POMELO-P3 (G063)
SERVICE MANUAL

⚠IMPORTANT SAFETY NOTICES

PHYSICAL INJURY PREVENTION

1. Before disassembling or assembling parts of the printer and peripherals, make sure that the power cord is unplugged.
2. The wall outlet should be near the printer and easily accessible.
3. Note that some printer components are supplied with electrical voltage even if the main switch is turned off.
4. If an adjustment or operation check must be made requiring the removal or opening of the exterior covers while the main switch is on, keep hands away from electrified or mechanically driven components.
5. The printer drives some of its components when it completes the warm-up period. Keep hands away from mechanical and electrical components when the printer starts operation.
6. The interior and metal parts for the fusing unit become extremely hot while the printer is operating. Do NOT touch these components with bare hands.

HEALTH SAFETY CONDITIONS

1. Never operate the printer without ozone filters installed.
2. Always replace the ozone filters with the specified replacement at the specified maintenance intervals.
3. Toner is non-toxic, but if it gets in your eyes by accident, it may cause temporary eye discomfort. Remove it with eye drops or flush eyes with water. If this is unsuccessful, get medical attention immediately.

SAFETY AND ECOLOGICAL NOTES FOR DISPOSAL

1. Do NOT incinerate toner cartridges or used toner. Toner dust may ignite suddenly when exposed to an open flame.
2. Dispose of used toner and belt cartridge in accordance with local regulations. (These are non-toxic supplies.)
3. Dispose of replaced parts in accordance with local regulations.

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CONTROLLER

PERIPHERALS

DUPLEX

PFU

NIB

1. INSTALLATION

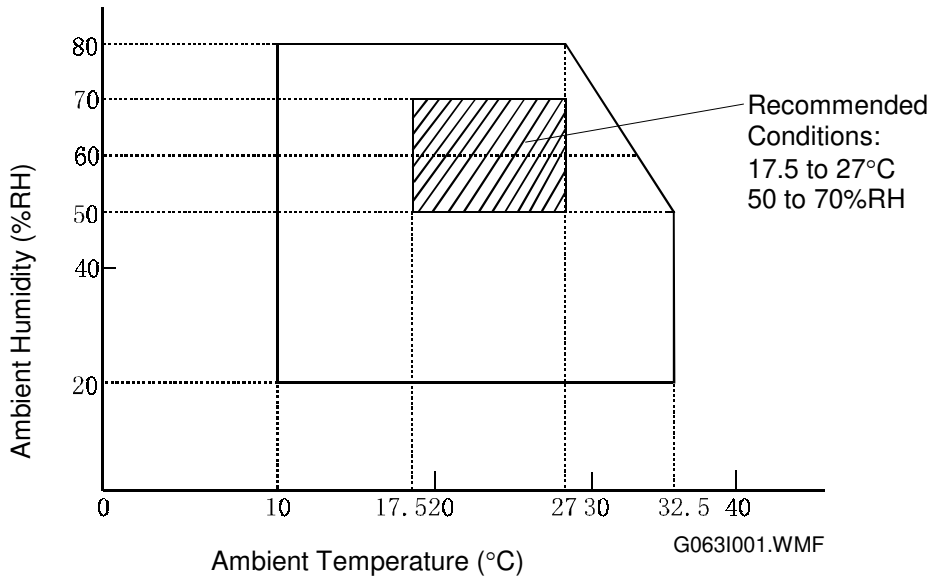
1.1 INSTALLATION ENVIRONMENT

If the printer is set up in an inappropriate location, it may not function as expected. Therefore, the following factors should be taken into consideration prior to deciding where to install the printer.

Do NOT place the printer in a place where it is:

- Likely to encounter direct sunlight or strong light. (For example, by a window.)
- Likely to encounter wide ranges of temperature and humidity. (Normal operation environment is within 10 ~ 32.5°C, 20 ~ 80%RH and without condensation.)
- Likely to encounter cold air from an air-conditioner, warm air from a heater, or direct radiant heat.
- Likely to encounter a lot of dust or exposure to corrosive gases such as ammonia.

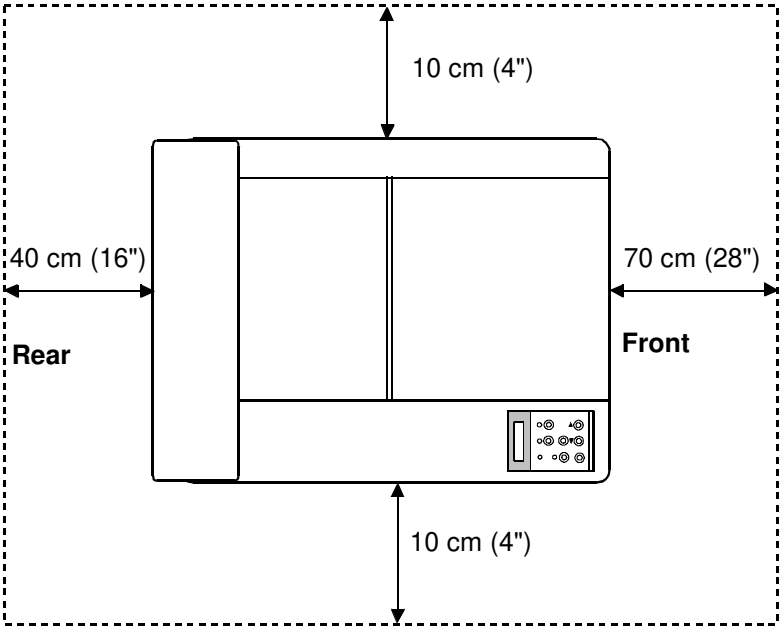
During Operation



Place the printer:

- Near good ventilation
- On a stable, strong, flat surface.
- With a maximum tilt of 1°.

Make sure to stand the printer on all of its legs. Otherwise, the frame will warp and belt home position errors will occur.



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1.2 INSTALLATION NOTES

- For installation procedures, see the Operating Instructions.
- When installing the toner cartridge, do not force it into the machine. Otherwise, the development roller may be pushed into contact with the OPC belt.
- Make sure that the correct brand name is selected (Refer to 5 - 3 Brand Setting in the controller manual). This ensures that the correct model name is displayed on the configuration page and on the LCD.

1.3 RELOCATION PROCEDURE

CAUTION: Observe the following precautions when relocating this unit:

1. This unit requires two or more persons to carry it, because it weighs about 36kg.
2. Keep the unit level during transportation (do not put pressure on any single part of the base).
3. Whenever possible, use the packing materials shipped with the unit.
4. Carry the unit AFTER removing the following supply parts:
   - Fusing Unit Oil Bottle
   - Toner Cartridge
   - Photoconductor Unit
   - Waste Toner Bottle
5. Be sure to protect the photoconductor unit surface with paper.
6. Be sure to remove the following items from various units:
   - Silicone oil from the fusing unit oil sump (with a syringe).
   - Paper from the cassette
   - Optional paper feed unit (remove from the machine)
7. Clean the interior of the unit before re-packing.
8. Secure the front, rear, and top covers with tape so that they do not open and cassettes can not fall out.

CAUTION: Since oil and toner will spill if they remain inside the unit if it is carried, be sure to remove those items and clean the unit before relocating it. If oil gets on the transfer belt, printouts may be faded.

2. PREVENTIVE MAINTENANCE

2.1 HANDLING PRECAUTIONS

Since a high quality laser printer is a precision instrument, daily checks and periodic maintenance are indispensable to maintain high performance.

The following is a list of important precautions for maintenance and periodic replacement of parts:

1. Refrain from any operation, disassembly, or modification that is not specified in this manual.
2. When assembling or disassembling the printer, turn the power supply off first and be sure to unplug the power supply cord before starting any work.
3. After replacing parts, make sure that the replaced parts are in place before starting the printer.
4. Carefully read all precautions and warning labels attached to any parts.
5. Unless otherwise specified, precisely follow the reverse order of the disassembly procedures for re-assembly. Be careful not to confuse the type and size of removed screws.
6. Do NOT use a solvent to clean any part of the printer.
7. It is strictly forbidden by law to dump or burn waste toner. Follow the appropriate laws for proper disposal of waste toner in your area.

2.2 MAINTENANCE BASICS

2.2.1 CLEANING

Clean the following whenever you visit the customer. Details follow in the 'Periodic Cleaning' section.

- Registration roller
- Transfer roller
- Paper discharger
- Belt cartridge, cleaning blade, charge corona wire
- Dust shield glass (optics unit)
- Inside the printer

2.2.2 REPLACEMENT

Replace the following parts at the stated interval. Details follow in a later section.

- Fusing unit (about 60 k prints, the exact interval depends on the average image ratio during the life of the part)
- Transfer roller (120 k prints)
- Paper discharger (120 k prints)
- Drum cleaner (120 k prints)
- Paper feed roller and separation pad (120 k prints)
- Transfer drum (300 k images – the same as 120 k prints if the ratio of monochrome printouts to color printouts is 1:1)

The following gives an outline of the maintenance procedure, and how to use both the controller and engine SP modes during maintenance.

⚠CAUTION

When turning off the unit to perform periodic maintenance, make sure that no data has been sent to the printer.

1. Enter controller SP mode and print a configuration page (user menu), maintenance page (S1), and a color chart (S2). The configuration page is required to restore the settings if they are altered during maintenance. Refer to the controller service manual for how to use controller SP modes.
2. Perform the periodic maintenance and cleaning procedures as instructed in the Periodic Maintenance – Periodic Cleaning section of this manual.
3. Examine the color chart to check the densities of the solid images and the grayscales in the images with gradations. If an anomaly is found, check the engine (see '4.Troubleshooting – 4.5 Imaging' in this manual).
4. If the "Change Fuser" and/or "Change 120K" message appears, replace the fusing unit and/or the parts in the 120k maintenance kit.
   Then, use either controller SP mode S3 (Maint. Clear) or engine SP mode 36 (Clear Care) to reset the counters for the fusing unit and 120k kit.
   For details on the replacement items and procedures, refer to '2. Preventive Maintenance – 2.4 Periodic Replacement' in this manual).

2.3 PERIODIC CLEANING

2.3.1 OVERVIEW

⚠WARNING

Before starting any cleaning, unplug the printer.

There is a risk of electric shock in working while the printer is energized.

Name of Part	Cleaning	Symptoms Prevented
Registration Roller	1. Open the transfer unit 2. Clean the roller and neighboring areas with a dry cloth.	Defective print quality Smeared paper
Transfer Roller	1. Open the transfer unit. 2. Clean the roller and neighboring areas with a dry cloth.	Defective print quality Smeared paper
Paper Discharger	1. Open the transfer unit. 2. Remove the paper discharge unit. 3. Clean the corona wire and case with a cotton bud or dry cloth.	Defective print quality Paper jam
Belt Cartridge	1. Remove the belt cartridge. 2. Clean off the toner around the belt cartridge and cleaning blade. 3. Clean the charge corona wire with a wire brush.	Defective print quality
Optical Unit Dust Shield Glass	1. Remove the toner cartridge. 2. Remove the belt cartridge. 3. Remove the dust shield glass. 4. Using a dry cloth or cotton bud, clean off any stains on the dust-proof glass.	Defective print quality
Printer Interior	1. Remove the toner and belt cartridges. 2. Clean the base of the printer with a vacuum cleaner and wipe it with a dry cloth.	Defective print quality

2.3.2 DAILY MAINTENANCE

There is no part in the standard or optional paper feed units that requires daily maintenance, such as cleaning etc.

2.3.3 PERIODIC MAINTENANCE

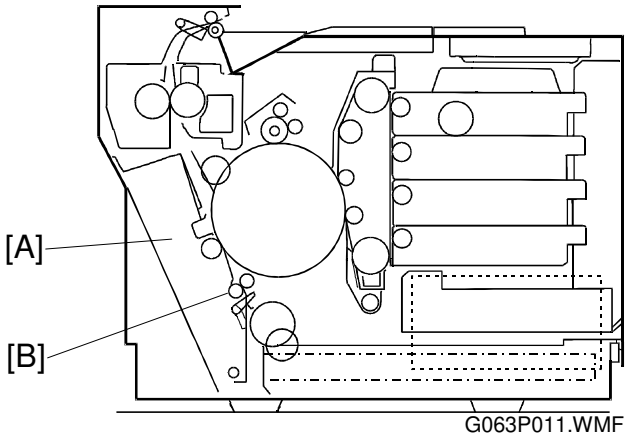
There is no part in the standard or optional paper feed units that requires periodic replacement. However, it is recommended for good paper feed performance to replace the following parts in accordance with the periodic replacement cycle based on the counter of the main engine.

Part Name	Part Code	Replacement Cycle
Paper Feed Roller	126142	Every 120k prints
Separator Pad (2) *	126528	

*: 'Separator Pad (2)' is a part name. The '2' does not indicate the quantity; there is only one separator pad in the main engine paper feed section. There is another pad, with the same name, in the optional paper feed unit.

2.3.4 PROCEDURES

(1) Registration Roller Cleaning



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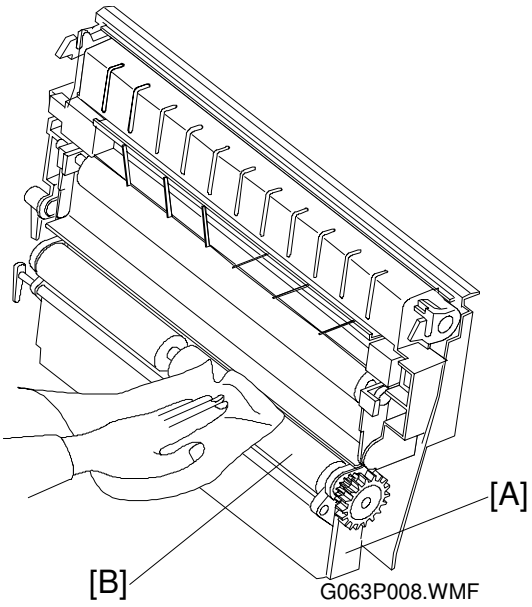

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Materials

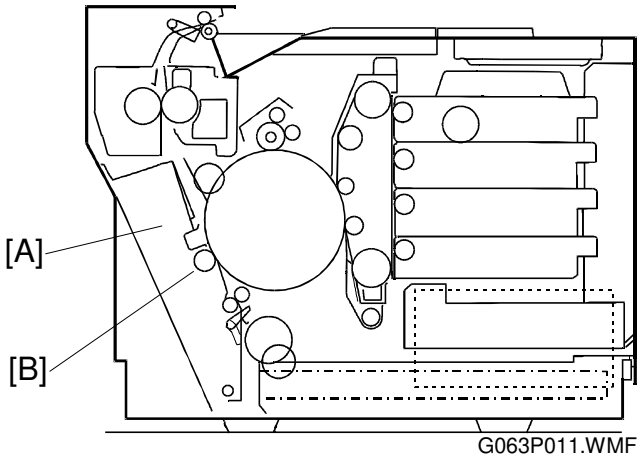
1. Dry cotton cloth (2 ~ 3 pieces)

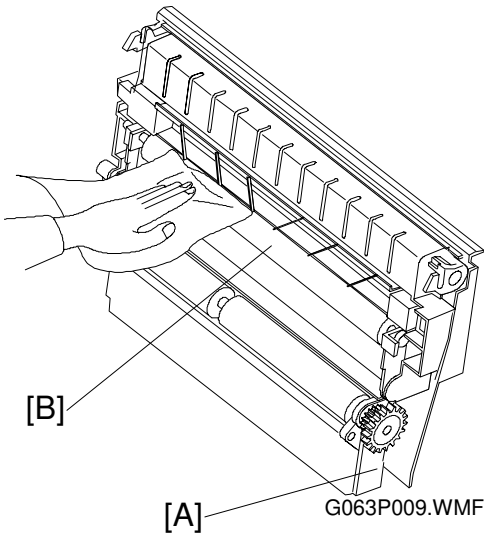
Cleaning Procedure

1. Turn off the power supply, and unplug the power cord.
2. Open the transfer unit [A].
3. Using the cotton cloth, clean the registration roller [B] in the transfer unit.

CAUTION: Do NOT use alcohol or a similar solvent to clean the registration roller.

(2) Transfer Roller Cleaning





Materials

1. Dry cotton cloth (2 ~ 3 pieces)

Cleaning Procedure

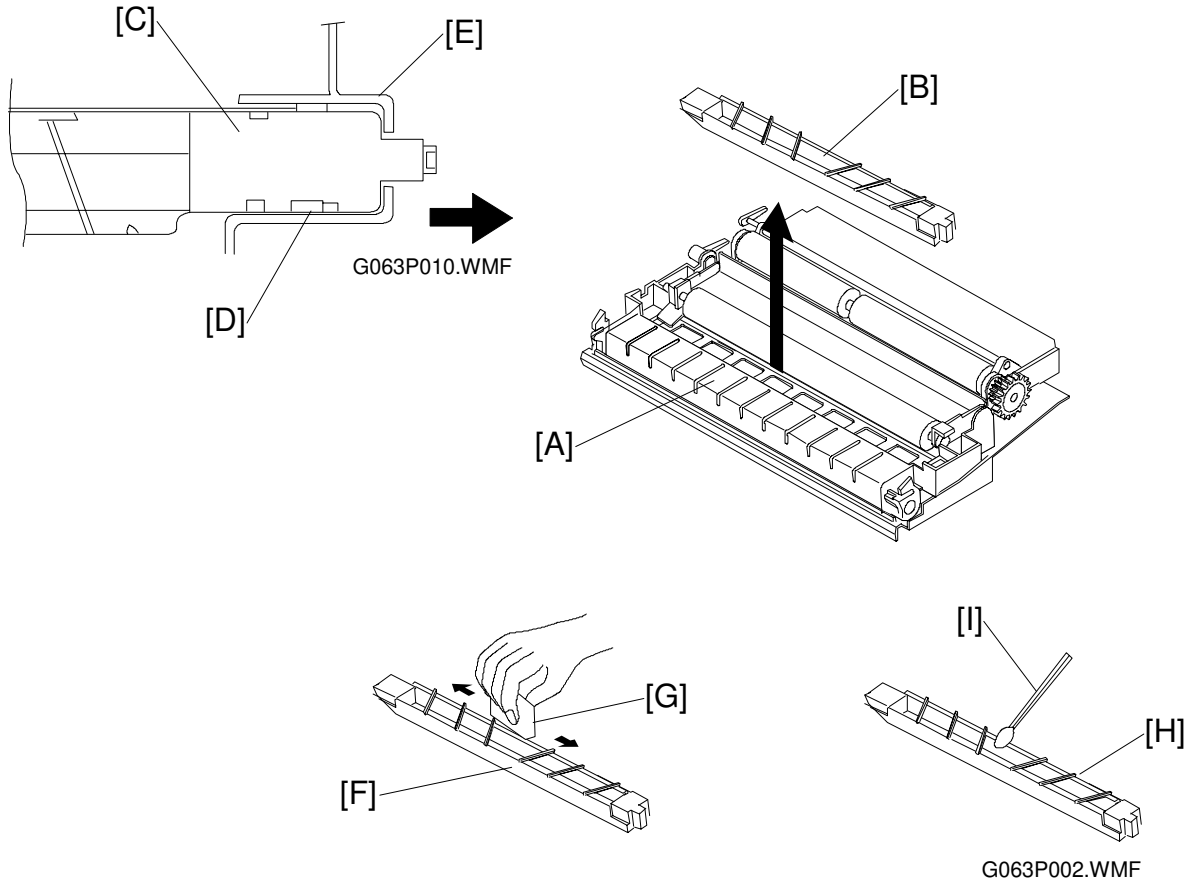
1. Turn off the power supply, and unplug the power cord.
2. Open the transfer unit [A].
3. Using a cotton cloth, clean the transfer roller [B].

CAUTION: Do not use alcohol or a similar solvent to clean the transfer roller.

(3) Paper Discharger Cleaning (AC Corona Unit)

Materials

1. Dry cotton cloth (2 to 3 pieces).
2. Cotton buds (2 to 3)



Cleaning Procedure

1. Turn off the power, and unplug the machine.
2. Open the transfer unit [A].
3. Remove the paper discharger unit [B].
   1) Slide the AC corona unit [C] in the direction of the arrow, and release it from the locking claw [D].
   2) Pull up the AC corona unit to remove it from the transfer unit holder [E].
4. Clean the case [F] with a cotton cloth [G].
5. Clean the corona wire [H] and inside the case with a cotton bud [I].

CAUTION: Do not break the corona wire when cleaning the paper discharger unit.

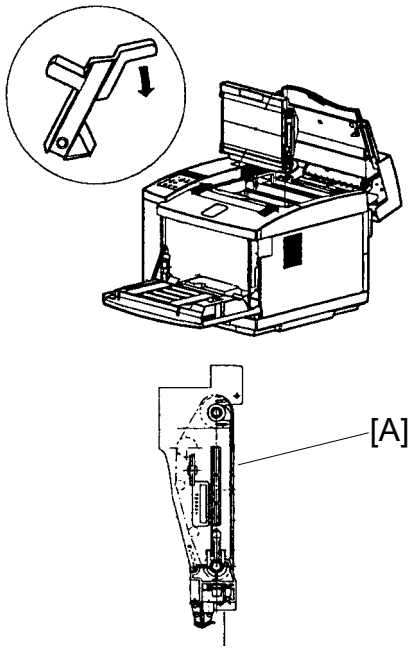
(4) Photoconductor Unit (Belt Cartridge) Cleaning

CAUTION: 1) Do NOT expose the OPC belt to more than 800 luxes of light (i.e., ordinary office light) for more than two minutes.
2) Do NOT touch the surface of the OPC belt.

NOTE: The photoconductor unit is sometimes referred to in the documentation as the 'belt cartridge'.

Materials

1. Clean cotton cloth (2 ~ 3 pieces)



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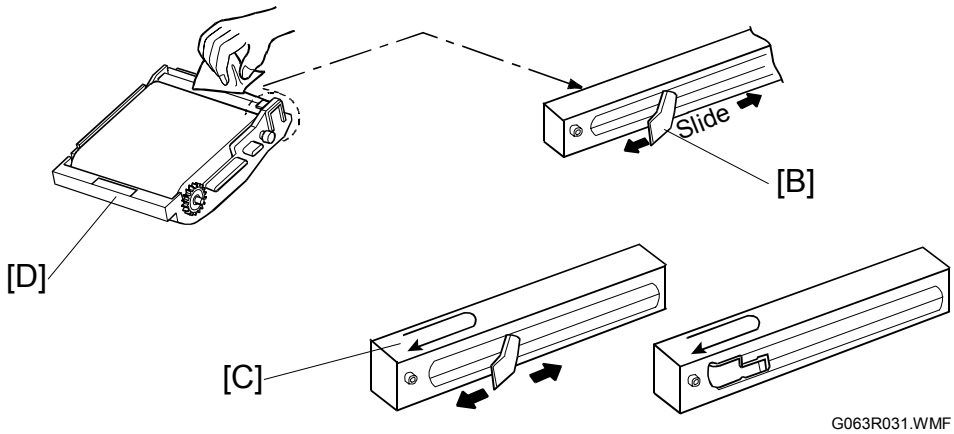

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Cleaning Procedure

1. Turn off the power supply switch.
2. Open the paper exit cover.
3. Open the front cover unit.
4. Release the lock mechanism for the belt cartridge.
5. Pull out the belt cartridge [A].
6. Clean the belt cartridge with a cotton cloth.
   1) Clean the rear of the belt cartridge.
   2) Holding the wire cleaner [B] attached to corona case, slide the wire cleaner to left and right for several times along the corona case [C]. After completing this operation, put the wire cleaner back to the original position.
   3) Clean the belt cartridge case [D].

CAUTION: Take care NOT to break the corona wire when cleaning it.

(5) Optics Unit Dust Shield Glass Cleaning

Materials

1. Dry cotton cloth (2 ~ 3 pieces)
2. Cotton buds (2 ~ 3)

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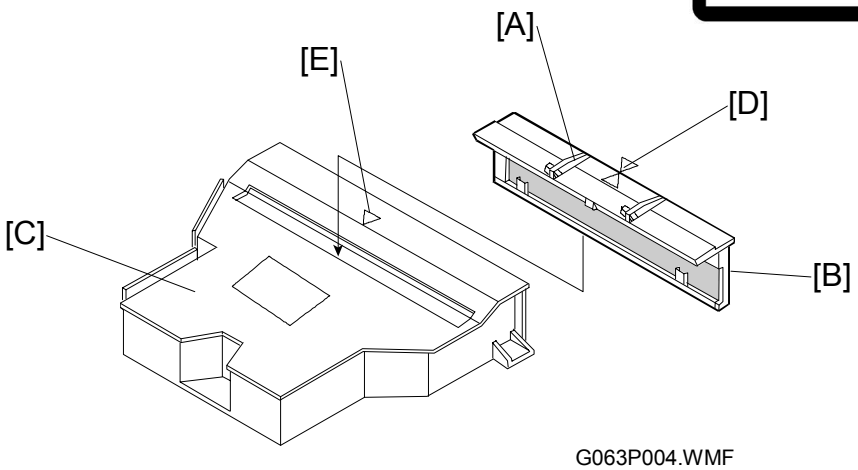

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Cleaning Procedure

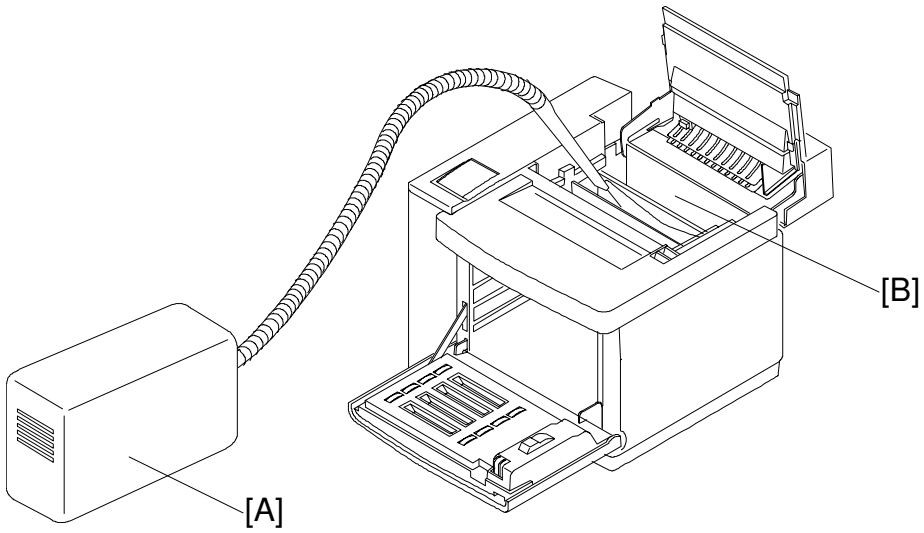
1. Turn off the power supply switch.
2. Open the paper exit cover.
3. Open the front cover unit.
4. Remove the toner cartridges.
5. Remove the belt cartridge.
6. Holding the knobs [A] on the glass frame [B], carefully remove it from the optical unit [C].
7. Clean the surface of the glass with a cotton bud or cloth.

Reinstallation

NOTE: Align the triangle mark on the glass [D] with the similar mark [E] on the optical unit, then push the dust shield glass in until it is firmly locked.

CAUTION: Do NOT use alcohol or a similar solvent to clean the glass, or print quality will deteriorate.

(6) Printer Interior Cleaning



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Materials

1. Compact vacuum cleaner, specially designed for vacuuming toner [A]
2. Dry cotton cloth (2 to 3 pieces)

Cleaning Procedure

1. Open the paper exit cover.
2. Open the front cover.
3. Remove the toner cartridge.
4. Remove the belt cartridge.
5. Vacuum toner scattered on the bottom of the printer interior [B]
6. Clean the printer interior with a cotton cloth.
7. Put back the removed units.

2.4 PERIODIC REPLACEMENT

2.4.1 OVERVIEW

Component	Cycle
Fusing Unit	60k prints ***1**
Transfer Roller	120k prints
Paper Discharge Unit	120k prints
Drum Cleaner	120k prints
Paper Feed Roller/Separation Pad	120k prints
Transfer Drum	300k images. ***2**

*1: The machine calculates the fusing unit replacement cycle from the image ratio. The greater the image ratio, the shorter the cycle.
Example: If the image ratio is 5% for each color, the total image ratio is 20% for all four colours. The machine will ask the user to replace the fusing unit after 50k copies (this value is 60k if the image ratio is less than 12.5%). See section 5.5.3 for details on how the machine changes the replacement cycle depending on image ratio.

*2: The image count is 1 for one monochrome print and 4 for a full color print. If the user makes monochrome and full color prints at a ratio of 1:1 on average, the image count per sheet (averaged out) is 2.5. In this condition, 300 k images is the same as 120 k prints.

After replacing a part, reset the maintenance counters as explained in each procedure.

Fusing Unit Replacement

(1) Replacement Criteria

Replace when this error message appears on the operation panel LCD.

IPDL-C Change Fuser

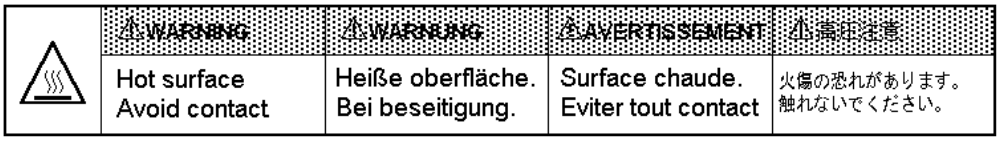
(2) Purpose of Replacement

To prevent print quality decline caused by fusing unit roller wear.

(3) Precaution

⚠WARNING

The fusing unit and surrounding parts are very hot. Make sure, prior to starting replacement, that the fusing unit and surrounding parts are cool, otherwise, you may get burned.



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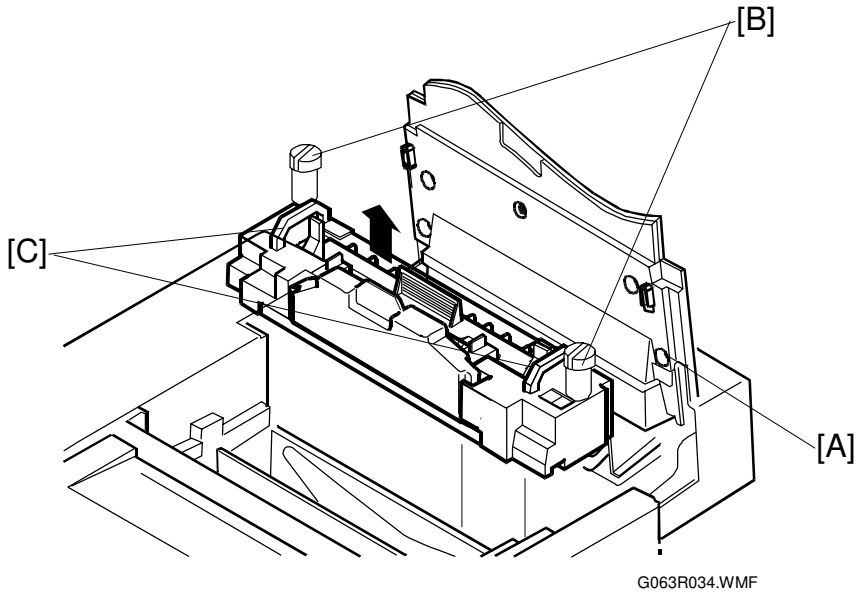
(4) Necessary tools and replacement materials

1. Two or three pieces of cotton cloth.
2. New fusing unit

(5) Procedure

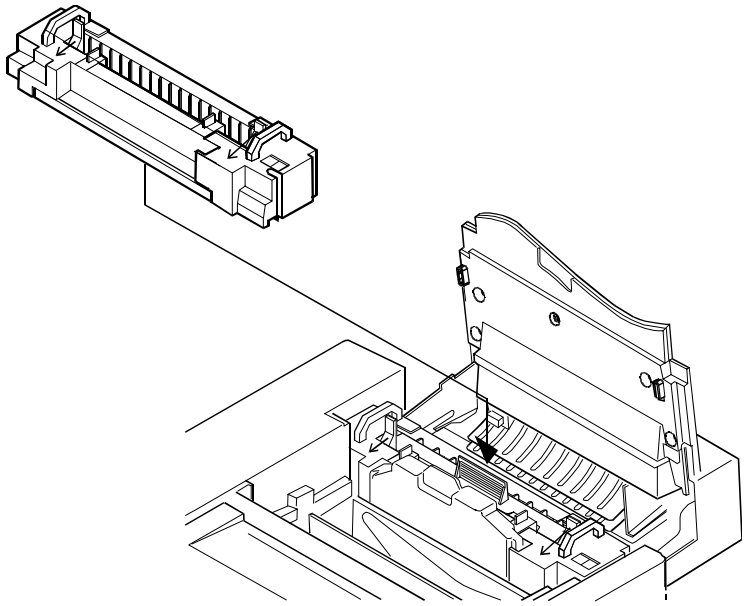
- Disassembly -



1. After turning the power off, unplug the machine.
2. Open the paper exit unit [A].
3. Loosen the screws.
   1) Place a sheet of paper over the transfer drum surface to protect it.
   2) Loosen the screws [B] at both left and right sides.
4. Holding the handles [C] at both sides of the fusing unit, remove the fusing unit.

⚠CAUTION
When removing the fusing unit, keep it level so that oil does not leak.

NOTE: Before installing a new fusing unit, restore the tension-release levers (left and right side) in the arrow direction.



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Transfer Roller Replacement

(1) Replacement Criteria

When it is time to replace the transfer roller, an error message appears on the operation panel LCD.

IPDL-C Change 120K

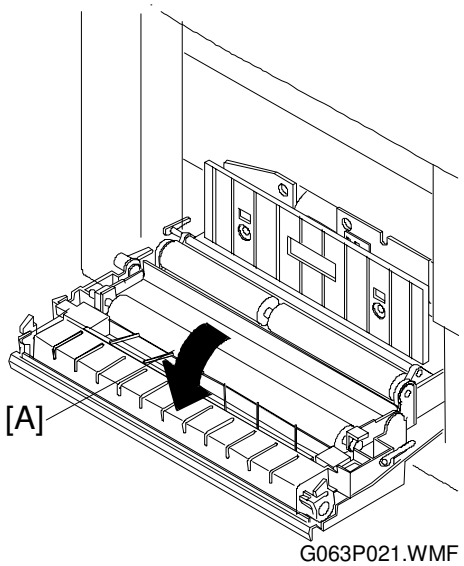
(2) Replacement Purpose

Prevents transfer efficiency from declining due to transfer roller wear.

(3) Necessary tools and replacement materials

1. Two or three pieces of cotton cloth for cleaning.
2. New transfer roller

(4) Procedure



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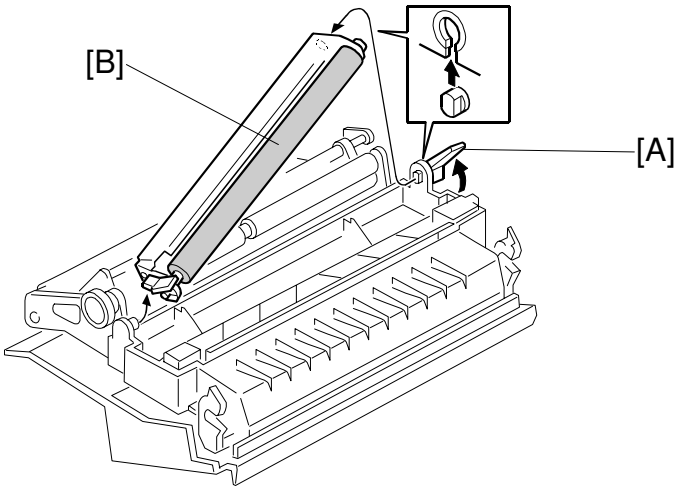
- Disassembly -

1. After turning the power off, unplug the machine.
2. Open the lower rear cover [A].

- Replacement -



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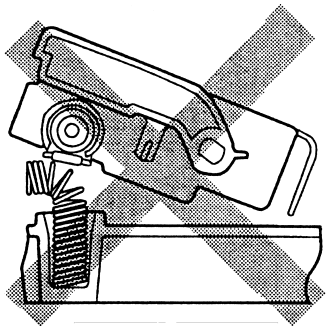
1. Release the lock lever [A] for the transfer roller [B] by turning it in the arrow direction.
   NOTE: The roller can only be removed when the lever is about 70 ° from the horizontal.
2. Remove the transfer roller.
   1) After lifting up the right end of the transfer roller, slide it to the right.
3. Put the new transfer roller into the printer.
   1) Fit the projecting shaft into the hole at the left end.
   2) Fit the lock lever shaft into the recessed hole at the right end.
   NOTE: Be sure that the spring is upright (see below).



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4. Lock the transfer roller down by turning the lock lever in the opposite direction to the arrow.

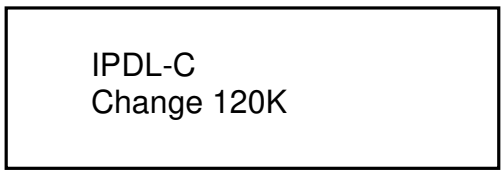
- Assembly -

1. Close the lower rear cover.
2. Plug in the printer.
3. Turn the power on.
4. After the machine completes the warm-up process, clear the maintenance counter for 120k maintenance using controller SP mode S3 (Maintenance Clear) or engine SP mode 36 (Clear Care).

Paper Discharger Replacement

(1) Replacement Criteria

When it is time to replace the paper discharger, an error message appears on the operation panel LCD.



(2) Replacement Purpose

Prevents paper discharger efficiency from declining.

(3) Precaution

CAUTION: Do NOT touch the corona wire in the paper discharger unit.

(4) Necessary tools and replacement materials

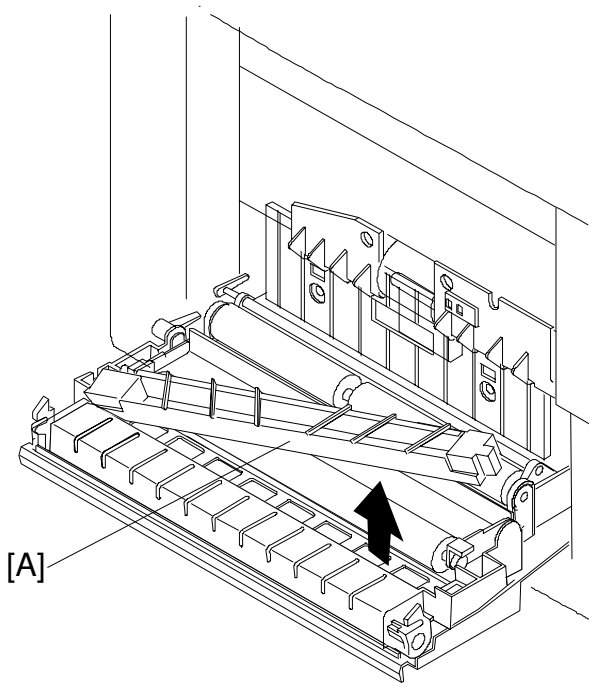
1. Two or three pieces of cotton cloth.
2. New paper discharger unit

(5) Procedure

- Disassembly -

1. After turning the power off, unplug the machine.
2. Open the lower rear cover.

- Replacement -



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1. Remove the paper discharger from the transfer unit [A].
2. Clean the area where the new paper discharger will be mounted.
3. Install the new unit in the transfer unit.

- Assembly -

1. Close the lower rear cover.
2. Plug in the printer.
3. Turn the power on.
4. After the machine completes the warm-up process, clear the maintenance counter for 120k maintenance using controller SP mode S3 (Maintenance Clear) or engine SP mode 36 (Clear Care).

Drum Cleaning Unit Replacement

(1) Replacement Criteria

When it is time to replace the drum cleaning unit, an error message appears on the operation panel LCD.

IPDL-C Change 120K

(2) Replacement Purpose

Prevents loss of drum cleaning efficiency.

(3) Precaution

CAUTION: When installing the drum cleaning unit, first connect the shaft and the bias terminal (see the diagram on the next page). Check this connection after installation.

(4) Necessary tools and replacement materials

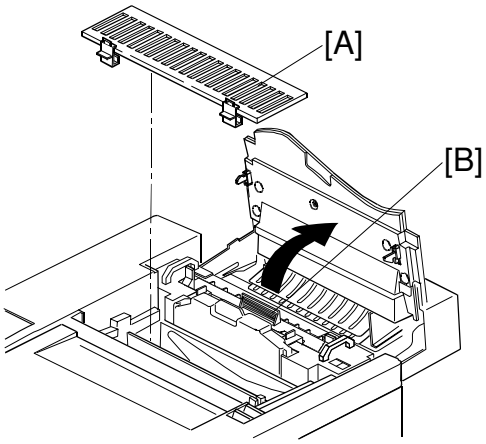
1. Two or three pieces of cotton cloth.
2. New drum cleaning unit

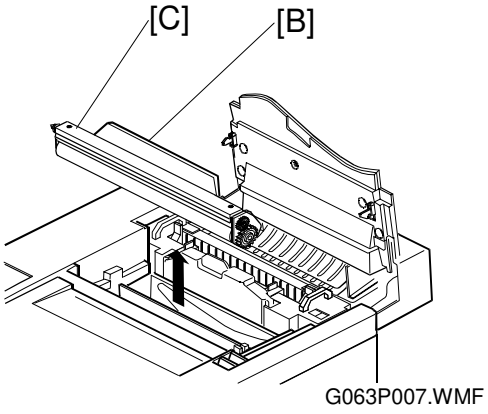
(5) Procedure

- Disassembly -

1. Turn the power off.
2. Open the paper exit cover.

- Replacement -





1. Remove the drum cleaning unit cover [A].
2. Holding the handle [B] on top of the drum cleaning unit [C], remove the drum cleaning unit.
   1) Turn the handle [B] in the center in the direction of the arrow to disconnect the drum cleaning unit shaft from the bearing.
3. Clean the area where the new unit will be mounted.
4. Put the new drum cleaning unit into the printer.

- Assembly -

1. Install the drum cleaning unit cover.
2. Close the paper exit cover.
3. Turn the power on.
4. After the machine completes the warm-up process, clear the maintenance counter for 120k maintenance using controller SP mode S3 (Maintenance Clear) or engine SP mode 36 (Clear Care).

Paper Feed Roller and Separation Pad Check

(1) Replacement Criteria

Replace these when an error message is displayed on the LCD or when paper feed jams occur.

IPDL-C Change 120K

(2) Replacement Procedure

1. Whenever a paper feed jam occurs, determine the cause of the error. See "Troubleshooting - Paper Transportation Error".
2. If the jam is caused by a defective paper feed roller or separation pad, replace the defective part as explained in the Replacement Procedures section.

CAUTION: 1) This cannot be done by the customer. These items should be replaced on customer request or during periodic maintenance.
2) After the replacement, check to make sure that the different types of media such as plain paper, OHP, and thick paper, move through the printer correctly.

Transfer Drum Replacement

(1) Replacement Criteria

Replace this when the error message appears on the LCD or when print quality is poor because of a defective transfer drum.

IPDL-C Change 120K

(2) Replacement Procedures

1. Whenever defective print quality occurs, check the cause in accordance with the "4. Troubleshooting - Imaging Failure" section.
2. If the transfer drum caused the failure, replace it as described in the Replacement Procedures section.

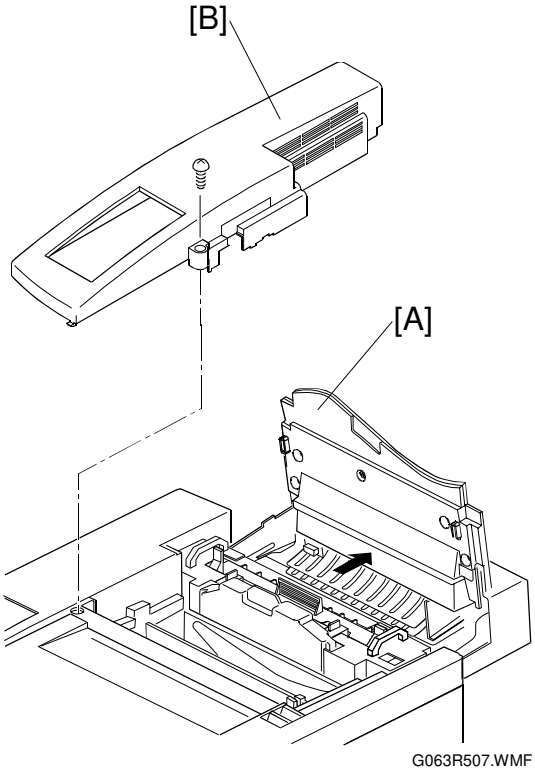
CAUTION: 1) This cannot be done by the customer. Replace this part on customer demand or during periodic maintenance.
2) After replacement, make a test print to check whether the print quality has improved.

3. REPLACEMENT AND ADJUSTMENT

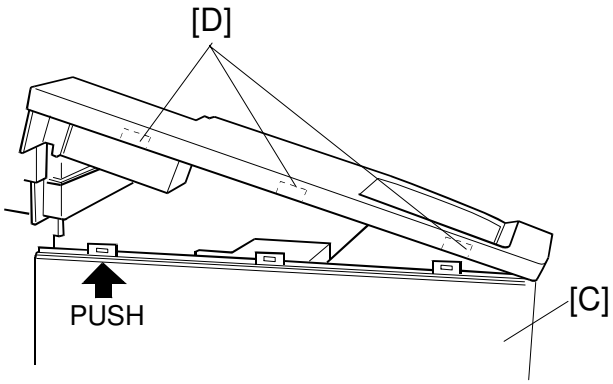
3.1 COVERS

3.1.1 LEFT UPPER SIDE COVER

Open the paper exit cover [A].
[B]: Left Upper Side Cover (x1)
NOTE: Pressing the exterior of the left side cover [C], unlock three hooks [D] on the left upper side cover.



G063R507.WMF



G063R508.WMF

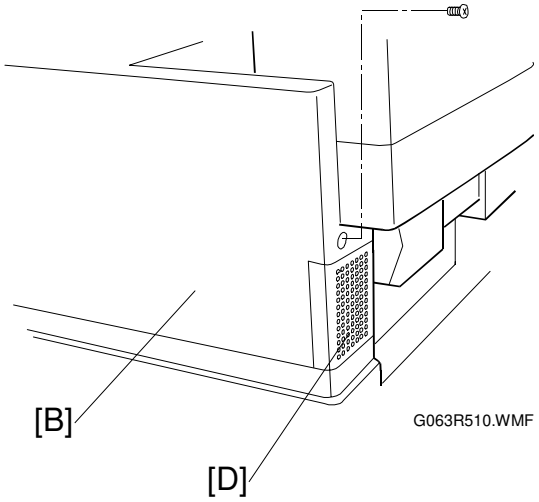
3.1.2 RIGHT SIDE COVER AND OZONE FILTER COVER

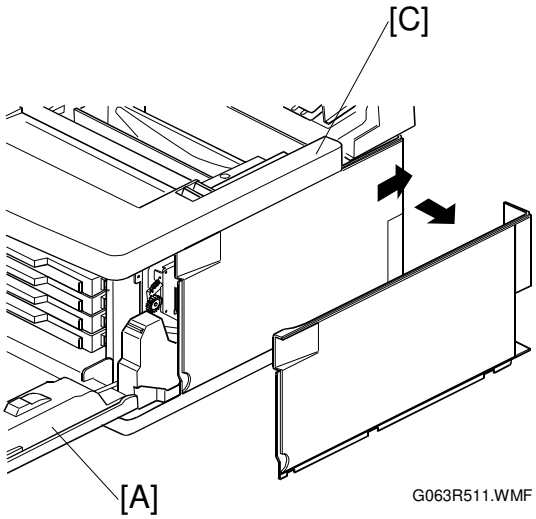
Open the front cover [A].

[A]: Right Side Cover (x1)

NOTE: While slightly lifting the rear right part of the top cover [C], slide the side cover in the arrow direction.

[D]: Ozone Filter Cover



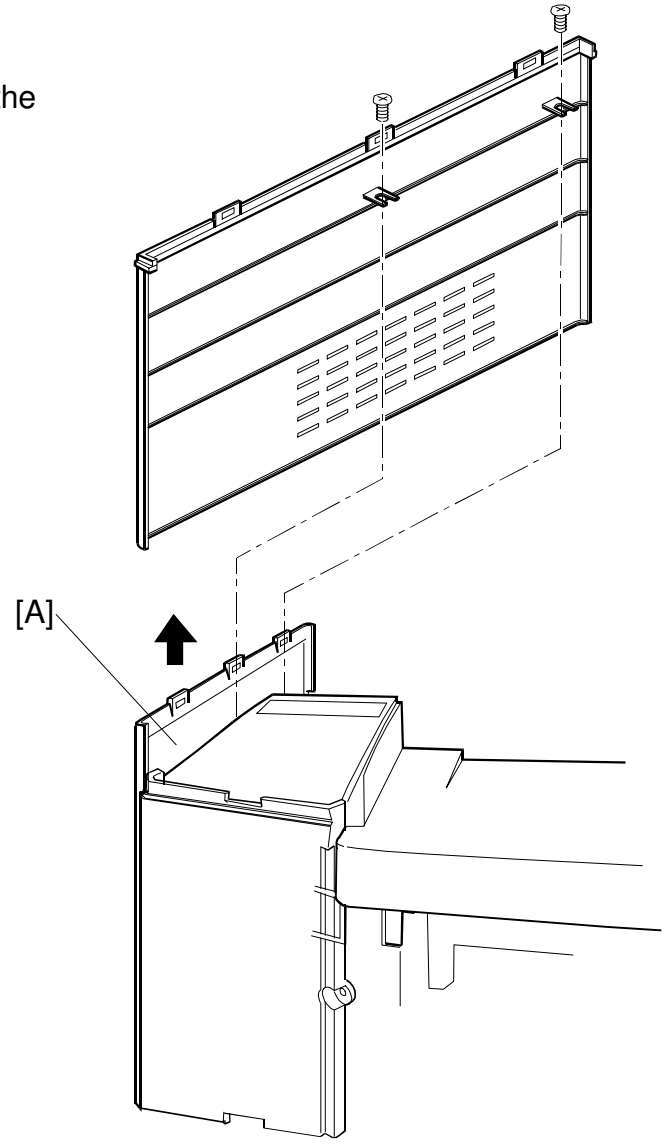


3.1.3 LEFT SIDE COVER

☛3.1.1 Left Upper Side Cover

[A]: Left Side Cover (🖉 x 2).

NOTE: Slowly and carefully pull up the cover



G063R509.WMF

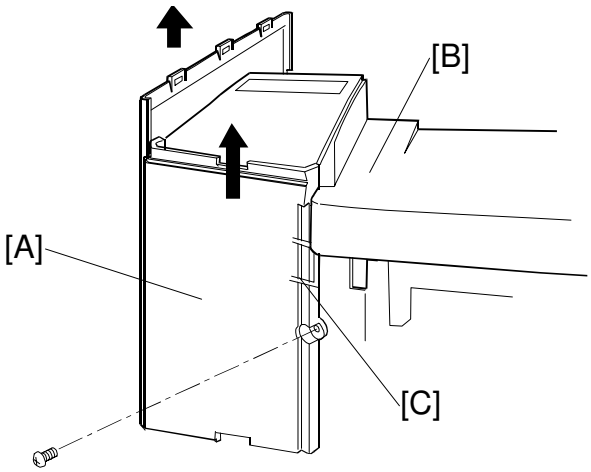
3.1.4 FRONT LEFT SIDE COVER

☛ 3.1.1 Left Upper Side Cover

☛ 3.1.3 Left Side Cover

[A]: Front Left Side Cover (🔩 x 1)

NOTE: Slightly lifting up the front left part of the top cover [B], pull up the front left side cover and unhook the hook [C] from the frame.



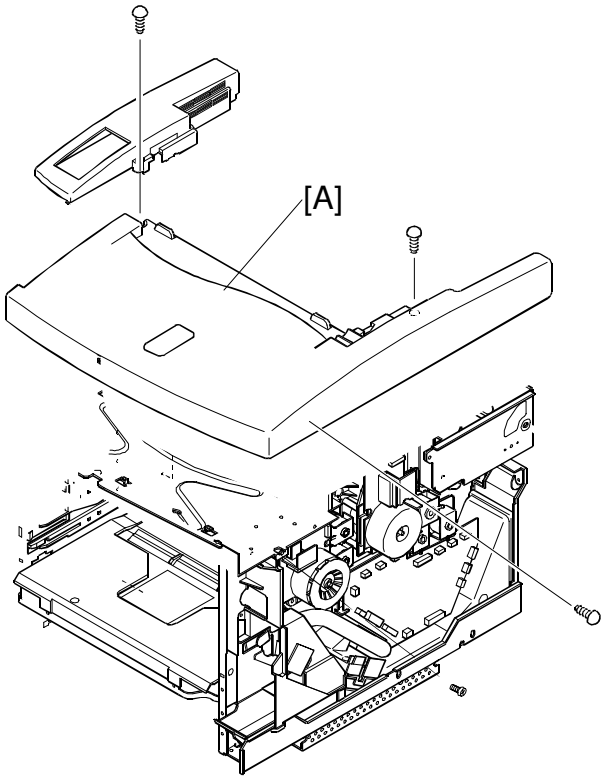
G063R513.WMF

3.1.5 TOP COVER

☛ 3.1.1 Left Upper Side Cover

☛ 3.1.2 Right Side Cover

[A]: Top Cover (🔩 x 2)

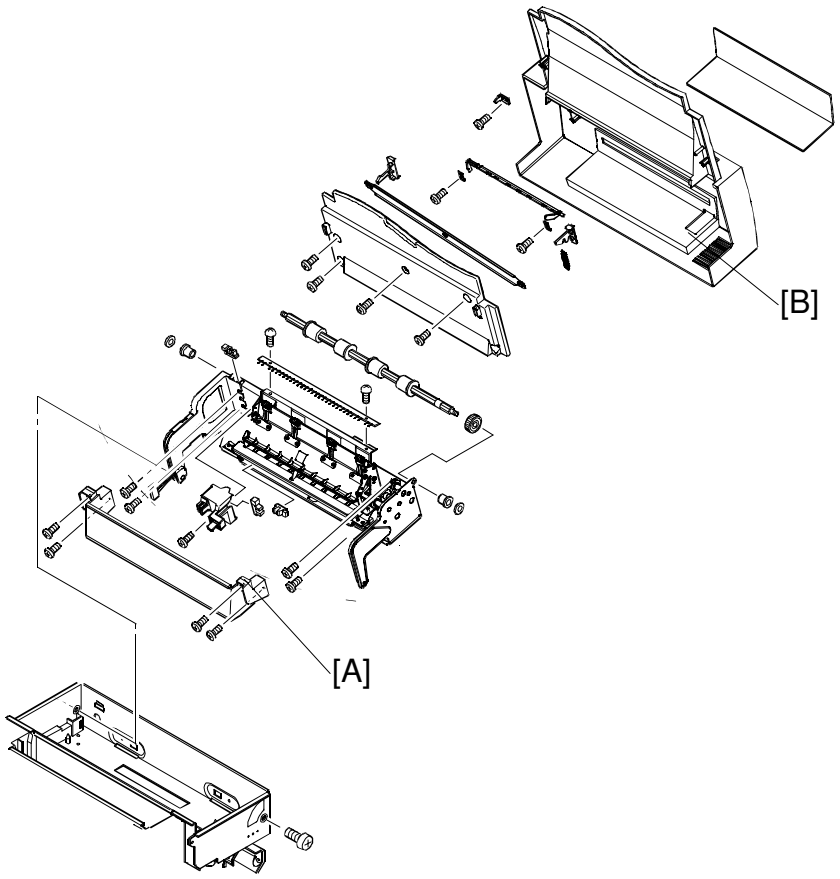


G063R512.WMF

3.1.6 PAPER EXIT FRONT COVER / PAPER EXIT COVER ASS'Y

☛ 3.6.6 Paper Exit Unit

[A]: Paper Exit Front Cover (🔩 x 4)
[B]: Paper Exit Cover Ass'y (🔩 x 4)



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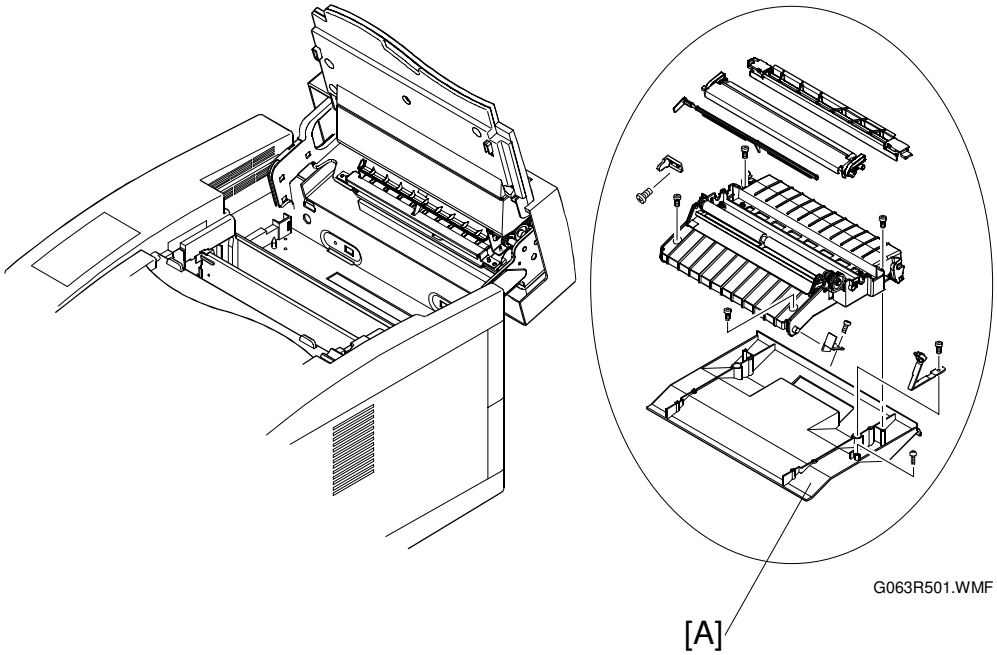
3.1.7 LOWER REAR COVER (TRANSFER COVER)

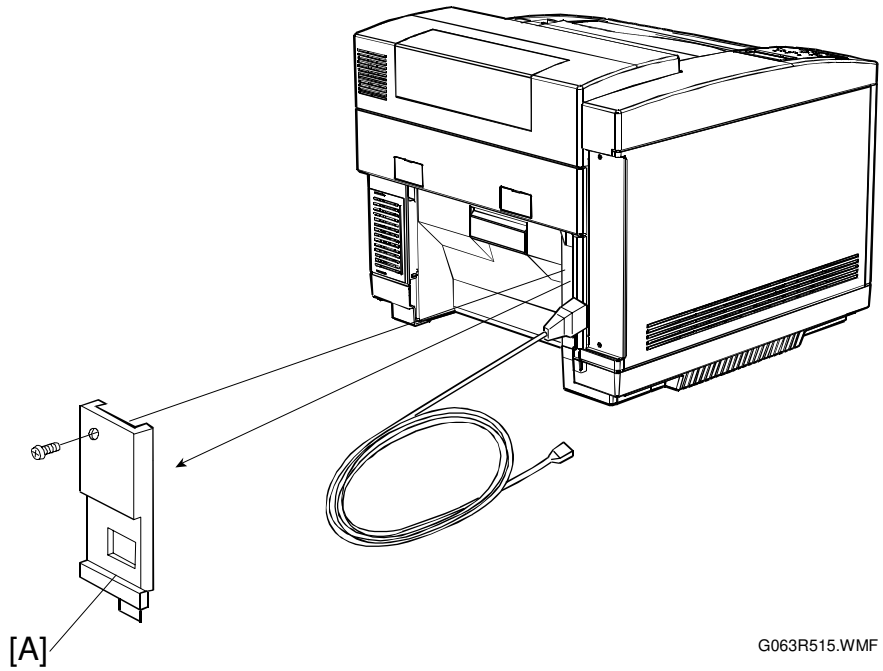
☛ 3.6.1 Transfer Unit

[A]: Lower Rear Cover (🔩 x 4)



3.1.8 LOWER REAR COVER

Unplug the power cable from the machine's ac inlet.
[A]: Lower Rear Cover (🔩 x 1)



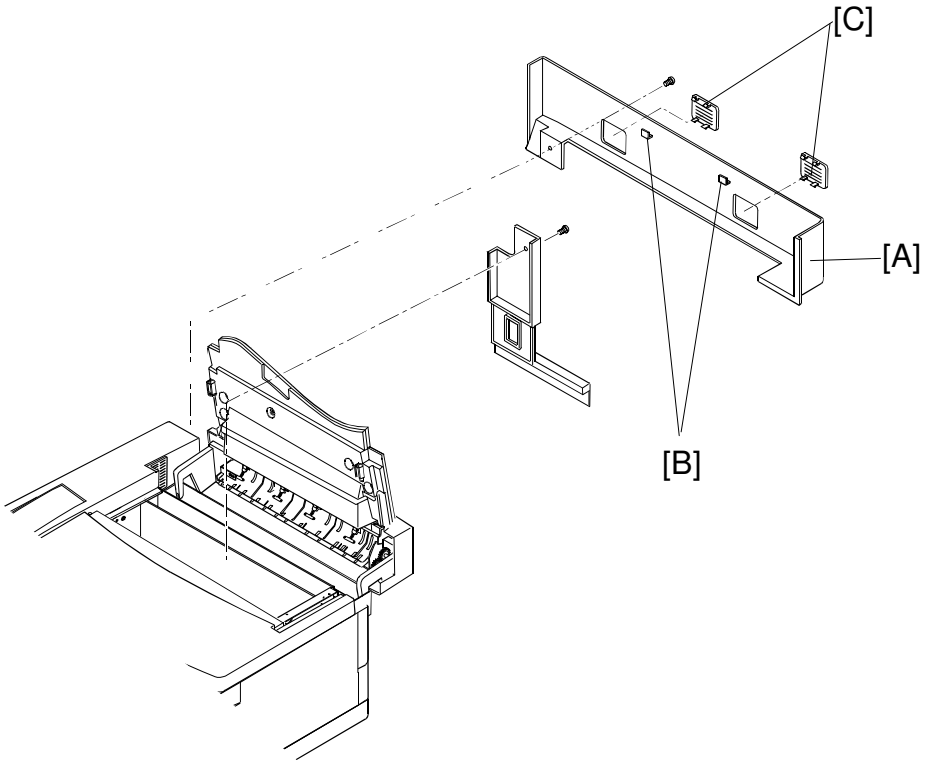
3.1.9 UPPER REAR COVER

☛ 3.1.2 Right Side Cover

☛ 3.1.8 Lower Rear Cover

[A]: Upper Rear Cover with Rear Cover Cap [C].

NOTE: Unhook the hooks [B] (2 locations) on the upper rear cover from the frame.

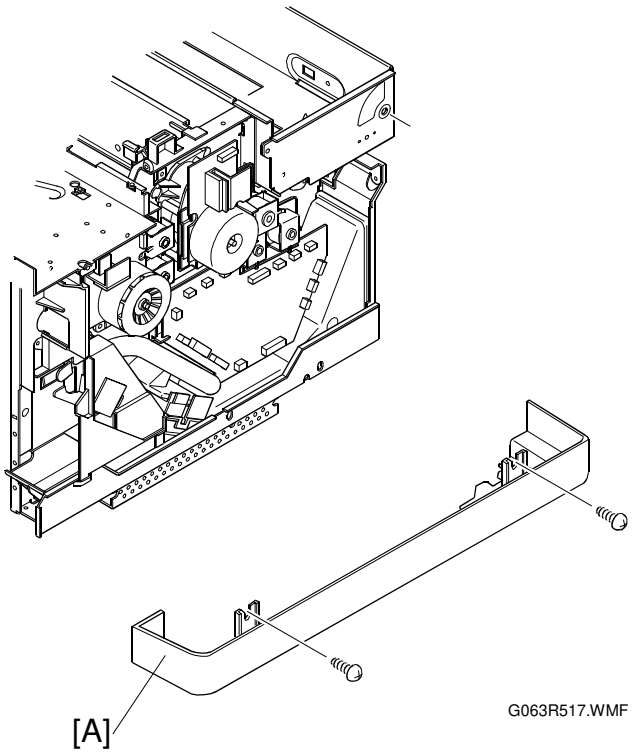


G063R514.WMF

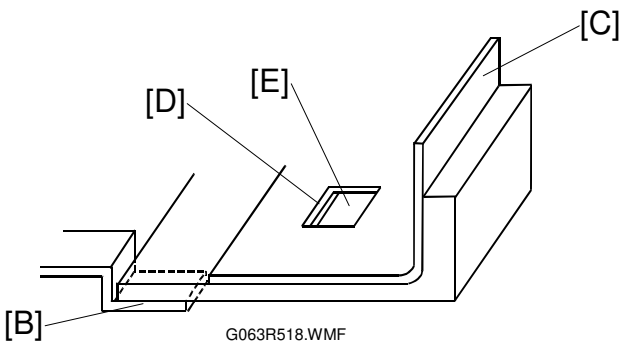
3.1.10 RIGHT BASE COVER

☛ 3.1.2 Right Side Cover

[A]: Right Base Cover (🔩 x 2)
1) Pull out the rear side.
2) Pull out the front side.



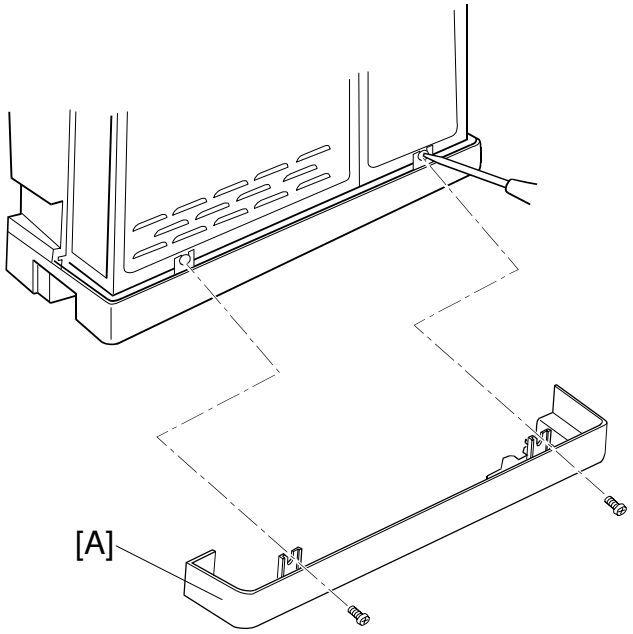
NOTE: 1) When assembling the base cover [C], insert the leading edge of the base cover over the hooks [B] (2 locations) provided at the bottom (left and right) of the base plate [C].
2) Have the hooks [D] on the base cover meet the holes [E] (2 locations) in the base plate bottom.



3.1.11 LEFT BASE COVER

☛ 3.1.3 Left Side Cover

[A]: Left Base Cover (🔩 x 2)
1) Pull and remove the rear side.
2) Pull and remove the front side.



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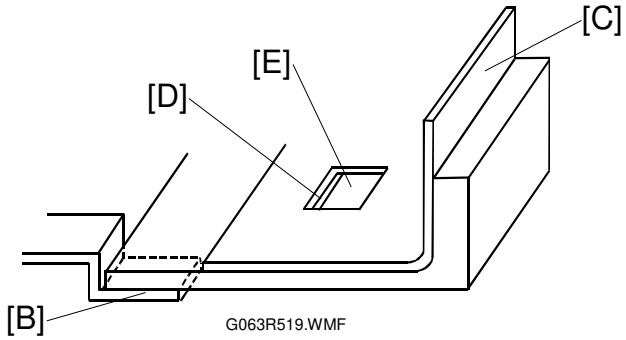
NOTE: 1) When assembling the left base cover [C], insert the leading edge of the base cover over the hook [B] (2 locations) provided at the bottom (left and right) of the base plate [C].
2) Have the hooks [D] on the base cover meet the holes [E] (2 locations) in the base plate bottom.

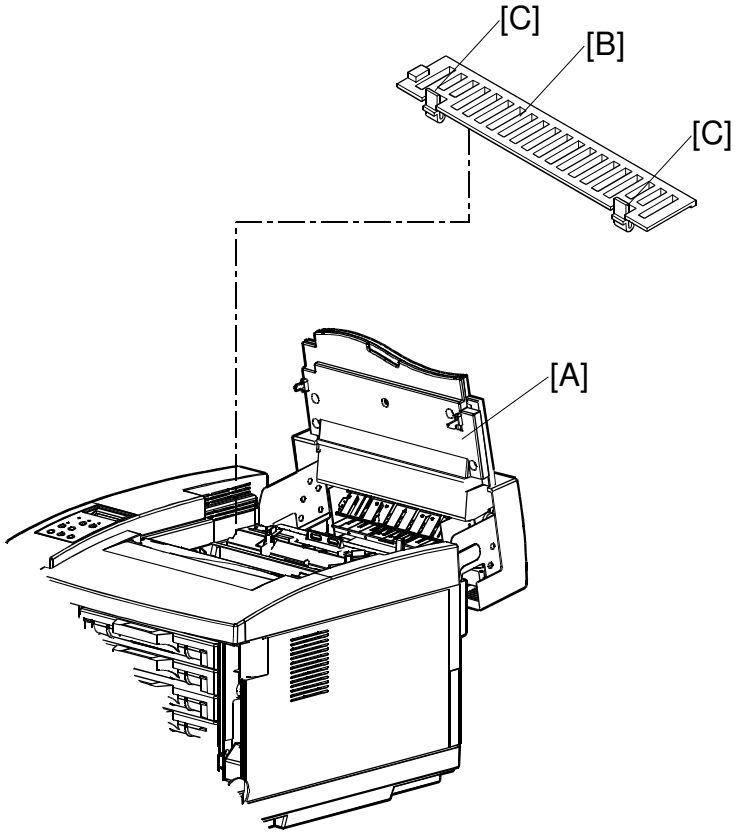


G063R519.WMF

3.1.12 CLEANER COVER

Open the Paper Exit Cover [A].

Holding the tabs [B], remove the Cleaner Cover [C].

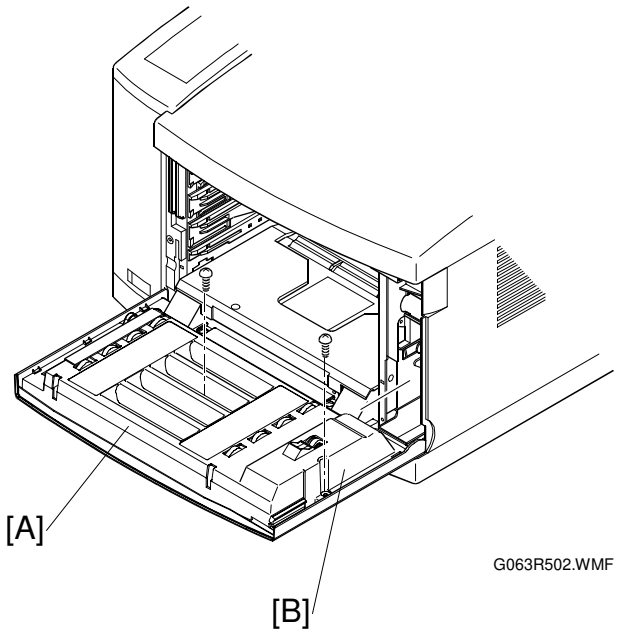


G063R506.WMF

3.1.13 FRONT COVER

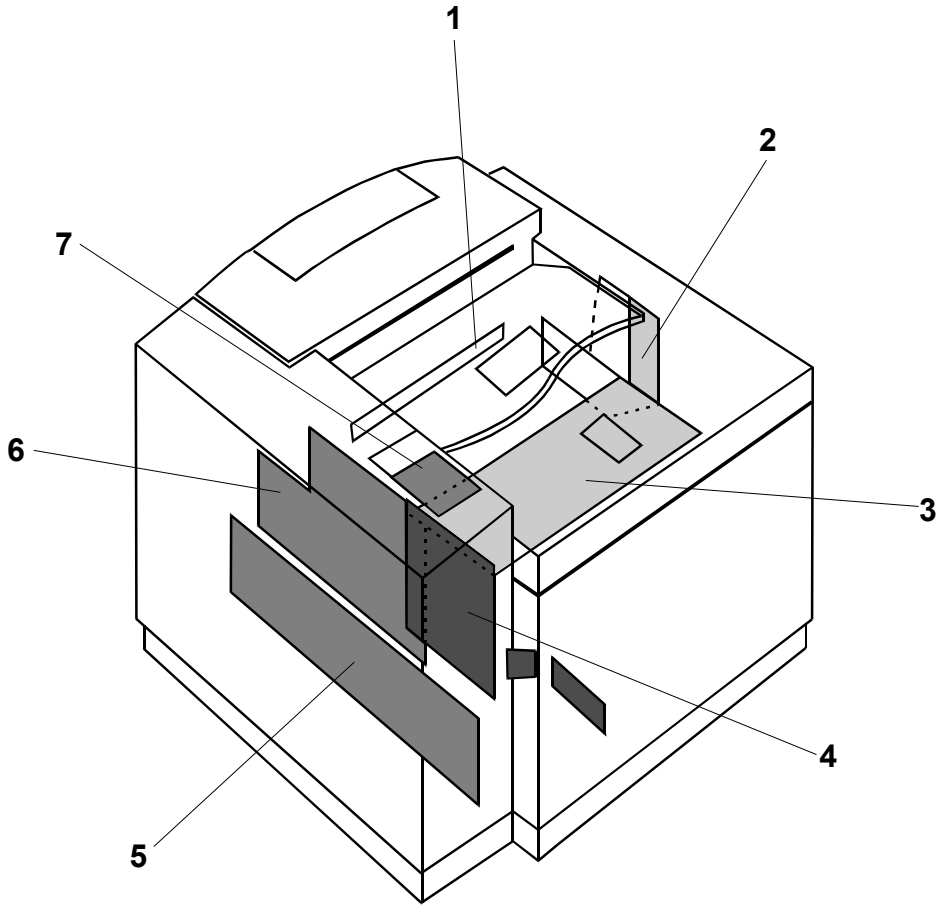
Open the front cover unit [A].
[B]: Front Cover (x 2)

NOTE: Unhook the hooks (3 at left and 1 at right), and remove the front cover from the front cover unit.



3.2 PCBS

3.2.1 PCB LAYOUT



1	Quenching Lamp	5	Power Supply Unit
2	IOD2	6	High Voltage Unit
3	IOD1	7	Panel Board
4	MCTL		

For the controller board, see the separate controller service manual.

NOTE: When replacing PCBs, take care that no damage occurs from static electricity.

3.2.2 MCTL

NOTE: If possible, make a note of the current NVRAM settings before starting (see Service Tables: 46. NVRAM INITIAL).

☛ 3.1.3 Left Side Cover

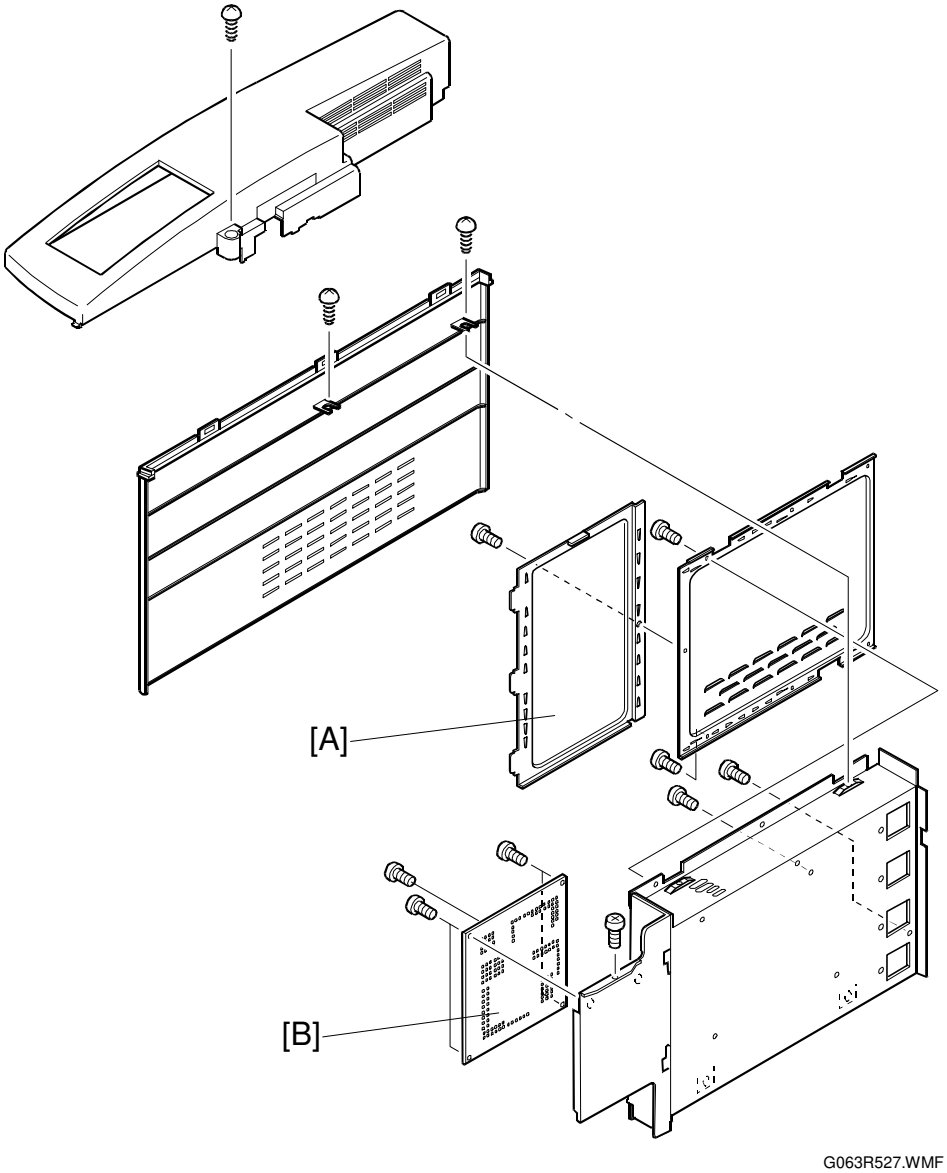
[A]: Shield Cover (🔩 x 1)

Disconnect all the connectors on the MCTL [B].

[B]: MCTL (🔩 x 4)

NOTE: After re-assembly, do the following:

1. Turn on the power switch while holding the [Menu], [Enter], and [▼] keys to access Service Mode.
2. Execute service mode 46 to clear the contents of the RAM.
3. Using service mode, input the values that were in the old RAM into the new RAM.
4. Check the operation and print quality by making a test print.


[A]
[B]
G063R527.WMF

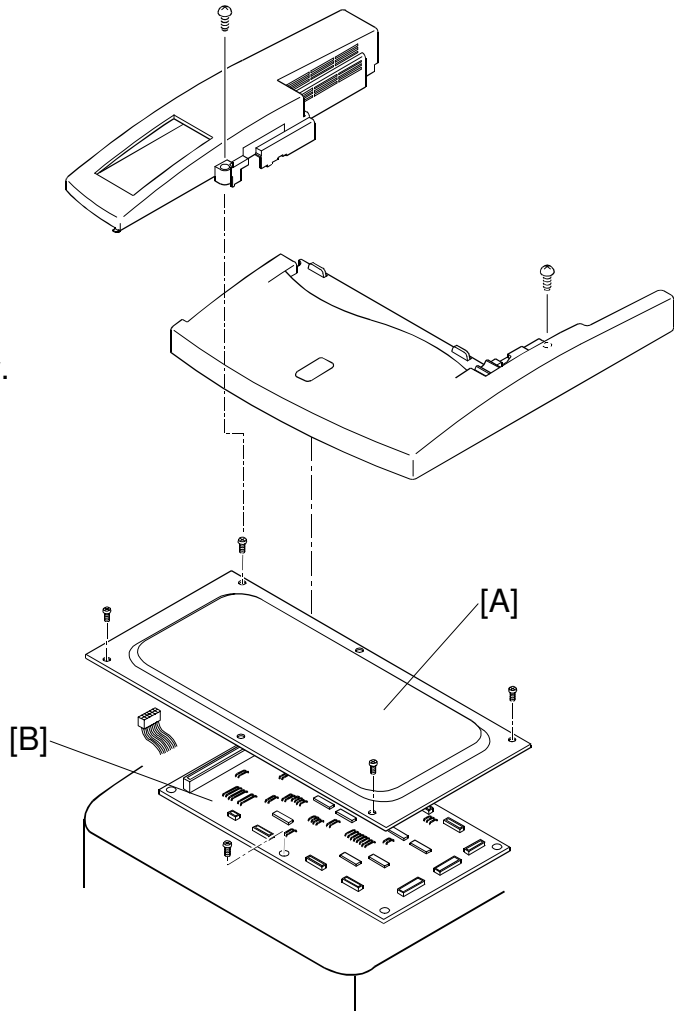
3.2.3 IOD 1

☛ 3.1.1 Left Upper Side Cover

☛ 3.1.5 Top Cover

[A]: Shield Cover (🔩 x 4)
[B]: IOD1 (🔩 x 6, 🖐 x 16)

NOTE: When replacing the IOD1, take care that no damage occurs from static electricity.



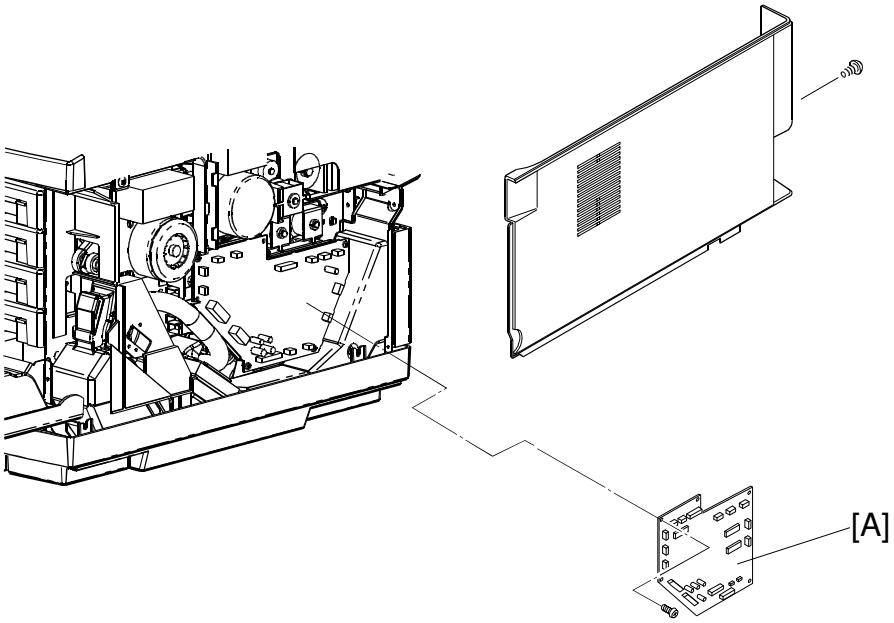
G063R526.WMF

3.2.4 IOD2

☛3.1.2 Right Side Cover

[A]: IOD2 (x 5, x 16)

NOTE: When replacing the IOD2, take care that no damage occurs from static electricity.



G063R524.WMF

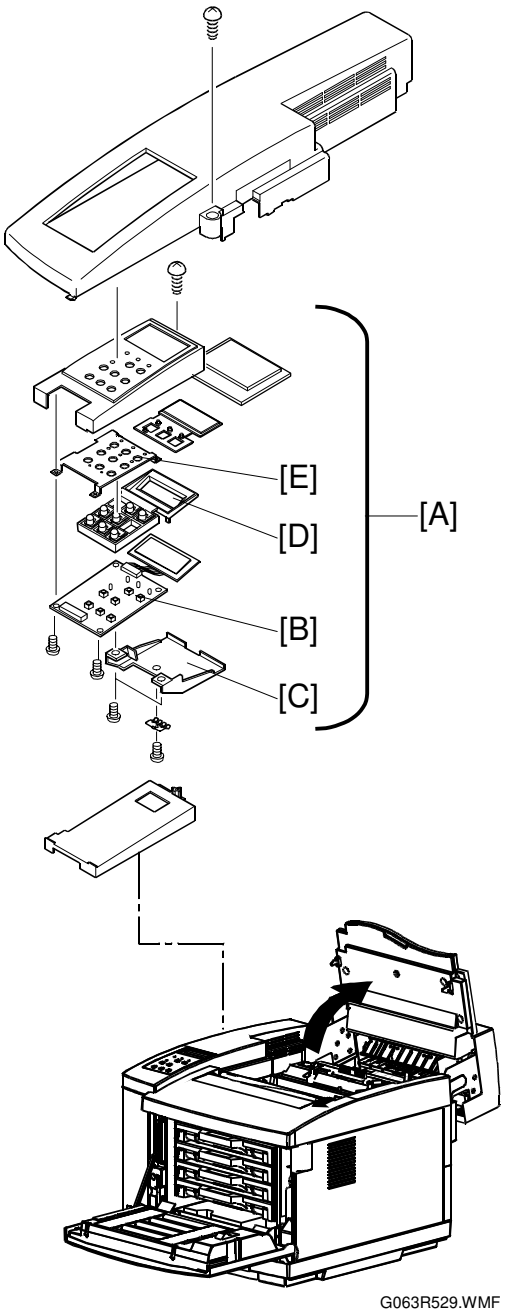
3.2.5 PANEL BOARD (INCLUDING LCD)

☛3.1.1 Left Upper Side Cover

Panel Case Assembly [A]: (x 1, x 1)

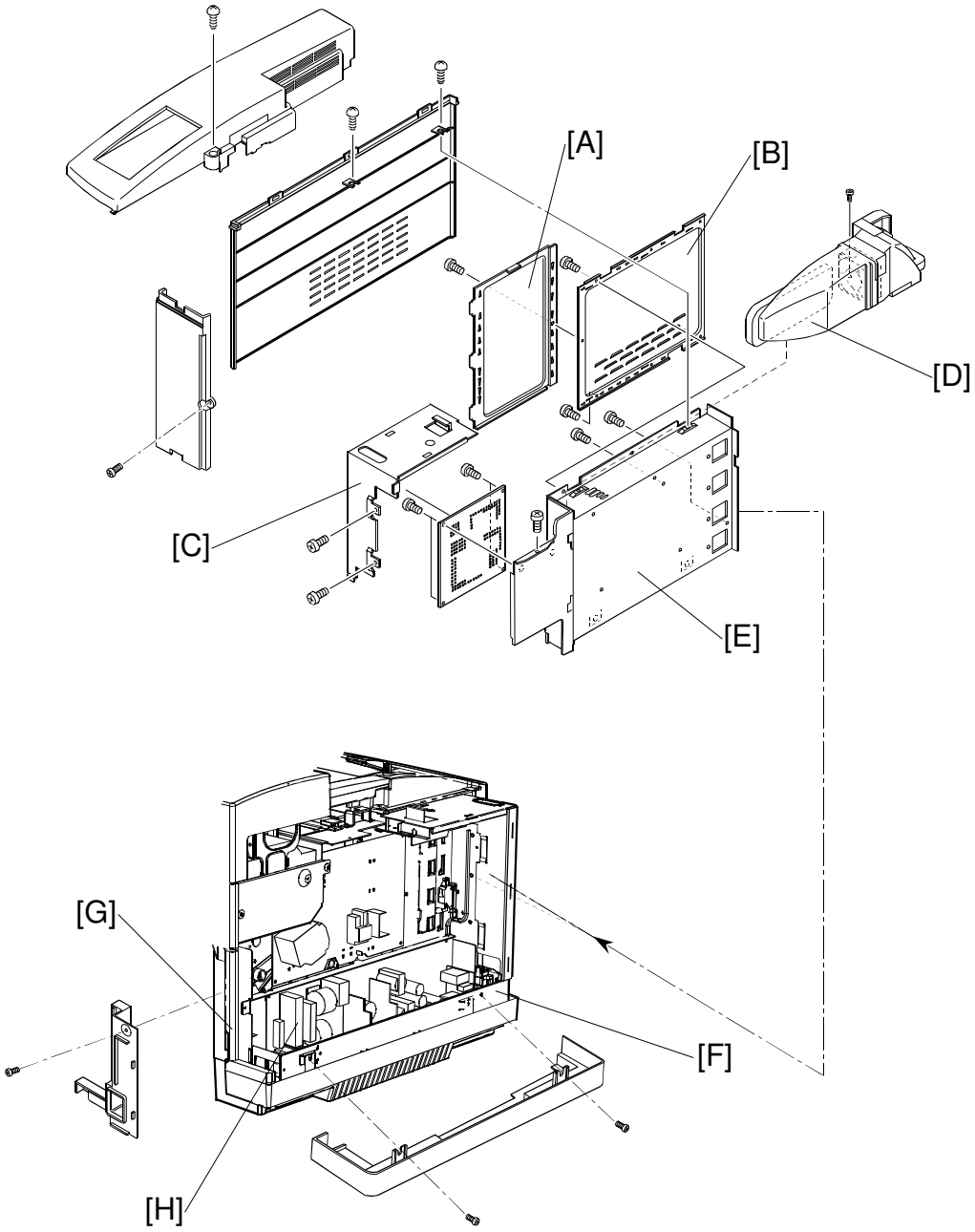
Panel Board [B]: (x 4)

Upon removal of the panel board, the shield plate [C], panel buttons [D], and panel shield [E] can be removed.



G063R529.WMF

3.2.6 POWER SUPPLY UNIT



G063R521.WMF

☛3.1.1 Left Upper Side Cover

☛3.1.3 Left Side Cover

☛3.1.4 Front Left Side Cover

☛3.1.11 Left Base Cover

☛3.1.8 Lower Rear Cover

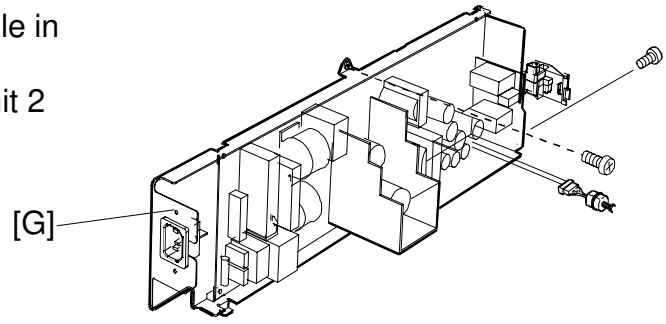
[A]: Shield Cover 2 (🔩 x 1)
[B]: Shield Cover 1 (🔩 x 2)
[C]: Shield Cover F (🔩 x 2)

Remove the switch button and switch holder from the remote switch located at the front of the machine.

Disconnect all the cables connected to the MCTL.
[D]: Controller Fan Assembly (🔩 x 1)
[E]: Shield Case A Assembly (🔩 x 5)
[F]: Left Bottom Stay (🔩 x 2)

Disconnect the 5 cables connected to the power supply unit.
[G]: Inlet (🔩 x 2)
[H]: Power supply unit (🔩 x 2)

- Pull out the front part.
- Unhook the hook from the hole in the base frame.
- Remove the power supply unit 2 from the engine.



G063R528.WMF

⚠ CAUTION

Grounding wires are very important to secure the safety of users. Upon removal of the power supply unit, confirm that the grounding wires (green and yellow) are securely connected to the required parts.

3.2.7 HIGH VOLTAGE UNIT

☛3.1.1 Left Upper Side Cover

☛3.1.3 Left Side Cover

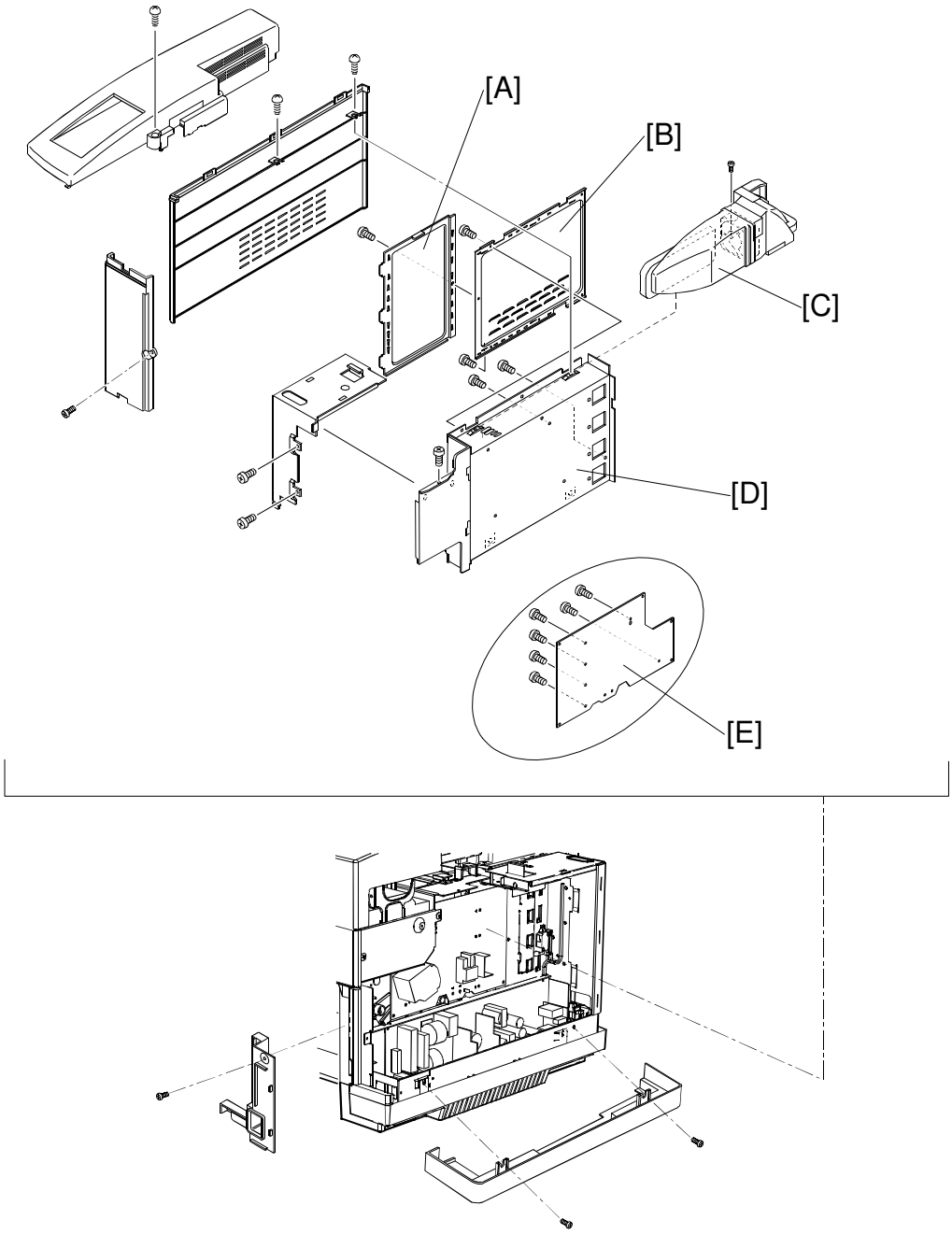
[A]: Shield Cover 2 (🔩 x 1)
[B]: Shield Cover 1 (🔩 x 2)

Disconnect the cables connected to the MCTL (6 locations).
[C]: Controller Fan Assembly (🔩 x 1)
[D]: Shield Case A Assembly (🔩 x 4)

Disconnect all the cables connected to the high voltage unit (3 locations).
[E]: High Voltage Unit (🔩 x 9)

⚠WARNING

The High Voltage Unit generates a high voltage (5KV). You may get an electric shock if you touch the unit while the power switch is on. Therefore, turn on the unit ONLY after installing the left side cover.



G063R525.WMF

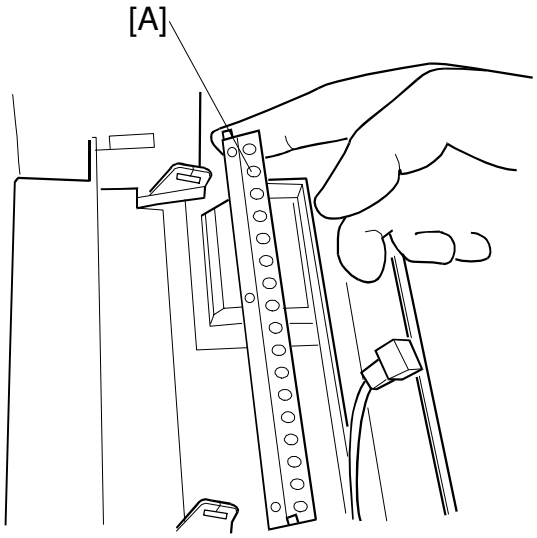
3.2.8 ERASE LAMP

Open the front cover.

Open the paper exit unit.

Pull out the toner cartridges (K/M/C/Y).

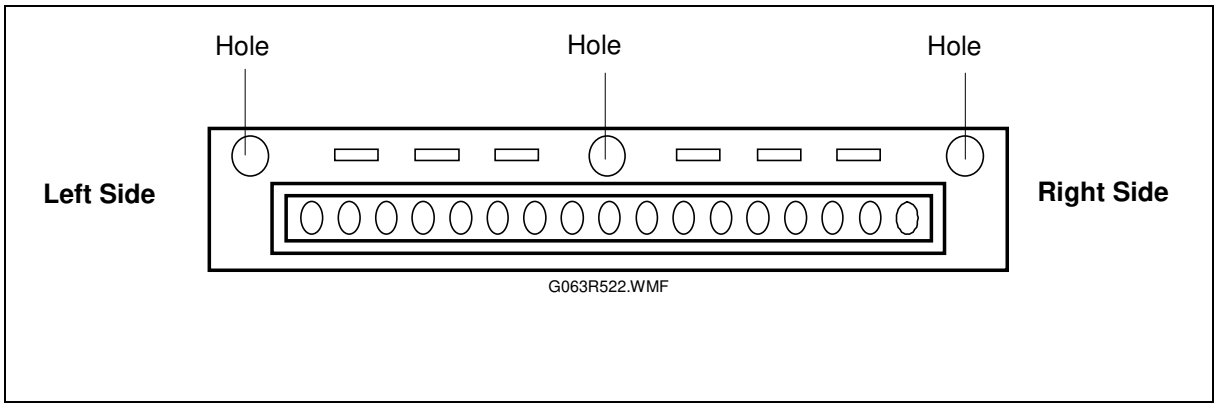
Pull up the belt cartridge.
[A]: Erase Lamp (☞ x 1).



G063R523.WMF

NOTE: Do not touch the transfer drum with your bare hands while removing or reassembling the erase lamp.

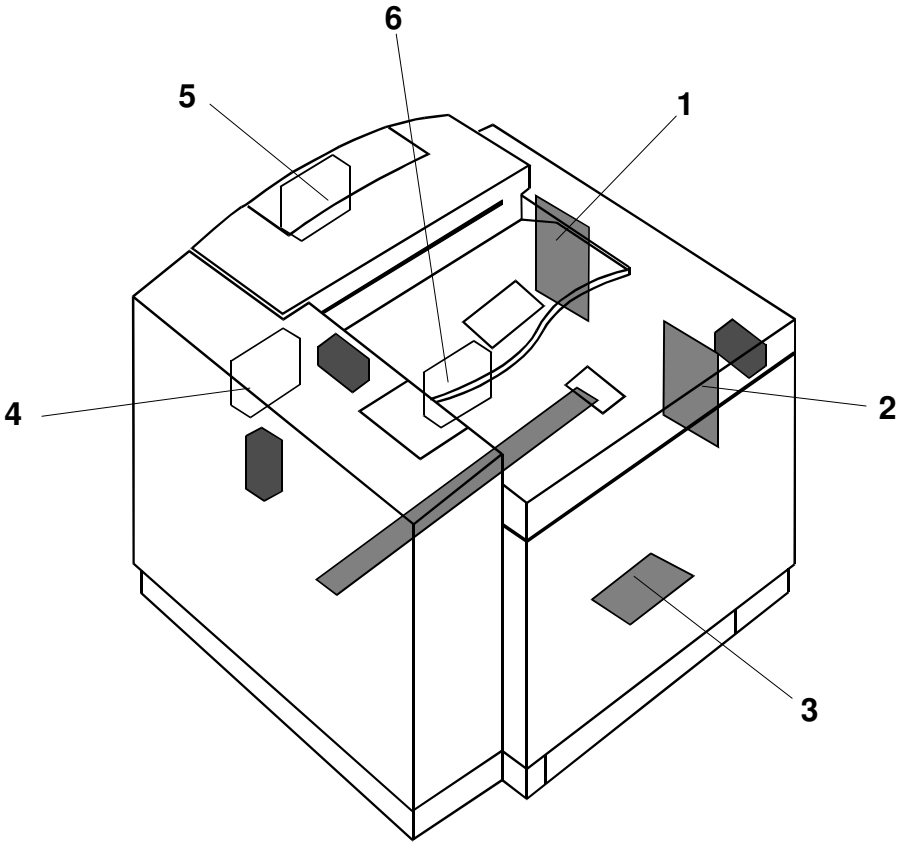
NOTE: The erase lamp has directional characteristics. If it is installed the wrong way around, the transfer drum may be damaged.



G063R522.WMF

3.3 MOTORS

3.3.1 MOTOR LAYOUT



G063R530.WMF

1	Main Motor	4	Controller Fan
2	Development Motor	5	Fusing Unit Fan
3	Polygonal Mirror Motor	6	Ozone Fan

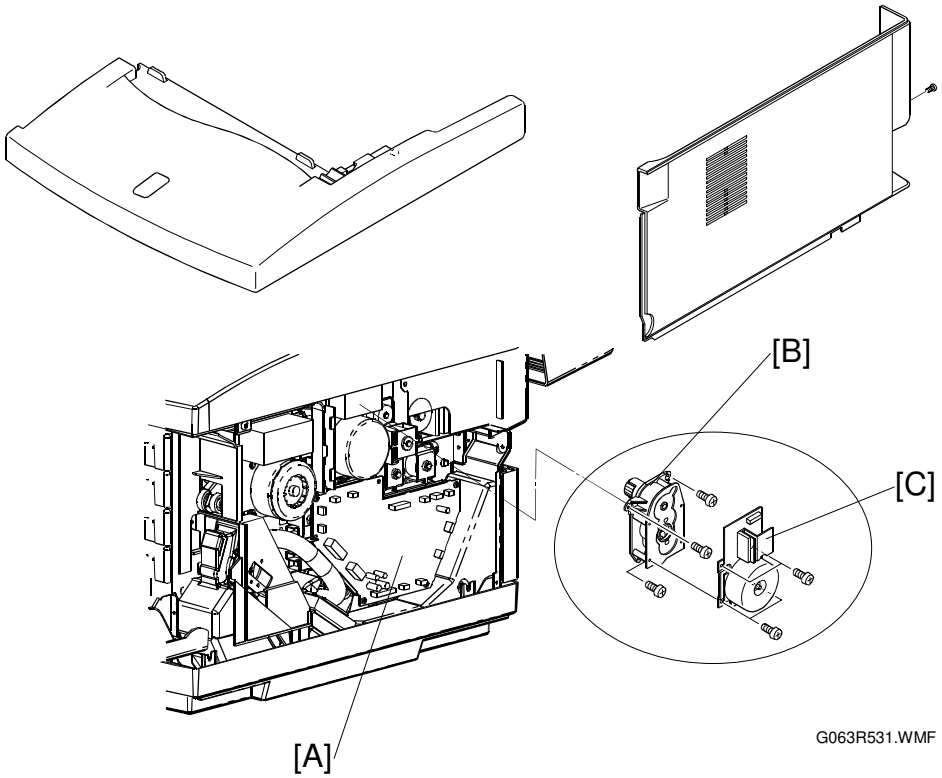
3.3.2 MAIN MOTOR / GEAR ASS''Y

☛3.1.2 Right Side Cover

☛3.1.5 Top Cover

Remove the cable connected to the main motor.

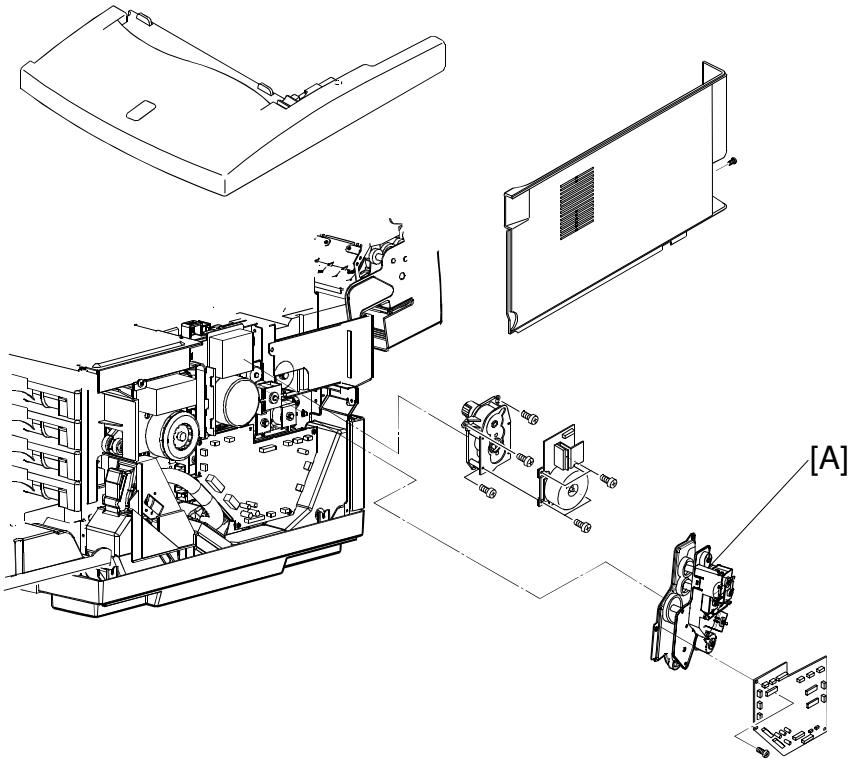
Remove all cables connected to the IOD2.
[A]: IOD2 Base Unit (☞ x 2)
[B]: Gear Ass'y (☞ x 3)
[C]: Main Motor (☞ x 4)



3.3.3 MAIN DRIVE UNIT

- Gear Ass'y (☛3.3.2 Main Motor / Gear A)

Remove the fusing unit.
[A]: Main Drive Unit (🔩 x 4)



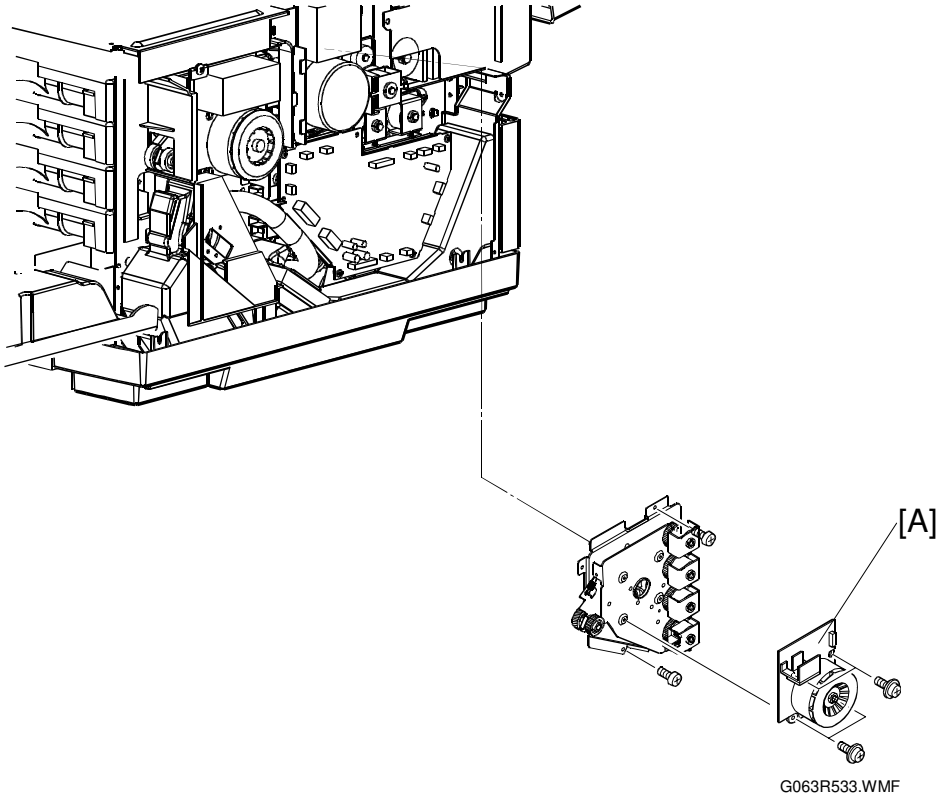
G063R532.WMF

3.3.4 DEVELOPMENT MOTOR

☛ 3.1.5 Top Cover

Remove the toner cartridges.

Disconnect the connector CN1 connected to the developer motor
[A]: Development Motor (🔩 x 4)



3.3.5 DEVELOPMENT DRIVE UNIT

Remove the toner cartridges.

Remove the waste toner bottle.

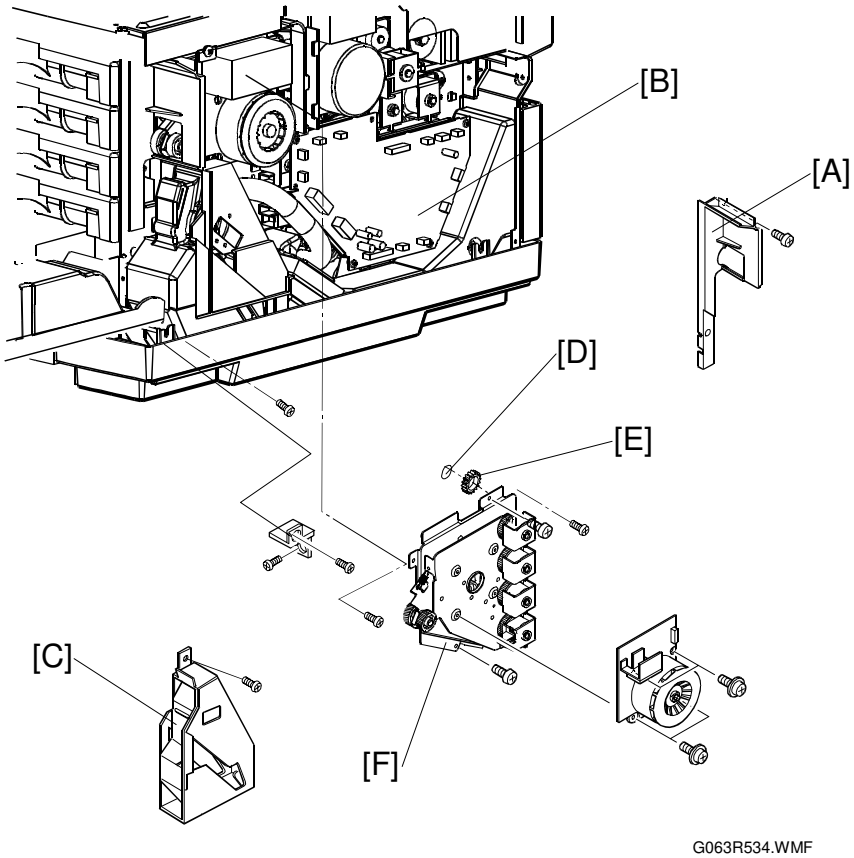
☛3.1.5 Top Cover

☛3.1.10 Right Base Cover

[A]: Cover RF (☞ x 1)
[B]: IOD2 Base Assy (☞ x 2)
[C]: WT Holder Assy (☞ x 2)

☛3.3.4 Development Motor

[D]: Washers (4pcs.) for Development Drive Gear
[E]: Development Drive Gear
[F]: Development Drive Unit (☞ x 4)



G063R534.WMF

3.3.6 OPTICAL UNIT (INCLUDING POLYGONAL MIRROR MOTOR)

Remove the toner cartridges.

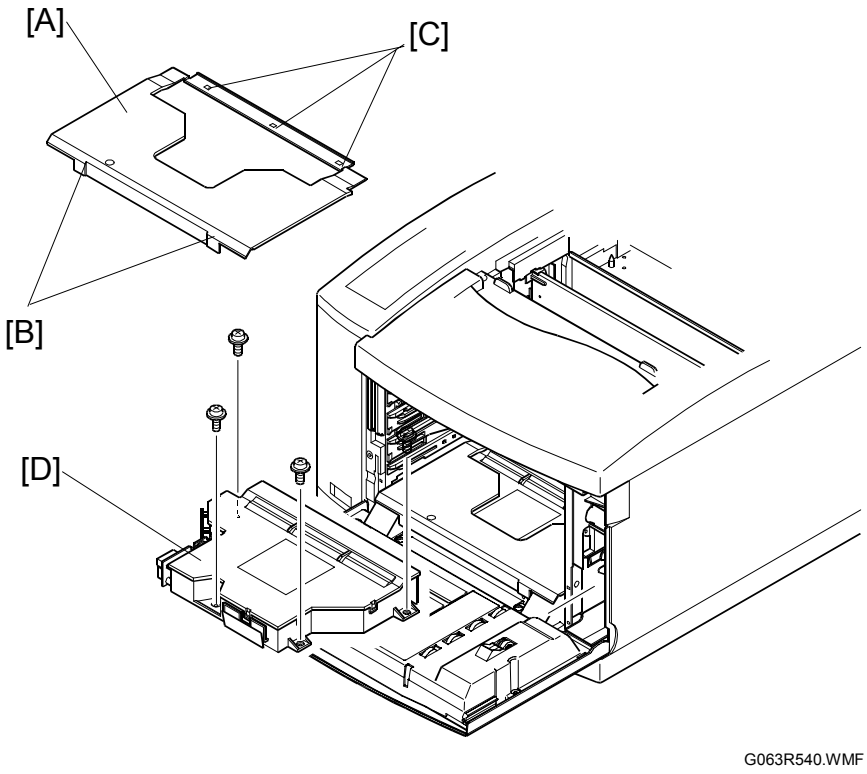
Remove the belt cartridge (photoconductor unit).

[A]: Optical Unit Cover

NOTE: The optics unit cover is fixed by plastic projections [B] on the front side and slots [C] on the rear side.

1) Release three slots at the rear.
2) Release two locks at the front while pulling the cover toward you.
3) Remove the cover from the printer.

[D]: Optical Unit (x 4, x 1)



G063R540.WMF

⚠WARNING

1. **There is a Class B laser within the optical unit. Do not attempt to disassemble the laser.**
2. **The optical unit is replaced as a whole unit. No adjustment is required to the new optical unit.**
3. **Confirm that all the covers have been installed prior to any test run or operation in order to prevent any laser radiation from escaping.**

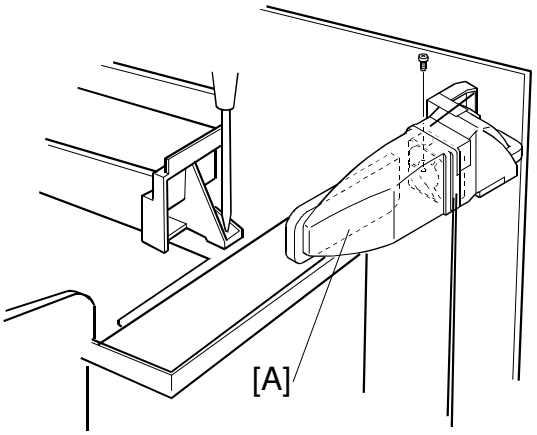
3.3.7 CONTROLLER FAN

☛3.1.1 Left Upper Side Cover

☛3.1.3 Left Side Cover

☛3.1.5 Top Cover

[A]: Upper Shield Cover(x 4)
[B]: Control Fan Case Assy (x 2, x 1)
[C]: Controller Fan



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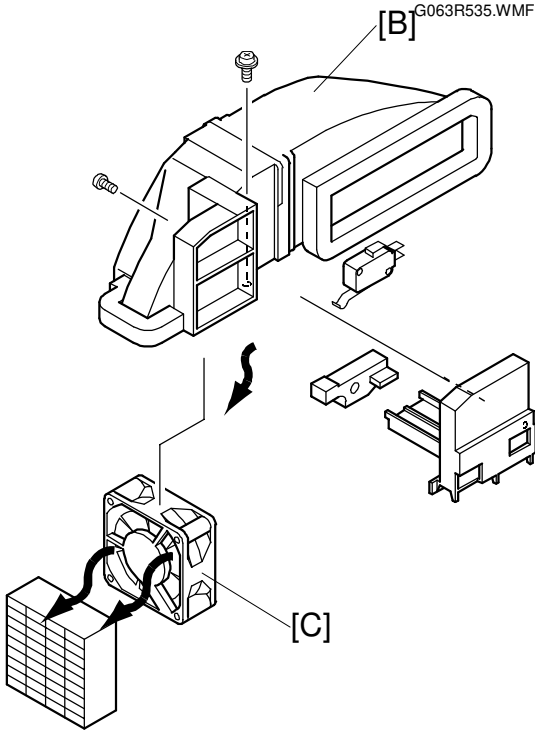
NOTE: Open the fan case (unhook at one location), and remove the fan motor (the interlock switch top is also removed.)
The interlock switch must be installed properly



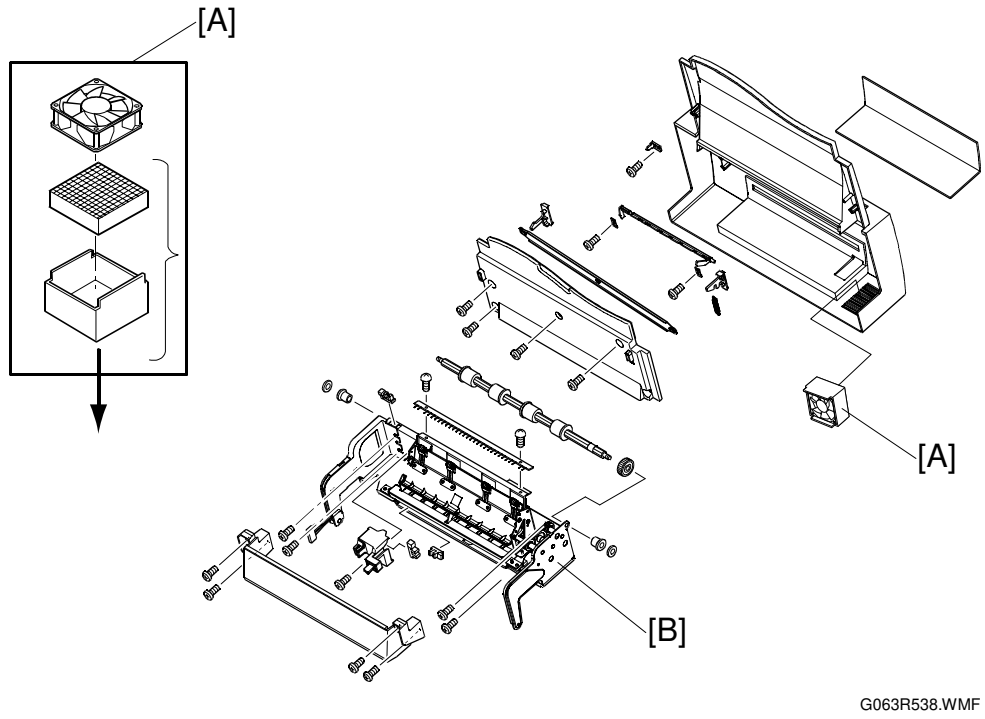
G063R537.WMF

3.3.8 FUSING UNIT FAN

- Paper Exit Cover (☛3.1.6 Paper Exit Front Cover / Paper Exit Cover Ass'y)

[A]: Heater Fan Case Assembly (✍ x 1)

NOTE: 1) This assembly is attached to the Paper Exit Frame Assembly [B] with a hook.)
2) When installing the fucing unit fan, make sure that rating label on the fan motor faces the exhaust side.



G063R538.WMF

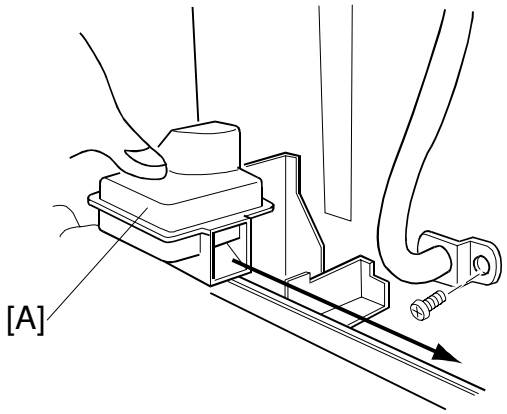
3.3.9 OZONE FAN

☛3.1.2 Right Side Cover and Ozone Filter Cover

☛3.1.10 Right Base Cover

☛3.2.4 IOD2

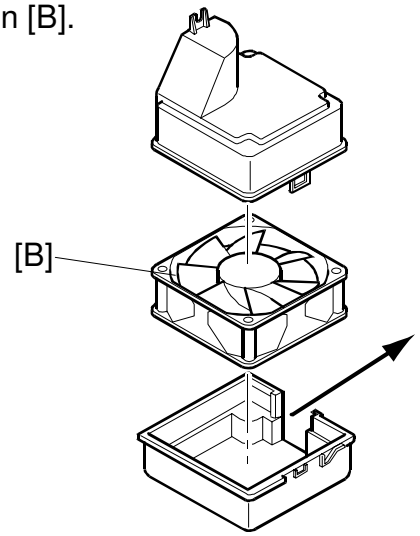
- WT Holder Ass'y (☛3.3.5 Development Drive Unit)



G063R539.WMF

[A]: Ozone Fan Case (🔩 x 1)

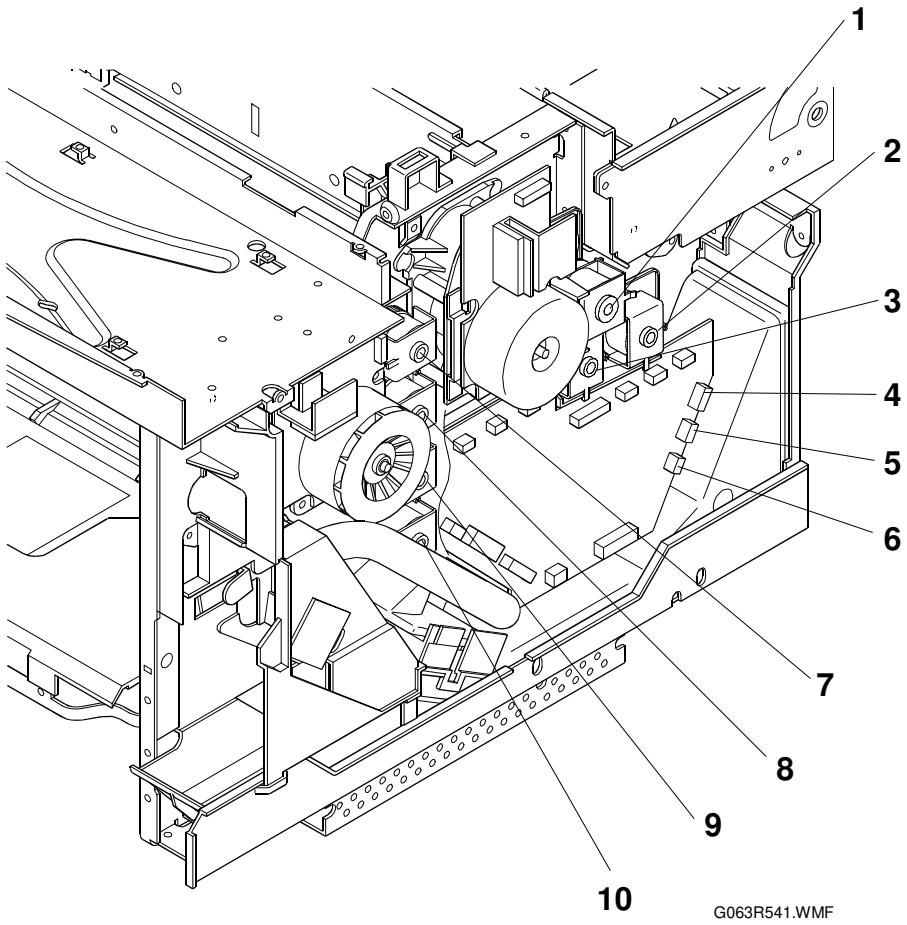
Open the Ozone Fan Case and remove the Ozone Fan [B].



G063R536.WMF

3.4 CLUTCHES AND SOLENOIDS

3.4.1 CLUTCH AND SOLENOID LAYOUT



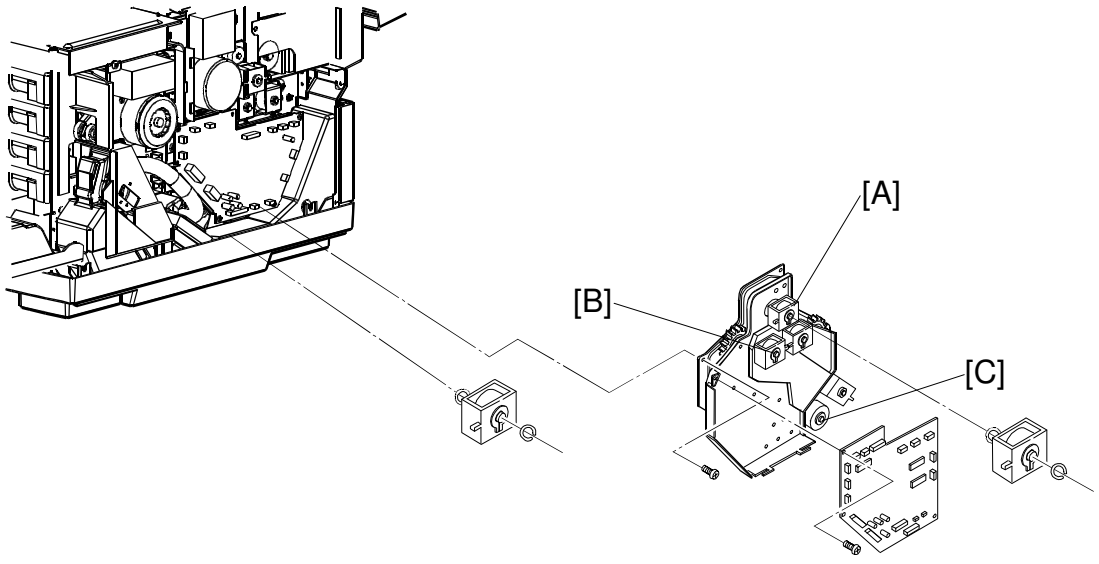
1	Drum Cleaner Clutch	6	Paper Feed Clutch
2	Fusing Clutch	7	Development Clutch (K)
3	Cleaning Clutch	8	Development Clutch (Y)
4	Transfer Clutch	9	Development Clutch (M)
5	Registration Clutch	10	Development Clutch (C)

3.4.2 FUSING / CLEANING / REGISTRATION CLUTCH

- Right Side Cover (☛3.1.2 Right Side Cover and Ozone Filter Cover)

1. Disconnect the connector for the applicable clutch from the IOD2.
2. Remove the washer of the applicable clutch from the shaft.
3. Pull the clutch off the shaft.

[A]: Fusing Clutch
[B]: Cleaning Clutch
[C]: Registration Clutch



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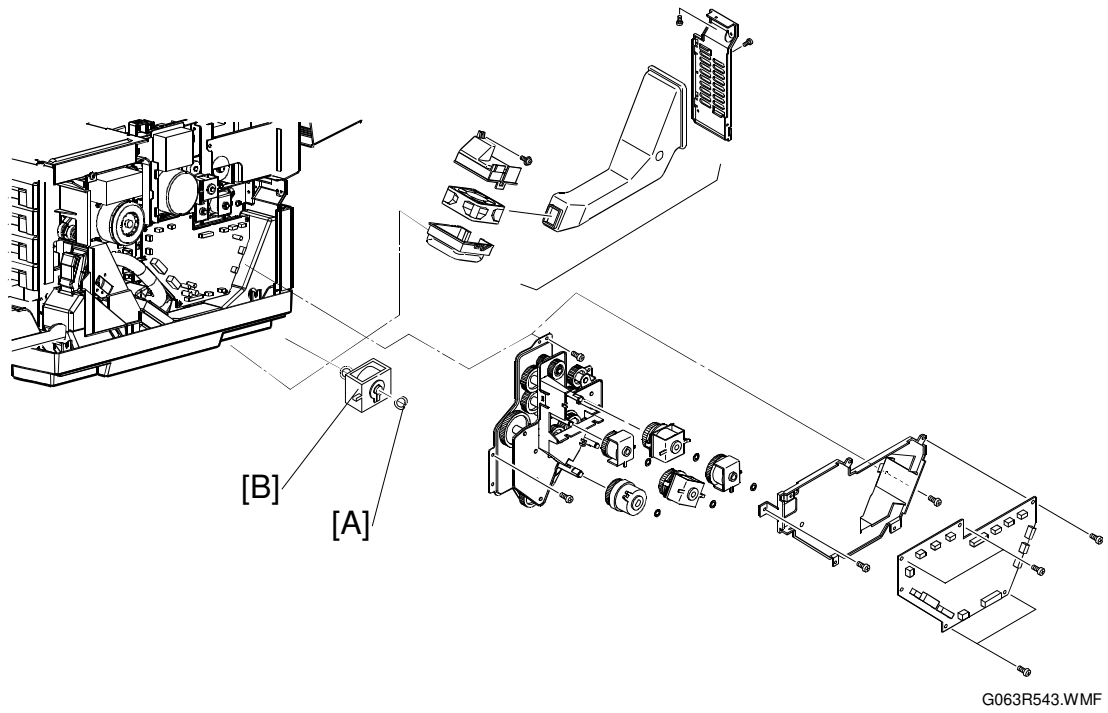
3.4.3 PAPER FEED CLUTCH

☛3.2.4 IOD2

[A]: Paper feed clutch washer
[B]: Paper Feed Clutch

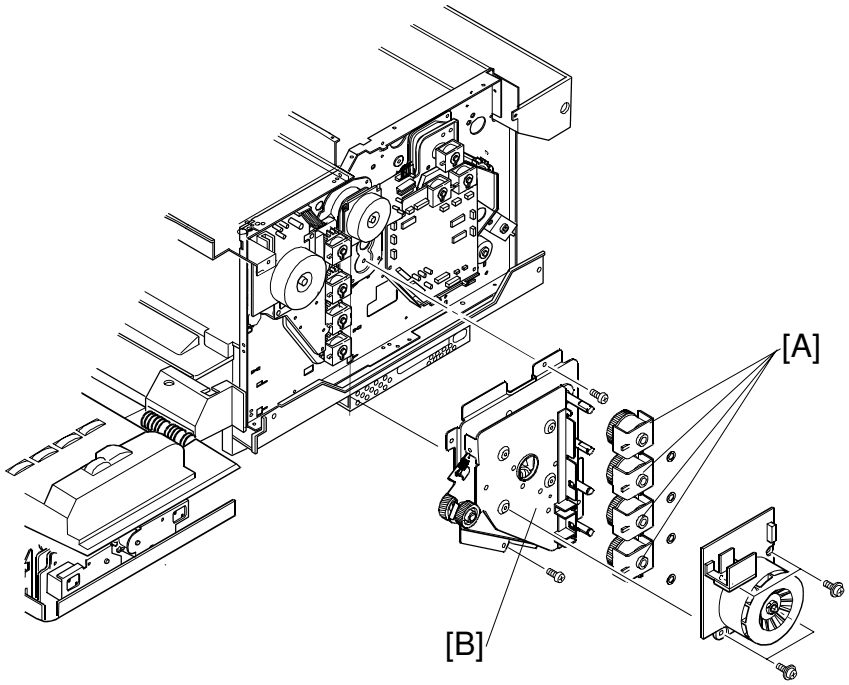


3.4.4 DEVELOPMENT CLUTCHES

- Right Side Cover (☛3.1.2 Right Side Cover and Ozone Filter Cover)

☛ 3.3.4 Development Motor

1. Disconnect the connector of the applicable clutch from the IOD2.
2. Remove the washer.
3. Pull out the applicable clutch [A] from the developer gear unit [B].



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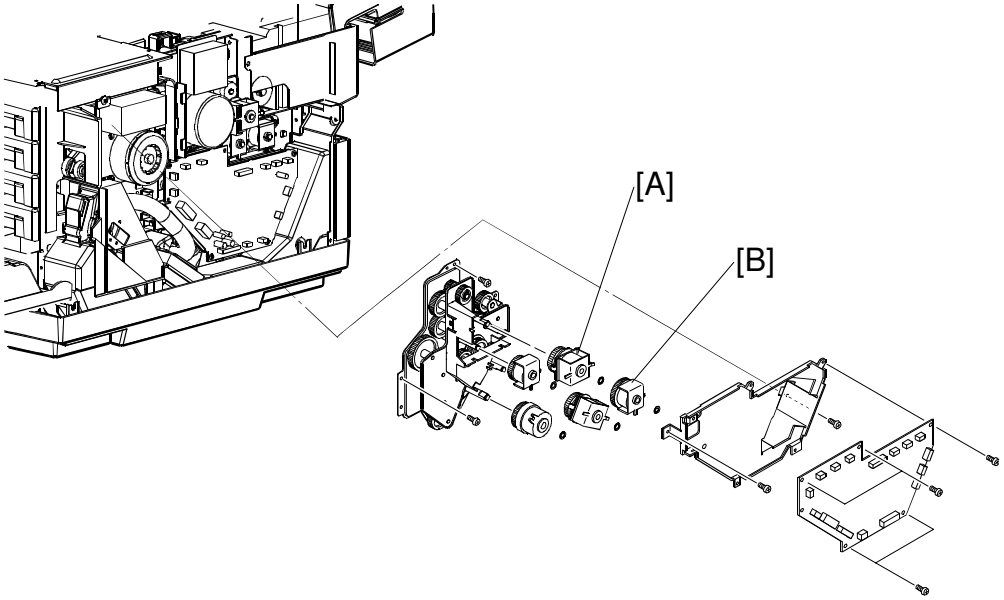
3.4.5 DRUM CLEANER / TRANSFER CLUTCH

- Right Side Cover (☛3.1.2 Right Side Cover and Ozone Filter Cover)

☛3.2.4 IOD2

1. Remove the washer from the shaft of the applicable clutch.
2. Pull the applicable clutch off the shaft.

[A]: Drum Cleaner Clutch
[B]: Transfer Clutch



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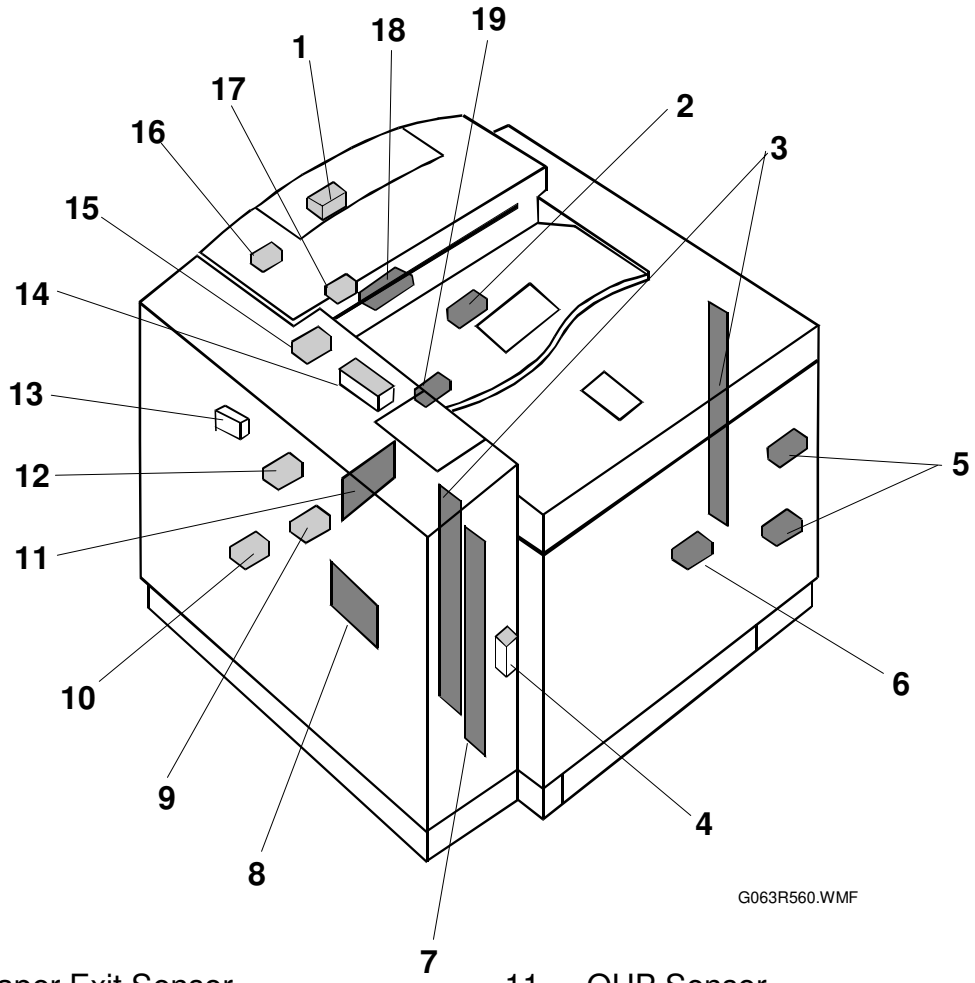
3.5 SENSORS AND SWITCHES

3.5.1 SENSOR LAYOUT



1	Paper Exit Sensor	11	OHP Sensor
2	Drum Paper Jam Sensor	12	Drum Encoder
3	Toner End Sensor	13	Rear Cover Switch
4	Front Cover Switch	14	Exit Cover Switch
5	Development Sensor	15	Oil Sensor
6	Waste Toner Sensor	16	Paper Exit Tray Full Sensor
7	Toner Type Sensor	17	Cleaning Roller Sensor
8	Paper Size Sensor	18	Fusing Thermistor
9	Paper Sensor	19	Belt Sensor
10	Paper Feed Sensor		

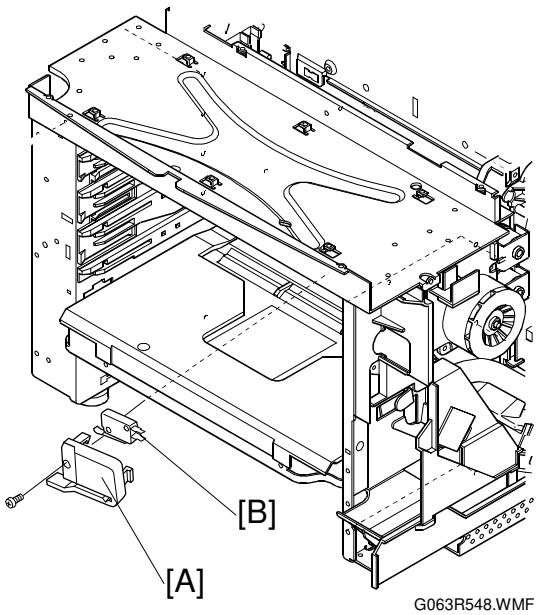
3.5.2 FRONT COVER SWITCH

☛3.1.1 Left Upper Side Cover

☛3.1.5 Top Cover

- Upper Shield Cover (☛3.2.3 IOD 1).

[A]: Switch Base (x 1, x 1)
[B]: Front Cover Switch



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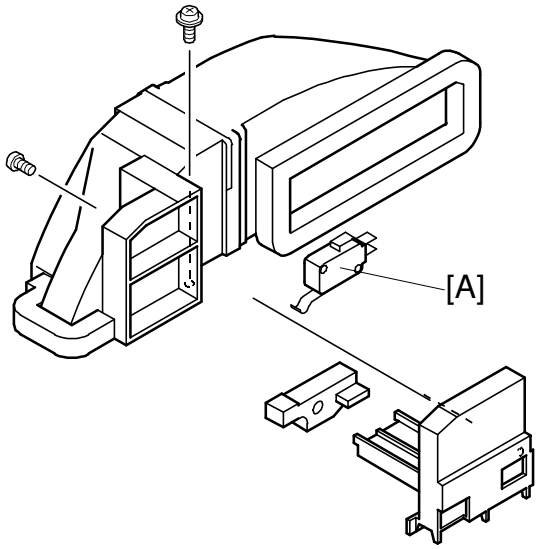
3.5.3 EXIT COVER SWITCH

Controller Fan (☛3.3.7 Controller Fan)
[A]: Exit Cover Switch



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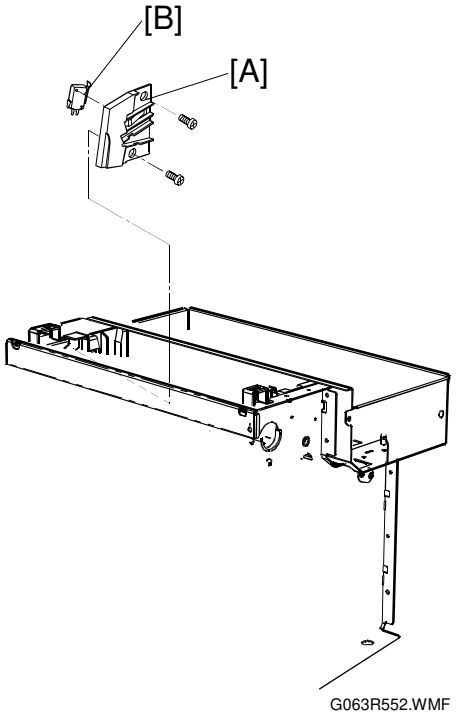
3.5.4 REAR COVER SWITCH



☛3.1.3 Left Side Cover

☛3.2.7 High Voltage Unit

☛3.6.3 Transfer Drum

☛3.6.1 Transfer Unit

[A]: Transfer Electrode Base (☞ x 2)
[B]: Rear Cover Switch (☞ x 1)

⚠CAUTION

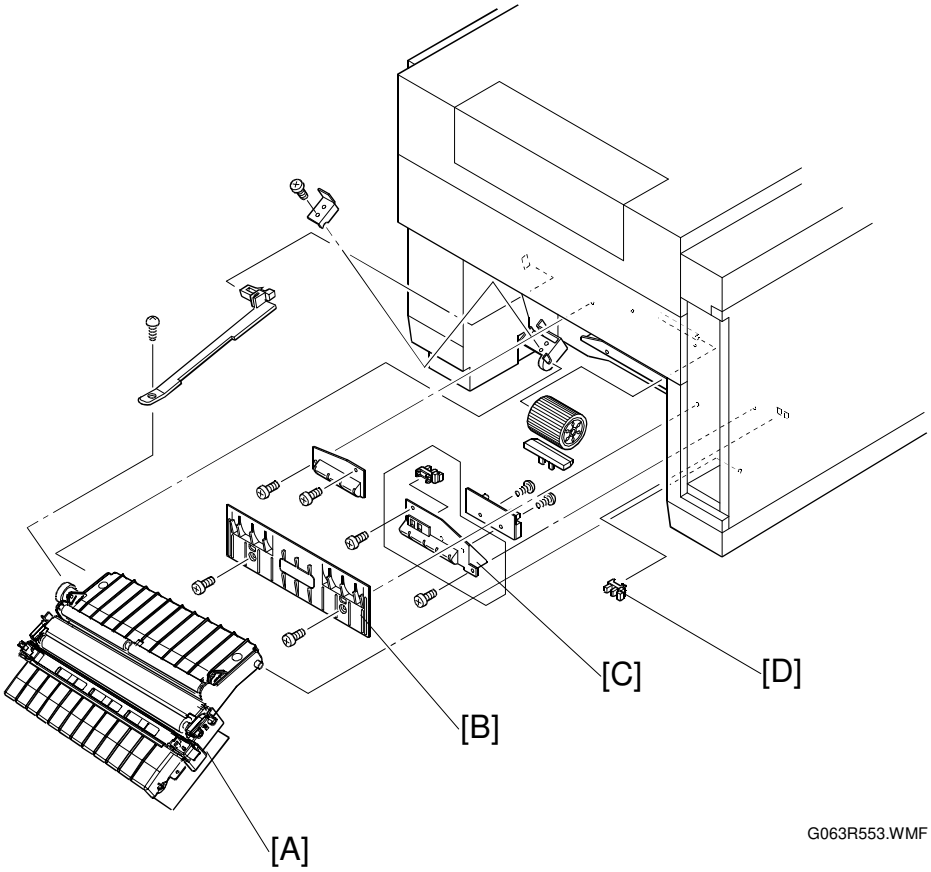
Since this micro-switch is an important part for safety, confirm after installation that the switch operates normally.

3.5.5 PAPER FEED SENSOR

☛3.6.1 Transfer Unit

[A]: Transfer Unit
[B]: Paper Guide (🔩 x 2)
[C]: Upper Left Paper Guide assembly (🔩 x 2)
[D]: Paper Feed Sensor (✋ x 1)

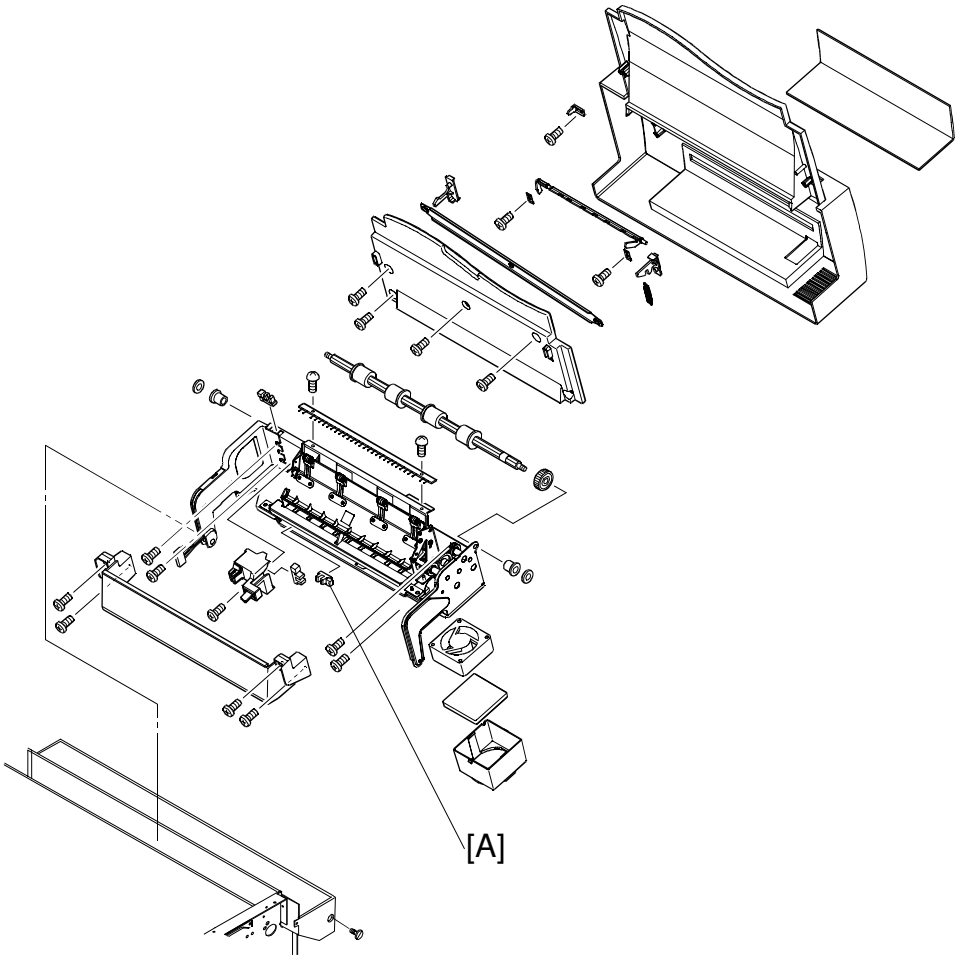
NOTE: Unhook the Paper Feed Sensor from the rear side of the hole through which the Upper Left Paper Guide was removed.



3.5.6 PAPER EXIT SENSOR

- Paper Exit Cover (☛3.6.6 Paper Exit Roller)

[A]: Paper Exit Sensor (☞ x 1)



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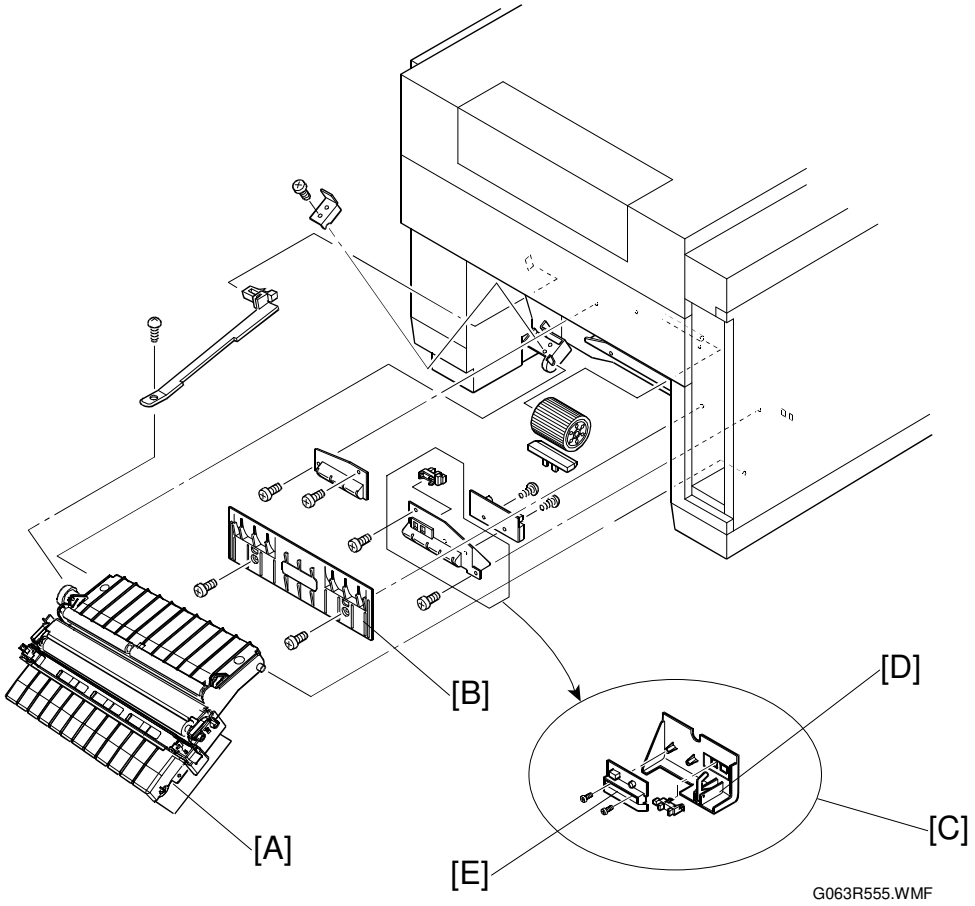
3.5.7 PAPER SENSOR / OHP SENSOR

☛3.6.1 Transfer Unit

[A]: Transfer Unit
[B]: Paper Guide (🔩 x 2)
[C]: Upper Left Paper Guide assembly (🔩 x 2)
[D]: Paper Sensor
[E]: OHP Sensor

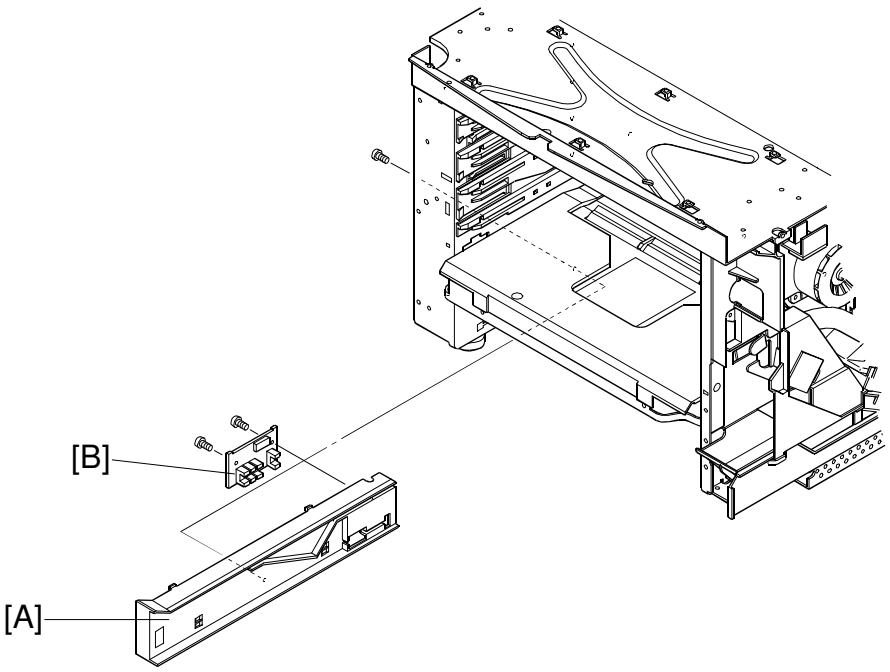


3.5.8 PAPER SIZE SENSOR

☛3.1.3 Left Side Cover

☛3.2.6 Power Supply Unit

[A]: Left Cassette Guide (x 2)
[B]: Paper Size Sensor (x 2, x 1)



3.5.9 DRUM PAPER JAM SENSOR

Remove the fusing unit.

Remove the belt cartridge (photoconductor unit).

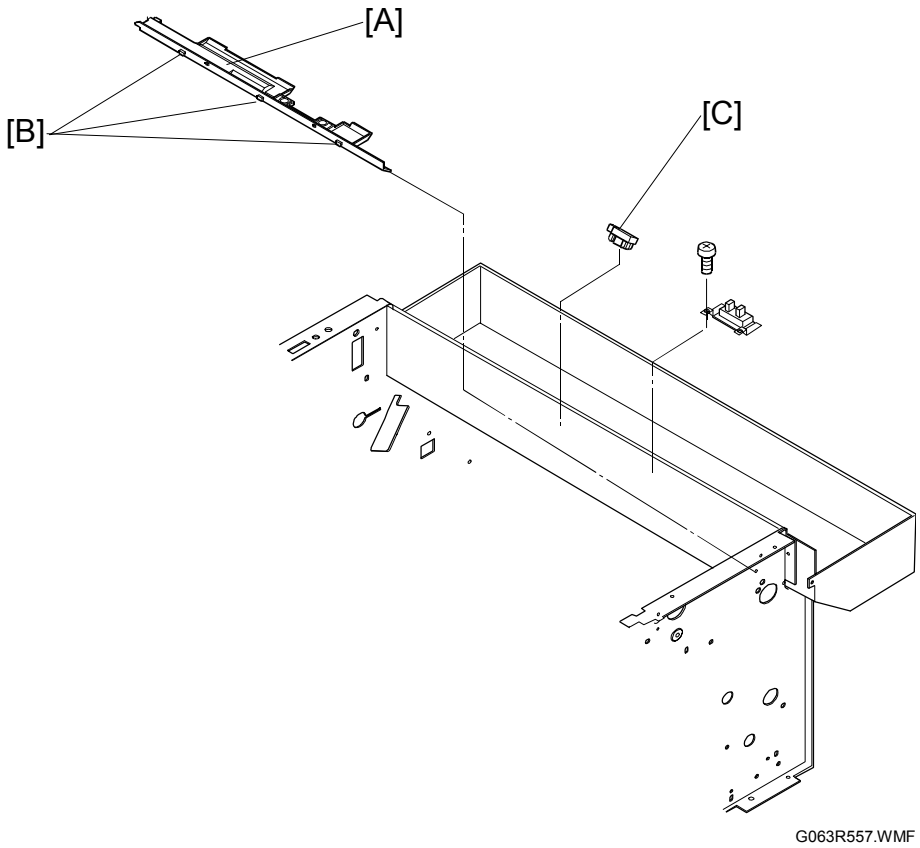
Remove the drum cleaner.

☛3.6.3 Transfer Drum

[A]: Cover F

NOTE: Release three hooks [B].

[C]: Drum Paper Jam Sensor (☞ x 1)



3.5.10 OIL SENSOR

Remove the fusing unit.

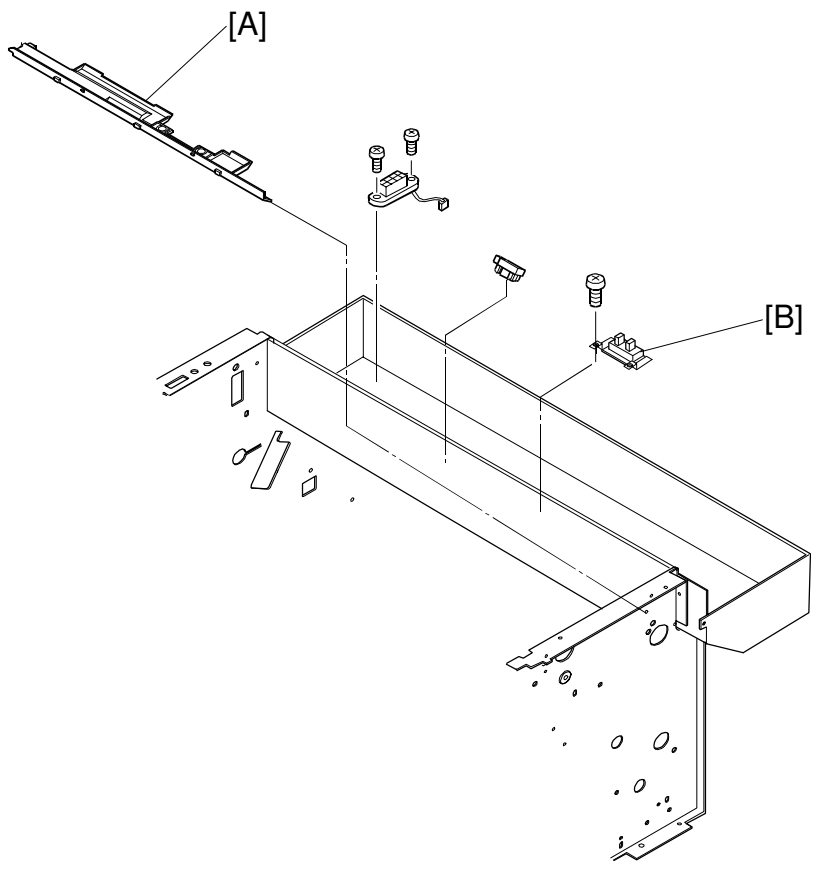
☛3.1.1 Left Upper Side Cover

☛3.1.3 Left Side Cover

☛3.1.5 Top Cover

- Shield Case A assembly(☛3.2.6 Power Supply Unit)

[A]: Cover F
[B]: Oil Sensor (x 2, x 1)



G063R558.WMF

3.5.11 DRUM ENCODER SENSOR

Remove the toner cartridges.

Remove the belt cartridge (photoconductor unit).

Remove the drum cleaner.

Remove the fusing unit.

☛3.1.3 Left Side Cover

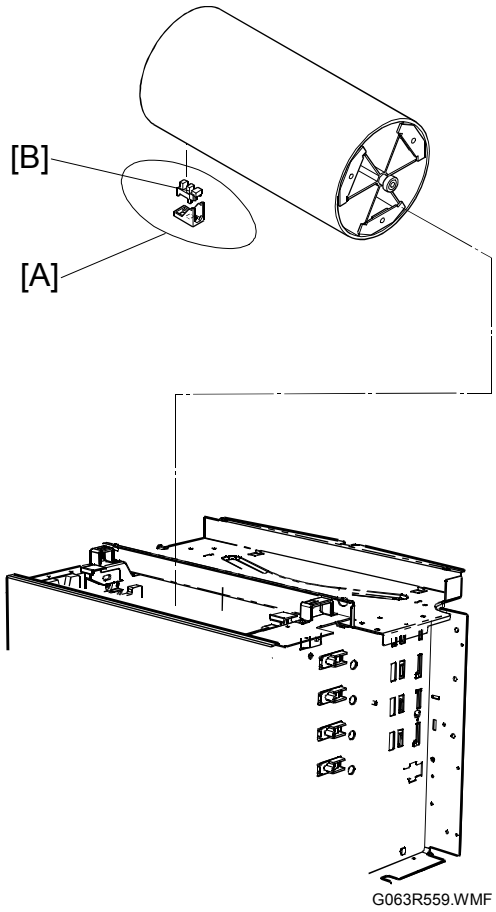
☛3.1.5 Top Cover

☛3.6.3 Transfer Drum

☛3.2.7 High Voltage Unit

[A]: Sensor Holder Assembly

[B]: Drum Encoder Sensor (☜ x 1)



G063R559.WMF

3.5.12 BELT SENSOR

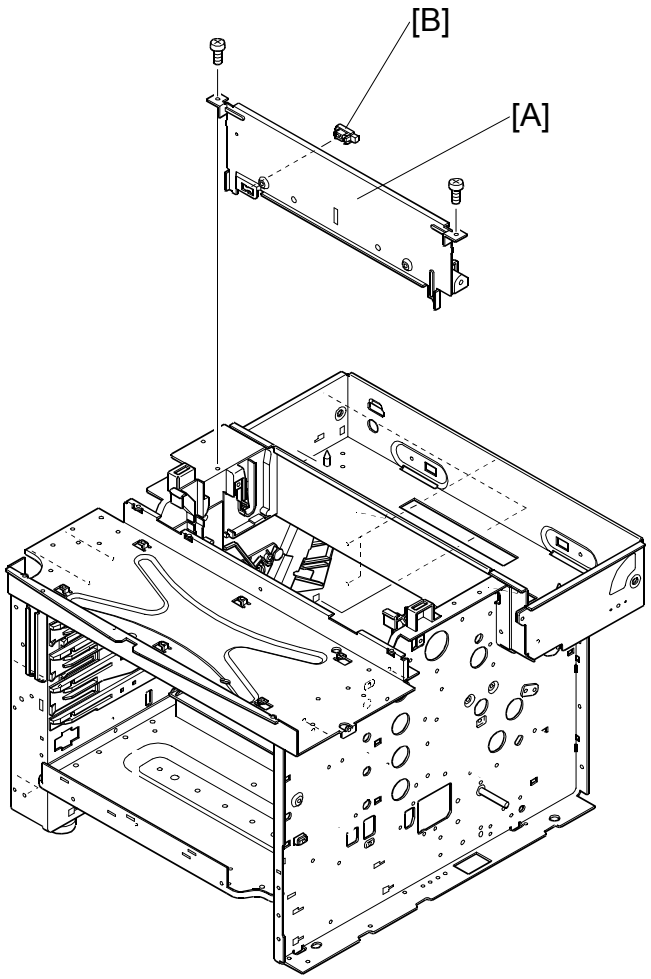
Remove the toner cartridges.

Remove the belt cartridge (photoconductor unit).

☛3.1.5 Top Cover

[A]: Stay A (🔩 x 2)

[B]: Belt Sensor (✋ x 1)



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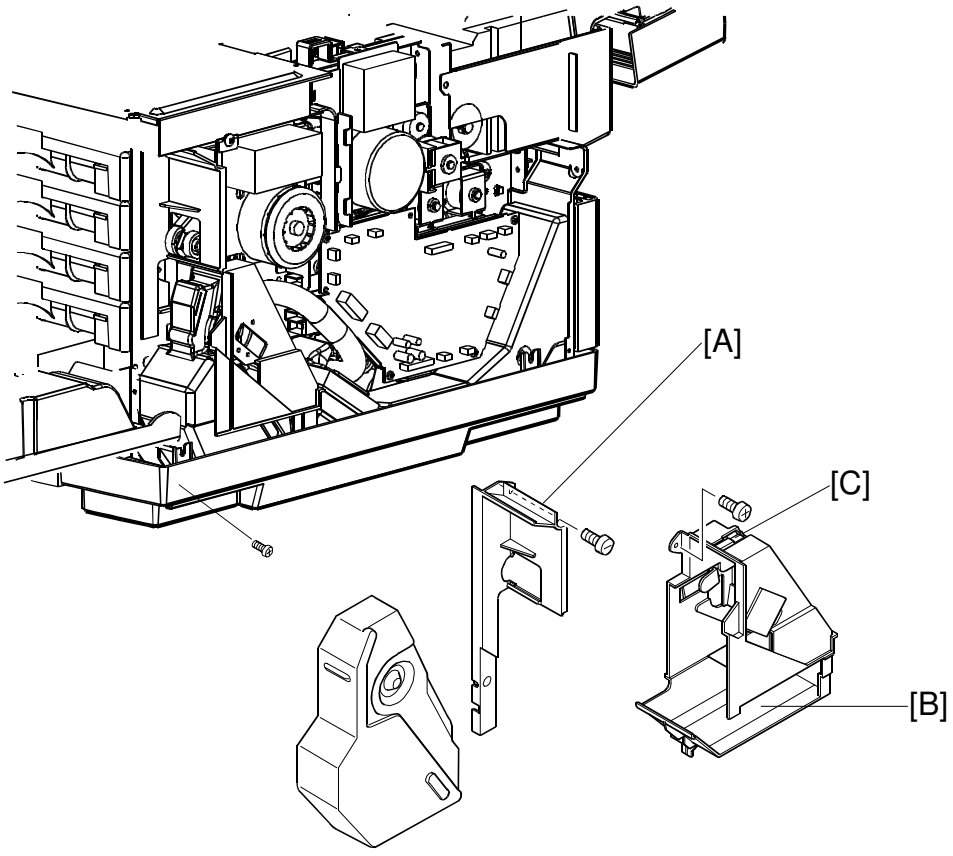
3.5.13 WASTE TONER SENSOR

- Right Side Cover (☛3.1.2 Right Side Cover and Ozone Filter Cover)

☛3.1.10 Right Base Cover

[A]: Cover F
[B]: WT Holder Ass'y (🔩 x 2)
[C]: Waste Toner Sensor



G063R546.WMF

3.5.14 TONER SENSOR ASSEMBLY

Light Emitter Board (Right)

- Right Side Cover (☛3.1.2 Right Side Cover and Ozone Filter Cover)

☛3.3.5 Development Drive Unit

[A]: Right Toner Sensor Board (🔩 x 3,🖐 x 1)

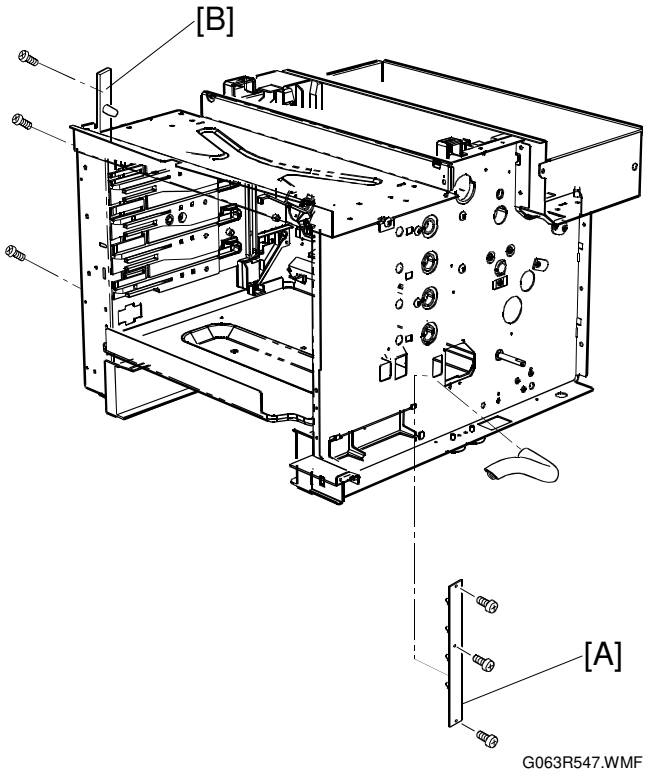
Light Receiver Board (Left)

☛3.1.3 Left Side Cover

☛3.2.7 High Voltage Unit

☛3.2.6 Power Supply Unit

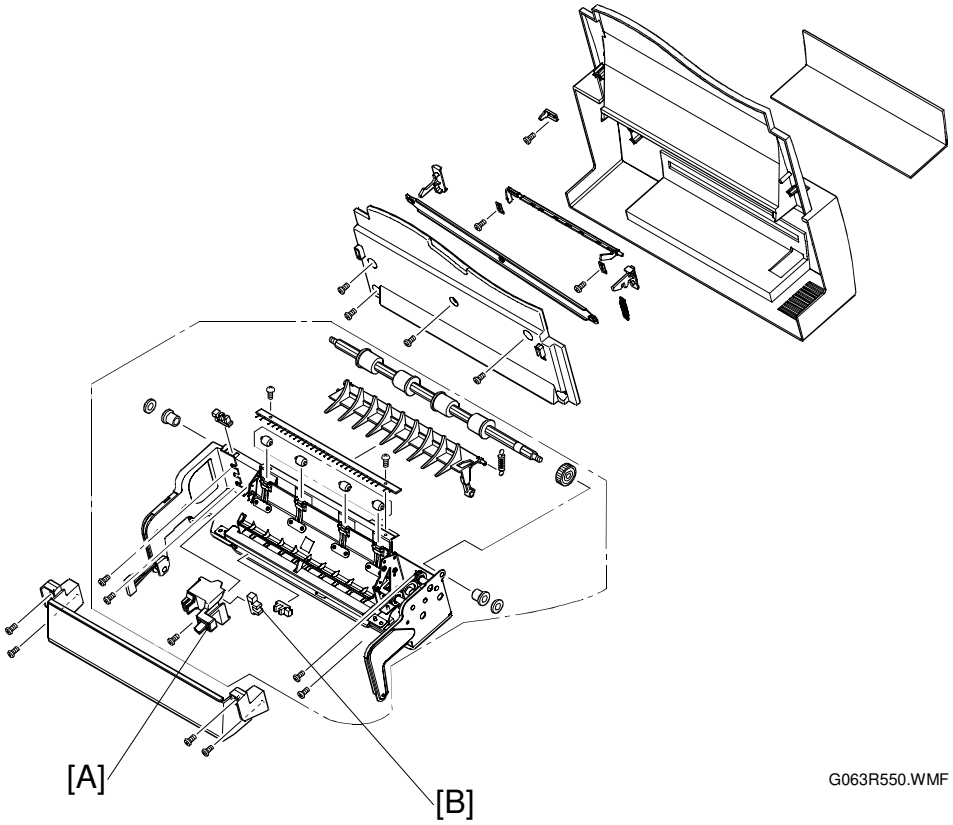
[B]: Left Toner Sensor Board (🔩 x 3, 🖐 x 1)



G063R547.WMF

3.5.15 CLEANING ROLLER SENSOR

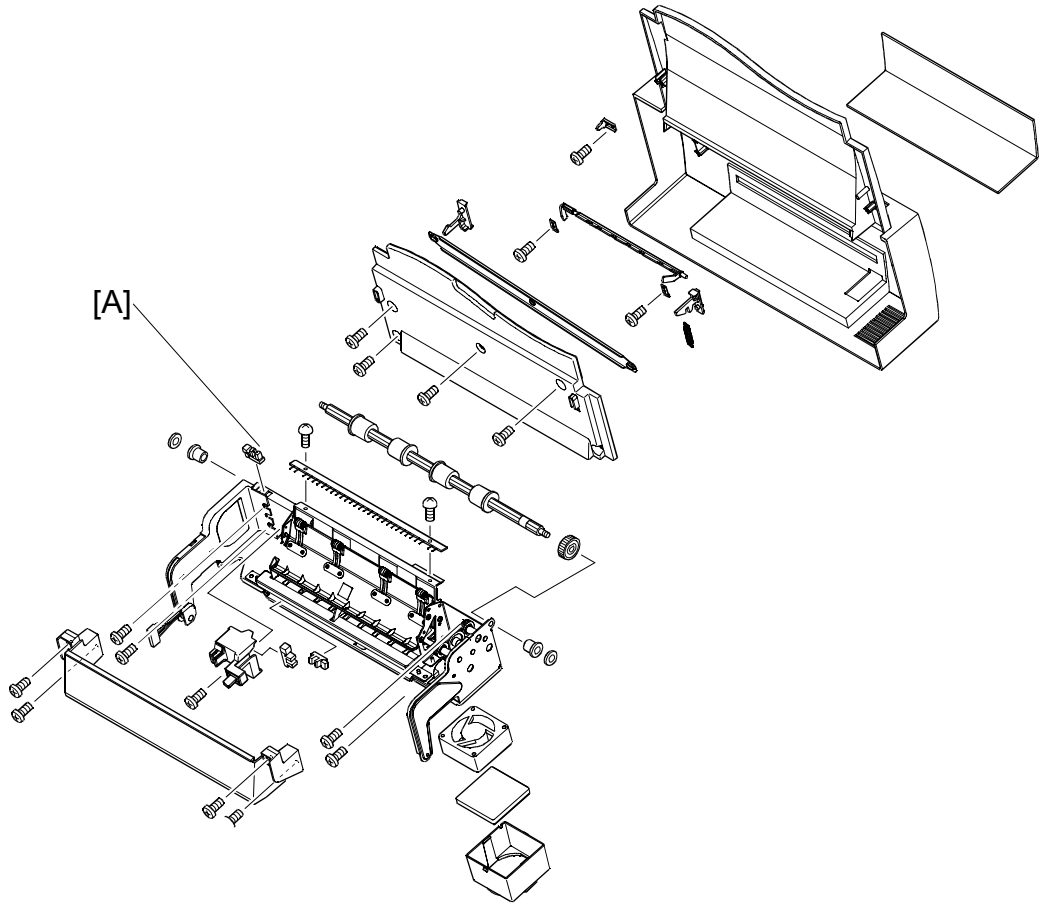
Open the paper exit unit.
[A]: Cleaning Roller Sensor Case (☞ x 1)
[B]: Cleaning Roller Sensor (☞ x 1)



3.5.16 PAPER EXIT TRAY FULL SENSOR

- Paper Exit Unit (☛3.6.6 Paper Exit Roller).

[A]: Paper Exit Tray Full Sensor (🖑 x 1)
NOTE: Unhook the sensor from its base, and remove the sensor



G063R551.WMF

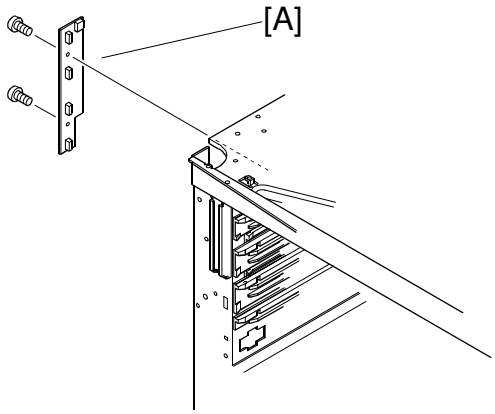
3.5.17 TONER TYPE SENSOR

☛3.1.1 Left Upper Side Cover

☛3.1.3 Left Side Cover

- Shield case A (☛3.2.6 Power Supply Unit)
- Upper Shield Cover (☛3.2.3 IOD 1).

[A]: Toner Type sensor (🔩 x 2,✋ x 1)



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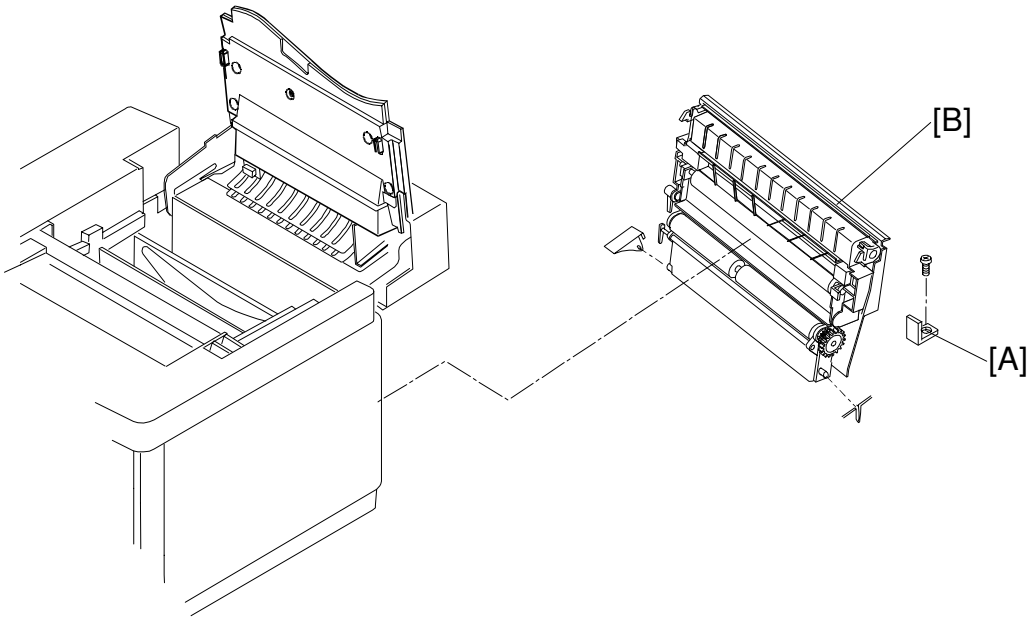
3.6 DRUM AND ROLLERS

3.6.1 TRANSFER UNIT

Remove the screw from the retainer band of the transfer unit.
[A]: Securing Bracket (x 1).
[B]: Transfer Unit
NOTE: Open the transfer unit, and remove the shaft from the frame installation hole.
1) Lifting the left side (as viewed from you), undo the shaft from the hole.
2) Slide the transfer unit to the left end, undo the shaft at the right side (as viewed from the rear side of the machine) from the hole.



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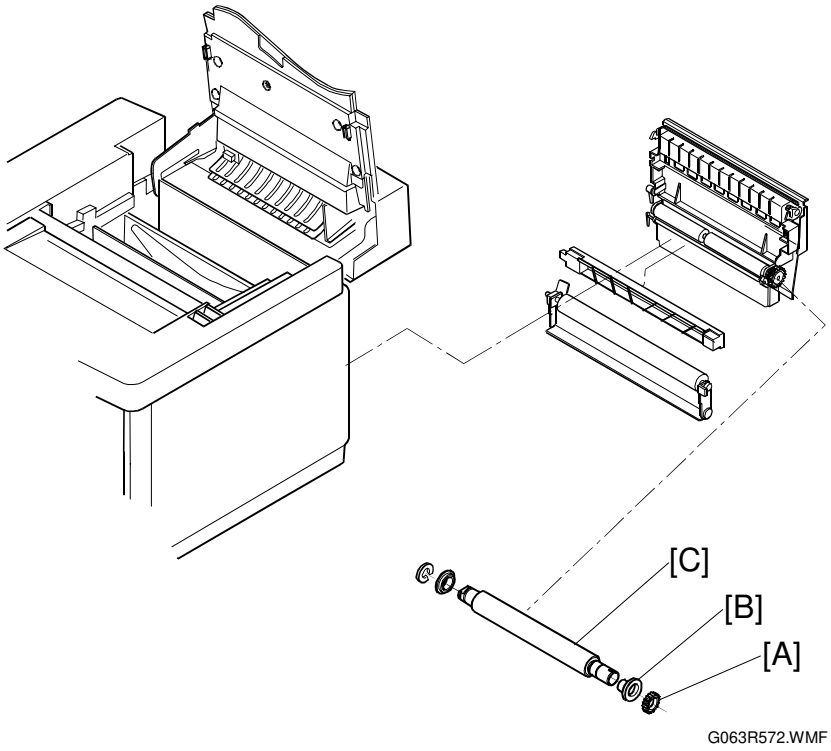
3.6.2 REGISTRATION ROLLER

☛3.6.1 Transfer Unit

[A]: Gear (℄ x 2)
[B]: Bushing
[C]: Registration Roller



3.6.3 TRANSFER DRUM

Remove the toner cartridges.

Remove the belt cartridge (photoconductor unit).

Remove the fusing unit.

Remove the cleaner cover.

Remove the drum cleaner.

Open the transfer unit.

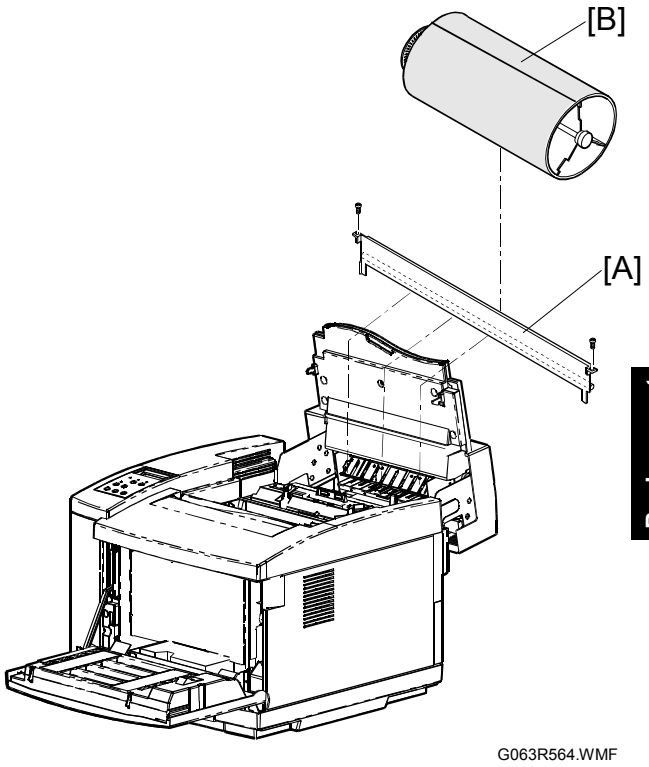
☛3.1.5 Top Cover

[A]: Stay A (🖉 x 2)

NOTE: Wrap the transfer drum surface with paper so that it will not be scratched. (The transfer drum as a maintenance part has a protective sheet.)

[B]: Transfer Drum

NOTE: Pull the transfer drum from the top side, and remove the transfer drum from the shaft support.



NOTE: Do not touch the transfer drum surface with bare hands, or scratch it.

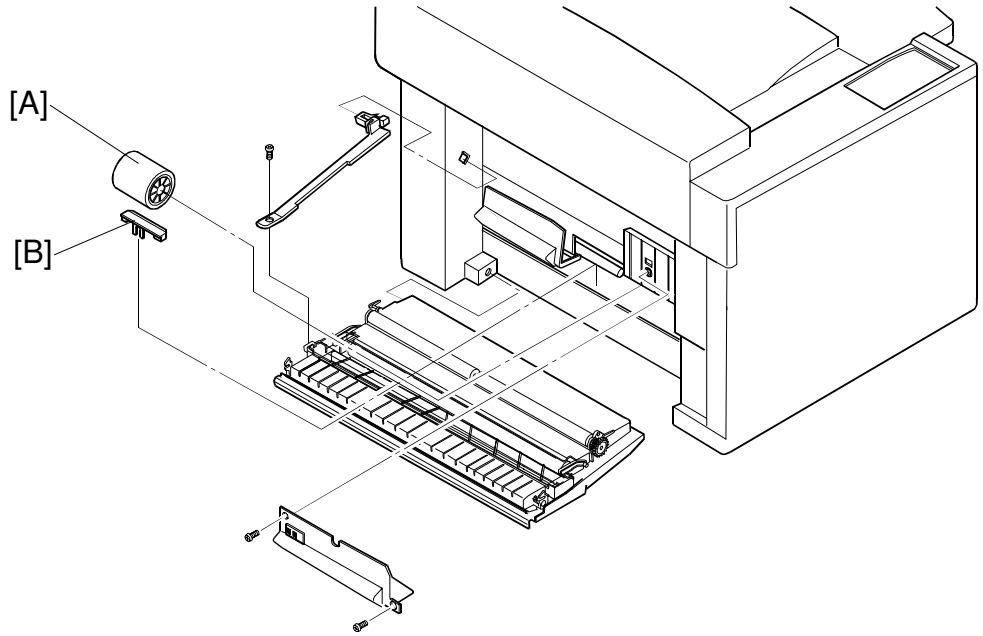
3.6.4 PAPER FEED ROLLER / SEPARATION PAD

Remove the paper feed cassette.
☛3.6.1 Transfer Unit

- Paper Guide (☛3.5.7 Paper Sensor / OHP Sensor)
- Upper Left Paper Guide (☛3.5.7 Paper Sensor / OHP Sensor)

Disconnect the cables connected to the OHP sensor and paper sensor.
[A]: Paper Feed Roller
NOTE: Sliding the paper feed roller to the right side, remove it from the shaft. Pull up and remove the separator pad.
[B]: Separation Pad

NOTE: Do not touch the surface of the paper feed roller and separator pad.



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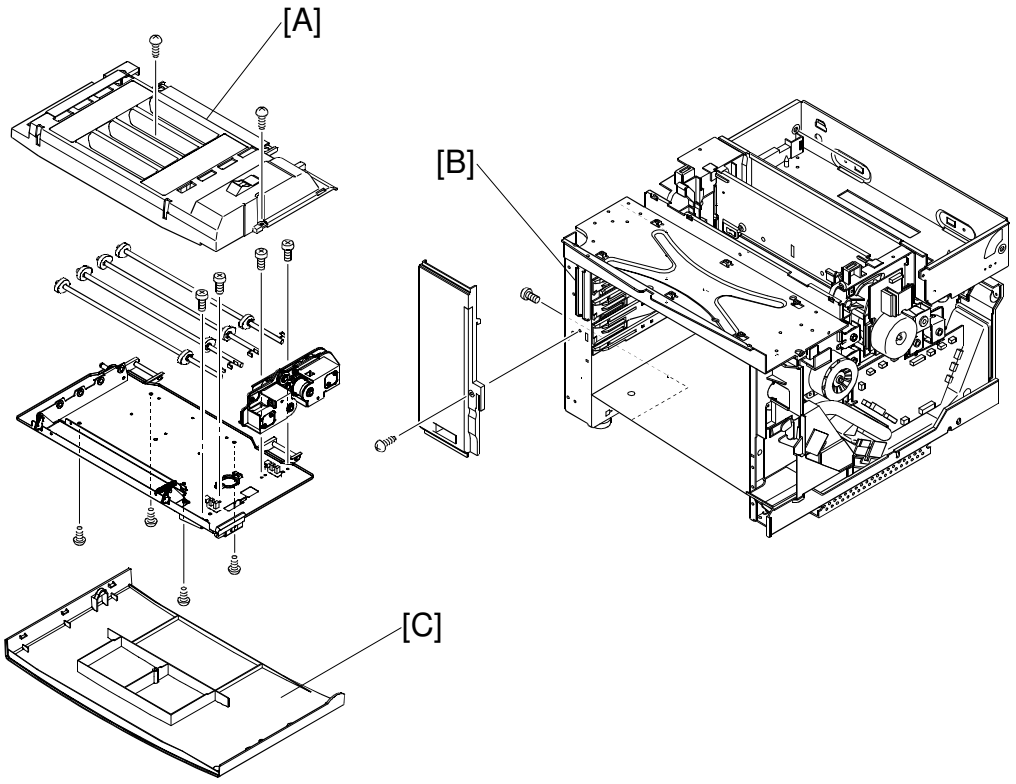
3.6.5 FRONT COVER UNIT

Open the front cover.

Optical Unit Cover (☛3.3.6 Optical Unit (Including Polygonal Mirror Motor)

☛3.1.13 Front Cover
[A]: Front Inner Cover (x 4)
[B]: Hinge Support (x 1, x 1)
[C]: Front Cover Unit (x 6)

NOTE: When removing the hinge of the front cover unit, watch out for the rebound of the spring.
To prevent the above, hold the hinge fixture, then unhook the hook from the frame.



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3.6.6 PAPER EXIT ROLLER

Remove the fusing unit.

- Right Side Cover (☛3.1.2 Right Side Cover and Ozone Filter Cover)

☛3.1.3 Left Side Cover

☛3.1.8 LOWER Rear Cover

☛3.1.9 Upper Rear Cover

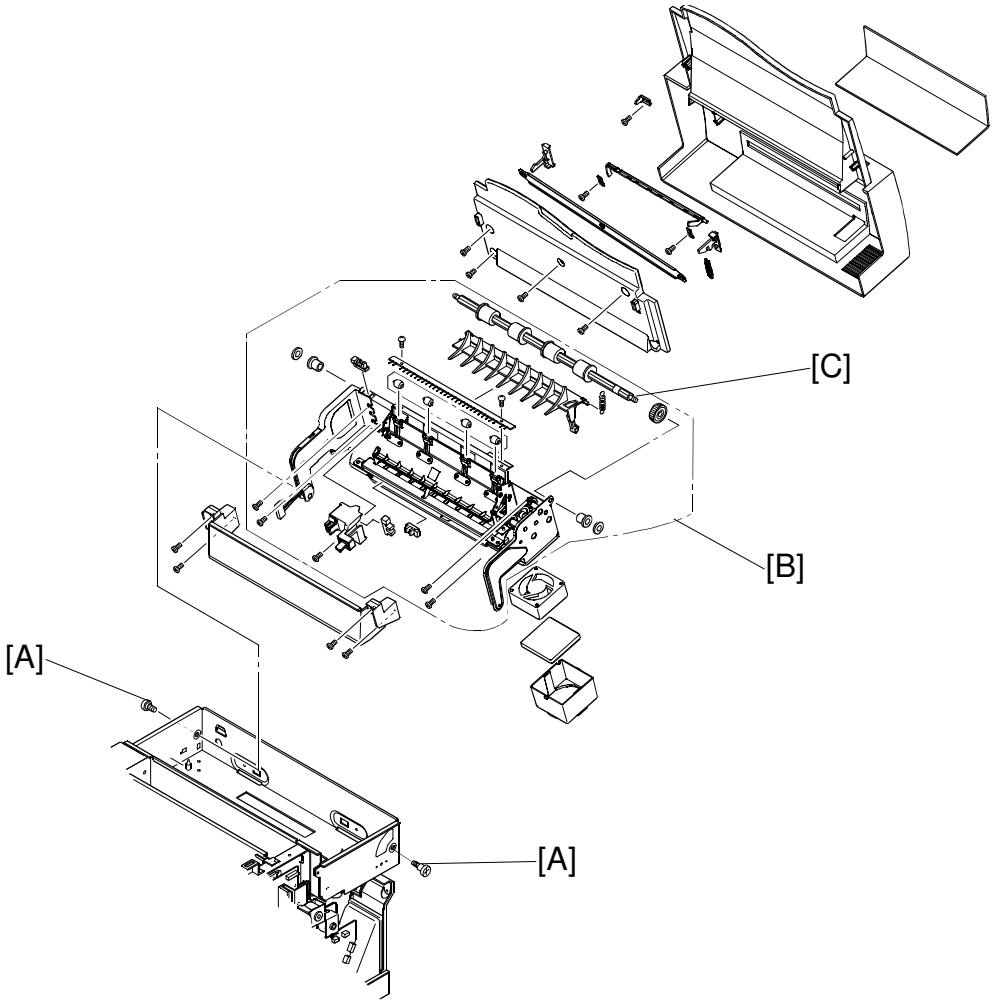
[A]: Support Pins (one each at left and right side) (x 2)

[B]: Paper Exit Unit (x 1)

NOTE: Remove the harness cover and disconnect the harness.

- Paper Exit Cover Ass'y (☛3.1.6 Paper Exit Front Cover / Paper Exit Cover Ass'y)

[C]: Paper Exit Roller (x 2)



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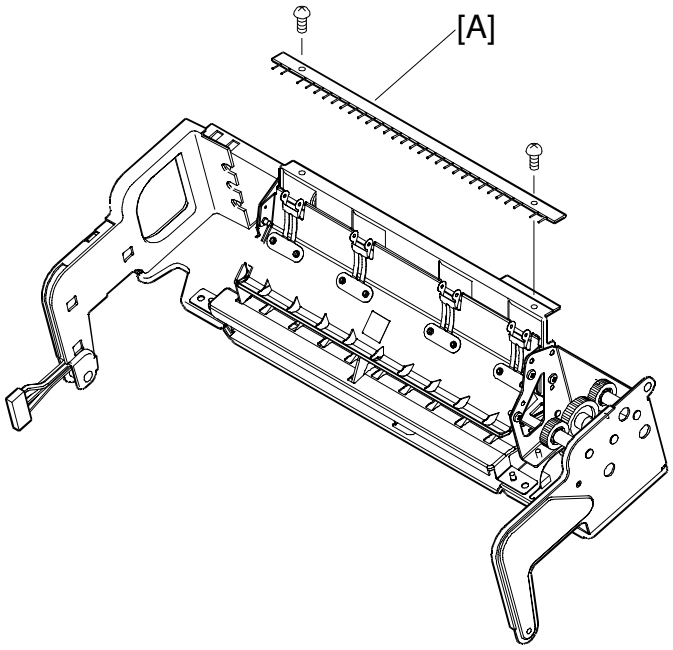
3.6.7 DISCHARGER BRUSH

- Paper Exit Unit (☛3.6.6 Paper Exit Roller)
- Paper Exit Front Cover (☛3.1.6 Paper Exit Front Cover / Paper Exit Cover Ass'y)
- Paper Exit Cover (☛ 3.1.6 Paper Exit Front Cover / Paper Exit Cover Ass'y)

[A]: Discharger Brush (🔩 x 2)



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NOTE: Do not damage the bristles of the discharger brush.

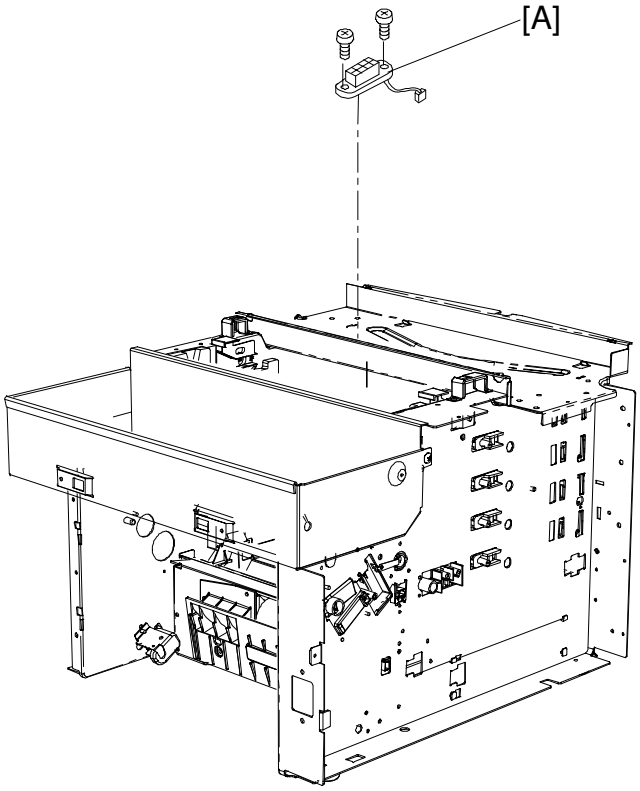
3.6.8 FUSING UNIT CONNECTOR

Remove the fusing unit.

☛3.1.3 Left Side Cover)

- Shield Case A (☛3.2.6 Power Supply Unit)

[A]: Fusing Unit Connector (x 2, x 2)



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3.6.9 LOWER WASTE TONER FEEDER

Remove the toner cartridges.

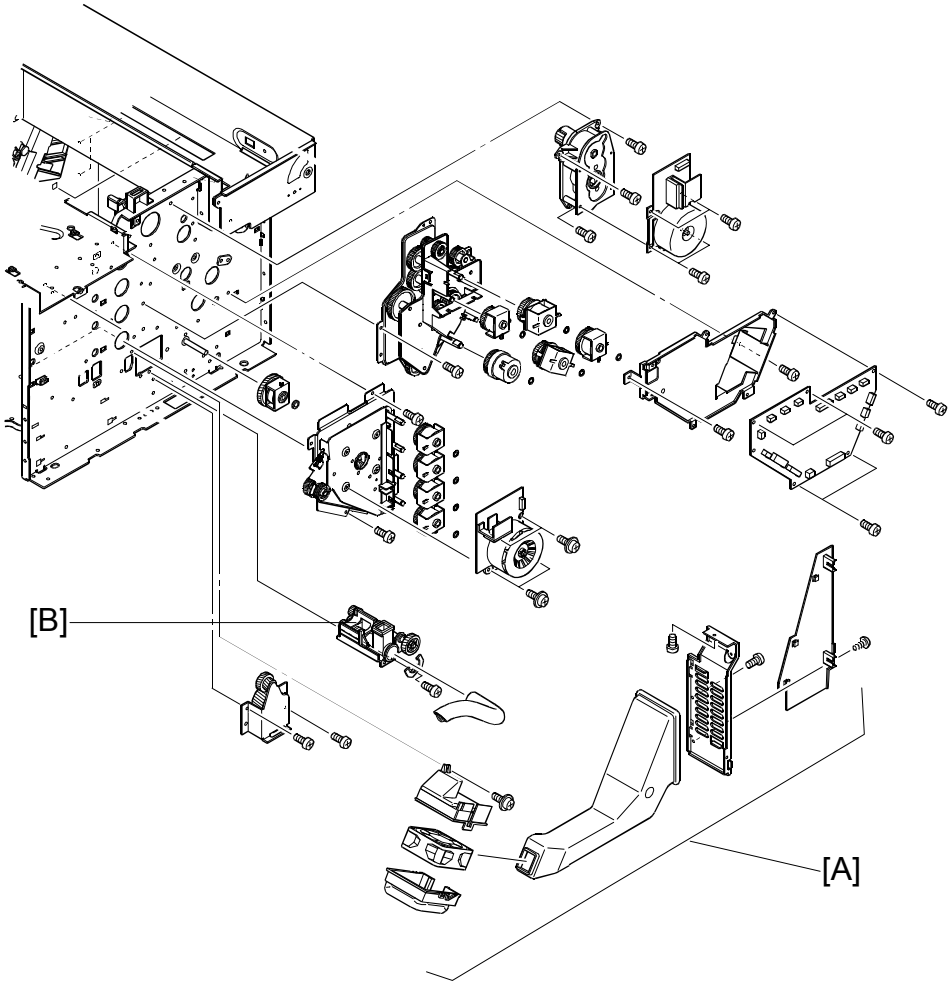
Remove the belt cartridge (photoconductor unit).

- Right Side Cover (☛3.1.2 Right Side Cover and Ozone Filter Cover)

☛3.2.4 IOD2

☛3.1.10 Right Base Cover

[A]: Ozone Fan Duct Assembly (🔩 x 3)
[B]: Lower Waste Toner Feeder (🔩 x 1)



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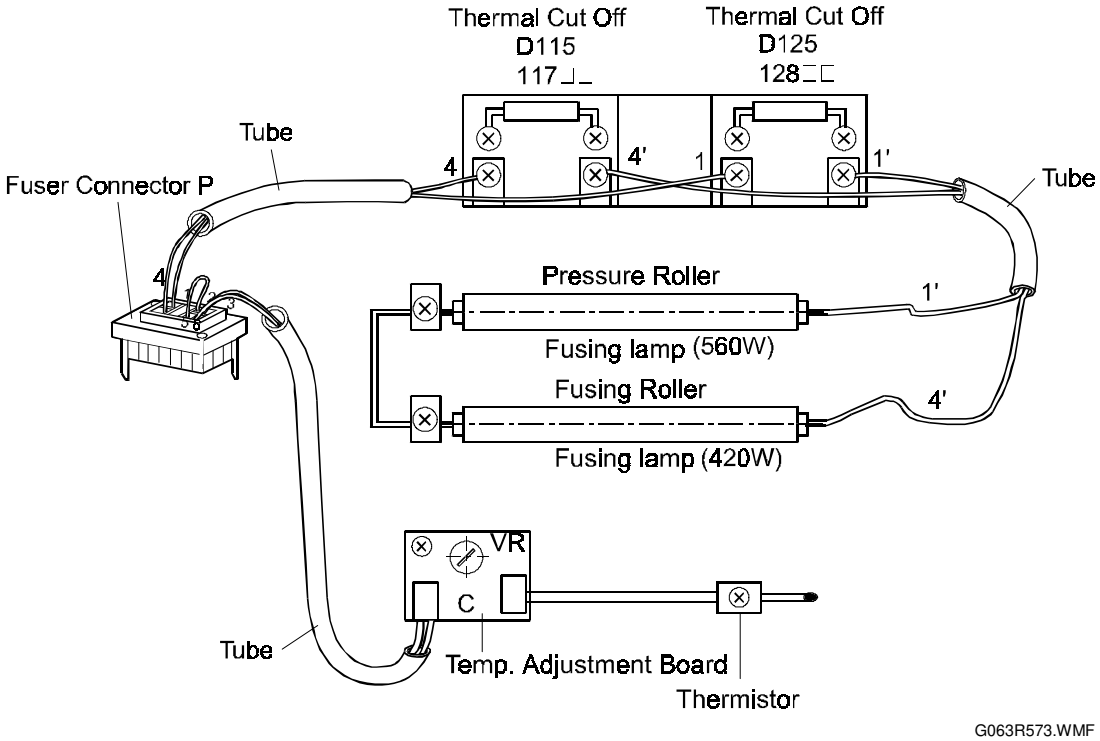
3.7 FUSING UNIT

3.7.1 INTRODUCTORY NOTES

⚠DANGER

- Note for Parts Replacement -

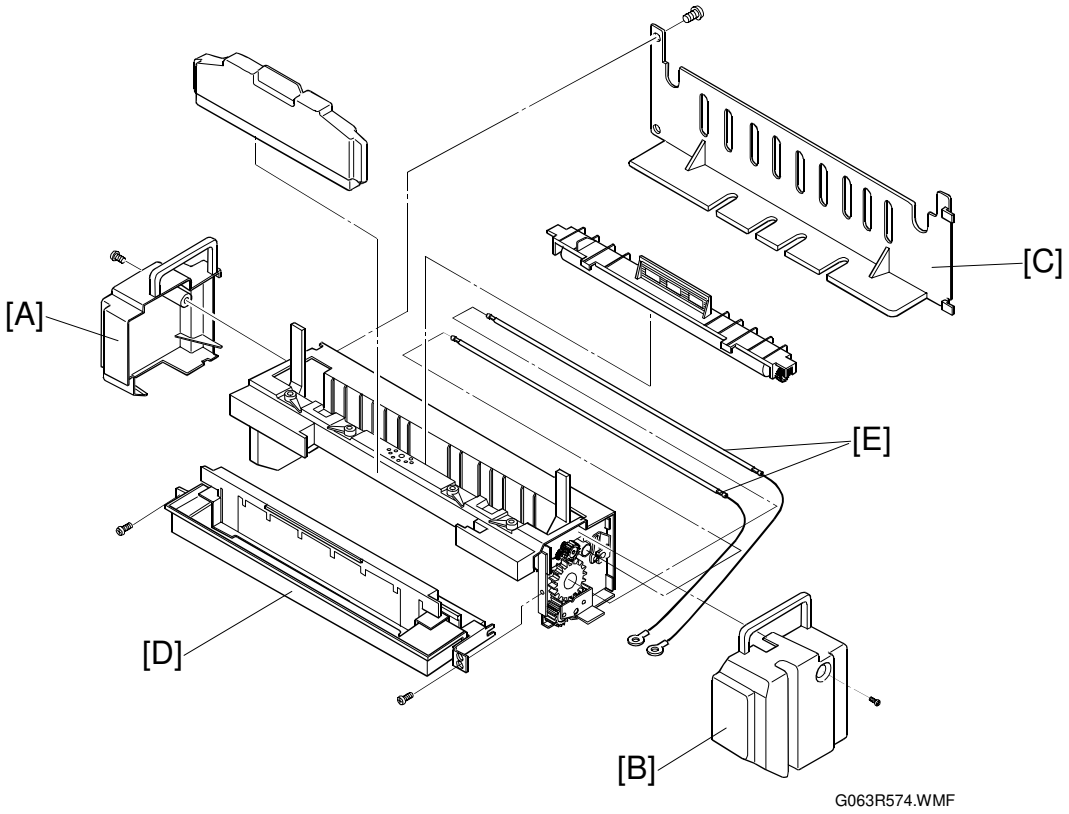
1. **The fusing unit consists of important parts in terms of safety. Therefore, replacement of parts or disassembly and maintenance work should be done at the appropriate facilities by skillful service personnel acquainted with electrical safety. After reassembly, the product's safety should be reconfirmed.**
2. **Since the fusing unit is very hot, make sure that the fusing unit and its perimeter is well cooled down prior to starting the replacement of parts. Otherwise, you may get burnt when touching the hot areas.**
3. **The fusing unit contains silicone oil. Do not drop silicone oil on the floor, or the floor will become very slippery and dangerous.**



3.7.2 FUSING LAMPS / OIL PAN UNIT

Remove the fusing unit.
[A]: Left Fusing Cover (x 1)
[B]: Right Fusing Cover (x 1)
[C]: Rear Fusing Cover (x 2)
[D]: Oil Pan Unit (x 2)
[E]: Fusing Lamp (x 8)

NOTE: Do not touch the surface of the fusing lamp with dirty hands.
The rating of the hot roller fusing lamp is different from the pressure roller fusing lamp. The rating is marked on the insulator of the lamp's electrode.
Hot roller : 560W
Pressure roller : 420W



3.8 MCTL FIRMWARE DOWNLOAD

Preparation

- IC Card Adapter (G0319350)
- IC Card containing new firmware

Insert the IC Card into the IC card adapter.

Procedure

1. Remove the printer controller board (🔩 x 2).
2. Turn SW1 of the DIP switch ON.
3. Install the IC Card adapter in either Optional Bus I/F slot 1 or slot 2.
4. Re-install the printer controller board in the machine.

CAUTION: To connect the MCTL and the printer controller board, firmly fasten the screws that secure the board. Otherwise, the download may fail and the MCTL may be damaged.

5. After turning the machine on, the LCD shows “Program ROM [#]”. Then, press [Enter] to start the downloading. This takes about 3 minutes.

CAUTION: Do not turn off the machine while the firmware is being downloaded. Otherwise, the download may fail and the MCTL may be damaged.

When the downloading is completed, “Completed” is displayed on the LCD.

6. Turn off the machine and remove the printer controller board (🔩 x 2).
7. Turn SW1 of the DIP switch OFF.
8. Remove the IC card adapter.
9. Install the printer controller board in the machine.
10. Reassemble the machine.

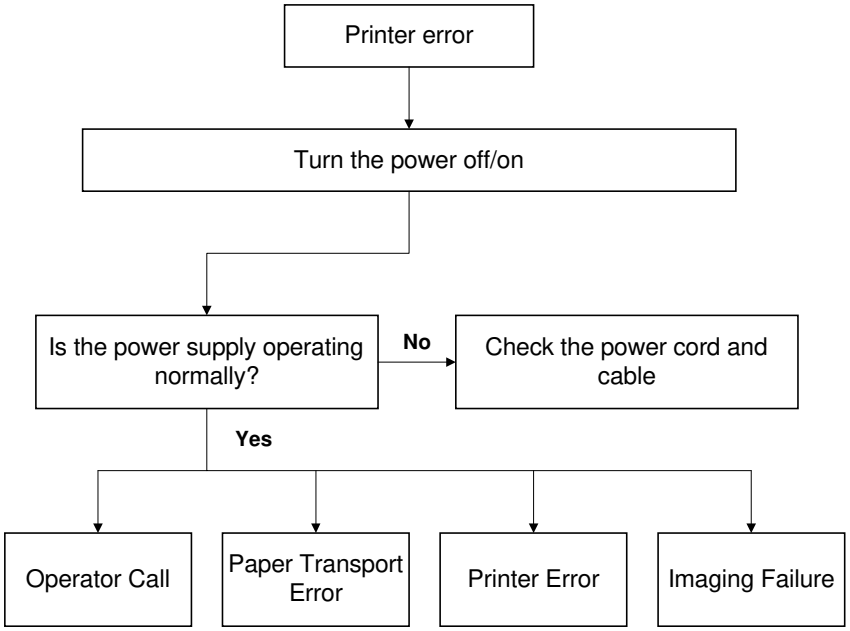
4. TROUBLESHOOTING

4.1 OVERVIEW

The following flow chart shows what to do if an error occurs.

If the machine cannot be recovered by cycling the power off/on, and if the power is plugged in correctly, the problem could be one of the four types shown at the bottom of the diagram.

The remainder of this section of the manual covers these four types of error.



G063H070.WMF

4.2 OPERATOR CALLS

4.2.1 OVERVIEW

When an operator call error occurs, the Error LED is lit, and a message appears on the LCD. The following types of error are operator call errors.

(1) A consumable (such as toner) ran out

(2) Waste toner bottle full

(3) Paper jam

(4) Maintenance required

(5) Maintenance incomplete

(6) Operator call error not cleared

Operator call errors are not usually considered breakdowns, and can normally be cleared by applying the correct countermeasures, as set out in the table on the next page.

If an error cannot be cleared, there may be a problem with the printer engine. Check and implement the appropriate countermeasures in accordance with the rest of this section.

Code	Message on Display/Possible Cause	Countermeasure
11	"Load xxx Tray xxx" No paper in the upper cassette. No paper in the lower cassette.	Add paper to the cassette.
12	"Reset Paper Tray Correctly" No upper paper cassette. No lower paper cassette.	Re-insert the cassette properly.
13	"Add Toner xxx" Toner cartridge (Y, M, C, or K) empty.	Add a new toner cartridge.
14	"Waste Toner is Full" Waste toner pack full of toner	Put in a new waste toner bottle.
	"Add Fuser Oil" Time to change the oil bottle.	Put in a new oil bottle.
	"Reset Fuser Cleaner Correctly" Time to change the cleaning roller.	Put in a new cleaning roller.
15	"Paper Size Error" Misprinting occurred	Check the paper cassette. Check the paper size. Check the media used.
16	"Reset xxx Toner Correctly" Toner cartridge not installed	Check the installation of the toner cartridge.
	"Reset Fusing Unit Correctly" Fusing unit not installed.	Remove the fusing unit, put it back in and reset it. Recheck the installation.
	"Reset PCU Correctly" Belt cartridge not installed	Check the belt cartridge (photoconductor unit) installation.
17	"Remove Misfeed From Tray xxx" Paper jammed in the feed area	Remove the paper cassette, and the paper jammed at the feed entrance.
	"Open Rear Cover Remove Misfeed" Paper jammed inside printer	Open the transfer unit, and remove the paper jammed inside.
	"Remove Misfeed From Output Tray" Paper jammed in paper exit area	Open the transfer unit/paper exit unit, and remove the paper jammed inside.
18	"Close Front Cover/Close Top Cover" Covers open	Check that the covers are firmly closed.
	"Close Rear Cover" Transfer unit open	Check that the transfer unit is firmly closed.
19	"Energy Save" Printer idling	The printer automatically returns to operating condition when the 'start printing' signal is received from the computer.
01	"Warming Up" Printer warming-up	Normal operation modes.
00	"Ready" Printer ready to print; in standby mode	
02	"Processing/Printing. . ." Printing or processing	

Trouble-shooting

4.2.2 TROUBLESHOOTING TIPS

Code 11 – Load xxx Tray xxx

Poor connection between the paper sensor and the IOD1 board
Defective paper sensor or actuator
Upper right paper guide out of position (see '3.6.4. Replacement Procedures – Paper Feed Roller/Separation Pad')
Defective IOD1 board

Code 12 – Reset Paper Tray Correctly

Damaged paper size sensor actuator – replace the paper cassette
Incorrectly installed paper size sensor
Poor connection between the paper size sensor and the IOD1 board
Defective paper size sensor
Defective IOD1 board

Code 13 – Add Toner xxx

Toner cartridge not installed
Poor connection between toner end sensor and IOD1 board
Defective toner end sensor
NOTE: If 'Reset xxx Toner Correctly' is displayed when the cartridge is removed, there is probably nothing wrong with the toner end sensor and its circuit.

Code 14 – Waste Toner is Full

Incorrectly installed waste toner bottle
Poor connection between waste toner sensor and IOD2 board
Defective waste toner sensor
Defective IOD2 board

Code 14 – Add Fuser Oil

Print 30 pages. If the error message does not disappear, check the following points.

Oil bottle not installed correctly with the lever
Oil not supplied from the oil bottle – replace the oil bottle
Damaged oil pan pin (does not push up the ball valve at the bottom of the oil bottle)
Fusing unit incorrectly installed
Poor connection between oil sensor and IOD1 board
Defective oil sensor
Defective IOD1 board

Code 14 – Reset Fuser Cleaner Correctly

Cleaning roller not installed properly
Poor connection between cleaning roller sensor and IOD1 board
Defective cleaning roller sensor
Defective IOD1 board

Code 15 - Paper Size Error

Damaged paper size sensor actuator – replace the paper cassette
Incorrectly installed paper size sensor
Poor connection between the paper size sensor and the IOD1 board
Defective paper size sensor
Defective IOD1 board

Code 16 - Reset xxx Toner Correctly

Poor connection between toner end sensor (LED/phototransistor) and IOD1 board
Defective toner end sensor (LED/phototransistor)
Defective IOD1 board

Code 16 - Reset Fusing Unit Correctly

Poor connection between fusing unit connector, power supply unit, and high voltage unit
Incorrectly connected fusing unit connector
Defective fusing unit

Code 16 - Reset PCU Correctly

Poor connection between belt sensor and IOD1 board
Defective belt sensor
Defective photoconductor

Code 17 – Remove Misfeed from Tray xxx

A recommended type of paper is not being used
Incorrectly installed paper cassette
Damaged cassette base – replace the cassette
Paper feed sensor actuator mechanism not smooth – replace the actuator if necessary
Defective paper feed roller or separation pad

Code 17 – Open Rear Cover Remove Misfeed

Debris in the paper feed path or in the transfer unit
Transfer unit not closed properly
Paper feed sensor actuator has come off or is defective
Poor connection between paper feed sensor and IOD1 board
Defective paper feed sensor
Defective IOD1 board

Code 17 – Remove Misfeed from Output Tray

Debris in the paper feed path or in the transfer unit
Paper exit sensor actuator has come off or is defective
Poor connection between paper exit sensor and IOD1 board
Defective paper exit sensor
Defective IOD1 board

Code 18 – Close Front Cover/Close Top Cover

Cover not closed
Front cover lock lever damaged
Top cover or switch actuator damaged – replace the paper exit unit
Loose front cover switch or exit cover switch
Poor connection between front cover switch and dc power supply board
Poor connection between exit cover switch and IOD1 board
Defective front cover switch or exit cover switch

Code 18 – Close Rear Cover

Transfer unit not closed
Transfer unit lock bent – replace the transfer unit
Loose rear cover switch
Poor connection between rear cover switch and IOD1 board
Defective rear cover switch

4.3 PAPER TRANSPORT ERRORS

The user can clear paper jams in the following locations:

Paper Feed Unit
Transfer Unit
Fusing Unit
Paper Exit Unit

(1) Feed Jam

Problem Item	Check Item	Result	Corrective Action
Print Paper	Is the paper a recommended paper type?	NO	Use a recommended paper type.
	Is the paper damp or moist?	YES	Replace the paper.
Paper Cassette	Is the paper correctly in place?	NO	Set the paper in the proper place.
	Is the end plate set up properly?	NO	Set the end plate to meet the paper size.
Pick-up Roller	Is the paper caught in the paper feed unit?	YES	Remove the caught paper.
	Is the pick-up roller damaged?	NO	Replace the pick-up roller.

(2) Jam inside the Machine

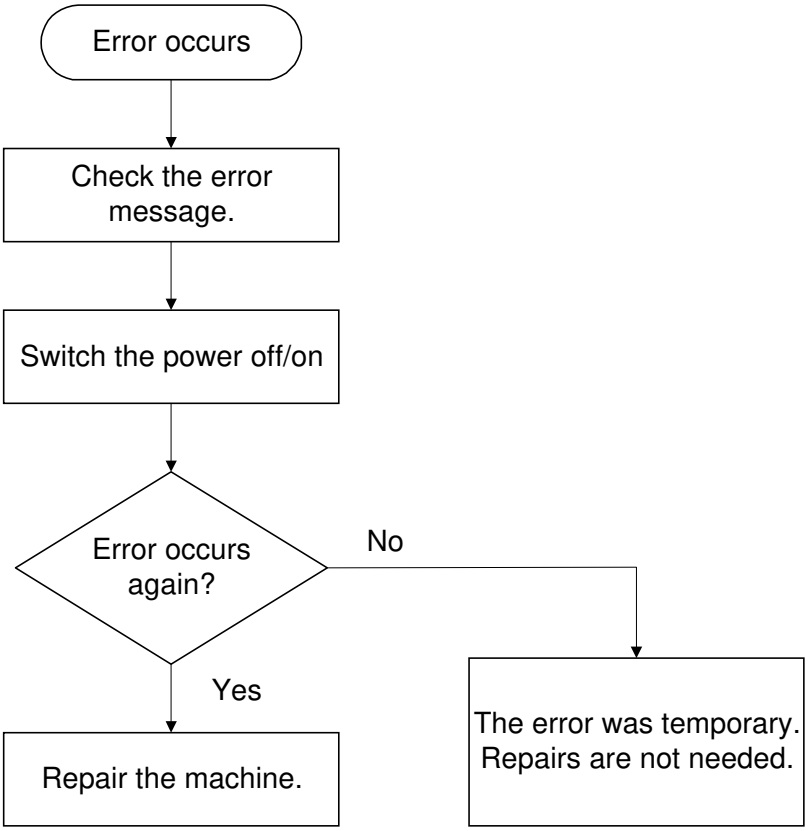
Problem Item	Check Item	Result	Corrective Action
Transfer Unit	Open the transfer unit to check it.		
	Is there paper inside the unit?	YES	Remove the paper.
	Is the transfer roller firmly locked by the lock lever?	NO	Fix the transfer roller using the lock lever.
	Is the paper discharge unit installed properly?	NO	Install the paper discharge unit firmly in place.
	Is the wire for the paper discharger unit damaged?	YES	Replace the paper discharger.
Fusing Unit	Is the fusing unit installed properly?	NO	Install the fusing unit firmly in place.
	Is there paper pinched between the rollers?	YES	Remove it.
	Is there any fusing oil in the oil bottle?	NO	Replace the oil bottle.

(3) Jam at the Entrance or Exit

Problem Item	Check Item	Result	Corrective Action
Print Paper	Is the paper a recommended type?	NO	Use a recommended paper type.
Paper Exit Unit	Is the paper exit unit firmly locked by the lock lever?	NO	Open and close the paper exit unit.

4.4 PRINTER ERRORS

4.4.1 OVERVIEW



G063H071.WMF

If a printer engine error occurs, the operation panel will display an error message, and the printer will stop. If the error occurs again after the machine is switched off/on, repair the machine. The rest of this section contains guidelines on how to repair the machine for each error code.

4.4.2 ERROR CODE TABLE

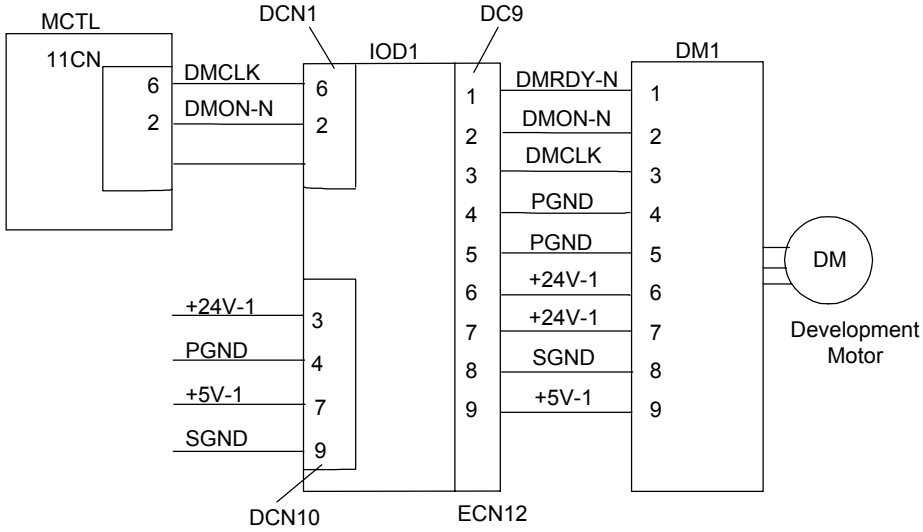
Code	Description
22 (08)	Development motor error
23 (07)	Main motor error
24 (06)	Polygon mirror motor error
25 (09)	Charge corona voltage (CHV) error
31 (13)	Fusing thermistor error
33 (12)	Fusing temperature error (Warm-up error: The fusing unit does not warm up to the required temperature within 4 minutes)
34 (11)	Fusing temperature error (Operating error: Fusing unit temperature drops below 100 °C or fails to rise to the standby temperature within 6 minutes)
35 (10)	Fusing temperature error (Operating error: Fusing unit temperature rises above 200 °C or fails to drop to the standby temperature within 8 minutes)
41 (05)	Laser beam sensor error (laser main scan synchronization)
42 (04)	Laser power error
43 (01)	NVRAM error (MCTL)
44 (03)	Engine controller MCTL hardware error
45 (02)	Process timing clock error (main motor clock error)
51 (18)	Quenching lamp error
52 (17)	Toner end sensor error
53 (16)	Control fan error
54 (15)	Ozone fan error
55 (14)	Fusing fan error
61 (24)	Yellow development unit clutch error
62 (23)	Magenta development unit clutch error
63 (22)	Cyan development unit clutch error
64 (21)	Black development unit clutch error
65 (20)	HPSI signal error (Retraction error for the black and yellow toner cartridge)
66 (19)	HPSI signal error (Retraction error for the cyan and magenta toner cartridge)
71 (30)	Transfer drum rotational error
72 (29)	Transfer roller contact solenoid error
73 (28)	Cleaner contact solenoid error
74 (27)	Cleaner clutch error
75 (26)	Fusing clutch error
76 (25)	Belt sensor error
81 (36)	Duplex unit controller error
83 (34)	Duplex unit lower solenoid error
84 (33)	Duplex unit motor error
85 (32)	Duplex unit upper solenoid error
86 (31)	Duplex unit fan motor error
EC (00)	Engine communication error

Codes in the brackets: Internal printer engine error codes

4.4.3 TROUBLESHOOTING TIPS

Code 22 – Development Motor

- If there is noise from the belt cartridge (photoconductor unit) during printing, replace the belt cartridge, or the development gear and/or development motor
- Poor cable connections – see the circuit diagram below

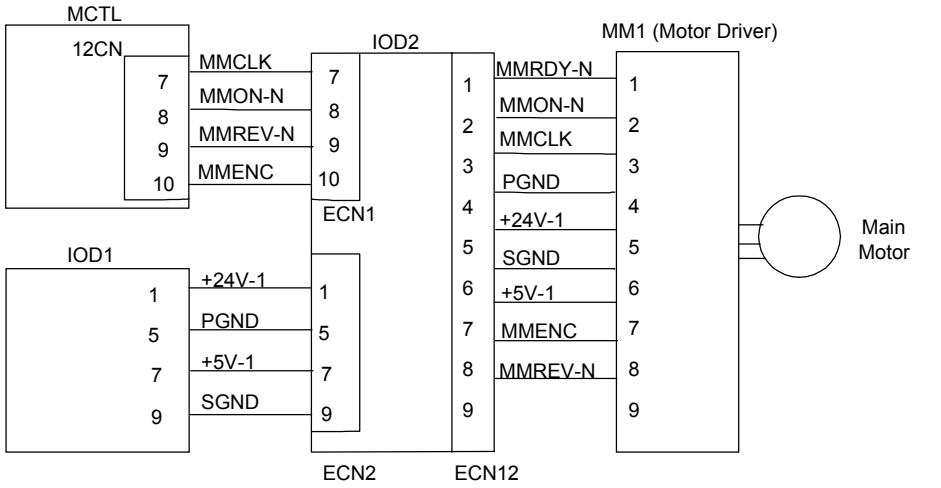


G063H080.WMF

- Defective development motor (especially if +24 and +5 V supplies arrive at the motor normally)
- Defective IOD1 board
- Defective MCTL board

Code 23 – Main Motor Error

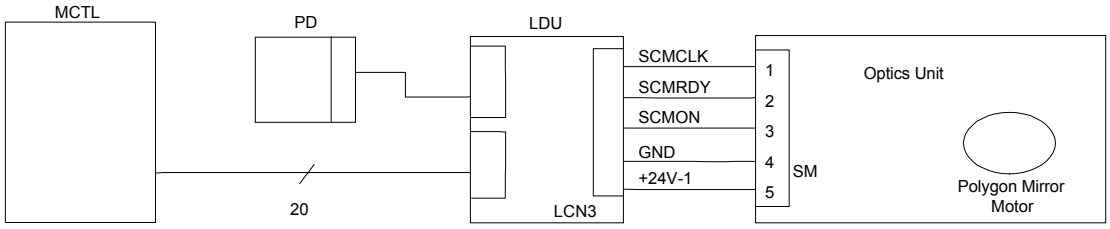
- Defective belt cartridge (photoconductor unit) – replace if not turning smoothly
- Defective fusing unit – replace if not turning smoothly
- Poor cable connections – see the circuit diagram below



- Defective main motor (especially if +24 and +5 V supplies arrive at the motor normally)
- Defective IOD2 board
- Defective IOD1 board
- Defective MCTL board

Code 24 – Polygon Mirror Motor Error

- Loose cable connection – see the circuit diagram below

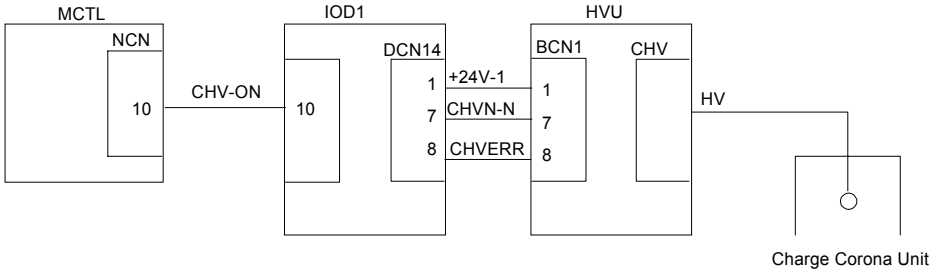


G063H046.WMF

- Defective optics unit
- Defective MCTL board

Code 25 – Charge Corona Voltage (CHV) Error

- Charge corona unit not installed properly
- Corona wire cut or shorted – replace the wire and if necessary, replace the belt cartridge (photoconductor unit) as well
- Check the cable and terminal connections – see the circuit diagram below

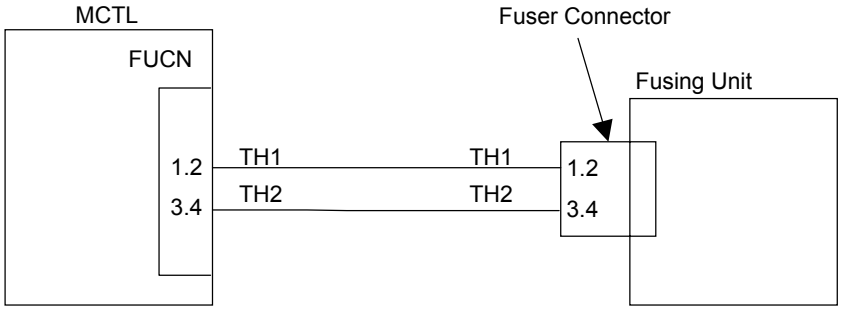


G063H042.WMF

- Dirty CHV terminal socket
- Defective high voltage unit (HVU)
- Defective IOD1 board
- Defective MCTL board

Code 31 – Fusing Thermistor Error

- Fusing unit incorrectly installed
- Fusing unit connector not connected properly
- Loose cable connection – see the circuit diagram below



- Defective fusing unit
- Defective high voltage unit (HVU)
- Defective IOD1 board
- Defective MCTL board

Codes 33, 34, 35 – Fusing Unit Temperature Errors

If the fusing lamps turn on and off normally:

- Defective fusing lamp
- Defective fusing unit
- Defective dc power supply board
- Defective MCTL board

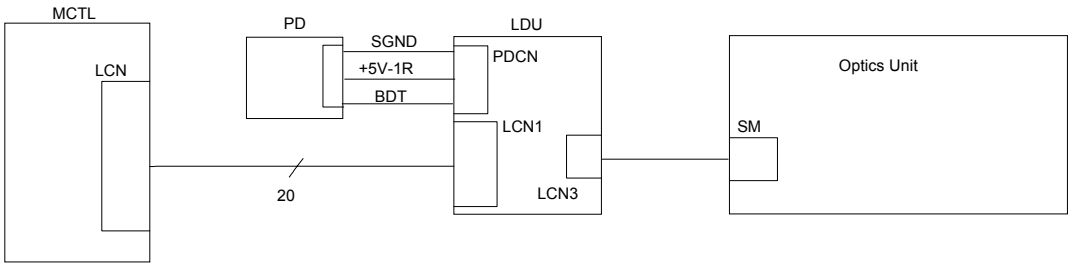
If one or both fusing lamps do not turn on and off normally:

- Thermofuses not connected properly
- Fusing unit not installed properly
- Damaged fusing connector
- Defective fusing lamp contact terminal
- Defective fusing lamp
- Defective fusing unit
- Defective dc power supply board
- Defective MCTL board

Also see section 6.6.2 (Control System – Fusing Temperature Control).

Code 41 – Laser Main Scan Synchronization Detector Error

- Loose cable connection – check the circuit diagram below

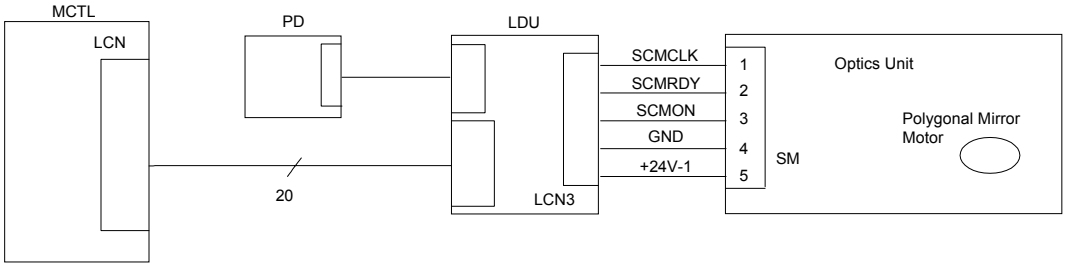


G063H045.WMF

- Defective optics unit
- Defective MCTL board

Code 42 – Laser Power Error

- Loose cable connection – check the circuit diagram below



G063H033.WMF

- Defective optics unit
- Defective dc power supply board
- Defective MCTL board

Code 43 – NVRAM Error

Turn the power switch off/on.
If the error has not disappeared, initialize the MCTL board NVRAM (engine SP mode 46, NVRAM INITIAL).
If that does not work, replace the MCTL board.

Code 44 – MCTL Board Hardware Error

Turn the power switch off/on.

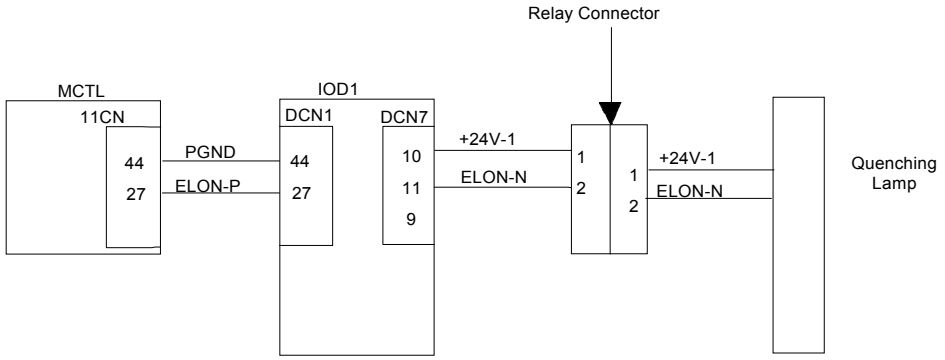
If the error has not disappeared, replace the MCTL board.

Code 45 – Process Timing Clock Error

The same as for code 23

Code 51 – Quenching Lamp Error

- Loose cable connection – see the circuit diagram below

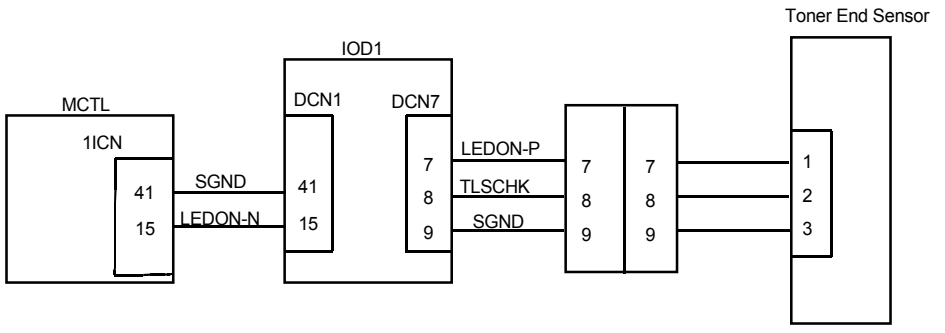


G063H038.WMF

- Defective quenching lamp
- Defective IOD1 board
- Defective MCTL board

Code 52 – Toner End Sensor Error

- Loose cable connection – see the circuit diagram below

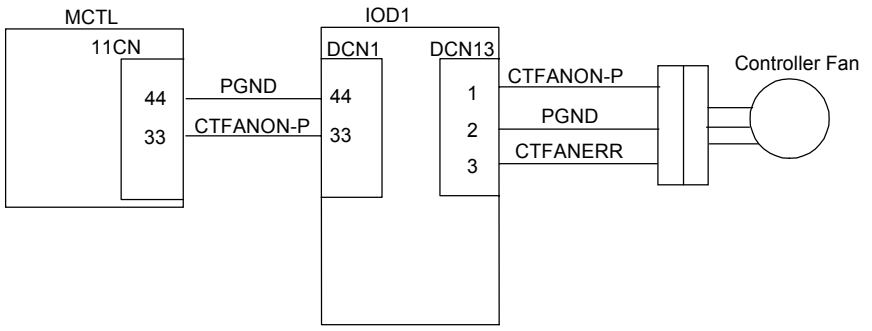


G063H032.WMF

- Defective toner end sensor
- Defective IOD1 board
- Defective MCTL board

Code 53 – Controller Fan Error

- Loose cable connection – see the circuit diagram below

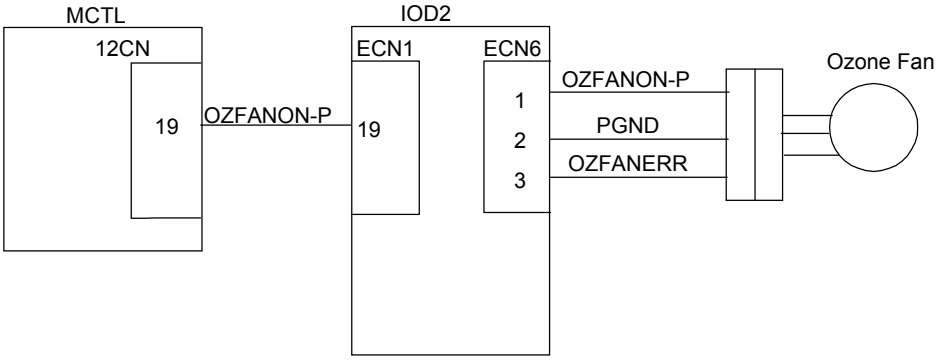


G063H039.WMF

- Defective controller fan
- Defective IOD1 board
- Defective MCTL board

Code 54 – Ozone Fan Error

- Loose cable connection – see the circuit diagram below

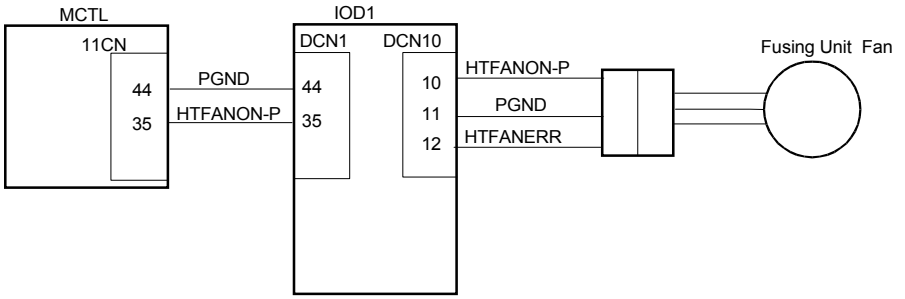


G063H040.WMF

- Defective ozone fan
- Defective IOD2 board
- Defective MCTL board

Code 55 – Fusing Unit Fan Error

- Loose cable connection – see the circuit diagram below

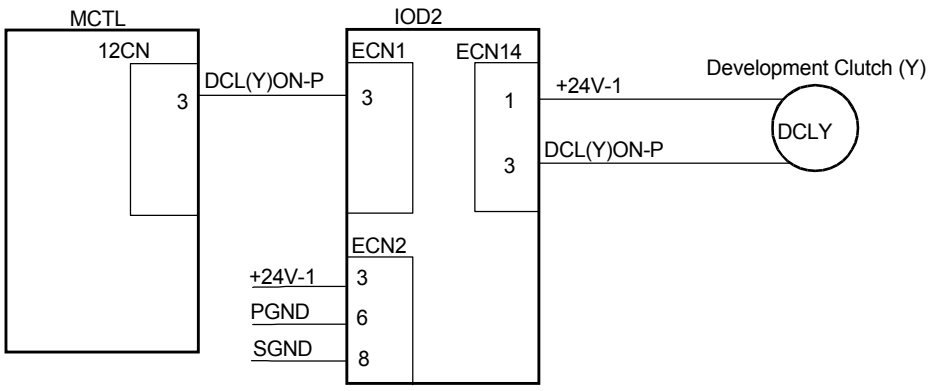


G063H041.WMF

- Defective fusing unit fan
- Defective IOD1 board
- Defective MCTL board

Code 61 – Yellow Development Clutch Error

- Loose cable connection – see the circuit diagram below

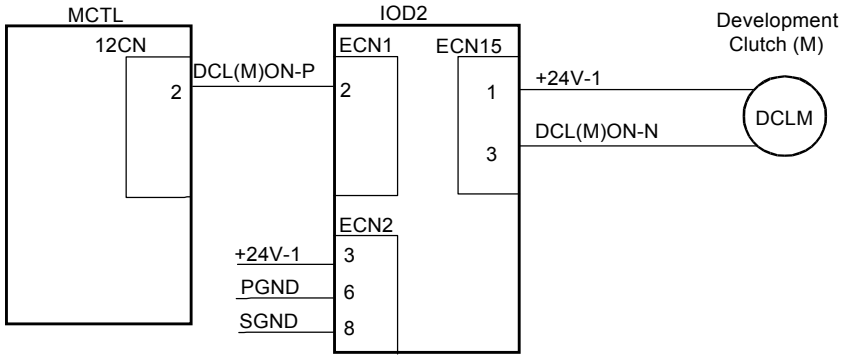


G063H057.WMF

- Defective development clutch for yellow
- Defective IOD2 board
- Defective MCTL board

Code 62 – Magenta Development Clutch Error

- Loose cable connection – see the circuit diagram below

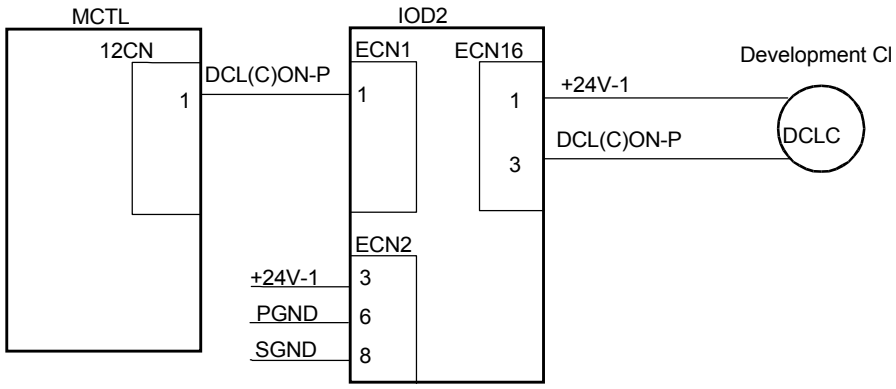


G063H058.WMF

- Defective development clutch for magenta
- Defective IOD2 board
- Defective MCTL board

Code 63 – Cyan Development Clutch Error

- Loose cable connection – see the circuit diagram below

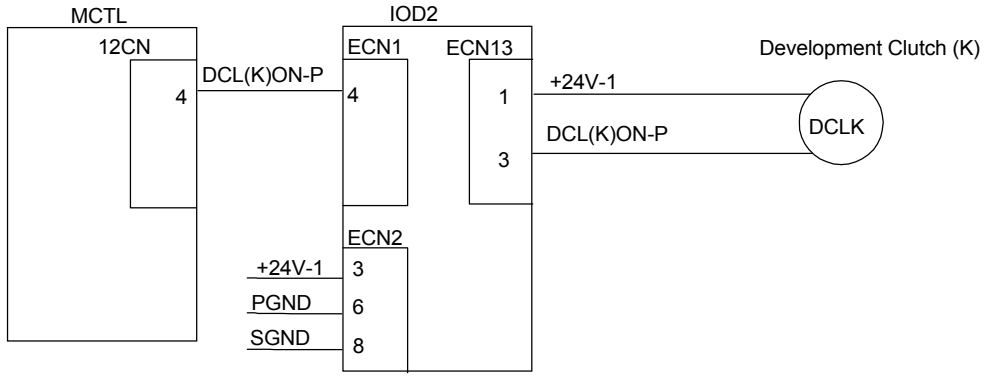


G063H059.WMF

- Defective development clutch for cyan
- Defective IOD2 board
- Defective MCTL board

Code 64 – Black Development Clutch Error

- Loose cable connection – see the circuit diagram below

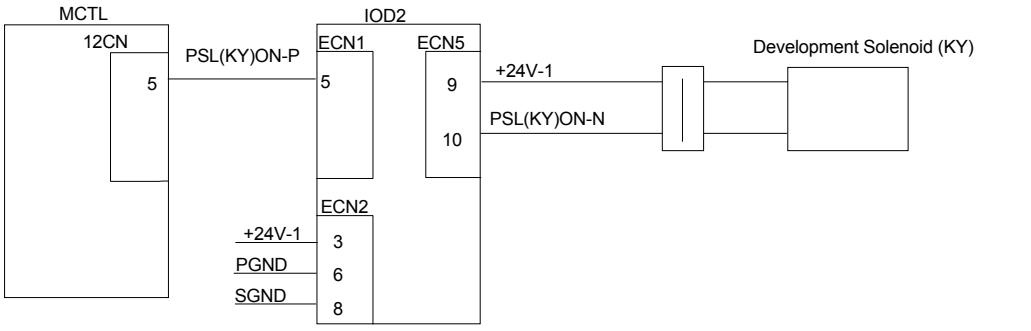


G063H060.WMF

- Defective development clutch for black
- Defective IOD2 board
- Defective MCTL board

Code 65 – Black or Yellow Toner Cartridge Retraction Error

- Loose cable connection – see the circuit diagram below

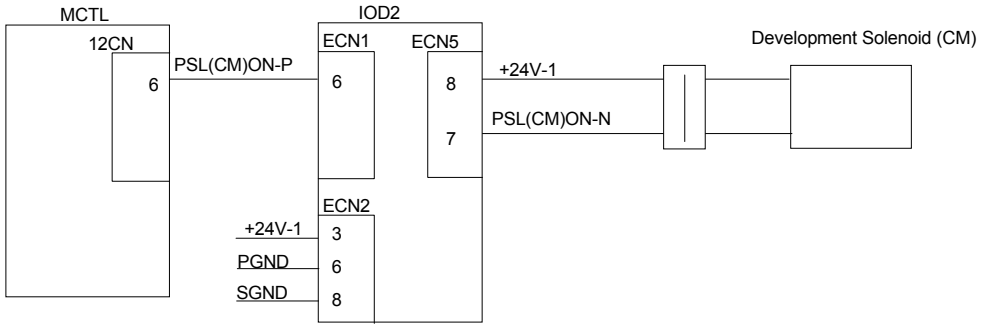


G063H061.WMF

- Defective development solenoid – replace the front cover unit
- Defective IOD2 board
- Defective MCTL board

Code 66 – Cyan or Magenta Toner Cartridge Retraction Error

- Loose cable connection – see the circuit diagram below

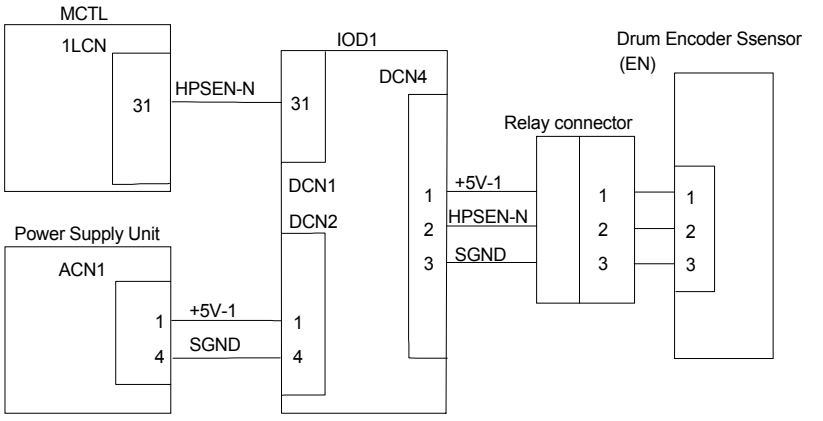


G063H062.WMF

- Defective development solenoid – replace the front cover unit
- Defective IOD2 board
- Defective MCTL board

Code 71 – Transfer Drum Rotation Error

- Incorrectly installed belt cartridge (photoconductor unit)
- Defective transfer drum (damaged encoder, or excessive torque)
- Loose cable connection – see the circuit diagram below

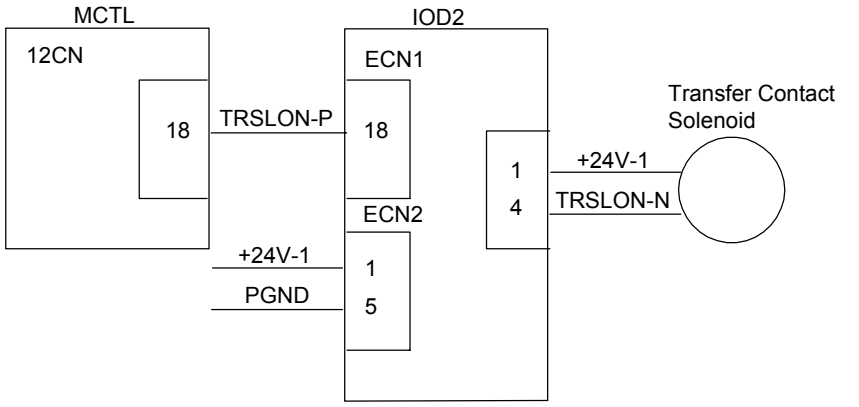


G063H031.WMF

- Defective drum encoder
- Defective IOD1 board
- Defective dc power supply board (LVPS)
- Defective MCTL board

Code 72 – Transfer Roller Contact Solenoid Error

- Loose cable connection – see the circuit diagram below

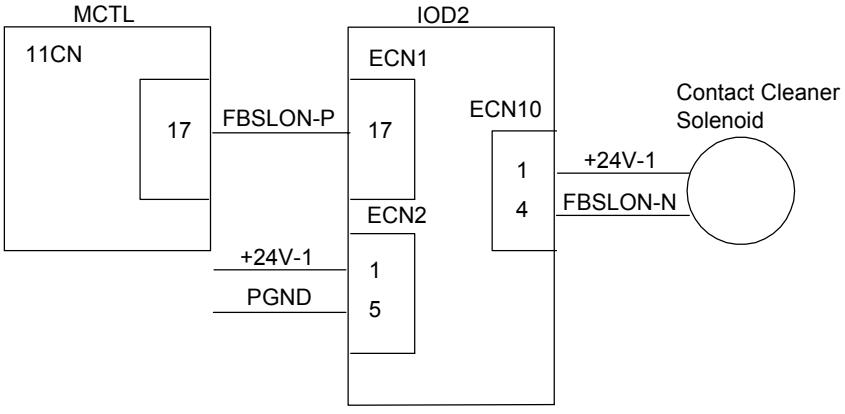


G063H087.WMF

- Defective transfer contact solenoid
- Defective IOD2 board
- Defective IOD1 board
- Defective MCTL board

Code 73 – Drum Cleaner Contact Clutch Error

- Loose cable connection – see the circuit diagram below

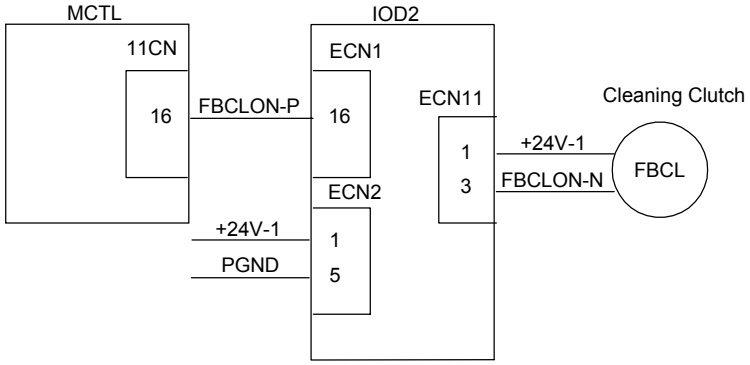


G063H088.WMF

- Defective drum cleaner contact solenoid
- Defective IOD2 board
- Defective IOD1 board
- Defective MCTL board

Code 74 – Cleaner Clutch Error

- Loose cable connection – see the circuit diagram below

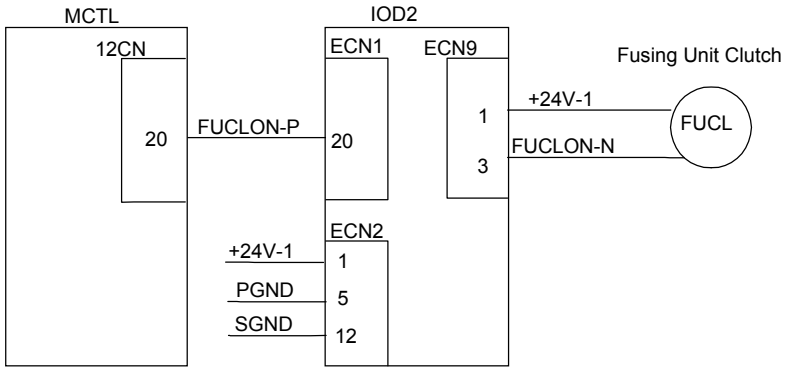


G063H089.WMF

- Defective cleaner clutch
- Defective IOD2 board
- Defective IOD1 board
- Defective MCTL board

Code 75 – Fusing Unit Clutch Error

- Loose cable connection – see the circuit diagram below



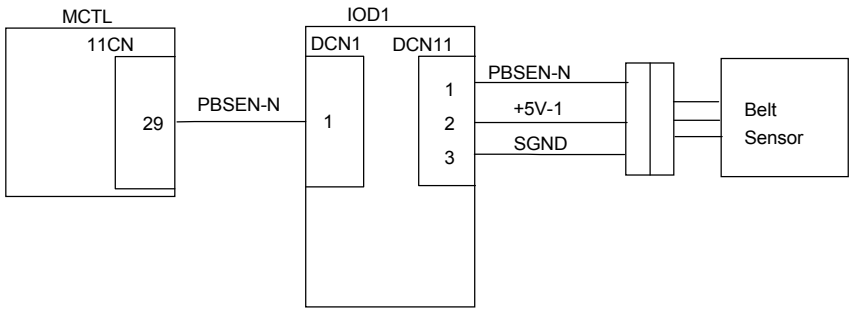
G063H036.WMF

- Defective fusing unit clutch
- Defective IOD2 board
- Defective MCTL board

Trouble-shooting

Code 76 – Belt Sensor Error

- Printer not level
- Dirt on the OPC belt
- Defective belt cartridge (photoconductor unit)
- Loose cable connection – see the circuit diagram below



G063H037.WMF

- Defective belt sensor
- Defective IOD1 board
- Defective MCTL board

Code EC: Engine Communication Error

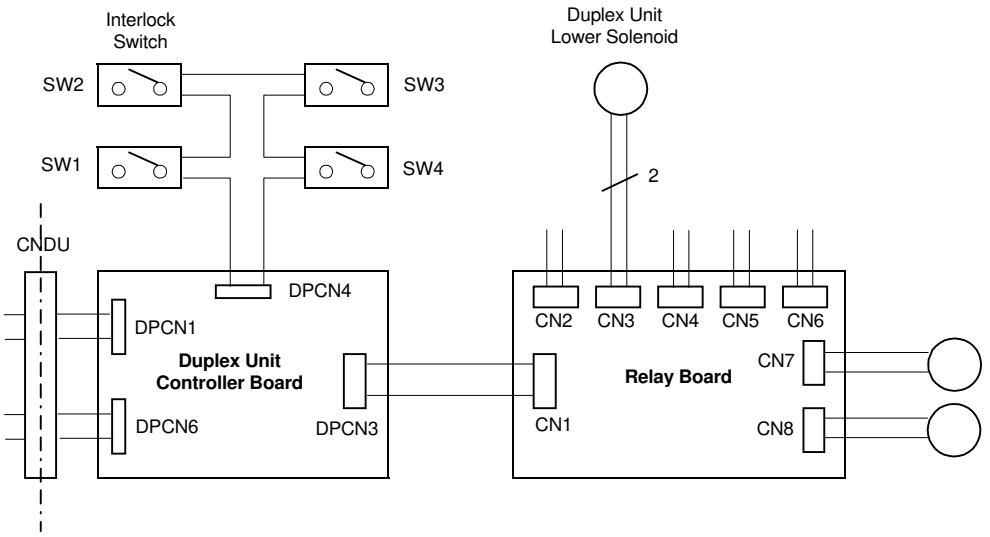
- Communication error between MCTL and controller

Code 81 – Duplex Unit Controller Error

Loose cable connection in the duplex unit.
Defective duplex unit controller board.

Code 83 – Duplex Unit Lower Solenoid Error

Loose cable connection in the duplex unit.
Loose cable connection - see the circuit diagram below.

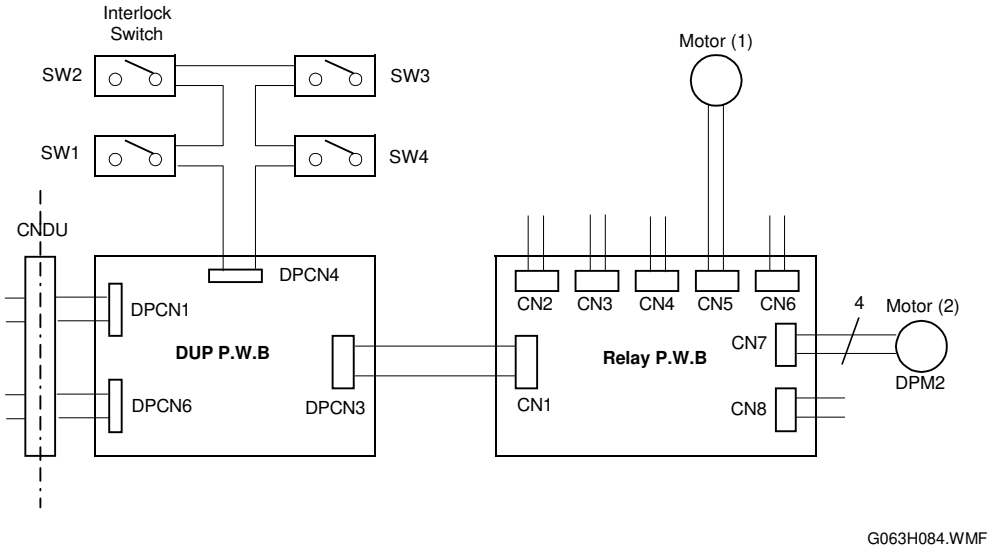


G063H083.WMF

Defective duplex unit lower solenoid.
Defective duplex unit controller board.

Code 84 – Duplex Unit Motor Error

Loose cable connector - see the circuit diagram below.



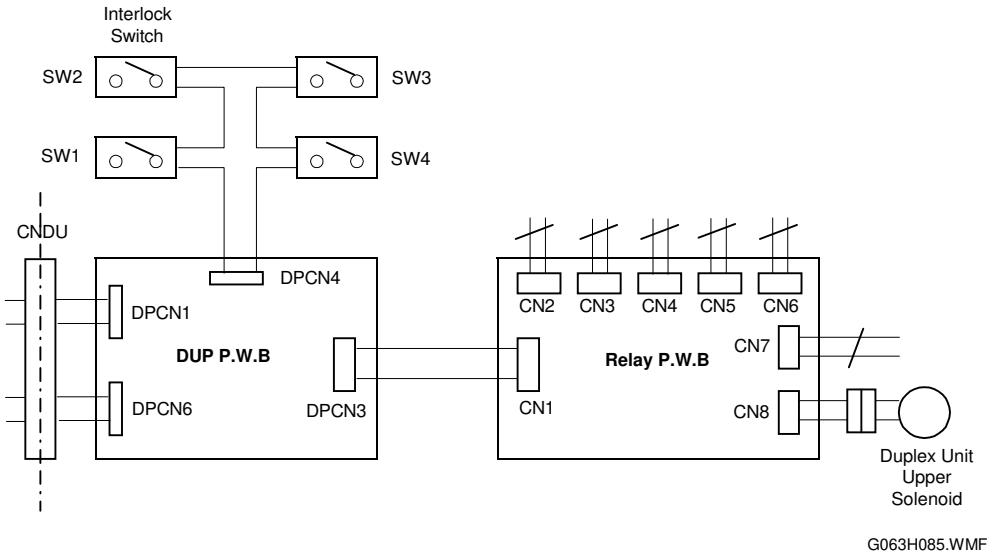
Defective duplex unit motor (1) or (2).

NOTE: The resistance is approximately 7 Ω respectively between Pin 1 and P2, and P3, and P4 of the motor connector (CN5 and CN7).

Defective duplex unit controller board.

Code 85 – Duplex Unit Upper Solenoid Error

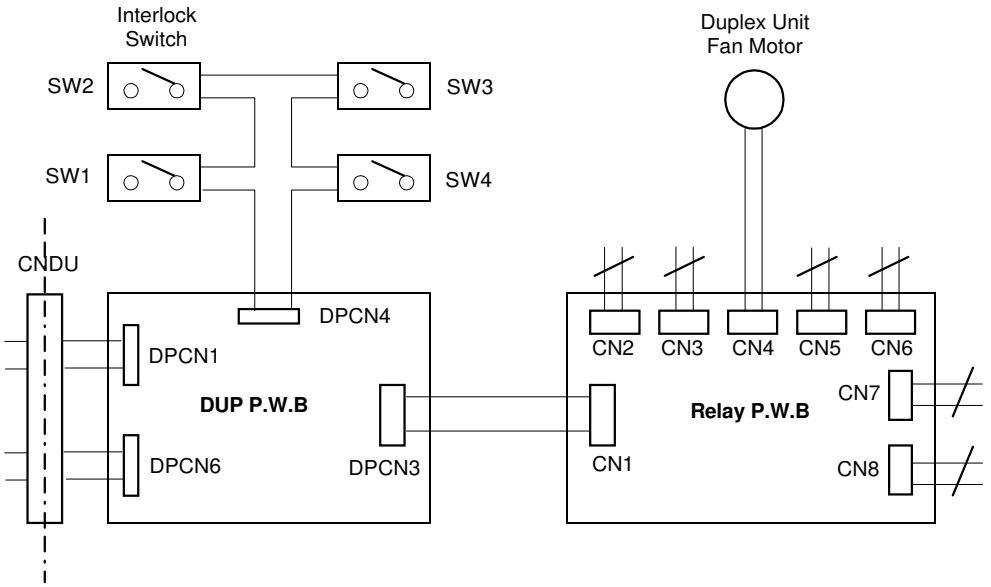
Loose cable connection in the duplex unit.
Loose cable connection - see the circuit diagram below.



Defective duplex unit upper solenoid.
Defective duplex unit controller board.

Code 86 – Duplex Fan Motor Error

Loose cable connector in the duplex unit.
Loose cable connection - see the circuit diagram below.



G063H086.WMF

Defective duplex unit fan motor.
Defective duplex unit controller board.

4.5 IMAGING FAILURE

4.5.1 DEFECTS AT REGULAR INTERVALS ON THE IMAGE

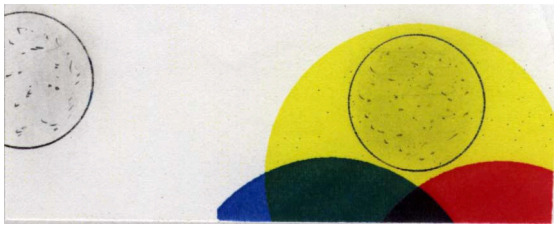
The imaging failures listed in the table below can occur periodically on the print when there are defective components as shown in the table below.

Part Name	Perimeter	Location
OPC belt	380 mm	Defect at the same location on each page.
Development roller	56 mm	Imaging failures occur at about 30-mm intervals (the development roller turns faster than the OPC belt).
Transfer drum	380 mm	Defect at the same location on each page.
Transfer roller	63 mm	Imaging failures occur at about 63-mm intervals.
Hot roller	100 mm	Imaging failures or defects due to poor fusing occur at about 100-mm intervals.

4.5.2 IMAGING FAILURE TROUBLESHOOTING

The subsequent pages include samples of typical imaging failures, followed by the corresponding troubleshooting procedures.

No. 1 Dirty Background



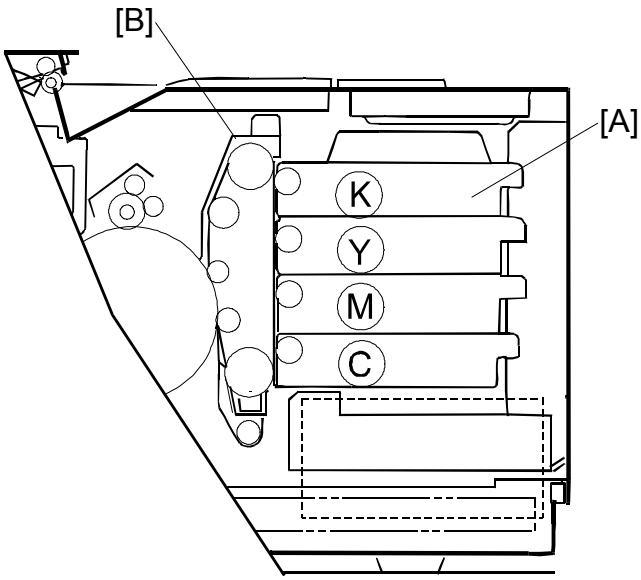
G063H501.TIF

Problem

Uneven optical density

Main Causes

1. Not enough toner, and not enough charge on the toner.
2. Poor development bias terminal contact.
3. Defective belt cartridge (photoconductor unit).
4. High voltage power supply unit failure (HVU).

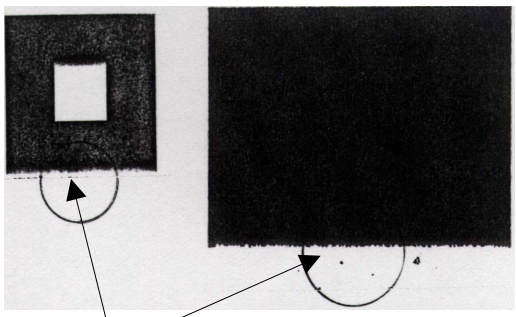


G063H002.WMF

Countermeasures

1. Replace the toner cartridge [A].
2. Check if the developer bias terminal is deformed.
3. Replace the belt cartridge (photoconductor unit) [B].
4. Replace the high voltage power supply unit (HVU).

No. 2 Missing Image at Edge



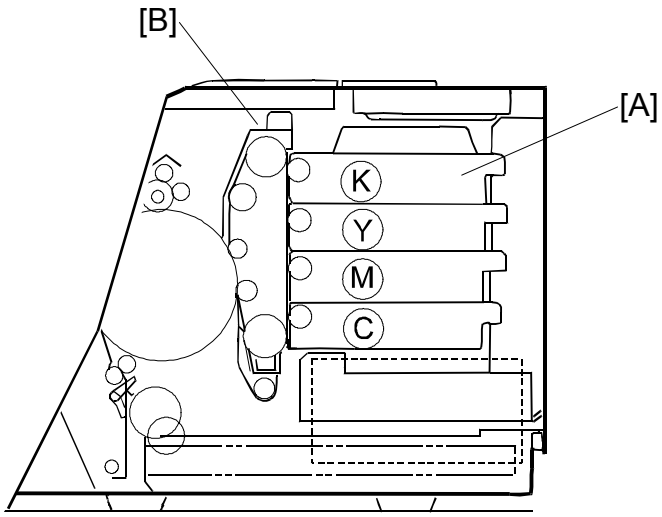
G063H052.TIF

Problem

There are parts missing or there is 'peeling' on the edges in the image.

Main Causes

1. Not enough toner, and not enough charge on the toner.
2. The belt is deformed.

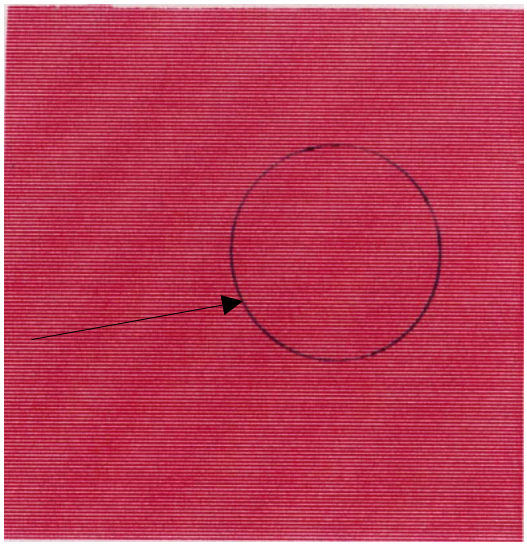


G063H003.WMF

Countermeasures

1. Replace the toner cartridge [A].
2. Replace the belt cartridge (photoconductor unit) [B].

No. 3 Jitter



G063H503.TIF

Problem

Uneven optical density appears periodically, perpendicular to the feed direction.

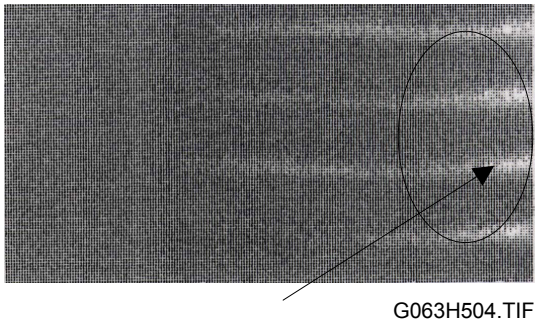
Main Causes

1. Main motor failure.
   1) Irregular rotation.
   2) Gear failure.
   3) Variation in the OPC belt running speed for the above reasons.
2. OPC belt failure.

Countermeasures

1. Replace the main motor.
2. Replace the belt cartridge (photoconductor unit).

No.4 Ribbing



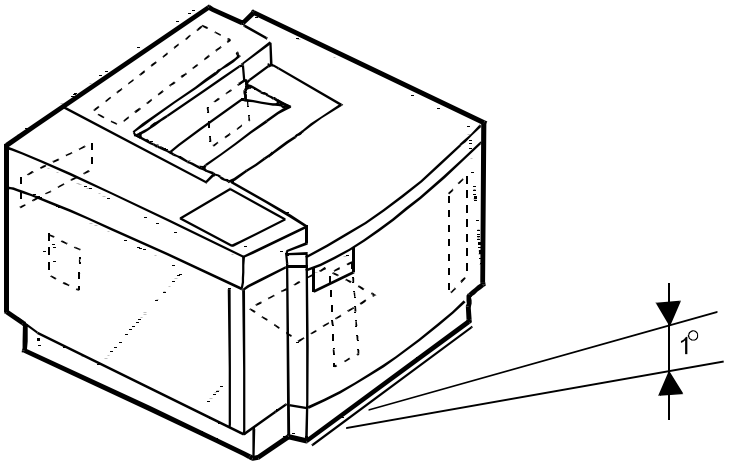
G063H504.TIF

Problem

Light image density at the left or right side of the image.

Main Causes

1. The printer is tilted. (The tilt should be less than 1°)
2. Insufficient toner in the toner cartridge.
3. The toner cartridge is not level, and as a result, the toner shifts to one side.

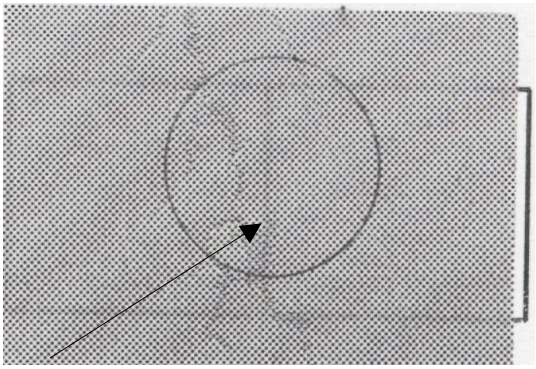


G063H048.WMF

Countermeasures

1. Check that the printer installation table is flat.
2. Shake the toner cartridge horizontally several times to redistribute the toner.
3. Replace the appropriate toner cartridge.

No.5 Wrinkle/Image Migration ("Mimizu" Pattern)



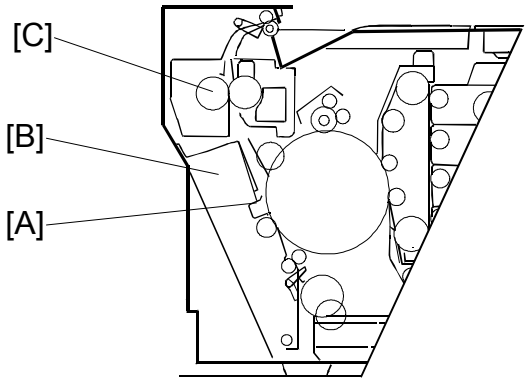
G063H505.TIF

Problem

Banding shadows of different optical density as a result of paper wrinkling, image migration, or incorrect color registration.

Main Causes

1. The paper in use is not a recommended paper type, or has been stored for too long.
2. The paper discharge unit is not functioning.
3. The transfer unit is not locked properly.
4. The hot roller needs replacement.
5. The fusing unit is not level inside the machine.

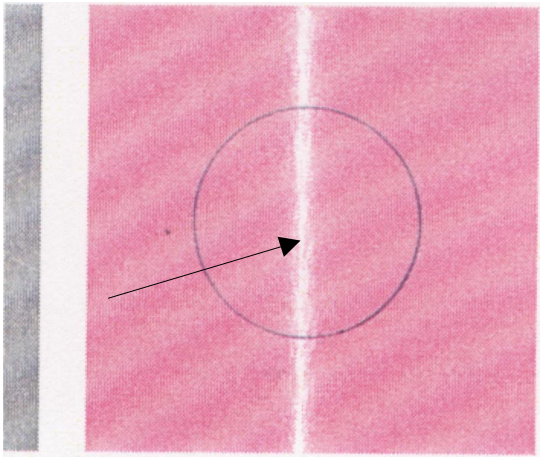


G063H016.WMF

Countermeasures

1. Use a recommended paper type or new paper.
2. Check that the paper discharge unit [A] is properly installed in the transfer unit [B] and functioning normally.
   - Push down on the transfer unit and ensure that it locks on both sides (right and left).
3. Check that the fusing unit [C] is installed properly and secured with screws.
4. Replace the fusing unit if necessary.

No. 6 Vertical White Line 1



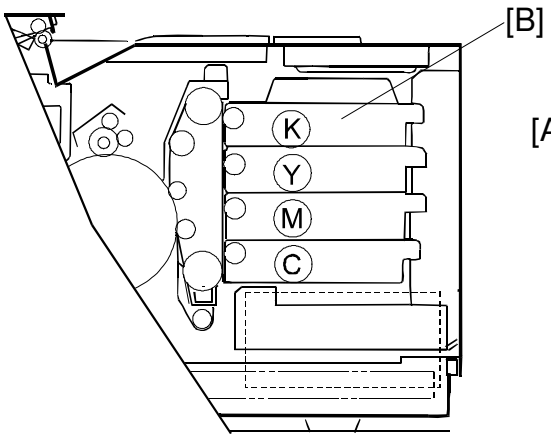
G063H506.TIF

Problem

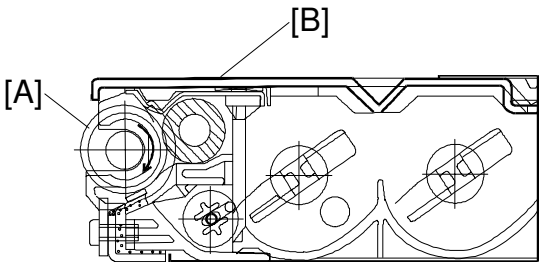
Vertical white lines appear in areas of a certain color when test-printed in four-color mode (stripe mode).

Main Causes

1. Foreign particles adhere to the development roller [A] for the color in question.
2. The development roller surface is damaged.



G063H002.WMF



G063H049.WMF

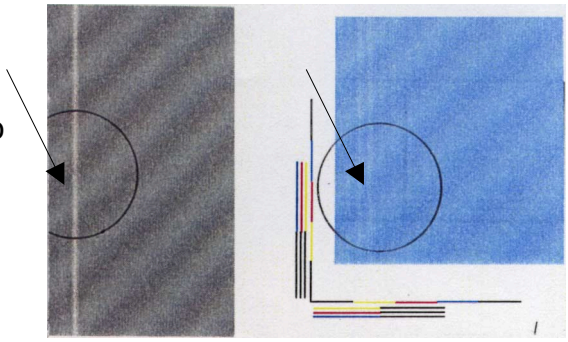
Countermeasures

1. Make a test print.
2. Check the toner cartridge [B] for the color that has the white line.
3. Remove any foreign particles adhering to the development roller.

No.7 Vertical White Line 2

Problem

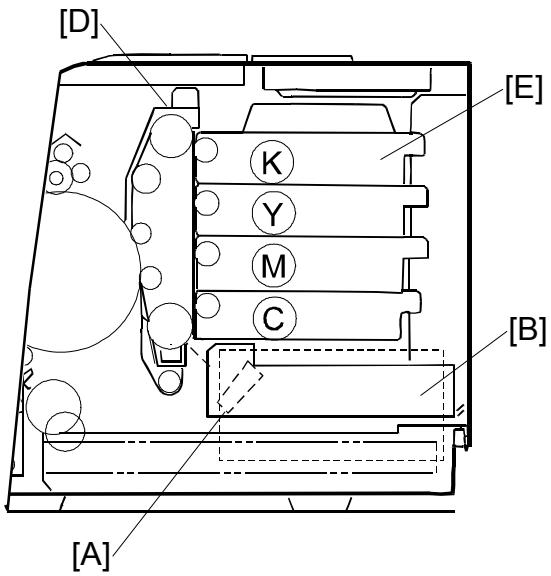
Vertical white lines from the leading edge to the trailing edge.



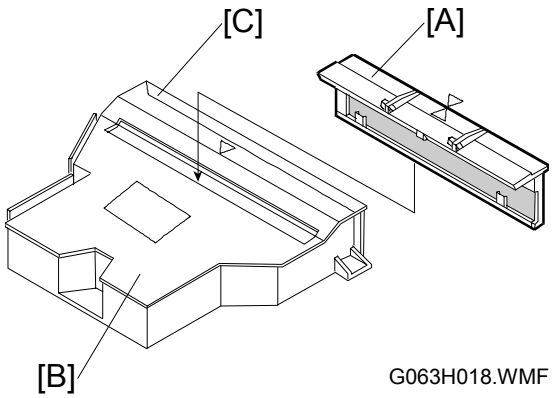
G063H507.TIF

Main Causes

1. The dust shield glass [A] for the optical unit [B] is smeared with toner or foreign particles.
2. Foreign particles adhere to the laser beam opening [C].
3. There are foreign particles mixed in the toner cartridge.



G063E017.WMF



G063H018.WMF

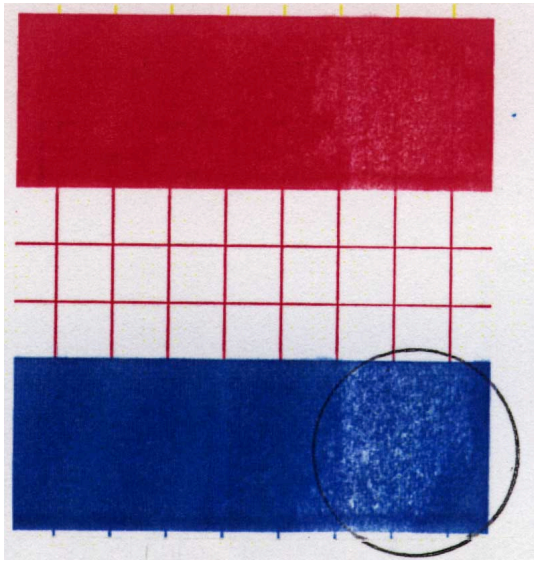
Countermeasures

1. Clean the dust shield glass.
   1) Remove the belt cartridge (photoconductor unit) [D] and all toner cartridges [E].
   2) Remove the dust shield glass from the optical unit.
   3) Clean the dust shield glass.
2. Clean the laser beam opening.
3. If the problem is caused by a defective toner cartridge, replace that cartridge.

No.8 Partial Blanking in Solid Images

Problem

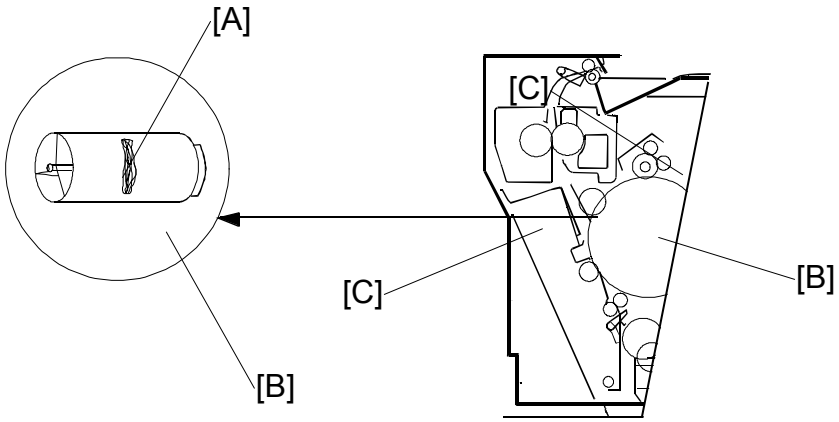
White bands appear in a vertical direction as shown in the print sample.



G063H508.TIF

Main Causes

1. Silicone oil [A] adhering to the transfer drum [B].

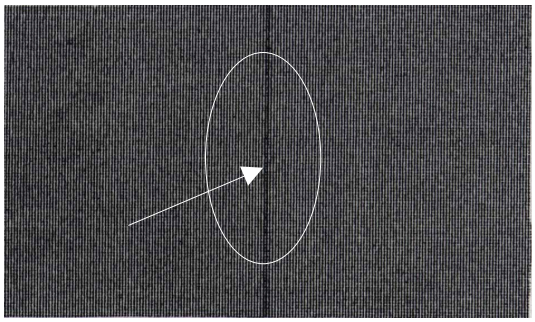


G063H050.WMF

Countermeasures

1. Wipe off the oil adhering to the transfer unit [C] and the area around it. Replace the transfer drum if necessary.
2. If there is excessive oil adhesion, replace the belt cartridge (photoconductor unit), cleaning brush and toner cartridge.

No. 9 Black Line



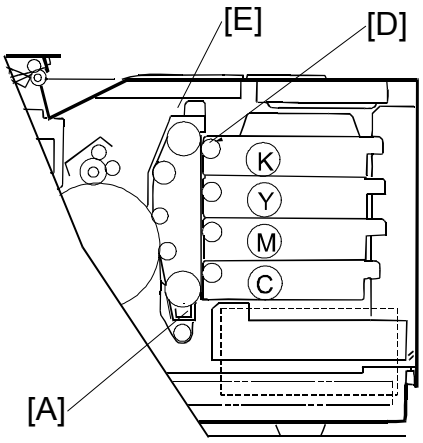
G063H509.TIF

Problem

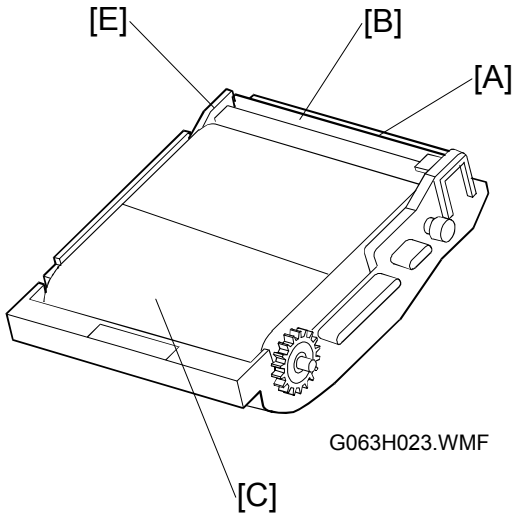
Fine black lines

Main Causes

1. The charge corona unit grid [A] is smeared.
2. The OPC belt surface is damaged.
3. Foreign particles (paper dust, etc.) are stuck between the cleaning blade [B] and the OPC belt [C] .
4. Debris adhering to the base of the development roller [D] comes in contact with the OPC belt.



G063H019.WMF

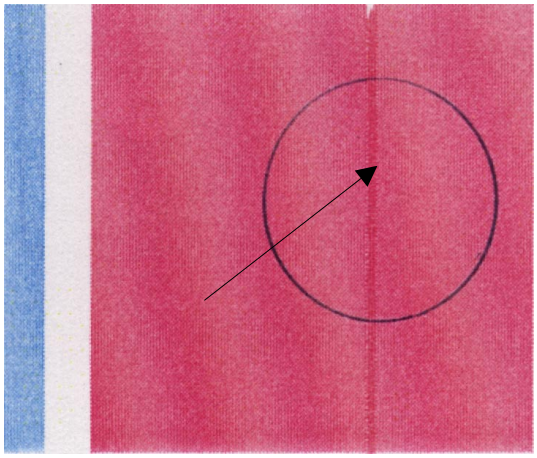


G063H023.WMF

Countermeasures

1. Remove the belt cartridge (photoconductor unit) [E].
2. Clean the charge corona unit.
3. Replace the belt cartridge (photoconductor unit).
4. Remove foreign particles adhering to the surface of the development roller.

No. 10 Vertical Line



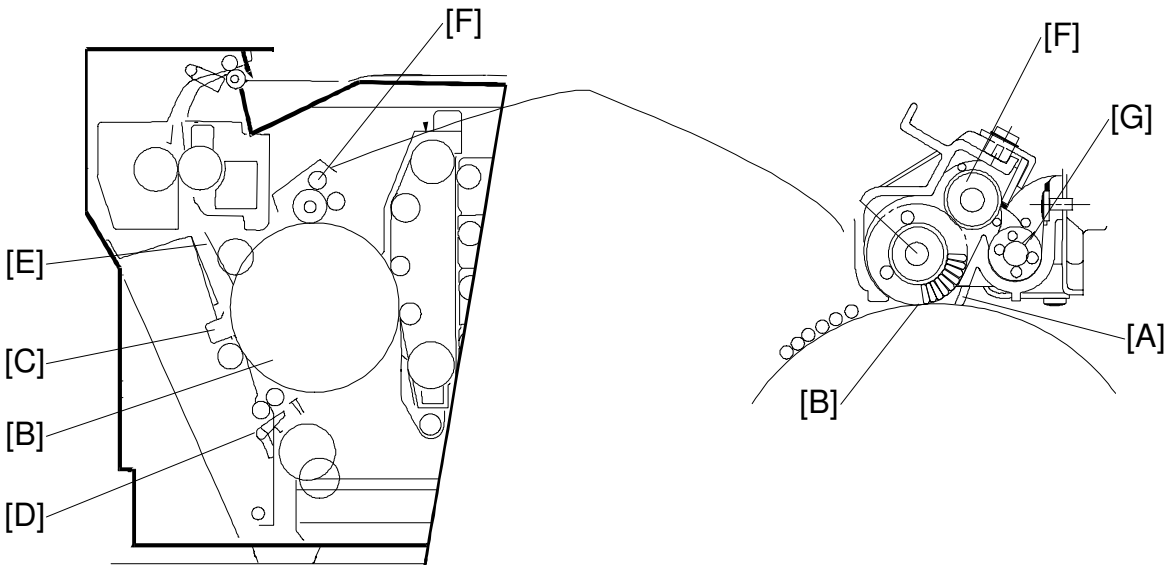
G063H510.TIF

Problem

Vertical lines

Main Causes

1. Foreign particles (dust, etc.) [A] adhere to the parts located around the transfer drum [B], and consequently come in contact with the toner image on the transfer drum.

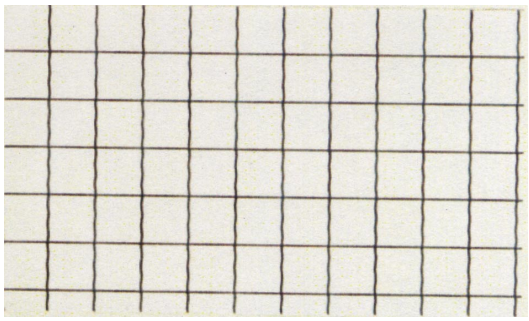


G063H021.WMF

Countermeasures

1. Clean the paper discharge unit [C].
2. Clean the guide [D] and separator pawl [E].
3. Remove the drum cleaner [F], then clean the inside and outside of the waste toner feeder [G].

No.11 Vertical Lines Not Straight



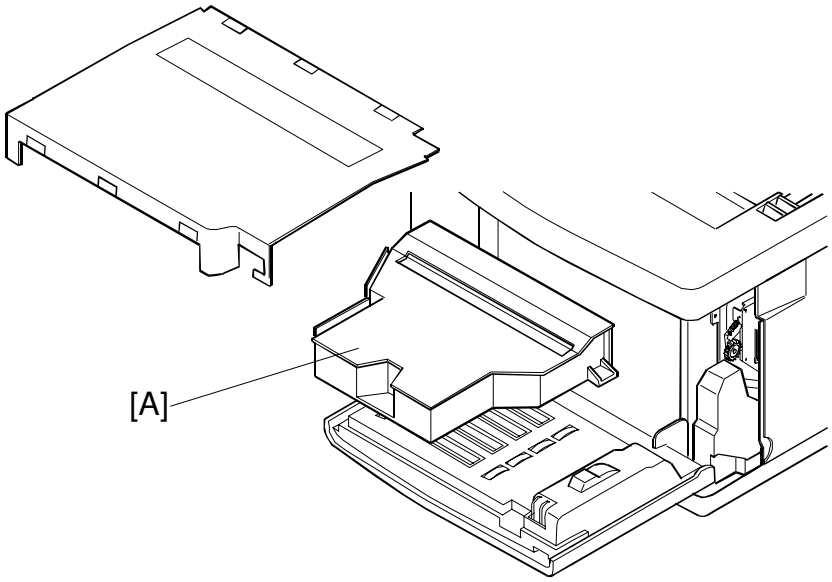
G063H511.TIF

Problem

Vertical lines appear to be wavy.

Main Causes

1. Excessive vibration.
2. Failure of the optical unit [A]: Vibration from the rotation of the polygon mirror motor.



G063H022.WMF

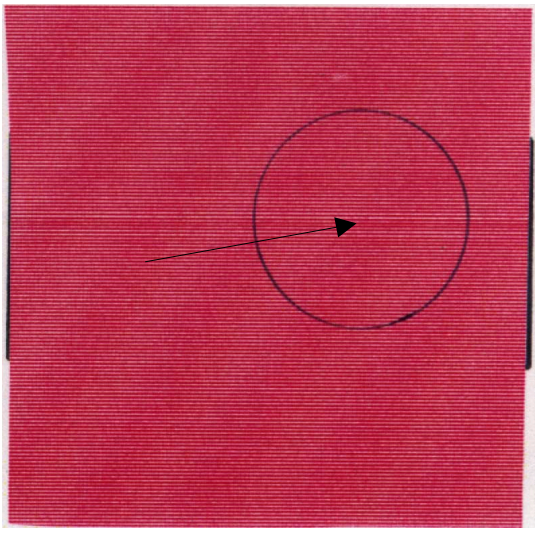
Countermeasures

1. Do not shock or vibrate the printer body.
2. Install in an area free from shock or vibrations, for example, not in Izu or the Kanto plain where there are a lot of earthquakes.
3. Replace the optical unit.

No.12 Banding

Problem

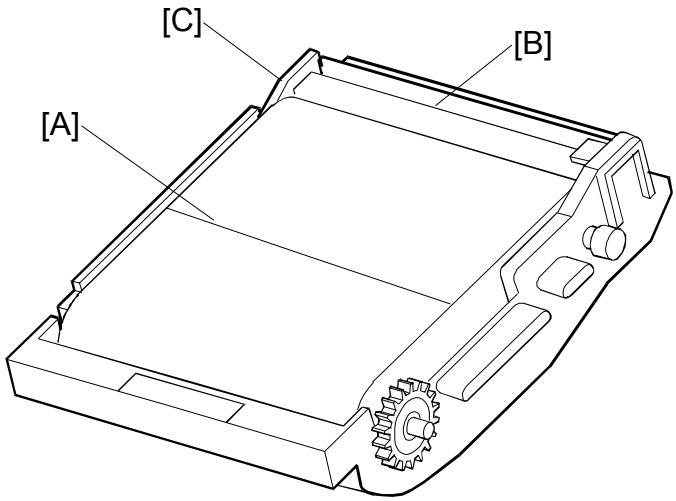
Horizontal bands



G063H512.TIF

Main Cause

1. This transfer failure occurs because of the uneven rotational speed caused by the shock from the OPC belt seam [A] passing over the cleaning blade [B].

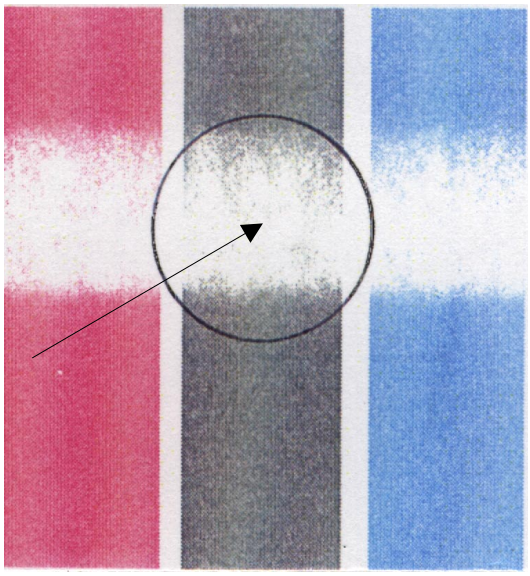


G063H023.WMF

Countermeasures

1. Replace the belt cartridge (photoconductor unit) [C].

No. 13 White Band



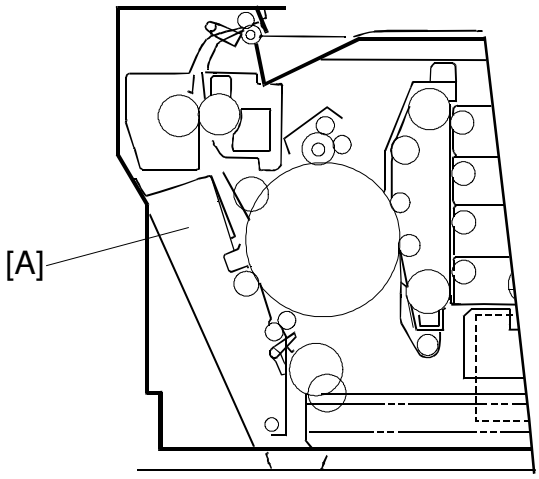
G063H513.TIF

Problem

Horizontal white band, creating a misted image.

Main Causes

1. Transfer unit installation failure [A], or transfer roller deformation.
2. Contact failure for the transfer roller bias terminal.
3. Transfer contact solenoid failure.

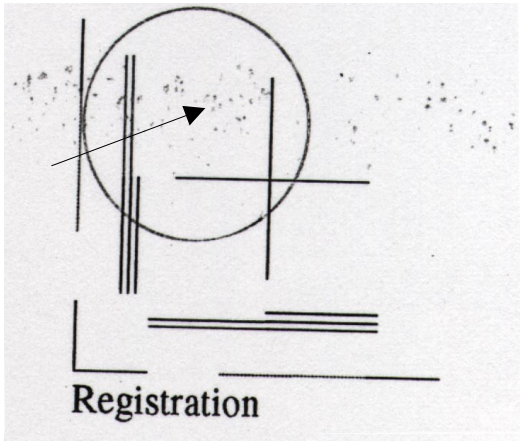


G063H024.WMF

Countermeasures

1. Check if the transfer unit is properly locked and that the hook is engaged at both sides.
2. Check that the transfer unit is properly installed.
3. Replace the transfer contact solenoid.
4. Replace the transfer unit.

No. 14 Toner Spots



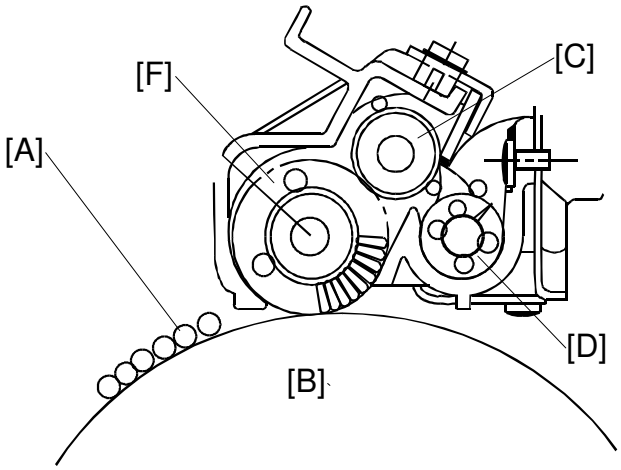
G063H514.TIF

Problem

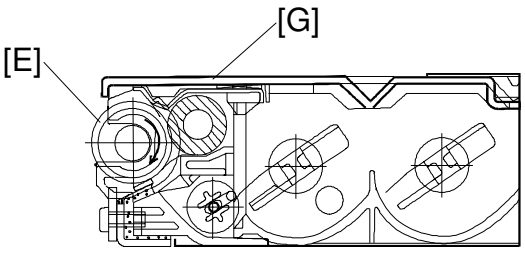
Toner spots result from toner dropping inside the printer engine.

Main Causes

1. Toner drops [A] on the transfer drum [B] because of a malfunction in the waste toner feeder inside the drum cleaner [C].
   1) The mylar for the waste toner feeder [D] is deformed.
   2) The waste toner is not collected properly.
2. Toner adhering to the development roller [E] drops onto the OPC belt.



G063H052.WMF

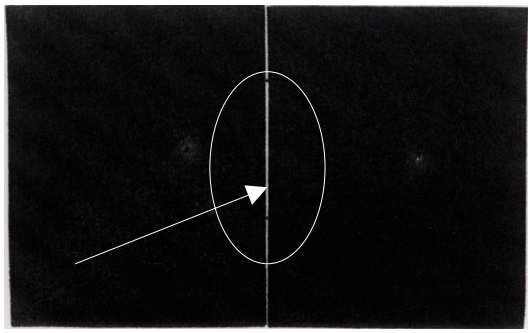


G063H051.WMF

Countermeasures

1. Check the cleaning brush [F] and the waste toner feeder.
   1) Clean the area around the cleaning brush.
   2) Check if the seal is deformed or damaged. If there is any deformation or damage, replace the waste toner feeder.
   3) Check if there is any waste toner stuck in the printer engine. If there is, remove the waste toner with a vacuum cleaner.
2. Remove the toner cartridge [G].
   1) Clean the toner cartridge first.

No.15 White Spots/Black Spots ('Firefly' Spots)



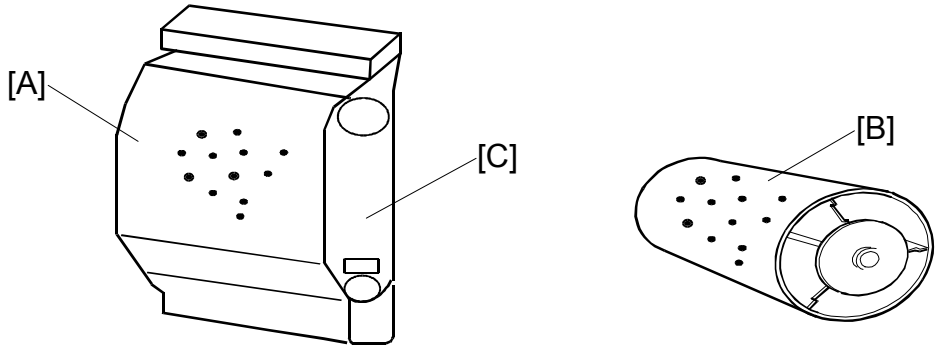
G063H515.TIF

Problem

White dots in black areas, and black spots in white areas

Main Causes

1. Foreign particles adhering to the OPC belt [A] or transfer drum [B].
2. The OPC belt or transfer drum is damaged.
3. Foreign particles mixed in the toner.
4. Foreign particles adhering to the transfer roller, or local deformation of the transfer roller.



G063H053.WMF

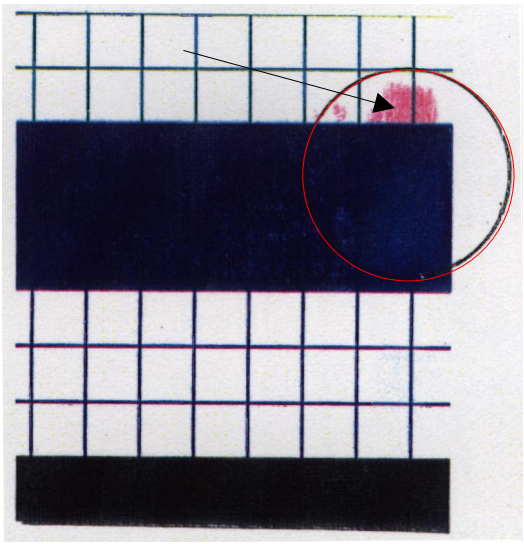
Countermeasures

1. Remove the belt cartridge (photoconductor unit) [C].
   1) Carefully wipe off the foreign particles adhering to the OPC belt, using a cotton cloth.
   2) Replace the damaged belt cartridge (photoconductor unit).
2. Open the transfer unit, and check the transfer drum.
   1) Carefully wipe off the foreign particles adhering to transfer drum, using a cotton cloth.
   2) Replace the transfer drum if it is damaged.
3. Replace the toner cartridge.
4. Replace the transfer unit.

No.16 Mixed Color Image

Problem

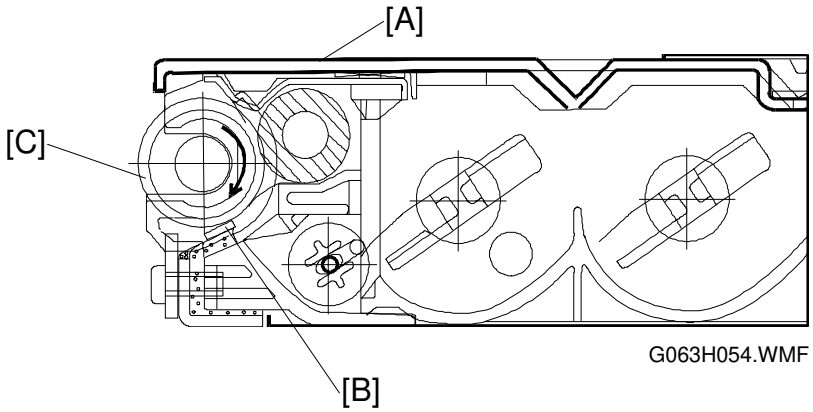
A mixed color image appears in the print.



G063H516.TIF

Main Causes

1. Toner cartridge [A] failure: The pressure of blade [B] on the development roller [C] is inappropriate or the blade is deformed.
2. Toner cartridge recovery error.

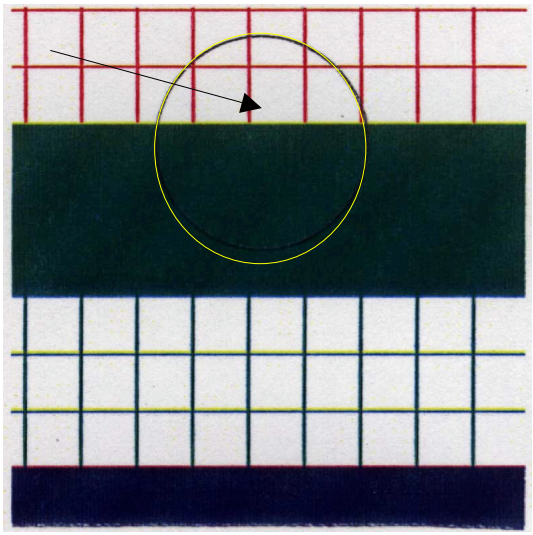


G063H054.WMF

Countermeasures

1. Check that the toner cartridge inserts smoothly.
2. Replace the toner cartridge.
3. Check that the front cover unit is locked.

No.17 Incorrect Color Registration



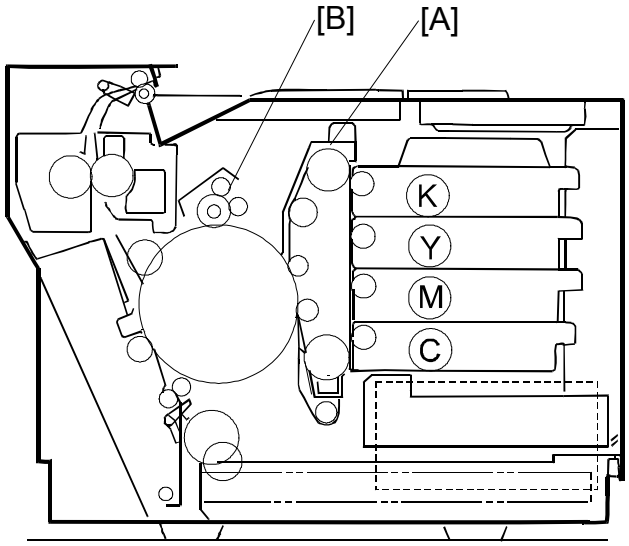
G063H517.TIF

Problem

Incorrect color registration between the two colors.

Main Causes

1. The OPC belt cartridge (photoconductor unit) [A] is not properly installed.
2. The OPC belt cartridge (photoconductor unit) is deformed.
3. The cleaning brush is not running smoothly.
4. An excessive rotational load on the OPC belt cartridge (photoconductor unit).

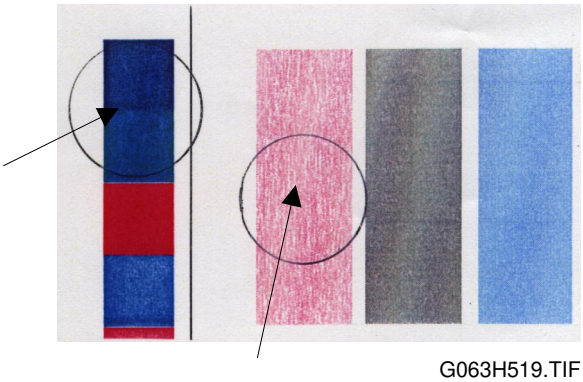


G063H025.WMF

Countermeasures

1. Reset the OPC belt cartridge (photoconductor unit) properly.
2. Replace the OPC belt cartridge (photoconductor unit).
3. Replace the cleaning brush.
4. Replace the cleaner contact solenoid [B].

No. 18 Uneven Image (Mottling)



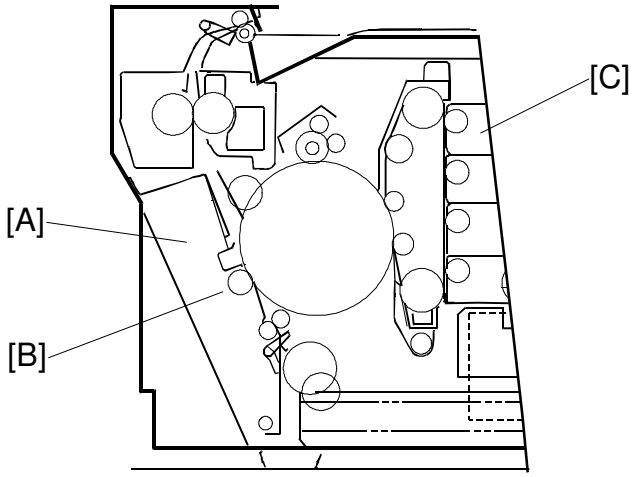
G063H519.TIF

Problem

Variation in the optical density

Main Causes

1. The transfer unit [A] is not fixed in place.
2. Inaccurate installation of the transfer roller [B].
3. Abnormal THV output from the high voltage unit.
4. Toner cartridge [C] failure.
5. Paper curl.



G063H024.WMF

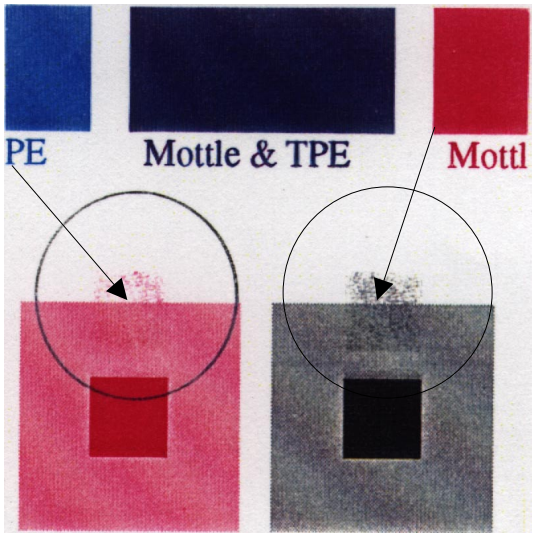
Countermeasures

1. Check if the transfer unit is firmly locked.
2. Check if the transfer roller is properly installed.
3. Replace the high voltage unit.
4. Replace the toner cartridge.
5. Replace the paper.

No.19 Residual Image

Problem

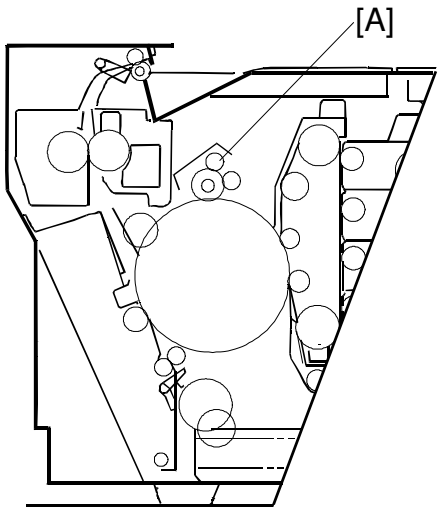
The image from the preceding page appears on every other page.



G063H520.TIF

Main Causes

1. The drum cleaner cleaning brush [A] failed to clean the drum properly.
2. Poor drum cleaner bias terminal contact
3. High voltage unit failure

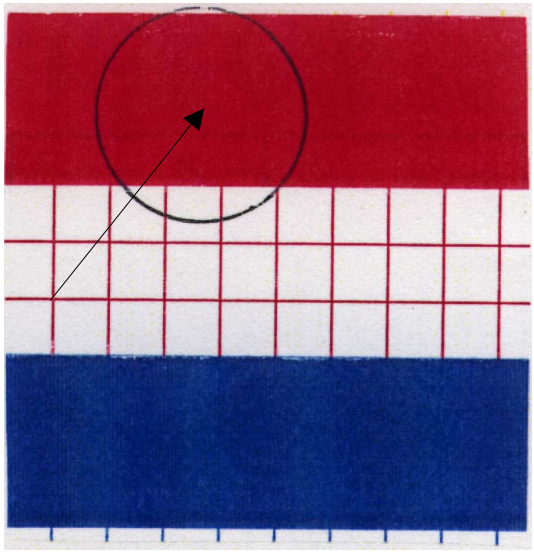


G063H026.WMF

Countermeasures

1. Check if the drum cleaner is properly installed.
2. Replace the high voltage unit.

No.20 Uneven Glossiness



G063H521.TIF

Problem

The print gloss is insufficient.

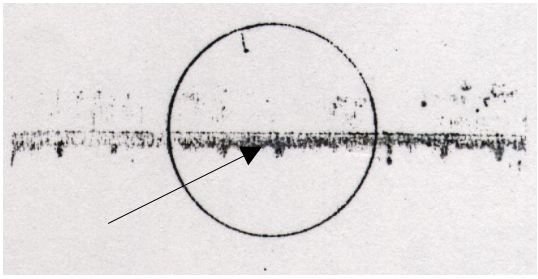
Main Causes

1. The hot roller's cleaning roller is dirty.
2. The hot roller has worn out.

Countermeasure

1. Replace the cleaning roller.
2. Replace the fusing unit.

No.21 Back Stain



G063H522.TIF

Problem

The back side of the paper is stained.

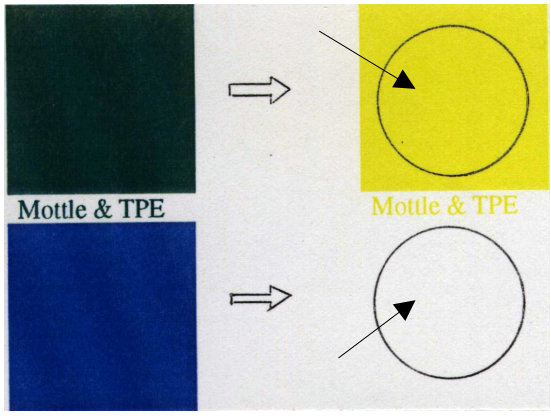
Main Causes

1. Fusing Unit:
   1) Dirty cleaning pad.
   2) Insufficient silicone oil supply.
   3) Dirty hot roller and pressure roller.

Countermeasures

1. Replace the cleaning roller.
2. Clean the hot roller and pressure roller.
3. Replace the fusing unit.
4. Replace the fusing oil bottle.

No.22 Blank Image



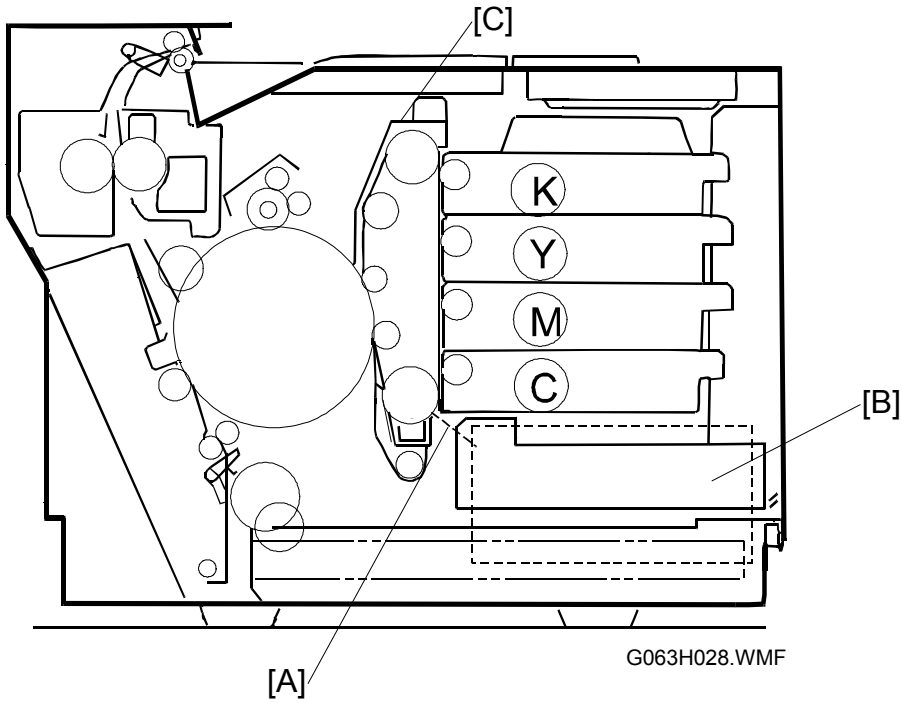
G063H523.TIF

Problem

A blank page (no print at all) is output or a specific color is missing (not printed).

Main Causes

1. The laser path [A] is blocked by paper or something is stuck in the opening of the optical unit [B]
2. The transfer contact solenoid is not functioning.
3. There is no belt bias voltage (CBV).
4. There is no output from the high voltage unit (HVU) because of a malfunction.

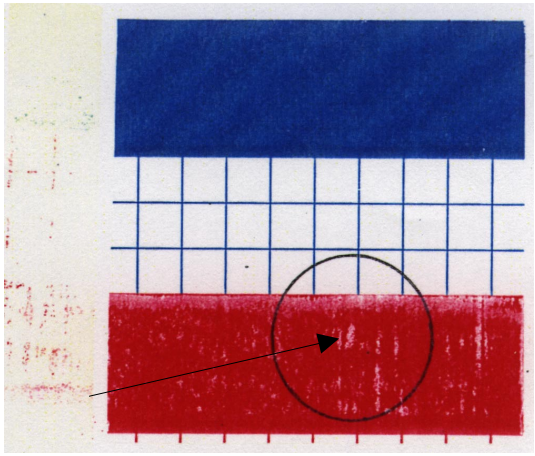


G063H028.WMF

Countermeasures

1. Check that there are no foreign particles stuck in the opening of the optical unit.
2. Replace the transfer contact solenoid.
3. Replace the belt cartridge (photoconductor unit) [C].
4. Replace the high voltage unit (HVU).

No.23 Insufficient Fusing



G063H524.TIF

Problem

Part of the image is missing.

Main Causes

1. Incorrect print media selection (label or envelope, etc.) at the host side.
2. A recommended paper type is not being used.
3. Fusing unit failure

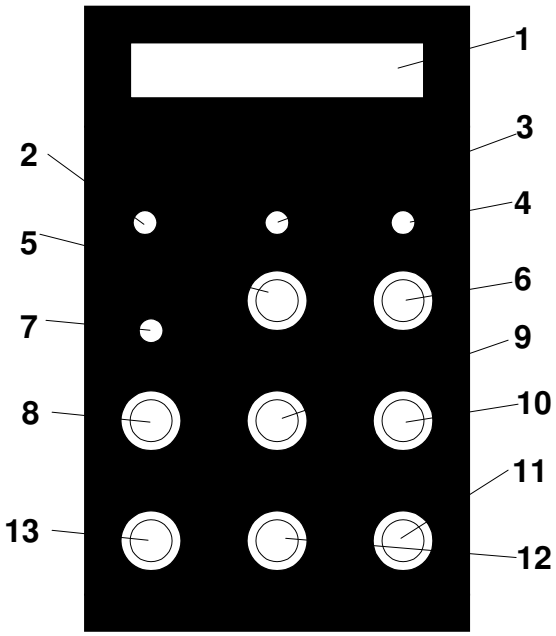
Countermeasures

1. Adjust the print media setting in the printer driver at the host computer.
2. Use a recommended paper type.
3. Replace the fusing unit.

5. SERVICE TABLES

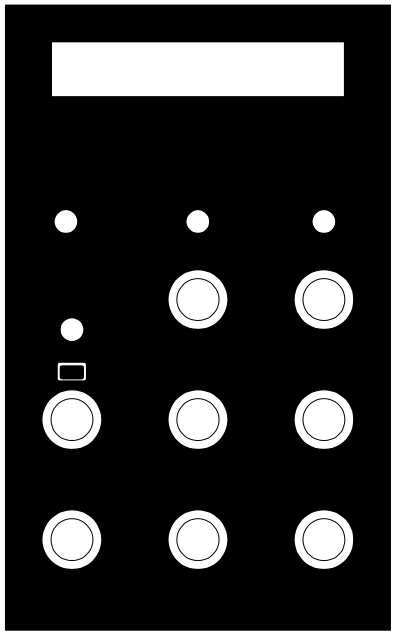
5.1 PANEL LAYOUT

US Version



G063S000.WMF

Europe Version



G063S001.WMF

1	LCD: 16 characters by 2 lines
2	Power Indicator
3	On Line Indicator
4	Data In Indicator
5	On Line Key
6	Reset Key
7	Error Indicator
8	Menu Key
9	Escape Key
10	Scroll Key (Up)
11	Scroll Key (Down)
12	Enter Key
13	Media Key

5.2 SP MODE

5.2.1 OVERVIEW

The printer has two types of SP modes:

1. Service Mode (Engine SP modes)
2. Controller SP modes

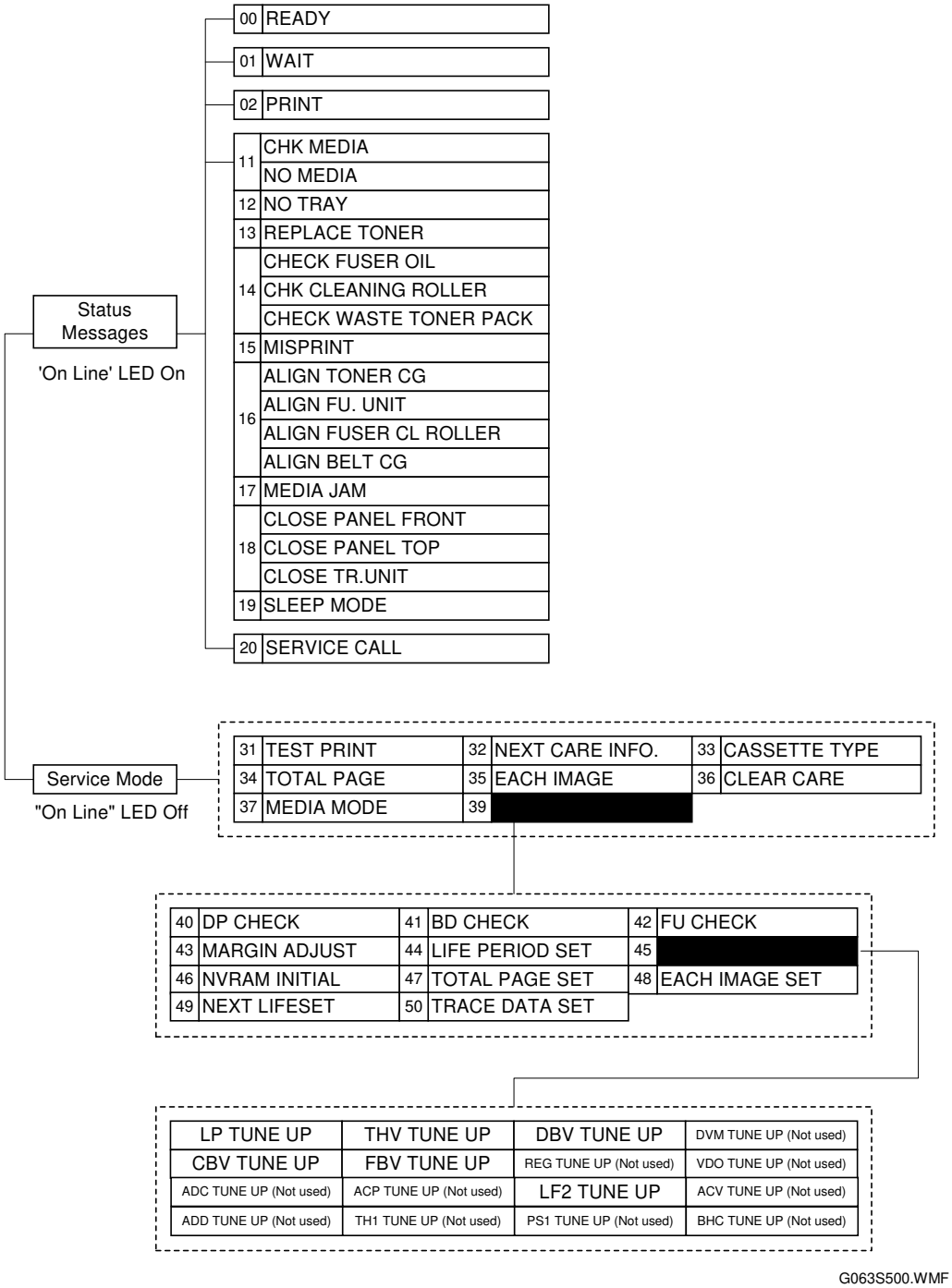
This manual deals with engine SP modes.

5.3 SERVICE MODE (ENGINE SP MODE) OVERVIEW

Service mode provides a range of procedures needed for maintenance and troubleshooting. The features available depend on whether the printer is on line or off line. If the printer is on line, operating status and error messages appear on the LCD as normal. If the printer is off line, a range of service modes become available.

The next page contains a chart of the messages and features that are available.

Item	Function and Use
TEST PRINT	Engine self-test print
NEXT CARE INFO	Displays the number of images or prints that can be made before the maintenance parts have to be replaced.
CASSETTE TYPE	Use this to specify the paper cassette type that is being used (USA, Europe, or Japan). This determines the paper sizes that can be detected for the cassette.
TOTAL PAGE	Displays the total number of printed pages.
EACH IMAGE	Displays the numbers of toner images made in each color (CMYK).
CLEAR CARE	Resets the maintenance counters.
MEDIA MANAGE	Enables or disables the OHP sensor.
FACTORY MODE	Factory setting mode (all of the following items are sub-menu items for FACTORY MODE.)
DP CHECK	Tests the toner cartridges and detects whether toner is present.
BD CHECK	Tests the laser beam synchronization detection signal and the laser power.
FU CHECK	Tests the fusing unit warm-up operation.
MARGIN ADJUST	Adjusts the registration for each tray.
LIFE PERIOD SET	Sets the maintenance cycle for each item that is managed by the maintenance counters.
NVRAM TUNE UP	Adjusts the laser power and process control voltage values stored in the NVRAM on the MCTL.
NVRAM INITIAL	Initializes the NVRAM on the MCTL.
TOTAL PAGE SET	Resets the total print counter in the NVRAM on the MCTL.
EACH IMAGE SET	Resets the toner image counters for each color (CMYK) in the NVRAM on the MCTL.
NEXT LIFE SET	Remaining life counters for periodical replaced units.
TRACE DATA SET	Factory use only. Do not change the settings.



G063S500.WMF

Service Tables

5.4 SERVICE MODE (ENGINE SP MODE)

5.4.1 OVERVIEW

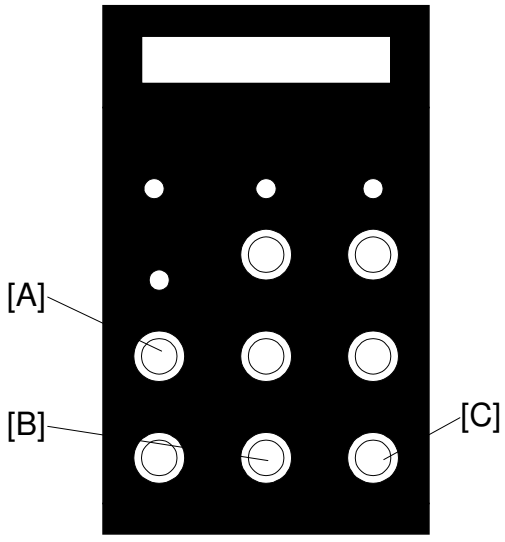
Functions 31 through 37 allow you to check the status of the machine (such as the counter values), and function 39 (Factory Mode) allows you to adjust various settings and reset the engine NVRAM.

In service mode, the keys on the operation panel work differently from normal operation. The functional changes are noted below.

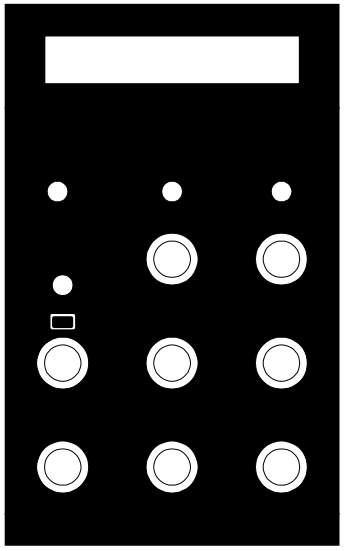
[Enter] key:	Scrolls backwards
[▼] key:	Scrolls forwards
[Media] key:	Executes a menu item
[Escape] key:	Returns to the previous display

Procedure

To enter engine SP mode:



G063S000.WMF



G063S001.WMF

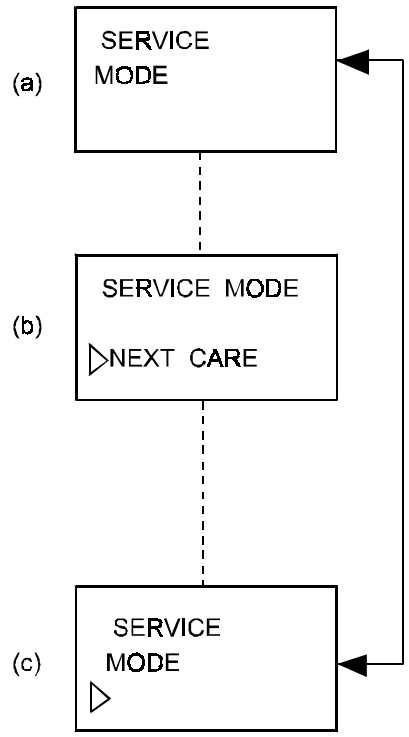
1. Turn the power switch on while holding the [Menu] [A], [Enter] [B] and [▼] [C] keys.
2. Use the [Enter], [▼], [Media], and [Escape] keys to select the desired mode as described below.

To exit engine SP mode:

1. Turn off the machine.

Selecting a mode

1. Press the [Enter] or [▼] key to scroll forwards and backwards through the service modes on the screen, as shown to the right as (a), (b) and (c).
2. To select the required mode, press the [Media] key.
3. In any particular mode, the current selection is indicated by a black triangle to the left of it. To change the selection, move the black triangle with the [Enter] or [▼] key then press the [Media] key.
4. Press the [Escape] key to leave the mode.



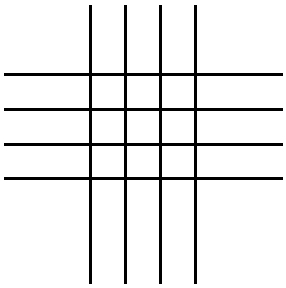
G063S027.WMF

5.4.2 PROCEDURES

31 TEST PRINT

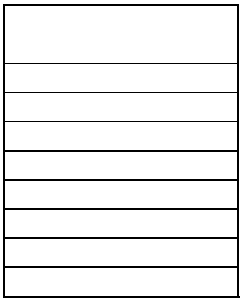
The following test patterns are available.

1. Grid Pattern:
   Available for mono-color printing of Y, M, C, K, and two-color printing of R, G, B.



G657A507.WMF

2. Stripe Pattern:
   Available for Y, M, C, K, R, G, B.



G657A508.WMF

Procedure

Step	Procedure	LCD
1	Press the [Media] key. (a) ---> (b)	(a) SERVICE MODE ▶ TEST PRINT
2	Using the [Enter] or [▼] key, select the desired pattern (e.g., grid pattern), then press the [Media] key. (b) ---> (c)	(b) 31 GRID PRINT ▶ GRID PRINT/STRIPE
3	Using the [Enter] or [▼] key, select the desired color (e.g., Red), then press the [Media] key. **NOTE: There is no difference between DPL1, 2, and 3 in this function.** (c) ---> (d)	(c) 31 GRID PRINT ▶ Y/M/C/K/R/G/B R: YM G: YC B: MC (d) 31 GRID PNT DPL ▶ 1/2/3/SIMP
4*	Select the printing mode (duplex or simplex).	
5	After the machine warms up (this may take a few minutes), the selected pattern in the required color will print continuously until you stop the machine (step 6). (e)	(e) 31 GRID PRINT [Y]
6	To stop printing, press the [Escape] key. (d) ---> (a)	
7	To return the printer to the on line mode, press the [On Line] key.	

*: This step appears only when the duplex unit is installed.

32 NEXT CARE INFORMATION

This procedure displays, for each of the maintenance parts, the counter value at which PM is required for each item. (This is toner images in the case of the OPC belt counter.) These counters can also be seen by printing the engine maintenance page with controller SP mode S1)

Procedure

Step	Procedure	LCD
1	Press the [Media] key when screen (a) "NEXT CARE INFO" appears. (a) ---> (b)	(a) SERVICE MODE ▶ NEXT CARE INFO (b) 32 NEXT CARE ⚠2345678910•12•••16
2	Using the [Enter] or [▼] key, move the cursor (white triangle) to the code for the required component. 2: Fusing Cleaning Roller (FC) 7: Belt Cartridge (Photoconductor Unit) (BL) 8: Fusing Unit (FU) 9: Transfer Drum (TR DRUM) 10: 120 K Replacement kit 13: Pick-up Roller (Main Frame) 14: Pick-up Roller (Paper Feed Unit) 16: Paper Discharger (b)	(b) NEXT FC ROLL 012000P (e) SERVICE MODE ▶TEST PRINT
3	Press the [Escape] key to go back to (b). Press the [Escape] key once more at screen (b) to return to the SERVICE MODE menu. (b) ---> (e)	

33 CASSETTE TYPE

Use this to specify the paper cassette type that is being used (USA, Europe, or Japan).

There is no need to use this outside Japan (types A and B are the same).

Procedure

Step	Procedure	LCD
1	Press the [Media] key when screen (a) "CASSETTE TYPE" appears. (a) ---> (b)	(a) SERVICE MODE ▶ CASSETTE TYPE (b) 33 CASSETTE TYPE TYPE=< ▶A/B/C>
2	Using the [Enter] or [▼] key, select the code for the required cassette type (A, B or C). Then press the [Media] key. A: US , B: Europe, C: Japan	
3	Press the [Escape] key to go back to the SERVICE MODE menu. (b) ---> (c)	(c) SERVICE MODE ▶ TEST PRINT

34 TOTAL PAGE

This function displays the total number of printouts. This is also listed on the configuration page printed in user mode or the engine maintenance page with controller SP mode S1.

Use service mode 47 (Total Page Set) to change the value stored in this counter. This is necessary after resetting the NVRAM (with NVRAM INITIAL) or after replacing the MCTL board.

Procedure

Step	Procedure	LCD
1	Press the [Media] key when 'TOTAL PAGE' appears. (a) ---> (b)	(a) SERVICE MODE TOTAL PAGE
2	Select a mode (Total or Duplex). Total: All prints Duplex: Duplex prints only (b)	(b) 34 TOTAL PAGE ▶ TOTAL/DUPLEX
3	A 6-digit number is displayed. This feature shows the number of printed pages. (c)	(c) 34 TOTAL PAGE 003060 P
4	Press the [Escape] key to go back to mode selection menu. (c) ---> (b) Press [Escape] to go back to the SERVICE MODE menu. (b) ---> (d)	(d) SERVICE MODE ▶ TEST PRINT

35 EACH IMAGE

This function displays the number of images created in each color. These counters also appear on the engine maintenance page printed with controller SP mode S1.

Use service mode 48 (Each Image Set) to change the values stored in this counter. This is necessary after resetting the NVRAM (with NVRAM INITIAL) or after replacing the MCTL board.

Procedure

Step	Procedure	LCD
1	Press the [Media] key when EACH IMAGE appears. (a) ---> (b)	(a) SERVICE MODE EACH IMAGE
2	Using the [Enter] or [▼] key, select the required color, then press the [Media] key. (b) ---> (c)	(b) 35 IMAGE OF ▶ Y/M/C/K
3	The machine displays the number of created images for the selected color. (Example: Yellow) (c)	(c) 35 IMAGE OF Y 000098P
4	Press the [Escape] key to go back to screen (b). (c) ---> (b)	(d) SERVICE MODE ▶TEST PRINT
5	Either: Using the [Enter] or [▼] key, select another color, and press the [Media] key to check the number of images created in that color. Or: Press the [Escape] key to return to the SERVICE MODE menu. (b) ---> (d)	

36 CLEAR CARE

This function resets the 'next care' counter (engine SP mode 32). Use Clear Care mode after replacing any of the four parts listed in the procedure below.

The counters for the fusing cleaning roller and photoconductor unit can also be reset using the controller user maintenance mode (Reinstall). The counters for the fusing unit and 120k replacement can also be reset using controller SP mode 3 (Maintenance Clear).

However, Clear Care mode must be used when resetting the 'next care information' after installing a new MCTL board or recovering from an MCTL board NVRAM clearance (this is explained in Adjustment Procedures – Setting the Next Life Limit). Controller modes do not work for this case.

Procedure

Step	Procedure	LCD
1	Press the [Media] key when CLEAR CARE appears. (a)---> (b)	(a) SERVICE MODE CLEAR CARE (b) 36 CLEAR CARE ⚠2345678910•12•••16 (c) CARED FC ROLL ▶ YES/NO (d) SERVICE MODE ▶ TEST PRINT
2	Using the [Enter] or [▼] key, move the cursor (white triangle) to the required 'care code', then press the [Media] key. (example "2") 2: Fusing Cleaning Roller (FC) 7: Belt Cartridge (Photoconductor Unit) (BL) 8: Fusing Unit (FU) 9: Transfer Drum (TR DRUM) 10: 120 K Replacement kit 13: Pick-up Roller (Main Frame) 14: Pick-up Roller (Paper Feed Unit) 16: Paper Discharger (b)---> (c)	
3	Use the [Enter] or [▼] key to move the cursor to YES, then press the [Media] key. (c) ---> (b)	
4	Press the [Escape] key once more to return to the FACTORY MODE menu. (d)	

37 MEDIA MANAGE

With this function, the machine can be instructed to ignore the signal from the OHP sensor. However, this mode should not be used under normal circumstances.

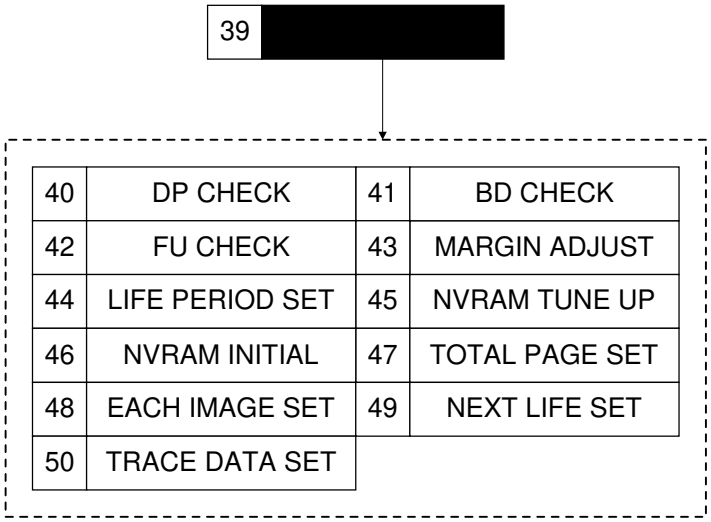
Procedure

Step	Procedure	LCD
1	Press the [Media] key when MEDIA MANAGE appears. (a) ---> (b)	(a) SERVICE MODE MEDIA MANAGE
2	Using the [Enter] or [▼] key, select DEFIANCE, then press the [Enter] key. The machine will now ignore the OHP sensor. For normal operation, this mode is preset to MANAGE.	(b) 37 IMAGE MANAGE ▶ MANAGE/DEFIANCE

39 FACTORY MODE

This mode consists of a range of tests, adjustments, and memory reset procedures.

Factory Mode Menu



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40 DP (Development Process) CHECK

This tests the toner cartridge mechanisms.

Procedure

Step	Procedure	LCD
1	Press the [Media] key when DP CHECK appears. (a) ---> (b)	(a) 39 FACTORY MODE ▶ DP CHECK
2	Using the [Enter] or [▼] key, select the required color, then press the [Media] key. (Example: Yellow) (b) ---> (c)	(b) 40 DP CHECK ▶ Y/M/C/K
3	The yellow toner cartridge is driven. If the toner end sensor for this cartridge does not detect toner end, "Good" will be displayed on the panel, otherwise, "Fail" will be displayed. (c) The toner cartridge will automatically stop turning after 60 seconds. (c) ---> (b)	(c) 40 DP CHECK Y GOOD (d) 39 FACTORY MODE ▶ DP CHECK
4	Press the [Escape] key to stop DP CHECK mode. (c) ---> (d)	

41 BD (Beam Detection) CHECK

This tests the laser beam positioning and output power.

Procedure

Step	Procedure	LCD
1	Press the [Media] key when BD CHECK appears. (a) ---> (b)	(a) 39 FACTORY MODE ▶ BD CHECK
2	The polygon mirror motor rotates and reflects the laser beam towards the detector. If the scanning position of the laser beam is normal, the LCD displays "GOOD", otherwise it will display "FAIL". (b) or (c) The polygon mirror motor automatically stops rotating after 60 seconds. (d)	(b) 41 BD CHECK GOOD (c) 41 BD CHECK FAIL (d) 39 FACTORY MODE ▶ DP CHECK
3	Press the [Escape] key to stop BD CHECK mode. (b) ---> (d)	

42 FU (Fusing Unit) CHECK

Checks the warm-up process for the fusing unit.

Procedure

Step	Procedure	LCD
1	Press the [Media] key when FU CHECK appears. (a) ---> (b)	(a) 39 FACTORY MODE FU CHECK
2	The fusing unit starts the warm-up process. "TEMP: FAIL" is displayed if the fusing unit does not reach the fusing temperature. "TEMP: GOOD" is displayed if it reaches that temperature. (b)	(b) 42 FU CHECK TEMP: FAIL
3	Press the [Escape] key to stop the FU CHECK mode. (b) ---> (c)	(c) 39 FACTORY MODE ▶ DP CHECK

43 MARGIN ADJUST

The leading edge and left side registrations can be adjusted over a range of 3.5 mm either side of a reference value (0).

For tray 1, the leading edge and left side registrations can be adjusted either with this SP mode or with controller SP mode 5 (Registration).

For tray 2, the leading edge and left side registrations can be adjusted with this SP mode. The left side registration can also be adjusted with a controller user mode, and leading edge registration can be adjusted with controller SP mode 5 (Registration).

For how to use this adjustment, see section 5.5. Adjustment Procedures – Adjusting the Leading Edge and Left Side Registrations.

Procedure

Step	Procedure	LCD
1	Press the [Media] key when MARGIN ADJUST appears. (a) ---> (b)	(a) 39 FACTORY MODE MARGIN ADJUST
2	Using the [Enter] or [▼] key, select either TOP or LEFT, then press the [Media] key. TOP: Leading Edge LEFT: Left edge of upper cassette LEFT1: Left edge of lower cassette LEFT3: Left edge from duplex unit (b) ---> (c)	(b) 43 MARGIN ADJUST TOP/LEFT/LEFT1/LEFT3 (c) 43 TOP –2.0mm –<7 6 5 4 3 2 1 0 1>+
3	The registrations can be adjusted up to 3.5 mm to the left or right of a reference value "0" in 0.5 mm intervals. Using the [Enter] or [▼] key, select the adjustment amount by choosing a number, as shown on screens (c) and (d). The selected adjustment amount will be displayed at the upper right corner of screen (c) or (d). Press the [Media] key to input the selected adjustment.	(d) 43 TOP +2.5mm –<1 0 1 2 3 4 5 6 7>+
4	Press the [Escape] key to terminate the MARGIN ADJUST mode. (d) ---> (b) Press the [Escape] key once more to return to the FACTORY MODE menu. (e)	(e) 39 FACTORY MODE ▶ DP CHECK

44 LIFE PERIOD SET

Use this to set the replacement interval for periodical replacement parts.

For how to use this procedure, refer to section 5.5 Adjustment Procedures – Setting the Next Life Limit Value.

NOTE: Do NOT use this mode in the field.

Procedure

Step	Procedure	LCD
1	Press the [Media] key when LIFE PERIOD appears. (a)---> (b)	(a) 39 FACTORY MODE LIFE PERIOD SET
2	Using the [Enter] or [▼] key, select the required code, then press the [Media] key. 2: Fusing Cleaning Roller (b) --> (c) 7: Belt Cartridge (Photoconductor Unit) 8: Fusing Unit 9: Transfer Drum 10: 120 K Replacement kit 13: Pick-up Roller (Main frame) 14: Pick-up Roller (Paper Feed Unit) 16: Paper Discharger (example "2")	(b) 44 LIFE PERIOD ⚠2345678910•12•••16 (c) PERIOD FC ROLL 012000 P SET (d) 44 LIFE PERIOD ⚠2345678910•12•••16 (e) 39 FACTORY MODE ▶ DP CHECK
3	Use the [Enter] or [▼] key to move the cursor to the digit that needs to be changed. Use the [Media] key to increment the value at the blinking digit. When the digits are all correct, use the [Enter] or [▼] key to move the cursor to SET, then press the [Media] key to register the value. (c) --->(d)	
4	Press the [Escape] key to complete the procedure. (e)	

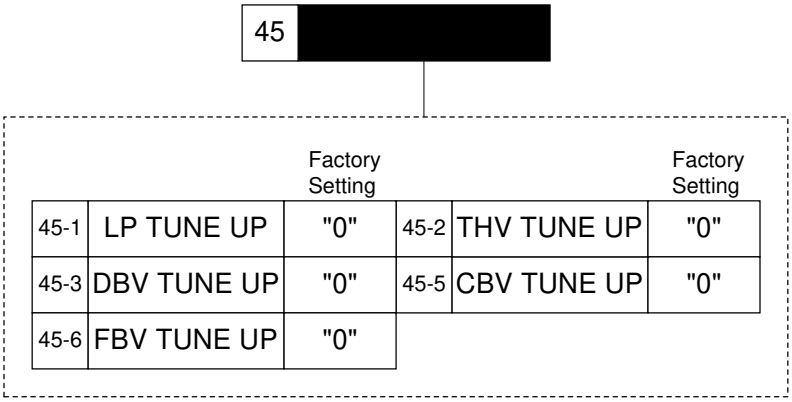
Service Tables

45 NVRAM TUNE UP

This mode is not normally used. However, it may be used when fine tuning of an adjustment value is required. This mode consists of eight subordinate modes. However, use only the five modes shown in the diagram below.

Refer to section 5.5 Adjustment Procedures – NVRAM Tune-up for how to use this procedure.

NVRAM TUNE UP Menu



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45-1 LP (Laser Power Adjustment) TUNE UP

This mode adjusts optical density, line thickness, and/or color reproduction. This can also be adjusted using controller user maintenance mode (toner level) and the adjustment value is printed on the engine maintenance page printed with controller SP mode S1.

Step	Procedure	LCD
1	Press the [Media] key when NVM TUNE UP appears. (a) ---> (b)	(a) 39 FACTORY MODE NVM TUNE UP
2	Move the cursor (white triangle) to LP TUNE UP (code 1 on the bottom line of the display), then press the [Media] key. (b) ---> (c)	(b) 45 LP TUNE UP ⚠ 2345678910•12•••16 (c) 45 LP TUNE UP Y/M/C/K
3	After selecting the color to adjust, press the [Media] key. Example: Yellow (c) ---> (d)	(d) 45 YELLOW [O] - <7 6 5 4 3 2 1▲1>+
4	The TUNE UP value can have one of 9 values between -7 and +7. Move the cursor to the required value, then press the [Media] key. (d)	
5	Press the [Escape] key to store the value for yellow. (d) ---> (c) Repeat steps 3 through 5 for each required color.	
6	Press the [Escape] key to finish the adjustment. (d) ---> (b)	

45-2 THV (Transfer Voltage Adjustment) TUNE UP

Use this to adjust the transfer voltage when toner does not transfer to certain types of media (such as OHPs). There are separate adjustments for plain paper, OHPs, and labels. The voltage that is applied during transfer depends on the media type selected with the printer driver. The transfer voltage can also be adjusted using controller SP mode 4 (Transfer Bias) and the adjustment value is listed on the engine maintenance page printed with controller SP mode S1.

Step	Procedure	LCD
1	Press the [Media] key when NVM TUNE UP appears. (a) ---> (b)	(a) 39 FACTORY MODE NVM TUNE UP
2	Move the cursor (white triangle) to THV TUNE UP (code 2 on the bottom line of the display), then press the [Media] key. (b) ---> (c)	(b) 45 THV TUNE UP 1▲345678910•12•••16 (c) 45 THV TUNE UP O PPC/OHP/LABEL
3	Select the media to adjust the voltage for, then press the [Media] key. Example: PPC (plain paper) (c) ---> (d)	(d) 45 THV (PPC) O –<4 3 2 1 △0 1 2 3 4>+ (e) 45 THV TUNE UP O ▶ PPC/OHP/LABEL
4	The TUNE UP value can have one of 9 values between -4 and +4. Move the cursor to the required value, then press the [Media] key. (d)	(f) 45 LP TUNE UP △ 2345678910•12•••16
5	Press the [Escape] key to complete the tune-up for PPC. (d) ---> (e) Repeat steps 3 through 5 for other media such as OHPs or labels.	
6	Press the [Escape] key to finish the adjustment. (e) ---> (f)	

45-3 DBV (Development Bias Adjustment) TUNE UP

This adjusts the image's optical density by changing the development bias voltage. This adjustment value appears on the engine maintenance list printed with controller SP mode S1.

Step	Procedure	LCD
1	Press the [Media] key when NVM TUNE UP appears. (a) ---> (b)	(a) 39 FACTORY MODE NVM TUNE UP
2	Move the cursor (white triangle) to DBV TUNE UP (code 3 on the bottom of the screen), then press the [Media] key. (b) ---> (c)	(b) 45 DBV TUNE UP 12▲45678910•12•••16
3	Select the color to adjust the development. bias for, then press the [Media] key. Example: Magenta (c) ---> (d)	(c) 45 DBV TUNE UP O ▶ Y/M/C/K (d) 45 MAGENTA O –<4 3 2 1 0 1 2 3 4>+
4	The TUNE UP value can have one of 9 values between -4 and +4. Move the cursor to the required value, then press the [Media] key. (d)	
5	Press the [Escape] key to complete the tune-up for Magenta. (d) ---> (c) Repeat steps 3 through 5 for each color.	
6	Press the [Escape] key to complete the DBV adjustment. (c) ---> (e)	(e) 45 LP TUNE UP ▲2345678910•12•••16

45-4 Not used

45-5 CBV (OPC Belt Bias Adjustment) TUNE UP

This adjusts the OPC belt bias to counteract image defects attributed to the OPC belt.

Step	Procedure	LCD
1	Press the [Media] key when NVM TUNE UP appears. (a) ---> (b)	(a) 39 FACTORY MODE NVM TUNE UP
2	Move the cursor (white triangle) to CBV TUNE UP (code 5 on the bottom of the screen), then press the [Media] key. (b) ---> (c)	(b) 45 CBV TUNE UP 1234▲678910•12•••16 (c) 45 CBV TUNE UP O -<4 3 2 1⚠1 2 3 4>+
3	The TUNE UP value can have one of 9 values between -4 and +4. Move the cursor to the required value, then press the [Media] key. (c)	(d) 45 LP TUNE UP ⚠ 2345678910•12•••16
4	Press the [Escape] key to complete the adjustment for CBV. (c) ---> (d)	

45-6 FBV (Drum Cleaning Roller Bias Adjustment) TUNE UP

This adjusts the drum cleaner bias voltage to counteract image defects attributed to residual toner on the transfer drum.

Note: FBV is sometimes called FCBV. These two acronyms mean the same thing.

Step	Procedure	LCD
1	Press the [Media] key when NVM TUNE UP appears. (a) ---> (b)	(a) 39 FACTORY MODE NVM TUNE UP
2	Move the cursor (white triangle) to FBV TUNE UP (code 6 on the bottom of the screen), then press the [Media] key. (b) ---> (c)	(b) 45 FBV TUNE UP 12345▲78910•12•••16
3	The TUNE UP value can have one of 9 values between -4 and +4. Move the cursor to the required value, then press the [Media] key. (c)	(c) 45 FBV TUNE UP -<4 3 2 1⚠1 2 3 4>+
4	Press the [Escape] key to complete the adjustment for FBV. (c) ---> (d)	(d) 45 LP TUNE UP ⚠2345678910•12•••16

45-11 LF2 (Additional Drum Cleaning Mode) TUNE UP

Use this mode to enable / disable the additional drum rotation between pages printed in different colors.

NOTE: When enabling this mode, printing speed is reduced because of additional drum rotation.

Step	Procedure	LCD
1	Press the [Media] key when NVM TUNE UP appears. (c) ---> (b)	(a) 39 FACTORY MODE NVM TUNE UP (b) 45 LF2 TUNE UP 12345678910▲12•••16 (c) 45 LF2 TUNE UP -<4 3 2 1 0 1 2 3 4>+ (d) 45 LP TUNE UP ⚠2345678910•12•••16
2	Move the cursor (white triangle) to LF2 TUNE UP (code 11 on the bottom of the screen), then press the [Media] key. (d) ---> (c)	
3	The TUNE UP value can be either -4 or 0. -4 : Enable additional cleaning 0 : Disable additional cleaning (Default) Move the cursor to the required value, then press the [Media] key. (c)	
4	Press the [Escape] key to complete the adjustment for FBV. (c) ---> (d)	

46 NVRAM INITIAL

This mode initializes (deletes) all data in the NVRAM on the MCTL board. This must be done when installing a new MCTL board.

⚠WARNING

1. **NVRAM INITIAL is NOT USED under normal circumstances. It should ONLY be used when the NVRAM is corrupted or a new MCTL board is installed. Remember that *execution of this mode will DELETE all the data in the NVRAM*.**
2. **Therefore, make a note of the following data in the NVRAM before executing NVRAM INITIAL.**
   Service mode 43: MARGIN ADJUST (leading edge and left side registrations)
   Service mode 45: NVRAM TUNE UP (laser power and print process voltages)
   LP TUNE UP (normally at "+1")
   THV TUNE UP (normally at "0")
   DBV TUNE UP (normally at "-2")
   CBV TUNE UP (normally at "0")
   FBV TUNE UP (normally at "0")
   LF2 TUNE UP (normally at "0")
   Service mode 47: TOTAL PAGE SET (total print counter)
   Service mode 48: EACH IMAGE SET (number of images in each toner color)
   Many of these values are included on the engine maintenance list printed with controller SP mode S1.
3. **After executing NVRAM INITIAL, input the above data. In addition, reset the 'next life limit' (next replacement for consumables and periodic replacement parts) – refer to 5.5 Adjustment Procedures – Setting the Next Life Limit Value**

Step	Procedure	LCD
1	Press the [Media] key when NVRAM INITIAL appears. (a) ---> (b)	(a) 39 FACTORY MODE ▶ NVRAM INITIAL
2	Select YES if you wish to reset the NVRAM. If not, move the cursor and select NO. Press the [Media] key to reset the NVRAM. All the data will be cleared. (e) ---> (c)	(b) 46 NVRAM INTIAL ▶ YES/NO (c) 39 FACTORY MODE ▶ DP CHECK

Service Tables

47 TOTAL PAGE SET

Use this mode to reset the total number of pages in the NVRAM whenever it has been cleared with NVRAM INITIAL or after replacing the MCTL board.

Service mode 34 (Total Page) displays the current setting of this counter.

Step	Procedure Description	LCD Message
1	Press the [Media] key when TOTAL PAGE SET appears. (a) ---> (b)	(a) 39 FACTORY MODE ▶ TOTAL PAGE SET
2	Select whether Total or Duplex.	(b) 47 TOTAL PAGE ▶ TOTAL/DUPLEX
3	Use the [Enter] or [▼] key to move the cursor to the digit that needs to be changed. Use the [Media] key to increment the value at the blinking digit. When the digits are all correct, use the [Enter] or [▼] key to move the cursor to SET, then press the [Media] key to register the value. (c) --->(b)	(c) 47 TOTAL PAGE 012345 P SET

48 EACH IMAGE SET

Use this mode to reset the total number of images for each color in the NVRAM whenever it has been cleared with NVRAM INITIAL or after replacing the MCTL board.

Service mode 35 (Each Image) displays the current settings of this counter.

Step	Procedure Description	LCD Message
1	Press the [Media] key when EACH IMAGE SET appears. (a) ---> (b)	(a) 39 FACTORY MODE EACH IMAGE SET
2	Use the [Enter] or [▼] key to move the cursor to the required color, then press the [Media] key. (b) ---> (d)	(b) 48 IMAGE OF ▶ Y/M/C/K (c) 48 IMGE OF C 005432 P SET
3	Use the [Enter] or [▼] key to move the cursor to the digit that needs to be changed. Use the [Media] key to increment the value at the blinking digit. When the digits are all correct, use the [Enter] or [▼] key to move the cursor to SET, then press the [Media] key to register the value. (b) ---> (b)	(d) 39 FACTORY MODE ▶ DP CHECK
4	Press the [Escape] key to finish the EACH IMAGE SET mode. (b) ---> (d)	

49 NEXT LIFE SET

This mode is to set the replacement timing (number of prints) of periodic replacement parts.

Step	Procedure Description	LCD Message
1	After selecting NEXT LIFE SET, press [Media] key. (c) ---> (b)	(a) 39 FACTORY MODE ▶NEXT LIFE SET
2	After selecting the code to be set, press [Media] key. (Example: Fuser Cleaning Roller) 2: Fuser Cleaning Roller (a) ---> (b) 7: Belt Cartridge (Photoconductor Unit) 8: Fuser Unit 9: Transfer Drum 10: 120K Volume Stack Kit 13: Pick-up Roller (Main Frame) 14: Pick-up Roller (Paper Feed Unit) 16: Paper Discharger	(b) 48 NEXT LIFE SET 1△345678910•12•••16 (c) PERIOD FC ROLL 007800 P SET (d) PERIOD FC ROLL 007800 P △ET
3	Use the [Enter] or [▼] key to move the cursor to the digit that needs to be changed. Use the [Media] key to increment the value at the blinking digit. When the digits are all correct, use the [Enter] or [▼] key to move the cursor to SET, then press the [Media] key to register the value. (d) --->(b)	
4	Press the [Escape] key to complete the NEXT LIFE SET procedure. (b)---> (e)	(e) 39 FACTORY MODE ▶ DP CHECK

50 TRACE DATA SET

Do not change the original setting.

5.5 ADJUSTMENT PROCEDURES

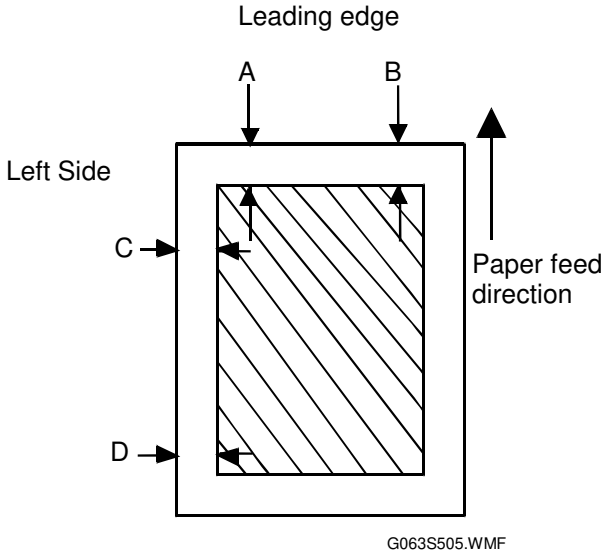
5.5.1 ADJUSTING THE LEADING EDGE AND LEFT SIDE REGISTRATIONS

(1) Purpose

If there is no top or left margin or if the MCTL was replaced, the print area may have changed and any part of or all of document may not print. In these cases, adjust the leading edge and left side registrations to ensure that the entire document prints.

(2) Adjustment Method :

1. Make a grid print using service mode 31 (Test Print).
2. Measure leading edge registration at positions 'A' and 'B' at the top of the page. The registration must meet the following specifications (the default value is 4 mm).
   (A + B) / 2 ≤ 4.0 ±1.5 mm
3. Measure the left side registration at positions 'C' and 'D' at the left edge of the page.
   The registration must meet the following specifications (the default value is 3 mm).
   (C + D) / 2 ≤ 3.0 ±1.5 mm
4. If the registration is not within the specified limit, adjust it using service mode 43 (Margin Adjust).
5. After the above adjustment, make another grid print to check the registration.



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[EO'B1]

5.5.2 NVRAM TUNE UP

Under normal conditions, adjustment is unnecessary. However, fine adjustment may be required to solve print quality problems.

(1) Purpose

Improving the print quality.

(2) Procedure

1. Select service mode 45 (NVRAM Tune Up).
2. Select the required mode.
3. Adjust the value.
4. Make a test print to test the print quality.

(3) Tune Up Mode Table

Mode	Adjustment	Purpose
LP TUNE UP	Laser power adjustment	Optical density
THV TUNE UP	Transfer voltage adjustment	Transfer efficiency
DBV TUNE UP	Development bias adjustment	Optical density
CBV TUNE UP	OPC belt bias adjustment	Optical density
FBV TUNE UP	Drum cleaning roller bias adjustment	Drum cleaning efficiency
LF2 TUNE UP	Enabling/Disabling additional Drum cleaning sequence	Drum cleaning efficiency

5.5.3 SETTING THE NEXT LIFE LIMIT VALUE

(1) How the Maintenance Counters Work

Overview

This maintenance counters in the NVRAM on the MCTL control the replacement cycle for supplies and periodic maintenance parts. The replacement cycle is also known as the 'next life limit'.

The counters control the replacement period for the fusing unit cleaning rollers (user replacement), OPC belt (user replacement), fusing unit (service replacement) and 120K maintenance kit (service replacement).

The 'next life limit' is the number of prints (or number of images, in the case of the belt cartridge [photoconductor unit]) that can be made during the life of the part.

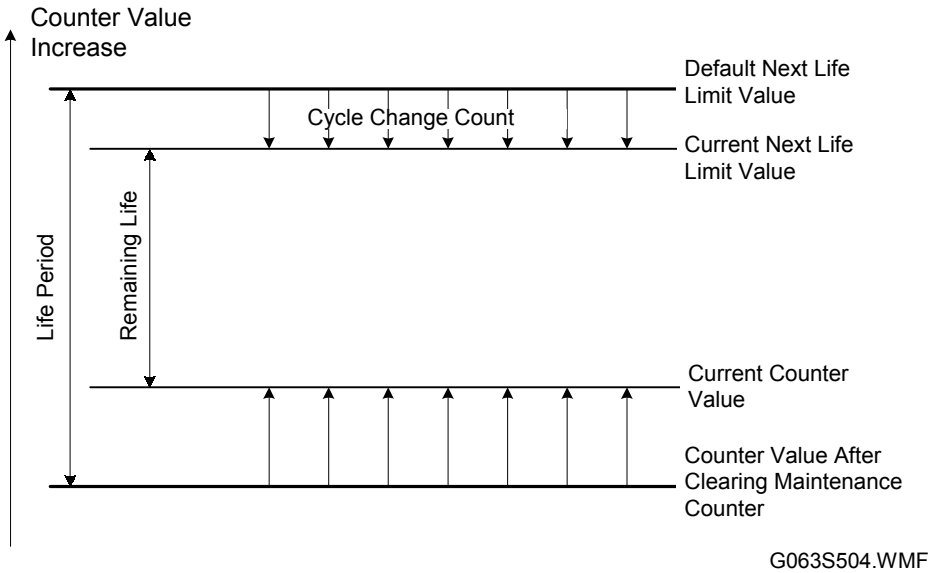
A maintenance indication appears on the operation panel in the following cases:

- For the belt cartridge (photoconductor unit): When the total of the image counter values for Y, M, C, and K reaches the 'next life limit'.
- For other units: When the total print counter value reaches the 'next life limit'.

Except for the 120K maintenance kit, the next life limits are affected by a factor known as the 'cycle change count'. This factor depends on the average image ratio (for the fusing unit and fusing unit cleaning rollers) or job size (for the belt cartridge [photoconductor unit]) during the life of the part.

When a page is printed, the copy count increases, as usual (from the bottom of the diagram). The amount of remaining life decreases by the same amount that the copy count increases. This is the same as in a normal printer or copier.

However, in this machine, if the page has a higher image ratio or if the print job is small, the 'cycle change count' also increases. This also reduces the amount of remaining life, so the part has to be replaced earlier.



Effect of Image Ratio and Job Size on the Cycle Change Count

The three columns in the following tables contain the following information.

Image ratio: Total of the color image ratios on the page.

Cycle change count: Change in the 'next life limit' for one print, which represents the next scheduled replacement.

Replacement cycle: Number of pages in the replacement cycle if all prints are performed at the corresponding image ratio (or job size for the bottom table).

Example: Image ratio of 40%.

The total counter increases by 1 as normal. However, in addition, the 'next life limit' for the fusing unit cleaning roller decreases by 1. Therefore, for one page, the total counter gets closer to the replacement time by two. If the image ratio was 40% for all pages, the replacement cycle would be 6,000, which is the half of the initial value (12,000).

Fusing Unit Cleaning Roller

Image Ratio	Cycle Change Count	Replacement Cycle (pages)
0 – 20%	-0	12,000
21 – 40%	-1	6,000
41 – 100%	-2	4,000

Fusing Unit

Image Ratio	Cycle Change Count	Replacement Cycle (pages)
0 – 12.5%	-0	60,000
12.6 – 20.0%	-0.2	50,000
20.1 – 40.0%	-0.5	40,000
40.1 – 60.0%	-1	30,000
60.1 – 100%	-2	20,000

OPC Belt Cartridge (Photoconductor Unit)

Job Size	Cycle Change Count	Replacement Cycle (images)
1 page	-1.5	20,000
2 pages	-1.27	22,000
3 pages	-1.08	24,000
4 pages	-0.72	29,000
5 pages	-0.61	31,000
6 pages	-0.47	34,000
7 pages	-0.39	35,000
8 pages	-0.35	37,000
9 pages	-0.28	39,000
10 pages	-0.25	40,000
25 pages	0	50,000

NOTE: For the OPC belt cartridge (photoconductor unit), these figures are for when the user makes monochrome and full color prints at a ratio of 1:1.

(2) Resetting the Counters after Normal Maintenance

The following table shows the replacement cycles for each component, assuming no alteration from image ratio and job size.
The table also shows how to reset the counters after maintenance (use one of the methods given in the 'reset method' column).

Counter No.	Item	Replacement cycle (normal life period)	Reset method
2	Fusing Cleaning Roller	12,000 pages	• Maintenance - Reinstall in User Mode. • Execute Clear Care (engine SP mode 36).
7	Belt Cartridge (Photoconductor Unit)	60,000 images	
8	Fusing Unit	60,000 pages	• Maintenance - Clear (controller SP mode S3). • Execute Clear Care (engine SP mode 36).
9	120k Kit (Paper Discharger, Drum Cleaner, Transfer Roller, Paper Feed Roller, Separation Pad, Transfer Drum)	120,000 pages	

After resetting the counters using the methods listed in the above table, the next replacement time (Next Life Limit) is set automatically. The replacement cycles for the items are determined as shown below.

- Fusing cleaning rollers, fusing unit, 120 k kit:
  Next Life Limit = Total Counter Value + Life Period ... (a)
- OPC belt
  Next Life Limit = C Counter Value + M Counter Value + Y Counter Value + K Counter Value + Life Period ... (b)

The 'life period' is the basic life expectancy of the component. It remains constant. The counter values are the current total and KCMY image counter values.

Example:

The life period for the fusing cleaning rollers is 12,000 pages. If the total counter is 23,805 when this roller is replaced, the next life limit will become 12,000 + 23,805 (35,805) after resetting the counters.

Remember the following points.

The next life limits for the fusing cleaning rollers, belt cartridge (photoconductor unit), and fusing unit will change during the life of the part, depending on image ratio (for the fusing unit and cleaning rollers) and job size (for the belt cartridge). The next life limit for the 120K kit remains constant.

(3) After Replacing the MCTL Board or Resetting the MCTL NVRAM

After replacing the MCTL board or clearing the NVRAM on the MCTL, it is necessary to transfer the record (stored in the NVRAM on the old board) of the next time to replace supplies and periodic parts.

There is no service mode to reset the 'next life limit'.

To do this, it is necessary to manipulate various counters, as set out in the procedure below.

Information Required

T: Total Page Count
IY, IM, IC, IK: Image Count (Yellow, Magenta, Cyan, Black)
NL2, LP2: Next Life Limit and Life Period (Fusing Unit Cleaner)
NL7, LP7: Next Life Limit and Life Period (Cartridge)
NL8, LP8: Next Life Limit and Life Period (Fusing Unit)
NL9, LP9: Next Life Limit and Life Period (120k Kit)
The defaults for the life periods are as follows. Do not adjust in the field.
LP2: 12,000, LP7: 50,000, LP8: 60,000, LP9: 120,000

This information can be got either in engine service mode (functions 34, 35, 32, and 44 in the order given in the above list) or by printing an engine maintenance list with controller SP mode S1.

Procedure

1. Replace the MCTL board and turn on the power.
2. Using engine service mode 47 (Total Page Set), set the total page count to "NL2 - 12,000 (LP2)" (see the note at the foot of the page).
3. Using engine service mode 36, do a 'clear care' for the fusing unit cleaning roller. This sets the next life limit for this component to "NL2."
4. Using engine service mode 48 (Each Image Set), input values for IY, IM, IC, and IK so that the total image count (IY + IM + IC +IK) is "NL7 - 50,000 (LP7)" (see the note at the foot of the page).
5. Do a 'clear care' for the belt cartridge (photoconductor unit) (engine service mode 36 again). This sets the next life limit for this component to "NL7."
6. Using engine service mode 47 (Total Page Set), set the total page count to "NL8 - 60,000 (LP8)" (see the note at the foot of the page).
7. Do a 'clear care' for the fusing unit (engine service mode 36 again). This sets the next life limit for this component to "NL8."
8. Using engine service mode 47 (Total Page Set), set the total page count to "NL9 - 120,000 (LP9)" (see the note at the foot of the page).

9. Do a ‘clear care’ for the 120k kit (engine service mode 36 again). This sets the next life limit for this kit to “NL9.”
10. Reset the total page count (engine service mode 47) and the image counts for Y, C, M, and K (engine service mode 48) to the correct values (the ones that were stored in the NVRAM on the old MCTL).
11. Turn off the power to finish this procedure.

NOTE: The next life limit value must not be smaller than the life period value (the counter value cannot be negative).

6. DETAILED DESCRIPTIONS

6.1 OVERVIEW

6.1.1 MAIN UNITS

This color laser printer consists of five systems: Printing, Optics, Transfer, Paper Transport, and Control.

1. Printing

The printing system consists of the following six units located around the OPC belt that form a toner image on the OPC belt.

- Charge
- Exposure
- Development
- First Transfer (from OPC belt to transfer drum)
- Quenching
- Belt Cleaning

2. Optics

The optics system consists of two units that form electrostatic latent images on the OPC belt by scanning a laser beam across it.

- Optics Unit
- Polygon Mirror Motor

3. Transfer

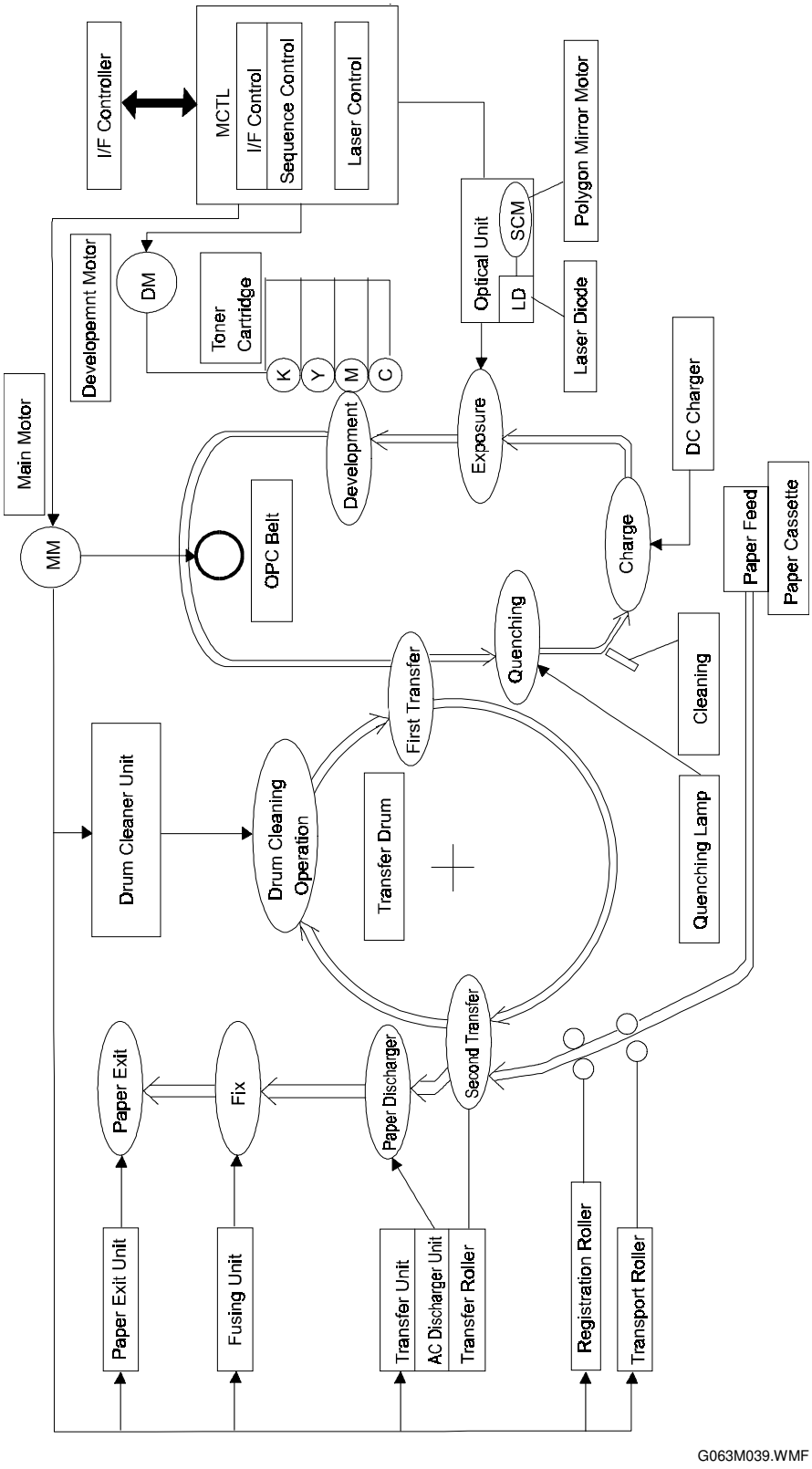
The transfer system consists of three units that transfer the toner image to the copy paper.

- Transfer Drum
- Second Transfer (from transfer drum to paper)
- Drum Cleaner

4. Paper Transport

The paper transport system consists of five units that pick up paper from the paper cassette, separate it from the transfer drum, and feed it out of the printer body after fusing the toner image onto it.

- Paper Cassette
- Transport Unit
- Paper Discharger
- Fusing Unit
- Paper Exit



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5. Control

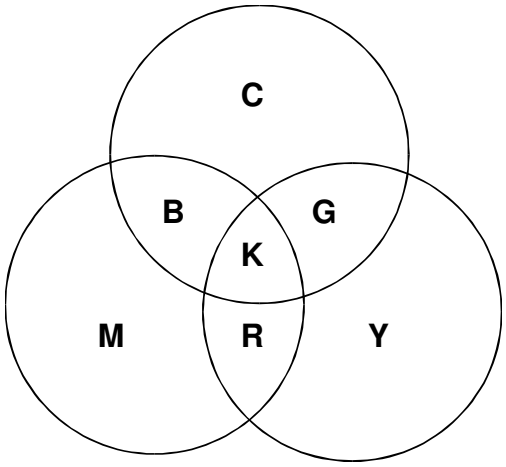
The control system consists of four units that run the printer by processing the interface signals transmitted from the host and other systems.

- Sequence Control
- Laser Control
- Fusing Temperature Control
- Interface Control

6.1.2 BASIC COLOR PRINTING MECHANISM

1. Principle of Color Printing

Color printing is made through a subtractive process by combining the three primary colors, yellow, magenta, and cyan. The following illustration shows how cyan, magenta, and yellow toners can be combined to form other colors.



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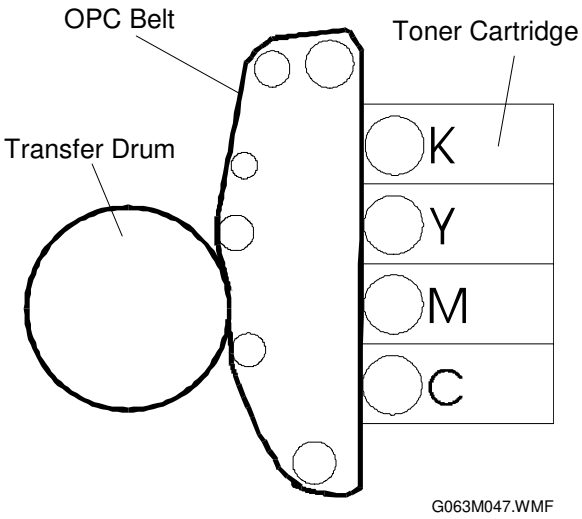
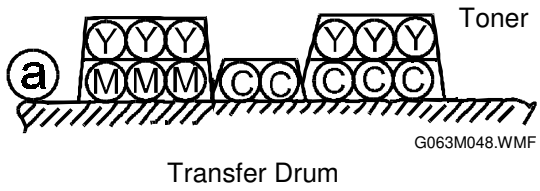
Y: Yellow
M: Magenta
C: Cyan
R: Red
G: Green
B: Blue
K: Black

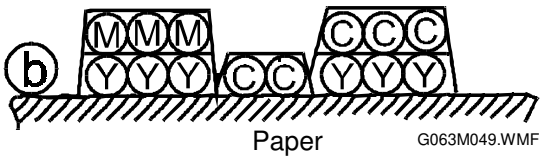
2. Basic Color Printing Process
   1) The printer contains yellow, magenta, cyan, and black toner cartridges.



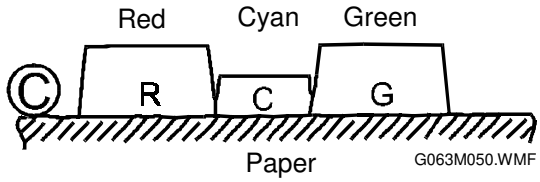
   2) The developed toner images are transferred to the transfer drum one at a time (a).
   The transfer drum turns 4 times per image (if all colors are used). Black toner is transferred first, then cyan, magenta, and finally yellow.



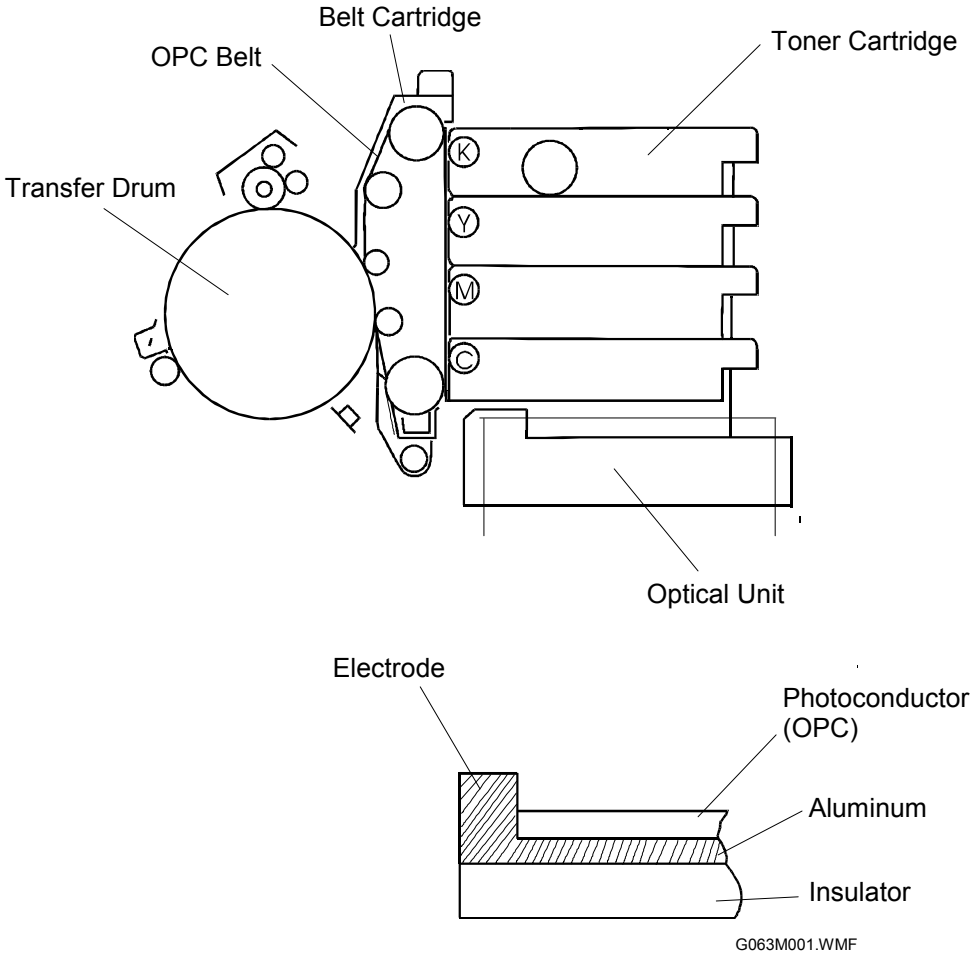
   3) The combined toner image formed on the transfer drum is transferred to the paper (b).



   4) The fusing unit fuses the toner to the paper. (c)



6.1.3 OPC BELT STRUCTURE



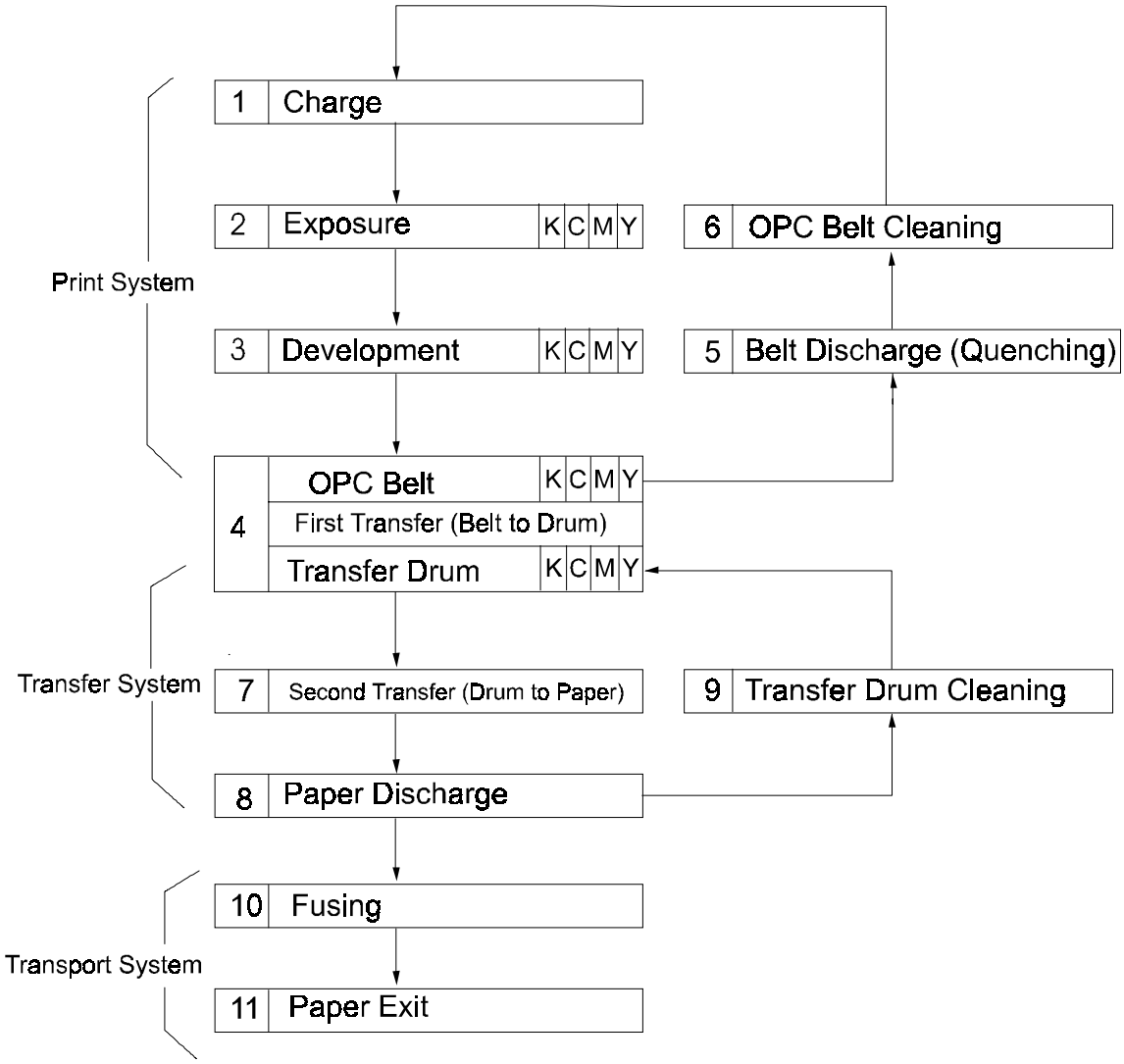
The OPC belt consists of a surface layer of organic photoconductor (OPC), an inner layer of insulation (PET), and an aluminum layer in between the two.

The ‘belt cartridge’ is also called the ‘photoconductor unit’.

6.2 PRINT SYSTEM AND TRANSFER SYSTEM

6.2.1 INTRODUCTION

The following illustration shows the basic steps of the printing system, with the OPC belt and transfer drum as the central components of the system.



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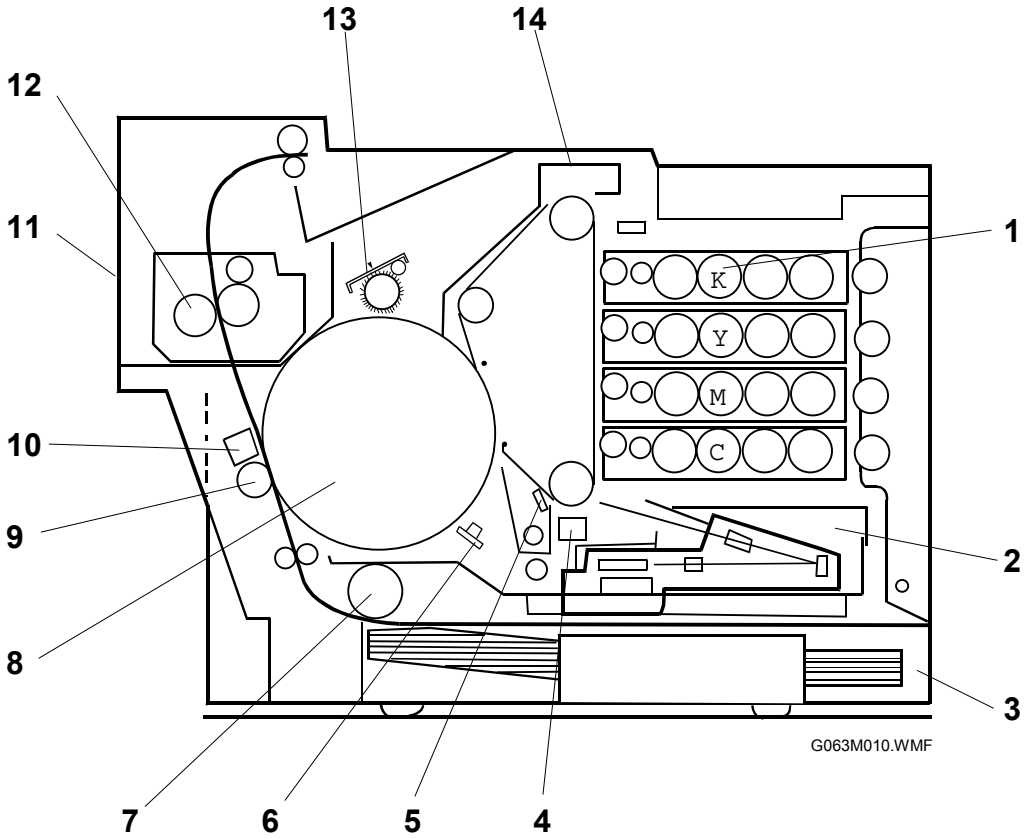
6.2.2 PRINTER COMPONENTS

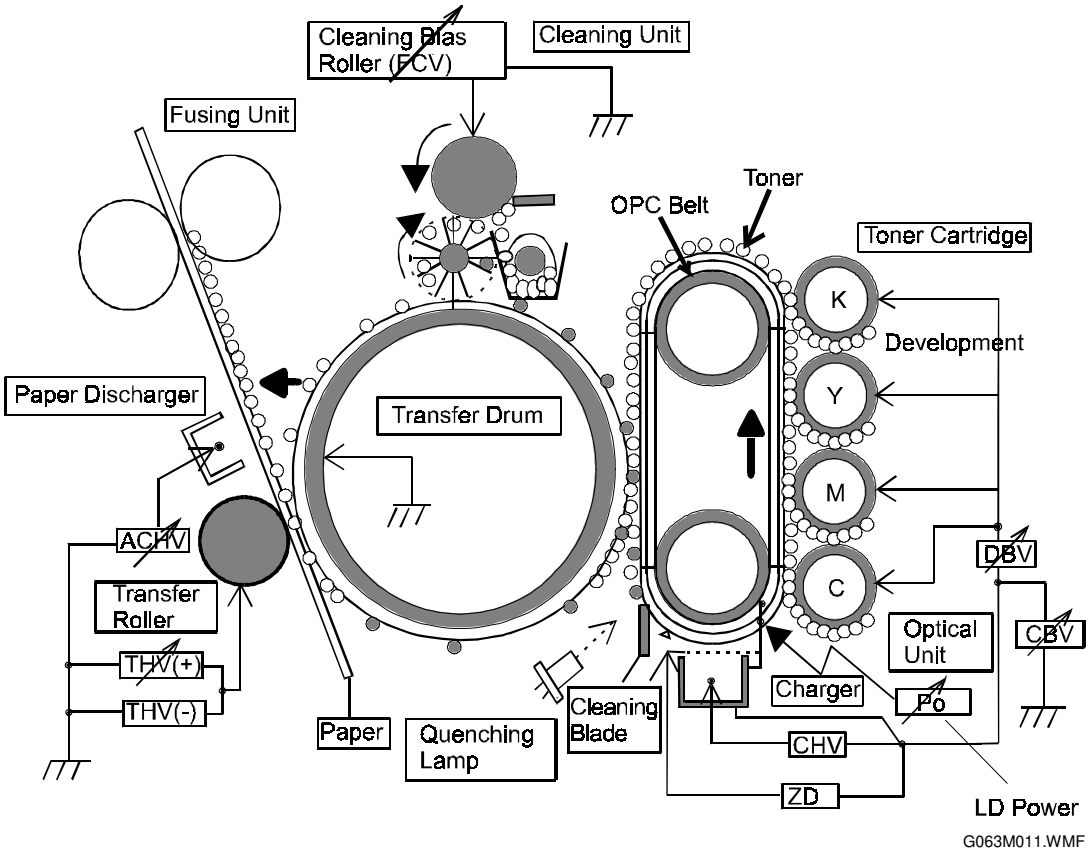


No.	Name of Component	Process
1	Toner Cartridge	Development
2	Optical Unit	Exposure
3	Paper Cassette	Paper Feed
4	Charge Corona Unit	Charge
5	Cleaning Blade	Belt Cleaning
6	Belt Discharger (Quenching Lamp)	Belt Discharge
7	Dick-up Roller	Paper Pick-up
8	Transfer Drum	Image Transfer
9	Transfer Roller	Image Transfer
10	Paper Discharger	Paper Discharge
11	Paper Exit Unit	Paper Feed-out
12	Fusing Unit	Fusing
13	Drum Cleaner	Drum Cleaning
14	Belt Cartridge (Photoconductor Unit)	Forming the Image

6.2.3 THE PRINTING SYSTEM

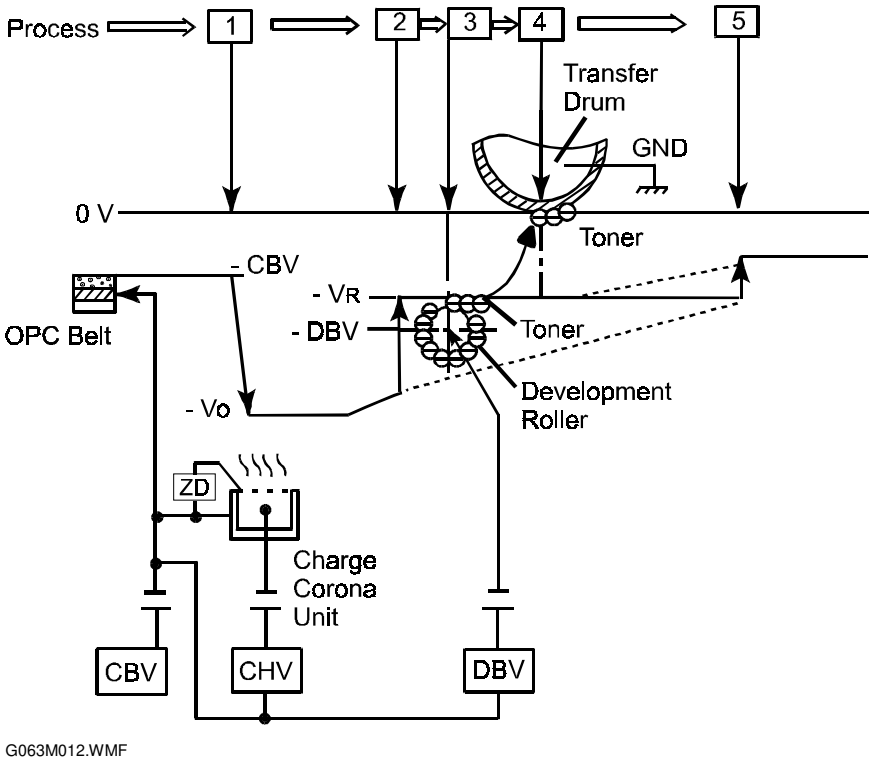
This section briefly describes the electrostatic imaging process for this printer.

1. Printing Process Overview
   1) The CBV terminal of the high voltage unit charges the OPC belt to –CBV (V).
   2) The CHV terminal of the high voltage unit applies a high negative voltage (-CHV) to the charge corona unit to generate the charge corona.
   3) The DBV terminals (one for each color) of the high voltage unit power supply charge the development rollers to –DBV (V).
   4) The transfer drum frame is grounded.
   5) The THV(+) terminal of the high voltage unit applies a high positive voltage (+THV) to the transfer roller



In the above diagram, blocks with a diagonal arrow through them indicate a power output that can be adjusted using an engine service mode. Potentiometers on the high voltage unit or laser diode drive board PCBs should not be touched.

2. OPC Belt Potential Variations
   1) The OPC belt is biased to -CBV(V). Then, during charging, the surface of the OPC belt is evenly charged to -V_O(V).
   2) During exposure, the belt is discharged to -V_R(V) when exposed to the laser beam, causing an electrostatic latent image to form on the OPC belt.
   3) During development, the difference in potential between -V_R(V) and -DBV(V) causes the negatively charged toner to move to the OPC belt, thereby forming a visible image. (Toner is attracted to the least negatively-charged surface, which is the exposed part of the OPC belt.)
   4) During transfer, the negatively charged toner on the OPC belt moves to the transfer drum because the transfer drum potential (GND) is more positive than the OPC belt.
   5) The OPC belt potential is discharged by the quenching lamp.



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1: Charging Process
2: Exposure Process
3: Development Process
4: Transfer Process
5: Cleaning (Quenching)
CBV: Power Supply for the OPC Belt Bias
CHV: Power Supply for Charging
DBV: Power Supply for Development Roller Bias
-V_R: Voltage on the exposed areas of the OPC Belt

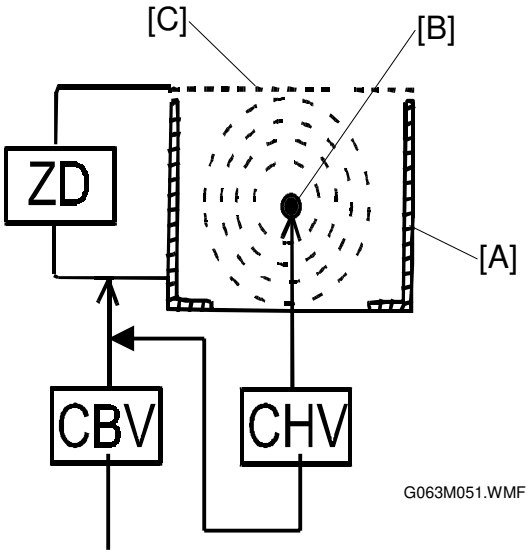
6.2.4 PROCESS DETAILS

Charge

The charge corona unit evenly charges the OPC belt.

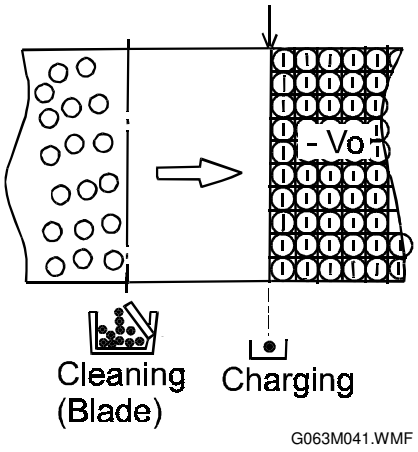
(1) Charge Corona Unit Structure

1) The charge corona unit consists of the case [A], corona wire [B], and grid [C].
2) The charge corona unit charges the OPC belt surface to a potential of $-V_O$ (V).
3) The zener diode keeps the grid at a constant voltage ZD(V) to apply the charge to the belt evenly.



(2) Charging Process

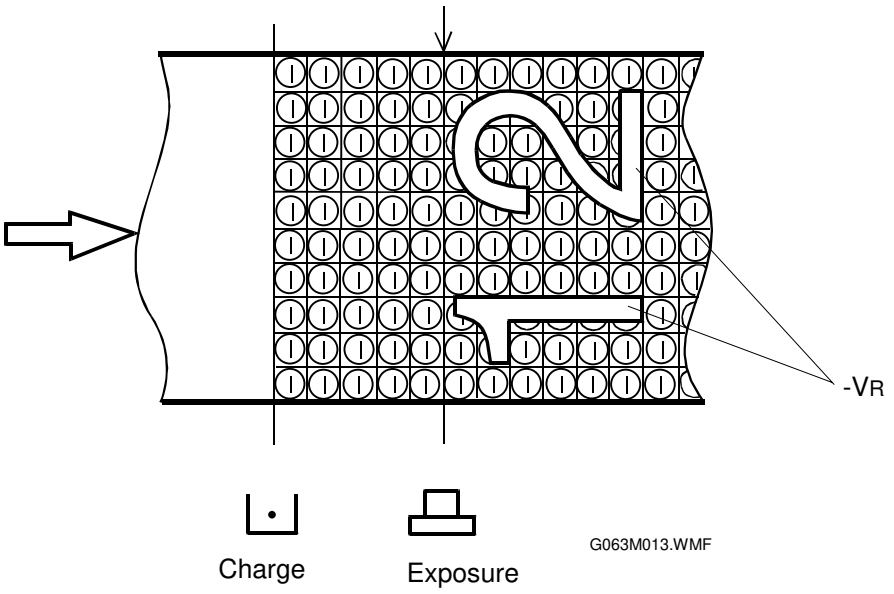
1) The potential of the OPC belt surface before charging is -CBV(V).
2) The charge corona unit applies an even voltage of $-V_O$ to the OPC belt surface.



Exposure

During exposure, the OPC belt surface is exposed to the laser beam to form an electrostatic latent image.

1. Structure of the Optical Unit
   1) The source of the laser beam is a semiconductor laser.
   2) A lens and mirror scan the laser beam across the OPC belt to form the electrostatic latent image.
2. Exposure Process
   1) After charging, the OPC belt surface has a potential of $-V_O$ (V).
   2) The laser is scanned across the OPC belt perpendicular to the direction of motion.
   3) The beam switches on then off at high speed in accordance with the image data.
   4) The charge on the illuminated areas decreases to a potential of $-V_R$ (V). Unexposed areas remain at $-V_O$ (V)
   5) As a result, an invisible electrostatic latent image forms on the OPC belt as shown below.



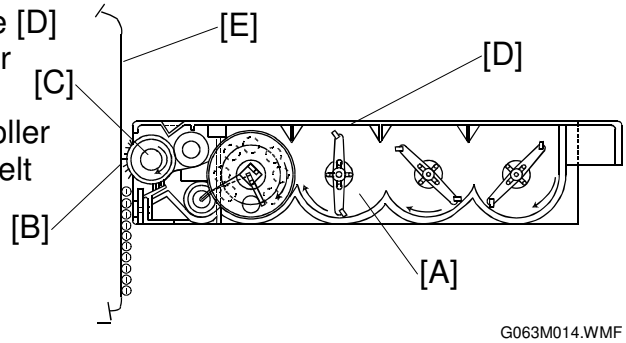
Development

During development, toner causes the electrostatic latent image on the OPC belt to become visible.

1. Toner Cartridges
   1) There are four toner cartridges from top to bottom in this order: black, yellow, magenta and cyan. It is not possible to install them in the wrong order.
   NOTE: This is not the same as the order of development (which is black, cyan, magenta, yellow).

   2) Each cartridge contains a single toner color [A].

2. Development Process
   1) Toner [B] from the toner cartridge [D] adheres to the development roller [C].
   Development occurs when this roller comes in contact with the OPC belt [E] surface.



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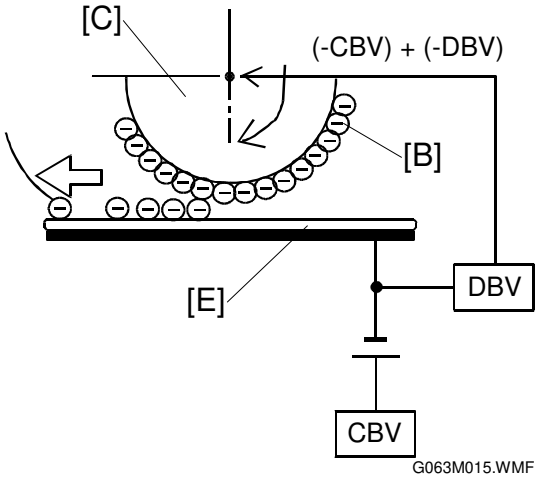
   2) The development roller is biased to the potential -DBV (V).



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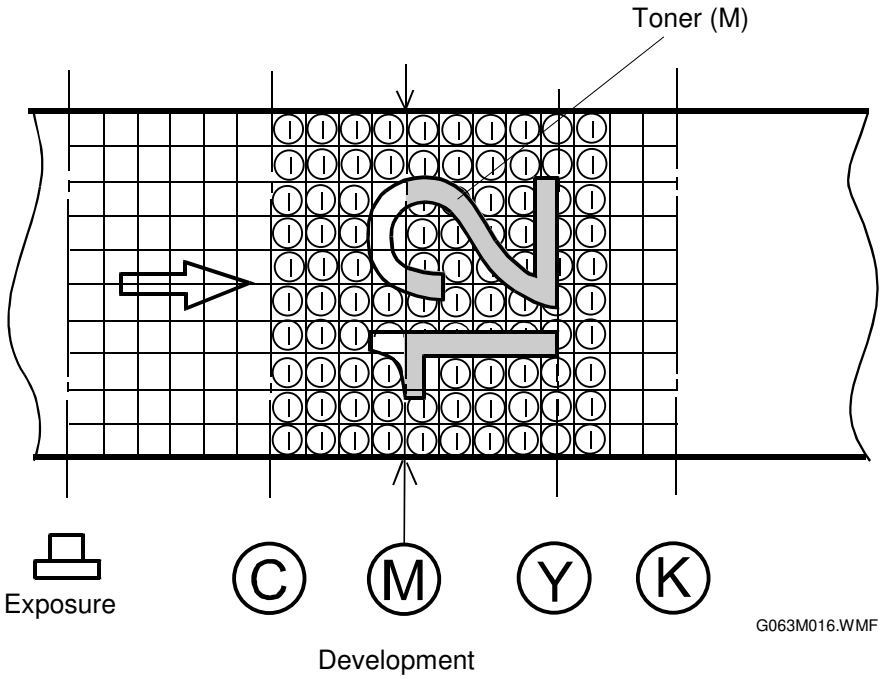
3) During development, a visible toner image is formed on the OPC belt. Toner is attracted to the least negatively-charged surface, which is the exposed part of the OPC belt.

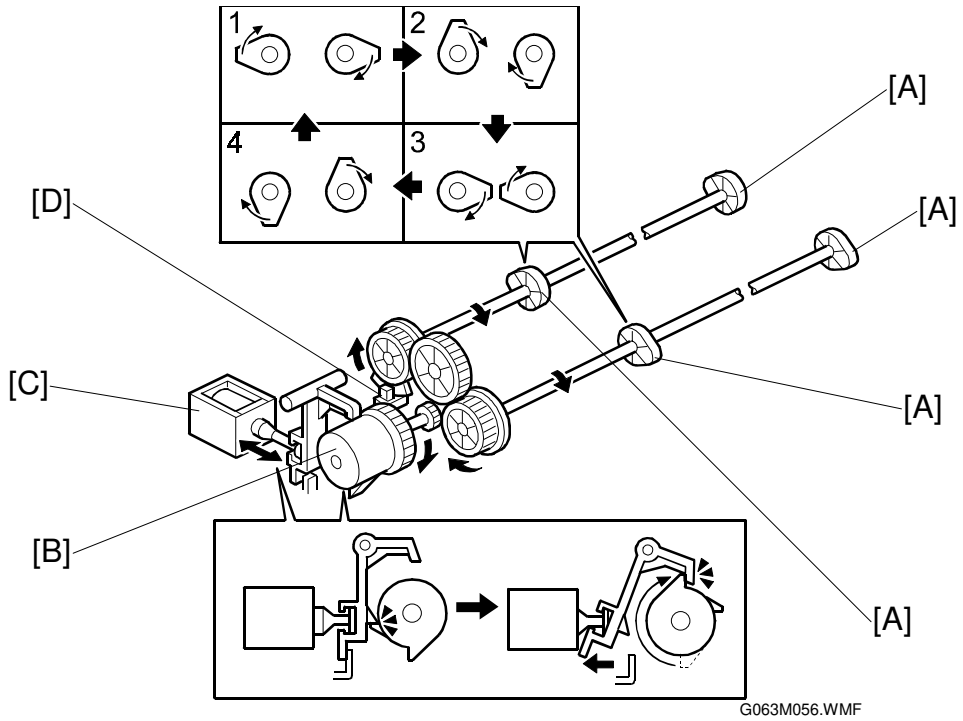
4) On the other hand, unexposed areas are not developed, because these have a higher negative charge than the toner, so they repel the toner.

The diagram shows the positions of the four color development units in relation to the belt. In the diagram, the magenta image is being developed.

If there are only two colors used in the image data, the other two development cycles will be skipped.



Toner Cartridge Positioning Mechanism



When the printer is idle, none of the toner cartridges contacts the OPC belt. During printing, the machine moves the toner cartridges into contact with the belt one at a time, in the order K, C, M, Y.

There are two toner cartridge drive mechanisms. One is for the black and yellow cartridges (the uppermost two cartridges), and the other drives the cyan and magenta cartridges.

In each mechanism, cams [A] driven by a spring clutch [B] and solenoid [C] mechanism push the toner cartridges into position. A sensor (the development sensor) [D] detects when the mechanism for the pair of cartridges is at home position.

Before the start of printing, the cams are pointing vertically (position 1 for KY and position 3 for CM in the diagram; note that in the diagram, the view of the mechanism has been rotated 90°). At this time, the actuator is inside the development sensor, which informs the CPU that the mechanism is in home position.

To move the black toner cartridge into contact with the belt, the development solenoid (K,Y) releases the pawl on the spring clutch, which turns 180°, and this turns the cam shaft 90° (to position 2 for KY in the diagram). When the cam shaft rotates, the cam pushes the black toner cartridge into contact with the belt.

After the black development cycle, the solenoid turns off, which allows the cam shaft to turn another 90° (to position 3 for KY in the diagram). The black toner cartridge is now pushed away from the belt by a spring. During this period, the solenoid for cyan and magenta remains off.

At about the same time, the solenoid and clutch mechanism for cyan and magenta moves the cyan cartridge into contact with the belt. To do this, the solenoid for cyan and magenta turns on. The cams turn 90° (to position 4 for CM in the diagram). This pushes the cyan cartridge against the belt. After the cyan cycle, the solenoid turns off, and the cam turns 90° again, to position 1 in the diagram.

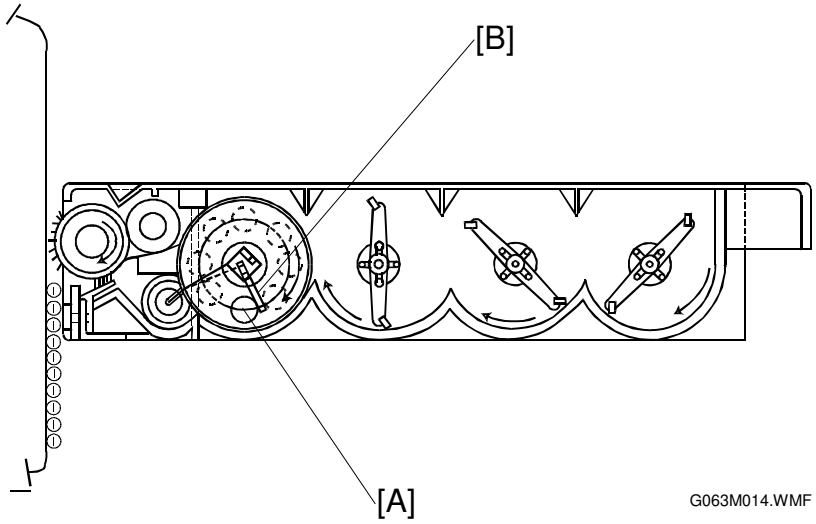
Next, the solenoid and clutch mechanism for cyan and magenta moves the magenta cartridge into contact with the belt. The sequence of events is similar to that for the black toner cartridge described above. After this cycle, the cyan/magenta mechanism is back in home position. During this period, the solenoid for black and yellow remains off.

Then the yellow development cycle begins, using the black/yellow mechanism again. After this cycle, the black/yellow mechanism is back in home position as well.

Position of each cam in the diagram during development

	HP	Dev. K	→	Dev. C	→	Dev. M	→	Dev. Y	HP
KY	1	2	3	3	3	3	3	4	1
CM	3	3	3	4	1	2	3	3	3

Toner End Sensor



There is a toner end sensor for each cartridge. The components of the sensor are located on the left and right sides of the machine (there is a photodiode at one side of the cartridge and a phototransistor at the other side). There are small windows [A] to allow the light from the photodiode to pass through the cartridge. When the solenoid and clutch mechanism pushes the cartridge against the belt, drive from the development motor is transmitted to the toner cartridge, then agitator [B] mixes the toner inside the cartridge. At this time, if the light path inside the cartridge remains blocked, the machine detects that there is sufficient toner in that cartridge. If the light path becomes unblocked, toner near end is detected.

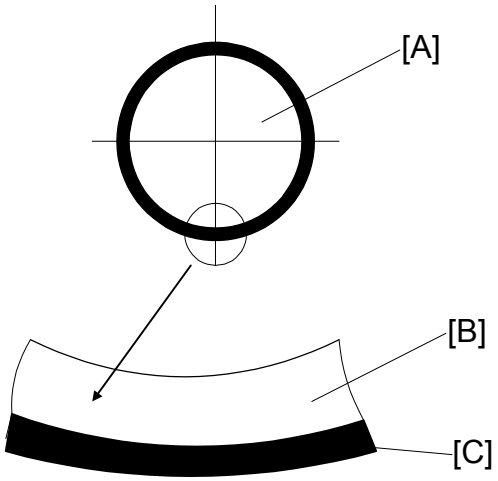
After near-end is detected, the machine allows up to 500 images (for the C, M, and Y cartridges) or up to 300 images (for the K cartridge) to be made until the toner end condition is reached. There are separate counters for each color. When one of the cartridges reaches a toner end condition, the machine prevents further printing.

If the front cover is opened for 15 seconds, any toner near-end or toner end conditions are cleared.

First Transfer (From Belt to Drum)

During the first transfer process, toner images on the OPC belt are transferred to the transfer drum one color at a time.

The Transfer Drum



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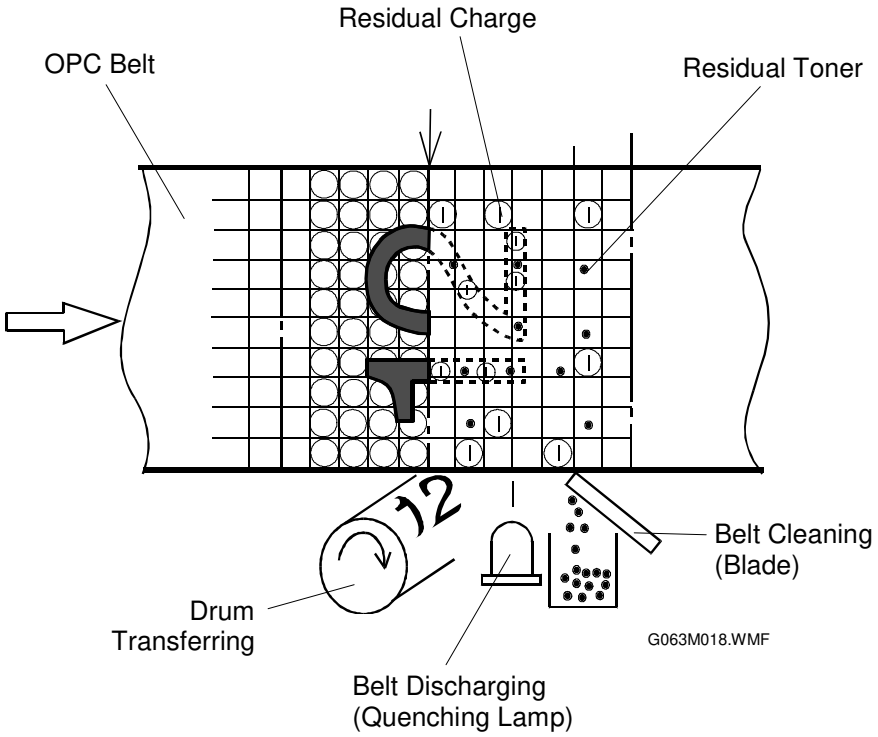
1) The transfer drum [A] has an aluminum base [B] and a rubber coating [C].
2) The transfer drum is driven by contact with the OPC belt. The rotation speeds and circumferences of the drum and belt are the same, so the leading edge of the toner image always arrives at the same place on the drum. The CPU uses the drum encoder to monitor the drum rotation, in case any slippage occurs. (SC 71 is generated if an error occurs.)

First Transfer Process



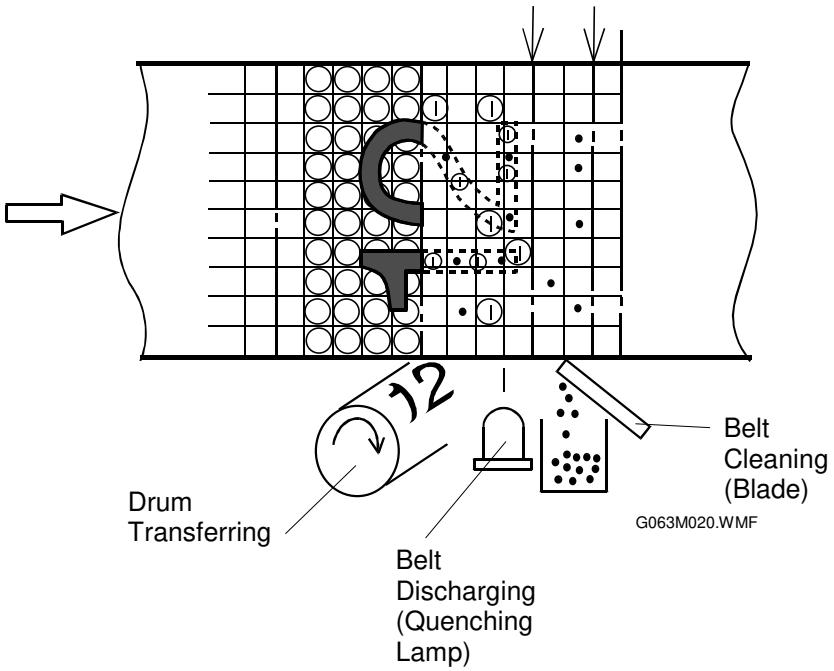
1) After the OPC belt passes the development mechanism, it comes in contact with the transfer drum. The transfer drum and belt rotations are synchronized so that the leading edge of the toner image on the belt always arrives at the same place on the drum.
2) The OPC belt has a negative voltage (the magnitude depends on whether it is an exposed or unexposed area of the belt). The potential of the transfer drum is nearly GND (Ground).
3) The difference in potential between the OPC belt and the transfer drum causes the negatively charged toner on the OPC belt to move to the transfer drum.
4) Each toner color moves from the OPC belt onto the transfer drum, and a full-color toner image builds up with each rotation of the transfer drum.
5) After all four colors have been transferred to the drum, the toner image transfers to the paper.

Belt Discharging (Quenching Lamp)

During belt discharge (after drum transfer), the quenching lamp illuminates the OPC belt to discharge the residual charge before cleaning the belt.

1. Quenching Lamp
   1) The quenching lamp is an LED array containing 24 light emitting diodes (LEDs).

Discharge Process



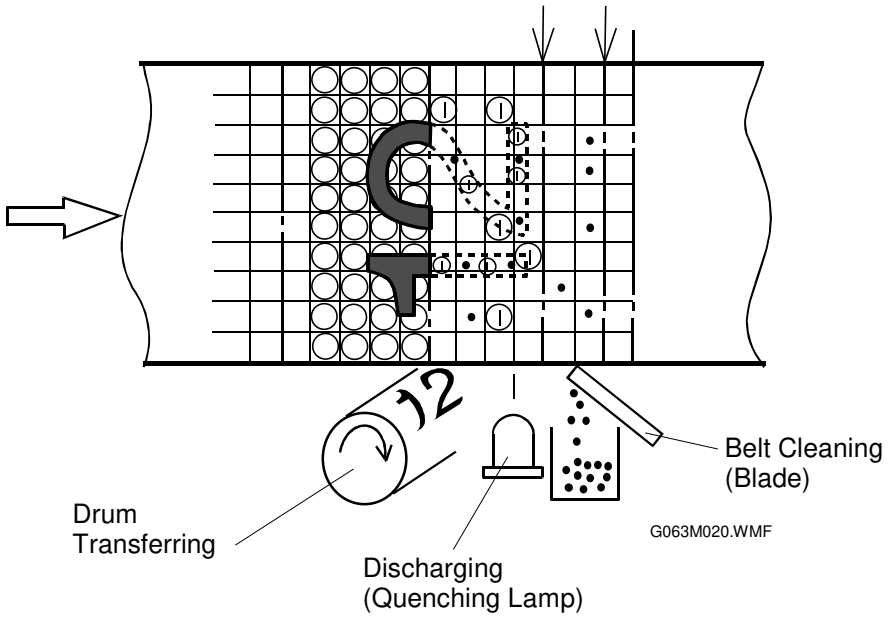
   1) After the toner image has transferred to the transfer drum, a residual charge still remains on the OPC belt.
   2) The quenching lamp discharges the OPC belt before belt cleaning. This makes it easier for the belt cleaner to remove remaining toner particles from the belt, and prepares the belt for the next development cycle.

Belt Cleaning

During belt cleaning, residual toner adhering to the OPC belt surface is removed.

1. Cleaning Blade
   1) The belt cleaning blade is in the belt cartridge.

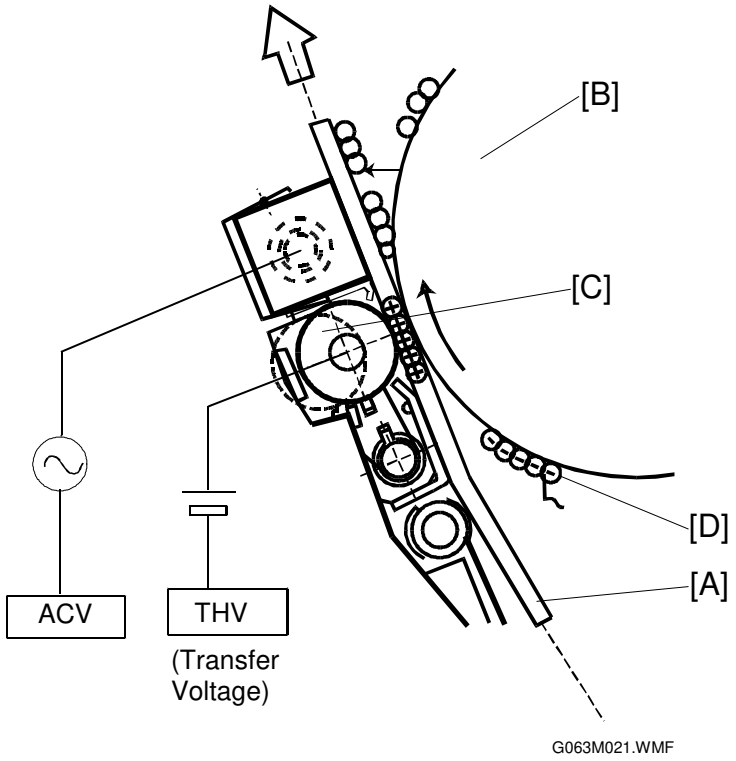
2. Belt Cleaning



   1) A small amount of toner remains on the OPC belt because it did not transfer during the drum transfer process.
   2) The edge of the blade scrapes the residual toner off the OPC belt.
   3) The waste toner feeder feeds the toner to the waste toner bottle.

Second Transfer (From Drum to Paper)

During the second transfer process, the toner image on the transfer drum transfers to the paper.



Second Transfer Components

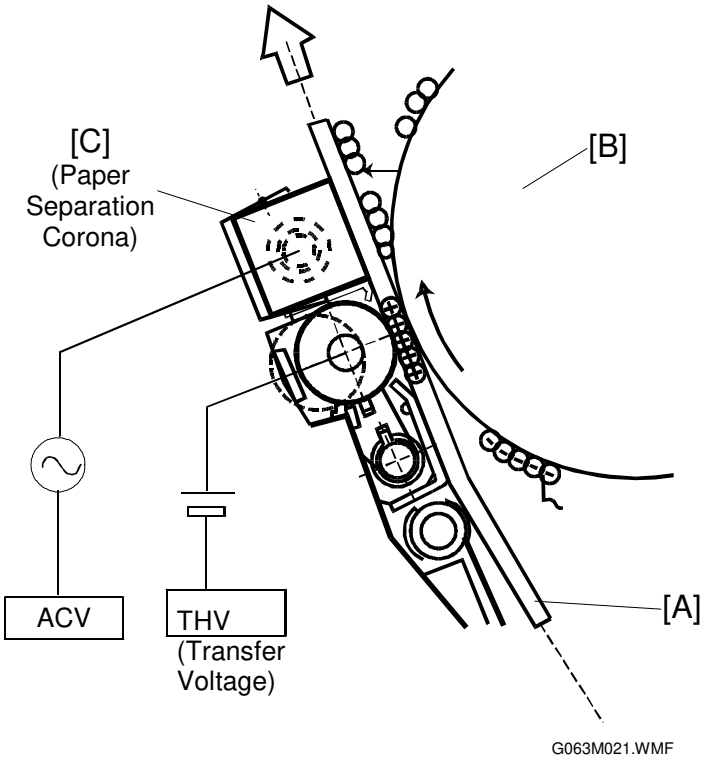
1) The transfer roller is normally away from the transfer drum.
2) The THV(+) terminal of the high voltage unit charges the transfer roller positively.
3) The transfer roller comes in contact with the transfer drum for the second transfer process only.
4) The paper passes between the transfer roller and transfer drum.

Second Transfer Process

1) The registration rollers feed the paper [A] to synchronize with the leading edge of the toner image on the transfer drum [B].
2) The transfer roller [C] and the transfer drum start to feed the paper as it comes in contact with the transfer drum.
3) The paper passes between the transfer roller and transfer drum.
   At this time, a positive high voltage (THV) is applied to the transfer roller.
4) Negatively charged toner [D] moves to the positively charged paper.
5) The paper with the transferred toner is continuously fed through towards the paper discharge unit.
6) At intervals (but not during paper transfer), a negative voltage is applied from the THV (-) terminal, to clean the transfer roller.

Paper Discharging

This process discharges the paper and separates it from the transfer drum using a combination of AC and DC charges.

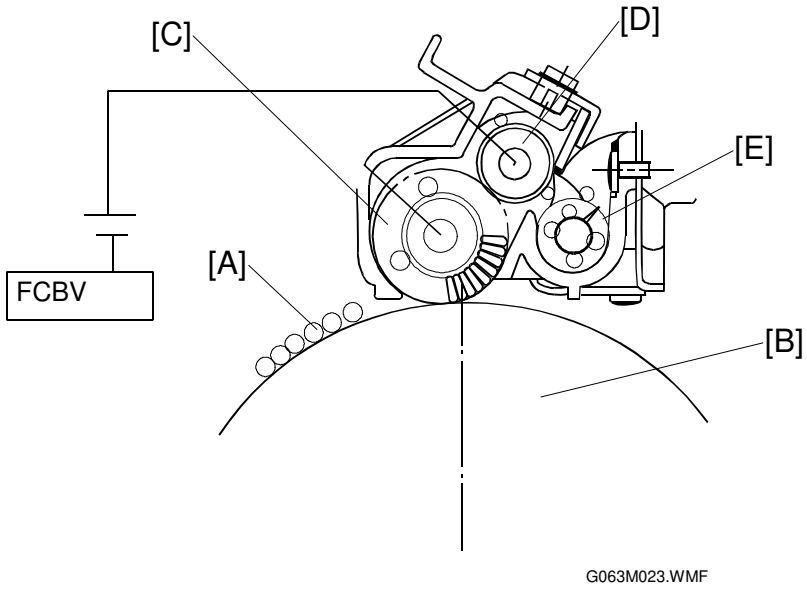


1. Paper Discharge Components
   1) The paper discharge unit consists of a case and a corona wire.
   2) High voltage AC (ACV) is applied to the paper discharge corona wire.

2. Paper Discharge and Separation Process
   1) Paper [A] adheres to the transfer drum [B] during the transfer process.
   2) The paper discharger neutralizes electrical charge on the paper by applying ac to the paper.
   3) The ac charge and a dc component (DCV) separate the paper from the transfer drum. The paper is then fed towards to the fusing unit.

Drum Cleaning

During drum cleaning, the residual toner on the transfer drum is removed.

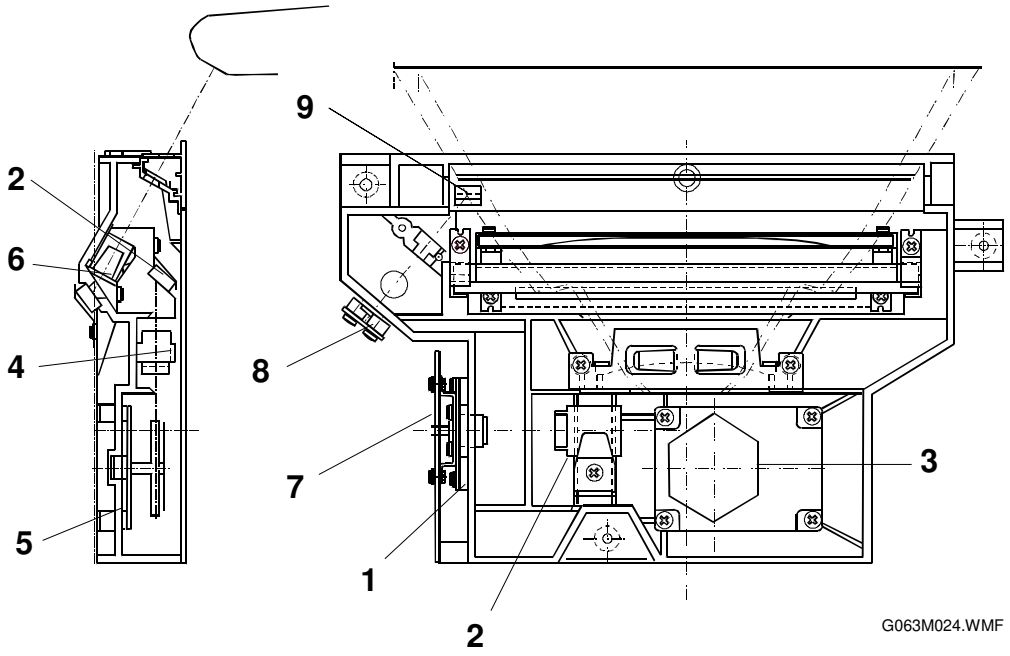


1. Drum Cleaning Unit
   1) After the toner image has been transferred to the paper, the drum cleaning brush cleans the surface of the transfer drum as it rotates. The cleaning brush stays away from the transfer drum during image processing.
   2) A positive voltage FCBV(V) is applied to the drum cleaning roller and cleaning brush.
      Note: Service mode displays this voltage as 'FBV', but the high voltage unit has 'FCBV' next to the terminal. Because of this, we have to keep using two acronyms in this manual for the same voltage.
   3) The drum cleaning roller rotates as it comes in contact with the drum cleaning brush.
2. Belt Cleaning Process
   1) There is residual toner [A] on the surface of the transfer drum [B] after the paper transfer process.
   2) The drum cleaning brush [C] is positively charged. The drum cleaning brush helps the negatively charged residual toner come off the surface of the transfer drum, and electrostatically attracts the toner.
   3) The drum cleaning roller [D] has a slightly higher positive charge (the drum cleaning brush is slightly discharged by contact with the drum) and therefore attracts the negatively charged toner adhering to the drum cleaning brush.
   4) The cleaning blade scrapes off the waste toner adhering to the surface of drum cleaning roller, and the waste toner feeder [E] transfers it to the waste toner unit.

6.3 OPTICAL SYSTEM

6.3.1 OUTLINE

This printer uses a laser diode to write the latent image on the OPC belt. The information supplied by the image data (video signal) tells the fast switching mechanism for the laser diode when to turn on and off. The laser scans over the OPC belt through a polygon mirror and lens, to form an electrostatic latent image on the OPC belt.



6.3.2 OPTICAL SYSTEM COMPONENTS

1. Laser Unit	Light emitting source with laser diode.
2. Cylinder Lens	Laser beam condenser.
3. Polygon Mirror	Hexagonal mirror for scanning the laser beam across the belt.
4. F-theta Lens	Focusing lens for the laser beam.
5. Polygon Mirror Motor	Turns the polygon mirror.
6. Mirror	Reflecting mirror for the laser beam path.
7. LDC	Laser diode control circuit.
8. PD (Photodetector)	Synchronizes the laser beam scan
9. BTD Mirror	The Beam Timing Detector mirror guides the laser beam to the PD.

6.3.3 SPECIFICATIONS

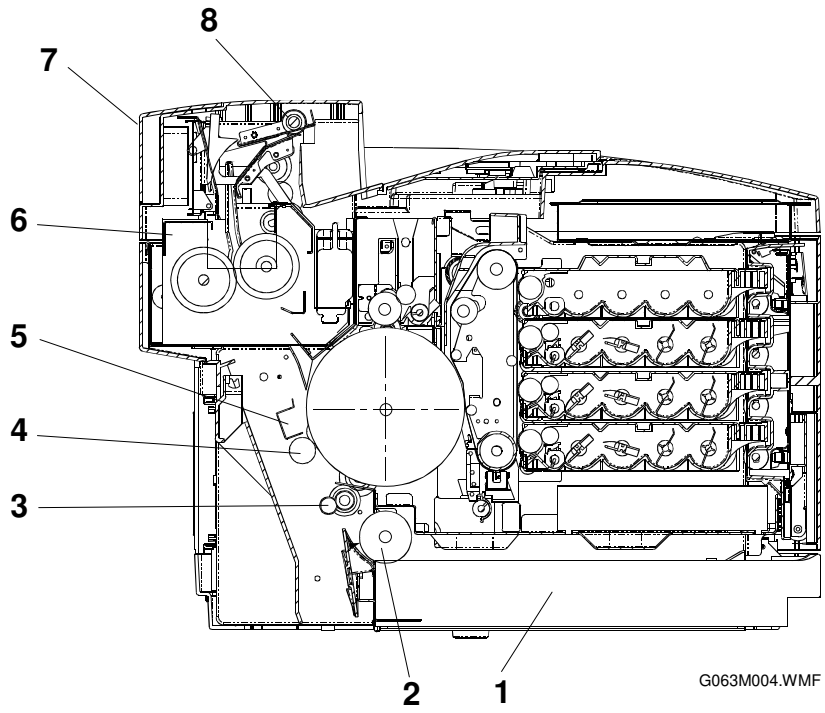
Item	Specification
Rated Output for the Laser Diode	5 mW
Laser Beam Wavelength	Approx. 785 nm
Scanning Resolution	600 dpi
Scanning Width	220 mm
Rotations Per Minute for Polygon Mirror Motor	35,904 rpm
Number of Polygon Mirror Faces	6

6.4 PAPER TRANSPORTATION SYSTEM

6.4.1 OUTLINE

After a toner image forms on the transfer drum, the pick-up roller feeds a sheet of paper to the registration roller. The registration roller feeds the paper to the transfer unit so that the leading edge of the paper is in synchronization with the leading edge of the toner image on the transfer drum.

6.4.2 PAPER TRANSPORTATION SYSTEM COMPONENTS



1.	Paper Cassette	Holds the printer paper.
2.	Pick-up Roller	Feeds paper one sheet at a time.
3.	Registration Roller	Feeds paper to synchronize with the toner image on the transfer drum.
4.	Transfer Roller	Transfers the toner image to the paper.
5.	Paper Discharger Unit	A corona unit that produces an AC corona to separate the paper from the transfer drum.
6.	Fusing Unit	Fuses the toner image to the paper.
7.	Paper Exit Unit	Feeds the completed print out of the printer.
8.	Paper Exit Roller	Feeds the paper from the printer to the exit tray.

6.4.3 OHP SENSOR

The OHP sensor (a reflective photosensor) inside the paper feed unit determines whether the cassette contains OHP transparencies.

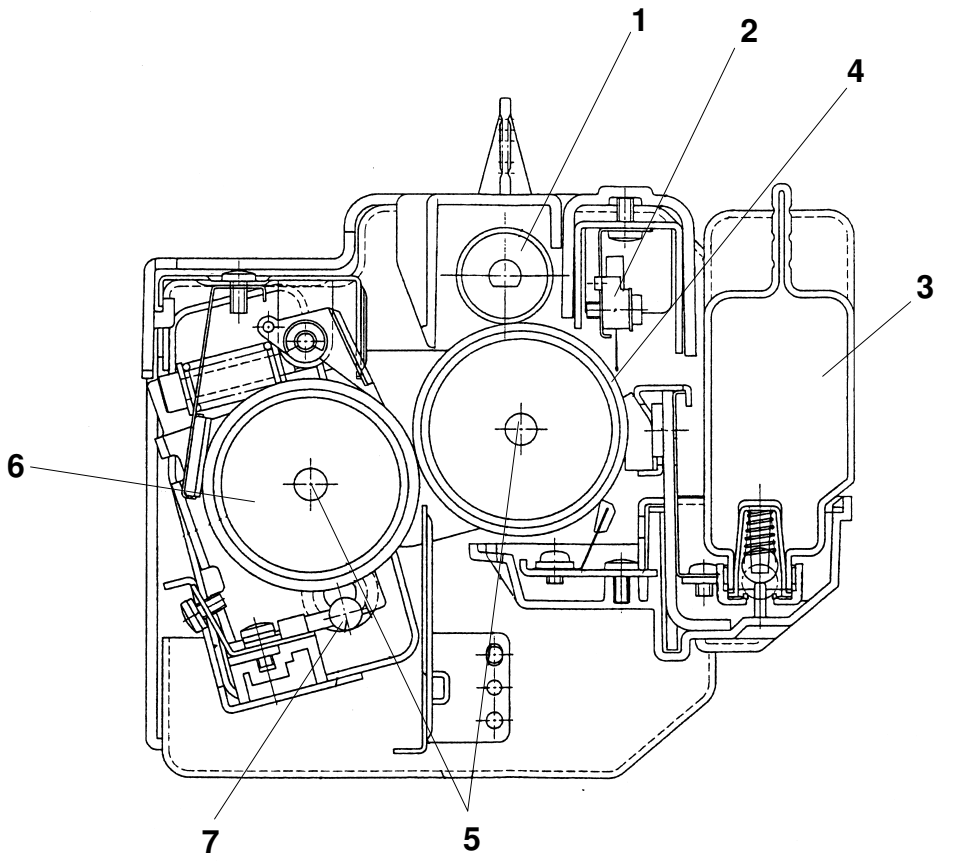
Using this sensor, the controller detects the paper type before paper feed starts, so it can control the printing process to suit the actual paper type. For example, even if the user sets the paper type to “Plain Paper” when the cassette contains OHP transparencies, a problem does not occur. The controller determines that the cassette contains OHPs and notifies the engine so it can switch from ‘plain paper’ mode to ‘OHP transparency’ mode.

6.5 FUSING UNIT

6.5.1 OVERVIEW

The fusing unit uses a thermal fusing system with two hot rollers. Paper carrying the toner passes between the hot rollers. The heat rollers apply heat and pressure to the paper passing between them, fusing the toner image to the paper.

6.5.2 COMPONENTS



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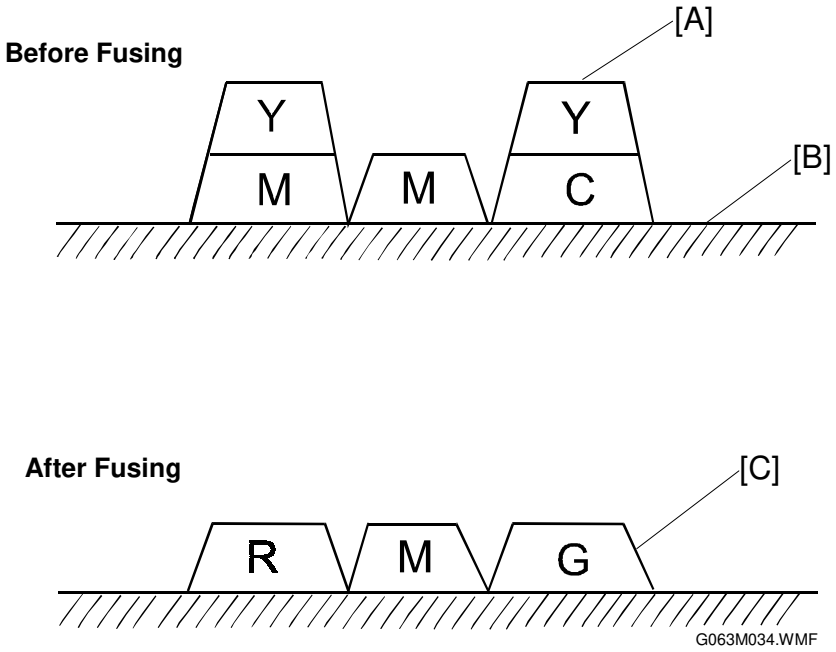
1. Cleaning Roller — Cleans the hot roller.
2. Thermistor — Detects the temperature on the surface of the hot roller.
3. Oil Bottle — Contains the silicone oil for the fusing unit.
4. Hot Roller — Contains a fusing lamp.
5. Fusing Lamp — A halogen lamp.
6. Pressure Roller — Contains a fusing lamp; applies pressure to the hot roller
7. Thermofuse — Prevents the hot roller from heating up excessively.

6.5.3 FUSING PROCESS



1. Silicone oil supplied from the oil bottle is applied to the surface of the hot and pressure rollers.
2. The toner image [A] has been transferred onto the paper [B], but has not been fused.
3. The paper passes between the hot and pressure rollers.
4. Each roller is heated to about 150° C, and receives a pressure of about 156N from the other roller.
5. When the paper carrying the toner passes between the hot and pressure rollers, the toners melt and fuse to the paper.
6. The paper carrying the fused image [C] separates from the hot and pressure rollers, and is ejected from the printer.

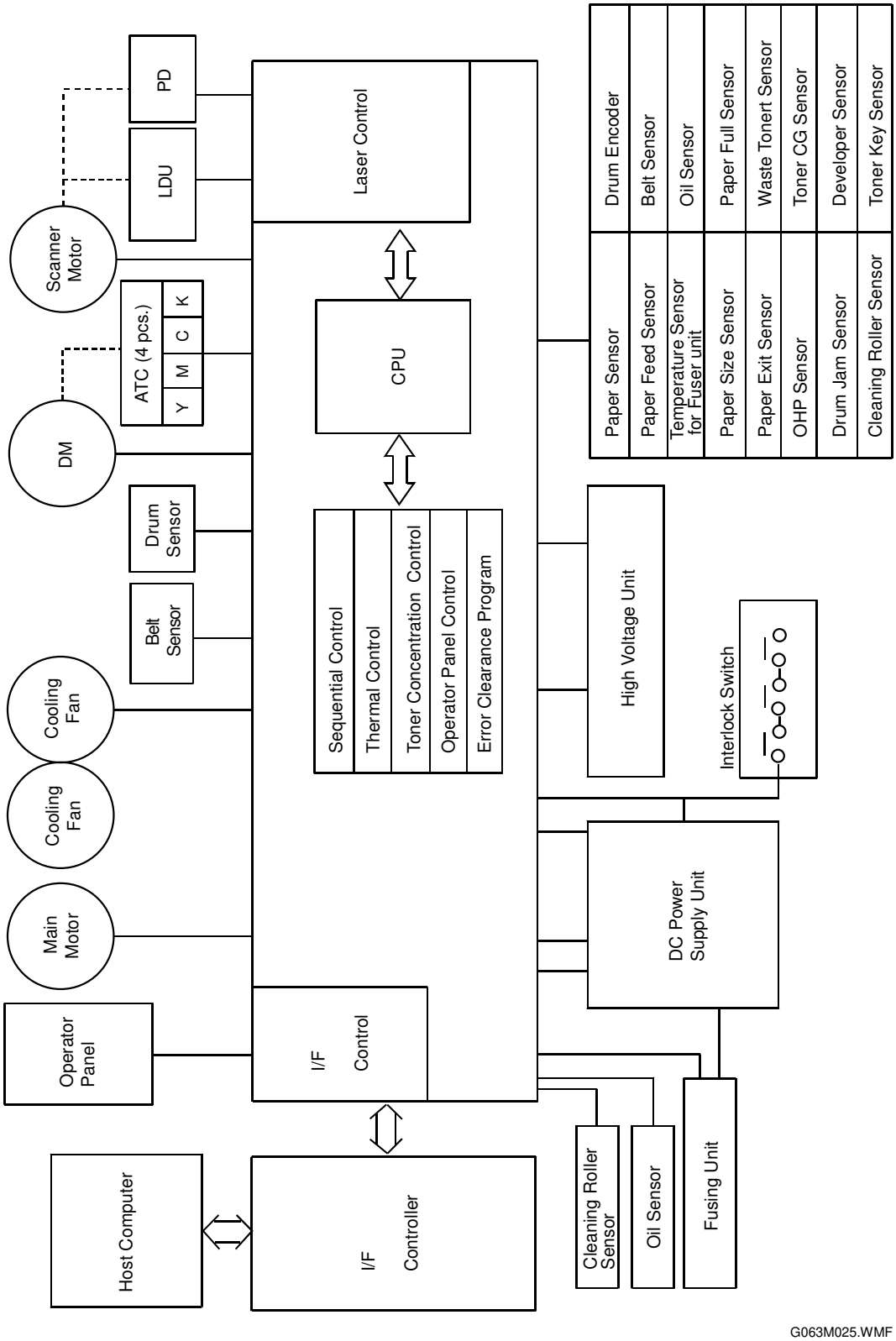
6.6 CONTROL SYSTEM

6.6.1 COMPONENTS

The MCTL (Main Control) board controls most of the main electrical parts for this printer.

Sequence Control Components

1. Printing Process Control	Controls the printing process from paper feed to paper exit.
2. Laser Output Control	Automatically controls the laser output.
3. Fusing Temperature Control	Controls the fusing lamps so that the hot roller and pressure roller are at the correct temperature.
4. Toner Detection Control	Controls toner end detection.
5. Interface Control	Processes the input and output signals between the printer and the host computer.
6. Operator Panel Indicators	Displays the printer operation status on the operator panel.
7. Error Control	Controls the halt procedures when errors occur in the printer.



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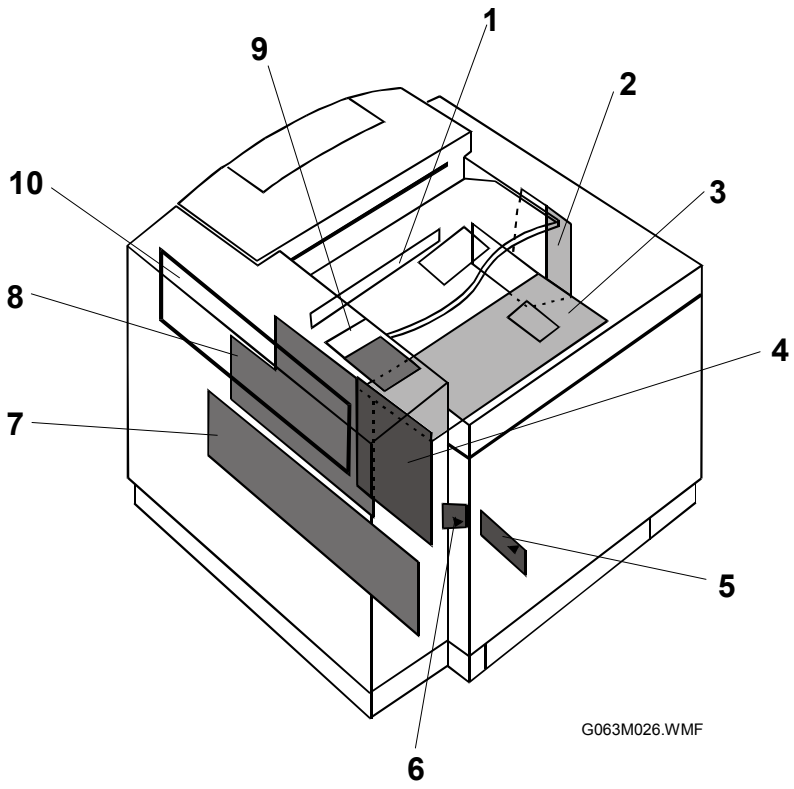
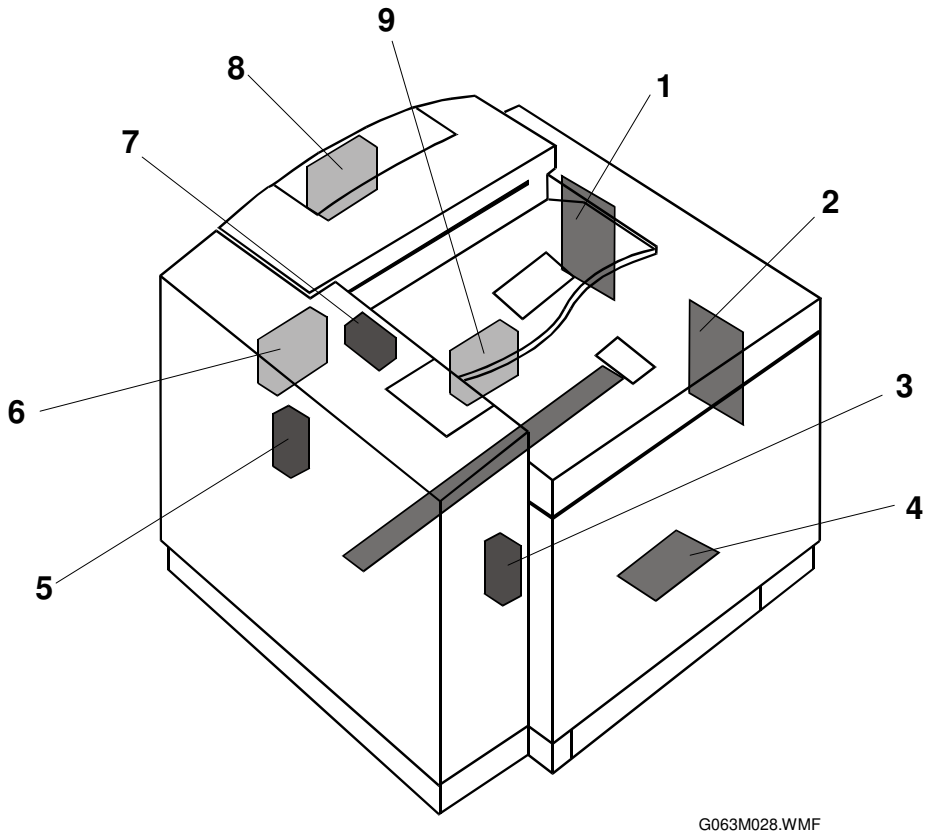
Detailed Descriptions

PCBs



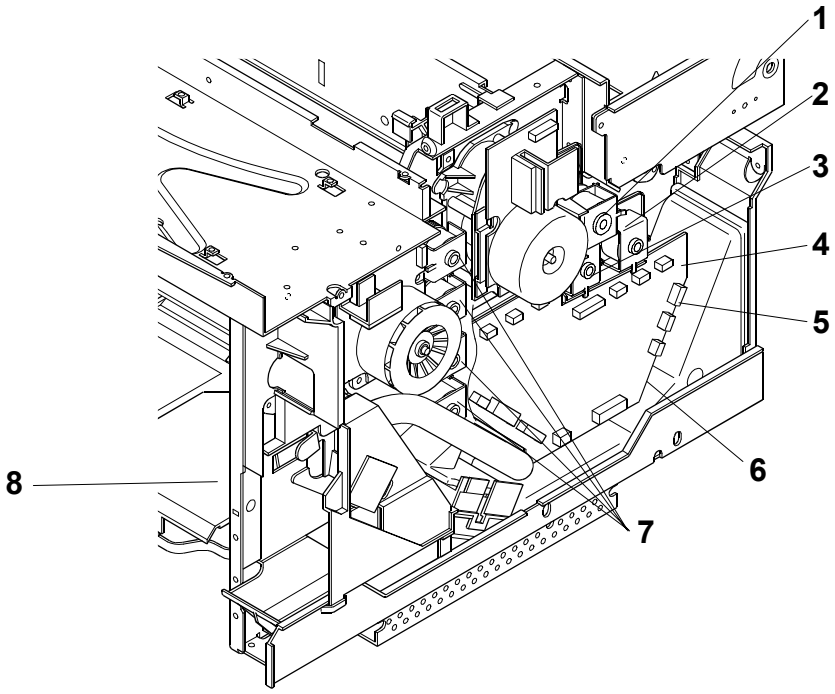
No.	Name	Function
1	Quenching Lamp	This row of LEDs discharges the OPC belt by illuminating it. It is part of the optical unit.
2	IOD2 (Input Output Device)	Relays signals between the controlled components and the MCTL, and drives the controlled components.
3	IOD1 (Input Output Device)	Relays signals between the controlled components and the MCTL, and drives the controlled components.
4	MCTL (Main Control Board)	Controls a series of processes for the printer: Fusing temperature and laser output control, operator panel indication, toner end sensor, error processing, and interface control.
5	LDU (Laser Diode Unit)	Drives the laser diode and controls its output power. Part of the optical unit.
6	PDU (Photo Detection Unit)	Detects the laser beam to synchronize the main scan. Part of the optical unit.
7	DC Power Supply (Low Voltage Power Supply) LVPS	Provides the printer with a power supply.
8	High Voltage Power Supply (HVU)	Provides the printer with the high voltage power supplies necessary for the printing process.
9	Panel Indicator	Displays the operation status of the printer and monitors the keys on the operation panel.
10	Controller	Printer controller

Motors and Interlock Switches



No.	Name	Code	Function
1	Main Motor	MM	Drives the OPC belt and the paper transport system.
2	Development Motor	DM	Drives the toner cartridges and the development system.
3	Front Cover Switch	DSW1	Cuts the power supply if the front cover is opened.
4	Polygon Mirror Motor	SCM	Scans the laser beam across the OPC belt.
5	Rear Cover Switch	DSW3	Cuts the power supply if the rear cover is opened.
6	Controller Fan Motor	CTLFAN	Vents heat from the power supply unit and interface controller.
7	Exit Cover Switch	DSW2	Cuts the power supply if the exit cover is opened.
8	Fusing Unit Fan	HTFAN	Vents heat from the fusing unit.
9	Ozone Fan	OZFAN	Vents ozone from the printer (the charge corona unit generates ozone).

Clutches and Solenoids



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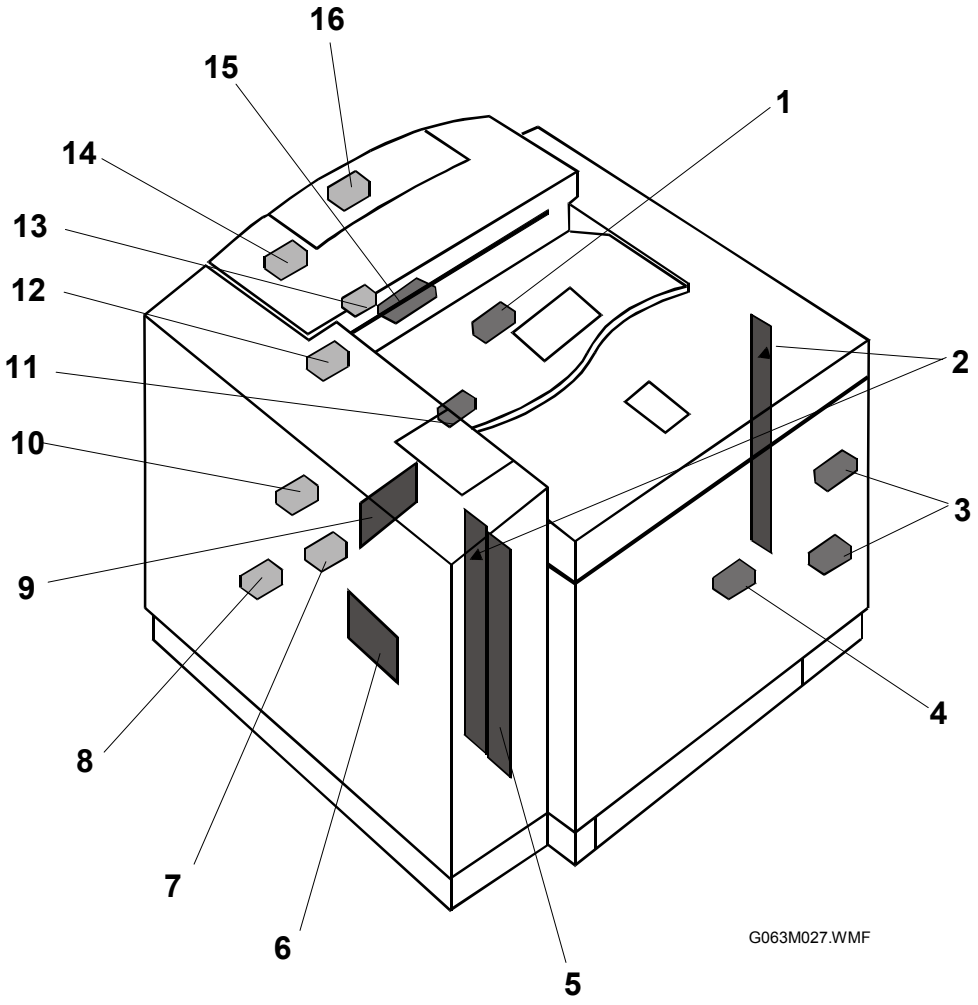
No.	Name	Code	Function
1	Cleaner Contact Clutch	FBCM	Moves the drum cleaner into contact with the transfer drum surface for drum cleaning.
2	Fusing Clutch	FUCL	Couples the fusing unit with the main gear unit, to drive the hot roller.
3	Cleaning Clutch	FBCL	Couples the cleaning gear with the main gear unit, to drive the drum cleaner brush.
4	Transfer Contact Solenoid	TRCM	Moves the transfer roller into contact with the paper to transfer the toner from the transfer drum to the paper.
5	Registration Clutch	RECL	Couples the registration roller with the main gear unit to feed the paper to the transfer drum at the correct time to synchronize the paper with the toner image on the transfer drum.
6	Paper Feed Clutch	PCLU	Couples the feed roller gear with the main gear unit to feed paper.
7	Development Clutches	DVCL (Y,M,C,K)	Couples the development roller of the desired color toner cartridge with the development gear unit during development.
8	Development Solenoids	PSL(MC) PSL(KY)	Move the desired color toner cartridge to the development position. **NOTE:** These solenoids are part of the front cover unit (not shown in the illustration).

Sensors



Refer to the table on the following page for details.

No.	Name	Code	Function
1	Drum Paper Jam Sensor	DPJ	Detects when paper is wrapped around the transfer drum.
2	Toner End Sensor	TPD/TTR	Detects if the toner cartridge is empty, for each toner cartridge.
3	Development Sensors	GHP1, GHP2	Detects when the toner cartridges are in home position.
4	Waste Toner Sensor	WTS	Detects how full the waste toner bottle is.
5	Toner Type Sensor	TNK	To detect if the proper type of toner cartridges are set in the machine..
6	Paper Size Sensor	PSU	Detects the paper size.
7	Paper Sensor	PEU	Detects whether there is paper in the paper cassette.
8	Paper Feed Sensor	PT1	Detects when paper is fed from the paper cassette.
9	OHP Sensor	OHP	Detects whether the paper cassette contains OHPs.
10	Drum Encoder	EN	Detects irregular rotation of the transfer drum.
11	Belt Sensor	PBS	Detects when the OPC belt is at home position.
12	Oil Sensor	OIL	Detects if the fusing unit oil has run out.
13	Cleaning Roller Sensor	CRS	Detects whether there is a cleaning roller in the fusing unit.
14	Paper Exit Sensor	PT2	Detects when paper exits from the paper exit unit.
15	Fusing Thermistor	TH	Detects the fusing unit temperature.
16	Paper Exit Tray Full Sensor	PFUL	Detect when the paper exit tray is full.

6.6.2 CONTROL SYSTEM

Print Process Control

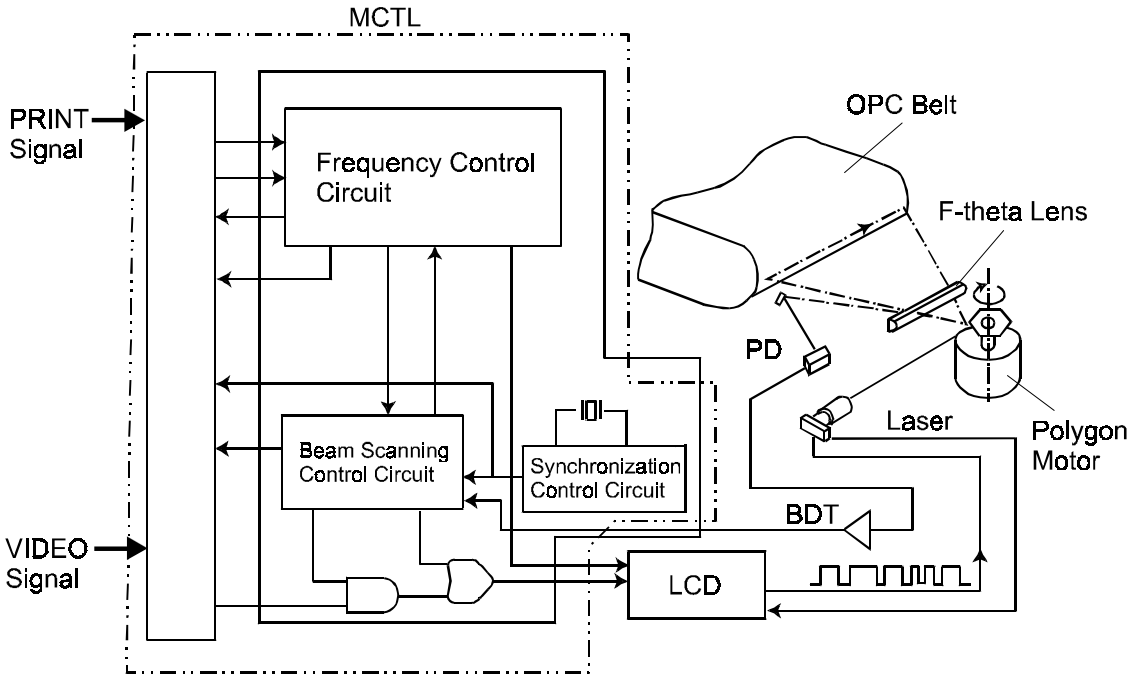
A CPU on the MCTL controls the print processes.

Laser Drive Control Circuit

The laser drive control circuit (LDC) consists of the laser diode, and video signal input, laser drive, output detection, and output control circuits.

Operation

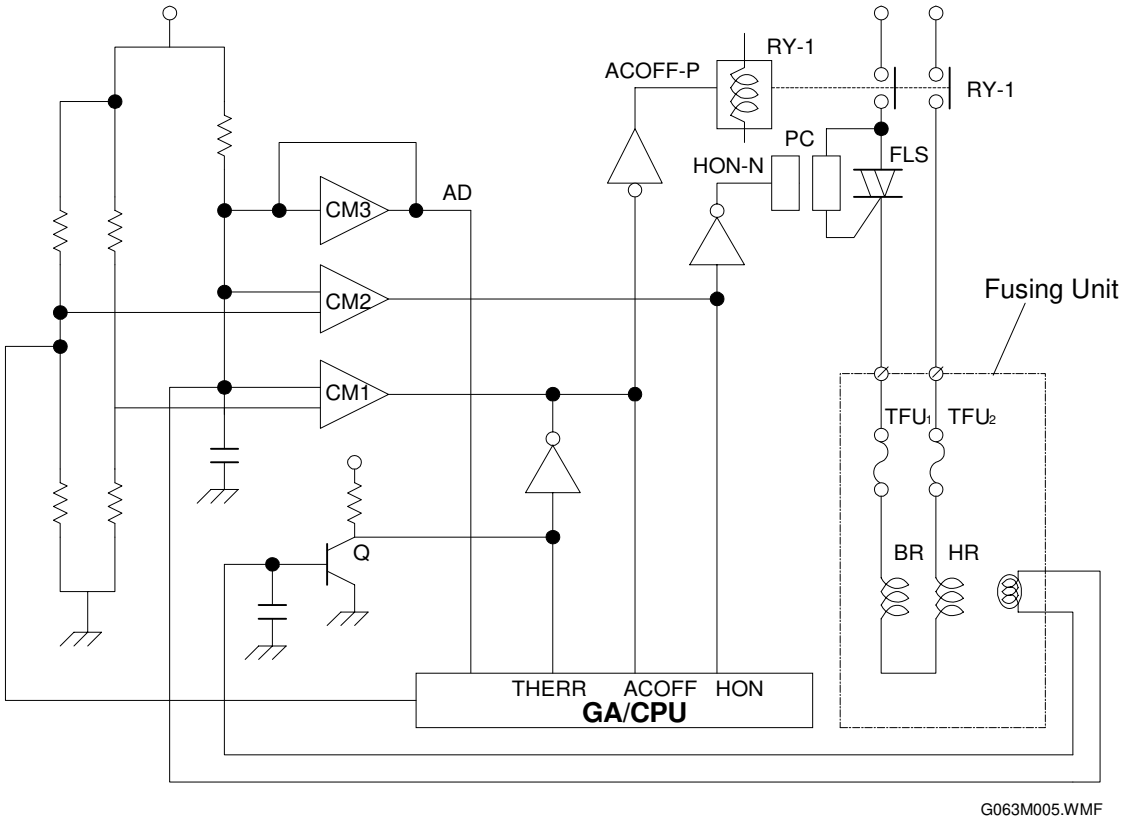
1. When the video signal is input, the LDC switches the laser diode on and off in accordance with the video signal.
2. The photo detector (PD) detects the laser beam at the start of each scan, and the signal is fed back to the output control circuit.
3. The output control circuit maintains a constant laser power output, by comparing the laser output default with the feedback from the output detection circuit.
4. When the beam detector (PD) detects the laser, the Beam Detection Timing (BDT) signal will be output.



Fusing Temperature Control

The fusing lamp in each hot roller is controlled to maintain the appropriate temperature so that the toner will fuse to the paper.

Temperature Control Circuit



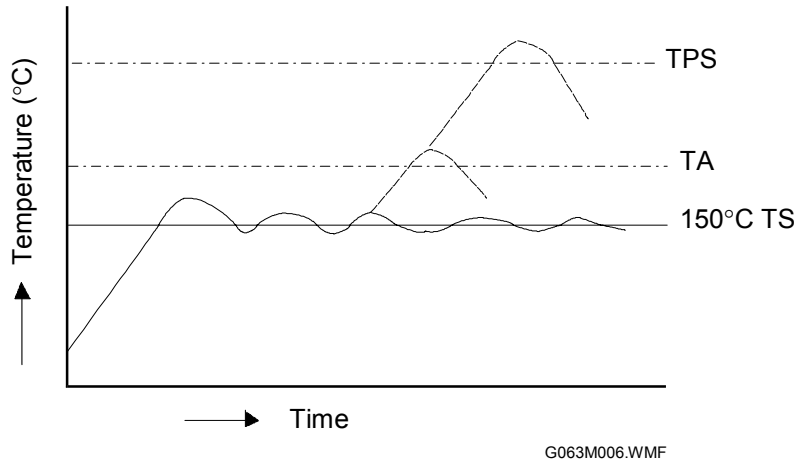
Components

FLS :	The thyristor turns the power supply for the fusing lamp on/off.
TFU1/TFU2 :	The thermofuses inside the fusing unit shut down the circuit for safety when it is too hot.
TH :	This temperature sensor detects the surface temperature of the hot roller (HR).
RY	This relay prevents further heating when the temperature inside the fusing unit exceeds a certain point.
GA/CPU	This microprocessor monitors the temperature signals.
CM1 :	Temperature sensor circuit (for the ACOFF signal).
CM2 :	Temperature sensor circuit (for the HON-N signal).
CM3	Temperature sensor circuit (for temperature signal processing).
Q :	Thermistor sensor circuit shutdown (for the THERR signal).
HR	Fusing lamp for the hot roller.
BR	Fusing lamp for the pressure roller.

Signals

HON-N :	Turns the fusing lamp inside the hot roller on or off.
ACOFF :	Turns off the relay RY1 when it is too hot.
THERR	Detects thermistor shutdown.
AD :	Converts the temperature sensor signal to digital.

Temperature Control and Safety



TS : The machine maintains a temperature of about 150°C by turning the thyristor on/off.

TA : A reference temperature (about 175°C) is used to identify whether it is excessively hot inside the fusing unit. When the temperature reaches this point, the relay (RY) turns off, the power supply to the fusing lamp shuts down, and the printer stops.

TPS : At this temperature, the thermofuse melts and the power supply for the fusing lamp shuts down. When the thermofuse melts, the printer stops.

Service Codes Generated by Temperature Control Signals

SC 31: When a thermistor error (THERR) signal is generated, the operator panel indicates “Call Service SC: 31”, and the printer stops.

SC 33 : If the fusing unit temperature does not reach a certain point after a certain time, the operator panel indicates “Call Service SC: 33”, and the printer stops.

SC 34 : If the “Fusing Lamp On” signal continues after the elapse of a certain time, the operator panel indicates “Call Service SC: 34”, and the printer stops.

SC 35: If the temperature within the fusing unit becomes unusually hot and an ACOFF signal is generated, the operator panel indicates “Call Service SC: 35”, and the printer stops.

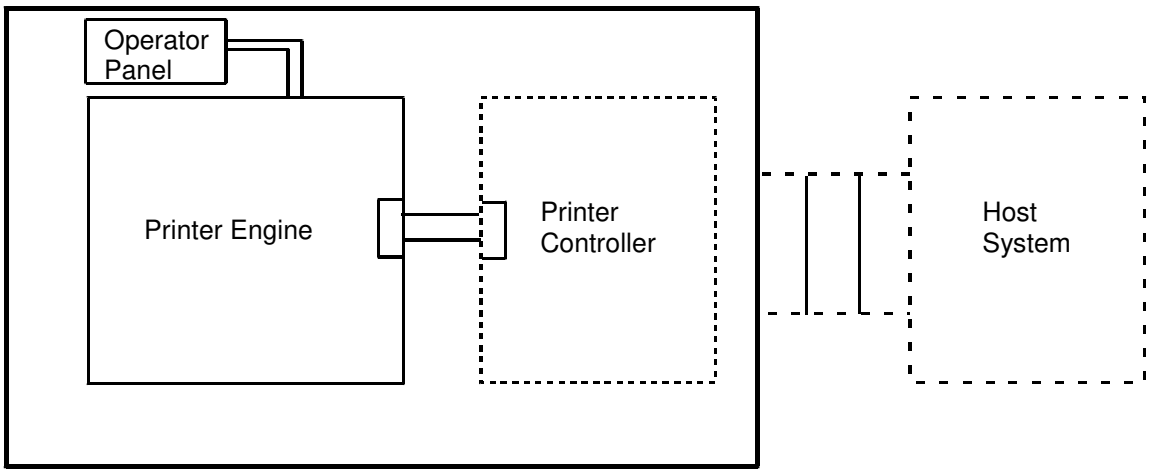
Interface Control

General

1. Type of Interface

The video interface handles image data, but does not accumulate it in a buffer. Video signals from the input image data switch the laser diode on and off, forming a latent image on the OPC belt.

2. Interface Connection System



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SPECIFICATIONS

1. GENERAL SPECIFICATIONS

Printing Speed:	6 pages per minute in full color mode (A4/LT LEF) (3 pages in full color: duplex printing) 24 pages per minute in B/W mode (A4/LT LEF) (12 pages in B/W mode: duplex printing)
Printer Languages:	IPDL-C R-PS2 (Ricoh Script 2)
Resolution:	600 x 600 dpi (Engine capability) 1200 x 600 dpi (Data processing)
Resident Fonts:	IPDL-C: Japanese fonts only – not used R-PS2: 39 fonts
Host Interfaces:	Standard: Bi-directional IEEE1284 (Compatible and nibble modes supported) Optional: Ethernet (100 Base-TX/10 Base-T), IEEE1284 (Only compatible mode supported)
Network Protocols:	TCP/IP, IPX/SPX, NetBEUI, Apple Talk
First Print Speed:	25 s. (color) 17.5 s. (B/W)
Warm-up Time	210 s. maximum
Paper Capacity:	Standard tray: 250 sheets (80 g/m^2, 20 lb Bond) Optional paper tray unit: 500 sheets
Print Paper Size:	Std: Maximum A4/Letter (210 mm x 297 mm / 8.5" x 11") Opt: Maximum Legal (8.5" x 14") (Refer to the "Supported Paper Sizes" table later in this section.)
Printing Paper Weight:	Paper mode: 64-90 g/m^2, 18 (Bond) – 24 (Bond) lbs. Thick mode: Simplex 90 –160 g/m^2, 24 – 43 lbs (Bond) Duplex 90 – 105 g/m^2, 24 – 28 lbs (Bond)
Output Paper Capacity:	Face down stack: 250 sheets (80 g/m^2, 20 lb Bond)
Memory:	Standard 32 MB, up to 256 MB with optional DIMM (For 256 MB, the standard 32 MB must be removed)
Power Source:	120 V, 60 Hz: More than 10 A (for North America) 220 V - 240 V, 50/60 Hz: More than 6.0 A (for Europe)
Power Consumption: (Max.)	Standby: 1,000 W Energy Saver mode: 25 W

Noise Emission	Standby: Less than 48 dB Operating: Less than 55 dB
Dimensions (W x D x H)	500 x 520 x 410 mm (19.7" x 20.5" x 16.1") 500 x 520 x 555 mm (19.7" x 20.5" x 21.9") with optional paper feed unit 500 x 505 x 605 mm (19.7" x 23.8" x 23.8") with optional paper feed unit and duplex unit.
Weight:	Approx. 39 kg (86 lb) with starter consumables

1.1 SUPPORTED PAPER SIZES

PostScript PPD Name	OEM Name	Feeding Direction	Dimension (mm or inches)	U.S.A.		Europe	
				Std.Tray	Opt. Tray	Std. Tray	Opt.Tray
A4	A4	Short	210mm x 297mm	Y	Y	Y (Default)	Y
A5	A5	Short	148mm x 210mm	Y*		Y*	
A6	A6/post card	Short	105mm x 148mm				
B4	B4	Short	257mm x 364mm				
B5	B5	Short	182mm x 257mm	Y	Y	Y	Y
B6	B6	Short	128mm x 182mm				
Tabloid	Ledger	Short	11"x 17"				
Legal	LG	Short	8.5"x 14"	Y with LG cassette		Y with LG cassette	
Letter	LT	Short	8.5"x11"	Y (Default)	Y (Default)	Y	Y (Default)
Statement	HLT	Short	5.5"x 8.5"				
Executive	EXE	Short	7.25"x 10.5"	Y	Y*	Y	Y*
-	F	Short	8"x 13"	Y* with LG		Y* with LG	
Folio	Folio	Short	8.25"x 13"	Y* with LG		Y* with LG	
FanFold GermanLegal	Foolscap	Short	8.5"x 13"	Y* with LG		Y* with LG	
Envelope	Com10	Short	4.125” x 9.5”	Y*		Y*	
	DL	Short	110 x 220	Y*		Y*	
Free (Max.)	216mm x 297mm	Short	8.5"x11.7" 14"with LG cassette	Y*		Y*	
Free (Min.)	100mm x 210mm	Short	4"x 8.2"	Y*		Y*	

*: There is no non-printable area (other paper sizes: 5 mm at each side)

Duplex printing - A4, B5, LT, EXE and LG sizes are available.

2. SOFTWARE ACCESSORIES

The printer drivers and utility software are provided on one CD-ROM. An auto-run installer allows you to select which components to install.

2.1 PRINTER DRIVERS

Printer Language	Windows 95/98/ME	Windows NT4.0	Windows 2000	Macintosh
IPDL-C	Yes	Yes	Yes	No
R-PS2	Yes	Yes		Yes (PPD for LaserWriter 8)

2.2 UTILITY SOFTWARE

Software	Description
Port Navi (Win95/98, 2000, NT4)	A peer to peer print utility over a TCP/IP network. This provides the parallel printing and recovery printing features.
Print Manager for Admin (Win 95/98, NT4)	A printer management utility for network administrators. NIB setup utilities are also available.
Aficio Manager for Client (Win95/98, NT4)	A printer management utility for client users.
Multidirect Print (Win95/98, 2000, NT4,)	A utility for peer-to-peer printing over a NetBEUI or TCP/IP network.

3. OPTIONAL EQUIPMENT

3.1 PAPER TRAY UNIT

Paper Size:	A4, Letter, B5, Executive
Print Paper Weight:	64 – 105 g/m^2, 24 – 28 lbs (Bond)
Tray Capacity:	500 sheets (80 g/m^2)
Paper Feed System:	Friction pad separation
Paper Height Detection:	Not available (only empty detected)
Power Source:	DC24V, supplied by main frame
Dimensions (W x D x H):	500mm x 540mm x 170mm
Weight	Approx. 8.5 kg (13.6 lb)

3.2 DUPLEX UNIT

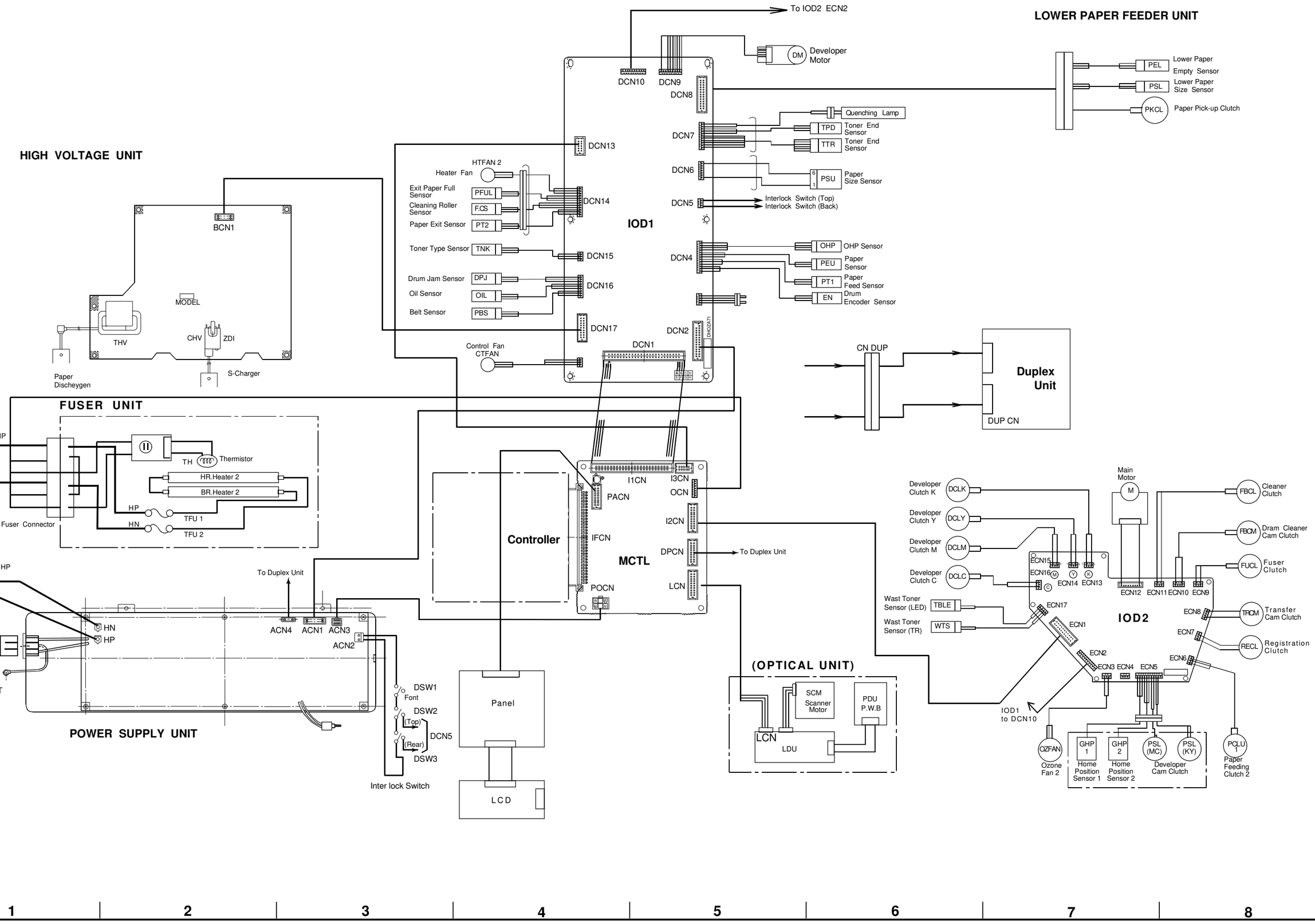
Before installing this unit, the paper tray unit must be installed.

Paper Size:	A4, Letter, Legal
Paper Weight:	64 – 105 g/m^2, 24 – 28 lbs (Bond)
Power Source:	DC 24V, supplied by main frame
Dimensions (W x D x H):	372 mm x 196 mm x 587 mm
Weight	Approx. 9 kg

3.3 NETWORK INTERFACE BOARD (C4000 FERRET)

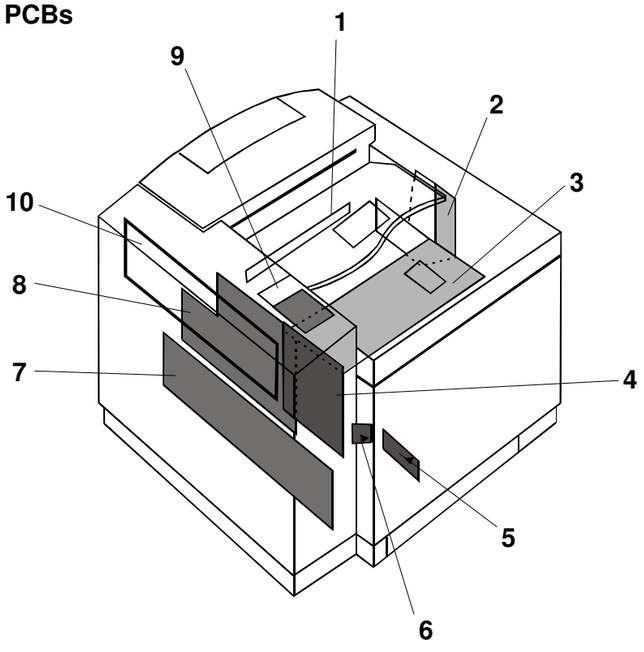
Configuration:	Embedded
LAN Interface:	100BASE-TX/10BASE-T
Frame Type:	Ethernet II, IEEE802.3, IEEE802.2, SNAP
Protocol:	TCP/IP, AppleTalk, NetWare, NetBEUI
SNAP:	MIB-II, PrinterMIB, HostResourceMIB, RicohPrivateMIB

POMELO-P3 (G063) Piont to Point Diagram

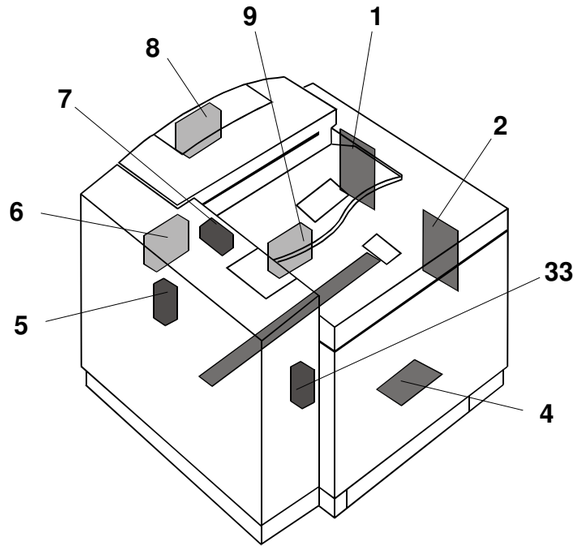


POMELO P3 (G063) ELECTRICAL COMPONENT LAYOUT

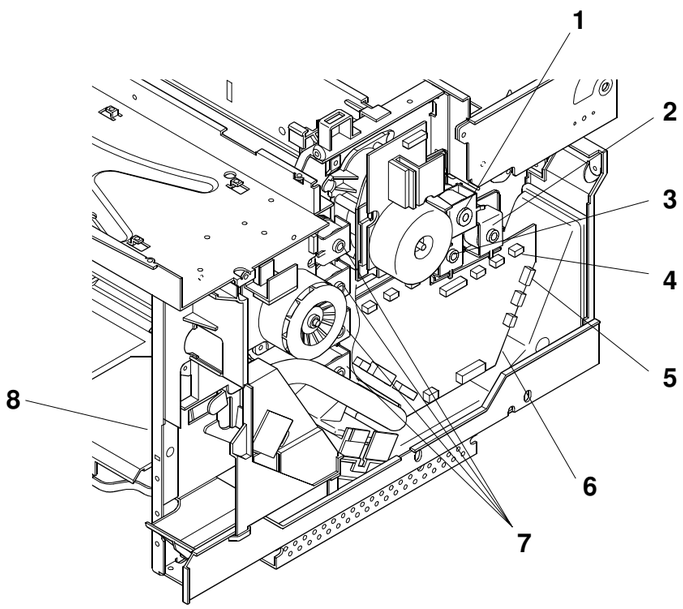
PCBs



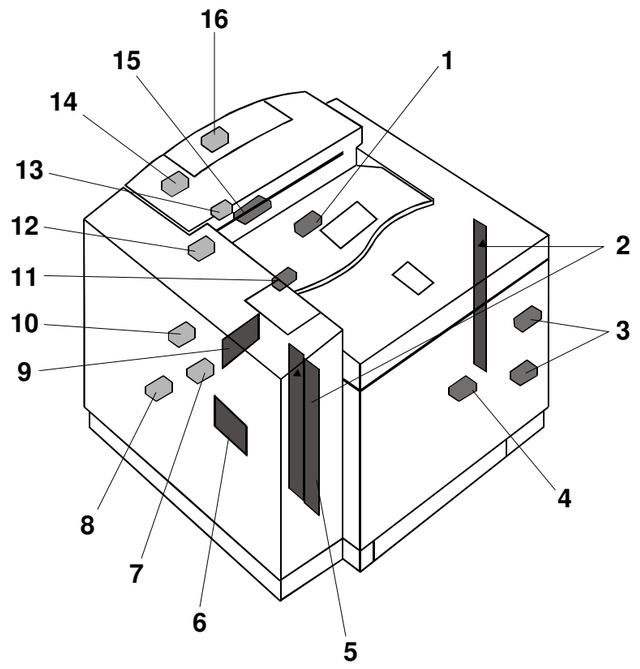
Motors and Interlock Switches



Clutches and Solenoids



Sensors



PCBs

Symbol	Index No.	Description	P to P
–	1	Quenching Lamp	A6
–	2	IOD2 (Input Output Device)	D7-E8
–	3	IOD1 (Input Output Device)	A4-C5
–	4	MCTL	D4-D5
–	5	LDU (Laser Diode Unit)	E5-E6
–	6	PDU (Photo Detection Unit)	E6
–	7	DC Power Supply (Low Voltage Power Supply) LVPS	E1-E3
–	8	High Voltage Power Supply (HVU)	B2-C2
–	9	Panel Indicator	E4
–	10	Controller	D3-D4

Motors and Interlock Switches

Symbol	Index No.	Description	P to P
MM	1	Main Motor	D7
DM	2	Development Motor	A5
DSW1	3	Front Cover Switch	E3
SCM	4	Polygon Mirror Motor	E6
DSW3	5	Rear Cover Switch	E3
CTLFAN	6	Controller Fan Motor	C4
DSW2	7	Exit Cover Switch	E3
HTFAN	8	Fusing Unit Fan	B4
OZFAN	9	Ozone Fan	E7

Clutches and Solenoids

Symbol	Index No.	Description	P to P
FBCM	1	Cleaner Contact Clutch	D8
FUCL	2	Fusing Clutch	D8
FBCL	3	Cleaning Clutch	D8
TRCM	4	Transfer Contact Solenoid	E8
RECL	5	Registration Clutch	E8
PCLU	6	Paper Feed Clutch	E8
DVCL (Y,M,C,K)	7	Development Clutches	D6
PSL (MC) PSL (KY)	8	Development Solenoids	E7

Sensors

Symbol	Index No.	Description	P to P
DPJ	1	Drum Paper Jam Sensor	C4
TPD/TTR	2	Toner End Sensor	B6
GHP1, GHP2	3	Development Sensors	E7
WTS	4	Waste Toner Sensor	E6
TNK	5	Toner Type Sensor	B4
PSU	6	Paper Size Sensor	B6
PEU	7	Paper Sensor	B6
PT1	8	Paper Feed Sensor	B6
OHP	9	OHP Sensor	B6
EN	10	Drum Encoder	B6
PBS	11	Belt Sensor	C4
OIL	12	Oil Sensor	C4
CRS	13	Cleaning Roller Sensor	B4
PT2	14	Paper Exit Sensor	B4
TH	15	Fusing Thermistor	D2
PFUL	16	Paper Exit Tray Full Sensor	B4