored Text Separation

- Identifies weather the text area's pixels are black or color.
- Based on:
  1) Differences among the RGB maximum signal levels.
  2) Output levels of the RGB video signals.

Filtering and Color Conversion



B023D079.WMF



B023D080.WMF

RGB Smoothing Filter

Appropriate software filters are applied to the RGB video signals.

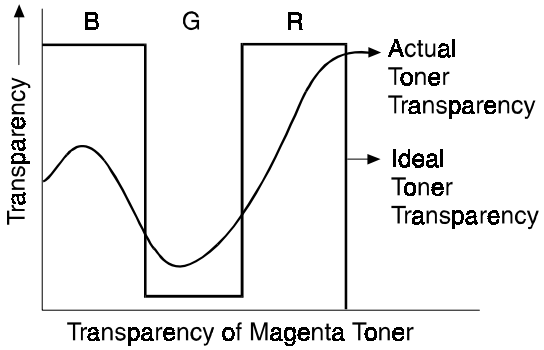
- Varies depending on the results of the auto text/photo separation (or on the selected original mode).
- RGB smoothing is applied to photo areas
- Edge emphasis applied to text areas.
- For more details (☛ CT)

Color Conversion

A matrix converts the RGB video signals from each scanning cycle into CMYK video signals.

Transparency for each color not ideal (☛ illustration).

Color conversion compensates for the differences between the ideal and actual characteristics.



B023D081.WMF

User Modes

The following affect the color conversion matrix.

- Color conversion mode
- Pastel mode
- Color balance mode
- Original mode (press print, glossy photo, 2nd generation)
- RGB toner correction mode.

Conversion Matrix

The following color conversion table is an example of the results from the matrix operation.

- Simple color copying.
- No special modes applied.
- To represent green, the yellow and cyan toners are used in a 1:1 ratio.

Color Conversion Table

Original Color / Toner	K	R	Y	G	C	B	M	W
Y	1	1	1	1	0	0	0	0
M	1	1	0	0	0	1	1	0
C	1	0	0	1	1	1	0	0
K	1	0	0	0	0	0	0	0

When the user selects a special mode, the values in this table may fall between 0 and 1. The following page briefly explains the effects of some modes.

Color Conversion mode

- Different than the RGB to CMYK conversion described above.
- Allows you to change a specified color on the original to a different color on the copy (i.e. swapping yellow to black).
- Selected color must fall within recognized thresholds to be converted.
- Up to 4 colors can be converted at one time.
- Please refer to the operator's manual for details.

Pastel mode

- Output of the combined CMYK data shifts to a value between 100 % and 25 %.
- There are 9 steps.
- Value used depends on the user's selection.

Color Balance mode

- Data output for each color (CMYK) can be adjusted independently by changing the matrix parameters.
- Nine possible values for each color.

Original mode

- Three sub-modes
  1) Press print
  2) Glossy photo
  3) 2nd generation
- Three types of special original mode
  1) Marker pen,
  2) Inkjet,
  3) Map
- Selects the most suitable matrix for the original type selected by the user at the operation panel.

Inkjet mode

- Emulate printer output.
- Three different inkjet gamma (γ) tables available.
- Selected with the User Tools.

RGB Toner Correction mode

- Only for two-toner, single color (R, G or B) copy mode.
- Two colored toners are mixed to output the selected color.
- Mixing ratios for R, G and B are adjustable (SP 5-611-001 to 5-611-006).

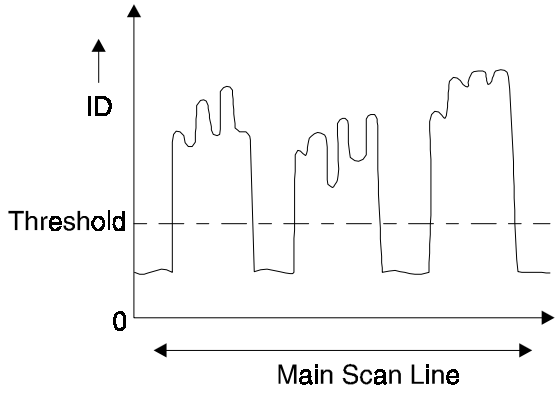
Twin Color mode

- Separates black areas and colored areas.
- Converts black areas to a color selected by the user.
- All other areas converted to a second color selected by the user.
- Refer to the operator's manual for details.

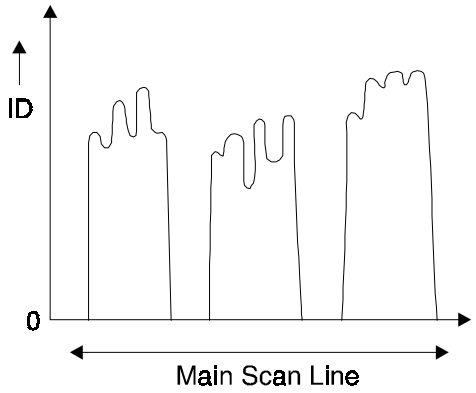
New Twin Color mode (Black & Red)

New twin color mode is new added to the current twin color mode. The new twin color mode is that only red portion in the original is copied as red, and the other portion (Bk, C, M, Y, B, …) is copied as black.

Background Density Control and ADS



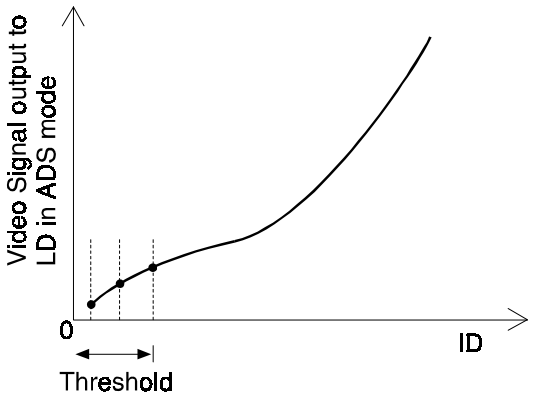
B023D084.WMF



B023D085.WMF

Background Density Control

- Removes low ID image signals (background) that are less than a certain threshold.
- Threshold varies depending on the color mode (single color or full color).
- User can select a different threshold for each mode.



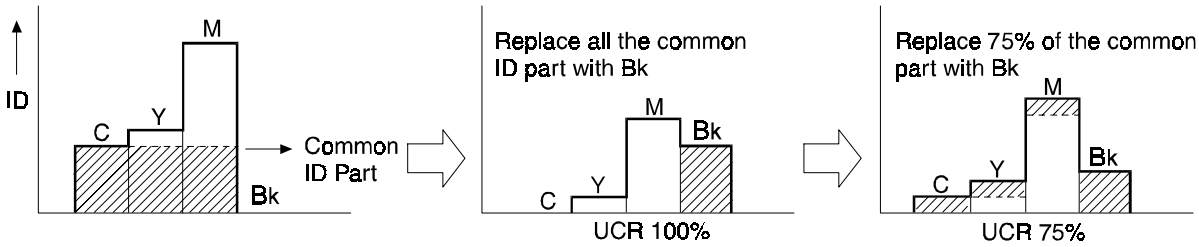
B023D083.WMF

ADS (Auto Image Density Selection)

In ADS, the user does not set the threshold; the machine calculates it, guided by input from the user for F/C and 2C mode.

- Full color mode
  1) Refers to the RGB data taken from the entire original.
  2) Calculates a threshold for removing the background based on this data.
- Black and white mode
  1) Determines the peak white level.
  2) Peak level data is taken for each scan line.
  3) Removes the peak white level from the image. This produces a white background.
  4) Also uses the peak white level to determine the white reference value for A/D conversion.
  5) Background density adjusted before data is input to the A/D converter.

UCR (Under Color Removal)

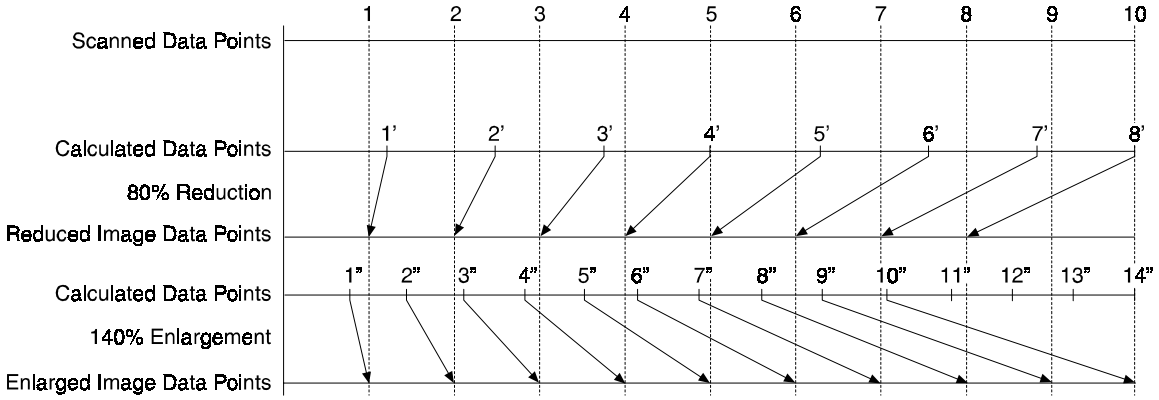


B023D086.WMF

Compensates for inaccuracies in the CMY toner addition process, by replacing equal amounts of C, M and Y toner with an equivalent amount of black toner.

- UCR ratio is the percentage of common ID value that is subtracted and converted to black.
- UCR ratio depends on the color mode and the image density.
- User can adjust the UCR ratio during initial setup.
- For more details (☛ CT)
- Magnification Processing

Main Scan Magnification



B023D088.WMF

While the machine changes the scanner speed to reduce or enlarge the original in the sub-scan direction, an LSI on the IPU Board handles reduction and enlargement in the main scan direction.

- Scanning and laser writing are done at a fixed pitch (CCD elements cannot be squeezed or expanded).
- Imaginary points are calculated, corresponding to a physical enlargement or reduction.
- Image density is then calculated for each of the imaginary points based on the image data for the nearest two true points.
- The calculated data then becomes the new (reduced or enlarged) image data.

NOTE: The actual calculations for main scan magnification use the polynomial convolution method. This mathematical process is beyond the scope of a service manual and will not be covered here.

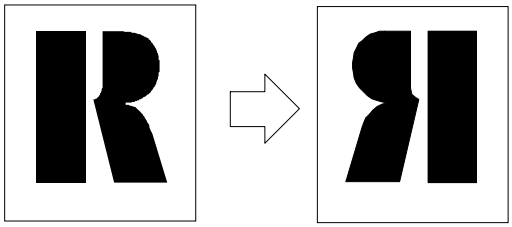
Image Creation

These are some of the user selectable image processing functions.

NOTE: To enable the image overlay and area editing functions, Edit Option (B370-01) should be installed. About the functions which require Edit Option more in detail, see operating instructions.

Mirror Image

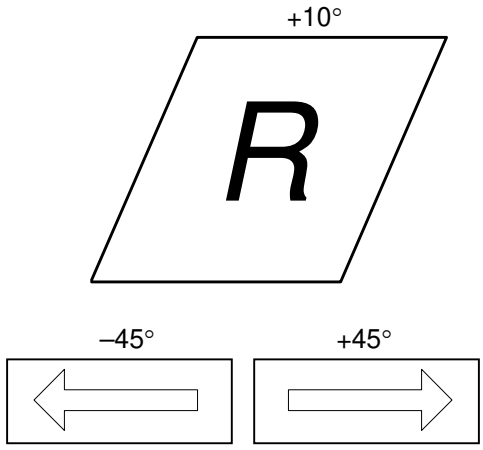
Generates a mirror image of the original by inverting the original image in the main scan direction.



B023D951.WMF

Slanted Image

- Generates a slanted image of the original by shifting the original image in the main scan direction by a specified angle.
- Maximum allowable angle is ±45°.



B023D952.WMF

Repeat Image

Copies a specified area of the original repeatedly over the entire page. There are three ways of specifying the copy area. (Refer to the operator's manual for details.)

1) Entering length.
2) Entering the number of images
3) Entering via an editor

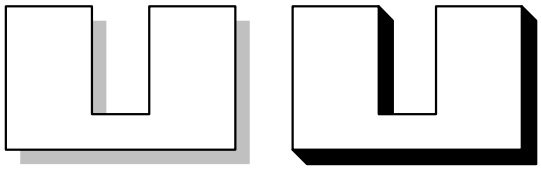
Outline Image

- Converts the image data into binary-value data.
- Submits the converted data into an outline image filter.
- Frame width may be set to 0.25, 0.5, or 0.75 mm.

B023D953.WMF

Shadow Image

- Shadow is cast to the lower right of the original (offset by 45 degrees).
- Both plane and solid shadows are available.
- Copier can identify the color of the original, using that as the basis for the shadow color.



<Plane shadow> <Solid shadow>

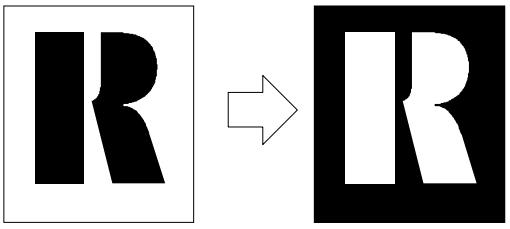
B023D954.WMF

- Specific shadow colors can be set using the editor (setting CMYK values).
- Width may also be specified between 1mm and 4mm in 1mm units.
- You may not specify the color when performing both outline imaging and shadowing.

Positive-Negative (Image Inversion)

The copier converts the colors of the full-color original to their complementary colors.

Conversions
W to K
B to Y
G to M
R to C

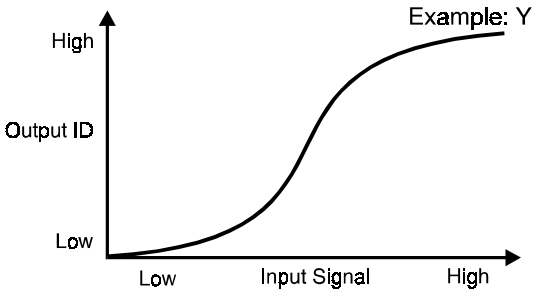


B023D955.WMF

The user may also specify the area and magnification ratio.

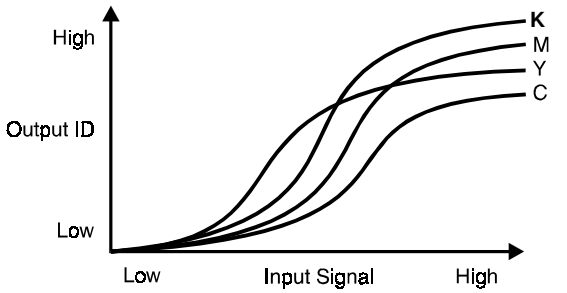
Gradation Processing

Gamma (γ) Correction (Printer γ)



[Fig. 1]

B023D089.WMF



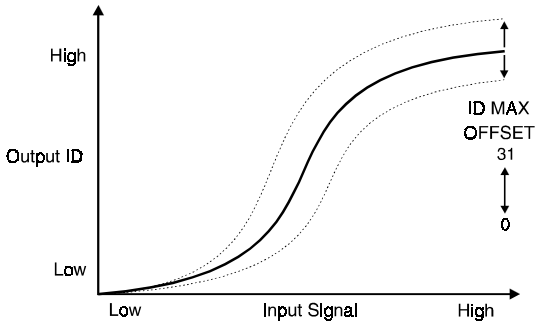
[Fig. 2]

B023D090.WMF

Ideally, the gamma curves for Yellow, Magenta, Cyan, and Black would be identical, as shown in figure 1. However, slight variations in the electrical components can result in varying gamma curves, as shown in figure 2.

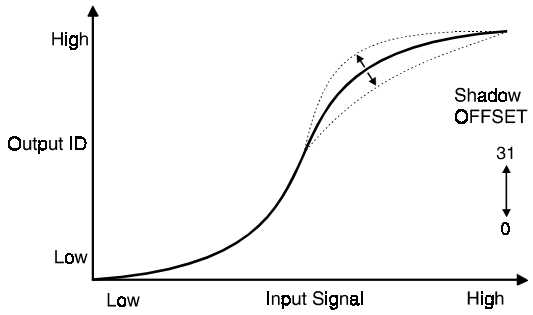
- Printer characteristics are much more variable than the scanner. Printer gamma needs recalibration and adjustment from time to time.
- Auto Color Calibration (ACC) procedure compensates for any discrepancies in color reproduction.
- ACC makes new gamma curves for each color in each mode (text, photo, and black text).
- After ACC, the gamma curve for each color can be adjusted with service programs (SP4-910 to SP4-926).
- 4 different modes:
  1) ID max.
  2) High ID
  3) Middle ID
  4) Low ID
- If the previous gamma curve was better, it can be recalled.
- Factory settings can be loaded using SP 5-610-004.
  NOTE: If the factory settings have been overwritten, this will return the new values, not the actual settings made in the factory. This is deliberate, since some drift is expected. After a time, the original factory settings may no longer be suitable.
- Factory settings can be overwritten by the current gamma settings using SP5-610-005.
- SP7-904 prints the current manual γ settings.

ID Max.
This mode adjusts the total image density as shown in figure 3.



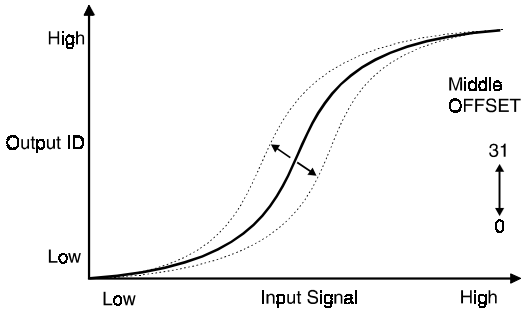
[Fig. 3] B023D091.WMF

Shadow (High ID)
The High ID mode adjusts the image density between Level 6 and Level 9 of the color gradation scale on the C-4 test chart (figure 4).



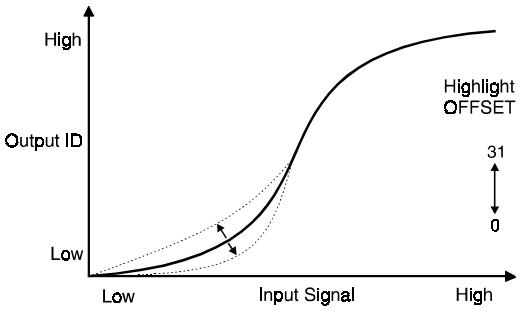
[Fig. 4] B023D092.WMF

Middle (Middle ID)
The Middle ID mode adjusts the image density between Level 3 and Level 7 of the color gradation scale on the C-4 test chart (figure 5).



[Fig. 5] B023D093.WMF

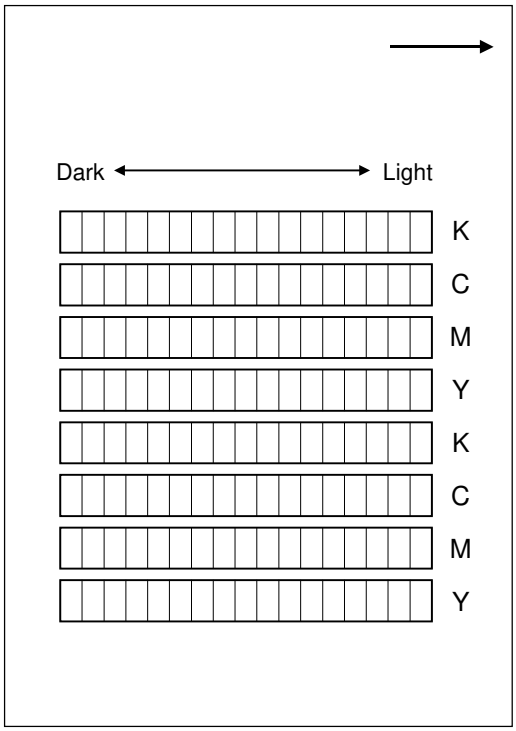
Highlight (Low ID)
The Low ID mode adjusts the image density between Level 2 and Level 5 of the color gradation scale on the C-4 test chart (figure 6).



[Fig. 6] B023D094.WMF

Auto Color Calibration Test Pattern

The copier firmware has a test pattern with eight 17-step gradation scales for each color (CMYK), including background white, for Text and Photo modes.



B023D095.WMF

Auto Color Calibration
Automatically calibrates the printer gamma (γ) curve when the user selects ACC.

1. Prints an ACC Test Pattern.
2. User places the test pattern on the exposure glass.
3. Copier scans eight lines. One for each color (CMYK) in text mode, and one for each color in photo mode.
4. Corrects the printer gamma by comparing the ideal settings with the current image density.
5. Combines the corrected gamma curve with the High, Middle, and Low ID values currently in memory (these are not reset to the defaults first, as in some earlier models)
6. Then calculates the ID max (amplitude of the gamma curve) based on data from the ACC scan.
7. The corrected printer gamma curves can be adjusted further using SP modes (SP4-910 to SP4-926).

ACC Target:
This copier allows adjustments in 10 steps on the target base γ to be used during auto color correction. This adjustment should only be done as a last resort.

- (SP4-501-001 through SP4-501-008: For the copier)
- (SP4-502-001 through SP4-502-008: For the printer)
- Default: 5
- Adjustable range: 0 to 10

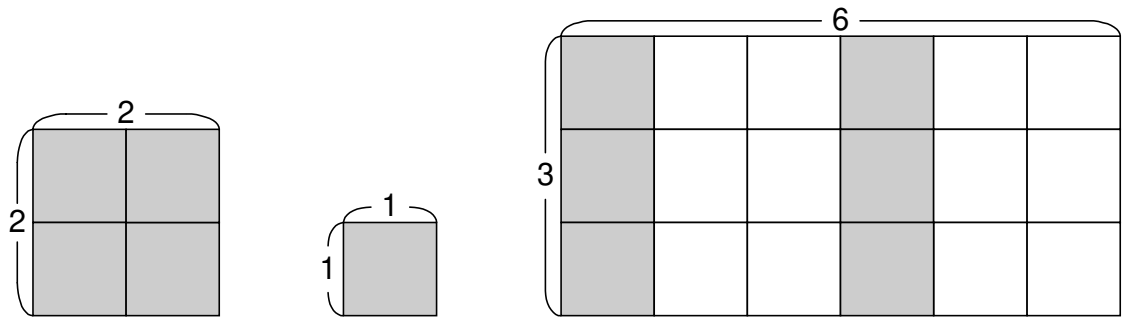
NOTE: The adjustable range is 0 to 50. However, the effective range is 0 to 10. Even when it is set to 50, it is the same level for 10.

Dither Processing

Copier Dither

This is not a true dithering process. True dithering produces grayscales with patterns of pure black and white output. However, this machine is capable of producing a true grayscale. Rather, this is a pseudo dithering process—altering the way gradations are printed, producing a smother final image.

- Two modes: Photo dither and text dither.
- Photo Mode uses a 6 x 3 (main x sub) dither pattern.
  This gives smoother gradations than the previous model's 2 x 2 pattern.
- Text mode uses a 2 x 2 dither pattern in highlight areas and 1 x 1 dither pattern in mid & shadow areas.
- The 2 x 2 pattern produces smoother gradations in grainy, highlight areas.



Letter mode in highlight area | Letter mode in mid and shadow area | Photo mode

B023D100.WMF

Area Manipulation Functions

With the edit option, areas can be selected from the operation panel.

- Selected areas are subject to pre-scanning, and are encoded in the area processor.
- Selection data is sent to the image processor, along with the main scan image data.
- Data in each area (max 20) is subject to color correction ("color calibration 2" step of the IPU board).
- Edit option also includes composition capability.

CPU

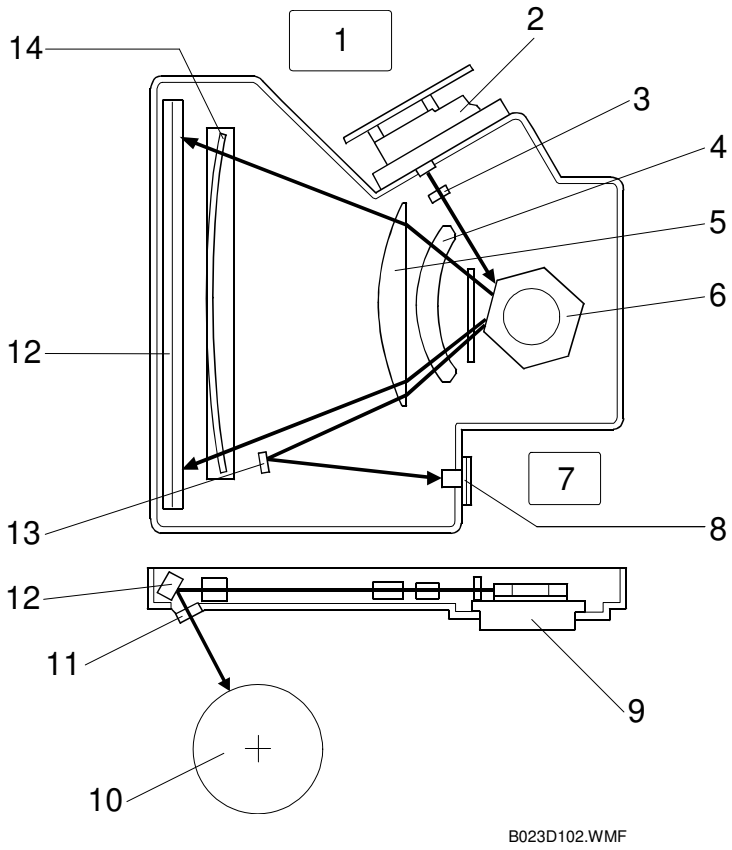
The copier incorporates a 32-bit CPU to process and control the timing of the data in the scanner and IPU sections.

IPU Board Test

- The IPU consists of several LSI chips, DRAM, SRAM, and a controller block.
- IPU board test can be run from the SP mode (SP4-904-001 and SP4-094-002).

6.9 LASER EXPOSURE

6.9.1 OVERVIEW

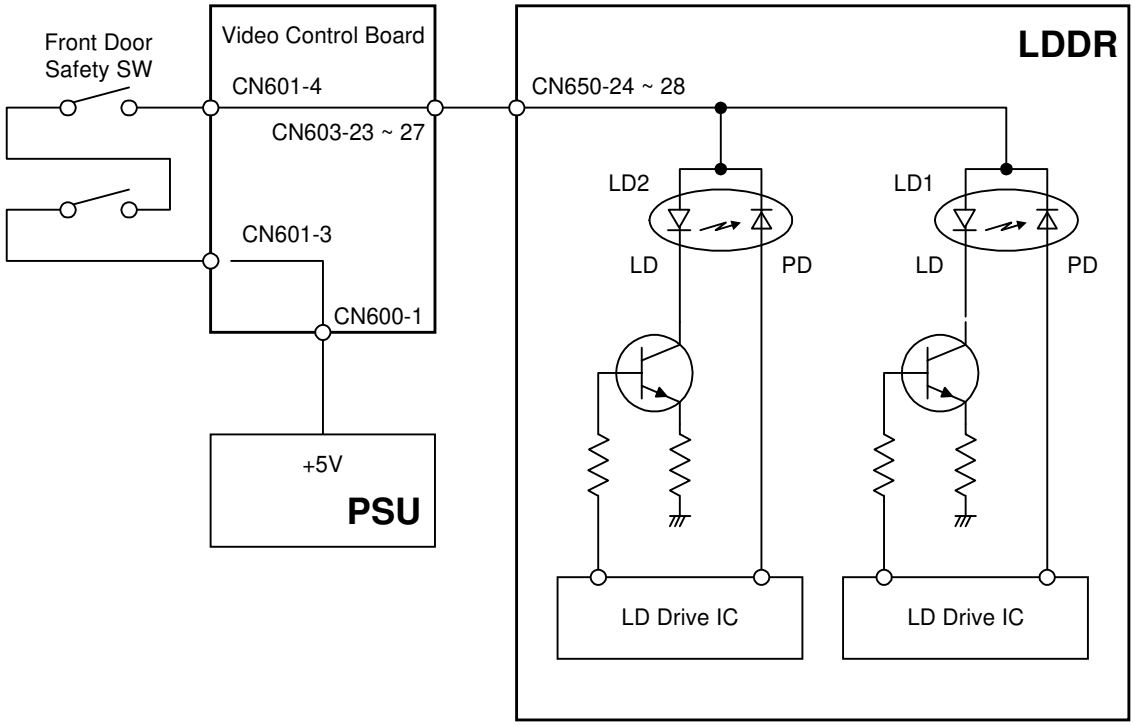


1. LD Control Board
2. LD Unit
3. Cylindrical Lens
4. First fθ Lens
5. Second fθ Lens
6. Polygon Mirror
7. Polygon Motor Drive Board
8. Laser Synchronization Detector
9. Polygon Mirror Motor
10. OPC Drum
11. Toner Shield Glass
12. Drum Mirror
13. Laser Synchronization Detector Mirror
14. BTL

- Uses a dual laser beam printing system (☛ CT).
- 600 dpi
- 256 gradations, using a combination of laser power modulation (PM) and pulse width modulation (PWM).

6.9.2 LD UNIT

LD Safety Switch

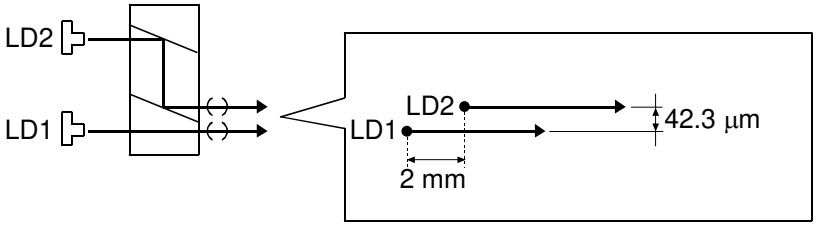


B023D250.WMF

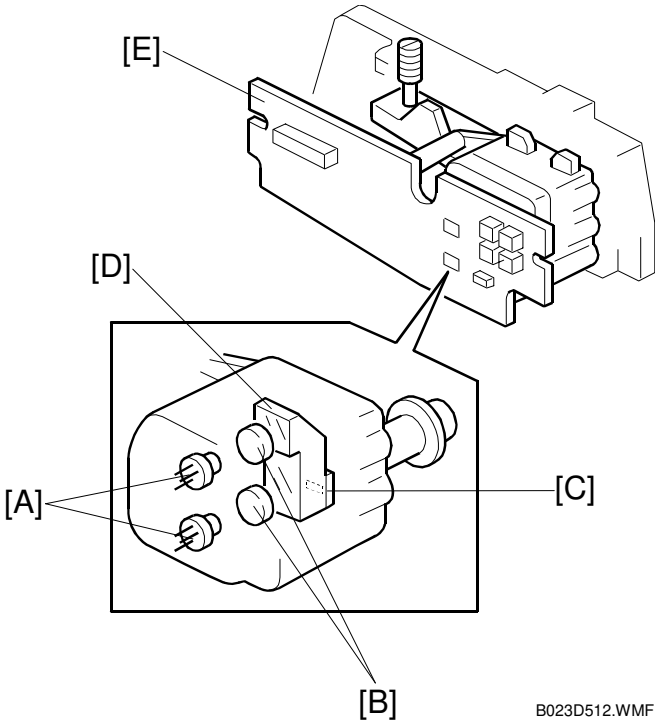
The front door has two safety switches.

- These ensure that the laser beam does not accidentally switch on while the front door is open.
- The switches are installed in series on the 5V line between the PSU and the LD unit.
- When the front door is opened, the switches cut the 5V line to the LD unit.

LD Unit Configuration



B023D103.WMF

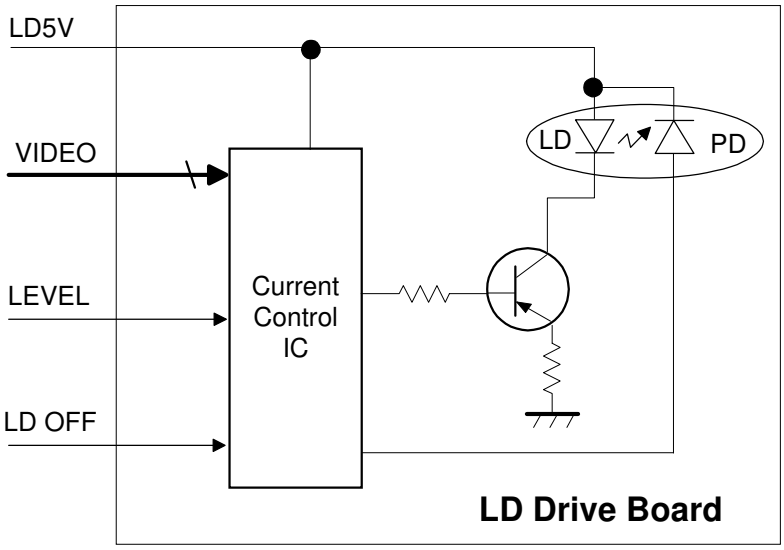


B023D512.WMF

Laser diodes
Collimate lenses
Apertures
Composite prism
LD control board

- Dual laser beam printing system (☛ CT).
- 42.3 μm separation between the two beams in the sub-scan direction
- Laser diode wavelength: 780 nm.
- Maximum output: 15 mW.

Auto Power Control (APC)

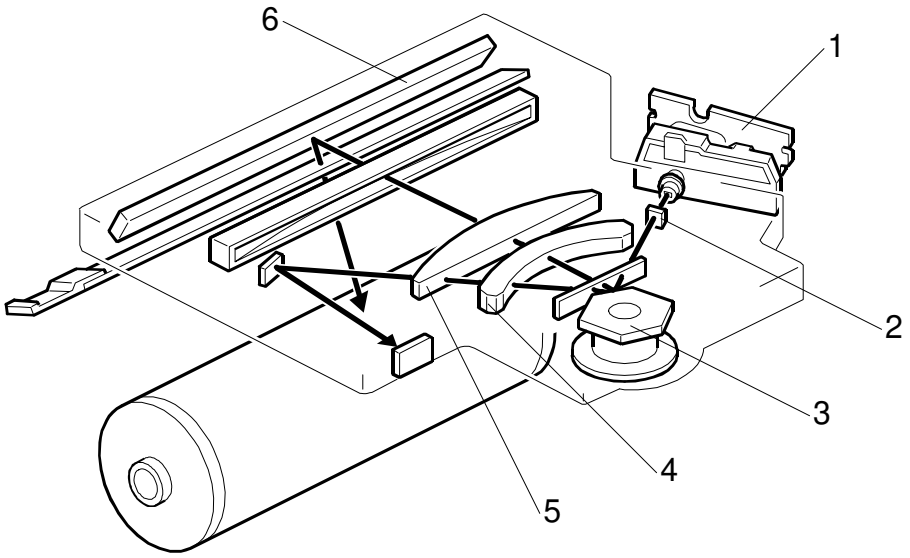


B023D501.WMF

Laser intensity decreases as temperature increases. To maintain a consistent output level, the light intensity is monitored by a photodiode (PD) enclosed in the laser diode (☛ CT).

NOTE: Laser power level is adjusted on the production line. Do NOT touch the LD unit variable resistors in the field.

6.9.3 LASER OPTICS SYSTEM



B023D101.WMF

1. Laser Diode Unit
2. Cylindrical Lens
3. Polygon Mirror
4. fθ Lens 1
5. fθ Lens 2
6. Drum Mirror
7. Barrel Toroidal Lens (BTL)

Cylindrical Lens

The cylindrical lens sets the beam diameter in the sub scan direction (☛ CT).

Polygon Mirror

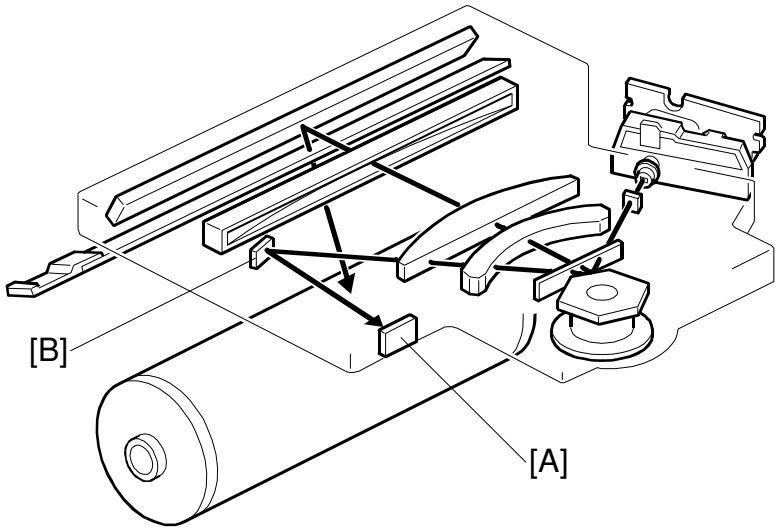
- This machine uses a six-sided mirror (☛ CT).
- Mirror and motor are integrated into a single unit.
- Polygon motor constantly rotating while the power is on. This ensures fast copying.

fθ Lenses and the BTL

- The f-theta lenses and barrel toroidal lens (BTL) ensure uniform pixel spacing and diameter (☛ CT).
- Also correct for slight deviations in the angle of the polygon mirror surface (not perfectly perpendicular to the beam plane)

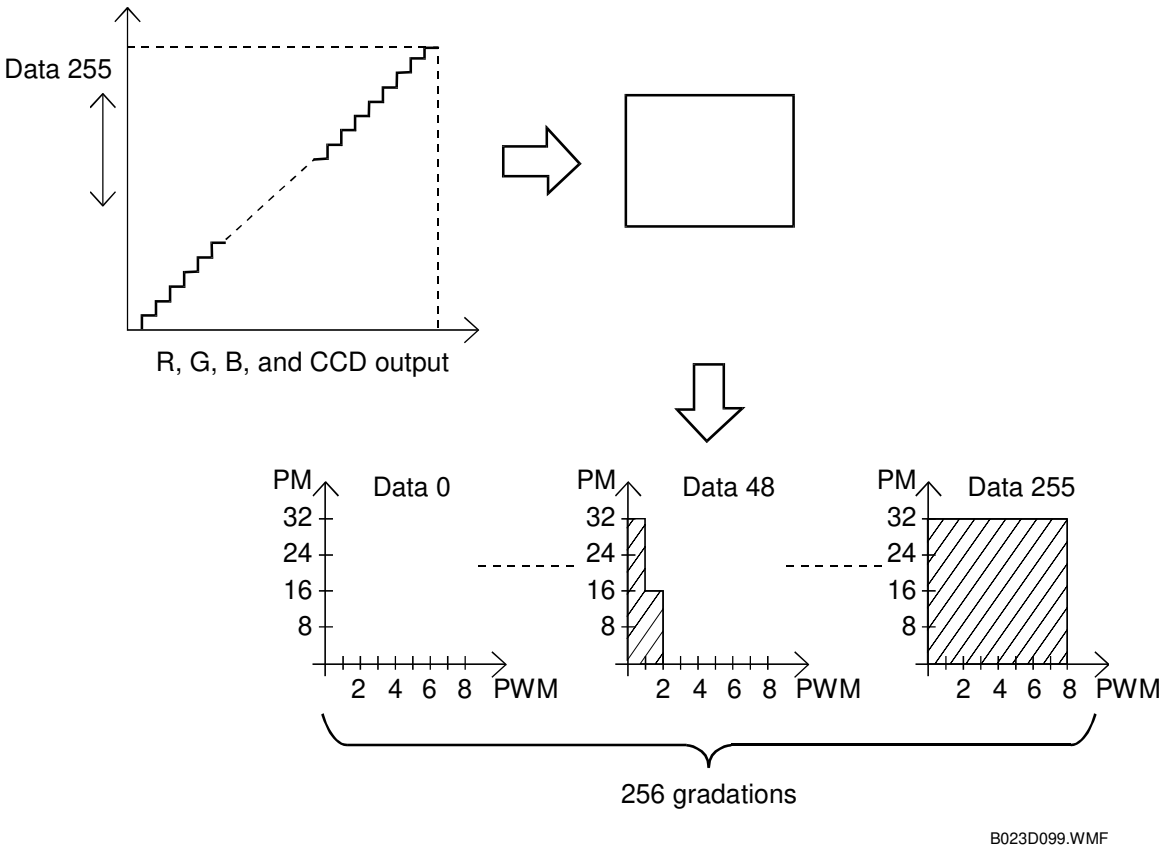
Laser Synchronization Mechanism

This machine uses a single-detector system (☛ CT).



B023D101.WMF

Laser Exposure Control



Two modulation systems are used to produce 256 gradations from the LD output.

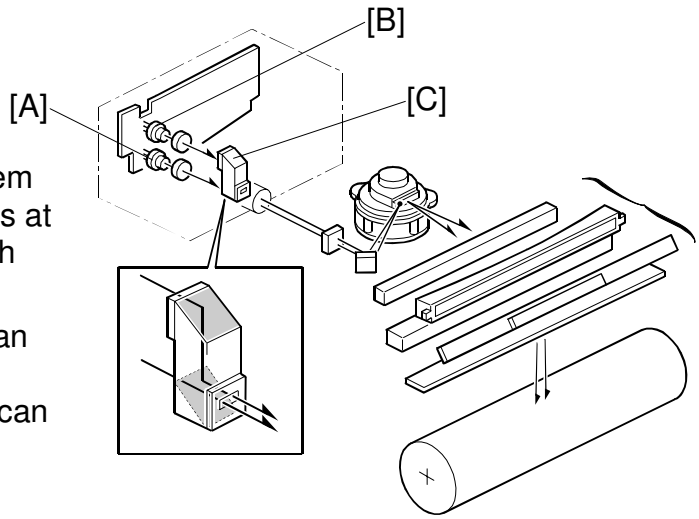
- Pulse width modulation (PWM) alters the length of time the laser is on (☛ CT).
- Power modulation (PM) alters the intensity of the beam (☛ CT).
- This laser engine supports 8 PWM levels and 32 PM levels.
- In the printer mode, this machine supports 1,200 dpi compatible smoothing.

Multibeam Laser Exposure

[A]: Laser Diode 1
[B]: Laser Diode 2
[C]: Composite prism

The dual laser beam printing system (☛ CT) writes two main scan lines at once (12 main scan lines with each rotation.

- 2 mm separation in the main scan direction.
- 42.3 μm separation in the sub-scan direction.
- 600 dpi



B023D511.WMF

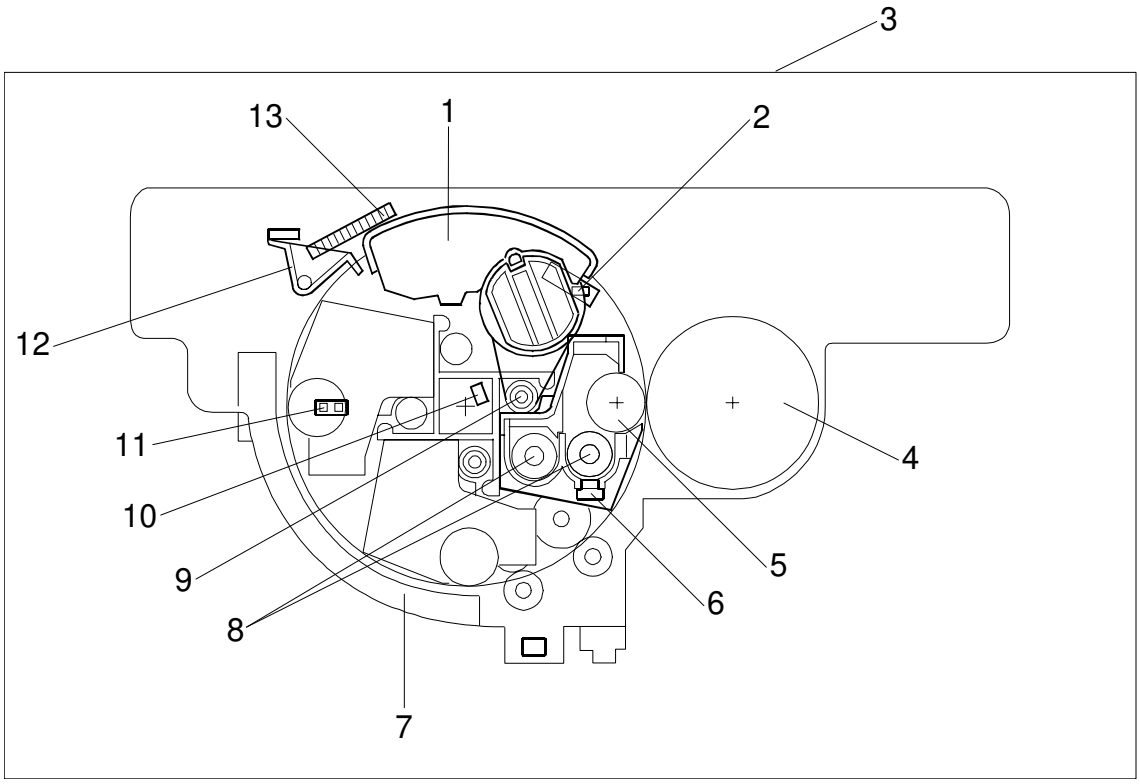
Laser Diode Control Board Functions

The laser exposure control board performs the following control functions:

- Processes control γ correction
- Stores internal pattern data
- Stores character data for data output
- Performs smoothing in the 1,200 dpi printer mode (actual smoothing processing is carried out by the printer controller).
- Preserves the auto color calibration values
- Preserves the printer γ values
- Performs fine adjustment of main and sub scan magnification ratios (controller mode)
  Main scan: Adjusts by changing the clock frequency (SP2-112).
  Sub scan: Adjusts by changing the polygon's rotational speed (SP2-113).
  (The main scan magnification ratio must be adjusted whenever the sub scan magnification ratio is adjusted.)

6.10 DEVELOPMENT UNIT

6.10.1 OVERVIEW



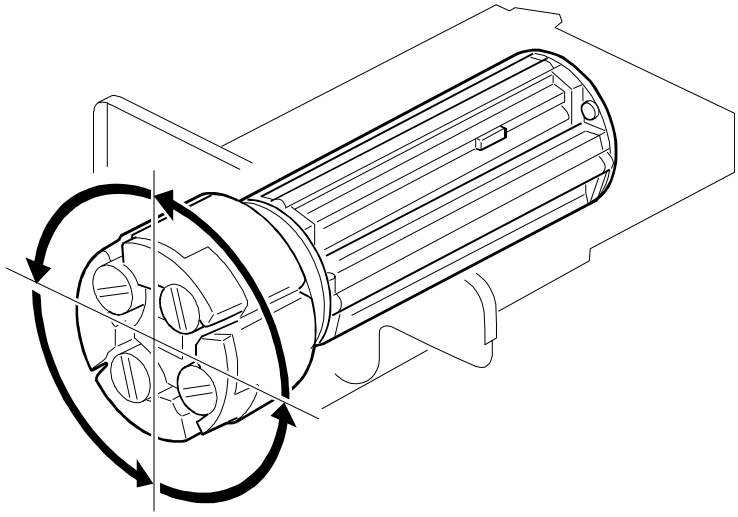
B023D301.WMF

1. Toner cartridge
2. Toner cartridge set sensor
3. Revolver/Drum drawer (without drum unit details)
4. Drum
5. Development roller
6. TD sensor
7. Toner catch cover
8. Mixing augers
9. Toner supply auger
10. Toner end sensor
11. Revolver H.P. sensor
12. Revolver lock
13. Revolver filter

This machine uses four development units—one for each color (cyan, magenta, yellow and black).

- Development units are mounted in a rotating mechanism called the revolver.
- Revolver rotates counterclockwise to bring the proper color to the drum.
- Revolver and drum units are mounted in a pullout drawer (revolver/drum drawer) for easy maintenance.

6.10.2 REVOLVER MECHANISM

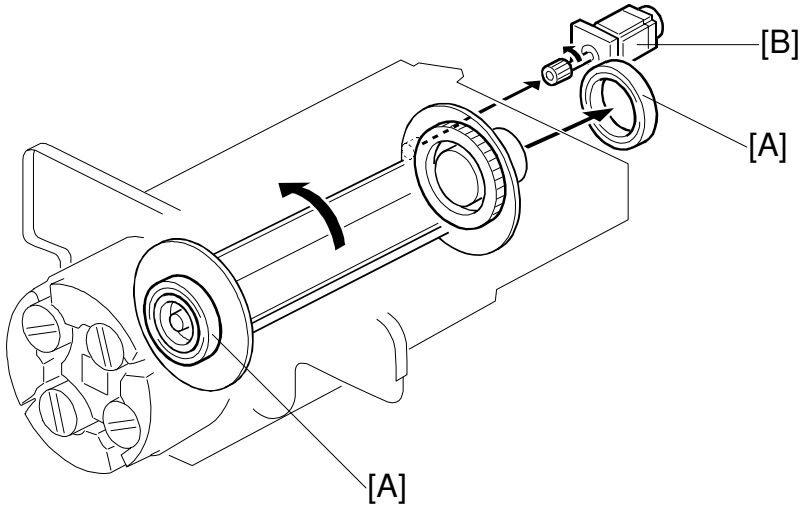


B023D302.WMF

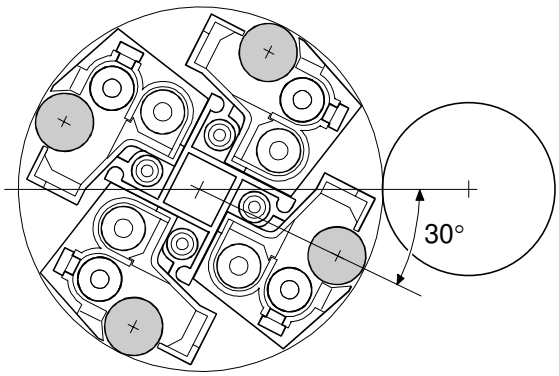
The revolver unit has four development units, one for each color (CMYK).

- Develops one color at a time.
- Rotates counterclockwise, 90 degrees at a time.
- Copy mode order: Black → Yellow→ Cyan → Magenta
  (allows black and white copies to stop after the first development cycle).
- Printer mode order: Yellow → Cyan → Magenta → Black
  (improves the clarity of black letters).
- Each development unit is easily removed.

Revolver Drive



B023D303.WMF



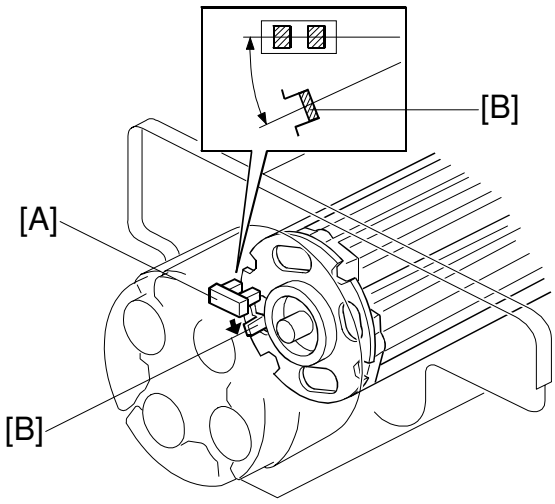
B023D304.WMF

[A]: Ring bearings
[B]: Drive motor

- Supported by front and rear ring bearings.
- Rotated by the revolver drive motor.
- Uses a 2-phase stepper motor
- Rotates counterclockwise (as seen from the front of the copier)
- Revolver's home position lies 30 degrees in front of the black development position.
- Must rotate into the development position before development can begin.

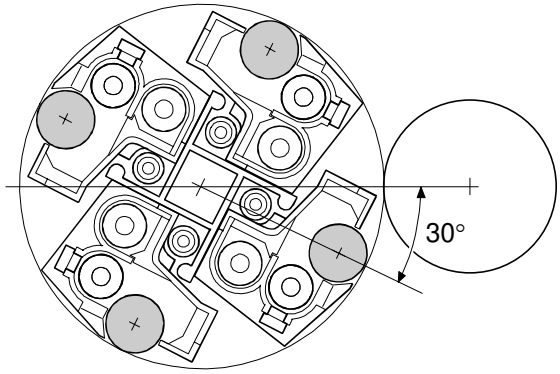
Revolver Home Position Detection

[A]: Revolver HP sensor
[B]: Activator



B023D305.WMF

- HP Sensor located on the front of the revolver/drum drawer.
- Actuator attached to the front of the revolver.
- CPU detects the revolver home position when the activator blocks the sensor.
- Home position is 30 degrees before the black development position for both copy and printer mode.
- Keeps the development sleeve and the drum separated.
  1) Prevents the drum from becoming dirty.
  2) Minimizes toner consumption when not developing.
- Returns to the home position:
  1) At the end of each copy job.
  2) When the machine is turned on.
  3) When the front door is opened or closed.



B023D304.WMF

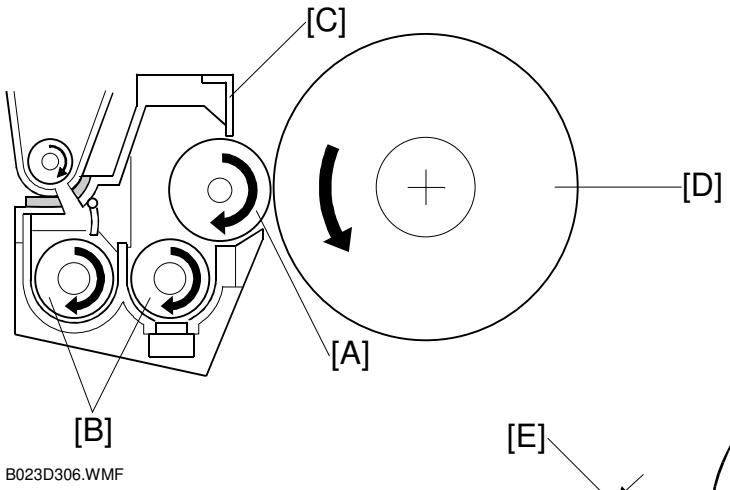
Toner Replacement

- Toner bottles normally locked in place.
- When a toner near end or toner end message is sent, the revolver stops in the toner replacement position while in standby mode. This allows you to remove and replace the toner cartridge.
- When the user makes a copy it returns to the home position before the copy is made.

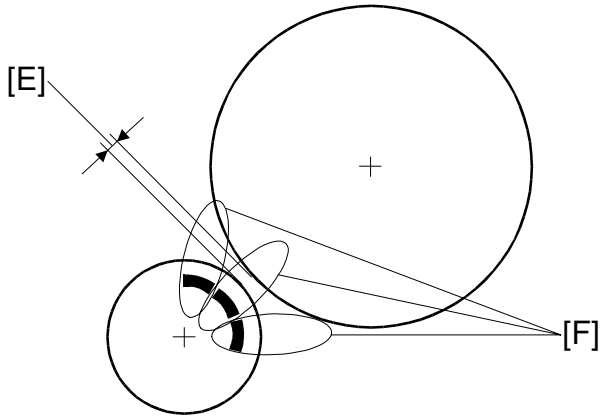
Error Codes

- SC361: sensor error.

6.10.3 DEVELOPMENT MECHANISM



B023D306.WMF



B023D990.WMF

[A]: Development roller
[B]: Mixing augers
[C]: Magnetic doctor blade
[D]: Drum
[E]: Photoconductor gap (PG)
[F]: Magnetic distribution peak

Development

- Each development unit contains 700 g of developer.
- Two mixing augers agitate the developer and supply it to the development roller.
- Magnets inside the development roller attract the developer.

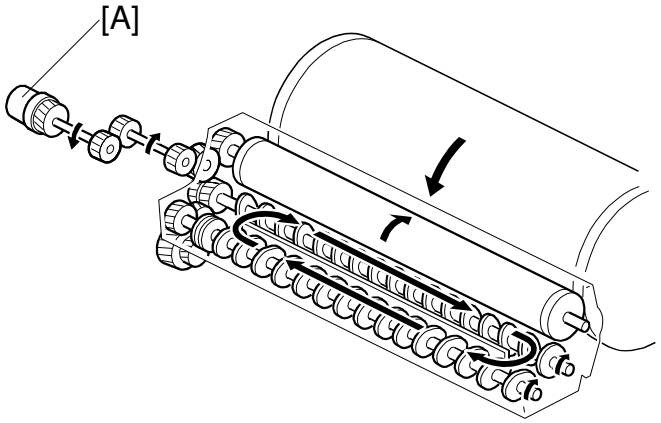
Magnetic Doctor Blade

- Trims the developer to the desired thickness.
- Attracts developer and increases friction.
- Reduces the time needed to generate the triboelectric charge.
- Maintains image density more effectively than a non-magnetic doctor blade.

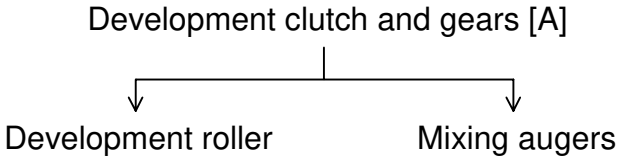
Narrow Gap Development

- Unit locks (located at both ends of the development mechanism) and the drawer positioning mechanism both help maintain a uniform gap between the development roller and the drum (photoconductor gap—PG).
- Narrow gap development system allows a narrower than normal PG.
- Three magnetic distribution peaks are formed on the developer roller.
- This shorter, thinner, more stable magnetic brush can create a finer latent image on the drum.

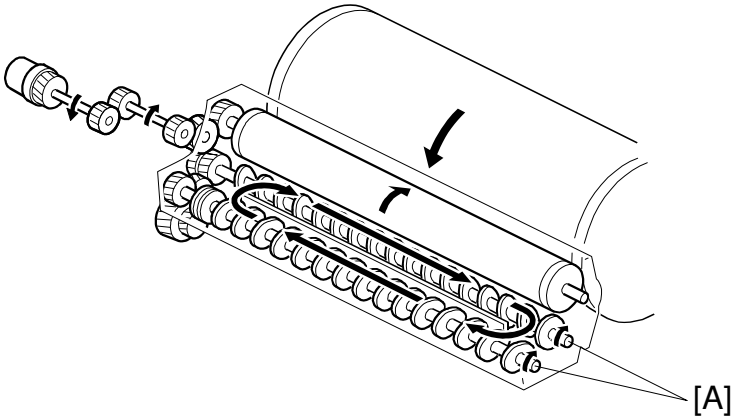
6.10.4 DEVELOPMENT DRIVE



B023D307.WMF



6.10.5 DEVELOPER AGITATION



B023D307.WMF

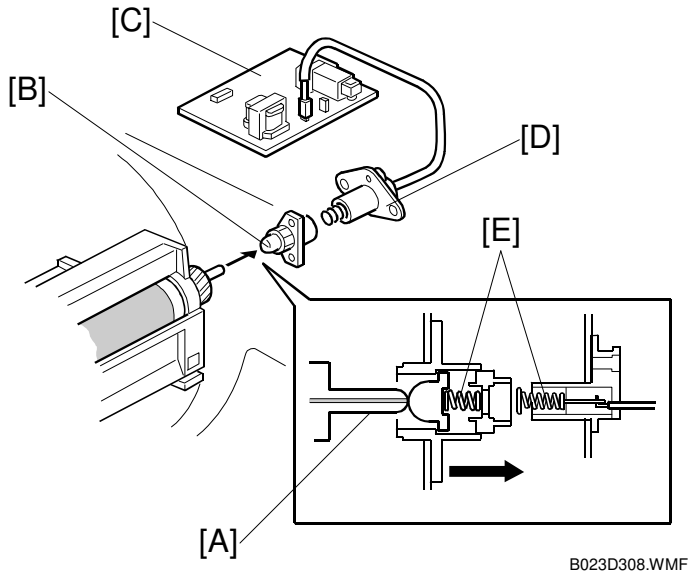
The two mixing augers [A] circulate and agitate the developer.

- More compact than the paddle mechanism used in older models.
- Agitates the developer during the process control check, toner supply and development (current color only).

6.10.6 TONER AGITATION

The toner is agitated by the rotation of the revolver.

6.10.7 DEVELOPMENT BIAS

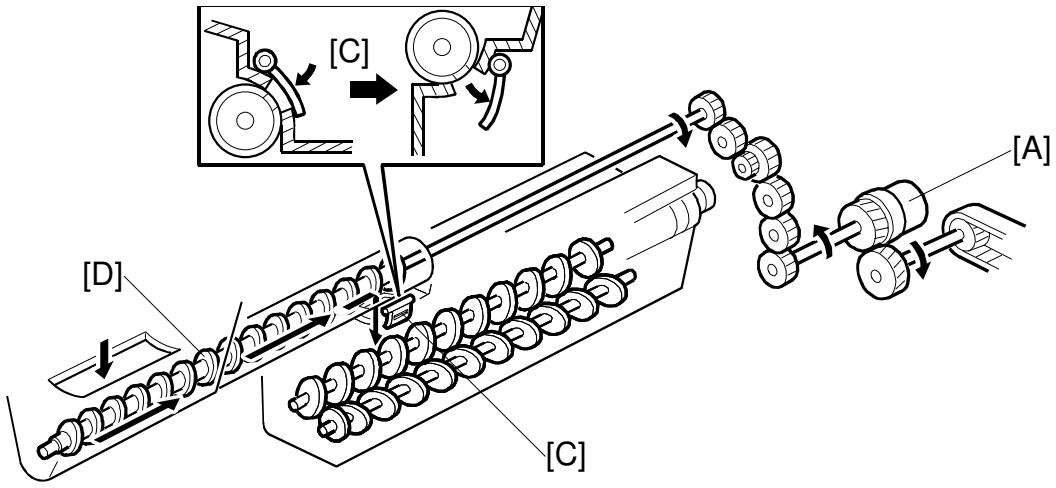


[A]: Development input shaft
[B]: Bias terminal 1
[C]: High voltage supply board
[D]: Bias terminal 2
[E]: Bias terminal springs

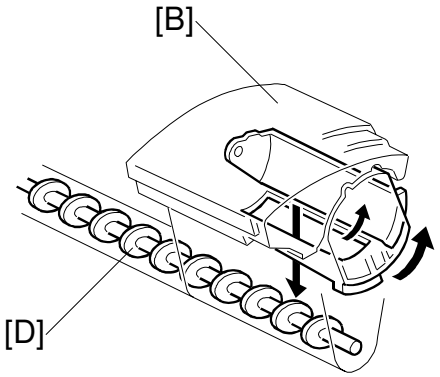
This machine uses a single bias terminal to apply a bias charge to each of the four development rollers.

- Bias terminal 1 is mounted on the upper drawer unit.
- Bias terminal 2 is mounted on the rear side of the machine frame.
- The spring of the bias terminal 2 touches the bias terminal 1 when the upper drawer unit is set inside the machine.
- When a unit is in the development position, the input shaft contacts the bias terminal (located at the rear of the revolver).
- Bias terminal's spring holds it securely against the input shaft.
- Voltage passes from the high voltage supply board to the development roller.
- Uses both AC and DC bias.
- While copying, an AC bias is applied to improve toner transfer to the drum.
- At other times, the AC bias is turned off to prevent unwanted toner transfer to the drum. Only the DC bias is applied.
- SC360: Development bias (high-voltage power supply - B) error

6.10.8 TONER SUPPLY MECHANISM



B023D311.WMF



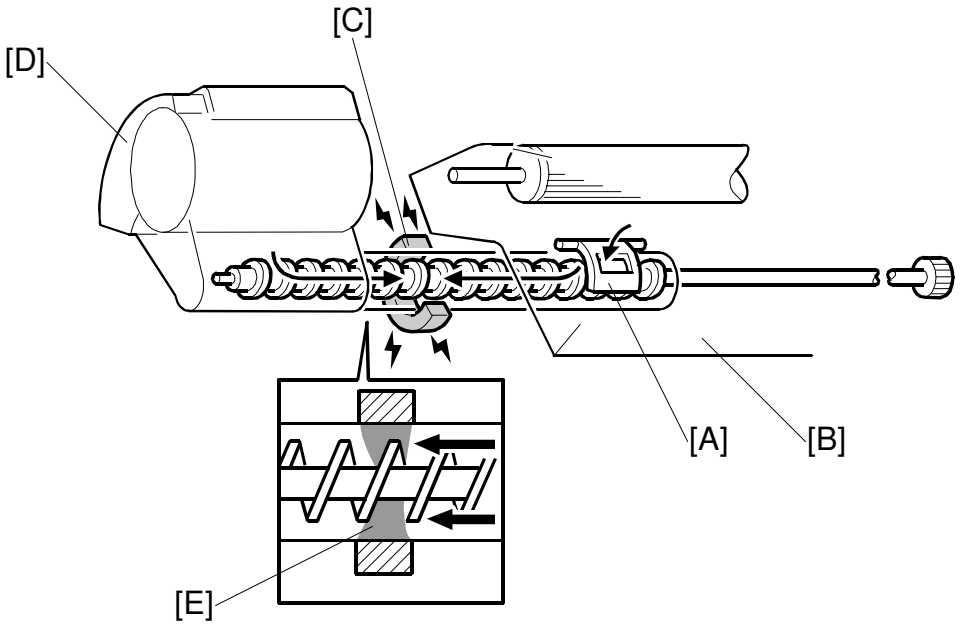
B023D310.WMF

[A]: Toner supply clutch
[B]: Toner cartridge
[C]: Development shutter opening
[D]: Toner supply auger

Toner is supplied to the development unit currently in the development position.

- Driven by the drum peripheral components motor.
- Toner supply auger transports the toner
  (Toner cartridge → Supply auger→ Magnetic shutter)
- Toner falls into the development unit.
- When the revolver rotates, the shutter closes under its own weight, preventing developer from being fed back into the toner supply unit.

6.10.9 TONER BLOCKING MECHANISM

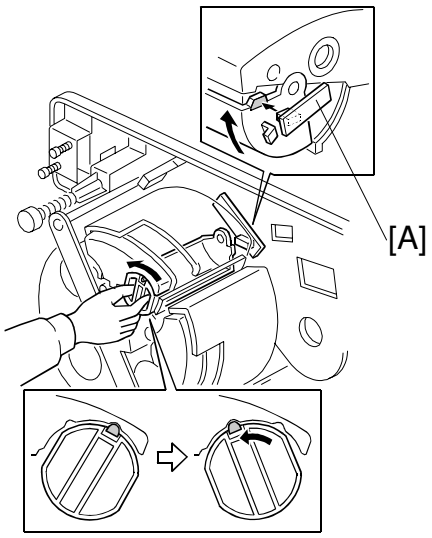


[A]: Development shutter opening
[B]: Development Unit
[C]: Toner blocking magnet
[D]: Toner cartridge
[E]: Sealing with toner and developer

- Developer with toner goes back from the development shutter opening.
- At the position of the toner blocking magnet, developer with toner forms sealing with developer with toner. This sealing prevents the unexpected toner from going into the development unit without rotating the toner supply auger.

6.10.10 TONER CARTRIDGE DETECTION

The toner cartridge set sensor [A] detects the metallic label on the toner bottle. The sensor is located on the upper front side of the drawer unit

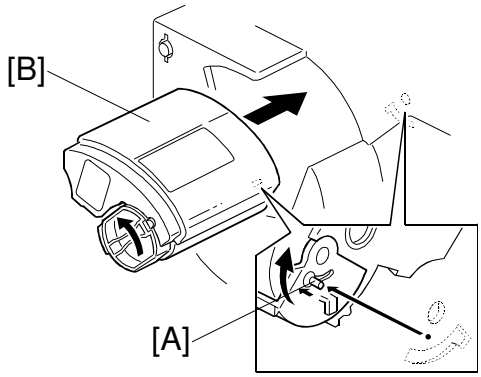


B023D312.WMF

6.10.11 TONER CARTRIDGE SHUTTER LOCK PIN

[A]: Lock pin
[B]: Toner cartridge

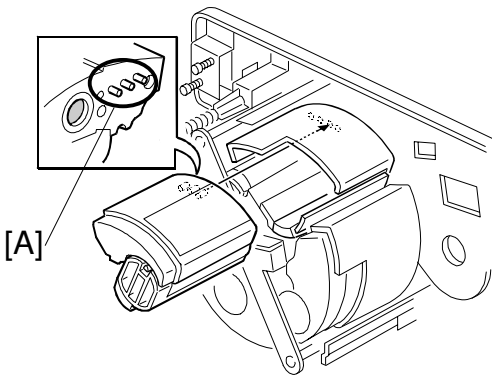
- The lock pin keeps the toner cartridge shutter from opening when no toner cartridge is installed.
- Inserting a toner cartridge presses the lock pin, releasing the shutter.



B023D358.WMF

6.10.12 INCORRECT TONER INSTALLATION PREVENTION

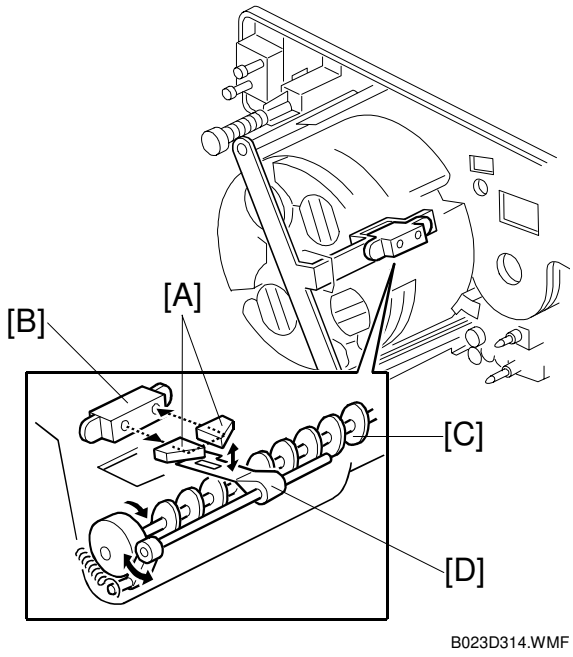
Each toner cartridge has pins [A] to prevent it from being installed in the wrong place. The pins are in different positions for each color.



B023D313.WMF

6.10.13 TONER END SENSOR

[A]: Mirror blocks
[B]: Light emitter and receiver
[C]: Toner supply auger
[D]: Mylar strip



B023D314.WMF

Sensor

- In the copy position, the mirror blocks line up with the light emitter and receiver.
- Toner, if present, blocks the light path between these mirrors.
- Sensor output High (5 V) = blocked
- Sensor output Low (0 V) = unblocked
- As the toner supply auger rotates, a strip of Mylar swings up and down, cleaning the inner surfaces of the mirror blocks.

Toner Near End/Toner End Detection

Introduction

- This copier uses the toner end sensor located in the toner hopper to detect toner near end conditions for the K, Y, C, and M toners.

Toner Near End Detection

- When moved into the development position, sensor output is checked 160 times (once every 4 ms).
- Toner absent = 20 or more low sensor reads.
- Toner near end = three toner absent reads in a row.
- Once three consecutive toner absent conditions are detected, the copier flags a toner near end condition.

Example 1: 3 full color copies, repeat mode

- 20 sensor low conditions detected out of 160 sampled conditions while developing the first copy sheet for K (toner absent #1)
- 25 sensor low conditions detected out of 160 sampled conditions while developing the second copy sheet for K (toner absent #2)
- 24 sensor low conditions detected out of 160 sampled conditions while developing the third copy sheet for K (toner absent #3)

↓

The K toner near end LED is lit.

Example 2: 4 full color copies, repeat mode

- 20 sensor low conditions detected out of 160 sampled conditions while developing the first copy sheet for Y (toner absent #1)
- 19 sensor low conditions detected out of 160 sampled conditions while developing the second copy sheet for Y (absent count reset)
- 21 sensor low conditions detected out of 160 sampled conditions while developing the third copy sheet for Y (toner absent #1)
- 25 sensor low conditions detected out of 160 sampled conditions while developing the fourth copy sheet for Y (toner absent #2)
- 21 sensor low conditions detected out of 160 sampled conditions while developing the fifth copy sheet for Y (toner absent #3)

↓

The Y toner near end LED is lit.

Toner End Detection

Once the near end condition is detected, the IPU begins counting the number of pixels printed using that toner. When the total number of pixels equals 10 sheets worth (A4, 100% coverage), a toner end condition is generated.

- At least 10 sheets can be printed/copied after the toner near end condition is reached, regardless of the paper size.
- Two conditions must exist before the machine suspends copying:
  1) A toner end condition has been generated
  2) At least 10 sheets have been copied since the toner near end.

Toner End Recovery

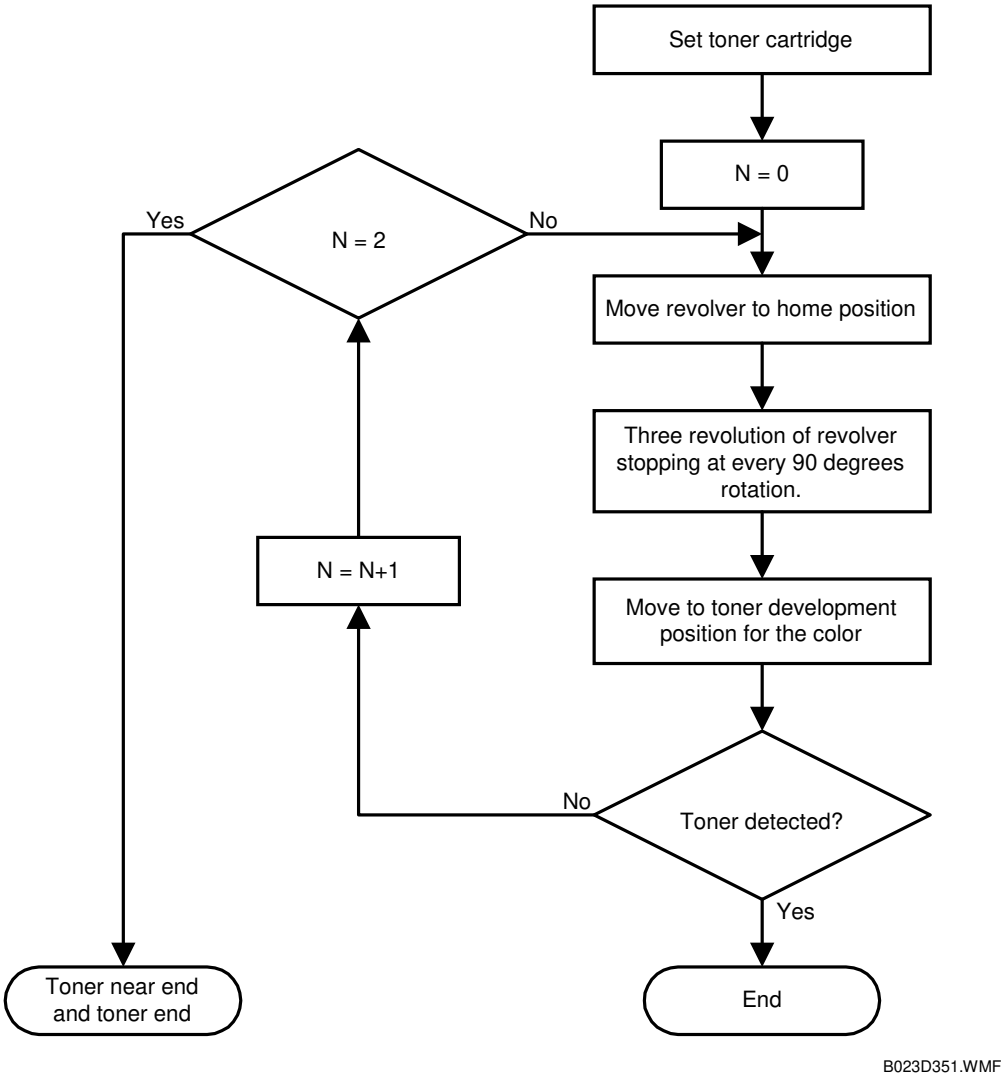
The copier enters the recovery process in the following cases:

- The front door is opened and a toner cartridge is removed or inserted.
  This is regarded as an ordinary replacement procedure for the toner cartridge.
  1) The first color to be replaced is moved to the toner replacement position.
  2) Replace the toner cartridge.
  3) Close the front door. If there are additional colors to be replaced, the next one moves into the toner replacement position.

  NOTE: When multiple colors are being replaced, you can manually skip colors from the operation panel.
- If the copier is turned off and on, it assumes that toner cartridges for all colors have been replaced and starts toner end recovery processing for all colors.

6.10.14 TONER END RECOVERY

The toner end recovery proceeds as shown below.

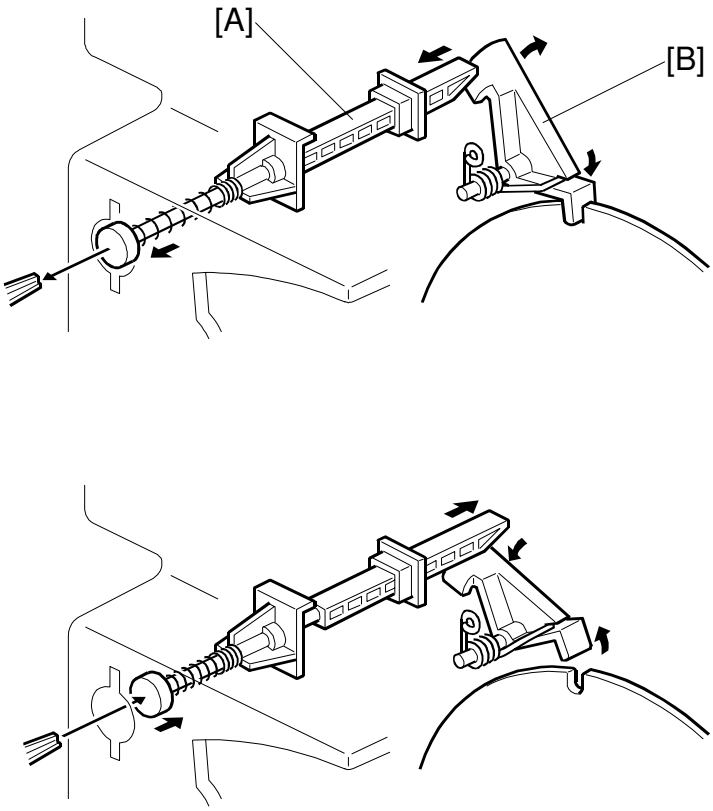


- Checks the colors in sequence (K → Y → C → M).
- Moves the cartridge to the development position.
- Toner supply auger rotates to add toner.
- Checks for toner. Flags the color as either OK or NG.
- Repeats for the next color.
- When all colors have been checked once, it will recheck any colors flagged as NG.
- If a color is marked NG twice, it redisplays the original toner condition (toner near end and toner end LEDs are lit).
- If the color is OK, reset the LEDs and end-related counters (pixel and page counters).

6.10.15 TONER LOOSENING

This copier rotates the revolver 3 full turns on power-up, before performing the initial process control check. This loosens the toner, preventing lumps if the copier is not used for a long time.

6.10.16 REVOLVER LOCK MECHANISM



B023D315.WMF

[A]: Push rod
[B]: Lock pawl

This copier has a locking mechanism that prevents it from rotating while the front cover is open.

- Opening the front cover releases the push rod. This rotates the lock pawl into the lock notch of the revolver.
- When the cover is closed, a pin on the door pushes the rod back in. This releases the pawl.
- This locking mechanism prevents accidental rotation during toner replacement.
- A lock release tool is stored inside the copier unit. It may be used to check the machine's operation during maintenance.
- If the revolver rotates while in the locked state, the copier displays "Revolver Motor Out-of-step" and SC361 (Revolver H.P. Error).

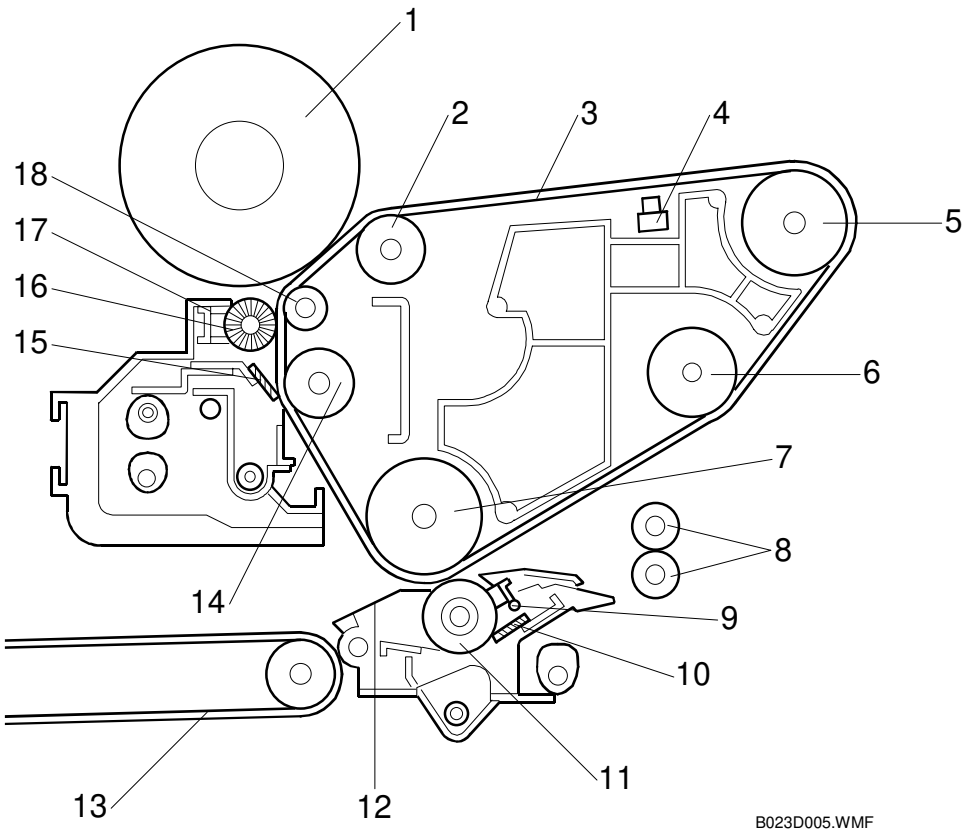
CAUTION: When using the door safety switch actuator, be sure to unlock the revolver with the lock release tool before inserting the actuator.

6.11 TRANSFER SYSTEM

6.11.1 OVERVIEW

This machine uses a two-step transfer system, incorporating an image transfer belt and a paper transfer roller.

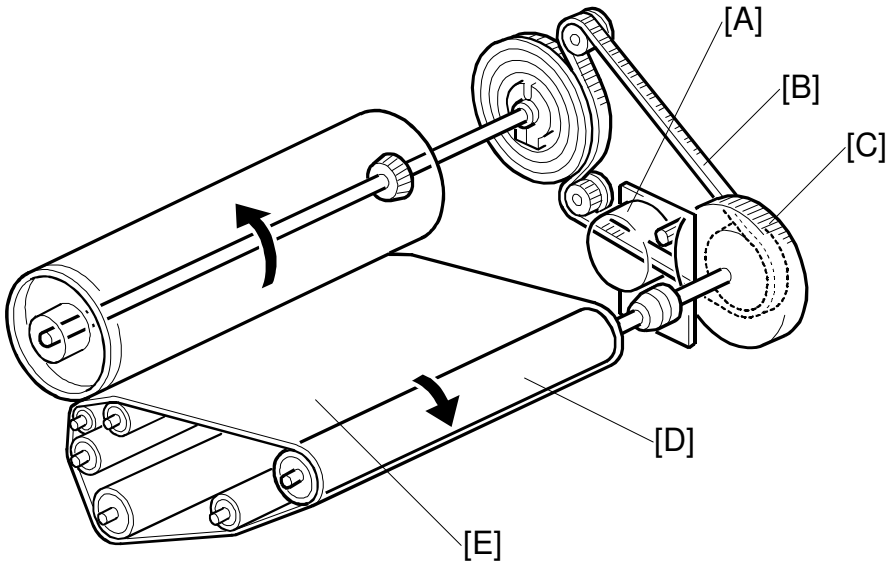
- Initially develops the four-color image on an intermediary transfer belt.
- Transfers the completed image to the paper in a single step.
- When transferring to the paper, this machine uses an insulated transfer roller system.
  1) Improves efficiency.
  2) Provides smooth paper transport through the image transfer area.



1. OPC Drum
2. Transfer Belt Bias Roller
3. Image Transfer Belt (ITB)
4. Belt Mark Sensor
5. Transfer Belt Drive Roller
6. Transfer Belt Tension Roller
7. Paper Transfer Counter Roller
8. Paper Registration Rollers
9. Paper Transfer Roller Coating Bar
10. PTR Cleaning Blade
11. Paper Transfer Roller (PTR)
12. Paper Discharge Plate
13. Transport Belt
14. ITB Blade Counter Roller
15. ITB Cleaning Blade
16. ITB Lubricant Brush
17. ITB Lubricant Bar
18. Ground Roller

6.11.2 IMAGE TRANSFER BELT SECTION

Image Transfer Belt Drive Mechanism

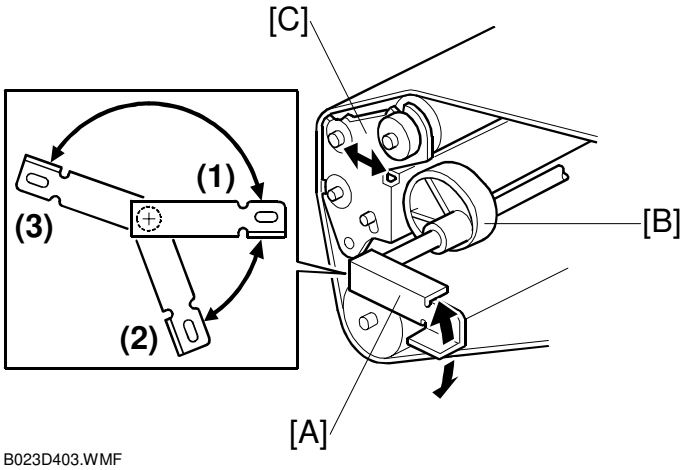


B023D014.WMF

Drum motor [A]
↓
Timing belt [B]
↓
Pulley [C]
↓
Image transfer belt [D]

- The image transfer belt is always in contact with the drum.
- In the OHP or thick paper mode 1, the operation speed of the machine is reduced to half-normal while the image is transferred to the paper.
- In the thick paper mode 2, the operation speed of the machine is reduced to approximately 30% while transferring to the paper.
- In the OHP/thick paper mode 1 and in the thick paper mode 2, image transfer belt performs extra one rotation before the paper transfer begins. This is to avoid the leading edge registration shift problem caused by the change of the operation speed.

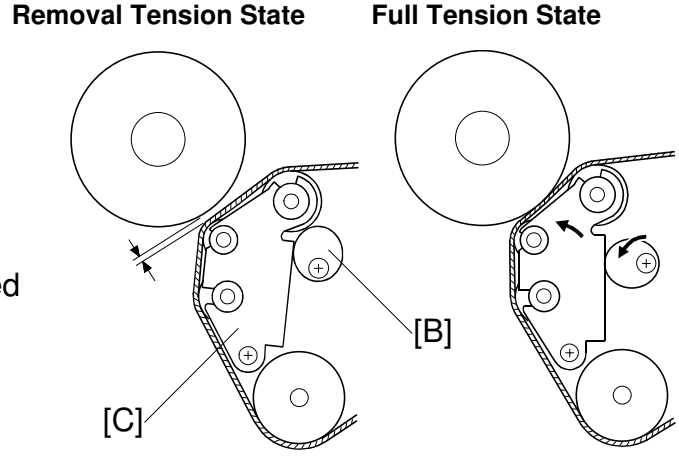
Belt Tension Release Mechanism



B023D403.WMF

[A]: Belt tension lever
[B]: Eccentric cams
[C]: Tension bracket

Image transfer belt tension is applied or released using the belt tension lever.



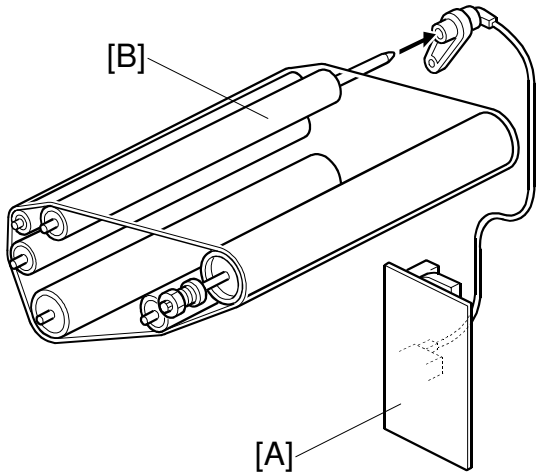
B023D404.WMF

The lever rotates the eccentric cams
↓
The cams change the angle of the tension bracket.
↓
The tension bracket alters the tension applied to the image transfer belt.

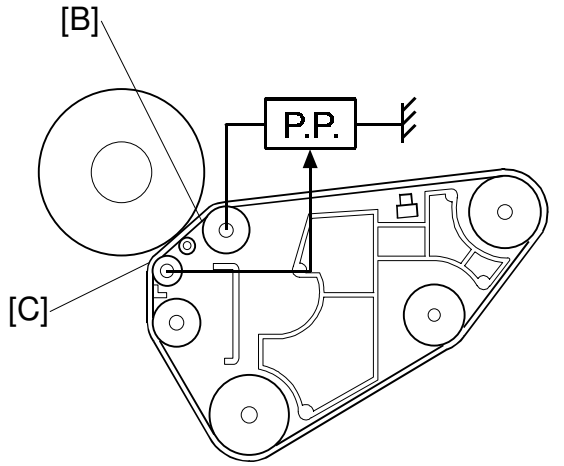
- There are three settings:
  1) Full tension (the belt and drum touch).
  2) Removal tension (image transfer belt unit install/uninstall position).
  3) Tension released (image transfer belt replacement position).

Detailed Descriptions

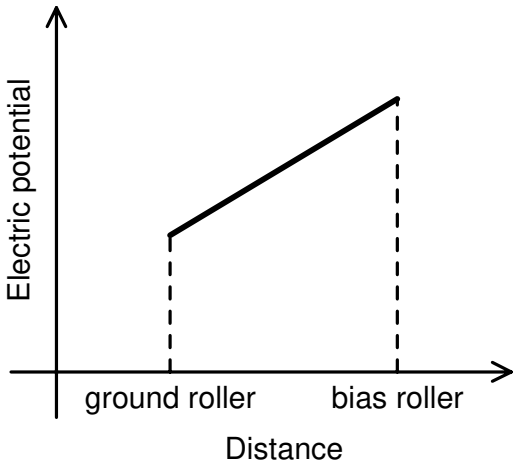
Image Transfer Belt Bias



B023D405.WMF



B023D880.WMF



B023D881.WMF

[A]: High voltage supply board
[B]: Bias roller
[C]: Ground roller

- The high voltage supply board applies a charge to the transfer belt through the bias roller.
- Color toners are superimposed on the transfer belt one at a time. The bias voltage is increased as each color is added.
- Since the image transfer belt has a high resistance, a belt discharge system is used (☛ belt cleaning section).
- Since the constant bias current control system, the electric potential inclination between the bias roller [B] and the ground roller [C] is constant regardless of the environment change.

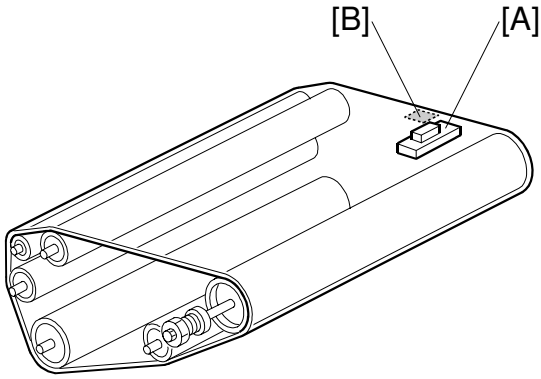
Error Codes

- SP2-301: Set Primary Transfer Bias
- SC400: Belt transfer bias PP (high-voltage power supply: T1, PCC) error

Belt Mark Sensor

[A]: Belt mark detection sensor
[B]: Belt mark

- Uses the belt mark sensor to align each color of the image on the belt.
- Belt mark is a highly reflective metallic patch (gold colored).
- When the sensor is activated, an FGATE signal is generated. Image data is then written on the drum.
- SC452 is generated when the sensor fails to activate after the expected interval.

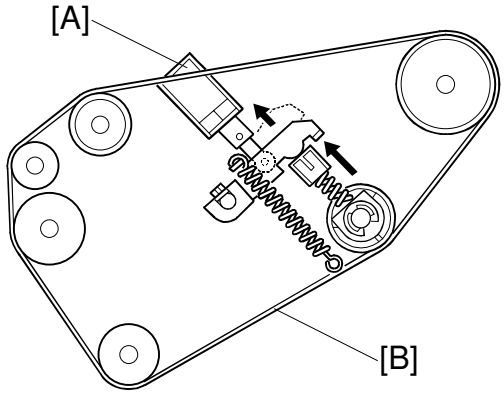


B023D406.WMF

Belt Pressure Release Mechanism

[A]: Belt release solenoid
[B]: Image transfer belt pressure

- Reduces the belts tendency to curl.

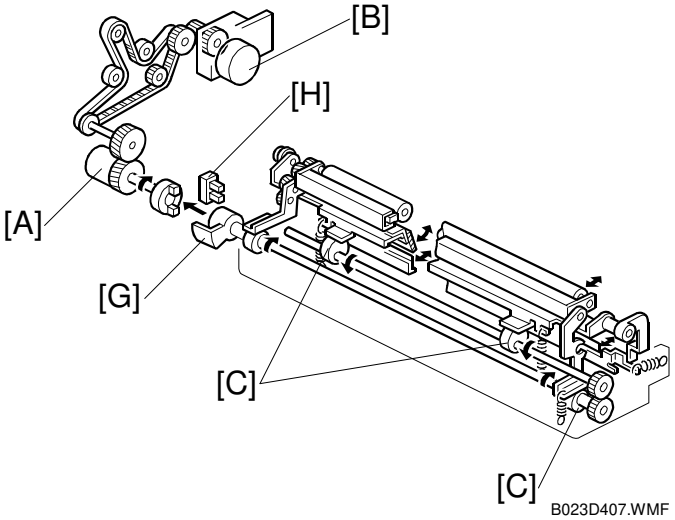


B023D025.WMF

Belt Cleaning Mechanism

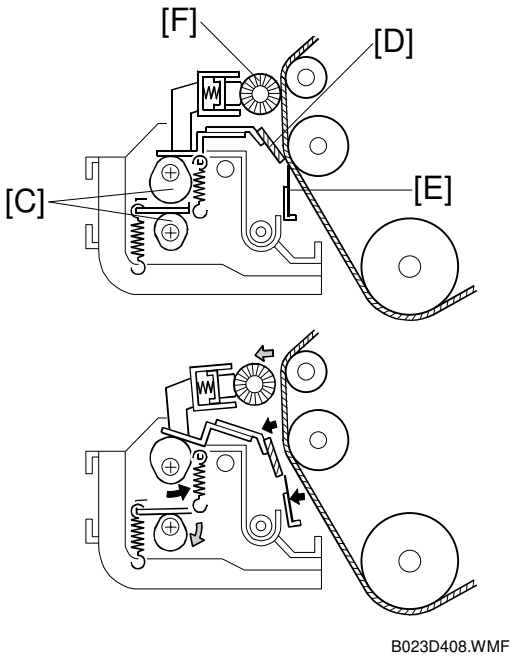
(1) Contact/Release Mechanism

[A]: Belt cleaning shift clutch
[B]: Drum peripheral component motor
[C]: Belt cleaning cams
[D]: Cleaning blade
[E]: Entrance seal
[F]: Lubricant brush
[G]: Actuator
[H]: Home position sensor



B023D407.WMF

Drum peripheral component motor
↓
Shift clutch
↓
Belt cleaning cams
↓
Cleaning blade | Entrance seal | Lubricant brush



The cleaning blade, entrance seal and the lubricant brush move into or out-of contact with the transfer belt depending on the point in the copy/print cycle.

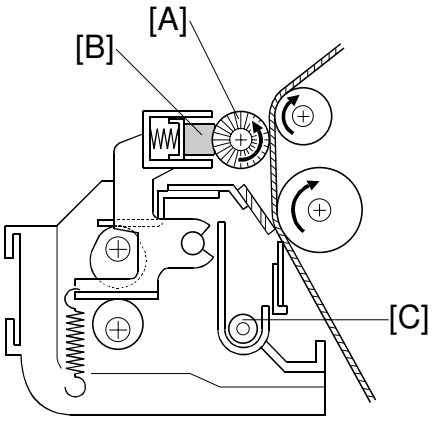
B023D408.WMF

(2) Contact/Release Detection

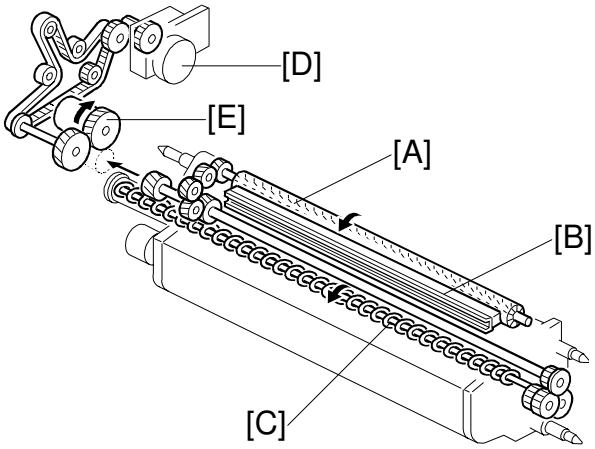
- Blade contact is detected when the actuator on the cleaning contact/release coupler actuates the home position sensor.
- If the actuator is not detected at the end of a copy job, SC457 (belt cleaner reset error) is generated and the copier stops.

(3) Contact/Release Timing

- Cleaning blade, entrance seal and lubricant brush contact the belt when the start key is pressed
- When printing two or more colors, they disengage when the image's leading edge reaches the front of the entrance seal.
- The entrance seal contacts the belt before (and disengages after) the cleaning blade and lubricant brush to prevent toner from falling into the paper transfer section.
- The toner pan on the bottom of the unit also prevents the toner from falling into the paper transfer section.
- The cleaning blade and lubricant brush touch the belt at the same time.

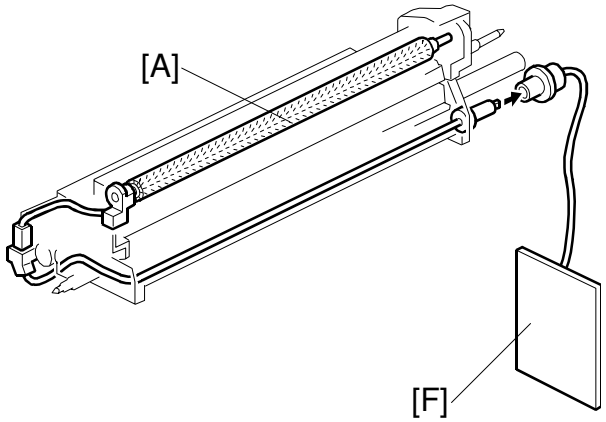


B023D409.WMF



B023D410.WMF

[A]: Lubricant brush
[B]: Lubricant
[C]: Toner collection coil
[D]: Drum peripheral component motor
[E]: Cleaning drive clutch
[F]: High voltage supply board



B023D419.WMF

Drum peripheral component motor
↓
Belt cleaning drive clutch
↓ ↓
Lubricant brush Toner collection coil

Lubricant Application

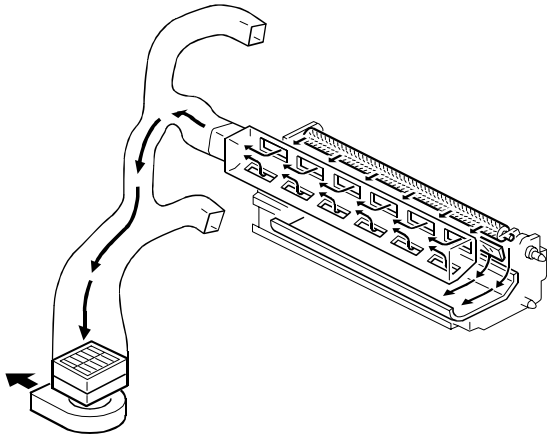
- During normal use, a film of toner develops on the belt.
- Toner film makes it more difficult to separate the toner from the transfer belt.
- To prevent this, the lubricant brush applies a small amount of lubricant to the belt.

Transfer Belt discharge

- High voltage supply board applies a DC+ bias to the lubricant brush. This discharges the voltages that accumulate on the belt.
- Residual charge varies depending on the environment (temperature and humidity). Bias charge is calculated accordingly to compensate.
- SP2-601: configure the belt discharge bias
- SC: SC402: Belt discharge leak error

Cleaning Vacuum

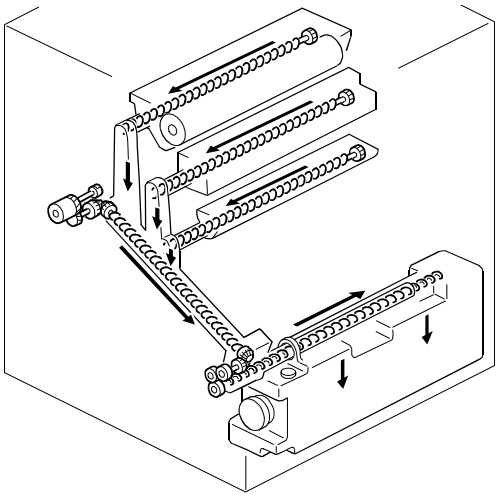
- Exhaust fan at the rear of the copier draws air through the cleaning unit.
- Removes any toner scattered by the cleaning mechanism.



B023D421.WMF

Toner Collection Mechanism

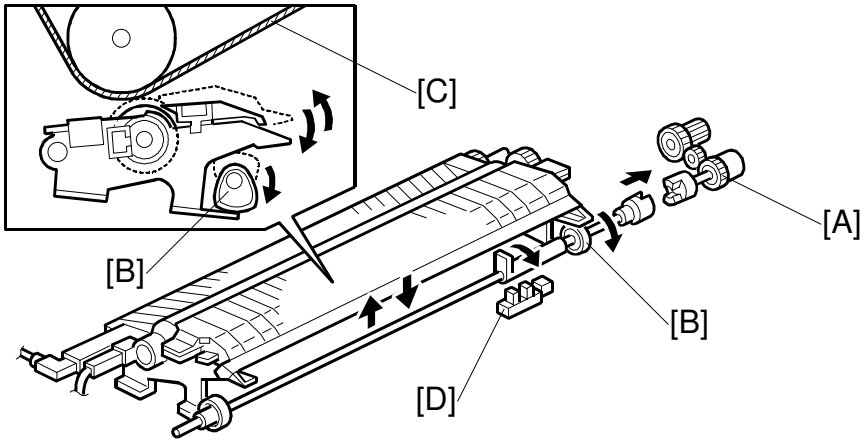
- Used toner is collected and transported to the used toner tank.
- Toner is collected from the drum cleaning unit, the image transfer belt cleaning unit and the paper transfer roller cleaning unit.
- Transportation uses various toner collection coils and transport coils.
- Used toner tank holds approximately 6 liters.



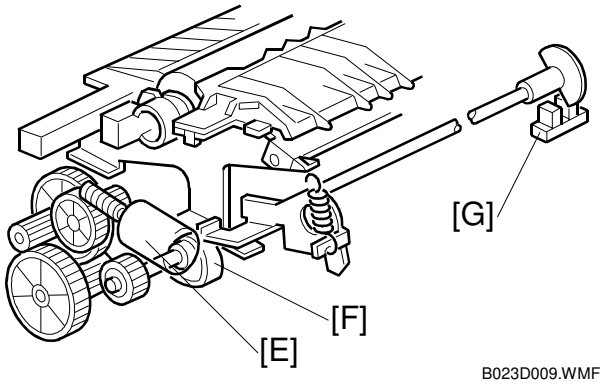
B023D411.WMF

6.11.3 PAPER TRANSFER MECHANISM

Paper Transfer Roller Unit Contact/Release Mechanism



B023D013.WMF



B023D009.WMF

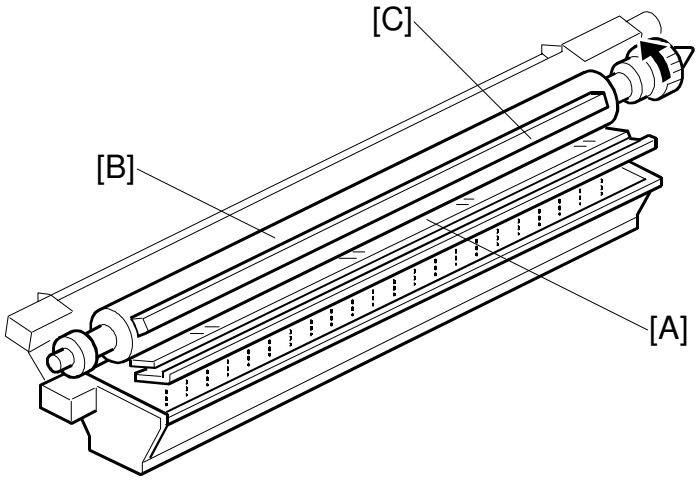
[A]: Paper transfer roller lift clutch
[B]: Paper transfer cam
[C]: Image transfer belt
[D]: Home position sensor
[E]: Paper transfer roller pressure motor
[F]: Paper transfer roller pressure cams
[G]: Pressure cam home position sensor

Detailed Descriptions

General Mechanism

- When the paper is about 10 mm from the paper transfer nip, the roller lift clutch (a half-turn clutch) turns on.
  1) Rotates the paper transfer cam by half a turn.
  2) Raises the paper transfer roller unit, causing the paper transfer roller to contact the image transfer belt.
- When the roller is in position, an actuator blocks the home position sensor.
- When paper transfer ends, the lift clutch turns on again.
  1) Rotates the paper transfer cam a half turn.
  2) Disengages the paper transfer roller from the transfer belt.
- Errors generated by the home position sensor (SC456: Paper transfer roller unit set) are displayed on the LCD and the copier stops.
- In thick paper mode 2, the motor and cams apply more pressure. In this mode the pressure cam home position sensor is not blocked.

Paper Transfer Roller Cleaning

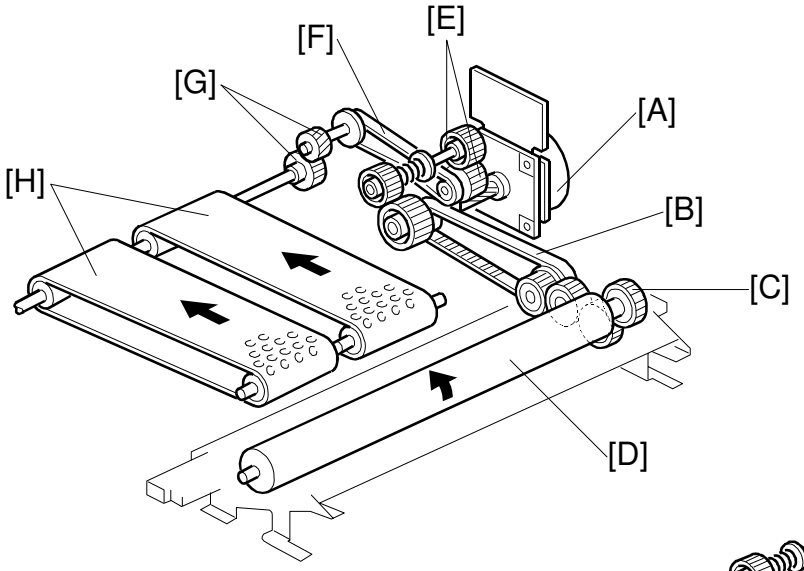


B023D417.WMF

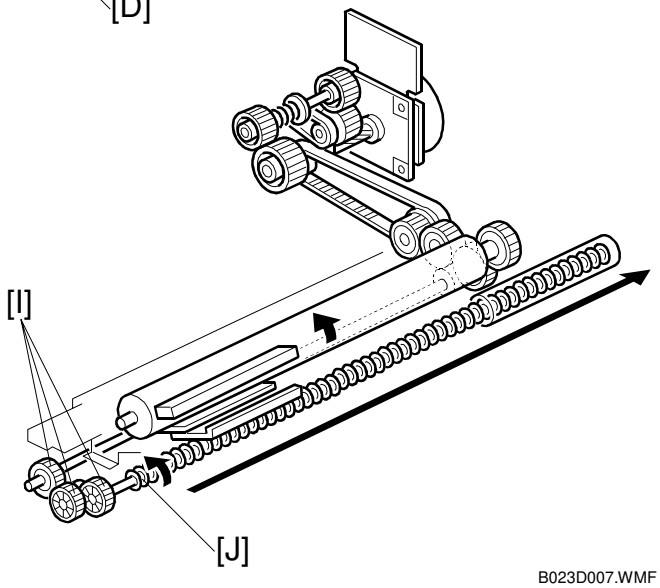
[A]: Cleaning blade
[B]: Paper transfer roller
[C]: Lubricant bar

- Cleaning blade scrapes toner off the paper transfer roller.
- To improve cleaning efficiency, spring plates press the lubricant bar against the paper transfer roller.
- Toner collection tray collects the paper dust and toner scraped off by the blade.

Paper Transfer Roller and Transport Belts Drive

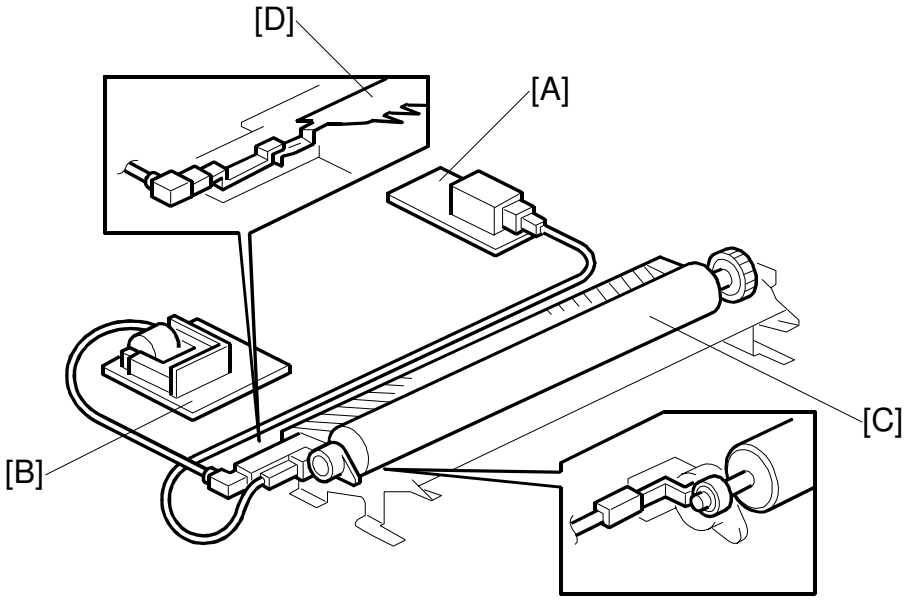


B023D006.WMF



B023D007.WMF

Drum peripheral component motor [A]
↓
Gears [E]
↓
Timing belt [B] → Gears [C] → Gears [I] → Toner collection coil [J]
Gears [C] → Paper transfer roller [D]
Timing belt [F] → Gears [E] → Transport belts [H]



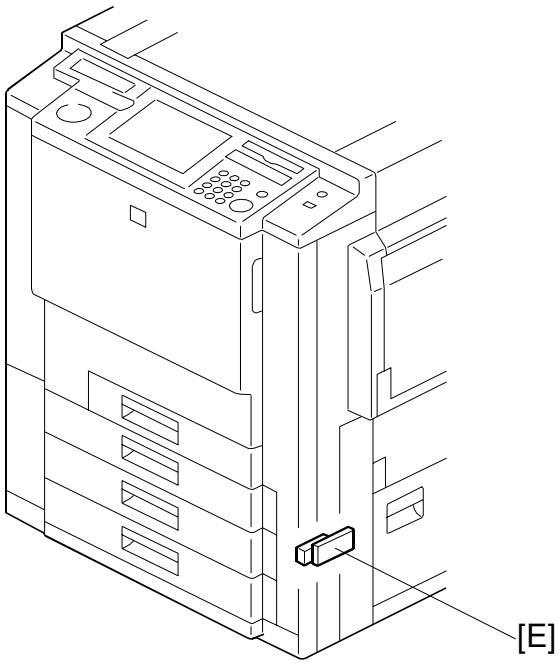
B023D008.WMF

[A]: T2 high voltage supply boards
[B]: D high voltage supply boards
[C]: Paper transfer roller
[D]: Paper discharge plate
[E]: Temperature and humidity sensors (next page)

Paper Transfer Bias

- A paper transfer voltage is applied using a bias roller and constant current.
- The high voltage supply boards (T2 and D) apply bias voltages. T2 supplies a bias to the roller and D supplies the discharge plate.
- The machine varies the paper transfer current, depending on the following six parameters:

1. Absolute humidity
   Under low temperature/low humidity conditions, the current depends on the absolute humidity. The temperature and humidity sensors (see the illustration on the next page) measure absolute humidity.
2. Paper size
   Since the bias current leaks around the edges of the paper, the current is adjusted according to the paper size.
3. Leading and trailing edges
   SP modes can adjust the current used for the leading and trailing paper edges. This prevents poor paper transfer along those edges.



B023D422.WMF

4. Paper type
   SP modes can adjust the current for different paper types, such as OHP or thick paper.
5. Duplex mode
   SP modes can adjust the current used for both the front and back sides of the paper.
6. Copy mode or printer mode
   SP modes can adjust the current used in these two modes.

SP modes

SP2-310 (Set Paper Transfer Bias) sets the paper transfer bias values.

SP2-313 to 2-315: Corrections for paper type, paper size, leading edge, and trailing edge

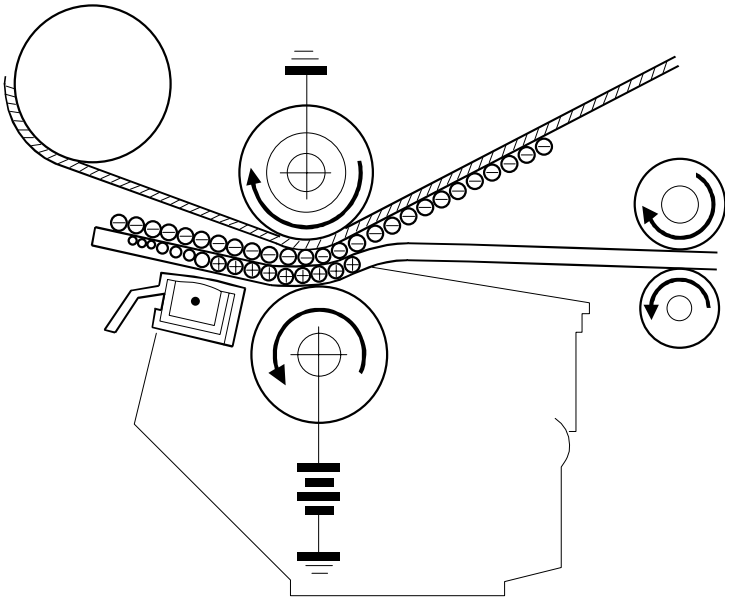
Error codes

SC450: Paper transfer power supply error

SC495: Temperature sensor error

SC496: Humidity sensor error

6.11.4 PAPER SEPARATION MECHANISM



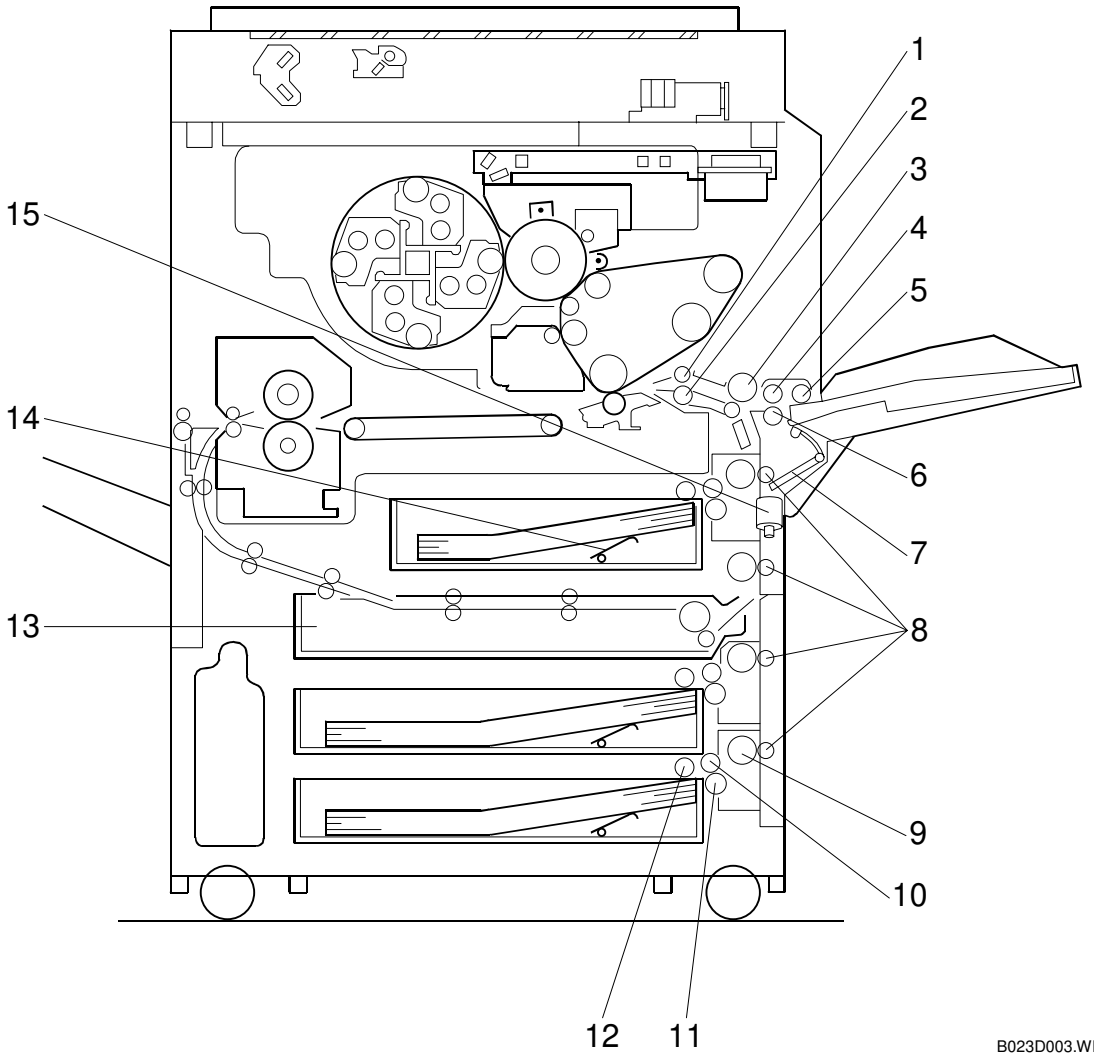
B023D412.WMF

- Uses curvature separation and a corona discharge
- For more details on these processes ☛ CT.
- The paper discharge plate discharges the remaining electricity on the paper to separate the paper from the ITB.
- The paper discharge plate also improves copy quality at low humidity.

6.12 PAPER FEED AND REGISTRATION SECTION

6.12.1 MAJOR COMPONENTS

Diagram



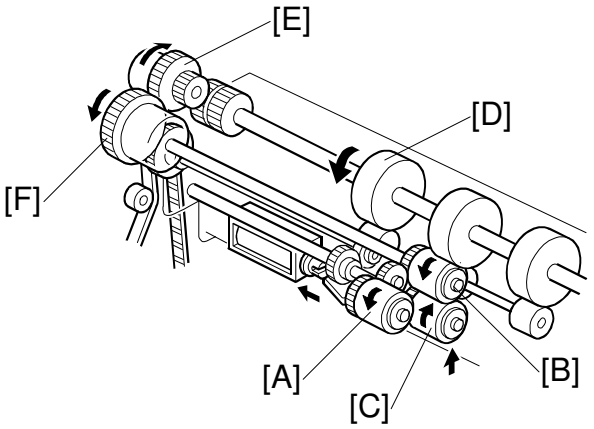
B023D003.WMF

1. Upper Registration Roller
2. Lower Registration Roller
3. By-pass Grip Roller
4. By-pass Feed Roller
5. By-pass Pick-up Roller
6. By-pass Reverse Roller
7. By-pass Feed Table Lift Arm
8. Vertical Transport Roller
9. Grip Roller
10. Tray Paper Feed Roller
11. Tray Reverse Roller
12. Tray Pick-up Roller
13. Duplex Unit
14. Tray Lift Arm
15. By-pass Feed Table Lift Motor

6.12.2 PAPER TRAY SECTION

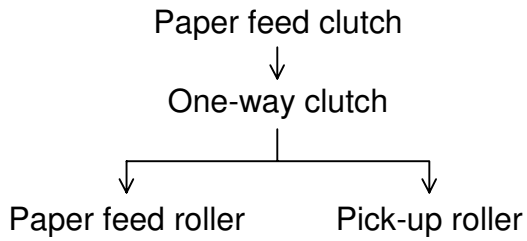
Paper Feed/Separation Mechanism

[A]: Pick up roller
[B]: Paper feed roller
[C]: Reverse roller
[D]: Grip transport roller
[E]: Paper feed clutch
[F]: One-way clutch



B023D703.WMF

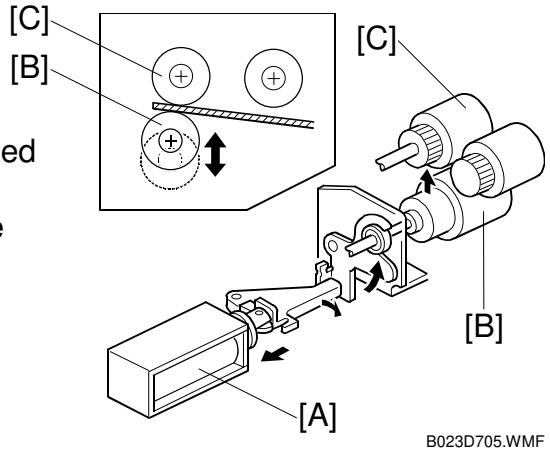
This copier employs the FRR paper feed system.



Reverse Roller Release Mechanism

[A]: Reverse roller solenoid
[B]: Reverse roller
[C]: Paper feed roller

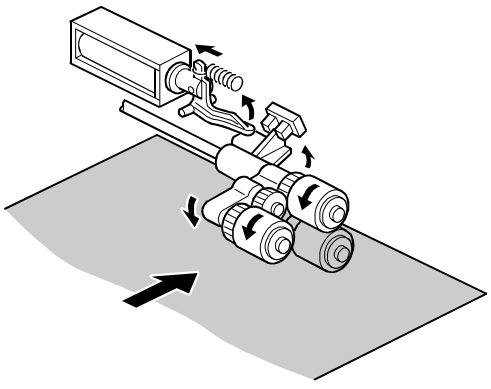
- Reverse roller kept away from the paper feed roller in the standby mode.
- During the paper feed process, the reverse roller solenoid moves the reverse roller up against the paper feed roller.



B023D705.WMF

Paper Feed Operation

1. Paper feed signal is supplied from the main control board.
2. Pick-up roller solenoid turns on.
3. Pick-up roller lowers and starts feeding the paper.

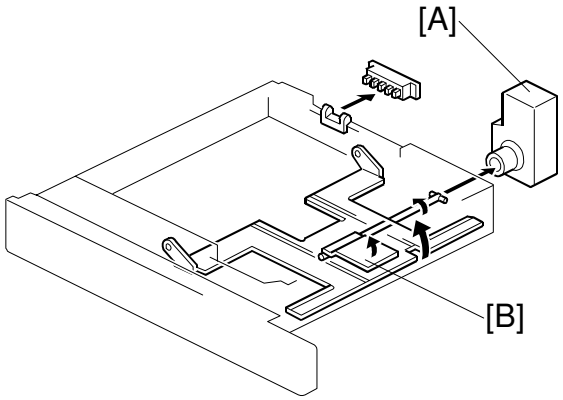

B023D704.WMF

Paper Lift Mechanism

[A]: Lift motor
[B]: Lift arm shaft

When the tray is inserted, the lift motor connects to the bottom late lift arm shaft.

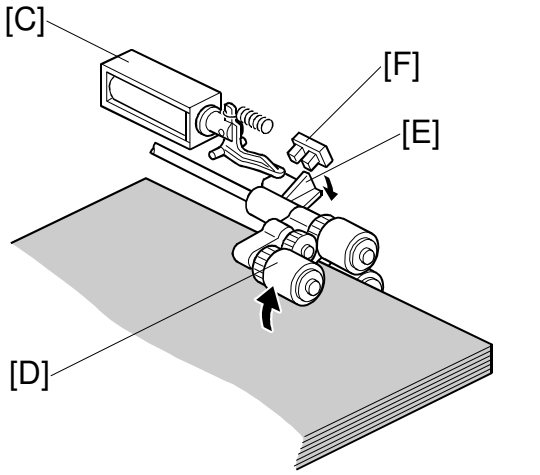
- Lift motor rotates the lift arm shaft.
- Lift arm shaft lifts the tray bottom plate.



B023D706.WMF

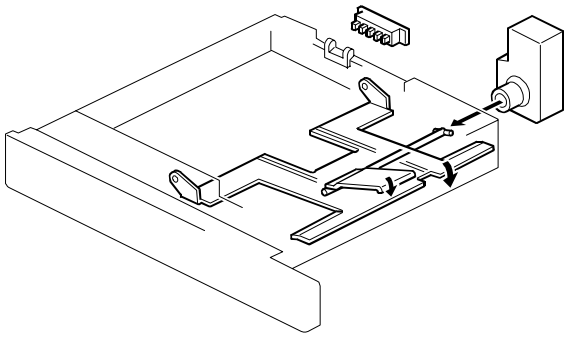
[C]: Pick-up roller solenoid
[D]: Pick-up roller
[E]: Actuator
[F]: Upper limit sensor

- When a tray is set, the pick-up roller solenoid turns on to lower the pick-up roller.
- As the tray bottom plate reaches the feed position, the paper lifts the roller.
- The actuator moves and the upper limit sensor is open.
  1) Sensor activates
  2) Lift motor turns off.
- As paper is used, the paper and the pick-up roller slowly drop.
- Once the actuator blocks the upper limit sensor again. The lift motor turns back on, lifting more paper into the feed position.



B023D707.WMF

When the tray is pulled out, the bottom plate lift arm shaft is disengaged from the lift motor, causing the tray bottom plate to fall under its own weight.

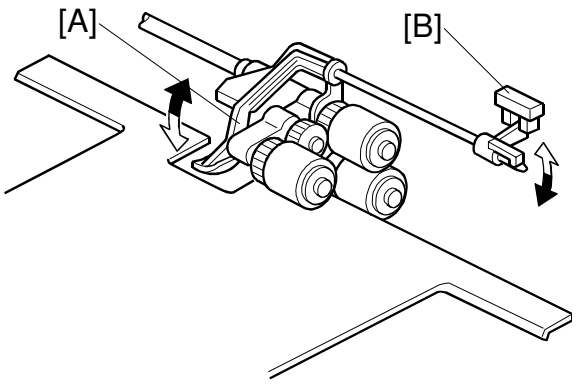


B023D708.WMF

Paper End Detection

[A]: Paper end feeler
[B]: Paper end sensor

Paper tray runs out of paper.
↓
Paper end feeler drops through the cutout in the tray bottom plate.
↓
Paper end sensor is blocked.



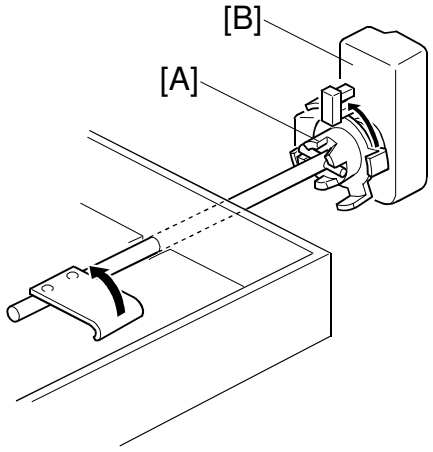
B023D709.WMF

Paper Near End Detection

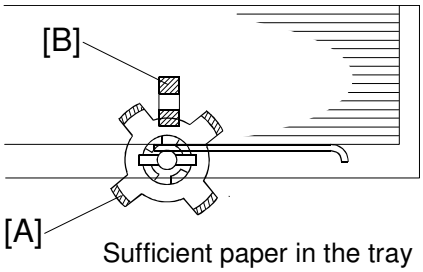
[A]: Actuators
[B]: Paper height sensor

The mechanism shown to the right tells the CPU when a tray is nearly out of paper.

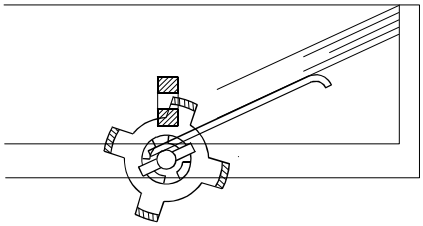
- When there is sufficient paper, the sensor is open (middle illustration).
- Actuators rotate with the tray lift arm.
- Eventually actuator blocks the paper height sensor, sending a near-end state signal to the main control board.
- There are four actuators because there are four possible ways for the motor's output coupler to connect with the tray lift arm shaft.
- Once connected, one of the actuators will be in the proper position.



B023D720.WMF



Sufficient paper in the tray



Paper near end

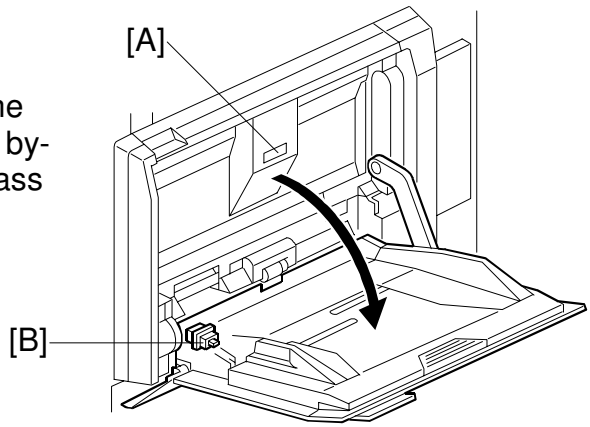
B023D721.WMF

6.12.3 BY-PASS PAPER FEED SECTION

By-pass Feed Table

[A]: Magnetic catch
[B]: By-pass table sensor

When the by-pass feed table is closed, the table is caught by the magnet catch. The by-pass table sensor detects when the by-pass feed table is opened.

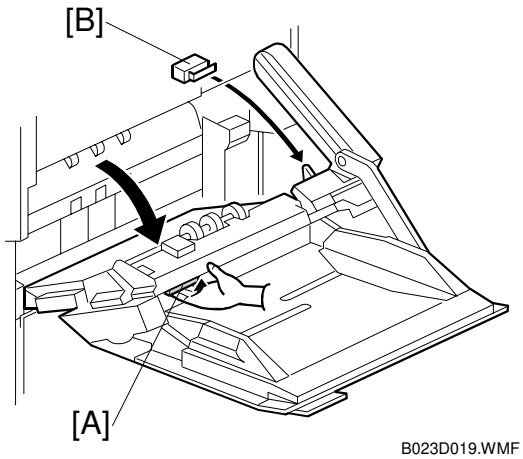


B023D018.WMF

By-pass Feed Unit

[A]: Release lever
[B]: By-pass feed unit switch

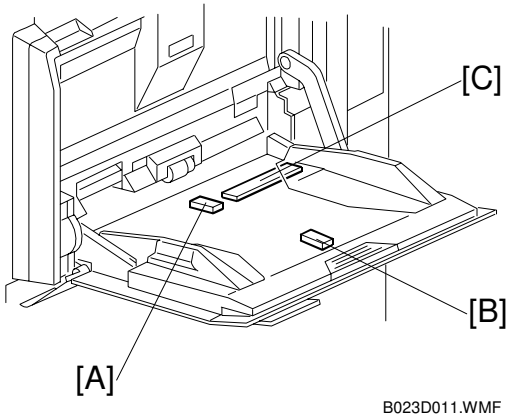
The by-pass feed unit opens as shown in the figure. It must be opened to remove paper jams in the vertical transport section.



B023D019.WMF

By-pass Paper End Sensor

[A]: By-pass paper end sensor
[B]: By-pass paper length sensor
[C]: By-pass paper width sensor



B023D011.WMF

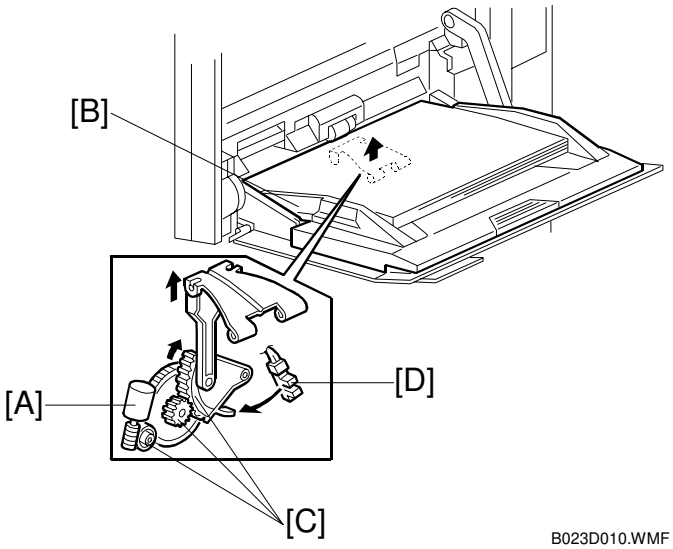
- The paper end sensor (a reflective photosensor) detects paper in the by-pass feed table.
- When the by-pass tray runs out of paper, the paper end sensor deactivates.
- Maximum stack height of theS paper tray capacity is 32 mm. (Approximately 250 sheets for normal paper/100 sheets for thick paper 2)
- Paper length sensor detects the paper's orientation (lengthwise or sideways).
- Paper width sensor detects the paper size.

By-pass Feed Table Lift Mechanism

[A]: By-pass feed table upper lift motor
[B]: By-pas feed table
[C]: Lift gears
[D]: Upper limit sensor

To enable the 250 sheets paper feed capacity in by-pass feed table, the by-pass tray has a feed table lift mechanism.

- Lift motor rotates the gears, lifting the table.
- When the upper limit sensor is blocked, the table lift motor stops.



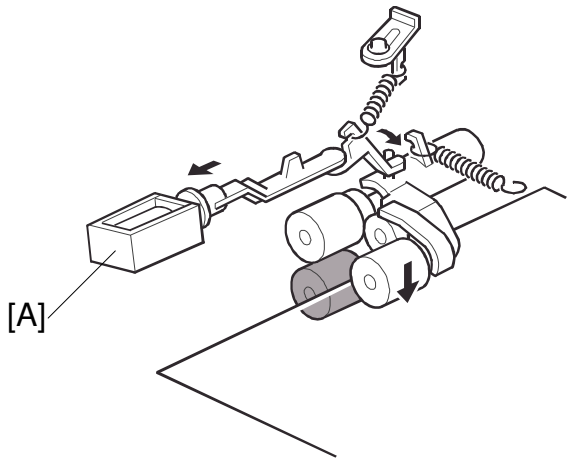
B023D010.WMF

By-pass Pick-up Roller Pressure

[A]: Pick-up solenoid

Uses a new type of rubber in the pick-up roller, feed roller and reverse roller.

- Enables a wider range of paper stock, including OHP, thick paper 1 and thick paper 2.
- New rollers grip better than the previous model.
- This copier has only one pick-up solenoid.

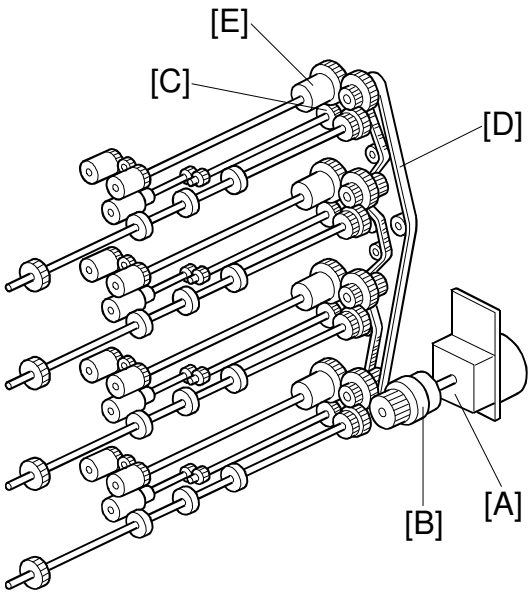


B023D012.WMF

6.12.4 PAPER FEED DRIVE

Tray Feed Unit Drive

Paper feed motor [A]
↓
Paper feed clutch [B]
↓
Drive belt [C]
↓
Drive gears [D]
(1 for each tray)
↓
Paper feed clutches [E]
(1 for each tray)

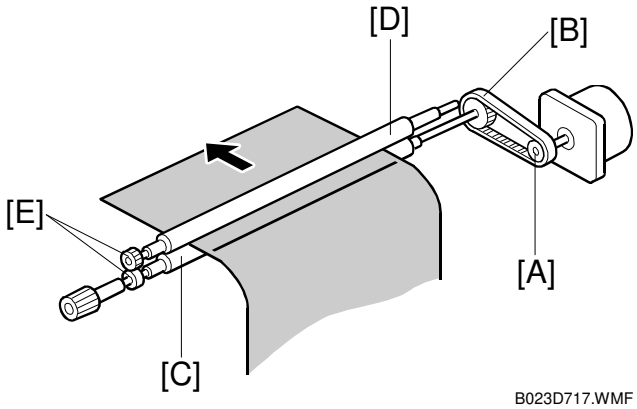


B023D718.WMF

Registration Roller Drive

[A]: Registration drive motor
[B]: Registration drive belt
[C]: Lower registration roller
[D]: Upper registration roller
[E]: Registration drive gears

- Registration roller has its own drive motor.
- Minimizes drive fluctuations, and helps prevent registration errors when feeding thick paper 2.
- Lower registration roller is a 20 mm diameter rubber roller.
- Drive force applied to the lower roller. Carried to the upper roller via the gears.



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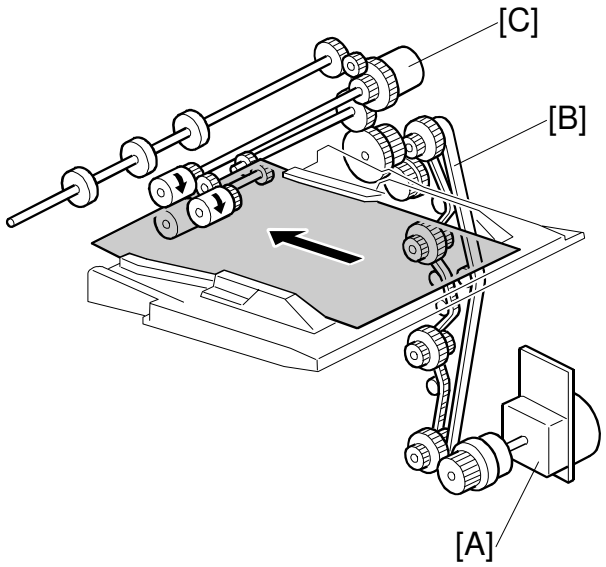
Detailed Descriptions

By-pass Feed Unit Drive

Paper feed motor [A]
↓
By-pass drive belt [B]
↓
By-pass feed clutch [C]



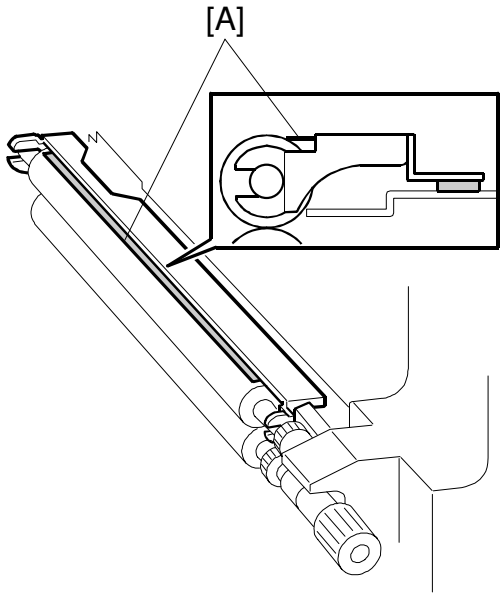
B023D712.WMF

NOTE: When copying on OHPS using the by-pass tray, small spots or scratches may appear at the center of the leading edge. This is caused by contact with the next OHP sheet.

6.12.5 PAPER DUST CATCHING

[A]: Paper dust catching mylar

- Paper dust catching mylar collects the paper dust as the paper feeds.



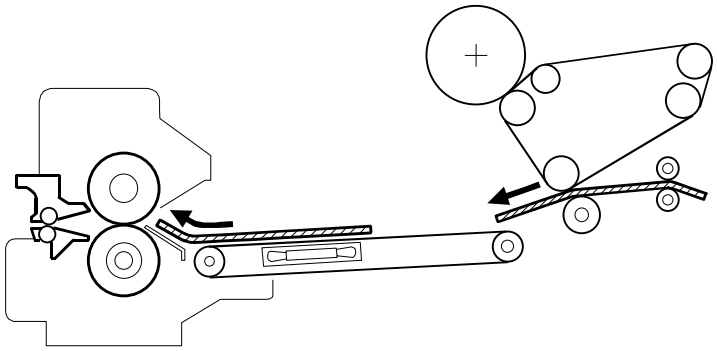
B023D026.WMF

6.12.6 PAPER FEEDING SPEED

- To enable the better copy quality, especially for the glossiness, the machine changes the paper feeding speed according to the type of paper.
  1) Normal paper: 245 mm/s
  2) OHP/Thick paper 1: 122.5 mm/s
  3) Thick paper 2: 70 mm/s

6.12.7 PAPER PATH

Dipping Up-hill Paper Path

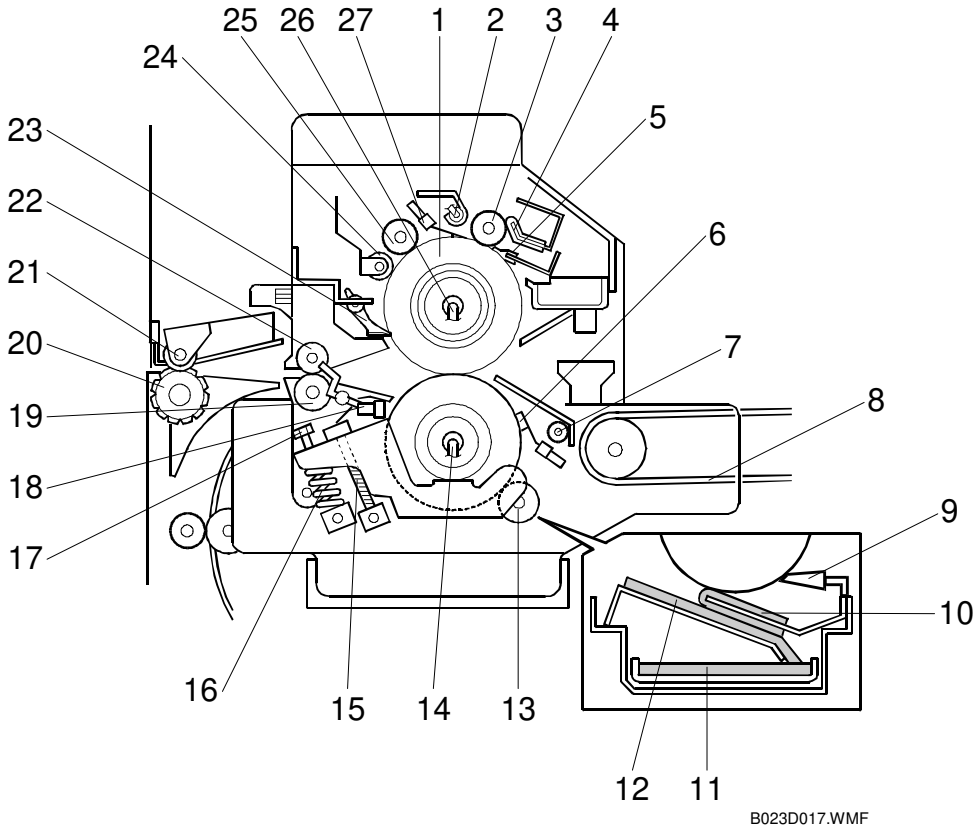


B023D021.WMF

- Paper dips from the ITB/PTR nip position to the fusing entrance. From the fusing entrance, paper goes up-hill into the fusing nip position. This dipping up-hill paper path prevents the shock jitter at fusing unit entrance (360 mm from leading edge). (☛ 4.4)
- Uses a “dipping up-hill” paper path.
  1) The previous model used a straight paper path between the image transfer section and the fusing entrance. The shock when the leading edge entered the fusing nip area occasionally caused jitter—especially for extra thick paper.
  2) Due to the shape of the paper path between the image transfer section and the fusing entrance, the leading edge of the paper buckles slightly as it enters the fusing unit nip area.
  3) This buckling reduces shock and helps prevent jitter.

6.13 TRANSPORT, FUSING, AND EXIT

6.13.1 MAJOR COMPONENTS

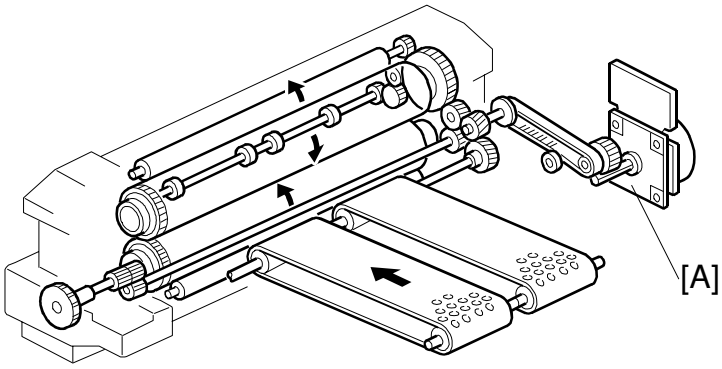


1. Hot Roller
2. Hot Roller Thermofuse
3. Oil Supply Roller
4. Hot Roller Oil Supply Pad
5. Hot Roller Blade
6. Pressure Roller Thermistor
7. Presser Roller Thermofuse
8. Transport Belt
9. Pressure Roller Blade
10. Pressure Roller Oil Supply Pad
11. Bottom Oil Pan Felt
12. Oil Pan Felt
13. Pressure Cleaning Roller (-15, -17, -19 only)
14. Pressure Roller Lamp
15. Pressure Release Screw
16. Pressure Spring
17. Pressure Adjustment Screw
18. Exit Sensor
19. Fusing Exit Roller (Lower)
20. Exit Roller (Lower)
21. Exit Roller (Upper)
22. Fusing Exit Roller (Upper)
23. Separation Pawl
24. Pre-Cleaning Roller
25. Cleaning Roller
26. Hot Roller Lamp
27. Hot Roller Thermistor

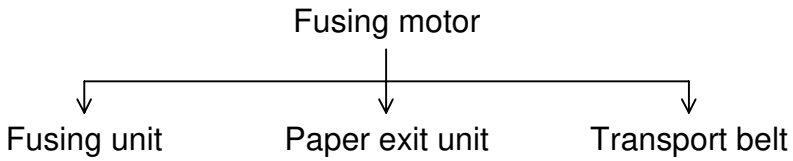
NOTE: 1) Item 13 is only for -15, -17, -19 copiers
2) Item 9, 10, 11 and 12 are only for -22, -26, -27, -29 copiers

6.13.2 DRIVE MECHANISM

[A]: Fusing motor

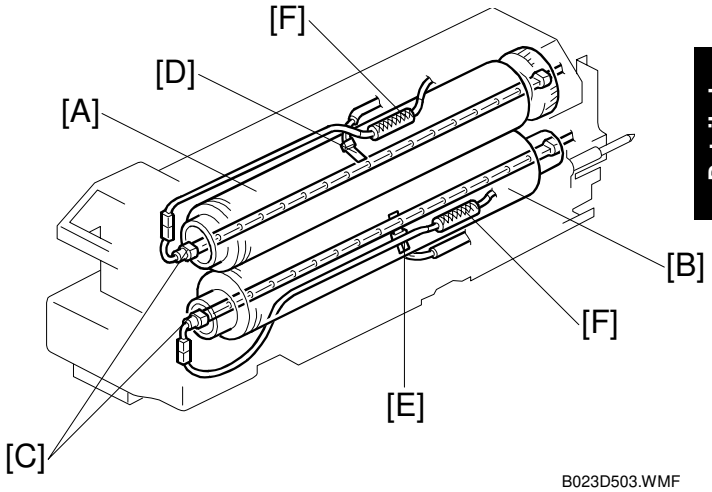


B023D016.WMF



6.13.3 FUSING UNIT OVERVIEW

[A]: Hot roller
[B]: Pressure roller
[C]: Fusing lamps
[D]: Hot roller thermistor
[E]: Pressure roller thermistor
[F]: Thermofuses



B023D503.WMF

- Each roller has a fusing lamp.
- Hot roller: 930 W
- Pressure Roller: 450 W
- Each roller's temperature controlled by its own thermistor.
- Temperature normally controlled by turning the lamps on and off.
- Phase control is also available (SP1-104-00).
- One thermofuse for each roller.
- Thermofuses open at 154°C, protecting the fusing unit from overheating.
- Uses silicone rubber rollers for the hot and pressure rollers.
- Rollers are not covered, helping to maintain high image reproducibility.
- Oil is applied to the rollers to reduce the tendency of toner to stick to the rollers.

6.13.4 FUSING TEMPERATURE CONTROL

Target temperatures for the rollers are set based on the copy mode and operating conditions.

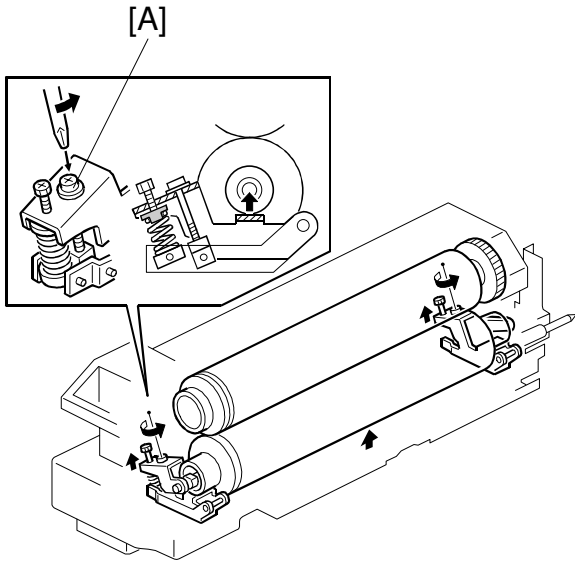
Roller	Stand-by Mode	Copy Mode			
		Normal		OHP/ Thick Paper 1 and 2	
		Single Color	Full Color	Single Color	Full Color
Fusing: simplex	195°C	170°C	180°C	180°C	180°C
Fusing: duplex	195°C	170°C	180°C	180°C	180°C
Pressure: simplex	160°C	145°C	155°C	155°C	
Pressure: duplex	160°C	145°C	155°C	155°C	

- Paper with a weight greater than 105 g/m^2 (28 lb) and not greater than 157 g/m^2 (42 lb) is called “thick paper 1” (thick paper).
- Paper with a weight greater than 157 g/m^2 (42 lb) and not greater than 256 g/m^2 (68 lb) is called “thick paper 2” (ultrathick paper).

6.13.5 FUSING PRESSURE

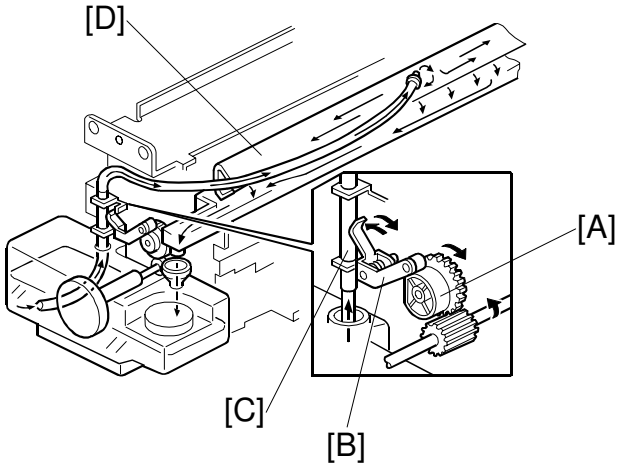
[A]: Pressure release screw

- Pressure roller is held against the hot roller by a spring and bracket.
- For shipping, the pressure release screw holds the pressure roller away from the hot roller.
- Unscrewing the pressure release screw raises the pressure roller, applying pressure to the hot roller.

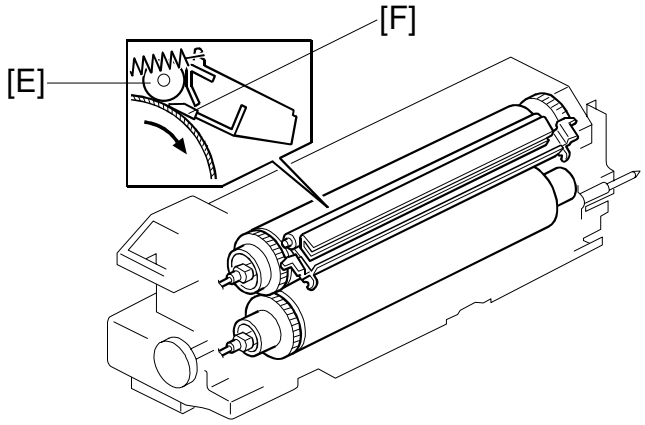


B023D504.WMF

6.13.6 OIL SUPPLY



B023D505.WMF

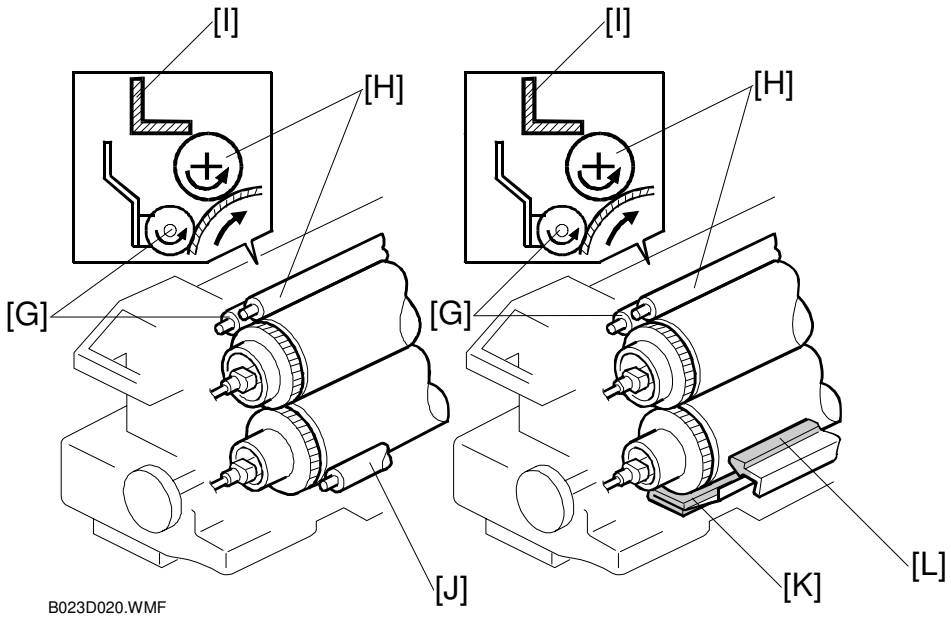


B023D506.WMF

[A]: Oil cam gear
[B]: Oil pump lever
[C]: Oil pump sleeve
[D]: Oil supply pad
[E]: Oil supply roller
[F]: Hot roller blade

- Starts when the fusing motor turns on.
- Fusing knob shaft → Oil cam gear → Oil pump lever
- The roller on the oil pump lever follows the surface of the cam.
- Alternately presses and releases the oil pump sleeve.
- This action pumps oil to the oil supply pad.
- Surplus oil returns to the oil tank.
- Oil supply pad presses against the oil supply roller.
- Oil supply roller applies oil to the hot roller.
- Hot roller applies oil to the pressure roller.
- Hot roller blade spreads the oil evenly across the hot roller.

6.13.7 CLEANING MECHANISM



The hot roller pre-cleaning roller [G] and the hot roller-cleaning roller [H] remove toner and dust from the hot roller.

- Double cleaning system increases the cleaning efficiency.
- Scraper [I] removes the toner and dust from the hot roller-cleaning roller.

[120 V machines]

The pressure roller-cleaning roller [J] cleans the pressure roller.

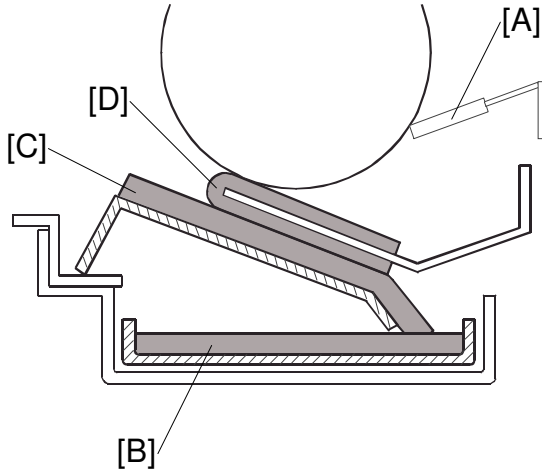
[230 V machines]

The pressure roller oil supply pad [K] supplies the oil to the pressure roller.
Pressure roller blade [L] scrapes the paper dust from the pressure roller.

6.13.8 FUSING OIL RECYCLING MECHANISM

NOTE: [230 V machines only]

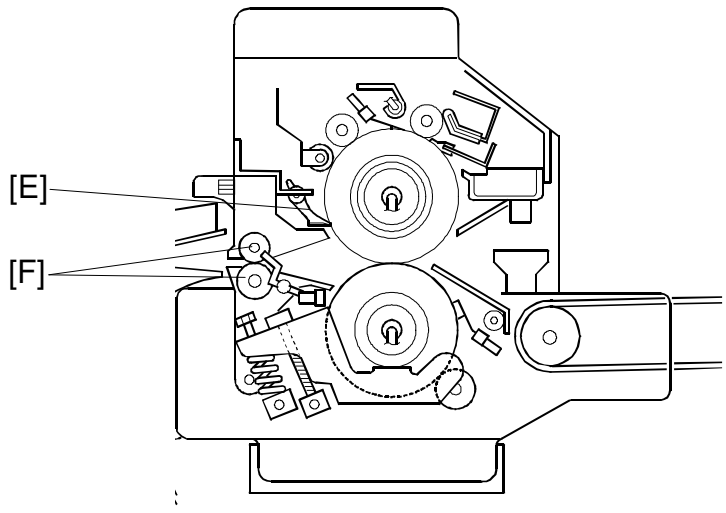
[A]: Pressure roller blade
[B]: Oil pan felt
[C]: Oil pan felt
[D]: Pressure roller oil supply pad



B023D999.WMF

- Fusing oil scraped off by the pressure roller blade.
- Returned to the pressure roller by the pressure roller oil supply pad.
- Actual amount of fusing oil collected varies, depending on conditions, including:
  1) Number of copies per original
  2) Paper size
- Sometimes the amount of oil remove from the pressure roller exceeds the amount returned to the roller.
- Oil pan felts absorb the accumulated oil in the oil pan and return it to the pressure roller.

6.13.9 HOT ROLLER SEPARATION PAWL



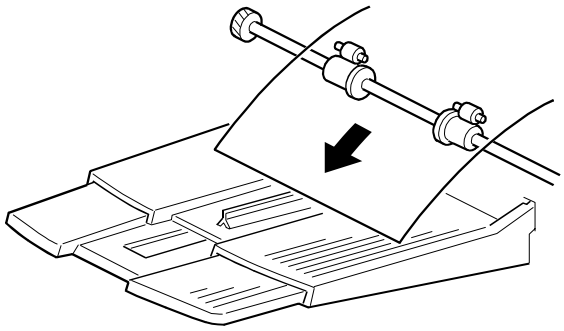
B023D030.WMF

Hot roller separation pawls [E] separates the copy paper from the hot roller and direct it to the exit rollers [F].

6.13.10 PAPER EXIT AND PAPER INVERSION

Paper Exit Mechanism

The exit rollers have ridges toward the inside to increase the stiffness of the paper and improve paper stacking.



B023D508.WMF

Junction Gate Mechanism

[A]: Junction gate
[B]: Junction gate solenoid

After fusing, the junction gate directs paper either to the exit tray or the duplex section.

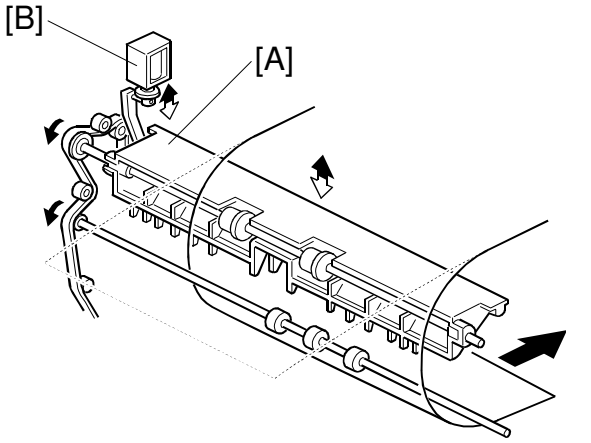
- Junction gate is actuated by the junction gate solenoid.

To the paper exit tray:

- The junction gate solenoid is off.

To the duplex tray:

- The junction gate solenoid is on



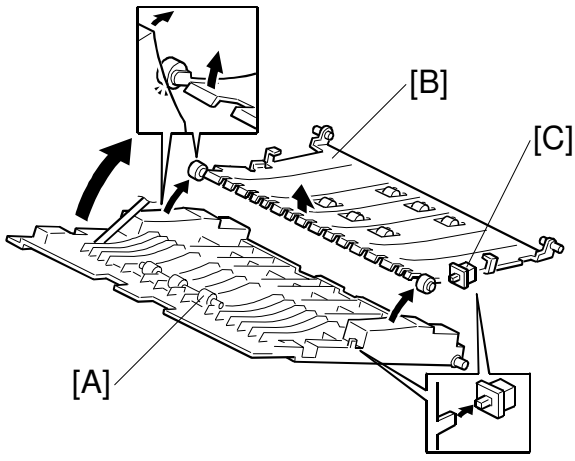
B023D509.WMF

Paper Exit Cover

[A]: Paper exit door
[B]: Transport roller plate
[C]: Paper exit door switch

Paper exit door opens and closes for jam removal.

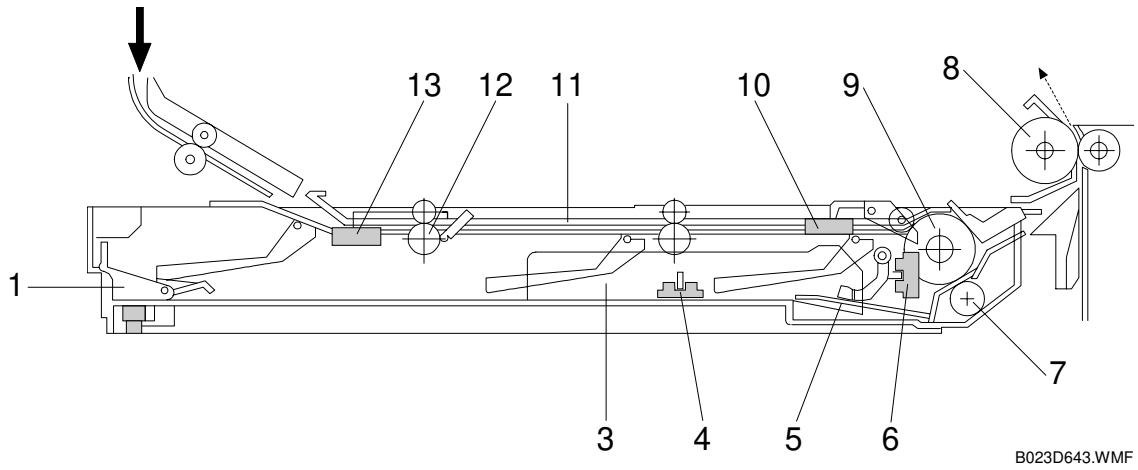
- Transport roller plate is released when the paper exit door is opened.
- Door state (open or closed) detected by the paper exit door switch.



B023D510.WMF

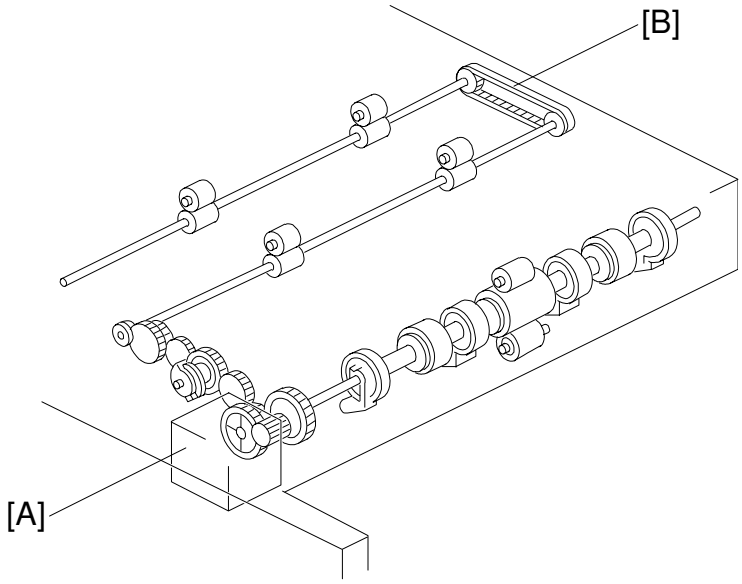
6.14 DUPLEX TRAY

6.14.1 OVERVIEW



1. End Fence
2. End Fence Jogger H.P. Sensor
3. Side Fence Jogger
4. Side Fence Jogger H.P. Sensor
5. Bottom Plate
6. Duplex Paper End Sensor
7. Separation Roller
8. Vertical Transport Roller
9. Paper Feed Roller
10. Duplex Turn Sensor
11. Transport Path
12. Duplex Entrance Roller
13. Duplex Entrance Sensor

6.14.2 DRIVE MECHANISM



B023D667.WMF

[A]: Duplex feed motor
[B]: Timing belt

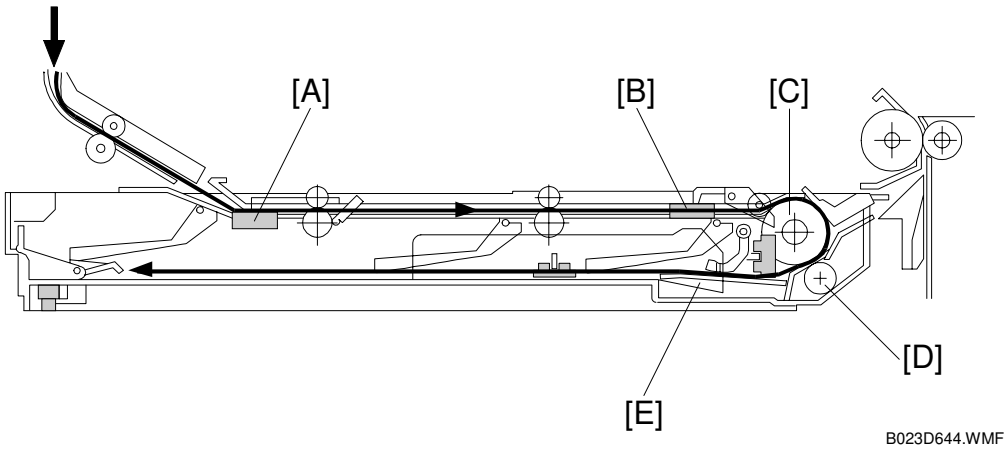
The duplex feed motor drives all the rollers in the duplex tray.

- Uses a series of gears and timing belts
- Helical gears are used to reduce noise.
- Duplex feed motor also raises and lowers the duplex bottom plate.

6.14.3 PAPER FEED INTO THE DUPLEX TRAY

The duplex feed motor is a stepper motor. The direction that the motor turns depends on whether the unit is stacking or feeding.

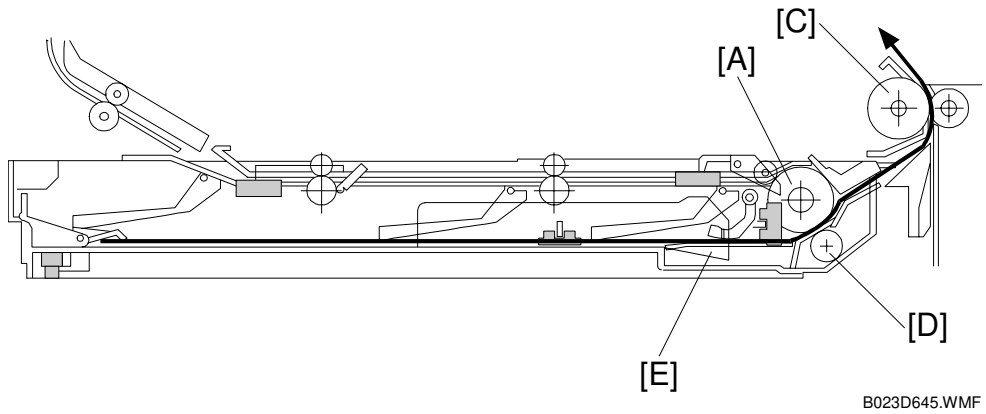
Duplex Stacking



[A]: Entrance sensor
[B]: Duplex turn sensor
[C]: Paper feed roller
[D]: Separation roller
[E]: Bottom plate

- Paper path:
  Paper enters the duplex unit → Entrance sensor → Duplex turn sensor → Paper feed roller → Separation roller → Stacked
- Bottom plate is in the lower position.
- Separation roller moves with the paper feed roller.

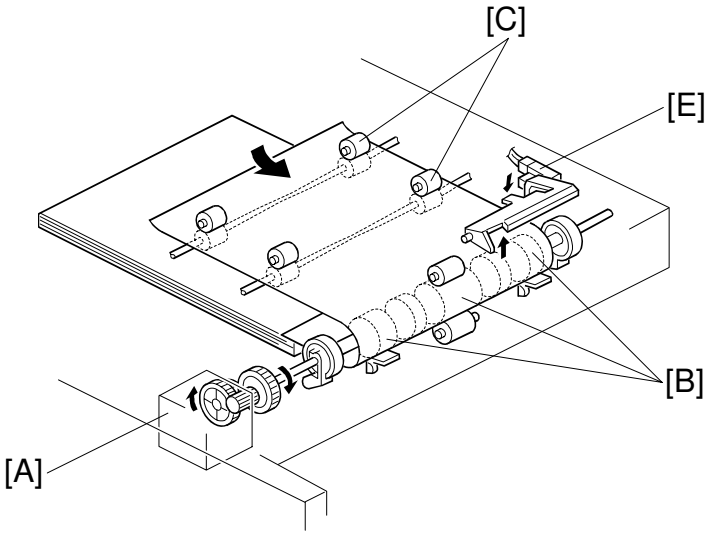
Paper Feed from the Duplex Tray



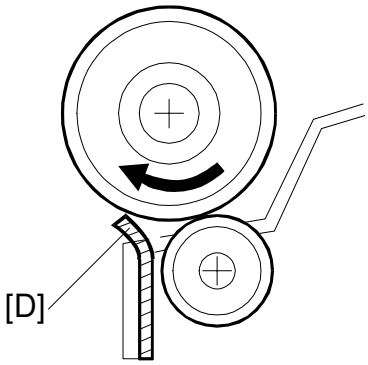
[A]: Paper feed roller
[B]: Bottom plate
[C]: Vertical transport roller
[D]: Separation roller

- When the bottom plate raises, the paper stacked in the duplex unit touches the paper feed roller.
- Paper feed roller feeds the paper through the vertical transport roller to the registration rollers in the copier main body.
- Separation roller has a one-way clutch.
  1) During paper stacking, the separation roller turns with the paper feed roller.
  2) During paper feed, the separation roller does not turn. This lets it separate the sheets of paper (☛ CT).

Duplex Entrance to Duplex Tray



B023D646.WMF



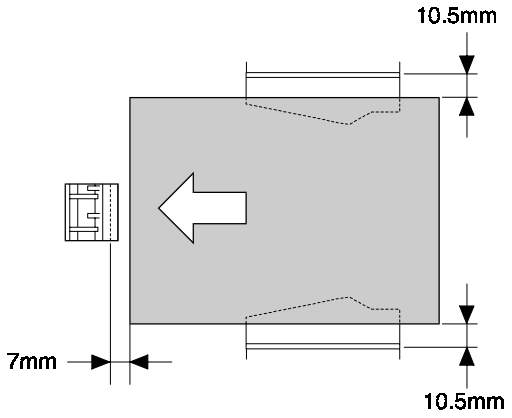
B023D654.WMF

[A]: Duplex feed motor
[B]: Duplex feed rollers
[C]: Duplex entrance rollers
[D]: Flip Mylar
[E]: Duplex turn sensor

- Duplex feed motor starts after the leading edge of the paper activates the paper exit sensor.
- This motor drives the duplex feed rollers and the duplex entrance rollers.
- These rollers direct the paper from the junction gate into the duplex tray.
- Tip of the flip Mylar moves to the left (front view) when the duplex feed rollers rotate to feed the copy into the duplex tray.
- Mylar presses the paper against the duplex feed rollers, ensuring that the trailing edge of the paper clears the guide plate.
- Duplex turn sensor detects the trailing edge of the paper as it enters the tray.

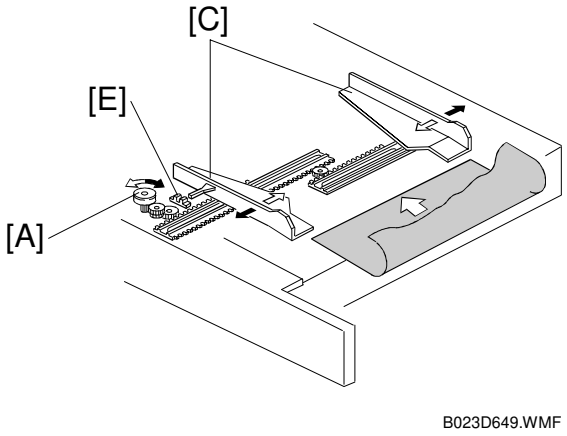
6.14.4 JOGGER MECHANISM

[A]: Side fence jogger motor
[B]: End fence jogger motor
[C]: Side jogger fences
[D]: End fence
[E]: Duplex turn sensor
[F]: First end fence
[G]: Second end fence
[H]: End fence stopper

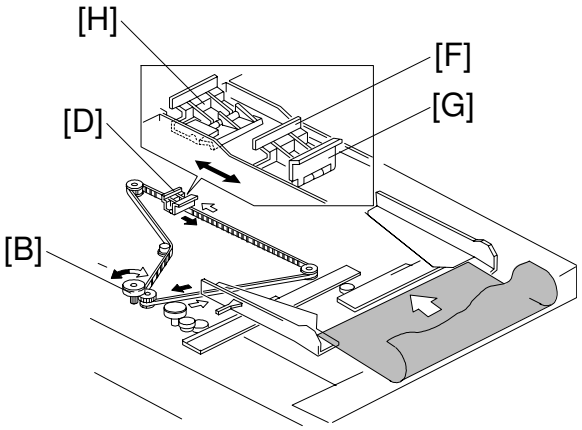


B023D648.WMF

- Two motors used to drive the fences.
  1) Side fence jogger motor.
  2) End fence jogger motor.
- Using separate motors allows the duplex tray to handle all paper sizes from A3/11" x 17" to A5/8 1/2" x 5 1/2" sideways.
- Two home position sensors.
  1) One for the side jogger fences.
  2) One for the end fence.
- When the main switch turns on, the side jogger fences and the end fence move to their home positions.
- When the registration clutch turns on, the side fences move 10.5 mm from the selected paper size.
- End fence moves 7 mm away from the selected paper size.
- When the copy paper is delivered to the duplex tray, the jogger fences move inward to square the paper (690 ms after the duplex turn sensor detects the trailing edge of the paper).
- Shortly after this, the jogger fences move back to their previous positions.
- After the last copy of the first side enters the duplex tray, the jogger fences remain against the paper stack.



B023D649.WMF

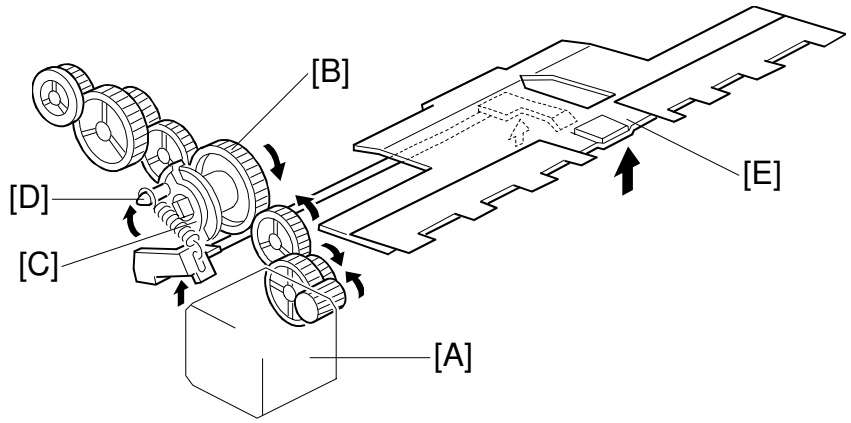


B023D650.WMF

- There are two end fences.
- The first is for A3/11" x 17" size paper.
- The second is for sizes smaller than B4.
- They are included as a unit. When A3/11" x 17" size paper is in the duplex tray, the end fence unit moves to the left and the B4 end fence rotates down as it is pressed against the end fence stopper.

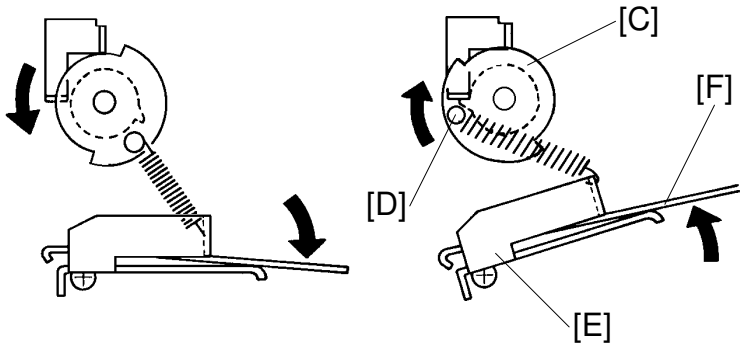
6.14.5 PAPER FEED FROM THE DUPLEX TRAY

Bottom Plate Lift Mechanism



B023D653.WMF

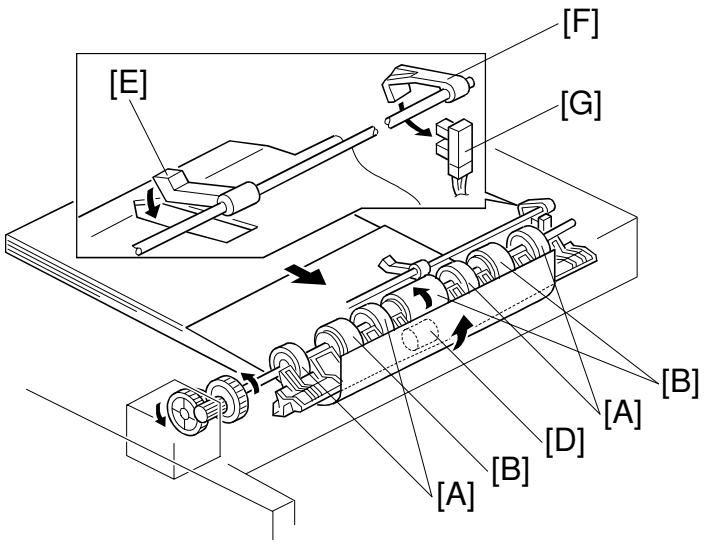
[A]: Duplex feed motor
[B]: Cam clutch gear
[C]: Cam clutch
[D]: Clutch pin
[E]: Duplex lever
[F]: Duplex bottom plate



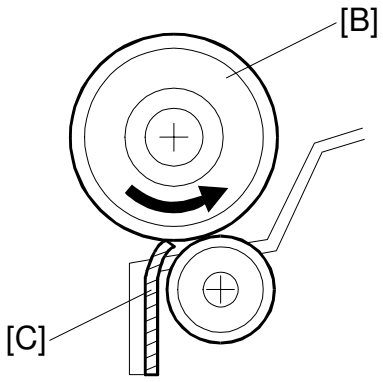
B023D655.PCX

- While the first side is being copied, the duplex feed motor turns clockwise and the cam clutch gear turns counter-clockwise (☛ upper illustration).
- The first side copies are stacked in the duplex tray unit.
- After the first side copies are done, the duplex feed motor changes direction, and the cam clutch gear turns clockwise.
- The spring inside the cam clutch engages, and it also turns clockwise. The pin on the clutch pulls a spring, lifting the duplex bottom plate.
- The paper contacts the duplex feed rollers, and the duplex feed rollers feed the stacked copies out to begin reverse side copying.

6.14.6 PAPER FEED-OUT MECHANISM



B023D651.WMF



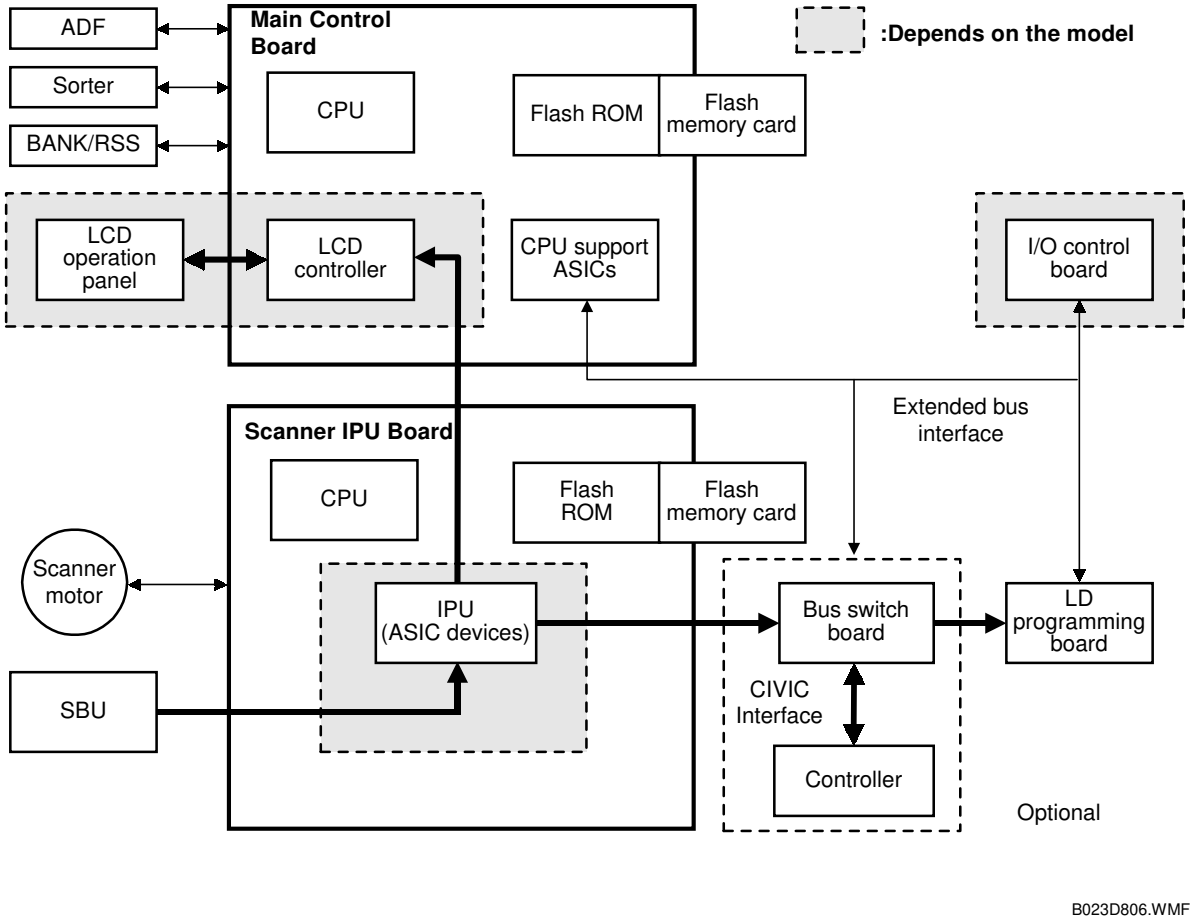
B023D647.WMF

[A]: Paper flatteners
[B]: Duplex feed rollers
[C]: Flip Mylar
[D]: Separation roller
[E]: Paper end feelers
[F]: Duplex paper end actuator
[G]: Duplex paper end sensor

- While stacking in the duplex tray, the paper flatteners correct curl at the paper's leading edge.
- Once all the paper is stacked in the duplex tray, the jogger fences square the paper and the duplex feed motor turns counter-clockwise briefly. The duplex tray is now prepared to feed out the paper.
- Bottom plate rises and the duplex feed rollers move the flip Mylar's back to the right (front view).
- Duplex paper feed system has three sets of duplex feed rollers and a separation roller.
- Separation roller has a one-way bearing inside. It rotates freely during paper stacking and locks during paper feeding.
- During feeding, the separation roller functions like a friction pad. Only the top sheet of the stack can feed through.
- After the duplex tray feeds out the final copy, the paper end feeler drops through a slot in the duplex bottom plate.
- Duplex paper end actuator (on the same shaft as the duplex paper end feeler) pivots into the duplex paper end sensor.
- Sensor signals the CPU to stop.

6.15 SYSTEM CONFIGURATION

6.15.1 CONFIGURATION



The main control board CPU manages the scanner, operation panel, and printer engine.

- Main control board manages printer controller options through the extended bus interface.
- Scanner IPU board CPU controls the scanner motor and image data processing.
- Both the main control board and the scanner IPU board have flash memory. Their programs can be replaced using a flash ROM card.

6.15.2 POWER STATES

This machine has three energy saver modes:

1) Energy saver mode
2) Power-off (sleep) state (called 'AOF, Auto Off mode' in the operation instructions)

Energy Saver Mode

In the energy saver mode, all indicators on the operation panel, except the Main Power indicator and the LED on the Energy Saver key, are turned off.

- Three energy saver levels are available.
- Energy saver level can be selected in User Tools (Default: Level 1).

Level	Warming-up time required	Energy Save	Fusing control
Level 1	0 seconds	3%	Indicators on operation panel turn off.
Level 2	170 seconds	25%	Both heat roller and pressure roller temperature drops by 45°C.
Level 3	260 seconds	50%	Heat roller temperature drops by 85°C and pressure roller temperature drops by 55°C.

Power-off (Sleep) State (AOF Mode)

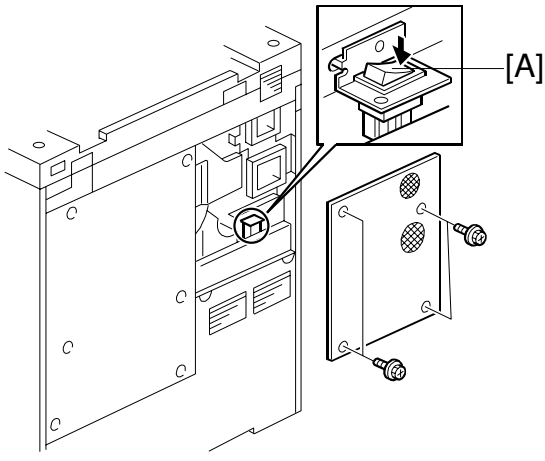
- The power-off state of this copier conforms to the International Energy Star standard (sleep mode).
- Off all the DC outputs (V_{AA}, V_{CA}, V_{CB}, $V_{CC}1$, and $V_{CC}2$) from the PSU, only $V_{CC}1$ is on.
- All the other outputs are off.
- Power is applied only to the main control board and the operation switch. The machine can detect when the operation switch is pressed.
- The fusing lamps are off.
- When the operation switch is pressed, the machine goes back to standby mode.

Main Power Switch Off State

When the main power switch is off, all power is shut off except the following heaters.

- Optics anti-condensation heater
- Transfer belt heater
- Paper transfer unit heater

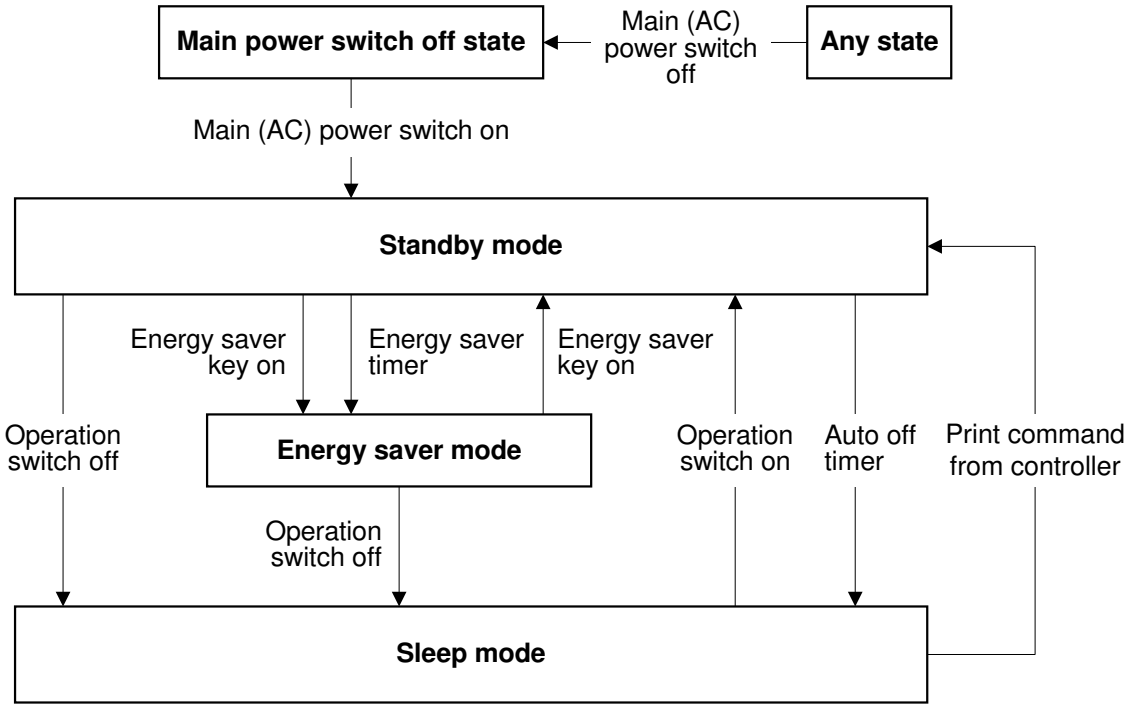
NOTE: 1) Heaters are turned on and off by the heater switch [A].
2) Heater switch is turned off for shipping.



B023I901.WMF

Copier Modes

This machine has three different modes it can assume when the main power switch is on and the machine is not copying. This is shown by the following illustration.



B023D807.WMF

Stand-by Mode

- Operation panel ON
- Fusing power ON (stand-by temperature)

Energy Saver Mode

- Operation panel OFF except for the Main Power indicator, Operation Switch on indicator, and “Energy Saver” key indicator.
- Fusing power ON (stand-by temperature)

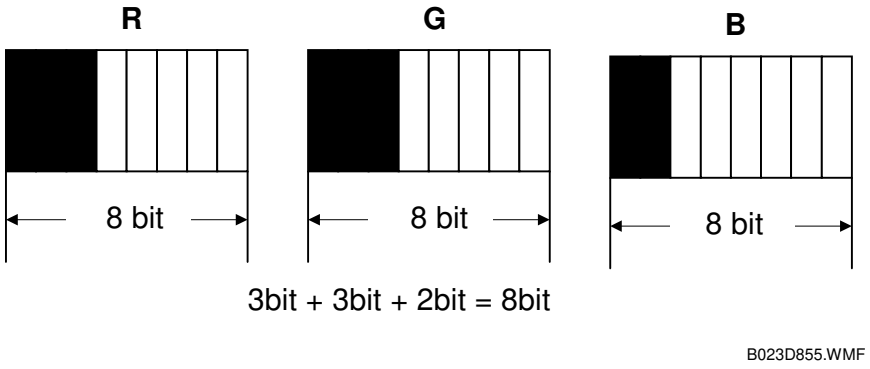
Sleep Mode

- Operation panel OFF except for the Operation Switch on indicator.
- Fusing power OFF
- +5 volts is supplied to the main control board

6.15.3 OPERATION PANEL

This copier has a large-sized full-color LCD (640 x 480 dot) operation panel.

- Operation panel controlled by the CPU (LCD controller) on the main control board.
- Display image data generated during area manipulation is stored by the scanner IPU directly (DMA mode) in the VRAM on the main control board before being transferred to the operation panel.
- Image data can be displayed in 256 colors using an 8-bit color scheme (3 bits for R, 3 bits for G, and 2 bits for B).
- Area manipulation information specified on the operation panel is sent to the area manipulation section in the scanner IPU. The information is used for image processing in synchronization with the scan data generated in the copy mode.



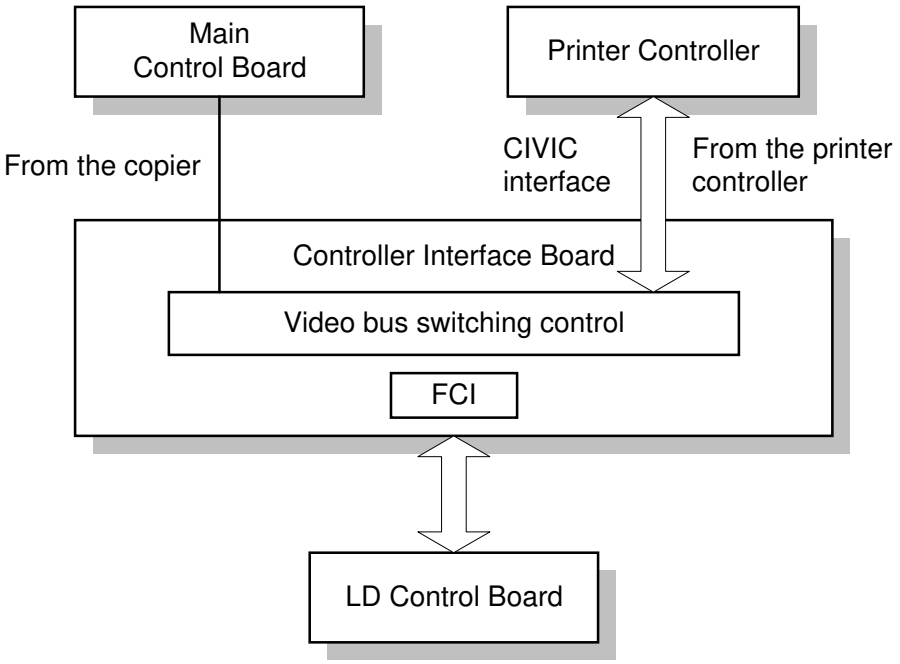
The following table shows the resolution of the data in the editor window. For example, if the user selects Zoom 1, the scale of the display in the editor window is 200%. The machine generates 50 dpi data.

	Resolution	Scale
Full display	25 dpi	100%
Zoom 1	50 dpi	200%
Zoom 2	67 dpi	264%
Zoom 3	100 dpi	400%
Zoom 4	132 dpi	528%

6.15.4 PRINTER CONTROLLER INTERFACE

There is an optional printer controller for this copier. The printer controller interface board connects the copier with the controller.

- CIVIC interface between the controller unit and the bus switch board transfers image data on an 8-bits/pixel basis for each color.
- FCI (Fine Character and Image) chip performs image smoothing and line correction.
- When the user selects smoothing, the FCI converts the image data (8 bits) to 7 bits of image and 1 bit of pixel positioning data. This simulates 1200 dpi resolution across the page (see Laser Exposure - Smoothing for more details).

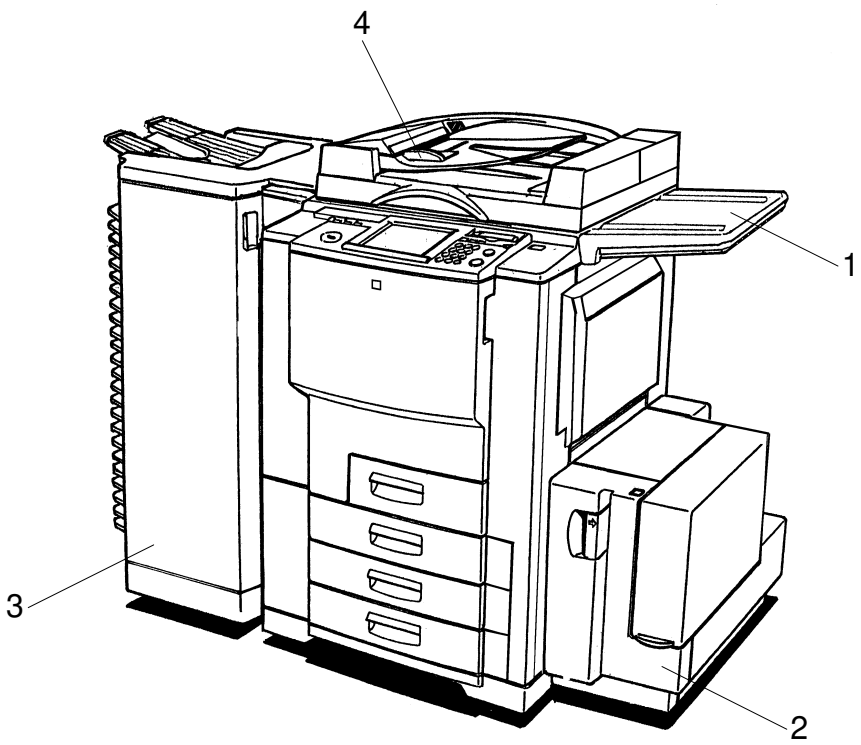


B023D811.WMF

SPECIFICATIONS

1. MAJOR UNITS

B023 Copier:



B023V001.PCX

1. Original Tray (A430)
2. LCT (A683) + LCT Adapter (A840-01)
3. 20 bin Sorter Stapler (A831)
4. ARDF (A663)

Other Options

- Platen Cover (A749-01)
- Controller Interface Type I (B371)
- Controller Interface Type J (B372)
- Edit Option (B370-01)

2. BASIC SPECIFICATIONS

Type:	Console type
Copy Process:	Dry electrostatic transfer system
Number of Scans:	1 (image memory for A3/DLT full color copy is installed)
Pre-scan:	Only when Auto Original Type mode is used
Resolution:	Copy mode (read/write): **600 dpi**/600 dpi Print mode (write): 600 dpi
Gradations:	256 gradations (8 bits)
Original Types:	Sheet, book, object
Maximum Original Size:	A3/11" x 17"
Original Reference Position:	Left rear corner
Maximum Print Size:	323 mm x 473 mm
Copy Paper Size:	First tray Maximum: A4 (S/L)/8 1/2" x 11" (S/L) Minimum: A5 (S)/ 8 1/2" x 5 1/2" (S) Other trays Maximum: A3/11" x 17" Minimum: A5 (S)/8 1/2" x 5 1/2" (S) By-pass Maximum: 13" x 19" (330 x 483 mm) Minimum: Postcard (100 x 148 mm) Auto/duplex Maximum: A3/11" x 17" Minimum: A5 (S)/8 1/2" x 5 1/2" (S)
Paper Thickness:	First tray (including duplex) 64 to 105 g/m^2, 17 to 28 lb **2nd and 3rd tray** **64 to 256 g/m^2, 17 to 68 lb** By-pass feed 64 to 256 g/m^2, 17 to 68 lb
Non-reproduction Area:	Leading edge: 4±2 mm Left and right: 2±2 mm (4 mm or less in total) Trailing edge: 2±2 mm

Copying Speed (cpm):

		Full color	C/M/ Y/K	B, G	R	K+M K+Y	K+C
Normal paper/ Normal mode	A4/8 1/2" x 11" or less	**13**	**51**	**17**	**13**	**17**	**13**
	A3/11" x 17"	**6.5**	**24**	**8.5**	**6.5**	**8.5**	**6.5**
Thick paper 1/OHP	A4/8 1/2" x 11" or less	**5.5**	**8.5**	**7**	**6**	**7**	**6**
	A3/11" x 17"	**2.5**	**4**	**3.5**	**3**	**3.5**	**3**
Thick paper 2	A4/8 1/2" x 11" or less	**4**	**5.5**	**5**	**4.5**	**5**	**4.5**
	A3/11" x 17"	**2**	**2.5**	**2.5**	**2**	**2.5**	**2**
ARDF 1 to 1	A4/8 1/2" x 11" or less	8	31	8	8	8	8
	A3/11" x 17"	5	15	5	5	5	4
Duplex feed	A4/8 1/2" x 11" or less	**12.6**	**45**	**16.5**	**12.6**	**16.5**	**12.6**
	A3/11" x 17"T	**6.3**	**22.5**	**8**	**6.3**	**8**	**6.3**

NOTE: Thick paper 1: 105 g/m^2 (28 lb) < Paper weight ≤ 157 g/m^2 (42 lb)
Thick paper 2: 157 g/m^2 (42 lb) < Paper weight ≤ 256 g/m^2 (68 lb)

Warm-up Time: 8 minutes and 30 seconds or less

First Copy Time (A4/8 1/2" x 11"): Normal paper:
Full Color: **14** seconds or less
K, C, M, Y: 8 seconds or less
B, G: **13** seconds or less
R: **14** seconds or less
Thick paper 1/OHP:
Full color: 29 seconds or less
Thick Paper 2:
Full color: 31 seconds or less

Paper Feed Capacity: Tray:
500 sheet paper tray: 3 trays
By-pass feed:
250 sheets (100 sheets for 256 g/m^2 paper)
Duplex tray:
50 sheets (30 sheets for A3/11" x 17")
20 sheets (42 color)

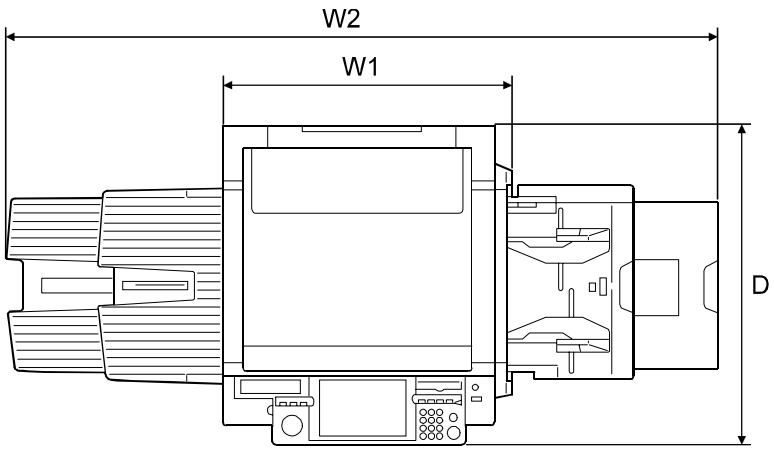
Paper Feed System: Tray:
FRR system (Stack height: 53 mm max.)
By-pass feed:
FRR system (Stack height: **32** mm max.)
Duplex tray:
Friction roller separation system

Reproduction Ratios:

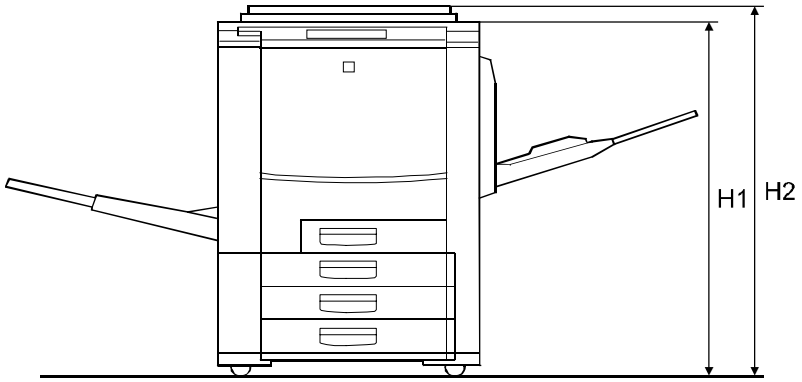
	8 1/2" x 11"LT/11" x 17"DLT version	**A4/A3 version**
Enlargement	121, 129, 155, 200, 400%	115, 122, 141, 200, 400%
Full size	100%	100%
Reduction	25, 50, 65, 73, 78, 85, 93%	25, 50, 65, 71, 75, 82, 93%
Programmable	2 user ratios	2 user ratios
Zoom	25% to 400% in 1% steps	25% to 400% in 1% steps

Number of Continuous Copies: 1 to 999 sheets
Scanning System: 3-line 1-chip CCD sensor (**600 dpi**)
Light Source: 1-halogen-lamp indirect lighting (frosted surface)
Print System: Twin laser beam, 600 dpi
Development System: 2-component magnetic brush
Drum Cleaning System: Counter blade
Image Transfer System: Belt transfer system
Paper Transfer System Roller transfer system
Fusing System: Heat and pressure roller system with oil application

Dimensions:

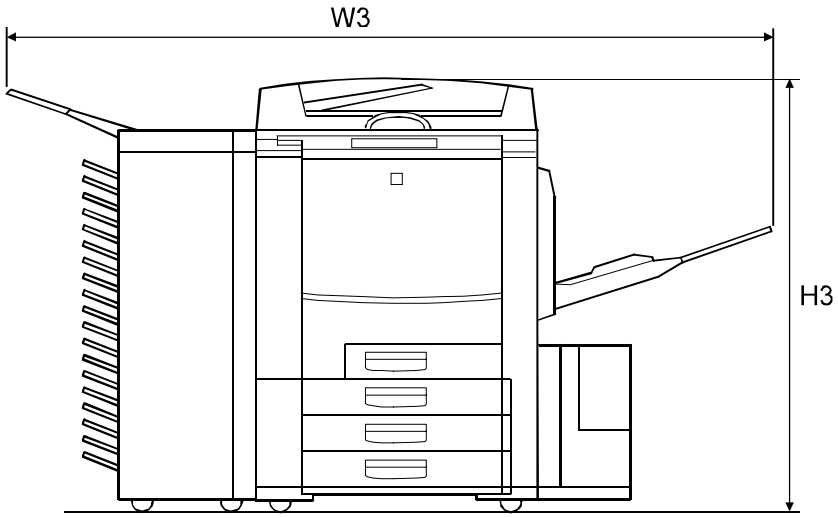


B023V155.WMF



B023V156.WMF

1. Copier
   750 mm (W1) x 780 mm (D) x 980 mm (H1)
2. Copier + Platen Cover + Paper Exit Tray + By-pass Tray
   1,653 mm (W2) x 780 mm (D) x 1,045 mm (H2)



B023V158.WMF

3. Copier + ARDF + LCT + Sorter Stapler + By-pass Tray
   1,960 mm (W3) x **880 mm** (D) x 1,110 mm (H3)

Weight:	**245 kg**
Power Source:	120 V, 60 Hz, 16 A (North America) 220 ~ 240 V, 50 Hz, 8 A (Europe, Mid-East) 220 ~ 240 V, 50/60 Hz, 8 A (Asia) 110 V, 60 Hz, 16 A (Taiwan)

3. PLATEN/ARDF ORIGINAL SIZE DETECTION

Size (width x length) [mm]	Platen		ARDF	
	Inch	Metric	Inch	Metric
A3 (297 x 420) L	No	Yes	No	Yes
B4 (257 x 364) L	No	Yes	No	Yes
A4 (210 x 297) L	No	Yes	Yes	Yes
A4 (297 x 210) S	No	Yes	Yes	Yes
B5 (182 x 257) L	No	Yes	No	Yes
B5 (257 x 182) S	No	Yes	No	Yes
A5 (148 x 210) L	No	Yes	No	Yes
A5 (210 x 148) S	No	Yes	No	Yes
B6 (128 x 182) L	No	No	No	Yes
B6 (182 x 128) S	No	No	No	Yes
11" x 17" (DLT)	Yes	No	Yes	Yes
11" x 15"	No	No	Yes	No
10" x 14"	Yes	No	Yes	Yes
8.5" x 14" (LG)	Yes	No	Yes	No
8.5" x 13" (F4)	Yes	Yes	Yes	Yes
8.25" x 13"	No	No	No	No
8" x 13"(F)	Yes	No	Yes	No
8.5" x 11" (LT)	Yes	No	Yes	Yes
11" x 8.5" (LT)	Yes	No	Yes	Yes
8" x 10.5"	No	No	No	No
8" x 10"	Yes	No	Yes	No
5.5" x 8.5" (HLT)	Yes	No	Yes	No
8.5" x 5.5" (HLT)	Yes	No	Yes	No
A6 (105 x 148) L	No	No	No	No

NOTE: In the above table “Inch” refers to versions of the machine that use non-metric traditional paper sizes and “Metric” refers to versions that use ISO standard paper sizes.

4. COPY PAPER SIZES

Size (width x length) [mm]	1st Tray	2nd/3rd Tray	Duplex Tray	By-pass Tray
A3 (297 x 420) L	No	Yes	Yes	Yes
B4 (257 x 364) L	No	Yes	Yes	Yes
A4 (210 x 297) L	Yes	Yes	Yes	Yes
A4 (297 x 210) S	Yes	Yes	Yes	Yes
B5 (182 x 257) L	Yes	Yes	Yes	Yes
B5 (257 x 182) S	Yes	Yes	Yes	Yes
A5 (148 x 210) L	No	No	No	Yes
A5 (210 x 148) S	Yes	Yes	Yes	Yes
B6 (128 x 182) L	No	No	No	Yes
B6 (182 x 128) S	No	No	No	Yes
13" x 19"	No	No	No	Yes
12" x 18"	No	No	No	Yes
11" x 17" (DLT)	No	Yes	Yes	Yes
11" x 15"	No	Yes	No	No
10" x 14"	No	Yes	Yes	No
8.5" x 14" (LG)	No	Yes	Yes	No
8.5" x 13" (F4)	No	Yes	Yes	No
8.25" x 13"	No	Yes	Yes	No
8" x 13"(F)	No	Yes	Yes	No
8.5" x 11" (LT)	Yes	Yes	Yes	Yes
11" x 8.5" (LT)	Yes	Yes	Yes	Yes
8" x 10.5"	No	Yes	Yes	No
8" x 10"	No	Yes	Yes	No
5.5" x 8.5" (HLT)	No	No	No	Yes
8.5" x 5.5" (HLT)	Yes	Yes	Yes	Yes
A6 (105 x 148) L	No	No	No	Yes

NOTE: The by-pass sizes shown above are those that the machine can automatically detect. When by-pass feeding other sizes, the user should select “Custom Size” and input the length and width. (Length limitations = 148 ~ 483 mm, Width limitations = 100 ~ 330 mm).

5. NOISE EMISSION

	Copier Only	Full System
Stand-by mode	**52** dB (A)	**54** dB (A)
Copy-mode average	**69.9** dB (A)	**72** dB (A)

6. POWER CONSUMPTION

1. Maximum power consumption
   1.75 kVA
2. Average power consumption

Sleep mode	See below
Stand-by mode	0.6 kW
Warm-up time	1.7 kW
Copying	1.5 kW

Sleep Mode:
Less than 0.01 kW (Anti-condensation heater off)
Less than 0.04 kW (Anti-condensation heater on)

B023 POINT TO POINT CIRCUIT DIAGRAM (1/2)

SYMBOL TABLE

———	AC Line
———	DC Line
- - - -	Pulse Signal
▷ ◁	Signal Direction
▲	Active High
▼	Active Low
[ ]	Voltage

I/O Control Board (PCB1)

Main Control Board (PCB4)

Main Control Board ↔ Controller I/F Board

CN305 Pin No.	Signal	CN102 Pin No.	CN305 Pin No.	Signal	CN102 Pin No.
A1	P3CLK	A12	B1	RXD8	B12
A2	/P3ST	A11	B2	GND	B11
A3	P3AD7	A10	B3	RXD7	B10
A4	P3AD5	A9	B4	GND	B9
A5	P3AD3	A8	B5	GND	B8
A6	P3AD1	A7	B6	/RESET	B7
A7	GND	A6	B7	P3AD0	B6
A8	/RTRG	A5	B8	P3AD2	B5
A9	WKUP	A4	B9	P3AD4	B4
A10	TXD7	A3	B10	P3AD6	B3
A11	GND	A2	B11	GND	B2
A12	TXD8	A1	B12	GND	B1

Main Control Board (CN311) ↔ Operation Panel Board (CN2)

Pin No.	Signal	Pin No.	Signal
A1	X–	B1	GND
A2	Y–	B2	GND
A3	X+	B3	GND
A4	Y–	B4	GND
A5	GND	B5	GND
A6	GND	B6	GND
A7	GND	B7	GND
A8	GND	B8	GND
A9	GND	B9	GND
A10	GND	B10	GND
A11	GND	B11	GND
A12	LD (4)	B12	GND
A13	LD (5)	B13	GND
A14	YD	B14	GND
A15	LD (6)	B15	GND
A16	LP	B16	GND
A17	LD (7)	B17	GND
A18	XCK	B18	GND
A19	LD (0)	B19	GND
A20	GND (CN2: N.C.)	B20	GND
A21	LD (1)	B21	GND
A22	LCD5V	B22	GND
A23	LCD5V	B23	GND
A24	LD (2)	B24	GND
A25	DISP (CN2: N.C.)	B25	GND
A26	LD (3)	B26	GND
A27	UD (3)	B27	GND
A28	UD (4)	B28	GND
A29	UD (2)	B29	GND
A30	UD (5)	B30	GND
A31	UD (1)	B31	GND
A32	UD (0)	B32	GND
A33	UD (6)	B33	GND
A34	UD (7)	B34	GND

I/F Board RDS/LCT (PCB3)

AC Drive Board (PCB16)

FUSE	NA	EU	USE
FU101	125V, 15A/ 250V, 15A		AC L Fusing Lamp
FU102	125V, 10A	250V, 6.3A	AC L PSU
FU103		250V	AC L PSU
FU301	125V, 5A	125V, 5A	AC L Anti-Condensation Heater

PSU (PCB2)

FUSE	NA	EU		USE	
FU1	125V	250V	6.3A	24V [MOT]	VAA3
FU2	125V	250V	FU2	24V [P.P]	VAA2
FU3	125V	250V	FU3	24V [PRN]	VAA1
FU4	125V	250V	FU4	24V [OPP]	VAA4
FU5	125V	250V	FU5	24V [SCN]	VAA5
FU6	125V	250V	FU6	38V [MOT]	VMM1
FU7	125V	250V	2A	17V [SCN]	VDD
FU81	125V	250V	3.15A	17V, 12V	VDD, VCA
FU71	250V	250V	2A	–12V [OP]	VCB
FU31	250V	250V	3.15A 2A (EU)	5V, 5VE	VCC1, VCC2

Scanner IPU Board (PCB11)

Scanner IPU Board (CN404) ↔ CCD (CN501)

CN404 Pin No.	Signal	CN501 Pin No.	CN404 Pin No.	Signal	CN501 Pin No.
30	CCD_1	1	15	12V	16
29	GND	2	14	12V	17
28	CCD_2	3	13	AGND	18
27	GND	4	12	AGND	19
26	CCD_1L	5	11	BO	20
25	GND	6	10	AGND	21
24	CCD_RB	7	9	BE	22
23	GND	8	8	AGND	23
22	CCD_CLB	9	7	GO	24
21	GND	10	6	AGND	25
20	CCD_TG	11	5	GE	26
19	5V	12	4	AGND	27
18	5V	13	3	RO	28
17	GND	14	2	AGND	29
16	GND	15	1	RE	30

Scanner IPU Board (CN408) ↔ LD Control (CN602) Board

CN408 Pin No.	Signal	CN602 Pin No.	CN408 Pin No.	Signal	CN602 Pin No.	CN408 Pin No.	Signal	CN602 Pin No.
A1	GND	A1	A11	XSDATA3	A11	A21	XSDATA12	A21
B1	GND	B1	B11	GND	B11	B21	GND	B21
A2	XSFGATE	A2	A12	XSDATA4	A12	A22	XSDATA13	A22
B2	GND	B2	B12	GND	B12	B22	GND	B22
A3	GSLSYNC	A3	A13	XSDATA5	A13	A23	XSDATA14	A23
B3	GND	B3	B13	GND	B13	B23	GND	B23
A4	SCLOCK	A4	A14	XSDATA6	A14	A24	XSDATA15	A24
B4	GND	B4	B14	GND	B14	B24	GND	B24
A5	GND	A5	A15	XSDATA7	A15	A25	GND	A25
B5	GND	B5	B15	GND	B15	B25	GND	B25
A6	XMFGATE	A6	A16	GND	A16			
B6	GND	B6	B16	GND	B16			
A7	XPMSYNC	A7	A17	XSDATA8	A17			
B7	GND	B7	B17	GND	B17			
A8	XSDATA0	A8	A18	XSDATA9	A18			
B8	GND	B8	B18	GND	B18			
A9	XSDATA1	A9	A19	XSDATA10	A19			
B9	GND	B9	B19	GND	B19			
A10	XSDATA2	A10	A20	XSDATA11	A20			
B10	GND	B10	B20	GND	B20			

LD Drive Board (PCB12)

LD Control Baord (PCB13)

LD Control Board (CN603) ↔ LD Drive Board (CN650)

CN603 Pin No.	Signal	CN1 Pin No.	CN603 Pin No.	Signal	CN1 Pin No.
1	GND	50	26	VCC	25
2	XVD20	49	27	VCC	24
3	XVD21	48	28	GND	23
4	XVD22	47	29	GND	22
5	XVD23	46	30	XVD10	21
6	XVD24	45	31	XVD11	20
7	XVD25	44	32	XVD12	19
8	XVD26	43	33	XVD13	18
9	XVD27	42	34	XVD14	17
10	CLK2	41	35	XVD15	16
11	GND	40	36	XVD16	15
12	LR2	39	37	XVD17	14
13	XLDERROR2	38	38	CLK1	13
14	GND	37	39	GND	12
15	XLDON2	36	40	LR1	11
16	GND	35	41	XLDERROR1	10
17	RESET2	34	42	GND	9
18	GND	33	43	XLDON1	8
19	VCONT2	32	44	GND	7
20	GND	31	45	RESET1	6
21	MODE2	30	46	GND	5
22	GND	29	47	VCONT1	4
23	VCC	28	48	GND	3
24	VCC	27	49	MODE1	2
25	VCC	26	50	GND	1

SYMBOL TABLE

- AC Line
- DC Line
- Pulse Signal
- Signal Direction
- Active High
- Active Low
- [ ] Voltage

High Voltage Supply Board T1/PCC/BR (PCB22)

High Voltage Supply Board C/G (PCB23)

High Voltage Supply Board B (PCB24)

CN857

CN849 CN852 CN848 CN829 CN831 CN843 CN833

S12 Toner End Sensor
S13 Toner Cartridge Set Sensor
S14 Revolver H.P. Sensor
S15 ID Sensor
S16 ITB Cleaning H.P. Sensor
L1 Quenching Lamp
M9 Wire Cleaner Motor
S17 Drum Potential Sensor
FM2 Charge Fan
FM1 ID Sensor Fan
MT6 Drum Motor
S18 Registration Sensor
T6 T7 By-pass Feed Unit Switch (SW8)
STM1 Registration Motor
T1 T2 Paper Exit Door Switch (SW7)
T1 T2 T3 T4 T5 T6 Front Door Switch (SW4) (SW6) (SW5)
S19 Humidity Sensor
CO2 Total Counter 2 (Bottom)
CO1 Total Counter 1 (Upper)
<Option> Key Counter
CO3
CN851 CN844 CN845 CN849 CN840 CN841 CN842 CN806
CL11 Paper Feed Drive Clutch
MT5 Paper Feed Motor
SW1 1st Tray Paper Set Switch
SW2 2nd Tray Paper Size Switch
SW3 3rd Tray Paper Size Switch
FM5 Charge Fan
S20 Toner Overflow Sensor
S21 Paper Exit Door Sensor
S22 Duplex Turn Guide Sensor
S23 1st Paper Hight Sensor
S24 2nd Paper Hight Sensor
S25 3rd Paper Hight Sensor
MT11 Fusing Transport Motor
CN831 CN825 CN823 CN835

CN216-1 VCC1 [5]
-2 Toner End [▼5]
-3 CGND
-4 VCC1 [5]
-5 Toner Cartridge Set [▲5]
-6 CGND
-7 VCC1 [5]
-8 CGND
-9 VCC1 [5]
-10 CGND
-11 Revolver H.P. [▲5]
-12 CGND
-13 ID Sensor LED
-14 ID Sensor 1
-15 ID Sensor 2
-16 CGND
-17 VCC1A [5]
CN219-B1 CGND
-B2 ITB Cleaning H.P. [▼5]
-B3 VCC1 [5]
CN219-A15 N.C.
-A14
-A13 VAA1 [24]
-A12 AGND
-A11 AGND
-A10 TRG [▼5]
-A9 LOCK [▼5]
-A8 CLK [▼5]
-A7 Gain [▼5]
-A6 VCC1 [5]
-A5 CGND
-A4 Registration S [▲5]
-A3 CGND
-A2 Registration S [▼5]
-A1 VCC1 [5]
CN223-8
-7
CN203-5 N.C.
-11 N.C.
-10 N.C.
-9 VMMIS2 [38]
-8 VMMIS1 [38]
CN824
CN203-4 VAA2S1 [24]
-10 VAA2S2 [24]
-9 VMM1 [38]
-8 VMM1S1 [38]
-7 VAA2 [24]
-6 Temperature S
-5 CGND
-4 Humidity S
-3 CGND
-2 VCC1A [5]
-1 CONT 2 [▼24]
CN210-1
-2
-3
-4
-5
-6
-7
-8
-9
-10
-11
-12
CN230-B10 CONT1 [▼24]
-B9 VAA1 [24]
-B8
-B7 KEYCONT [▼24]
-B6 VAA1 [24]
-B5 KEYCONTCK [▼5]
-B4 CGND
-B3 Paper Feed Drive CL [▼24]
-B2 VAA1 [24]
-B1
CN230-A10
-A9
-A8
-A7
-A6
-A5
-A4
-A3
-A2
-A1
CN206-1
-2
-3
-4
-5
-6
-7
-8
CN208-A1 VAA1 [24]
-A2 Sirocco Fan [▼24]
-A3 CGND
-A4 Toner Overflow S [▼5]
-A5 VCC1 [5]
-A6 Paper Exit door S [▼5]
-A7 CGND
-A8 Duplex Turn Guide S [▼5]
-A9 CGND
-A10 VCC1 [5]
-A11 1st Paper Hight [▲5]
-A12 CGND
-A13 VCC1 [5]
CN225-12
-13
-14
-29 CGND
-30 2nd Paper Hight [▲5]
-31 VCC1 [5]
-32 CGND
-33 3rd Paper Hight [▲5]
-34 VCC1 [5]
CN217-B13
-B12 N.C.
-B11 N.C.
-B10 VMMIS2 [38]
-B9 VMMIS1 [38]
-B8 MGND
-B7 MGND
-B6 VCC1 [5]
-B5 CGND
-B4 LOCK [▼5]
-B3 CLOCK [▼5]
-B2 TRG [▼5]
-B1 1/2 PP-MODE [▼5]
1/3 PP-MODE [▼5]

TGR BR [▼5]
LEAK PCC [▼5]
TRG PCC (DC) [▼5]
TRG PCC (AC) [▼5]
FB_TT
PWM_TT
AGND
AGND
VAA2S1 [24]
VAA2S1 [24]
N.C.
FB C
PWM C
FB G
PWM G
AGND
AGND
VAA2S1 [24]
VAA2S1 [24]
N.C.
FB B (DC)
PWM B (DC)
FB B (AC) [▼5]
TRG B (AC) [▼5]
AGND
VAA2S1 [24]

I/O Control Board (PCB17)

CN222-1
-2 VCC1 [5]
-3 2nd Feed S [▲5]
-4 CGND
-5 VCC1
-6 1st Feed S [▲5]
-7 CGND
-8 CGND
-9 By-pass Table Lower Limit S [▲5]
-10 VCC1 [5]
-11 CGND
-12 By-pass Table S [▼5]
-13 CGND
-14 By-pass Table Upper Limit S [▲5]
-15 VCC1 [5]
-16
VAA1 [24] Main By-pass Pick-up SOL [▼24]
-17
VAA1 [24] Sub By-pass Pick-up SOL[▼24]
-18
VAA1 [24]
-19 By-pas Feed CL [▼24]
-20
-21 By-pass Lift Down (–) [▲24]
-22 By-pass Lift Up (+) [▲24]
-23 SIZE-0 [▼5]
-24 SIZE-1 [▼5]
-25 SIZE-2 [▼5]
-26 SIZE-3 [▼5]
-27 CGND
-28 CGND
-29 By-pass Paper Length S [▲5]
-30 VCC1 [5]
-31 CGND
-32 By-pass Paper End [▲5]
-33 VCC1 [5]
-34 N.C.
-35 VAA1 [24]
-36 [▼24]

CN871 CN875 CN870 CN890 CN888 CN862 CN883 CN861 CN877 CN868

S26 2nd Paper Feed Sensor
S27 1st Paper Feed Sensor
S28 By-pass Table Lower Limit Sensor
S29 By-pass Table Sensor
S30 By-pass Table Upper Limit Sensor
SOL9 Main By-pass Pick-up Solenoid
MC5 By-pas Feed Clutch
M13 By-pass Table Lift Motor
PCB26 By-pass Paper Width Detection Board
PCB27 By-pass Paper Length Sensor
PCB28 By-pass Paper End Sensor

CN228-1
-2 VAA1 [24]
-3 VAA1S2 [24]
-4 CGND
-5 2nd Feed S [▲5]
-6 VCC1 [5]
-7 CGND
-8 3rd Feed S [▲5]
VCC1 [5]
CN830
T1 T2 Vertical Transport Door Switch
S31 2nd Paper Feed Sensor
S32 3rd Paper Feed Sensor

CN220-A1
-A2 VCC1 [5]
-A3 Belt Mark Detection [▲5]
-A4 CGND
-A5 ITB Pressure Release SOL: Reset [▼24]
-A6 ITB Pressure release SOL: Set [▼24]
VAA1 [24]
-A7 VAA1 [24]
-A8 PTR Shift CL [▼24]
VAA [24]
Viberation Motor [▼24]
-A9
-A10
CN815 CN824 CN857
S33 Belt Mark Detection Sensor
SOL13 ITB Pressure Release Solenoid
MC10 PTR Pressure Release Clutch

-B1 Speed Change [▼5]
-B2 TRG [▼5]
-B3 CLOCK
-B4 LOCK [▼5]
-B5 CGND
-B6 VCC1 [5]
-B7 MGND
-B8 MGND
-B9 VMM1S1 [38]
-B10 VMM1S1 [38]
M7 Drum Peripheral Component Motor

CN214-B1 VAA1 [24] Junction Gate SOL
-B2
-B3 [▲5] RM2A
-B4 [▲5] RM1A
-B5 RM XB
-B6 RM XA
-B7 RM B
-B8 RM A
-B9 AGND
-B10 [5] VCC1
-B11 [38] MVV1S1
CN203-3 MGND
CN222-1 FB T2
-A2 PWM T2
-A3 AGND
-A4 [24] VAA2S1
-A5 [▼5] LEAK D
-A6 [▼5] TRG D
-A7 AGND
-A8 [24] VAA2S1
-A9 [24] VAA1
-A10 [▼24] PTR Pressure M
-A11 [▼24] PTR Pressure S
-A12 [24] VAA1
-B1 [▼24] Transport Fan (F)
-B2 [24] VAA1
-B3 [▼24] Transport Fan (R)
-B4 [24] VAA1
-B5 [▼24] Transport Fan (Rear)
-B6 [24] VAA2S1
-B7 [24] VAA1
-B8 [▼24] PTR H.P.
-B9 [5] VCC1
-B10 [24] VAA1
-B11 [▲24] Paper Transfer Cam H.P.
-B12 [5] VCC1
CN215-A1 [24] VAA1
-A2 [▲24] ITB Cleaning Shift CL
-A3 [24] VAA1
-A4 [▲24] ITB Cleaning Drive CL
-A5 [24] VAA1
-A6 [▼24] Toner Supply CL
-A7 [24] VAA1
-A8 [▲24] Development CL
-A9 [24] VAA1
-A10 [▼24] Development Cooling Fan
-A11 N.C.
-B1 [24] VAA1
-B2 [▼24] Fusing Fan
-B3 [24] VAA1
-B4 [▼24] Fusing Fan Upper
-B5 [24] VAA1
-B6 [▲24] Fusing Fan Upper
-B7 [5] LEAK Q1
-B8 [24] VAA1
-B9 PWM Q1
-B10 [▼5] TRG Q1
-B11 AGND
N.C.
N.C.
CGND
[5] VCC1
-A9 XEF_V
-A8 XEF_XA
-A7 XEF_A
-A6 XEF_XB
-A5 XSF_B
-A4 XSF_XA
-A3 XSF_A
-A2 [▼5] XDUP_SET
-A1 DUP_CLK
-B1 XDUP_CW
-B2 XDUP_STT
-B3 XDUP_PDN
-B4 [▼5] DUP_SFHP
-B5 [▼5] DUP_EFHP
-B6 [▼5] DUP_PE
-B7 [▼5] XDUP_FD
-B8 [▼5] DUP_RVS
-B9 [24] VAA1
-B10 AGND
-B11
CN205-1
-2
CN812 CN859 CN808 CN860 CN861 CN881 CN882 CN862 CN864 CN865 CN813
CN482-9
CN482-7
-11
CN481-12
-10
-9
-8
-7
-6
-5
CN482-8
CN481-11
-2
CN482-3
-4
-3
CN480-1
-2
CN480-2
CN483-1
-2
-3
-4
-5
-6
CN888
CN484-1
-2
-3
-4
-5
-6
CN485-1
-2
-3
CN486-1
-2
-3
CN929
CN890 CN888 CN483 CN484 CN485 CN486 CN480

Duplex Control Board (PCB29)

[24] VAA1
-A
-XA
[24] VAA1
-B
-XB
[24] VAA1
-A
-XA
[24] VAA1
-B
-XB
[24] VAA1
-A
-XA
[24] VAA1
-B
-XB
GND
[▼5] DUP_SHP
[5] VCC1
CGND
[▼5] DUP_EHP
[5] VCC1
CGND
[▼5] DUP_PE
[5] VCC1
CGND
[▼5] XDUP_FD
[5] VCC1
CGND
[▼5] DUP_RVS
[5] VCC1

STM4 Duplex Feed Motor
STM5 Side Fence Jogger Motor
STM6 End Fence Jogger Motor
S36 Duplex Side Fence H.P. Sensor
S37 Duplex End Fence H.P. Sensor
S38 Duplex Paper End Sensor
S39 Duplex Entrance Sensor
S40 Duplex Turn Sensor

Revolver Motor Drive Board (PCB18)

CN722-1 -2 -3 -4 STM2 Revolver Motor
CN720-8 -7 -6 -5 -4 -3 -2 -1 CN721-1 -2 -3
SOL12 Junction Gate Solenoid
PCB19 High Voltage Supply Board T2
PCB20 High Voltage Supply Board D
M14 PTR Pressure Motor
F7 Transport Fan (Front)
FM6 Transport Fan (Rear)
S34 PTR H.P. Sensor
S35 Paper Transfer Cam H.P. Sensor
MC9 ITB Cleaning Shift Clutch
MC8 ITB Cleaning Drive Clutch
MC6 Toner Supply Clutch
MC7 Development Clutch
FM3 Development Cooling Fan (Front)
FM9 Fusing Fan (Bottom)
FM8 Fusing Fan (Upper)
PCB21 High Voltage Supply Board Q1

VCC2 (5VE) [5] -11
CGND -10
VCC1 [5] -9
VCC1 [5] -8
CGND -7
CGND -6
VCA [12] -5
CGND -4
CGND -3
VCB [–12] -2
VAA [24] -1
AGND
CN232-12 CN101-1 -2
I/O Control Board (PCB1)

Main Control Board (PCB4)
CN305 24P
CN102

LD Control Board (PCB13)
CN600 100P
CN103

E F <To PSU>

External Controller I/F Board

LD Contorl Board (CN600) ↔ I/F Board (CN103)

Pin No.	Signal	Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
A1	GND	A26	GND	B1	GND	B26	GND
A2	GND	A27	XPDATA6	B2	GND	B27	XSDATA4
A3	XPIFGATE	A28	GND	B3	XSDATA15	B28	GND
A4	GND	A29	XPDATA7	B4	GND	B29	XSDATA3
A5	XPILSYNC	A30	GND	B5	XSDATA14	B30	GND
A6	GND	A31	GND	B6	GND	B31	XSDATA2
A7	PICLOCK	A32	GND	B7	XSDATA13	B32	GND
A8	GND	A33	XPDATA8	B8	GND	B33	XSDATA1
A9	GND	A34	GND	B9	XSDATA12	B34	GND
A10	GND	A35	XPDATA9	B10	GND	B35	XSDATA0
A11	XOMFGATE	A36	GND	B11	XSDATA11	B36	GND
A12	GND	A37	XPDATA10	B12	GND	B37	XIPMSYNC
A13	XOPMSYNC	A38	GND	B13	XSDATA10	B38	GND
A14	GND	A39	XPDATA11	B14	GND	B39	XIMFGATE
A15	XPDATA0	A40	GND	B15	XSDATA9	B40	GND
A16	GND	A41	XPDATA12	B16	GND	B41	GND
A17	XPDATA1	A42	GND	B17	XSDATA8	B42	GND
A18	GND	A43	XPDATA13	B18	GND	B43	SOCLOCK
A19	XPDATA2	A44	GND	B19	GND	B44	GND
A20	GND	A45	XPDATA14	B20	GND	B45	XSOLSYNC
A21	XPDATA3	A46	GND	B21	XSDATA7	B46	GND
A22	GND	A47	XPDATA15	B22	GND	B47	XSOFGATE
A23	XPDATA4	A48	GND	B23	XSDATA6	B48	GND
A24	GND	A49	TCONT	B24	GND	B49	GND
A25	XPDATA5	A50	GND	B25	XSDATA5	B50	GND

CN105 50P
CN104 96P
CN Printer Contoller
Embedded Controller I/F Board

1st Paper End Sensor S41
1st Pick-up Solenoid SOL2
1st Upper Limit Sensor S42
1st Reverse Roller Solenoid SOL1
1st Feed Clutch MC1
1st Tray Lift Motor M1
CN855 CN811 CN861 CN812 CN863 CN813

CN224-1
-2 CGND
-3 [▲5] 1st Paper End S
-4 [5] VCC1
-5 [24] VAA1
-6 [▼24] 1st Pick-up SOL
-7 CGND
-8 CGND
-9 [▼5] 1st Upper Limt
-10 [5] VCC1
-11 [24] VAA1
-12 [▼24] 1st Reverse SOL
-13 [24] VAA1
-14 [▼24] 1st Feed CL
-15 [▲24] 1st Tray Lift (–)
-16 [▲24] 2nd Tray Lift (+)

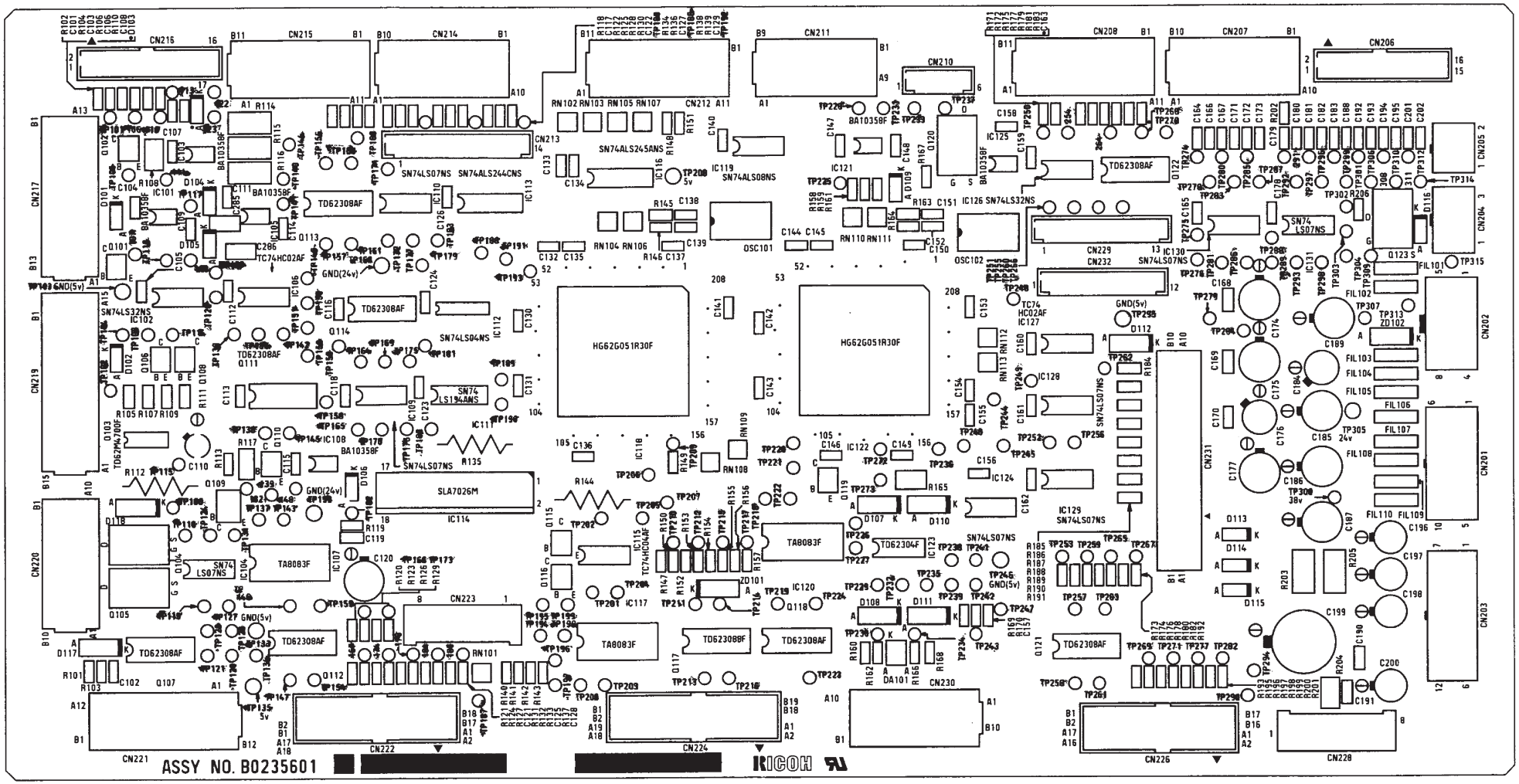
2nd Paper End Sensor S43
2nd Pick-up Solenoid SOL6
2nd Upper Limit Sensor S44
2nd Reverse Roller Solenoid SOL5
2nd Feed Clutch MC3
2nd Tray Lift Motor M3
CN855 CN817 CN861 CN818 CN819

CN224-20 CGND
-21
-22
-23
-24
-25
-26
-27
-28
-29
-30
CN224-16
-17
-18
-19
CN226-1
-2 CGND
-3 [▲5] 2nd Paper End S
-4 [5] VCC1
-5 [24] VAA1
-6 [▼24] 2nd Pick-up S
-7 CGND
-8 CGND
-9 [▼5] 2nd Upper Limit S
-10 [5] VCC1
-11 [24] VAA1
-12 [▼24] 2nd Reverse SOL
CN224-31
-32 [24] VAA1
[▼24] 2nd Feed CL
-33
-34 [▲24] 2nd Tray Lift (–)
[▲24] 2nd Tray Lift (+)

3rd Paper End Sensor S45
3rd Pick-up Solenoid SOL8
3rd Upper Limit Sensor S46
3rd Reverse Roller Solenoid SOL7
3rd Feed Clutch MC4
3rd Tray Lift Motor M4
CN855 CN820 CN861 CN821 CN822

CN226-18
-19 CGND
-20 [▲5] 3rd Paper End S
-21 [5] VCC1
-22 [24] VAA1
-23 [▼24] 3rd Pick-up SOL
-24 CGND
-25 CGND
-26 [▼5] 3rd Upper Limit S
-27 [5] VCC1
-28 [24] VAA1
CN224-35
-36 [▼24] 3rd Feed CL
-37
-38 [▲24] 3rd Tray Lift (–)
[▲24] 3rd Tray Lift (+)

B023 POINT TO POINT CIRCUIT DIAGRAM (2/2)


ASSY NO. B0235601
RICOH

ELECTRICAL COMPONENT LAYOUT (B023) 1/2

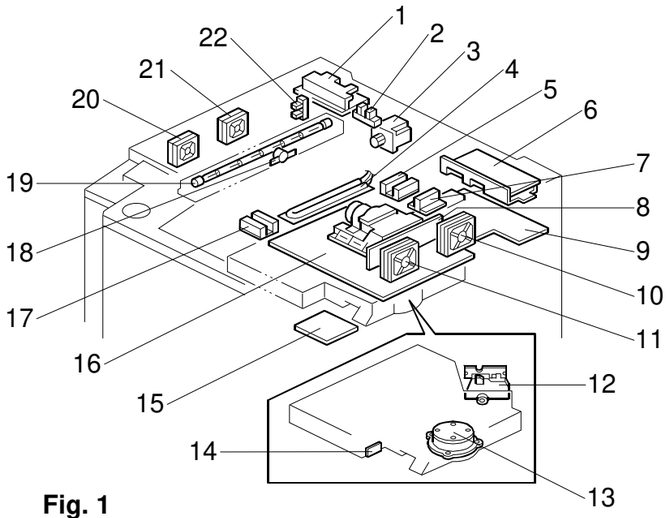


Fig. 1

B023V004.WMF

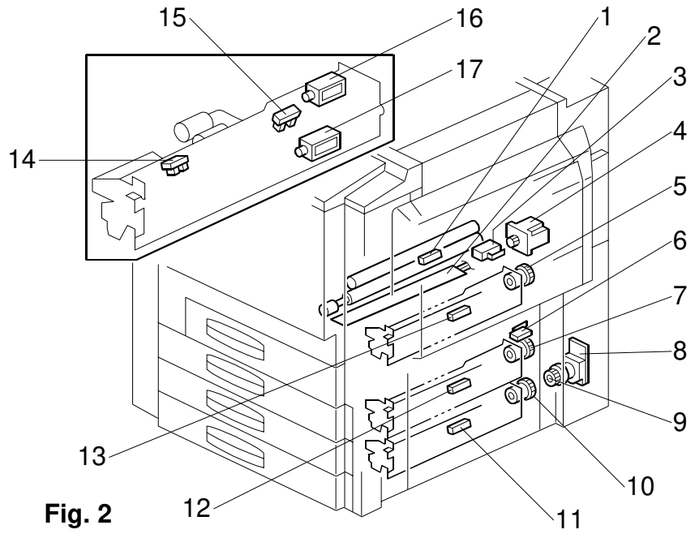


Fig. 2

B023V005.WMF

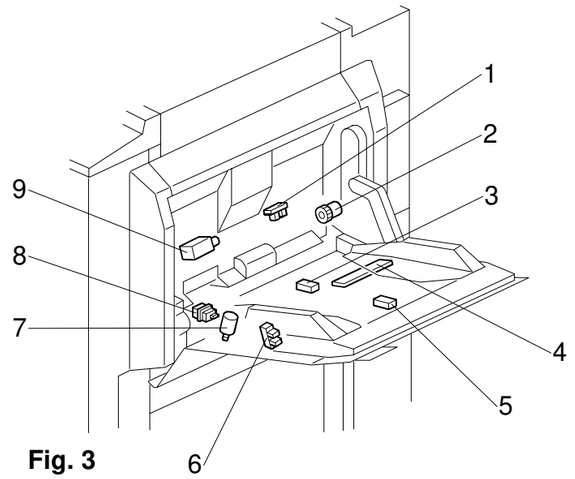


Fig. 3

B023V006.WMF

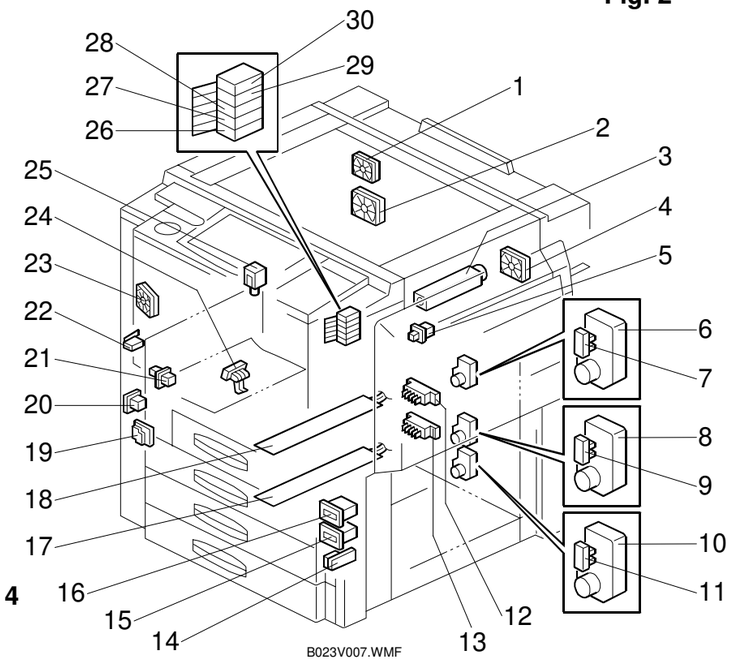


Fig. 4

B023V007.WMF

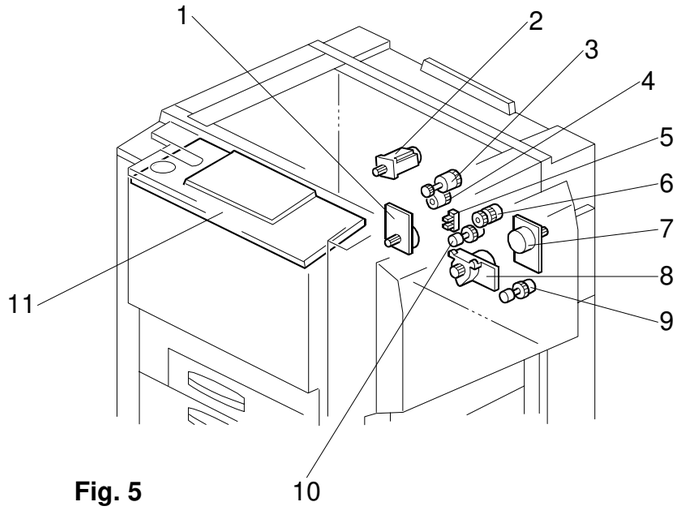


Fig. 5

B023V008.WMF

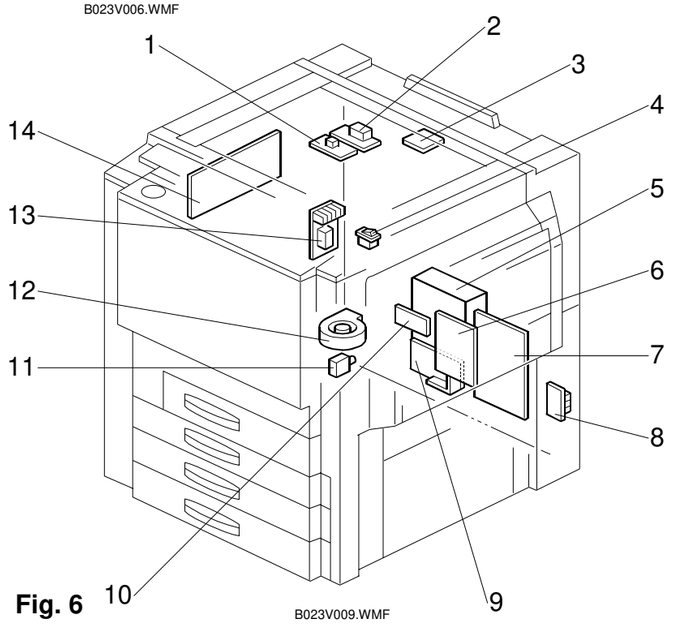


Fig. 6

B023V009.WMF

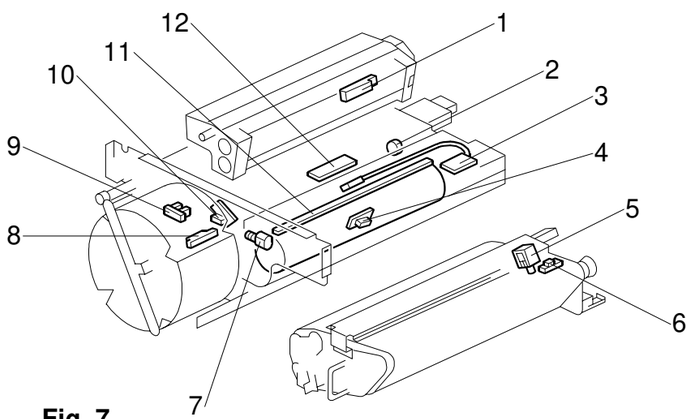


Fig. 7

B023V010.WMF

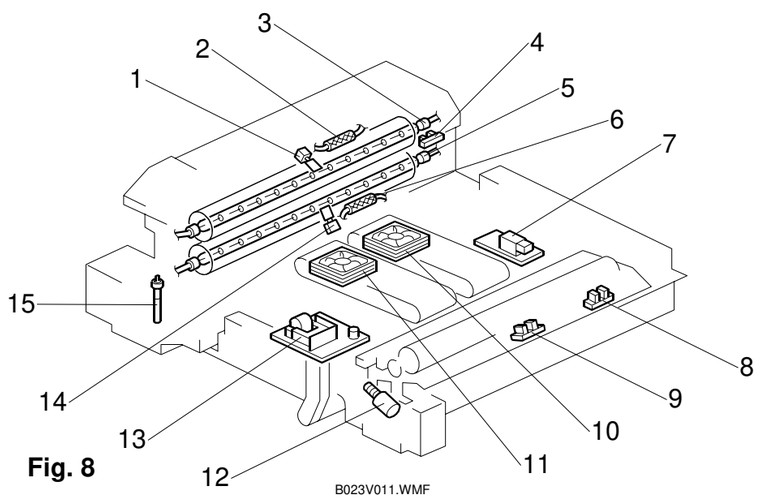


Fig. 8

B023V011.WMF

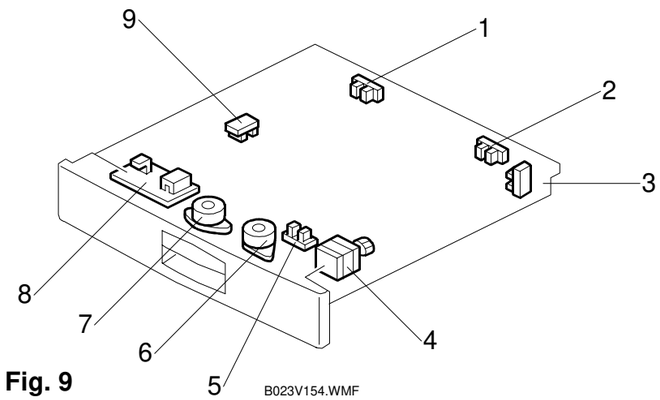


Fig. 9

B023V154.WMF

ELECTRICAL COMPONENT LAYOUT (B023) 2/2

Symbol	Name	P-to-P	Index No.
Sensors			
S1	Paper Eit	1-B1	8-4
S2	Oil End	1-B1	8-15
S3	Original Length 3,4	1-G5	1-5
S4	Platen Cover Position	1-G5	1-2
S5	Scanner H.P.	1-H5	1-22
S6	Original Width 1,2	1-G8	1-17
S7	Original Length 5	1-H8	1-7
S8	TD - Y	1-C10	7-1
S9	TD - K	1-C11	7-1
S10	TD - M	1-C11	7-1
S11	TD - C	1-C11	7-1
S12	Toner End	2-A2	7-8
S13	Toner Cartridge Set	2-A3	7-10
S14	Revolver H.P.	2-A3	7-9
S15	ID	2-A3	7-4
S16	ITB Cleaning H.P.	2-A3	5-5
S17	Drum Potential	2-A4	7-3
S18	Registration	2-A5	2-1
S19	Humidity	2-A7	4-14
S20	Toner Overflow	2-A9	4-19
S21	Paper Exit Door	2-A10	4-21
S22	Duplex Turn Gate	2-A10	4-24
S23	1st Paper Height	2-A10	4-7
S24	2nd Paper Height	2-A10	4-9
S25	3rd Paper Height	2-A10	4-11
S27	1st Paper Feed	2-D3	2-13
S8	By-pass Table Lower Limit	2-D3	3-6
S29	By-pass Table	2-D3	3-8
S30	By-pass Table Upper Limit	2-D3	3-1
S31	2nd Paper Feed	2-F3	2-12
S32	3rd Paper Feed	2-F3	2-11
S33	Belt Mark Detection	2-G3	7-6
S34	PTR H.P.	2-E5	8-8
S35	Paper Transfer Cam H.P.	2-E5	8-9
S36	Duplex Side Fence H.P.	2-E8	9-5
S37	Duplex End Fence H.P.	2-E8	9-9
S38	Duplex Paper End	2-E9	9-3
S39	Duplex Entrance	2-E9	9-1
S40	Duplex Turn	2-E9	9-2
S41	1st Paper End	2-D10	2-14
S42	1st Upper Limit	2-D10	2-15
S43	2nd Paper End	2-F10	2-14
S44	2nd Upper Limit	2-F10	2-15
S45	3rd Paper End	2-G10	2-14
S46	3rd Upper Limit	2-G10	2-15
Lamps			
L1	Quenching	2-A4	7-11
L2	Exposure	1-G4	1-19
L3	Hot Roller Fusing	1-C1	8-3
L4	Pressure Roller Fusing	1-D1	8-5
Thermistors			
1	Hot Roller	1-B1	8-1
2	Pressure Roller	1-C1	8-14

Symbol	Name	P-to-P	Index No.
Switches			
SW1	1st Tray Paper Set	2-A8	4-5
SW2	2nd Tray Paper Size	2-A8	4-12
SW3	3rd Tray Paper Size	2-A9	4-13
SW4	Front Door 4	2-A6	4-30
SW5	Front Door 5	2-A6	4-28
SW6	Front Door 6	2-A6	4-29
SW7	Paper Exit Door	2-A6	2-22
SW8	By-pass Feed Unit	2-A5	2-3
SW9	Front Door 2	1-H11	4-26
SW10	Front Door 3	1-H11	4-27
SW11	Vertical Transport Door	2-F3	2-6
SW12	Main	1-F1	4-20
SW13	Heater	1-E1	6-4
Motors			
M1	1st Tray Lift	2-E10	4-6
M2	2nd Tray Lift	2-G10	4-8
M3	3rd Tray Lift	2-H10	4-10
M4	Paper Feed	2-A8	2-8
M5	Drum	2-A5	5-7
M6	Drum Peripheral Component	2-H3	5-8
M7	Wire Cleaner	2-A4	7-7
M8	Fusing Transport	2-A11	5-1
M9	Polygon	1-H11	1-13
M10	By-pass Table Lift	2-E3	3-7
M11	PTR Pressure	2-E5	8-12
STM1	Registration	2-A6	2-4
STM2	Revolver	2-E4	5-2
STM3	Scanner	1-F4	1-3
STM4	Duplex Feed	2-E7	9-4
STM5	Side Fence Jogger	2-E8	9-6
STM6	End Fence Jogger	2-E8	9-7
FM1	ID Sensor Fan	2-A4	4-4
FM2	Charge Fan	2-A4	4-3
FM3	Development Cooling Fan (Front)	2-E6	4-23
FM5	Exhaust Fan	2-A9	6-12
FM6	Transport Fan (Rear)	2-E5	8-10
FM7	Transport Fan (Front)	2-E5	8-11
FM8	Fusing Fan (Upper)	2-E7	4-1
FM9	Fusing Fan (Bottom)	2-E6	4-2
FM12	Optics Exhaust Fan (Rear)	1-G8	1-10
FM13	Optics Exhaust Fan (Front)	1-G8	1-11
FM14	Optics Cooling Fan (Front)	1-H8	1-20
FM15	Optics Cooling Fan (Rear)	1-H8	1-21
Clutches			
MC1	1st Feed	2-D10	2-5
MC3	2nd Feed	2-G10	2-7
MC4	3rd Feed	2-H10	2-10
MC5	By-pass Feed Unit	2-E3	3-2
MC6	Toner Supply	2-E6	5-4
MC7	Development	2-E6	5-3
MC8	ITB Cleanig Drive	2-E6	5-6
MC9	ITB Cleaning Shaft	2-E6	5-10
MC10	PTR Pressure Release	2-G3	5-9
MC11	Paper Feed Drive	2-A7	2-9

Symbol	Name	P-to-P	Index No.
PCBs			
PCB1	I/O Control	2-C2, F4, 1-A7	6-7
PCB2	PSU	1-F3	6-5
PCB3	I/F (RDS/LCT)	1-C6	6-8
PCB4	Main Control	2-G4, 1-B8	6-14
PCB5	TD Sensor I/F 1	1-B9	6-3
PCB6	Slip Ring	1-B10	7-2
PCB7	TD Sensor I/F 2	1-B11	7-12
PCB8	Operation Panel	1-D10	5-11
PCB9	Scanner Motor Drive	1-F5	1-1
PCB10	Lamp Regurator	1-G5	1-6
PCB11	Scanner IPU	1-H7	1-16
PCB12	LD Drive	1-E10	1-12
PCB13	LD Control	1-E10, 2-G4	1-9
PCB14	Polygon Motor Drive	1-H11	1-15
PCB15	CCD	1-F8	1-8
PCB16	AC Drive	1-D3	6-9
PCB18	Revolver Motor Drive	2-E4	6-13
PCB19	High Voltage Supply - T2	2-E4	8-7
PCB20	High Voltage Supply - D	2-E4	8-13
PCB21	High Voltage Supply - Q1	2-E7	6-10
PCB22	High Voltage Supply - T1/PCC/BR	2-B1	6-6
PCB23	High Voltage Supply - CG	2-B2	6-2
PCB24	High Voltage Supply - B	2-B2	6-1
PCB25	Laser Syncronaizing Detector	1-H11	1-14
PCB26	By-pass Paper Width Detection	2-E3	3-4
PCB27	By-pass Paper Length	2-E3	3-5
PCB28	By-pass Paper End Sensor	2-F3	3-3
PCB29	Duplex Control	2-D8	9-8
Solenoids			
SOL1	1st Reverse Roller	2-D10	2-17
SOL2	1st Pick-up	2-D10	2-16
SOL3	2nd Reverse Roller	2-F10	2-17
SOL4	2nd Pick-up	2-F10	2-16
SOL5	3rd Reverse Roller	2-H10	2-17
SOL6	3rd Pick-up	2-G10	2-16
SOL7	By-pass Pick-up	2-E3	3-9
SOL8	Junction Gate	2-E3	4-25
SOL9	ITB Pressure Release	2-G3	7-5
Heaters			
H1	Paper Tray 1	1-D1	4-18
H2	Paper Tray 2	1-D1	4-17
H3	Paper Transfer	1-D1	2-2
H4	Optics Anti-condensation	1-E1	1-4
Counters			
CO1	Total 1	2-A7	4-16
CO2	Total 2	2-A7	4-15
CO3	Key (Option)	2-A7	-
Thermofuse			
TF1	Pressure Roller	1-C1	8-6
TF2	Hot Roller	1-C1	8-2
Others			
TS1	Thermostat	1-G4	1-18
CB	Circuit Breaker	1-F1	6-11