Model-U
(Machine Code: G071)

SERVICE MANUAL

⚠IMPORTANT SAFETY NOTICES

PREVENTION OF PHYSICAL INJURY

1. Before disassembling or assembling parts of the printer and peripherals, make sure that the printer power cord is unplugged.
2. The wall outlet should be near the printer and easily accessible.
3. If any adjustment or operation check has to be made with exterior covers off or open while the main switch is turned on, keep hands away from electrified or mechanically driven components.
4. The printer drives some of its components when it completes the warm-up period. Be careful to keep hands away from the mechanical and electrical components as the printer starts operation.
5. The inside and the metal parts of the fusing unit become extremely hot while the printer is operating. Be careful to avoid touching those components with your bare hands.

HEALTH SAFETY CONDITIONS

Toner and developer are non-toxic, but if you get either of them in your eyes by accident, it may cause temporary eye discomfort. Try to remove with eye drops or flush with water as first aid. If unsuccessful, get medical attention.

OBSERVANCE OF ELECTRICAL SAFETY STANDARDS

1. The printer and its peripherals must be serviced by a customer service representative who has completed the training course on those models.
2. The NVRAM module (option) installed on the controller has a lithium battery which can explode if replaced incorrectly. Replace the NVRAM only with an identical one. The manufacturer recommends replacing the entire NVRAM. Do not recharge or burn this battery. Used NVRAM must be handled in accordance with local regulations.

SAFETY AND ECOLOGICAL NOTES FOR DISPOSAL

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

LASER SAFETY

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

⚠WARNING

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

⚠WARNING

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

CAUTION MARKING:

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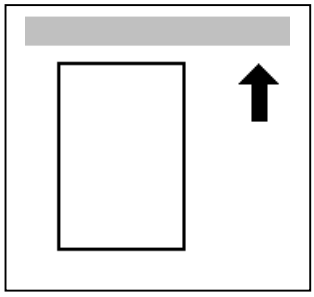
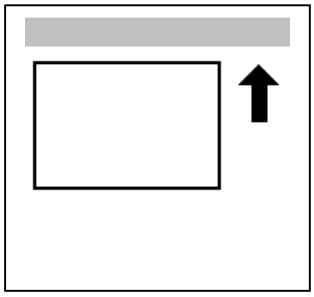
Conventions in this Manual

This manual uses several symbols.

Symbol	What it means
	Refer to section number
CT	See Core Tech Manual for details
	Screw
	Connector
	Clip ring
	E-ring



Lengthwise, SEF (Short Edge Feed)



Sideways, LEF (Long Edge Feed)

TABLE OF CONTENTS

PERIPHERALS

PAPER TRAY UNIT (Machine Code: G313)

INTERCHANGE UNIT (Machine Code: G305)

DUPLEX UNIT (Machine Code: G303)

500-SHEET FINISHER (Machine Code: G314)

FOUR-BIN MAILBOX (Machine Code: G312)

1. INSTALLATION

1.1 INSTALLATION REQUIREMENTS

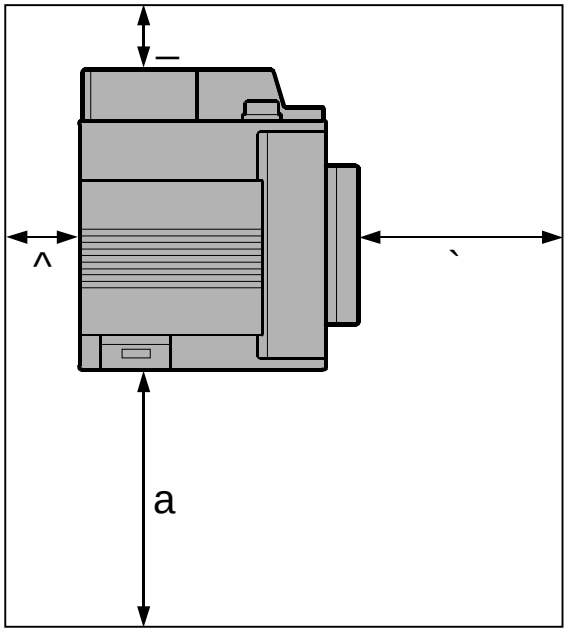
1.1.1 ENVIRONMENT

1. Temperature Range: 10°C to 32°C (50°F to 89°F)
2. Humidity Range: 20% to 80% RH
3. Ambient Illumination: Less than 2,000 lux (keep the machine out of direct sunlight.)
4. Ventilation: 3 times/hr/person or more
5. Avoid exposing the machine to sudden temperature changes, which include:
   1) Direct cool air from an air conditioner
   2) Direct heat from a heater
6. Avoid installing the machine in areas that may be exposed to corrosive gas.
7. Install the machine at a location lower than 2,500 m (8,200 ft.) above sea level.
8. Install the machine on a strong, level base. (☛ 1.1.2)
9. Avoid installing the machine in areas that may be subjected to strong vibration.

1.1.2 MACHINE LEVEL

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

1.1.3 SPACE REQUIREMENTS



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A: Over 100 mm (4")
B: Over 100 mm (4")
C: Over 550 mm (22")
D: Over 750 mm (30")

1.1.4 POWER REQUIREMENTS

⚠CAUTION

1. **Insert the plug firmly in the outlet.**
2. **Avoid using an outlet extension plug or cord.**
3. **Ground the machine.**

1. Input voltage level:
   120 V, 60 Hz, More than 11 A
   220 to 240 V, 50/60 Hz, More than 7 A
2. Permissible voltage fluctuation: ±10%
3. Do not put or place anything on the power cord.

1.2 MACHINE INSTALLATION

Refer to the Operating Instructions for details.

If the customer has a service contract, change the settings of the following SP modes depending on the contract type.

Item	SP No.	Function	Default
Meter charge	SP5-930-1	Specifies whether the meter charge mode is enabled or disabled. If the user is doing the user PM procedures, set meter charge to 'Off'. If the technician is doing all the PM, set meter charge to 'On'. **Meter charge mode enabled:** • The Counter menu appears immediately after the Menu key is pressed. • The counter type selected by the counting method (SP5-045-1) can be displayed with the Counter menu. • The counter values can also be printed with the Counter menu. • The selected counter starts from a negative number. **Meter charge mode disabled:** • The Counter menu is not displayed. • The total counter starts from 0.	Off
Counting method	SP5-045-1	Specifies whether the counting method used in meter charge mode is based on developments or prints. **Important:** This SP can only be done before the negative counters are reset with SP7-825-001	Developments
A3/11" x 17" double counting	SP5-104-1	Specifies whether the counter is doubled for A3/11" x 17" paper.	No: Single counting
PM warning display 1	SP5-931-1	Specifies whether the PM warning for the charge corona unit is displayed when the replacement time arrives. 1: Displayed 0: Not displayed	1
PM warning display 2	SP5-931-2	Specifies whether the PM warning for the PCU is displayed. 1: Displayed 0: Not displayed	1
PM warning display 3	SP5-931-3	Specifies whether the PM warning for the feed rollers in the optional paper feed unit is displayed. 1: Displayed 0: Not displayed	0

Item	SP No.	Function	Default
Fax No. setting	SP5-812-2	Programs the service station fax number. The number is printed on the counter list when the meter charge mode is selected, so that the user can fax the counter data to the service station.	
Counter reset	SP7-825-1	Resets the counters to 0. **Important:** This must be done at installation after all the above settings have been finished. The negative counters used in meter charge mode will be reset to zero.	

NOTE: 1) The default setting for this machine is meter-charge mode off.
2) The meter-charge counter cannot be reset.

1.3 OPTIONS

Refer to the Option Setup Guide for details.

No.	Optional Unit	Alternative	Requirements
1	500-sheet finisher	No. 2	• No. 3 • Hard disk or memory (extra 64 MB or more) for sort mode
2	4-bin mailbox	No. 1	• No. 3
3	Interchange unit		
4	Duplex unit		• No. 3
5	Paper tray unit		
6	Printer hard disk		
7	DIMM memory (64, 128, or 256 MB modules available)		
8	IEEE1394 interface unit		• Extra 64 MB (or more) optional SDRAM module
9	User account enhancement unit		

NOTE: 1) You cannot install the finisher and mailbox on the same machine.
2) You can install either 1 or 2 paper tray units.

2. PREVENTIVE MAINTENANCE

2.1 OVERVIEW

Users Do the User PM Procedures

The user does PM for the items in section 2.2. The technician does PM for the items in section 2.3. Meter-charge mode must be set to “off” (SP5-930, ☛ 5.2).

All PM Done by Technicians

The technician does PM for the items in sections 2.2 and 2.3. Meter-charge mode must be set to “on” (SP5-930, ☛ 5.2).

Counters

When a maintenance counter for a unit has reached the limit, the corresponding message is displayed on the operation panel. After completing the maintenance procedure for that item, reset the counter (SP7-804, ☛ 5.2).

2.2 USER MAINTENANCE

Abbreviations:
Clean, **I**nspect, **L**ubricate, **R**eplace, **K**ilo**P**rints, **K**ilo**D**evelopments, **W**henever**N**ecessary

Main Unit

Item	KP		Detection	Reset	Machine stops
	30	120			
O/B and T/B waste toner bottles	R*		Waste toner sensors	Auto-reset (sensor)	Yes
Oil supply unit	R**		Oil end sensor	Auto-reset (sensor)	Yes
Fusing unit with paper feed roller		R	Exit sheet counter	Manual reset	Yes

* : Replacement period calculated for a 50% color ratio (the actual waste toner bottle condition is detected with the sensors)
** : Standard replacement period (the actual oil amount is detected with the sensor)

Item	KD		Detection	Reset	Machine stops
	120	240			
Black development unit	R		Dev. Bk counter*	Auto-reset (memory chip)	Yes
Color development unit	R		Dev. color counter*	Auto-reset (memory chip)	Yes
Charge corona unit & dust filters	R		Charge corona counter*	Manual reset	No
PCU		R	PCU counter*	Auto-reset (new PCU sensor)	No

*Displayed with SP7-906

Item	WN	Detection	Reset	Machine stops	Remarks
Registration roller	C	None	None	No	① damp cloth and ② dry cloth
Dust shield glass (LD unit)	C	None	None	No	Built-in cleaning brush
Bottom plate pad	C	None	None	No	① damp cloth and ② dry cloth

Optional Paper Tray Unit

Item	150KP	Detection	Reset	Machine stops	Remarks
Feed, pick-up, and separation rollers	R	None	None	No	① damp cloth and ② dry cloth

2.3 SERVICE MAINTENANCE

Abbreviations:
Clean, **I**nspect, **L**ubricate, **R**eplace, **K**ilo**P**rints, **K**ilo**D**evelopments, **W**henever**N**ecessary

Main Unit

Bypass Tray

Item	WN	Remarks
Feed Roller	C	① damp cloth and ② dry cloth
Pick-up Roller	C	① damp cloth and ② dry cloth
Separation Roller	C	① damp cloth and ② dry cloth

Optional Units

Paper Tray Unit

Item	WN	Remarks
Relay Roller	C	① damp cloth and ② dry cloth
Bottom Plate Pad	C	① damp cloth and ② dry cloth

Finisher

Item	WN	Remarks
Rollers	C	① damp cloth and ② dry cloth
Sensors	C	Blower blush or dry cloth
Anti-Static Brush	C	Blower blush or dry cloth
Bushings	L	Launa oil when abnormal noise occurs
Stapler	R	Every 200K staples (estimated replacement period)

Mail Box

Item	WN	Remarks
Rollers	C	① damp cloth and ② dry cloth
Tray Paper Sensors	C	Blower blush or dry cloth

Duplex Unit

Item	WN	Remarks
Rollers	C	① damp cloth and ② dry cloth
Feed/exit sensors	C	Blower blush or dry cloth

Interchange Unit

Item	WN	Remarks
Paper Exit Sensor	C	Blower blush or dry cloth

3. REPLACEMENT AND ADJUSTMENT

⚠CAUTION

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

NOTE: This manual uses the following symbols.

☛ : See or Refer to : Screws : Connector : Clip ring
 : E-ring

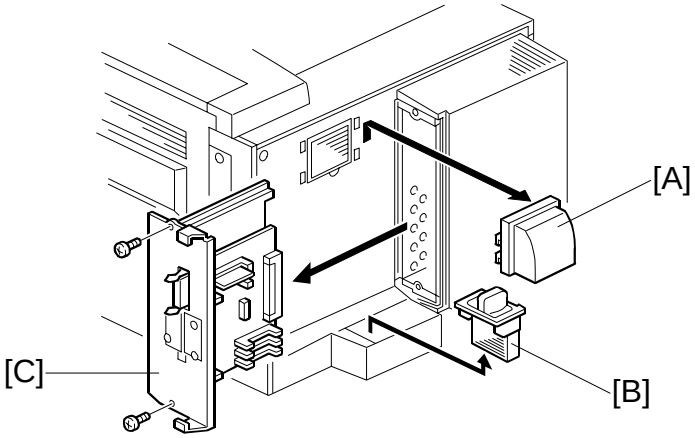
3.1 SPECIAL TOOLS

Part Number	Part Name
N8036701	Flash Memory Card - 4MB
G0219350	Loop-back connector - Parallel

3.2 EXTERIOR COVERS

3.2.1 REAR COVER

1. Duct cover [A] (4 hooks)
2. Ozone filter [B]
3. Printer controller [C] (x 2)



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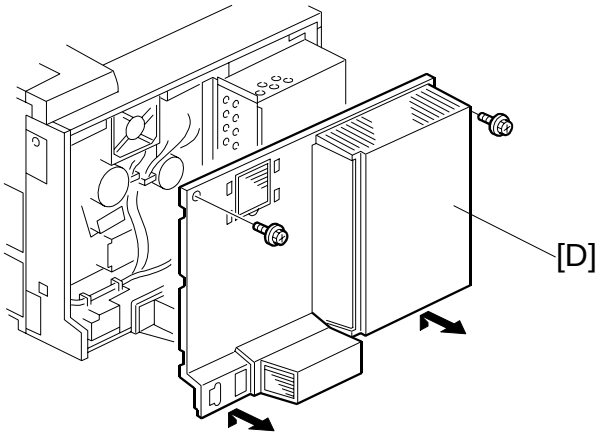
4. Rear cover [D] (x 2)



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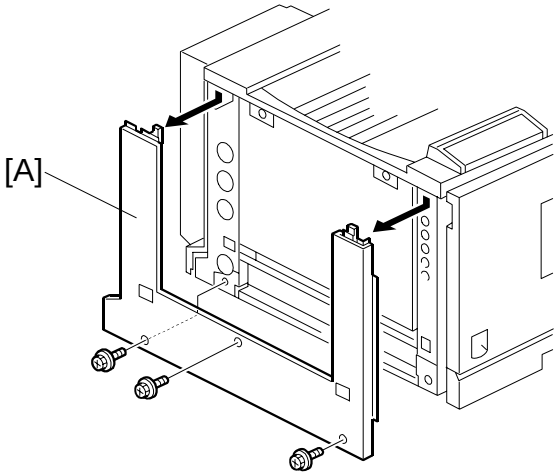
3.2.2 LOWER LEFT COVER

1. Lower left cover [A] (☞ x 3)



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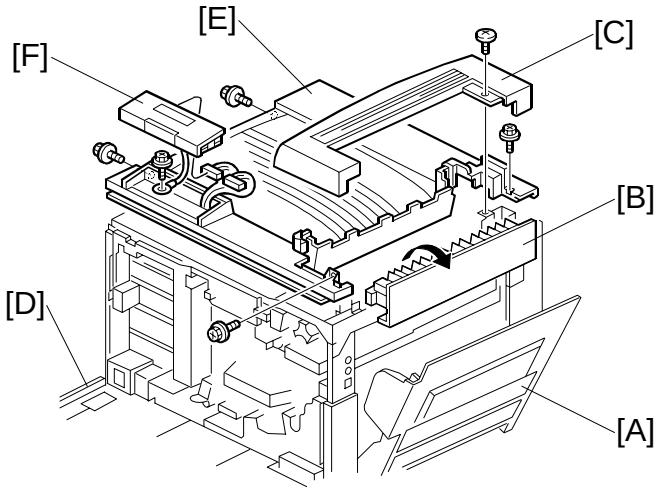
3.2.3 UPPER COVER, OPERATION PANEL

1. Open the right cover [A].
2. Upper right cover [B]
3. Paper exit cover [C] (☞ x 1)
4. Open the front cover [D].
5. Upper cover [E] (☞ x 4)
6. Operation panel [F] (4 hooks, ☞ x 2, ☞ x 1)

NOTE: Insert a screwdriver between the upper cover and the main unit and unhook the panel.



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3.3 ELECTRICAL COMPONENTS

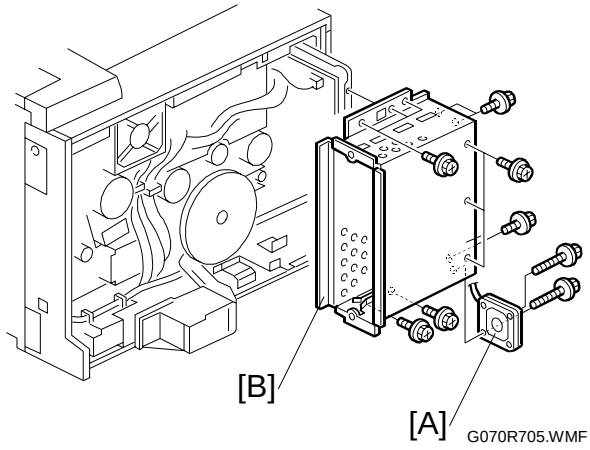
3.3.1 PRINTER CONTROLLER

☛ 3.2.1

NOTE: Remove the NVRAM from the old controller board, and install it on the new one.
If the controller NVRAM is defective, reset the total counter to 0 after changing the NVRAM, if meter charge mode is enabled.

3.3.2 CONTROLLER BOX

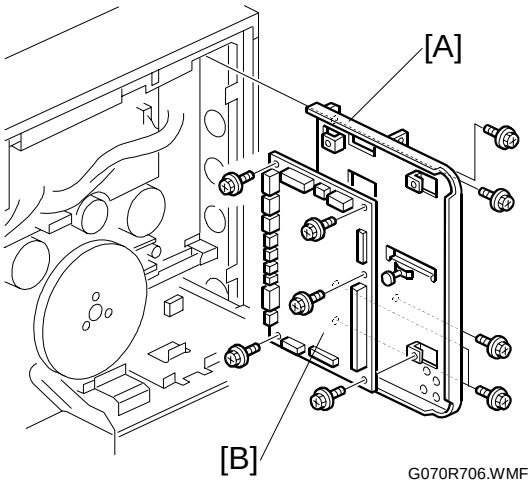
1. Rear cover (☛ 3.2.1)
2. Cooling fan [A] (🔩 x 2)
   NOTE: When reassembling, install the fan with the label facing the inside.
3. Controller box [B] (🔩 x 11)
   NOTE: Do not remove the BCU board base with the controller box.
   NOTE: When putting back the controller box, take care not to pinch the cable from the I/O board.



3.3.3 BCU BOARD

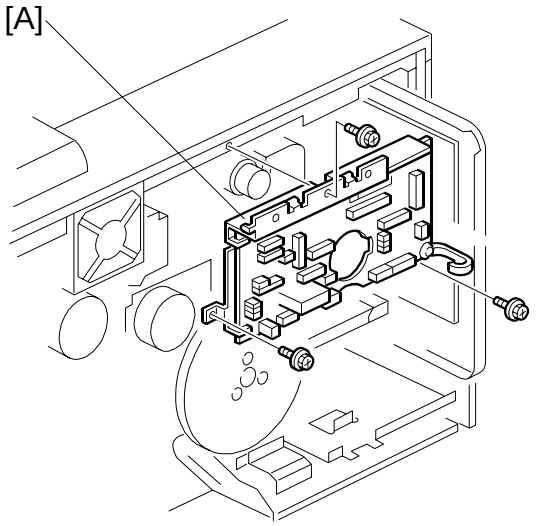
1. Controller box (☛ 3.3.2)
2. All 🖐 (12)
3. 1 flat cable
4. BCU board base [A] (🔩 x 5)
5. BCU board [B] (🔩 x 5)

NOTE: Remove the NVRAM from the old BCU board, and install it on the new one.



3.3.4 I/O BOARD

1. Controller box (☛ 3.3.2)
2. All ☞ (33)
3. I/O board [A] (☞ x 4)



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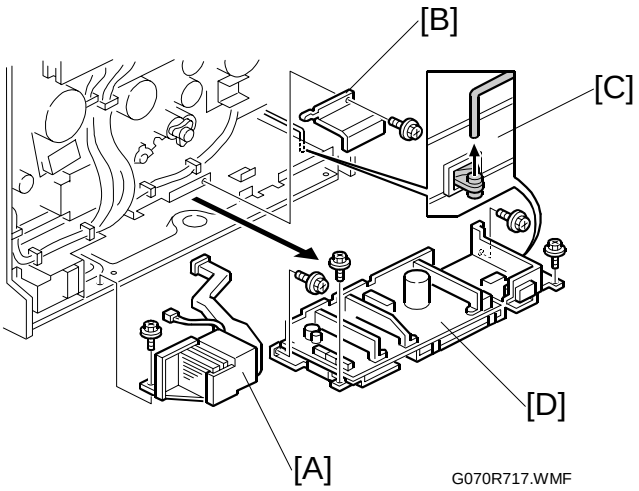
3.3.5 PSU

1. Controller box (☛ 3.3.2)
2. Flywheel (☞ x 3) (☛ 3.4.1)
3. Duct [A] (☞ x 1, ☞ x 1)
   NOTE: When removing and reassembling the fan, install it with the label facing the outside.
4. PSU protector [B] (☞ x 1)
5. Unlink the main switch [C].
6. PSU base (☞ x 8, ☞ x 4)
   NOTE: 1) Remove the PSU [D] with the PSU base.
   2) When reassembling, check that the main switch is linked to the PSU.



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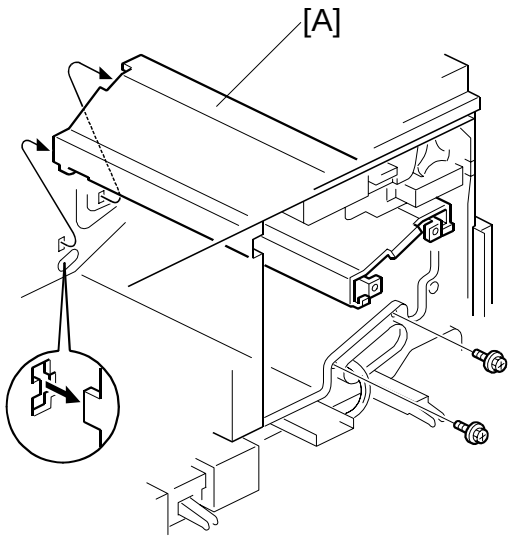
3.3.6 HIGH VOLTAGE SUPPLY BOARD

1. Photoconductor unit (☛ 3.7)
2. Right inner cover (☛ 3.10.2)
3. Photoconductor unit rail [A] (☞ x 2)



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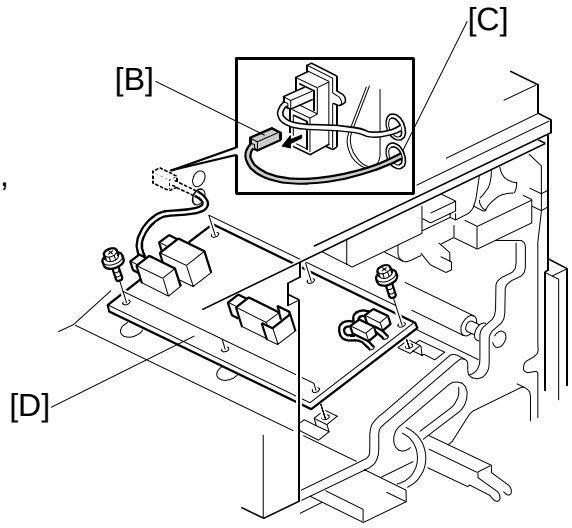
4. ☞ [B] x 1
5. Bushing [C] x 1
6. High voltage supply board [D] (☞ x 17, ☞ x 6)



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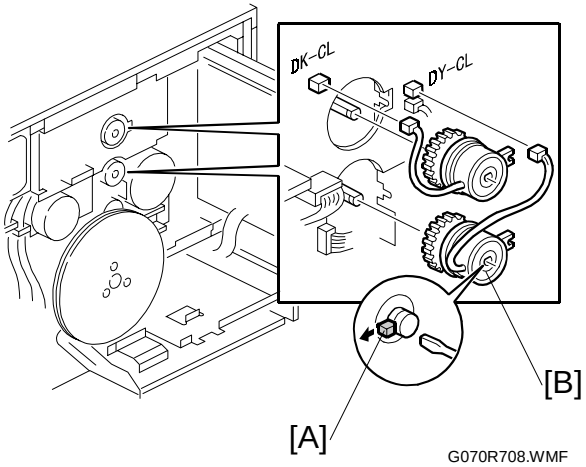
3.4 DRIVE UNITS

3.4.1 DEVELOPMENT CLUTCHES

1. Controller box (☛ 3.3.2)

K/Y Development Units

1. Unhook the lock [A] and pull out the clutch [B] (✋ x 1).



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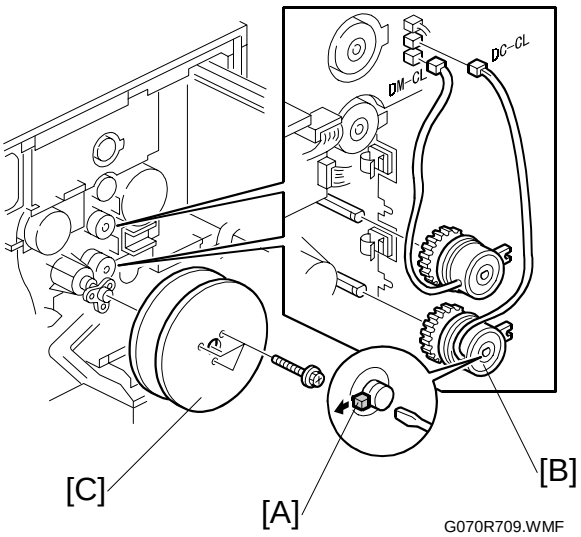
C/M Development Units

1. Flywheel [A] (🔧 x 3)
2. Unhook the lock [B] and pull out the clutch [C] (✋ x 1).



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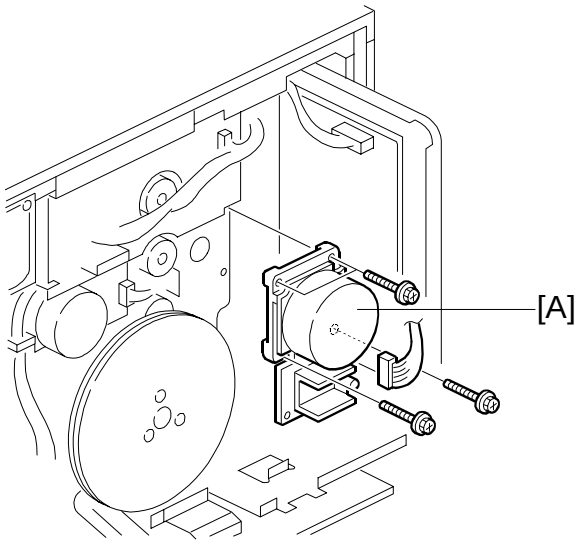
3.4.2 DEVELOPMENT MOTOR

1. Controller box (☛ 3.3.2)
2. Development motor [A] (☞ x 1, 🔩 x 3)



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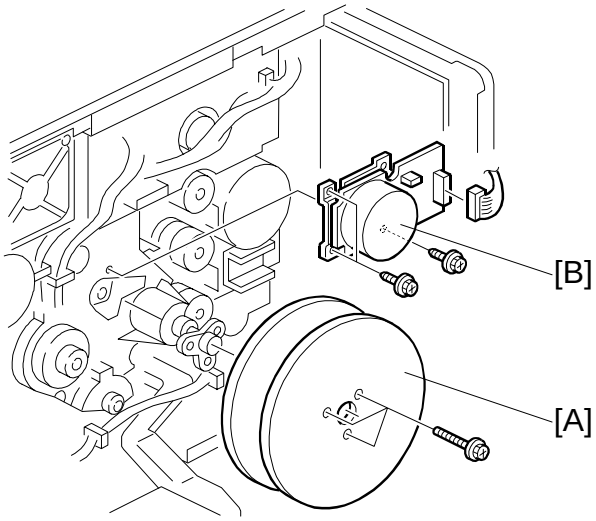
3.4.3 MAIN MOTOR

1. Controller box (☛ 3.3.2)
2. Flywheel [A] (🔩 x 3)
3. Main motor [B] (☞ x 1, 🔩 x 3)



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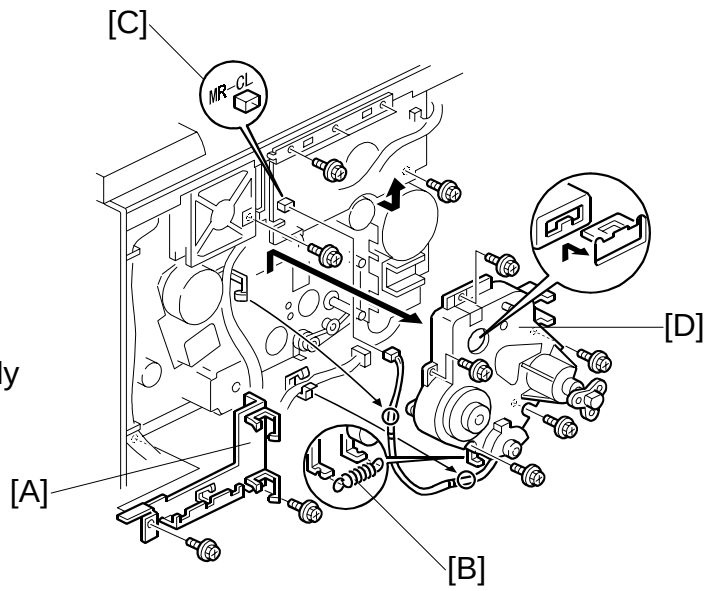
3.4.4 PCU GEAR BOX AND OPC BELT CLEANING CLUTCH

1. I/O board (☛3.3.4)
2. Main motor (☛ 3.4.3)
3. C/M development unit clutch (☛ 3.4.1)
4. Bracket [A] (🔩 x 2)
5. Tension spring [B]
6. 🔌 x 1 [C]
7. Gear box and clutch assembly [D] (🔩 x 5)



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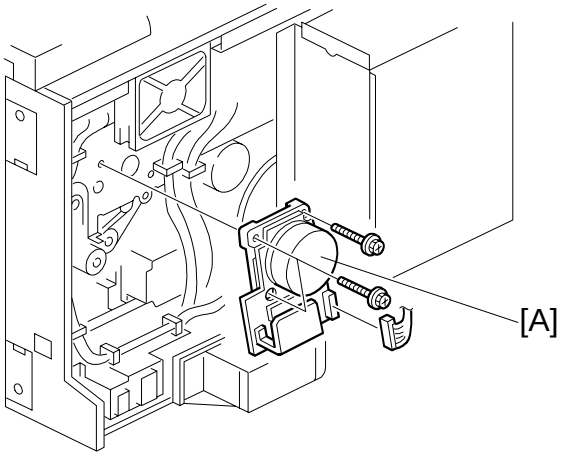
3.4.5 FUSING UNIT MOTOR

1. Rear cover (☛ 3.2.1)
2. Fusing unit motor (🔌 x 1, 🔩 x 3) [A]



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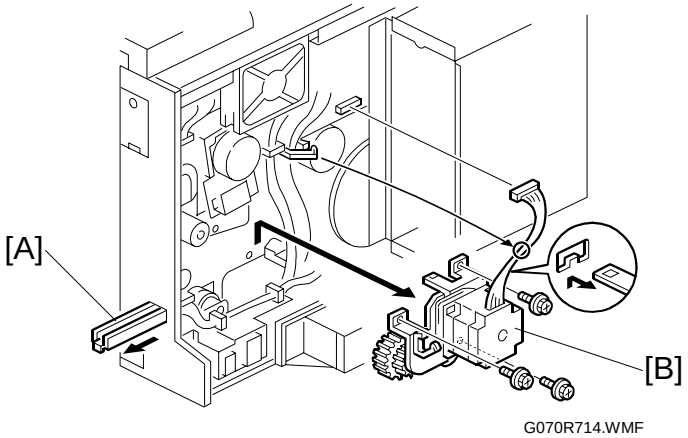
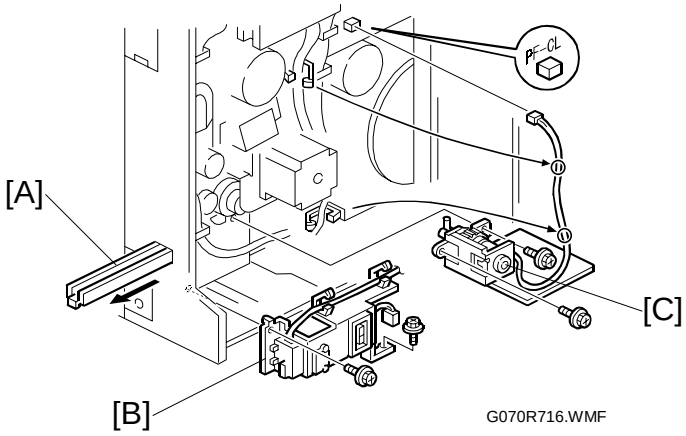
3.4.6 PAPER FEED MOTOR

1. Rear cover (☛ 3.2.1)
2. Pull out the handle [A].
3. Paper feed motor [B] (✋ x 1, 🔩 x 3)



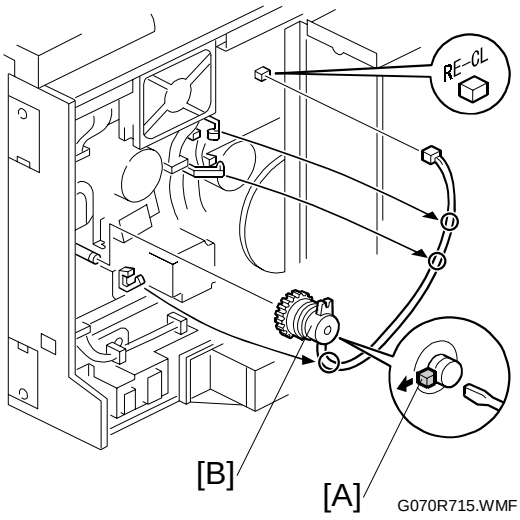
3.4.7 PAPER FEED CLUTCH

1. Rear cover (☛ 3.2.1)
2. Pull out the handle [A].
3. Connector bracket [B] (✋ x 6, 🔩 x 2)
4. Paper feed clutch [C] (✋ x 1, 🔩 x 2)



3.4.8 REGISTRATION CLUTCH

1. Rear cover (☛ 3.2.1)
2. Unhook the lock [A] and pull the clutch out [B] (✋ x 1).

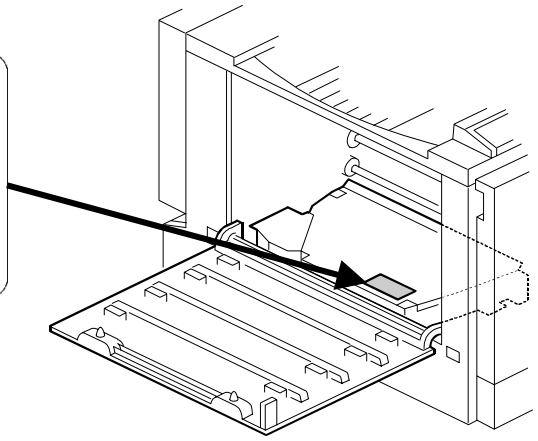


3.5 LASER OPTICS SECTION

⚠WARNING
Turn off the main switch and unplug the machine before beginning any of the procedures in this section. Laser beams can cause serious eye injury.

3.5.1 CAUTION DECAL LOCATION

LD_CAUTION.TIF

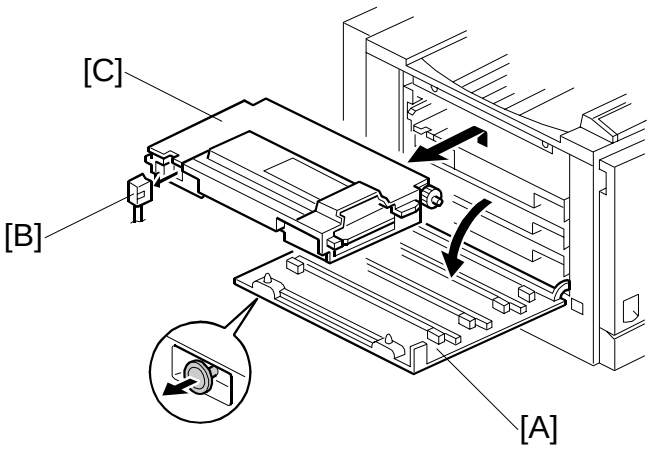


G070R208.WMF

⚠DANGER
Turn off the main switch and disconnect the power plug from the power outlet before beginning any disassembly or adjustment of the laser unit. This printer uses a class-1 laser beam with a wavelength of 650 nm and an output of 7 mW. The laser can cause serious eye injury.

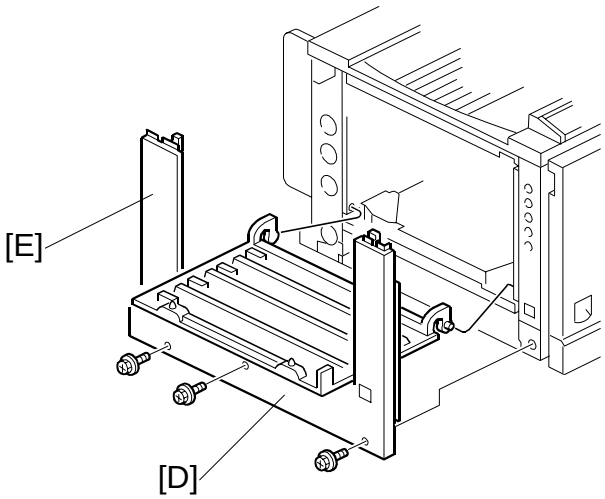
3.5.2 LASER OPTICS HOUSING UNIT

1. Open the left cover [A].
2. ID chip connectors [B] (x 4)
3. Development units [C] x 4



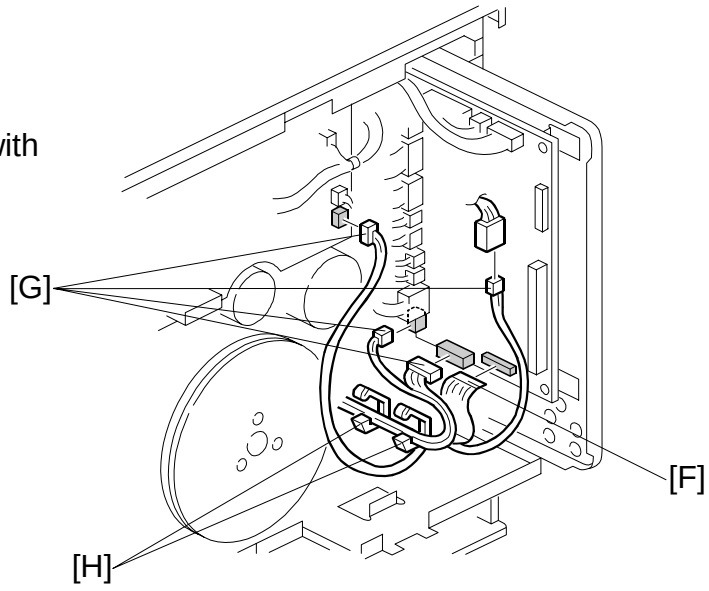
G070R301.WMF

4. Rear cover (☛ 3.2.1)
5. Left cover [D]
6. Lower left cover [E] (x 3)



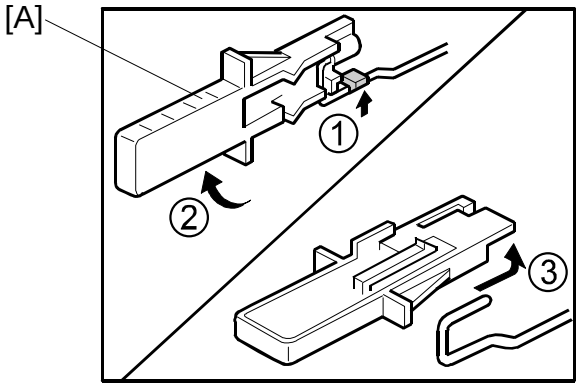
G070R201.WMF

7. Controller box (☛ 3.3.2)
8. Flat cable [F]
   NOTE: When reassembling, connect the flat cable with the blue side up.
9. x 4 [G]
10. Harness clamps [H]



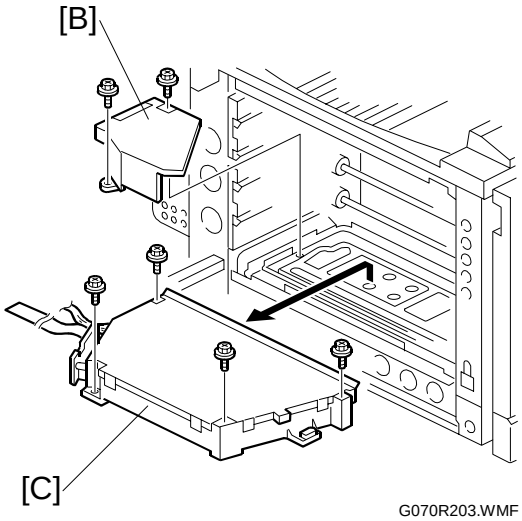
G070R202.WMF

11. Open the front cover.
12. Remove the dust shield glass cleaner lever [A] from the dust shield glass cleaner.
    NOTE: The dust shield glass cleaner lever is the blue lever at the right side of the main switch.



G070R209.WMF

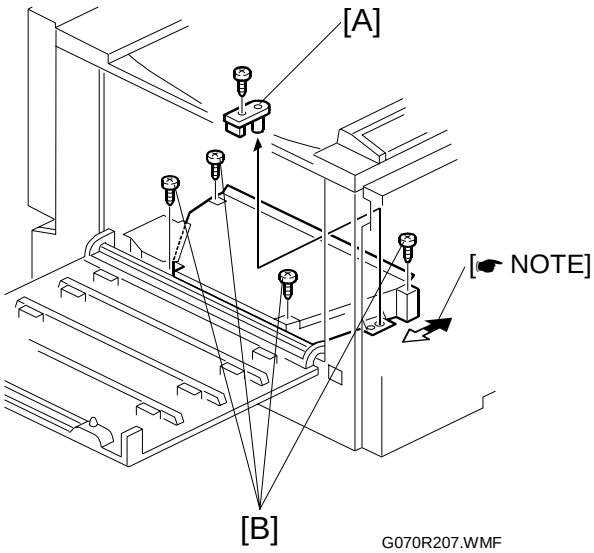
13. LD cover [B] (☞ x 2)
14. Laser optics housing unit [C] (☞ x 4)



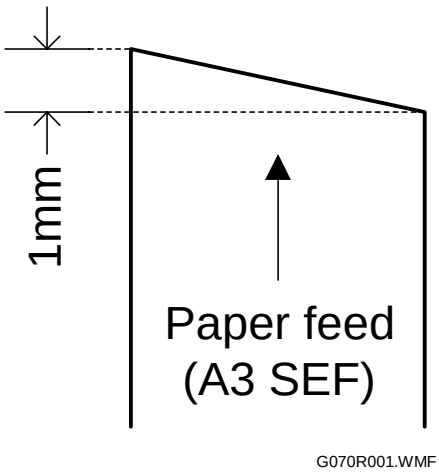
G070R203.WMF

Adjusting for Image Skew

1. Positioning pin [A] (☞ x 1)
2. Loosen ☞ (x 4) [B].
3. Adjust the position of the laser optics housing unit [☛ NOTE].
4. Fasten ☞ (x 4) [B].
   NOTE: After changing the position of the laser optics housing unit, do not reinstall the positioning pin. Keep the pin in a safe place.

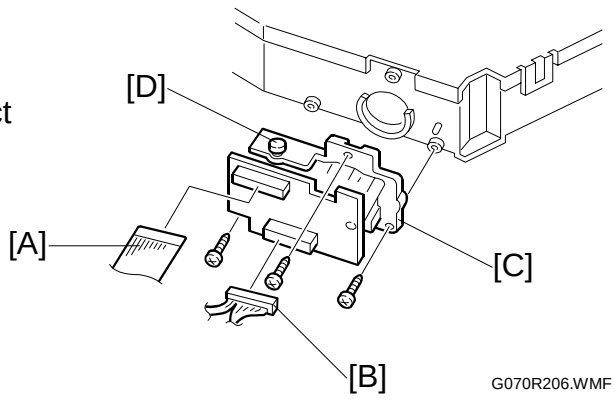


NOTE: When the image skews as shown, move the unit 1 mm in the direction of the black arrow as shown in the **upper** diagram.



3.5.3 LD UNIT

1. Laser optics housing unit (☛ 3.5.2)
2. Flat cable [A]
   NOTE: When reassembling, connect the flat cable with the blue side down.
3. Harness [B]
4. LD unit [C] (☞ x 3)
   NOTE: Do not move the screw [D]. Do not break the paint lock.

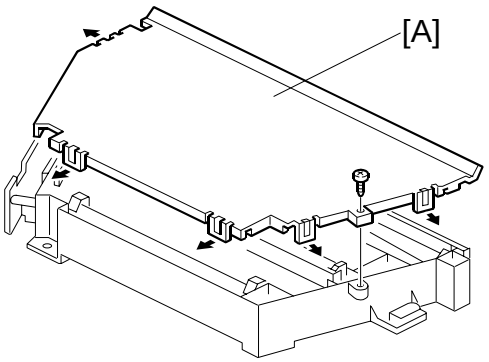


3.5.4 POLYGONAL MIRROR MOTOR AND SYNC. DETECTION BOARD

⚠WARNING

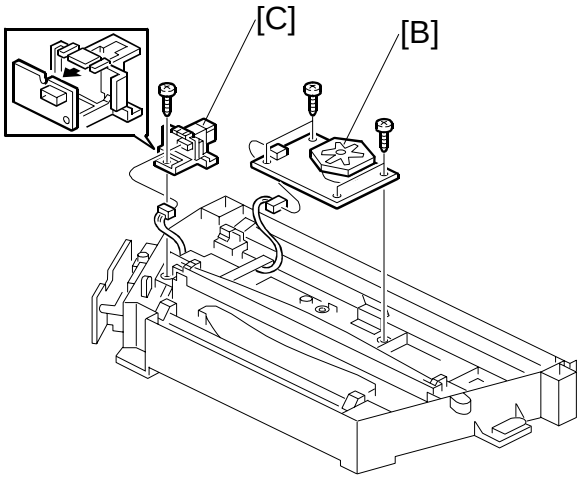
Do not touch any edges of the polygon mirror, spring, or bracket. These edges can cause serious injury.

1. Development units, LD cover (☛ 3.5.2)
2. Cover [A] (🔩 x 1)
   NOTE: Before removing the cover, clean up spilled toner around the laser optics housing unit. Prevent the toner from entering into the unit.



G070R204.WMF

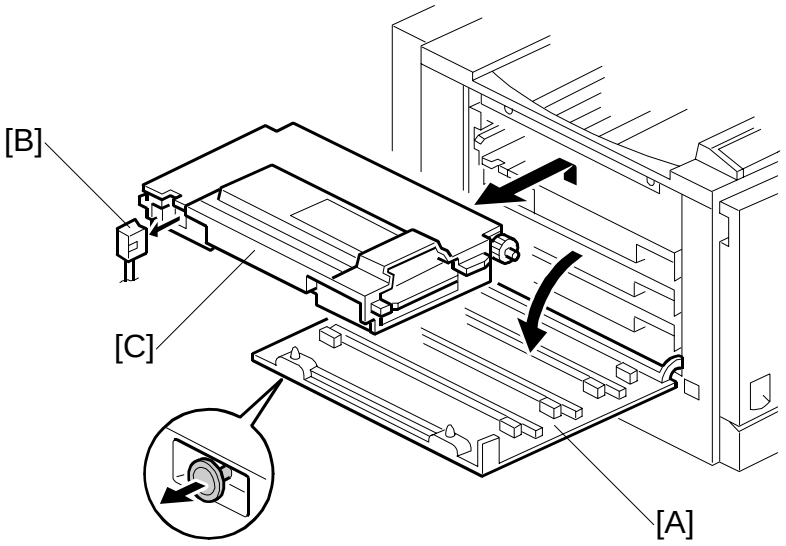
3. Polygonal mirror motor [B] (🖐 x 1, 🔩 x 4)
4. Sync. detection board [C] (🖐 x 1, 🔩 x 1)



G070R205.WMF

3.6 DEVELOPMENT UNIT

⚠CAUTION
Do not touch the development unit sleeves or ID chip terminals.



G070R301.WMF

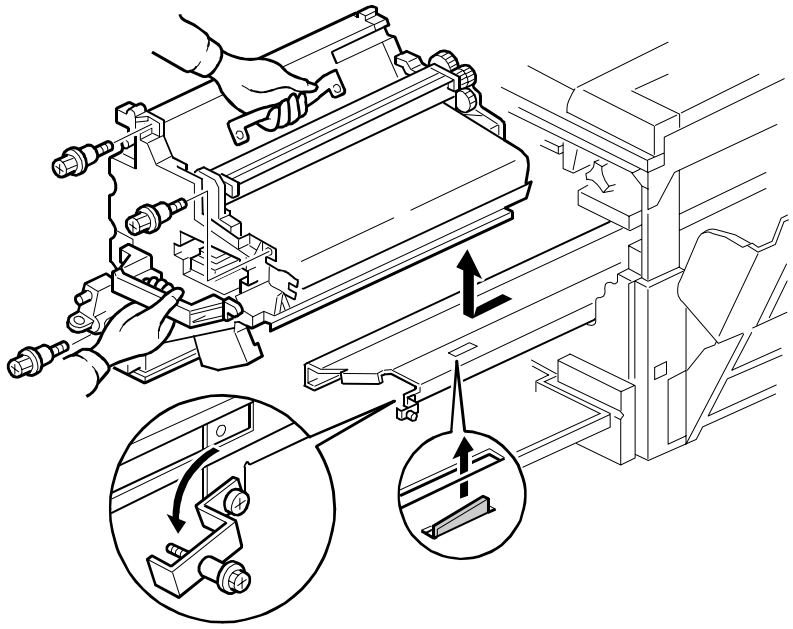
1. Open the left cover [A].
2. ID chip connector [B]
3. Push the left end of the development unit [C] to the right, lift the unit, and pull the unit out of the machine.

NOTE: 1) Remove the units in the order K, Y, C, and M. For example, before removing the M unit, remove the K, Y, and C units first.
2) When reassembling, make sure each development unit is installed correctly. Otherwise, a white line or band may appear on one half of the paper.

3.7 PHOTOCONDUCTOR UNIT (PCU)

3.7.1 MAIN UNIT

NOTE: 1) Before replacing any of the parts or consumables in this section, cover the floor with cloth or some sheets of paper.
2) Never tilt the unit. The toner may come out of the unit.
3) When handling the unit, grasp the brown (front) and green (top) grips. Never touch the OPC (left) or transfer (right) belts.
4) After removing the photoconductor unit, cover it with a light-proof sheet. Keep it in a dark place.

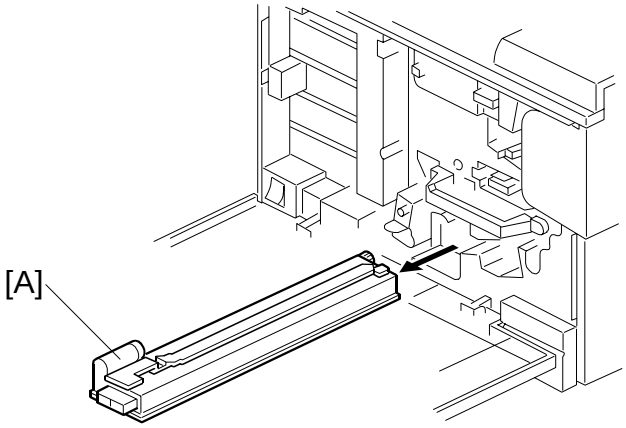


G070R308.WMF

1. Open the front cover.
2. Open the right cover.
3. x 4
4. Pull the unit out of the machine.
5. Grasp the brown and green grips.
6. Lift the unit and remove it.

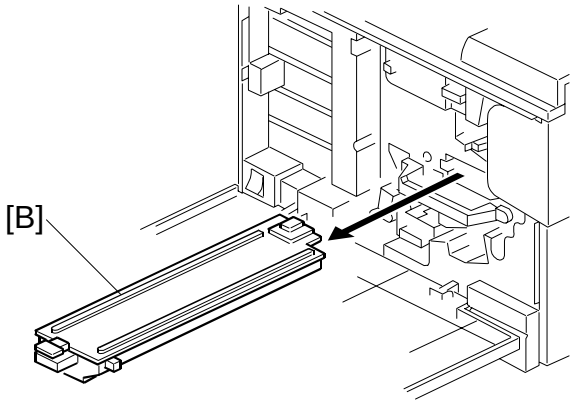
3.7.2 WASTE TONER BOTTLES

1. O/B waste toner bottle [A]



G070R302.WMF

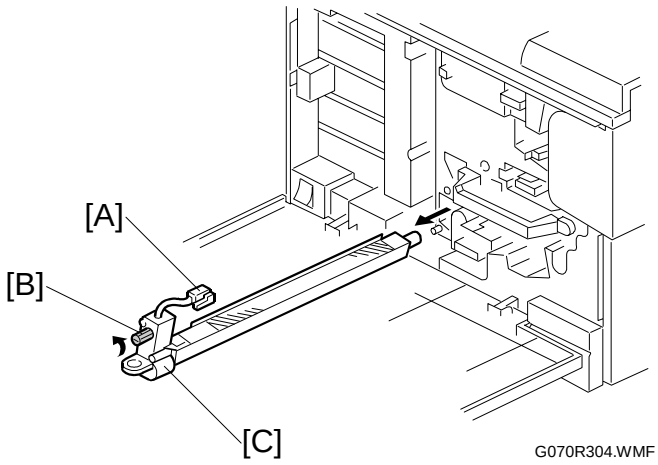
2. T/B waste toner bottle [B]



G070R303.WMF

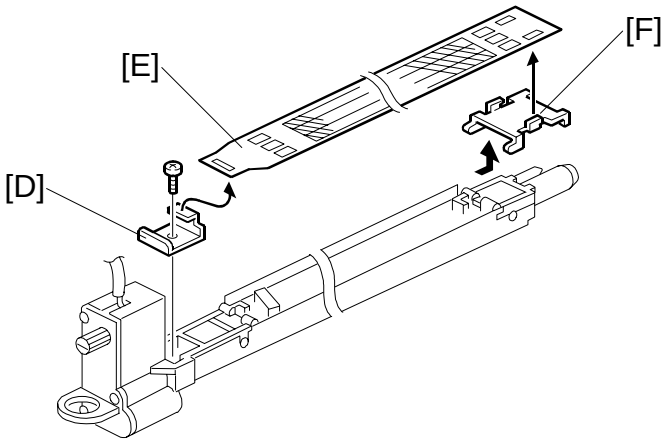
3.7.3 CHARGE CORONA WIRE

1. Modular cable [A]
2. Loosen (x 1) [B]
3. Charge corona unit [C]



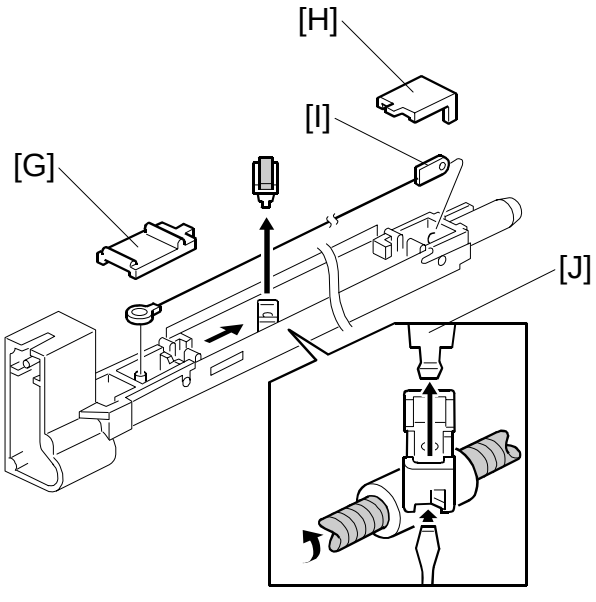
G070R304.WMF

4. Front bracket (x 1) [D]
5. Grid [E]
6. Rear bracket [F]



G070R305.WMF

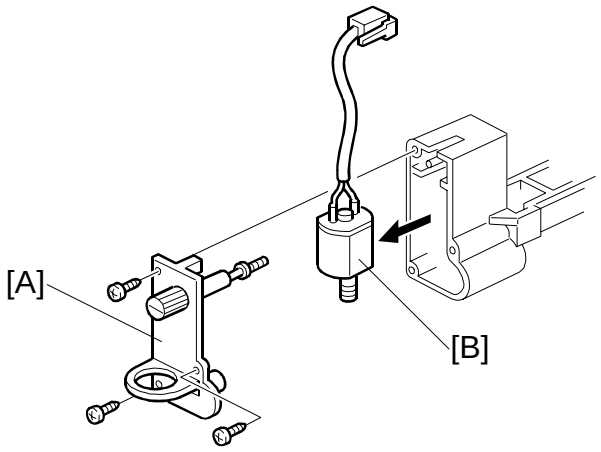
7. Front wire cover [G]
8. Rear wire cover [H]
9. Unhook the charge wire [I].
10. Wire cleaner [J] (x 1)



G070R307.WMF

3.7.4 CHARGE CORONA WIRE CLEANER MOTOR

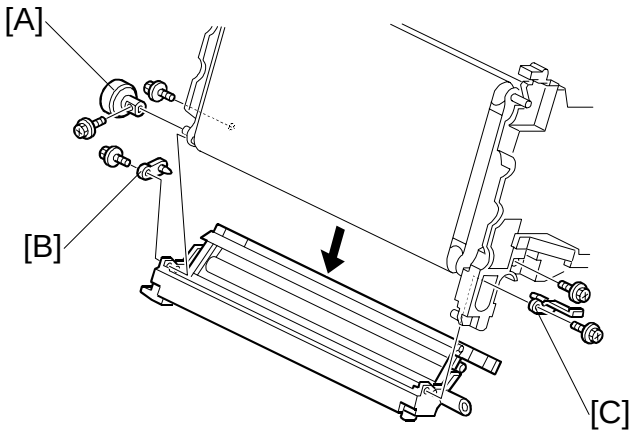
1. Charge corona unit (☛ 3.7.3)
2. Front motor cover [A] (☞ x 3)
3. Motor [B]



G070R306.WMF

3.7.5 OPC BELT CLEANING UNIT

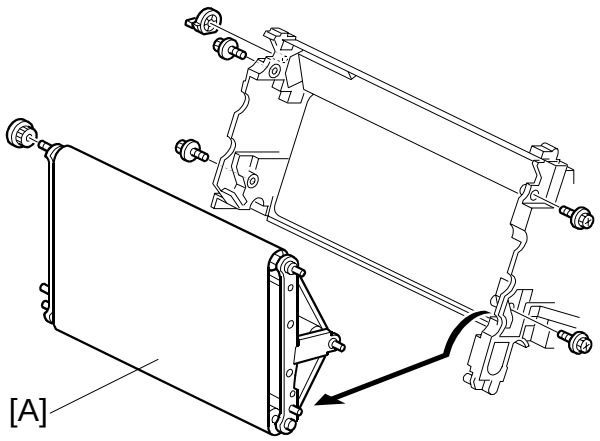
1. Photoconductor unit (☛ 3.7.1)
2. Charge corona unit (☛ 3.7.3)
3. Drive gear [A] (☞ x 1)
4. Rear brace [B] (☞ x 1)
5. Front brace [C] (☞ x 1)
6. OPC belt cleaning unit [D] (☞ x 2)
   NOTE: Hold up the photoconductor unit while removing the OPC belt cleaning unit.



G070R315.WMF

3.7.6 OPC BELT UNIT

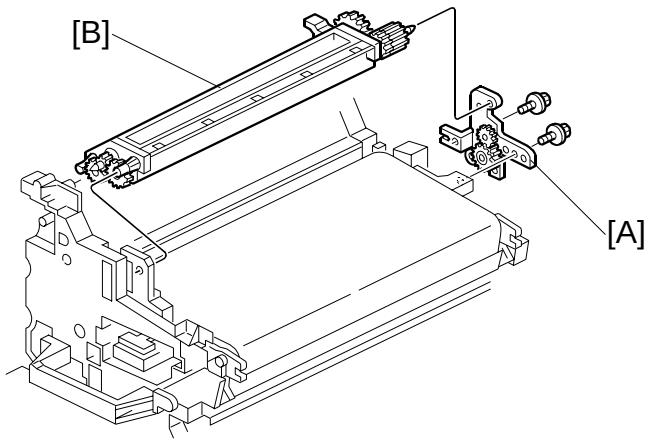
1. Photoconductor unit (☛ 3.7.1)
2. OPC belt cleaning unit (☛ 3.7.5)
3. OPC belt unit [A] (☞ x 4)
   NOTE: After installing a new OPC belt, do SP 2-940 (OPC lubrication mode) then SP 3-001 (forced process control).



G070R316.WMF

3.7.7 IMAGE TRANSFER BELT CLEANING UNIT

1. Photoconductor unit (☛ 3.7.1)
2. Bracket [A] (☞ x 2)
3. Image transfer belt cleaning unit [B]



G070R309.WMF

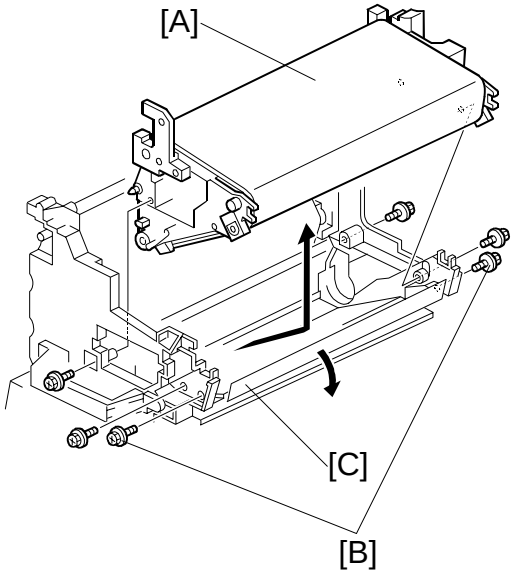
3.7.8 IMAGE TRANSFER BELT UNIT

⚠CAUTION

1. **Never touch the surface of the OPC or image transfer belt with bare hands.**
2. **Do not damage the OPC or image transfer belt.**

1. Photoconductor unit (☛ 3.7.1)
2. T/B waste toner bottle (☛ 3.7.2)
3. Image transfer belt cleaning unit (☛ 3.7.7)
4. Image transfer belt unit [A] (☞ x 6)

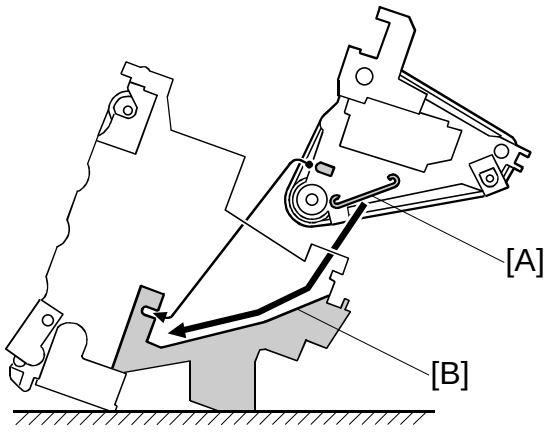
NOTE: 1) Do not damage the connectors.
2) Remove the 2 screws [B] to lower the entrance guide [C]. Otherwise, the belt will be caught by the entrance guide when putting back the image transfer belt unit.



G070R311.WMF

Reassembling

1. Put the guide [A] on the rail [B].
2. Slide the unit in.

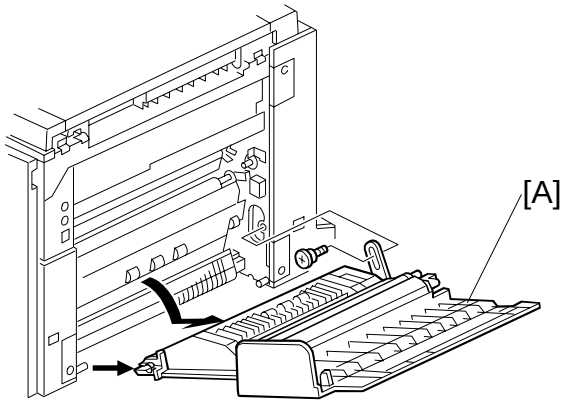


G070R314.WMF

3.8 PAPER TRANSFER UNIT

3.8.1 VERTICAL TRANSPORT UNIT

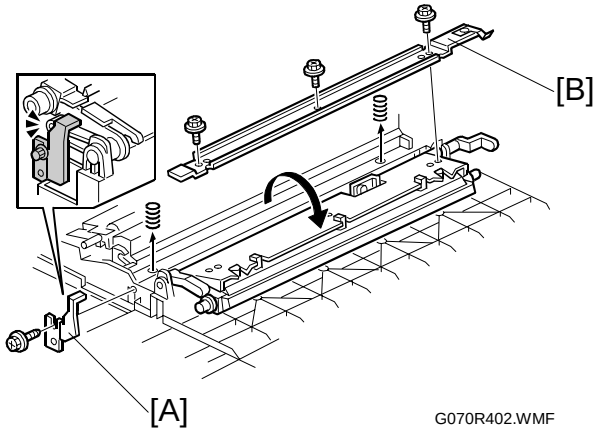
[A]: Right cover (pivot-screw x 1)



G070R401.WMF

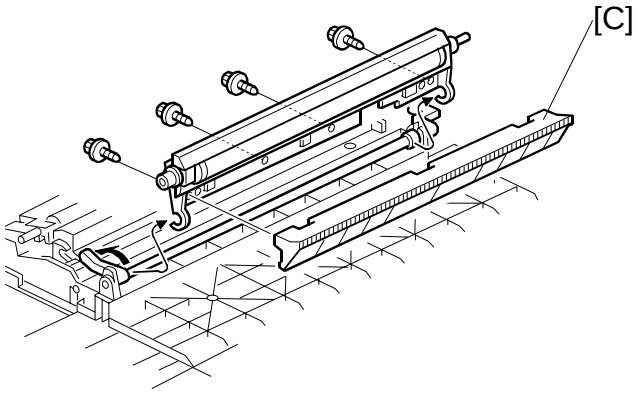
3.8.2 TRANSFER ROLLER

1. Brace [A] (☞ x 1)
2. Turn the roller unit on its pivot.
3. Bracket [B] (☞ x 3)



G070R402.WMF

4. Guide [C] (☞ x 4)



G070R403.WMF

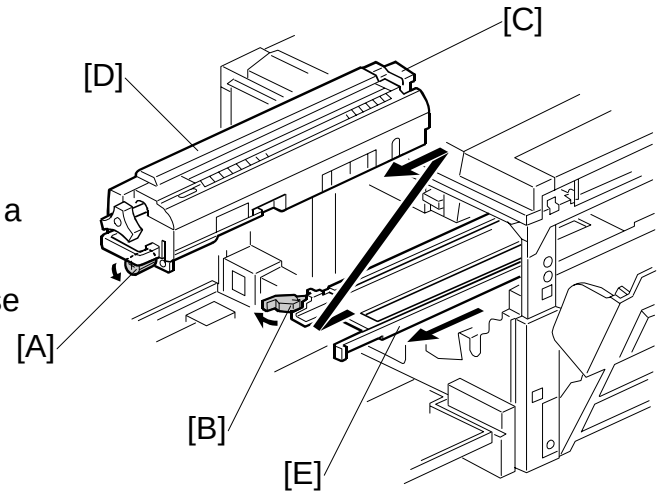
3.9 FUSING/PAPER EXIT

⚠CAUTION

Turn off the main switch and wait until the fusing unit cools down before beginning any of the procedures in this section. The fusing unit can cause serious burns.

3.9.1 FUSING UNIT

1. Loosen the knob screw [A].
2. Pull the unit out of the machine.
3. Unhook the bottom stopper [B].
4. Grasp the rear end (marked with a green label) [C].
5. Release the unit [D] from the base plate [E].



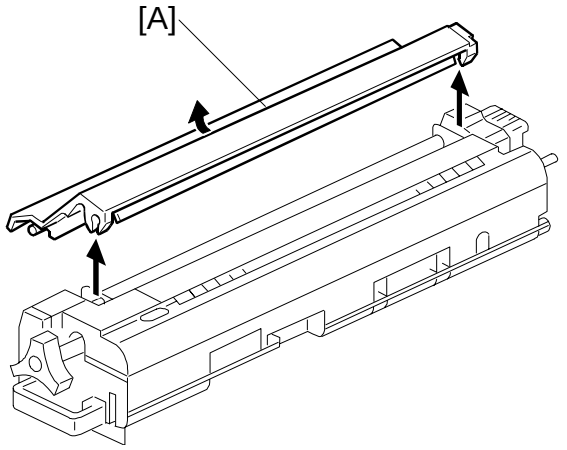
G070R501.WMF

3.9.2 OIL SUPPLY UNIT

NOTE: When removing either of the lamps (☛ 3.9.3), remove the knob screw (☛ 3.9.1) before removing the oil supply unit.

1. Fusing unit (☛ 3.9.1)
2. Put the fusing unit on a level place.
3. Oil supply unit [A]

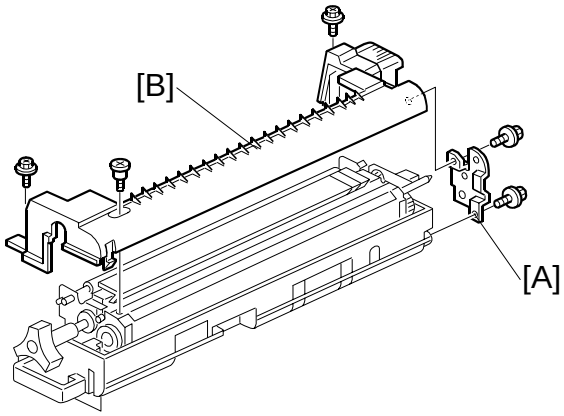
NOTE: Do not touch the oiling felt.



G070R502.WMF

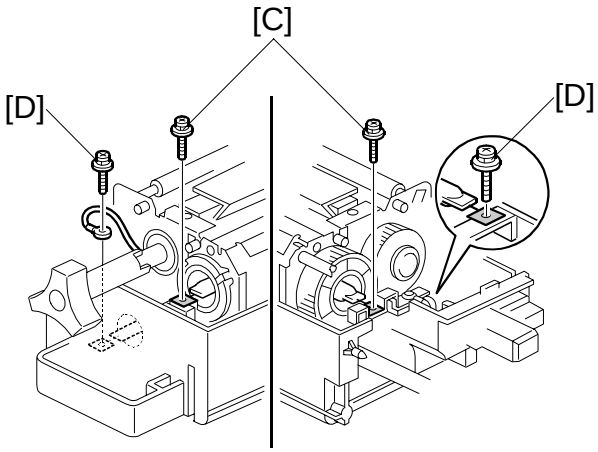
3.9.3 LAMPS

1. Oil supply unit (☛ 3.9.2)
2. Gear bracket [A] (🔩 x 2)
3. Upper cover [B] (🔩 x 2, shoulder screw x 1)



G070R503.WMF

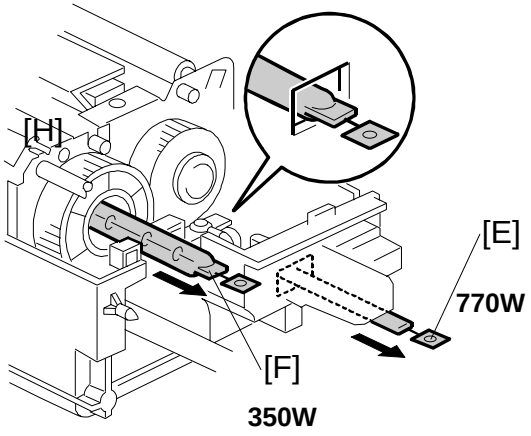
4. Terminals [C] [D] (🔩 x 5)
   NOTE: [C]: Pressure roller lamp terminals
   [D]: Heating roller lamp terminals



G070R504.WMF

5. Pull out the lamp (350W) [E].
6. Pull out the lamp (770W) [F].

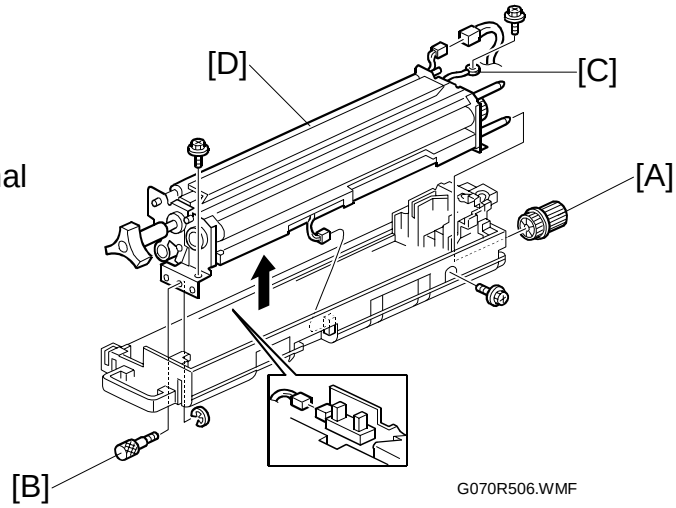
NOTE: "350W" and "770W" are etched on the respective terminals.



G070R510.WMF

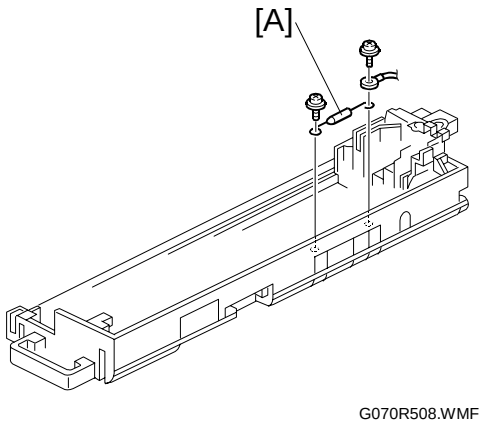
3.9.4 FUSING INNER UNIT

1. Lamps (☛ 3.9.3)
2. Drive gear [A]
3. Knob screw [B] (ℂ x 1)
4. Heating roller lamp harness terminal [C] (☞ x 1)
5. Fusing inner unit [D] (☞ x 2, ☞ x 3)



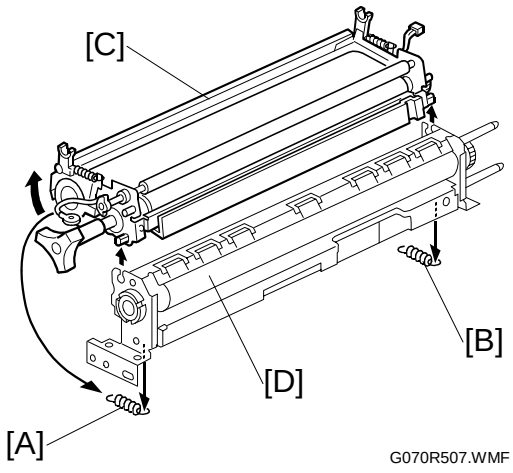
3.9.5 PRESSURE ROLLER THERMOFUSE

1. Fusing inner unit (☛ 3.9.4)
2. Pressure roller thermofuse [A] (☞ x 2)



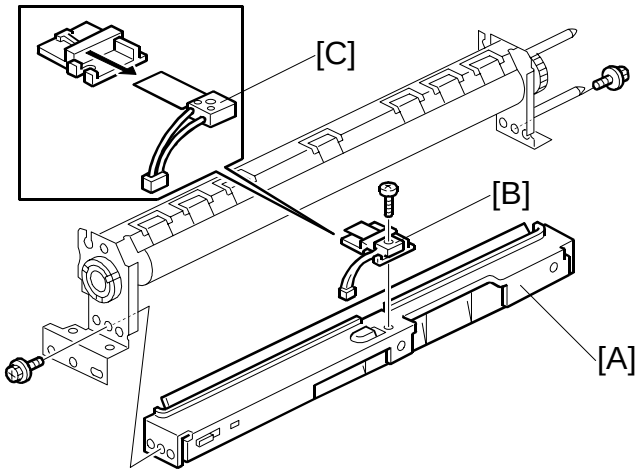
3.9.6 FUSING BELT UNIT AND PRESSURE ROLLER UNIT

1. Fusing inner unit (☛ 3.9.4)
2. Springs [A] [B]
3. Separate the fusing belt unit [C] and pressure roller unit [D].



3.9.7 PRESSURE ROLLER THERMISTOR

1. Pressure roller unit (☛ 3.9.6)
2. Pressure roller lower stay [A] (☞ x 2)
3. Pressure roller thermistor holder [B] (☞ x 1)
4. Pressure roller thermistor [C]



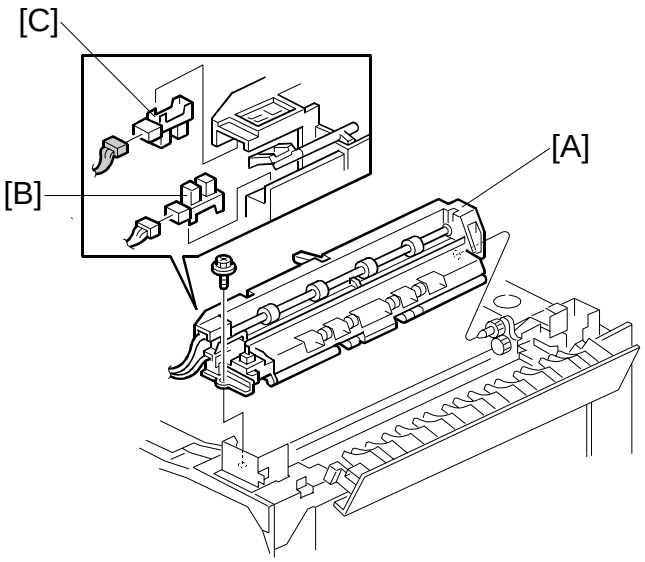
G070R509.WMF

3.9.8 PAPER EXIT UNIT AND PAPER EXIT/OVERFLOW SENSOR

⚠CAUTION

Turn off the main switch and wait until the paper exit unit cools down before beginning any of the procedures in this section. The paper exit unit can cause serious burns.

1. Paper exit cover (☛ 3.2.3)
2. Paper exit unit [A] (☞ x 3, ☞ x 1)
   NOTE: Remove 2 connectors before removing the unit. To remove the last connector, remove the unit and turn it. The connector is on the bottom side.
3. Paper exit sensor [B]
4. Paper overflow sensor [C]

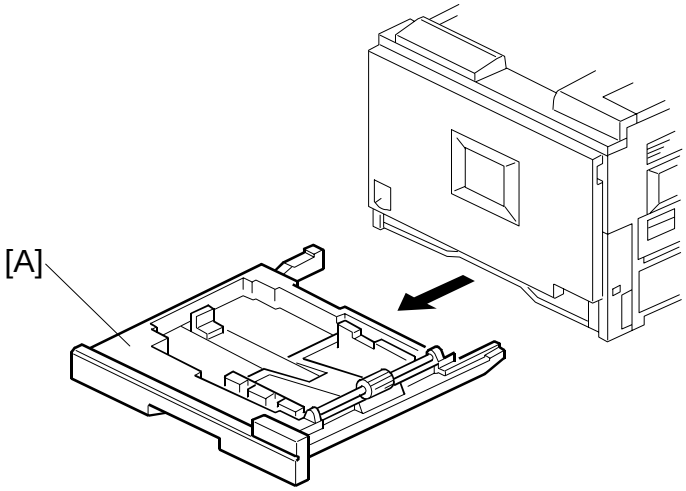


G070R601.WMF

3.10 PAPER FEED AND TRANSPORT

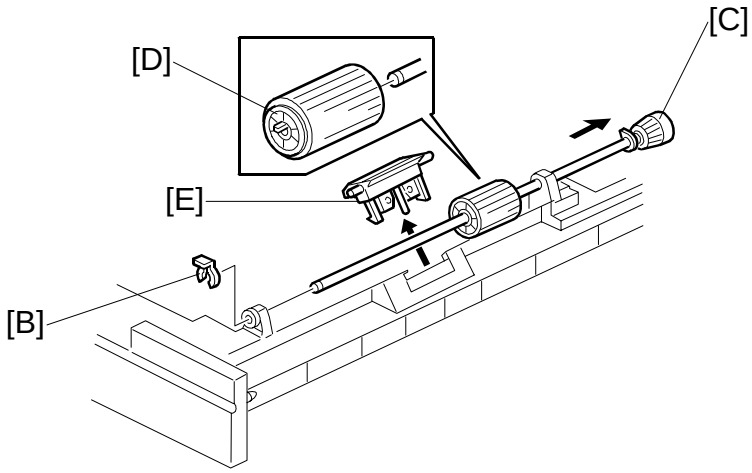
3.10.1 FEED ROLLER AND FRICTION PAD

1. Paper tray [A]



G070R101.WMF

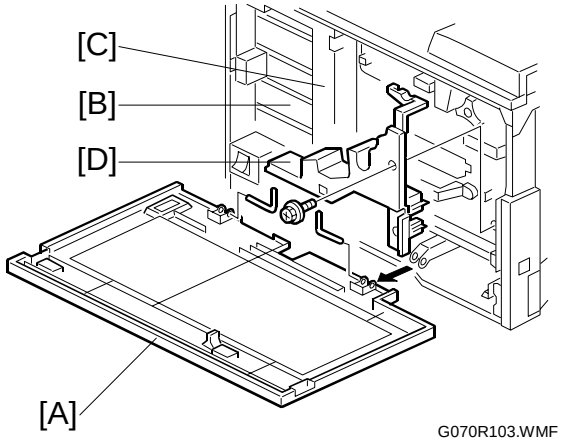
2. ⓜ x 1 [B]
3. Slide the shaft [C].
4. Feed roller [D] (1 hook)
5. Friction pad [E]



G070R102.WMF

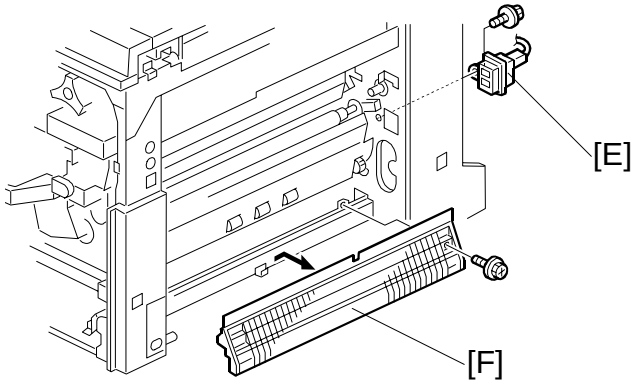
3.10.2 REGISTRATION SENSOR

1. Front cover [A] (L-shaped-pin x 2)
2. Rear cover (☛ 3.2.1)
3. Upper cover (☛ 3.2.3)
4. Lower left cover (☛ 3.5.2)
5. Dust shield glass cleaning lever (☛ 3.5.2)
6. Charge corona unit (☛ 3.7.3)
7. Right cover (☛ 3.8.1)
8. Left inner cover door [B]
9. Left inner cover [C] (🔩 x 2)
10. Right inner cover [D] (🔩 x 3)



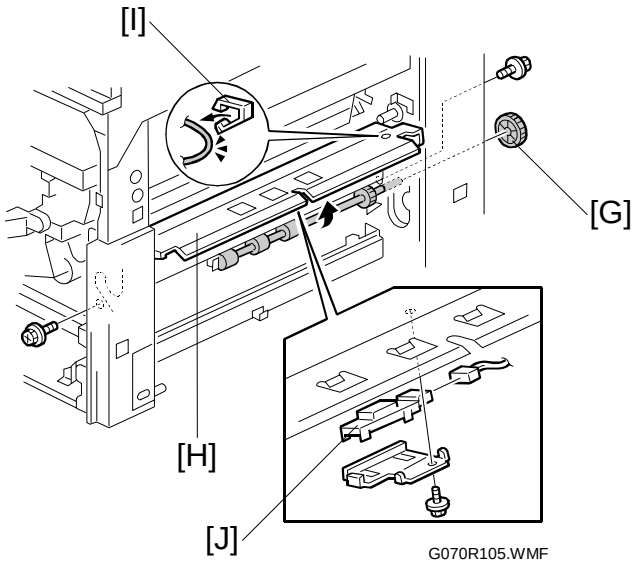
G070R103.WMF

11. Terminal [E] (🔩 x 1)
    NOTE: You have to remove the terminal to lift the transport stay (☛ step 14).
12. Transport guide [F] (🔩 x 1)



G070R104.WMF

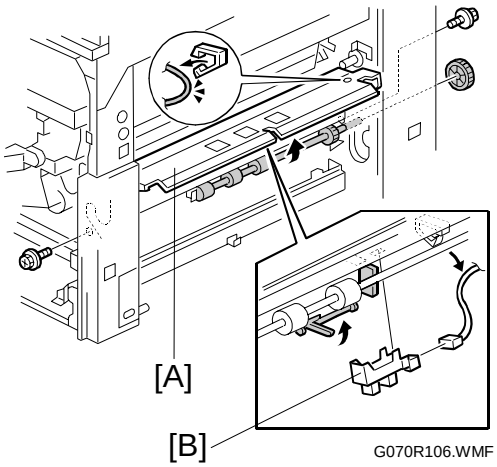
13. Drive gear [G] (1 hook)
14. Lift the transport stay [H] (🔩 x 2) and release the wire [I].
    NOTE: You can see the wire clip from the rear of the machine.
15. Registration sensor [J] (🖐 x 1, 🔩 x 1)



G070R105.WMF

3.10.3 PAPER FEED SENSOR

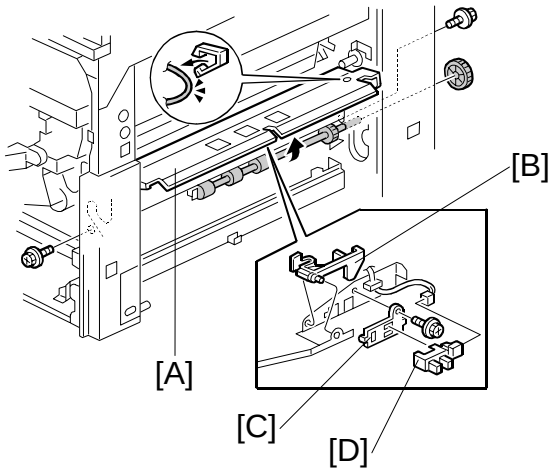
1. Lift the transport stay [A] (☛ 3.10.2)
2. Paper feed sensor [B] (✍ x 1)
   NOTE: Unhook the rear two pawls first, move the feeler, and unhook the front pawl.



G070R106.WMF

3.10.4 PAPER NEAR-END SENSOR

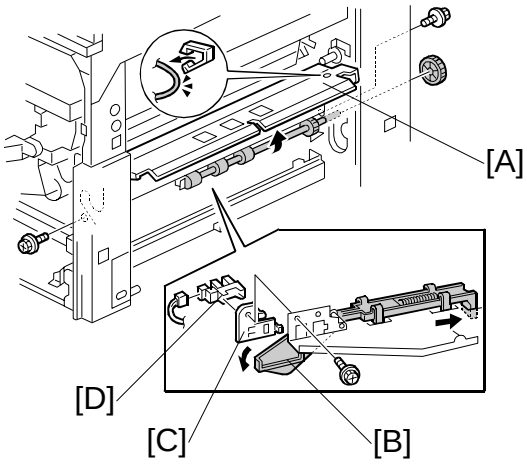
1. Lift the transport stay [A] (☛ 3.10.2)
2. Feeler [B]
3. Sensor bracket [C] (✍ x 1)
4. Paper near-end sensor [D] (✍ x 1)



G070R107.WMF

3.10.5 PAPER END SENSOR

1. Lift the transport stay [A] (☛ 3.10.2)
2. Feeler [B]
3. Sensor bracket [C] (✍ x 2)
4. Paper end sensor [D] (✍ x 1)

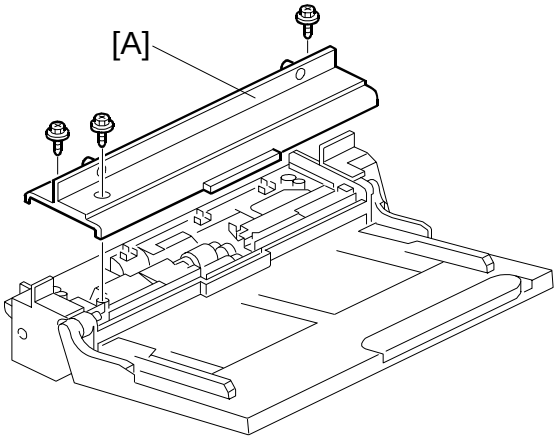


G070R108.WMF

3.11 BYPASS TRAY

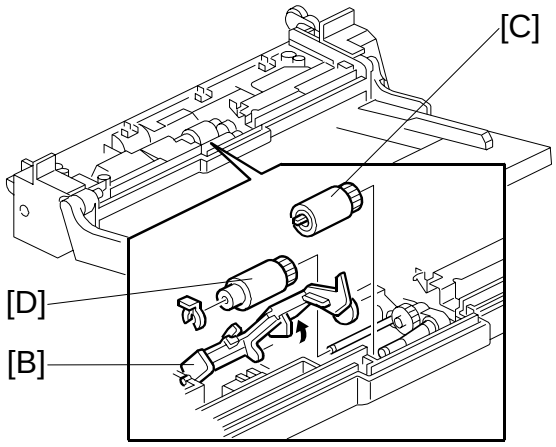
3.11.1 PICKUP/FEED ROLLER

1. Bypass tray (☞ x 3)
2. Upper cover [A] (☞ x 3)



G070R151.WMF

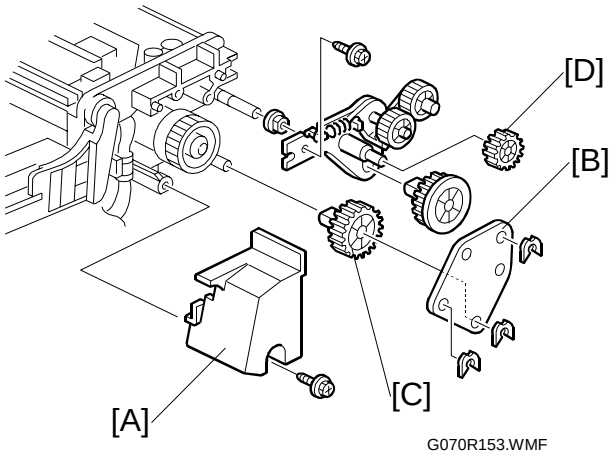
3. Lift the paper end sensor feeler [B].
4. Pick-up roller [C] (1 hook)
5. Paper feed roller [D] (⌓ x 1)



G070R152.WMF

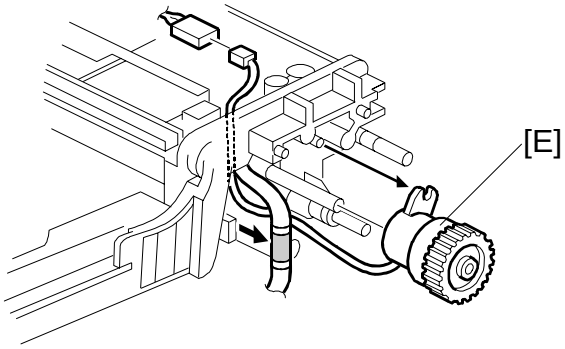
3.11.2 PAPER FEED CLUTCH

1. Upper cover (☛ 3.11.1)
2. Rear cover [A] (🔩 x 1)
3. Gear holder [B] (C x 3)
4. Gears [C][D]



G070R153.WMF

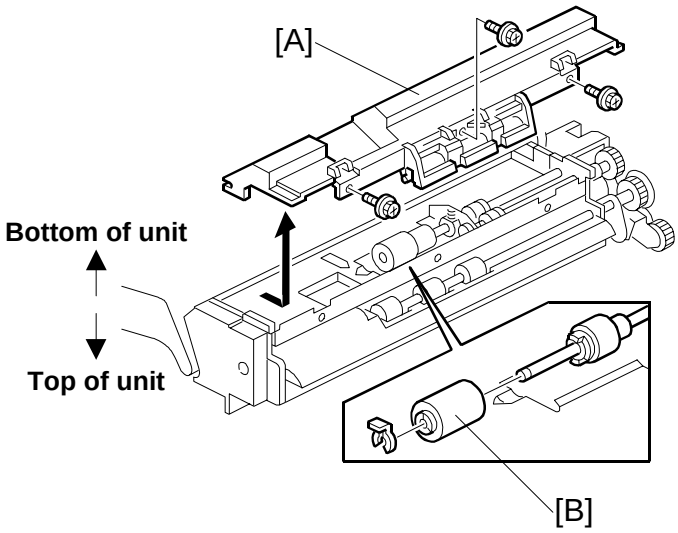
5. Clutch [E] (✋ x 1)



G070R154.WMF

3.11.3 REVERSE ROLLER

1. Bypass tray (☛ 3.11.1)
2. Turn the unit upside down.
3. Bottom cover [A] (🔩 x 3)
4. Reverse roller [B] (x 1)



G070R155.WMF

4. TROUBLESHOOTING

4.1 SERVICE CALL

4.1.1 SERVICE CALL CONDITIONS

Level	Definition	Reset Procedure
A	Fusing unit SCs displayed on the operation panel. The machine is disabled. The user cannot reset the SC.	Turn the main switch off then on before entering SP mode. Reset the SC (set SP5-810 to 1), then turn the main switch off then on again.
B	SCs that disable only the features that use the defective item. Although these SCs are not shown to the user under normal conditions, they are displayed on the operation panel only when the defective feature is selected.	Turn the main power switch off and on.
C	SCs that are not shown on the operation panel. They are internally logged.	Logging only
D	Turning the operation switch or main power switch off then on resets the SC. The SC is displayed on the operation panel. It is redisplayed if it occurs after the main power switch is turned on again.	Turn the main power switch off and on.

NOTE: 1) All SCs are logged.
2) When an electrical circuit board has a problem, check the connections before replacing the PCBs.
3) When a motor has a problem, check the mechanical load before replacing the motor or sensor.

4.1.2 SC TABLE

No.	Definition	Symptom	Possible Cause
201	D	Polygon motor error • The polygon motor starts operating. → The lock signal is not detected within 20 seconds. • The polygon motor starts operating. → The lock signal is detected within 20 seconds. → After a 3-second waiting time, no lock signal is detected within 20 seconds. • The polygon motor strops operating. → The lock signal is not detected within 20 seconds. • The polygon motor is operating. → The lock signal remains undetected for 0.5 seconds.	• Defective polygon motor • Defective harness
220	D	1st beam synchronization error A polygon motor lock is detected; the LD door is closed; the LD remains on. → The LD error (1st beam synchronization error) continues for 0.5 seconds.	• Disconnected synchronization detector board • Defective LD unit • Defective BCU
221	D	2nd beam synchronization error A polygon motor lock is detected; the LD door is closed; the LD remains on. → The LD error (2nd beam synchronization error) continues for 0.5 seconds.	• Disconnected synchronization detector board • Defective LD unit • Defective BCU
230	D	FGATE on error A transfer belt mark is detected. → No FGATE on signal is detected within 175+50 milliseconds.	• Defective BCU
231	D	FGATE off error A FGATE assert signal is detected. → The FGATE negate signal is not detected within 30 seconds.	• Defective BCU
241	D	LD error An LD error continues for 0.5 seconds. (After an LD error is detected, an LD error release is written to the GAVD chip during monitoring.)	• Defective LD unit
280	D	Image transfer belt mark detection error • An imaging process starts. → No belt mark is detected in 1 revolution. • A color imaging process starts. → A mono color image is transferred. → FGATE becomes active. → No belt mark is detected in 1 revolution. • Thick paper or OHP film is used. → The belt slows down. → No belt mark is detected in 1 revolution.	• Defective BCU • Poor electrical connection • Noise
281	D	GAPCI communication error Data is transferred. → The CPU does not detect the communication ACK signal from GAPCI.	• Defective BCU
282	D	GAVD communication error Data is transferred. → The CPU does not detect the communication ACK signal from GAVD.	• Defective BCU

No.	Definition	Symptom	Possible Cause
300	D	Charge corona unit electrical leak The charge corona unit keeps outputting; the unit is operating at the minimum PWM duty value. → 4.5 Volt (or more) is returning for 60 milliseconds.	• Short circuit in the charge corona unit • Defective high voltage supply board • Defective harness (BCU - high voltage supply board)
301	D	Charge corona unit disconnection The charge corona unit keeps outputting. → The unit is operating at the maximum PWM duty value for 60 milliseconds.	• Defective PCU installation • Defective high voltage supply board • Defective harness (BCU - high voltage supply board)
302	D	Charge grid electrical leak The charge grid keeps outputting. → The returning voltage exceeds the target by 0.5 Volt or more for 120 milliseconds.	• Short circuit in the charge grid • Defective high voltage supply board • Defective harness (BCU - high voltage supply board)
305	D	Charge corona unit cleaner error • Cleaning starts. → The lock signal is not detected within 30 seconds. • Cleaning starts. → The cleaner turns. → The lock signal is detected within 6 seconds. • The lock signal is detected while the unit is moving away from the HP. → The next lock signal is detected within 6 seconds after the unit has turned toward the HP.	• Defective cleaner
350	D	Development error 1 (K/Y) A development process starts. → The returning voltage exceeds the target by 0.5 Volt or more for 60 milliseconds.	• Short circuit in the development unit • Defective high voltage supply board • Defective harness (BCU - high voltage supply board)
351	D	Development error 2 (C/M) A development process starts. → The returning voltage exceeds the target by 0.5 Volt or more for 60 milliseconds.	• Short circuit in the development unit • Defective high voltage supply board • Defective harness (BCU - high voltage supply board)
352	D	Development motor error • The development motor starts or changes speed. → The motor does not detect a 1-second lock signal within 3 seconds. • The development motor starts. → The lock signal is detected during normal operation. → The lock signal is interrupted for 1 second or more.	• Defective development motor

No.	Definition	Symptom	Possible Cause
400	D	1st transfer (image transfer) error Image transfer starts. → The process operates at the maximum PWM duty for a certain time.	• Short circuit in the image transfer unit • Defective image transfer belt • Defective high voltage supply board • Defective harness (BCU - high voltage supply board)
410	D	2nd transfer (paper transfer) electric leakage (+) Paper transfer starts. → The positive (+) output is at the minimum PWM duty value. → The returning voltage stays at 2.7 V or more for 60 milliseconds.	• Short circuit in the paper transfer unit • Defective high voltage supply board • Defective harness (BCU - high voltage supply board)
411	D	2nd transfer (paper transfer) electric leakage (–) Paper transfer starts. → The negative (–) output is at the minimum PWM duty value. → The returning voltage stays at 4.5 V or more for 60 milliseconds.	• Short circuit in the paper transfer unit • Defective high voltage supply board • Defective harness (BCU - high voltage supply board)
412	D	2nd transfer (paper transfer) disconnection (+) Paper transfer starts. → The positive (+) output is at the maximum PWM duty value for 60 milliseconds.	• Right cover not closed • Defective transfer roller contact mechanism • Defective high voltage supply board • Defective harness (BCU - high voltage supply board)
413	D	2nd transfer (paper transfer) disconnection (–) Paper transfer starts. → The negative (–) output is at the maximum PWM duty value for 60 milliseconds.	• Right cover not closed • Defective transfer roller contact mechanism • Defective high voltage supply board • Defective harness (BCU - high voltage supply board)
420	D	Discharge error (paper separation) The discharge circuit is operating at the maximum PWM duty value for 60 milliseconds.	• Discharge pin short circuit • Defective high voltage supply board • Defective harness (BCU - high voltage supply board)

No.	Definition	Symptom	Possible Cause
430	D	Transfer belt cleaning error Cleaning is operating at the maximum PWM duty value for 60 milliseconds.	• Short circuit in the transfer belt cleaning unit • Defective high voltage supply board • Defective harness (BCU - high voltage supply board)
440	D	Main motor error • The main motor starts or changes speed. → The lock signal does not continue for 1 second within 3 seconds. • The main motor starts. → The lock signal is detected and operation proceeds normally. → The lock signal is interrupted for 1 second.	• Defective main motor
460	D	Temperature sensor error The output is 4.5 V (or higher) or 0.3 V (or lower) for 12 seconds.	• Short circuit in the temperature sensor • Defective circuit • Defective connector
461	D	Humidity sensor error The output is 4.5 V (or higher) or 0.3 V (or lower) for 12 seconds.	• Short circuit in the humidity sensor • Defective circuit • Defective connector
480	D	ID sensor error The ID sensor is being calibrated (process control, step 1) → While the LED is off, the output voltage is 0.5 V or lower.	• Defective ID sensor • Defective connector
481	D	Transfer belt mark detection error The main motor is operating; and the lock signal is detected. → The belt mark sensor signal does not change for 120 milliseconds.	• Defective main motor • Image transfer belt out of position • Belt mark blurred or absent
502	B	2nd tray error • The tray lift motor turns on. → The top of the paper stack is not detected for 13 seconds. • The tray is set. → The top of the paper stack is detected. → The bottom plate is lowered. → The stack detection is not cleared within 5 seconds. → These steps are repeated 4 times.	• Defective paper height sensor • Defective tray lift motor
503	B	3rd tray error • The tray lift motor turns on. → The top of the paper stack is not detected for 13 seconds. • The tray is set. → The top of the paper stack is detected. → The bottom plate is lowered. → The stack detection is not cleared within 5 seconds. → These steps are repeated 4 times.	• Defective paper height sensor • Defective tray lift motor
515	D	Duplex unit communication error • A connection error occurs. • The UART reports a communication error. • While no communication is conducted, a 3-second command is sent. → The duplex unit does not respond within 5 seconds.	• Defective duplex unit board • Defective BCU • Defective IOB • Defective connection (Main unit - Duplex unit)

No.	Definition	Symptom	Possible Cause
520	D	Paper feed motor error • The motor starts or changes speed. → The lock signal does not continue for 1 second within a 3-second interval. • The motor starts. → The lock signal is detected and operation proceeds normally. → The lock signal is interrupted for 1 second.	• Defective paper feed motor
541	A	Thermistor disconnection (heating roller) The fusing unit starts warm up to the print ready temperature. → The temperature does not reach 7°C for 10 seconds.	• Defective thermistor • Thermistor loose connection • Defective connector
542	A	Fusing warm-up timeout (heating roller) The main switch is turned on or a cover is closed. → The heating roller does not reach the warm-up temperature within 50 seconds.	• Defective lamp (loose connection, thermostat failure, PSU, thermostat) • Incorrect detection (loose thermistor connection, fusing - drawer loose connection)
543	A	Overheat error (heating roller) The heating roller thermistor detects 220°C for 5 seconds.	• Short circuit • Defective BCU board • Defective PSU
544	A	Low temperature error (heating roller) During standby or operation, the heating roller thermistor detects 100 °C or less for 5 seconds.	• Defective lamp (loose connection, thermostat failure, PSU, thermostat) • Incorrect detection (loose thermistor connection, fusing - drawer loose connection)
545	A	Full power error (heating roller) Fusing unit warm-up is complete. → The heating roller stops turning. → The heating roller lamp keeps outputting the maximum power for 30 seconds.	• Thermistor loose connection • Fusing - drawer loose connection
546	A	Unstable temperature (heating roller) • The heating roller thermistor detects unstable temperature increases or decreases within 60 seconds.	• Thermistor loose connection • Fusing - drawer loose connection
551	A	Thermistor disconnection (pressure roller) The pressure roller thermistor detects7°C or lower for 30 seconds.	• Thermistor loose connection • Defective harness • Defective connector
552	A	Warm-up time over (pressure roller) The main switch is turned on or a cover is closed. → The fusing pressure roller does not reach the ready temperature within 200 seconds.	• Defective lamp (loose connection, thermostat failure, PSU, thermostat) • Incorrect detection (thermistor loose connection, fusing - drawer loose connection)

No.	Definition	Symptom	Possible Cause
553	A	Overheat error (pressure roller) The pressure roller thermistor detects 220°C for 5 seconds.	• Loose connection • Defective BCU board • Defective PSU
554	A	Low temperature error (pressure roller) During standby or operation, the pressure roller thermistor detects 80°C or less for 5 seconds.	• Defective lamp (loose connection, thermostat failure, PSU, thermostat) • Incorrect detection (thermistor loose connection, fusing - drawer loose connection)
555	A	Full power error (pressure roller) Fusing unit warm-up is complete.→ The fusing pressure roller stops turning. → The pressure roller lamp keeps outputting the maximum power for 200 seconds.	• Thermistor loose connection • Fusing - drawer loose connection
556	A	Unstable temperature (pressure roller) • The pressure roller thermistor detects unstable temperature increases or decreases within 60 seconds.	• Thermistor loose connection • Fusing - drawer loose connection
560	D	Zero cross error The main switch is turned on; the fusing relay turns on. → 50 Hz or 60 Hz is not detected within 5 seconds.	• Defective relay circuit • Defective PSU • Incorrect power supply
670	D	No response from BCU at power on	• Loose connection • Defective controller • Defective BCU
680	D	EEPROM error The main switch is turned on.→ EEPROM is not connected.	• Incorrect EEPROM connection
687	D	PER command error • Some image data is transferred. → The controller does not report the necessary memory address. • The PES command is issued. → The controller does not issue the necessary memory report (PER) command within 6 seconds..	• Poor connection between BCU and controller • Defective BCU • Defective controller
730	D	Four-bin mail box communication error • A connection error occurs. • The UART reports a communication error. • In other cases than paper transport, after an every-3-second command is sent, the mail box does not respond within 5 seconds.	• Defective mail box control board • Defective BCU • Defective IOB • Incorrect installation
740	D	Finisher communication error • A connection error occurs. • The UART reports a communication error. • In other cases than paper transport, after an every-3-second command is sent, the finisher does not respond within 5 seconds.	• Defective finisher control board • Defective board • Defective BCU • Defective IOB • Incorrect installation
741	D	Finisher jogger motor error The jogger home position sensor (on/off) is not detected in a given time.	• Defective jogger motor • Defective jogger home position sensor

No.	Definition	Symptom	Possible Cause
742	D	Finisher stapler unit error • The stapler does not return to home position within 1 second.	• Defective stapler unit
743	D	Finisher output tray motor error The stack height and lever sensors do not detect paper.	
744	D	Finisher output tray motor lock The tray is locked for 10 seconds.	• Defective motor
745	D	Finisher paper detection error The stack height and lever sensors do not correctly detect paper.	
750	D	1st paper tray unit communication error • A connection error occurs. • The UART reports a communication error. • In other cases than paper transport, after an every-3-second command is sent, the paper tray unit does not respond within 5 seconds.	• Defective paper tray unit control board • Defective BCU • Defective IOB • Defective connection (Paper tray - main unit)
751	D	2nd paper tray unit communication error • After the 1st paper tray has recognized the 2nd paper tray, the trays cannot communicate with each other. • After the 1st paper tray has recognized the 2nd paper tray, an ATM (CPU reset) is sent from the 2nd paper tray.	• Defective paper tray unit control board • Defective connection (1st - 2nd paper tray

4.2 CONTROLLER ERROR TABLE

The table lists the controller error codes. If an error occurs, the code is displayed when the main switch is turned on or after the startup self-diagnostics.

NOTE: For the startup self-diagnostics, see section 5.3.

Code	Description	Required Action
640	BCU – Controller communication error (no response)	Turn the main switch off and on. Replace the controller. Replace the BCU.
641	BCU – Controller communication error (no response)	Turn the main switch off and on. Check the connection between BCU and controller. Replace the controller. Replace the BCU.
800	Video output error (K)	Data transfer starts to the BCU, but the transfer completion command does not return to the controller within the required time. Defective controller board
801	Video output error (Y)	
802	Video output error (M)	
803	Video output error (C)	
818	Watchdog error	Turn the main switch off and on. Replace the controller. See **NOTE** at the end of this table
819	Fatal error	Turn the main switch off and on. Check and/or replace the RAM DIMM. Check and/or replace the ROM DIMM. Replace the controller. See **NOTE** at the end of this table
820	Self-diagnostics error: CPU [XXXX]: Detailed error code	Turn the main switch off and on. Reinstall the controller system firmware. Replace the controller.
821	Self-diagnostics error: ASIC	Turn the main switch off and on. Reinstall the controller system firmware. Replace the RAM DIMM. Replace the controller board.
822	Self-diagnostics error: HDD (Hard Disk Drive) [XXXX]: Detailed error code	Turn the main switch off and on. Check that the HDD is properly connected to the controller. Replace the HDD. Replace the controller.
823	Self-diagnostics error: NIB [XXXX]: Detailed error code	Turn the main switch off and on. Replace the controller.
824	Self-diagnostics error: Standard NVRAM	Turn the main switch off and on. Check that the standard NVRAM is firmly inserted into the socket. Replace the NVRAM. Replace the controller.
827	Self-diagnostics error: Standard SRAM DIMM [XXXX]: Detailed error code	Turn the main switch off and on. Replace the SRAM DIMM. Replace the controller.

Code	Description	Required Action
828	Self-diagnostics error : ROM [XXXX]: Detailed error code	Turn the main switch on and off. Replace the ROM DIMM Replace the controller.
829	Self-diagnostics error: optional RAM [XXXX]: Detailed error code	Turn the main switch off and on. Replace the RAM DIMM. Replace the controller board.
835	Self-diagnostics error: Centronics interface [XXXX]: Detailed error code	Turn the main switch off and on. Check the connection between the Centronics connector and loop-back connector. Reconnect the loop-back connector. Replace the controller.
836	Self-diagnostics error: Font ROM (standard)	Turn the main switch off and on. Replace the standard ROM-DIMM.
838	Self-diagnostics error: Font ROM (clock generator)	Replace the controller.
850	Network interface error	Turn the main switch off and on. Replace the controller.
851	IEEE1394 interface error	Turn the main switch off and on. Replace the IEEE1394 interface board. Replace the controller.
860	HDD: Error detected at power up (partition error, unformatted disk, incorrect disk type)	Turn the main switch off and on. Reformat the HDD (SP 5-832). Replace the HDD.
861	HDD: Reboot error	Turn the main switch off and on. Check the connection between HDD and controller. Check and replace the cables. Replace the HDD. Replace the controller.
862	Defective sector management maximum	Replace the HDD.
863	HDD: Read error	Turn the main switch off and on. Replace the HDD. Replace the controller.
864	HDD: CRC error	Turn the main switch off and on. Replace the HDD.
865	HDD: Access error	Turn the main switch off and on. Replace the HDD.
900	Electrical counter error	Turn the main switch off and on. Check the connection between NVRAM and controller. Replace the NVRAM. Replace the controller.
990	Software performance error	Turn the main switch off and on. Reinstall the controller and/or engine main firmware. See **NOTE** at the end of this table.
998	Application start error	Turn the main switch off and on. Check that the RAM DIMM and ROM DIMM are properly connected. Reinstall the controller system firmware. Replace the controller.

Code	Description	Required Action
999	Program installation error	Controller DIP SW1 setting incorrect. Defective software on IC card. Controller software download error. Replace the controller.

NOTE: If a problem always occurs in a specific situation (for example, same printer driver settings, same image file), the problem may be caused by a software error. In this case, send the following data and information to your product specialist.

- Symptom/Possible causes/Action taken
- Summary sheet (SP mode '1 Service', [Print Summary])
- SMC All (SP5-990-002)
- Logged data (SP5-990-004)
- Printer driver settings used when the problem occurs
- All data displayed on the screen (SC code, error code, and program address where the problem is logged.)
- Image file which causes the problem, if possible

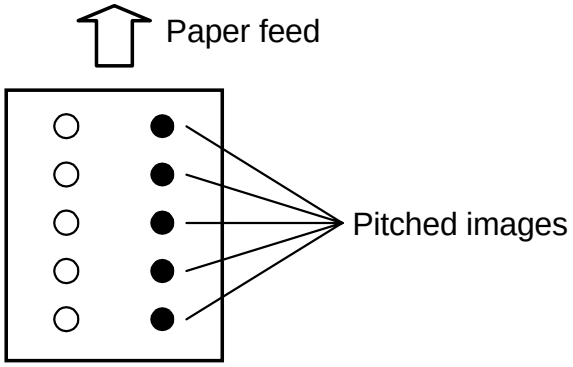
4.3 BLOWN FUSE CONDITIONS

Fuse	Rating		Symptom when turning on the main switch
	115V	220 ~ 240V	
Power Supply Board			
FU1 (N.A.)/ CB1 (Eur./Asia)	15A/125V	8A/250V	No response
FU2	6.3A/250V	3.15A/250V	No response
FU3	4A/125V	4A/125V	"Tray 2 Hardware Problem" is displayed. The optional tray does not operate.*1
FU4	4A/125V	4A/125V	"Ready" is displayed. The interchange unit (and the finisher and/or the 4-bin mail box and/or duplex) does not operate.*2

*1: Vaa (+24V) for the optional tray is cut.
*2: Vaa (+24V) for the interchange unit is cut.

4.4 CHECK POINTS FOR IMAGE PROBLEMS AT REGULAR INTERVALS

Symptoms for image problems at regular intervals depend on the circumference of certain components. The following diagram shows the possible symptoms (black or white dots at regular intervals).



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Color spots at 54-mm intervals: Development roller in the development unit
Abnormal image at 68-mm intervals: Transfer roller
Abnormal image at 188-mm intervals: Fusing belt in the fusing unit
Abnormal image at 125-mm intervals: Pressure roller in the fusing unit

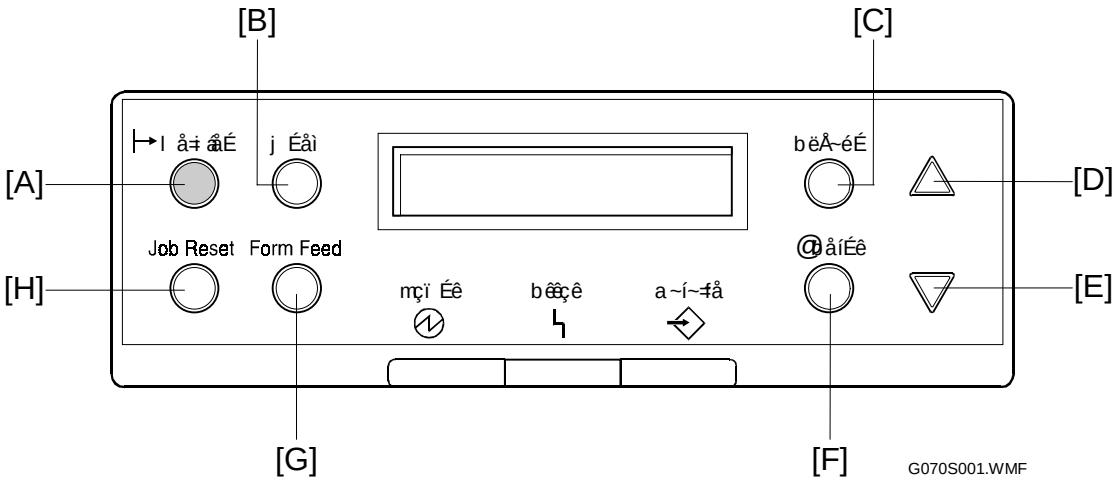
5. SERVICE TABLES

5.1 SERVICE PROGRAM MODE

⚠CAUTION

Before starting a service program, check that no data is coming into the printer. If data is coming in, wait until the data is completely processed.

5.1.1 OPERATION PANEL KEYS



[A]: Online
[B]: Menu
[C]: Escape
[D]: Up arrow
[E]: Down arrow
[F]: Enter
[G]: Form feed
[H]: Reset

5.1.2 STARTING SERVICE PROGRAM MODE

You can enter service mode with either of the following procedures.

Procedure 1

1. Turn the main switch off.
2. Press the online key and the escape key at the same time, and hold them.
3. Turn the main switch on.
4. Wait until “SYSTEM ver V.x.xx. 1. Service” is displayed.
   NOTE: “ver V.x.xx.” indicates the machine’s firmware version.

Procedure 2

1. Press the up arrow key and the down arrow key at the same time, and hold them for about 5 seconds.
   NOTE: At this moment, the display does not change.
2. Press the enter key. “SYSTEM ver V.x.xx. 1. Service” is displayed.
   NOTE: “ver V.x.xx.” indicates the machine’s firmware version.

5.1.3 MAIN MENU

1. The main menu has three sub menus (see below). Press the up arrow key or the down arrow key to scroll through these sub menus.
   1) Service: Goes to the controller service modes
   2) Engine: Goes to the engine service modes
   3) End: Exits from the main menu
2. Press the enter key.
3. Press the up arrow key or the down arrow key to scroll through the items in the selected sub menu.
4. To exit from the sub menu, press the escape key.

5.1.4 SPECIFYING A VALUE OR SETTING

1. Select the required item from the sub menu. The current setting is displayed.
2. Use the up arrow key or down arrow key to specify a new setting.
3. Press the enter key.
   NOTE: If you do not press the enter key, the previous setting remains valid.
4. To exit from the sub menu item, press the escape key.

5.1.5 LEAVING SERVICE MODE

1. Select “3. End.”
2. Press the enter key.

NOTE: You cannot exit from the main menu by pressing the escape key.

5.2 SP MODE TABLES

NOTE: In the Function/[Setting] column:

- The related pop-up screen name and function name (if any) appear in parenthesis following the function description.
- Comments are in *italics*.
- The setting range is enclosed in brackets, with the default setting written in **bold**.
- An asterisk (*) after the mode number means that this mode's value is stored in the NVRAM. If you do a RAM reset, all these SP modes will be returned to their factory settings.
- **DFU** stands for **D**esign/**F**actory **U**se only. Values marked **DFU** should not be changed.

5.2.1 SERVICE (CONTROLLER SERVICE MODES)

Mode No. (Class 1 and 2)		Function / [Setting]
Bit Switch		
1	Bit Switch 1	(See "Bit switch Settings".) For use in Japan only.
2	Bit Switch 2	
3	Bit Switch 3	
4	Bit Switch 4	
Clear Setting		
1	Clear Setting	Initializes the settings in the "System" menu of the user tools.
Print Summary		
1	Print Summary	Prints the service summary sheet (a summary of all the controller settings).
DispVersion		
1	Disp Version	Displays the version of the controller firmware.
ToneCtlSet		
1	Tone (Factory)	Recalls the gamma settings. Select the factory, previous, or current setting.
2	Tone (Prev.)	
3	Tone (Current)	
ToneCtlSet		
1	*600 x 600 x 2 Photo	Selects the printing mode (resolution) for the printer gamma adjustment. When selecting a print mode, an asterisk (*) is displayed in the front of the mode.
2	600 x 600 x 2 Graph	
3	600 x 600 Text	
4	600 x 600 x 2 Text	
5	600 x 600 Photo	
PrnColorSheet		
1	ToneCtlSheet	Prints the test page to check the color balance before and after the gamma adjustment.
2	ColorChart	

Mode No. (Class 1 and 2)		Function / [Setting]
TonerCtlValue		
1	Black/Cyan/Magenta/Yellow 1	Adjusts the printer gamma for the mode selected with the “Tone Ctl Set” setting. [0 to 255 / 16 / 1/step]
2	Black/Cyan/Magenta/Yellow 2	[0 to 255 / 32 / 1/step]
3	Black/Cyan/Magenta/Yellow 3	[0 to 255 / 48 / 1/step]
4	Black/Cyan/Magenta/Yellow 4	[0 to 255 / 64 / 1/step]
5	Black/Cyan/Magenta/Yellow 5	[0 to 255 / 80 / 1/step]
6	Black/Cyan/Magenta/Yellow 6	[0 to 255 / 96 / 1/step]
7	Black/Cyan/Magenta/Yellow 7	[0 to 255 / 112 / 1/step]
8	Black/Cyan/Magenta/Yellow 8	[0 to 255 / 128 / 1/step]
9	Black/Cyan/Magenta/Yellow 9	[0 to 255 / 144 / 1/step]
10	Black/Cyan/Magenta/Yellow 10	[0 to 255 / 160 / 1/step]
11	Black/Cyan/Magenta/Yellow 11	[0 to 255 / 176 / 1/step]
12	Black/Cyan/Magenta/Yellow 12	[0 to 255 / 192 / 1/step]
13	Black/Cyan/Magenta/Yellow 13	[0 to 255 / 208 / 1/step]
14	Black/Cyan/Magenta/Yellow 14	[0 to 255 / 224 / 1/step]
15	Black/Cyan/Magenta/Yellow 15	[0 to 255 / 240 / 1/step]
ToneCtlSave		
1	ToneCtlSave	Stores the print gamma adjusted with the “Toner Ctl Value” menu item as the current setting. Before the machine stores the new “current setting”, it moves the data currently stored as the “current setting” to the “previous setting” memory storage location.
Toner Limit		
1	TonerLimitPhot	Adjusts the maximum toner amount for image development. [100 to 400 / 260 / 1%/step]
2	TonerLimitText	[100 to 400 / 260 / 1%/step]

Bit Switch Settings

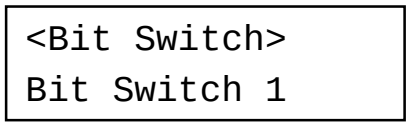
NOTE: These bit switches are all for use in Japan only.

How to Change Bit Switch Settings

1. Select “1. Service”.
   NOTE: “ver V.x.xx.” indicates the machine’s firmware version.

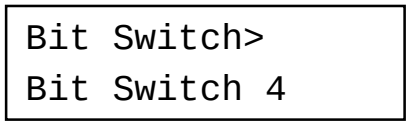
G070S501.WMF

2. Press the enter key 2 times.



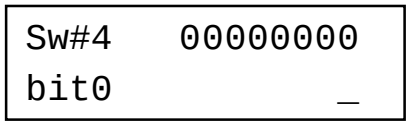
G070S502.WMF

3. Press the up arrow key or down arrow key to display bit switches 1 through 4.



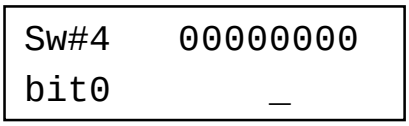
G070S503.WMF

4. Press the enter key.



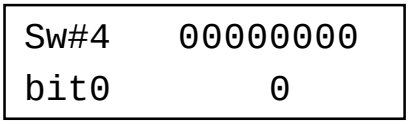
G070S504.WMF

5. Press the up arrow key or down arrow key to select a column.



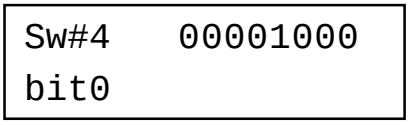
G070S505.WMF

6. Press the enter key. The current value appears in the column.



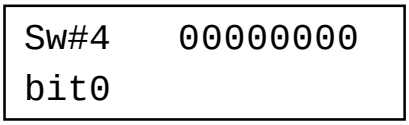
G070S506.WMF

7. Press the up arrow key or down arrow key to change the value.



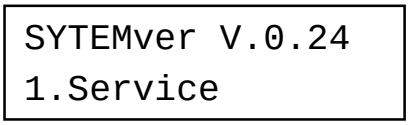
G070S507.WMF

8. Press the enter key. The changed value is stored.



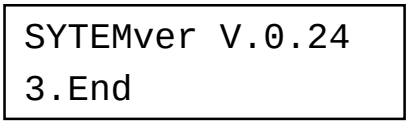
G070S508.WMF

9. Press the escape key 3 times.



G070S509.WMF

10. Select “3. End”.



G070S510.WMF

Bit Switch 1

Bit	Function	Default
0	Key protect [0: Not activated, 1: Activated] **DFU**	0
1	(Not used.) **DFU**	0
2	(Not used.) **DFU**	0
3	(Not used.) **DFU**	0
4	(Not used.) **DFU**	0
5	(Not used.) **DFU**	0
6	(Not used.) **DFU**	0
7	Emulation print area (RPCS only). [0: Not printed, 1: Printed]**DFU**	0

Bit Switch 2

Bit	Function	Default
1	Overlap job mode (njob) [0: Not activated, 1: Activated] **DFU**	0

Bit Switch 3

Not used

Bit Switch 4

Bit	Function	Default
0	Background areas of simple graphics (RPDL, R16, R55, R98) [0: Not painted, 1: Painted] **DFU**	0
1	Unknown 2-byte characters (R98) [0: Cleared, 1: Not cleared] **DFU**	0
2	Specifies portrait/landscape reset (R16) [0: Reset by the reset command, 1: Not reset by the reset command] **DFU**	0
3	Changes line thickness adjustment mode [0: Mode 1, 1: Mode 2] **DFU**	0
4	Displays or not displays error messages No. 84 through DF (RPDL, R16, R55, R98, GL/GL2). [0: Displays, 1: Not displays] **DFU**	0
5	Displays or not displays error messages No. E1 and higher (RPDL, R16, R55, R98, GL/GL2). [0: Displays, 1: Not displays] **DFU**	0
6	Changes the tray setting (GL/GL2). [0: LP, 1: MFP] **DFU**	0
7	Changes the default tray. [0: LP (Tray 1), 1: MFP (System default)] **DFU**	0

Gamma Adjustment

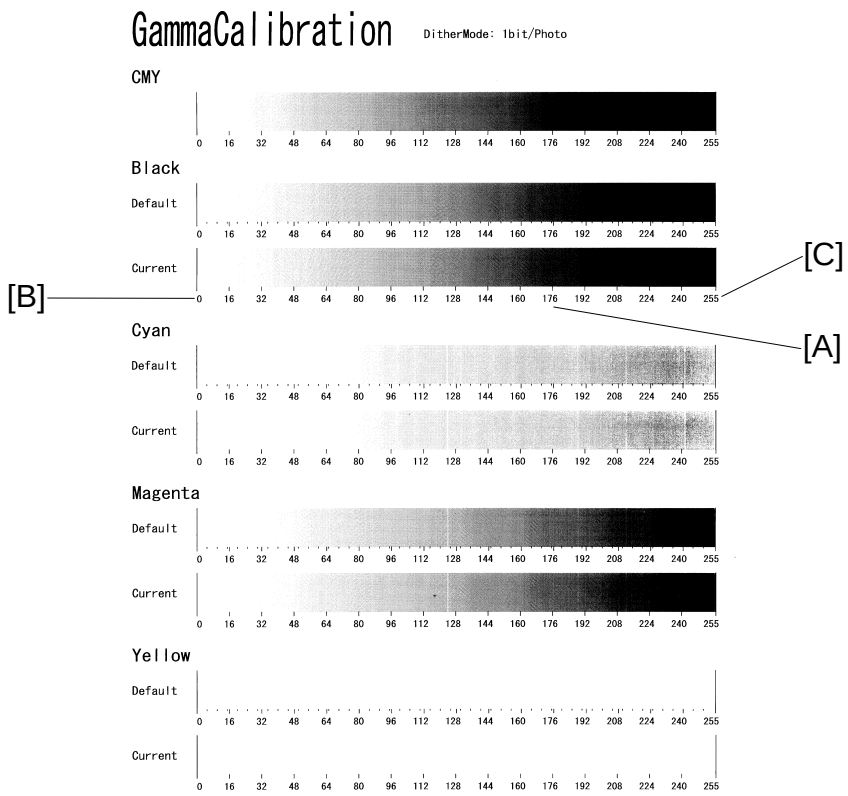
NOTE: To solve color quality problems, clean and/or replace related parts first. If adjustments are required, follow the procedure in this section.

Summary

To adjust the printer gamma:

- Select the print mode that needs calibrating
- Print a color calibration test sheet
- Make the gradation scales on the printout smooth from the lowest to the highest density. Adjust the CMY gradation scale at the top of the chart by balancing the density of the C, M, and Y gradation scales – the CMY gray scale should change smoothly from minimum to maximum, and there should be no coloration.

The color adjustment sheet is as follows.



G070S013.PCX

For each color, you can adjust 15 points (example [A]) between 0 (lowest density) [B] and 255 (highest density) [C]. For each point, you can adjust the density within 0 and 255.

The gradation scales marked ‘Default’ are printed according to the default gamma settings in the flash ROM in the controller. The gamma adjustment changes the densities at the adjustable points in the gradation scale. The gradation scale marked “Current” shows the current settings.

During the adjustment procedure, compare the “Current” gradation scale with the ‘Default’. Select the density for each of the 15 adjustable points, excluding points 0 and 255, from the ‘Default’ gradation scale.

The NVRAM holds three sets of controller gamma settings:

- Those saved this time: ToneCtlSet - Tone (Current)
- Those saved in the previous adjustment: ToneCtlSet - Tone (Prev)
- The factory settings: ToneCtlSet - Tone (Factory).

Adjustment Procedure

1. Enter the controller service mode.
2. Use the down arrow key to select “ToneCtlSet” (the second of the two) and press the Enter key.
3. Use the up/down key to select the mode that requires calibrating, then press the Escape key until you get back to the controller service mode menu.
4. Use the down arrow key to select “PrnColorSheet” and press the Enter key.
5. Use the up/down key to select “ToneCtlSheet” (normally this is displayed by default) and press the Enter key.
6. When “Execute?” is displayed, press the Enter key to print out the “color calibration test sheet”.
7. When “Execute OK” is displayed, press the Escape key 2 times to exit from the menu. (You return to “PrnColorSheet” in the controller service menu.)
8. Use the down arrow key to select “ToneCtlValue” and press the enter key.

9. Use the up/down arrow key to select the setting you are adjusting, then press the enter key. The three digits in the display (example '016') indicate a position on the color calibration test sheet.

Operation Panel Display	Color Calibration Test Sheet
Set Black 1	Default Value 16
Set Black 2	Default Value 32
Set Black 3	Default Value 48
: :	: :
Set Black 13	Default Value 208
Set Black 14	Default Value 224
Set Black 15	Default Value 240
Set Cyan 1 ~ 15	See Set Black 1 ~ 15
Set Magenta 1 ~ 15	See Set Black 1 ~ 15
Set Yellow 1 ~ 15	See Set Black 1 ~ 15

Adjust the color density at each of the 15 points for each of the four colors.

NOTE: 1) To decide what density value to input, do the following.
2) Look at the color adjustment sheet.
3) For the color you are adjusting, look at the gradation scale entitled 'Default'.
4) Go along the scale until you reach the density that you wish to input.
5) Read off the value on the scale and store it in the machine.
   a) Use the up/down key to move the cursor along the three-digit display, then press the Enter key.
   b) Use the up/down key to change the digit at the cursor, then press the Enter key.
   c) Press the Escape key to exit from the menu.
6) Do the same for all 15 points.

10. When the density setting is complete for all colors, print out a color adjustment sheet again and make sure that the gradation scale for each printed color is smooth and that the CMY gradation scale is gray. Repeat the adjustment if there is an anomaly (normally, repeat this procedure 3 to 5 times).

11. When the adjustment results are satisfactory, do the following:
    1) Use "ToneCtlSave" in the controller service menu, to store the new settings in the controller.
    2) Reset the controller (press the **[Reset]** key when the machine is off line") to use the new settings.

NOTE: The new settings will not be saved in the controller NVRAM unless you reset the controller.

5.2.2 ENGINE SERVICE MODES

The SP numbers do not appear on the screen, but they may appear on reports.

SP1-XXX: (Feed)

1	Mode No. (Class 1, 2, and 3)		Function / [Setting]
001*	Lead_Edge_Reg.		
	1	Tray: Plain	Adjusts the leading edge registration by changing the registration clutch operation timing for each mode. [–4.0 ~ 4.0 / **0.0** / 0.1 mm/step] • *The user mode cannot adjust the settings for thick paper or OHP sheets.*
	2	Tray: Thick	
	3	Tray: OHP	
	4	Bank1	
	5	Bank2	
	6	By-pass: Plain	
	7	By-pass: Thick	
	8	By-pass: OHP	
	9	Duplex	
002*	S-to-S_Reg.		
	1	By-pass	Adjusts the side-to-side registration by changing the laser main scan start position for each mode. [–4.0 ~ 4.0 / **0.0** / 0.1 mm/step]
	2	Tray1	
	3	Bank1	
	4	Bank2	
	5	Duplex	
003*	Paper_Buckle		
	1	Tray: Plain	Adjusts the amount of paper buckle at the registration roller by changing the paper feed timing. [–9 ~ 9 / **0** / 1 mm/step]
	2	Tray: Thick	[–9 ~ 9 / **–2** / 1 mm/step]
	3	Tray: OHP	[–9 ~ 9 / **–2** / 1 mm/step]
		Tray: SmallSize	
	6	By-pass: Plain	[–9 ~ 9 / **0** / 1 mm/step]
	7	By-pass: Thick	[–9 ~ 9 / **–2** / 1 mm/step]
	8	By-pass: OHP	[–9 ~ 9 / **–2** / 1 mm/step]
	9	Duplex	[–9 ~ 9 / **0** / 1 mm/step]
105*	Fusing_Temp.		
	1	H: Pre	Sets the temperature at which the heating roller starts idling. [100 ~ 180 / **145** / 1°C/step]
	2	H: _Ready	Sets the temperature at which the heating roller enters the print ready condition. [100 ~ 180 / **165** / 1°C/step]
	3	H: _Standby	Sets the heating roller temperature for the ready (standby) condition. After the main switch has been turned on, the machine enters this condition when the heating roller temperature reaches the temperature specified in this SP mode. When the machine is recovering from energy saver or auto off mode, the machine becomes ready when both heat and pressure roller temperatures reach the specified temperature. Pressure roller: SP1-105-16 [100 ~ 180 / **175** / 1°C/step]

1	Mode No. (Class 1, 2, and 3)		Function / [Setting]
105*	4	H: Plain/1C	Sets the heating roller temperature for plain paper in single-color mode. [120 ~ 190 / **160** / 1°C/step]
	5	H: Plain/FC	Sets the heating roller temperature for plain paper in full-color mode. [120 ~ 190 / **170** / 1°C/step]
	6	H: M-Thick/1C	Sets the heating roller temperature for medium thickness paper in single-color mode. [120 ~ 190 / **170** / 1°C/step]
	7	H: M-Thick/FC	Sets the heating roller temperature for medium thickness paper in full-color mode. [120 ~ 190 / **180** / 1°C/step]
	8	H: Thick/1C	Sets the heating roller temperature for thick paper in single-color mode. [120 ~ 190 / **165** / 1°C/step]
	9	H: Thick/FC	Sets the heating roller temperature for thick paper in full-color mode. [120 ~ 190 / **175** / 1°C/step]
	10	H:OHP/1C	Sets the heating roller temperature for OHP sheets in single-color mode. [120 ~ 190 / **170** / 1°C/step]
	11	H: OHP/FC	Sets the heating roller temperature for the OHP sheets in full-color mode. [120 ~ 190 / **180** / 1°C/step]
	12	H: Duplex/1C	Sets the heating roller temperature for duplex printing (both sides) in single-color mode. [120 ~ 190 / **155** / 1°C/step]
	13	H: Duplex/FC	Sets the heating roller temperature for duplex printing (both sides) in full-color mode. [120 ~ 190 / **165** / 1°C/step]
	14	P: Pre	Sets the temperature at which the pressure roller starts idling. [30 ~ 100 / **30** / 1°C/step]
	15	P: _Ready	Sets the temperature at which the pressure roller becomes ready for printing. [60 ~ 150 / **80** / 1°C/step]
	16	P: _Standby	Sets the pressure roller temperature for the ready (standby) condition. After the main switch has been turned on, the machine enters this condition when the pressure roller temperature reaches the temperature specified in this SP mode. When the machine is recovering from energy saver or auto off mode, the machine becomes ready when both heat and pressure roller temperatures reach the specified temperature. Heating roller: SP1-105-3 [60 ~ 150 / **130** / 1°C/step]
	17	P: Plain/1C	Sets the pressure roller temperature for plain paper. [30 ~ 200 / **80** / 1°C/step] **DFU**
	18	P: Plain/FC	
	19	P: M-Thick/1C	Sets the pressure roller temperature for middle thick paper. [30 ~ 200 / **80** / 1°C/step] **DFU**
	20	P: M-Thick/FC	

1	Mode No. (Class 1, 2, and 3)		Function / [Setting]
105*	21	P: Thick/1C	Sets the pressure roller temperature for medium thickness paper. [30 ~ 200 / **80** / 1°C/step] **DFU**
	22	P: Thick/FC	
	23	P: OHP/1C	Sets the pressure roller temperature for OHP sheets. [30 ~ 200 / **80** / 1°C/step] **DFU**
	24	P: OHP/FC	
	25	P: Duplex/1C	Sets the pressure roller temperature for duplex printing (both sides). [30 ~ 200 / **80** / 1°C/step] **DFU**
	26	P: Duplex/FC	
	27	H: OFFSET+	Sets the heating roller temperature correction for when room temperature is 15°C or lower. [0 ~ 20 / **5** / 1°C/step]
	28	P: OFFSET+	Sets the pressure roller temperature correction for when room temperature is 15°C or lower. [0 ~ 20 / **0** / 1°C/step]
	29	H: OFFSET–	Sets the heating roller temperature correction for when room temperature is 30°C or higher. [0 ~ 20 / **5** / 1°C/step]
	30	P: OFFSET–	Sets the pressure roller temperature correction for when room temperature is 30°C or higher. [0 ~ 20 / **0** / 1°C/step]
106	Temp._Display		
	1	H_Roller	Displays the current temperature of the heating or pressure roller. [0 ~ 255 / **0** / 1/step]
	2	P_Roller	
109	Fusing_Nip		
	1	ExecuteMode	Checks the fusing nip width using an OHP sheet. [0 ~ 1 / **0** / 1/step] • *The OHP sheet stops in the fusing unit for the specified time (☛ SP1-109-2).* • *The nip width should be 9 ± 0.5 mm at front and rear. If this requirement is not met, change the fusing unit.*
	2	Stop_Duration	Adjusts the stoppage time for the OHP sheet in the fusing unit (☛ SP1-109-1). [0 ~ 100 / **10** / 1 s/step]
902*	PaperSize		
	1	B4/LG	Specifies how the machine interprets the paper size sensor output for the main unit tray. [0 ~ 1 / **0** / 1/step] • ***For Europe:*** *0: B4 SEF, 1: LG SEF* • ***For N. America:*** *0: LG SEF, 1: B4 SEF*
	2	A3/DLT	Specifies how the machine interprets the paper size sensor output for the main unit tray. [0 ~ 1 / **0** / 1 /step] • ***For Europe:*** *0: A3 SEF, 1: DLT SEF* • ***For N. America:*** *0: DLT SEF, 1: A3 SEF*

1	Mode No. (Class 1, 2, and 3)		Function / [Setting]
902*	3	A4/LT	Specifies how the machine interprets the paper size sensor output for the main unit tray. [0 ~ 1 / **0** / 1/step] • ***For Europe:*** *0: A4 SEF, 1: LT SEF* • ***For N. America:*** *0: LT SEF, 1: A4 SEF*
	4	B5/Executive	Specifies how the machine interprets the paper size sensor output for the main unit tray. [0 ~ 1 / **0** / 1/step] • ***For Europe:*** *0: B5 SEF, 1: Executive (10.5" x 7.25") SEF* • ***For N. America:*** *0: B5 SEF, 1: Executive (10.5" x 7.25") SEF*
910	EmptyRev		
			Specifies the settings for when fusing idling is done after printing on A4/LT LEF or smaller paper sizes. [0 ~ 2 / **0** / 1/step] • *After printing on small-width paper (A4 LEF/LT LEF or smaller), fusing idling evens the oil thickness on the roller surface.* • *0 (Int): Enables printing during fusing idling.* • *1 (NoRev): Disables this type of fusing idling.* • *2 (NoInt): Disables printing during fusing idling.*

SP2-XXX: (Drum)

2	Mode No. (Class 1, 2, and 3)		Function / [Setting]
001*	Charge_Bias		
	1	[M]	Adjusts the charge corona unit grid voltage. [300 ~ 800 / **500** / 1 Volt/step] Only effective is SP3-003 is set to 0.
	2	[C]	
	3	[Y]	
	4	[K]	
	5	NoImageArea	
	6	ChargerCurrent	Adjusts the charge corona unit current. [400 ~ 800 / **500** / 1 μA/step]
100*	Mag._Adjust		
	1	MainDirection	Adjusts the magnification in the main scan direction. [–128 ~ 127 / **0** / 0.1%/step]
101*	Mag._Adjust		
	1	SubDirection	Adjusts the magnification in the sub scan direction. [–128 ~ 127 / **2** / 0.1%/step]
201*	DevelopBiasAdj		
	1	[M]	Adjusts the development bias. [0 ~ 500 / **220** / 1 Volt/step] Only effective is SP3-003 is set to 0.
	2	[C]	
	3	[Y]	
	4	[K]	
208	Forced_Toner		
	1	[K]	Forces toner to be supplied to the development unit. [0 ~ 1 / **0** / 1/step]
	2	[C]	
	3	[M]	
	4	[Y]	
	5	AllColor	
303*	TransBeltEnv		
	1	1	Adjusts the environmental threshold for the transfer belt. [0 ~ 100.0 / **7.0** / 0.1 g/m^3/step] **DFU**
	2	2	[0 ~ 100.0 / **19.0** / 0.1 g/m^3/step] **DFU**
305*	TransBeltStart		
	1	BiasOnOff	Sets the bias for the image transfer start to on or off. [0 ~ 1 / 1 / 1/step] **DFU** • *0: Bias off* • *1: Bias on*
310*	PaperTrans_LL1 (Paper Transfer LL1) The display indicates: Paper Weight/Side 1 or 2/Paper Width (mm)		
	1	Nrml/1st/-297	Sets the paper transfer current when absolute humidity AH (g/m^3) is in the following range: $0 < AH \leq 3.5$ (this is the 'LL1' humidity range) Adjust only if there are problems with insufficient transfer in the image area of the copy for a particular paper type or mode, or in response to field problems as directed by technical support staff. [0 ~ 70.0 / **28.0** / 0.2 μA/step]
	2	Nrml/1st/257-296	[0 ~ 70.0 / **28.0** / 0.2 μA/step]
	3	Nrml/1st/210-256	[0 ~ 70.0 / **28.0** / 0.2 μA/step]
	4	Nrml/1st/129-209	[0 ~ 70.0 / **28.0** / 0.2 μA/step]
	5	Nrml/1st/-128	[0 ~ 70.0 / **28.0** / 0.2 μA/step]

2	Mode No. (Class 1, 2, and 3)		Function / [Setting]
310*	6	Mid/1st/-297	[0 ~ 70.0 / **29.0** / 0.2 μA/step]
	7	Mid/1st/257-296	[0 ~ 70.0 / **29.0** / 0.2 μA/step]
	8	Mid/1st/210-256	[0 ~ 70.0 / **29.0** / 0.2 μA/step]
	9	Mid/1st/129-209	[0 ~ 70.0 / **29.0** / 0.2 μA/step]
	10	Mid/1st/-128	[0 ~ 70.0 / **29.0** / 0.2 μA/step]
	11	Thk/1st/-297	[0 ~ 70.0 / **12.0** / 0.2 μA/step]
	12	Thk/1st/257-296	[0 ~ 70.0 / **12.0** / 0.2 μA/step]
	13	Thk/1st/210-256	[0 ~ 70.0 / **12.0** / 0.2 μA/step]
	14	Thk/1st/129-209	[0 ~ 70.0 / **14.0** / 0.2 μA/step]
	15	Thk/1st/-128	[0 ~ 70.0 / **16.0** / 0.2 μA/step]
	16	Nrml/2nd/-297	[0 ~ 70.0 / **32.0** / 0.2 μA/step]
	17	Nrml/2nd/257-296	[0 ~ 70.0 / **32.0** / 0.2 μA/step]
	18	Nrml/2nd/210-256	[0 ~ 70.0 / **32.0** / 0.2 μA/step]
	19	Nrml/2nd/129-209	[0 ~ 70.0 / **30.0** / 0.2 μA/step]
	20	Nrml/2nd/-128	[0 ~ 70.0 / **28.0** / 0.2 μA/step]
	21	Mid/2nd/-297	[0 ~ 70.0 / **37.0** / 0.2 μA/step]
	22	Mid/2nd/257-296	[0 ~ 70.0 / **35.0** / 0.2 μA/step]
	23	Mid/2nd/210-256	[0 ~ 70.0 / **31.0** / 0.2 μA/step]
	24	Mid/2nd/129-209	[0 ~ 70.0 / **31.0** / 0.2 μA/step]
	25	Mid/2nd/-128	[0 ~ 70.0 / **29.0** / 0.2 μA/step]
	26	Thk/2nd/-297	[0 ~ 70.0 / **10.0** / 0.2 μA/step]
	27	Thk/2nd/257-296	[0 ~ 70.0 / **12.0** / 0.2 μA/step]
	28	Thk/2nd/210-256	[0 ~ 70.0 / **14.0** / 0.2 μA/step]
	29	Thk/2nd/129-209	[0 ~ 70.0 / **16.0** / 0.2 μA/step]
	30	Thk/2nd/-128	[0 ~ 70.0 / **18.0** / 0.2 μA/step]
	31	OHP/297	[0 ~ 70.0 / **12.0** / 0.2 μA/step]
	32	OHP/210	[0 ~ 70.0 / **18.0** / 0.2 μA/step]
311*	PaperTrans_LL2 (Paper Transfer LL2) The display indicates: Paper Weight/Side 1 or 2/Paper Width (mm)		
	1	Nrml/1st/-297	Sets the paper transfer current when absolute humidity AH (g/m^3) is in the following range: $3.5 < AH \leq 8.0$ (this is the 'LL2' humidity range) See SP2-310 for comments. [0 ~ 70.0 / **26.0** / 0.2 μA/step]
	2	Nrml/1st/257-296	[0 ~ 70.0 / **27.0** / 0.2 μA/step]
	3	Nrml/1st/210-256	[0 ~ 70.0 / **28.0** / 0.2 μA/step]
	4	Nrml/1st/129-209	[0 ~ 70.0 / **28.0** / 0.2 μA/step]
	5	Nrml/1st/-128	[0 ~ 70.0 / **29.0** / 0.2 μA/step]
	6	Mid/1st/-297	[0 ~ 70.0 / **27.0** / 0.2 μA/step]
	7	Mid/1st/257-296	[0 ~ 70.0 / **28.0** / 0.2 μA/step]
	8	Mid/1st/210-256	[0 ~ 70.0 / **29.0** / 0.2 μA/step]
	9	Mid/1st/129-209	[0 ~ 70.0 / **29.0** / 0.2 μA/step]
	10	Mid/1st/-128	[0 ~ 70.0 / **30.0** / 0.2 μA/step]
	11	Thk/1st/-297	[0 ~ 70.0 / **12.0** / 0.2 μA/step]
	12	Thk/1st/257-296	[0 ~ 70.0 / **12.0** / 0.2 μA/step]
	13	Thk/1st/210-256	[0 ~ 70.0 / **12.0** / 0.2 μA/step]
	14	Thk/1st/129-209	[0 ~ 70.0 / **13.0** / 0.2 μA/step]

2	Mode No. (Class 1, 2, and 3)		Function / [Setting]
311*	15	Thk/1st/-128	[0 ~ 70.0 / **14.0** / 0.2 μA/step]
	16	Nrml/2nd/-297	[0 ~ 70.0 / **32.0** / 0.2 μA/step]
	17	Nrml/2nd/257-296	[0 ~ 70.0 / **31.0** / 0.2 μA/step]
	18	Nrml/2nd/210-256	[0 ~ 70.0 / **31.0** / 0.2 μA/step]
	19	Nrml/2nd/129-209	[0 ~ 70.0 / **32.0** / 0.2 μA/step]
	20	Nrml/2nd/-128	[0 ~ 70.0 / **32.0** / 0.2 μA/step]
	21	Mid/2nd/-297	[0 ~ 70.0 / **33.0** / 0.2 μA/step]
	22	Mid/2nd/257-296	[0 ~ 70.0 / **32.0** / 0.2 μA/step]
	23	Mid/2nd/210-256	[0 ~ 70.0 / **32.0** / 0.2 μA/step]
	24	Mid/2nd/129-209	[0 ~ 70.0 / **33.0** / 0.2 μA/step]
	25	Mid/2nd/-128	[0 ~ 70.0 / **34.0** / 0.2 μA/step]
	26	Thk/2nd/-297	[0 ~ 70.0 / **11.0** / 0.2 μA/step]
	27	Thk/2nd/257-296	[0 ~ 70.0 / **12.0** / 0.2 μA/step]
	28	Thk/2nd/210-256	[0 ~ 70.0 / **14.0** / 0.2 μA/step]
	29	Thk/2nd/129-209	[0 ~ 70.0 / **16.0** / 0.2 μA/step]
	30	Thk/2nd/-128	[0 ~ 70.0 / **18.0** / 0.2 μA/step]
	31	OHP/297	[0 ~ 70.0 / **13.0** / 0.2 μA/step]
	32	OHP/210	[0 ~ 70.0 / **19.0** / 0.2 μA/step]
312*	PaperTrans_NN1 (Paper Transfer NN1) The display indicates: Paper Weight/Side 1 or 2/Paper Width (mm)		
	1	Nrml/1st/-297	Sets the paper transfer current when absolute humidity AH (g/m^3) is in the following range: $80 < AH \leq 14$ (this is the 'NN1' humidity range) See SP2-310 for comments. [0 ~ 70.0 / **24.0** / 0.2 μA/step]
	2	Nrml/1st/257-296	[0 ~ 70.0 / **28.0** / 0.2 μA/step]
	3	Nrml/1st/210-256	[0 ~ 70.0 / **30.0** / 0.2 μA/step]
	4	Nrml/1st/129-209	[0 ~ 70.0 / **32.0** / 0.2 μA/step]
	5	Nrml/1st/-128	[0 ~ 70.0 / **32.0** / 0.2 μA/step]
	6	Mid/1st/-297	[0 ~ 70.0 / **25.0** / 0.2 μA/step]
	7	Mid/1st/257-296	[0 ~ 70.0 / **27.0** / 0.2 μA/step]
	8	Mid/1st/210-256	[0 ~ 70.0 / **31.0** / 0.2 μA/step]
	9	Mid/1st/129-209	[0 ~ 70.0 / **33.0** / 0.2 μA/step]
	10	Mid/1st/-128	[0 ~ 70.0 / **33.0** / 0.2 μA/step]
	11	Thk/1st/-297	[0 ~ 70.0 / **12.0** / 0.2 μA/step]
	12	Thk/1st/257-296	[0 ~ 70.0 / **12.0** / 0.2 μA/step]
	13	Thk/1st/210-256	[0 ~ 70.0 / **12.0** / 0.2 μA/step]
	14	Thk/1st/129-209	[0 ~ 70.0 / **11.0** / 0.2 μA/step]
	15	Thk/1st/-128	[0 ~ 70.0 / **10.0** / 0.2 μA/step]
	16	Nrml/2nd/-297	[0 ~ 70.0 / **32.0** / 0.2 μA/step]
	17	Nrml/2nd/257-296	[0 ~ 70.0 / **31.0** / 0.2 μA/step]
	18	Nrml/2nd/210-256	[0 ~ 70.0 / **30.0** / 0.2 μA/step]
	19	Nrml/2nd/129-209	[0 ~ 70.0 / **33.0** / 0.2 μA/step]
	20	Nrml/2nd/-128	[0 ~ 70.0 / **35.0** / 0.2 μA/step]
	21	Mid/2nd/-297	[0 ~ 70.0 / **33.0** / 0.2 μA/step]
	22	Mid/2nd/257-296	[0 ~ 70.0 / **32.0** / 0.2 μA/step]
	23	Mid/2nd/210-256	[0 ~ 70.0 / **31.0** / 0.2 μA/step]

2	Mode No. (Class 1, 2, and 3)		Function / [Setting]
312*	24	Mid/2nd/129-209	[0 ~ 70.0 / **34.0** / 0.2 μA/step]
	25	Mid/2nd/-128	[0 ~ 70.0 / **36.0** / 0.2 μA/step]
	26	Thk/2nd/-297	[0 ~ 70.0 / **11.0** / 0.2 μA/step]
	27	Thk/2nd/257-296	[0 ~ 70.0 / **11.0** / 0.2 μA/step]
	28	Thk/2nd/210-256	[0 ~ 70.0 / **13.0** / 0.2 μA/step]
	29	Thk/2nd/129-209	[0 ~ 70.0 / **14.0** / 0.2 μA/step]
	30	Thk/2nd/-128	[0 ~ 70.0 / **17.0** / 0.2 μA/step]
	31	OHP/297	[0 ~ 70.0 / **14.0** / 0.2 μA/step]
	32	OHP/210	[0 ~ 70.0 / **20.0** / 0.2 μA/step]
313*	PaperTrans_NN2 (Paper Transfer NN2) The display indicates: Paper Weight/Side 1 or 2/Paper Width (mm)		
	1	Nrml/1st/-297	Sets the paper transfer current when absolute humidity AH (g/m^3) is in the following range: $14 < AH \leq 19$ (this is the 'NN2' humidity range) See SP2-310 for comments. [0 ~ 70.0 / **24.0** / 0.2 μA/step]
	2	Nrml/1st/257-296	[0 ~ 70.0 / **25.0** / 0.2 μA/step]
	3	Nrml/1st/210-256	[0 ~ 70.0 / **27.0** / 0.2 μA/step]
	4	Nrml/1st/129-209	[0 ~ 70.0 / **28.0** / 0.2 μA/step]
	5	Nrml/1st/-128	[0 ~ 70.0 / **30.0** / 0.2 μA/step]
	6	Mid/1st/-297	[0 ~ 70.0 / **25.0** / 0.2 μA/step]
	7	Mid/1st/257-296	[0 ~ 70.0 / **26.0** / 0.2 μA/step]
	8	Mid/1st/210-256	[0 ~ 70.0 / **28.0** / 0.2 μA/step]
	9	Mid/1st/129-209	[0 ~ 70.0 / **29.0** / 0.2 μA/step]
	10	Mid/1st/-128	[0 ~ 70.0 / **31.0** / 0.2 μA/step]
	11	Thk/1st/-297	[0 ~ 70.0 / **10.0** / 0.2 μA/step]
	12	Thk/1st/257-296	[0 ~ 70.0 / **11.0** / 0.2 μA/step]
	13	Thk/1st/210-256	[0 ~ 70.0 / **12.0** / 0.2 μA/step]
	14	Thk/1st/129-209	[0 ~ 70.0 / **11.0** / 0.2 μA/step]
	15	Thk/1st/-128	[0 ~ 70.0 / **10.0** / 0.2 μA/step]
	16	Nrml/2nd/-297	[0 ~ 70.0 / **32.0** / 0.2 μA/step]
	17	Nrml/2nd/257-296	[0 ~ 70.0 / **32.0** / 0.2 μA/step]
	18	Nrml/2nd/210-256	[0 ~ 70.0 / **32.0** / 0.2 μA/step]
	19	Nrml/2nd/129-209	[0 ~ 70.0 / **35.0** / 0.2 μA/step]
	20	Nrml/2nd/-128	[0 ~ 70.0 / **38.0** / 0.2 μA/step]
	21	Mid/2nd/-297	[0 ~ 70.0 / **33.0** / 0.2 μA/step]
	22	Mid/2nd/257-296	[0 ~ 70.0 / **33.0** / 0.2 μA/step]
	23	Mid/2nd/210-256	[0 ~ 70.0 / **33.0** / 0.2 μA/step]
	24	Mid/2nd/129-209	[0 ~ 70.0 / **36.0** / 0.2 μA/step]
	25	Mid/2nd/-128	[0 ~ 70.0 / **39.0** / 0.2 μA/step]
	26	Thk/2nd/-297	[0 ~ 70.0 / **11.0** / 0.2 μA/step]
	27	Thk/2nd/257-296	[0 ~ 70.0 / **11.0** / 0.2 μA/step]
	28	Thk/2nd/210-256	[0 ~ 70.0 / **14.0** / 0.2 μA/step]
	29	Thk/2nd/129-209	[0 ~ 70.0 / **16.0** / 0.2 μA/step]
	30	Thk/2nd/-128	[0 ~ 70.0 / **16.0** / 0.2 μA/step]
	31	OHP/297	[0 ~ 70.0 / **10.0** / 0.2 μA/step]
	32	OHP/210	[0 ~ 70.0 / **14.0** / 0.2 μA/step]

2	Mode No. (Class 1, 2, and 3)		Function / [Setting]
314*	PaperTrans_HH (Paper Transfer HH). The display indicates: Paper Weight/Side 1 or 2/Paper Width (mm)		
	1	Nrml/1st/-297	Sets the paper transfer current when absolute humidity AH (g/m^3) is in the following range: 19 < AH (this is the 'HH' humidity range) See SP2-310 for comments. [0 ~ 70.0 / **24.0** / 0.2 μA/step]
	2	Nrml/1st/257-296	[0 ~ 70.0 / **24.0** / 0.2 μA/step]
	3	Nrml/1st/210-256	[0 ~ 70.0 / **26.0** / 0.2 μA/step]
	4	Nrml/1st/129-209	[0 ~ 70.0 / **27.0** / 0.2 μA/step]
	5	Nrml/1st/-128	[0 ~ 70.0 / **28.0** / 0.2 μA/step]
	6	Mid/1st/-297	[0 ~ 70.0 / **25.0** / 0.2 μA/step]
	7	Mid/1st/257-296	[0 ~ 70.0 / **25.0** / 0.2 μA/step]
	8	Mid/1st/210-256	[0 ~ 70.0 / **27.0** / 0.2 μA/step]
	9	Mid/1st/129-209	[0 ~ 70.0 / **28.0** / 0.2 μA/step]
	10	Mid/1st/-128	[0 ~ 70.0 / **29.0** / 0.2 μA/step]
	11	Thk/1st/-297	[0 ~ 70.0 / **8.0** / 0.2 μA/step]
	12	Thk/1st/257-296	[0 ~ 70.0 / **10.0** / 0.2 μA/step]
	13	Thk/1st/210-256	[0 ~ 70.0 / **12.0** / 0.2 μA/step]
	14	Thk/1st/129-209	[0 ~ 70.0 / **10.0** / 0.2 μA/step]
	15	Thk/1st/-128	[0 ~ 70.0 / **10.0** / 0.2 μA/step]
	16	Nrml/2nd/-297	[0 ~ 70.0 / **32.0** / 0.2 μA/step]
	17	Nrml/2nd/257-296	[0 ~ 70.0 / **33.0** / 0.2 μA/step]
	18	Nrml/2nd/210-256	[0 ~ 70.0 / **33.0** / 0.2 μA/step]
	19	Nrml/2nd/129-209	[0 ~ 70.0 / **36.0** / 0.2 μA/step]
	20	Nrml/2nd/-128	[0 ~ 70.0 / **38.0** / 0.2 μA/step]
	21	Mid/2nd/-297	[0 ~ 70.0 / **33.0** / 0.2 μA/step]
	22	Mid/2nd/257-296	[0 ~ 70.0 / **34.0** / 0.2 μA/step]
	23	Mid/2nd/210-256	[0 ~ 70.0 / **34.0** / 0.2 μA/step]
	24	Mid/2nd/129-209	[0 ~ 70.0 / **37.0** / 0.2 μA/step]
	25	Mid/2nd/-128	[0 ~ 70.0 / **39.0** / 0.2 μA/step]
	26	Thk/2nd/-297	[0 ~ 70.0 / **13.0** / 0.2 μA/step]
	27	Thk/2nd/257-296	[0 ~ 70.0 / **14.0** / 0.2 μA/step]
	28	Thk/2nd/210-256	[0 ~ 70.0 / **15.0** / 0.2 μA/step]
	29	Thk/2nd/129-209	[0 ~ 70.0 / **17.0** / 0.2 μA/step]
	30	Thk/2nd/-128	[0 ~ 70.0 / **17.0** / 0.2 μA/step]
	31	OHP/297	[0 ~ 70.0 / **5.0** / 0.2 μA/step]
	32	OHP/210	[0 ~ 70.0 / **8.0** / 0.2 μA/step]
320*	PaperTrans_Col (Paper Transfer Correction) The display indicates: Paper Type/Side 1 or 2/Printing mode		
	1	Nrml/1st/1C	Corrects the electric current for paper transfer. **DFU** [0 ~ 100 / **60** / 1%/step]
	2	Nrml/1st/2C	[0 ~ 100 / **90** / 1%/step]
	3	Nrml/1st/3C	[0 ~ 100 / **100** / 1%/step]
	4	Nrml/2nd/1C	[0 ~ 100 / **60** / 1%/step]
	5	Nrml/2nd/2C	[0 ~ 100 / **90** / 1%/step]
	6	Nrml/2nd/3C	[0 ~ 100 / **100** / 1%/step]
	7	Thick/1st/1C	[0 ~ 100 / **70** / 1%/step]

2	Mode No. (Class 1, 2, and 3)		Function / [Setting]
320*	8	Thick/1st/2C	[0 ~ 100 / **90** / 1%/step]
	9	Thick/1st/3C	[0 ~ 100 / **100** / 1%/step]
	10	Thick/2nd/1C	[0 ~ 100 / **70** / 1%/step]
	11	Thick/2nd/2C	[0 ~ 100 / **90** / 1%/step]
	12	Thick/2nd/3C	[0 ~ 100 / **100** / 1%/step]
	13	OHP/1C	[0 ~ 100 / **70** / 1%/step]
	14	OHP/2C	[0 ~ 100 / **90** / 1%/step]
	15	OHP/3C	[0 ~ 100 / **100** / 1%/step]
400*	ClnBiasLL1		
	1	1C	Adjusts the transfer belt cleaning bias voltage when absolute humidity AH (g/m^3) is in the following range: $0 < AH \leq 3.5$ (this is the 'LL1' humidity range) **DFU** [0 ~ 2000 / **1300** / 10 Volt/step]
	2	2C-4C	[0 ~ 2000 / **1300** / 10 Volt/step]
	3	HalfSpeed/1C	[0 ~ 2000 / **1300** / 10 Volt/step]
	4	HalfSpeed/2C-4C	[0 ~ 2000 / **1300** / 10 Volt/step]
	5	Ppattern	[0 ~ 2000 / **1400** / 10 Volt/step]
	6	NoImageArea	[0 ~ 2000 / **1300** / 10 Volt/step]
	7	JamRecovery	[0 ~ 2000 / **1400** / 10 Volt/step]
401*	ClnBiasLL2		
	1	1C	Adjusts the transfer belt cleaning bias voltage when absolute humidity AH (g/m^3) is in the following range: $3.5 < AH \leq 8.0$ (this is the 'LL2' humidity range) **DFU** [0 ~ 2000 / **1300** / 10 Volt/step]
	2	2C-4C	[0 ~ 2000 / **1300** / 10 Volt/step]
	3	HalfSpeed/1C	[0 ~ 2000 / **1300** / 10 Volt/step]
	4	HalfSpeed/2C-4C	[0 ~ 2000 / **1300** / 10 Volt/step]
	5	Ppattern	[0 ~ 2000 / **1400** / 10 Volt/step]
	6	NoImageArea	[0 ~ 2000 / **1300** / 10 Volt/step]
	7	JamRecovery	[0 ~ 2000 / **1400** / 10 Volt/step]
402*	ClnBiasNN1		
	1	1C	Adjusts the transfer belt cleaning bias voltage when absolute humidity AH (g/m^3) is in the following range: $8.0 < AH \leq 14$ (this is the 'NN1' humidity range) **DFU** [0 ~ 2000 / **1300** / 10 Volt/step]
	2	2C-4C	[0 ~ 2000 / **1300** / 10 Volt/step]
	3	HalfSpeed/1C	[0 ~ 2000 / **1300** / 10 Volt/step]
	4	HalfSpeed/2C-4C	[0 ~ 2000 / **1300** / 10 Volt/step]
	5	Ppattern	[0 ~ 2000 / **1400** / 10 Volt/step]
	6	NoImageArea	[0 ~ 2000 / **1300** / 10 Volt/step]
	7	JamRecovery	[0 ~ 2000 / **1400** / 10 Volt/step]
403*	ClnBiasNN2		
	1	1C	Adjusts the transfer belt cleaning bias voltage when absolute humidity AH (g/m^3) is in the following range: $14 < AH \leq 19$ (this is the 'NN2' humidity range) **DFU** [0 ~ 2000 / **1300** / 10 Volt/step]
	2	2C-4C	[0 ~ 2000 / **1300** / 10 Volt/step]
	3	HalfSpeed/1C	[0 ~ 2000 / **1300** / 10 Volt/step]
	4	HalfSpeed/2C-4C	[0 ~ 2000 / **1300** / 10 Volt/step]
	5	Ppattern	[0 ~ 2000 / **1400** / 10 Volt/step]

2	Mode No. (Class 1, 2, and 3)		Function / [Setting]
403*	6	NoImageArea	[0 ~ 2000 / **1300** / 10 Volt/step]
	7	JamRecovery	[0 ~ 2000 / **1400** / 10 Volt/step]
404*	ClnBiasHH		
	1	1C	Adjusts the transfer belt cleaning bias voltage when absolute humidity AH (g/m^3) is in the following range: 19 < AH (this is the 'HH' humidity range) **DFU** [0 ~ 2000 / **1300** / 10 Volt/step]
	2	2C-4C	[0 ~ 2000 / **1300** / 10 Volt/step]
	3	HalfSpeed/1C	[0 ~ 2000 / **1300** / 10 Volt/step]
	4	HalfSpeed/2C-4C	[0 ~ 2000 / **1300** / 10 Volt/step]
	5	Ppattern	[0 ~ 2000 / **1400** / 10 Volt/step]
	6	NoImageArea	[0 ~ 2000 / **1300** / 10 Volt/step]
	7	JamRecovery	[0 ~ 2000 / **1400** / 10 Volt/step]
500*	FusingBias (Discharge pin)		
	1	Nrml/1C/1st	Adjusts the discharge pin voltage (paper separation) and fusing bias voltage. **DFU** [4000 ~ 1000 / **3000** / 100 Volt/step] • *Same bias voltage is applied to the fusing unit and the discharge pin.*
	2	Nrml/1C/2nd	[4000 ~ 1000 / **3000** / 100 Volt/step]
	3	Nrml/FC/1st	[4000 ~ 1000 / **2500** / 100 Volt/step]
	4	Nrml/FC/2nd	[4000 ~ 1000 / **2500** / 100 Volt/step]
	5	Thk/1C/1st	[4000 ~ 1000 / **3000** / 100 Volt/step]
	6	Thk/1C/2nd	[4000 ~ 1000 / **3000** / 100 Volt/step]
	7	Thk/FC/1st	[4000 ~ 1000 / **2500** / 100 Volt/step]
	8	Thk/FC/2nd	[4000 ~ 1000 / **2500** / 100 Volt/step]
510*	Fu_Bias_SW		
	1	Fu_Bias_SW	Switches the fusing and discharge pin bias control on or off. [0 ~ 1 / **1** / 1/step] **DFU** • *0: Control off* • *1: Control on*
801*	ChrgClnIntval		
	1	ChrgClnIntval	Sets the charge corona unit cleaning interval. [0 ~ 5000 / **600** / 100 counts/step] Refer to section 6 for details.
802	ChargerCln		
	1	Charger Cln	Executes a forced charge corona unit cleaning. Set to 1 to start cleaning. [0 ~ 1 / **0** / 1/step]
901*	EnvControl		
	1	EnvControl	Switches environment control on or off. [0 ~ 1 / **1** / 1/step] **DFU** • *0: Control off (The paper transfer and cleaning bias environments are set to NN1. The image transfer bias environment is set to MM.)* • *1: Control on*

2	Mode No. (Class 1, 2, and 3)		Function / [Setting]
912	Temp_HumDisp		
	1	Temp	Displays the temperature measured by the temperature sensor inside the machine. [–127 ~ 127 / 0 / 1°C/step]
	2	Humidity_1	Displays the humidity measured by the humidity sensor inside the machine. [0 ~ 255 / **0** / 1%/step]
	3	Humidity_2	Displays the absolute humidity calculated from the temperature/humidity sensor readings. [0 ~ 65535 / **0** / 0.1 g/m^3/step]
	4	EnvLevel	Displays the current humidity level calculated from the absolute humidity. [0 ~ 1 / **0** / 1/step] • *LL1: 0 < AH ≤ 3.5* • *LL2: 3.5 < AH ≤ 8.0* • *NN1: 8.0 < AH ≤ 14* • *NN2: 14 < AH ≤ 19* • *HH: 19 < AH* ** AH = absolute humidity*
917	Test Pattern		
	1	Test Pattern	Prints out the test pattern. [0 ~ 1 / **0** / 1/step] • *1: Print out the test patterns listed in SP5-955.* To print the selected chart, change the setting from 0 to 1, then print out the demo sheet (user tool) or send a print job from a PC.
930*	TrimAdjust		
	1	Front	Adjusts the white margin on printouts. [0 ~ 65535 / **0** / 1/step]
	2	Back	[0 ~ 65535 / **0** / 1/step]
	3	Lead	[0 ~ 65535 / **20** / 1/step]
	4	Trail	[0 ~ 65535 / **20** / /step]
940	OPC_Lub_Mode		
	1	OPC_Lub_Mode	Executes a forced OPC lubrication to reduce the friction on the OPC belt. [0 ~ 1 / **0** / 1/step] DFU • *The OPC belt and the lubricant brush operate for 2 minutes.*
941	OPC_Lub_Time		
	1	OPC_Lub_Time	Determines how long the OPC belt is lubricated for after the end of every job. [0 ~ 30 / **10** / 1 s/step]

2	Mode No. (Class 1, 2, and 3)		Function / [Setting]
942	OPC_Lub_Intrvl		
	1	OPC_Lub_Intrvl	[10 ~ 200 / **50** / 10/step] The machine lubricates the OPC belt and image transfer belt at the interval (number of prints) set with this SP. Incoming print jobs do not interrupt the lubrication.
950	S_Reg._Adj.		
	1	S_Reg._[M2]	Colour registration adjustment: adjusts the start timing of imaging for each color. [–3 ~ 3 / **0** / 2 line/step] • *2 lines = 0.047566 ms (about 85 μm)* • *+: Delays the start timing.* • *–: Advances the start timing.* • *The start timing is adjusted only in plain paper mode, and when one of the following conditions is satisfied:* *1) Between the two images on the transfer belt (when two images are developed on the OPC at the same time (☛ 6.2))* *2) B4 SEF or larger (multi-print job)*
	2	S_Reg._[C2]	[–3 ~ 3 / **–1** / 2 line/step]
	3	S_Reg._[Y2]	[–3 ~ 3 / **0** / 2 line/step]
	4	S_Reg._[K2]	[–3 ~ 3 / **0** / 2 line/step]
	5	S_Reg._[M1]	[–3 ~ 3 / **0** / 2 line/step]
	6	S_Reg._[C1]	[–3 ~ 3 / **0** / 2 line/step]
	7	S_Reg._[Y1]	[–3 ~ 3 / **0** / 2 line/step]
	8	S_Reg._[K1]	[–3 ~ 3 / **0** / 2 line/step]
	9	S_Reg._[M(P1a)]	For use in Japan only. [–3 ~ 3 / **0** / 2 line/step]
	10	S_Reg._[C(P1a)]	
	11	S_Reg._[Y(P1a)]	
	12	S_Reg._[K(P1a)]	
960 *	Tray Heater		
	1		Optional tray heaters installed or not [0 ~ 1 / **0** / 1/step] 0: No, 1: Yes

SP3-XXX: (Process)

3	Mode No. (Class 1, 2, and 3)		Function / [Setting]
001	ProcessCtrl		
	1	ProcessCtrl	Does a forced process control, and displays the result as one of the following codes. [0 ~ 1 / **0** / 1/step] • *0: Normal termination* • *103: Error (ID sensor inactive → Defective ID sensor, Defective circuit, Defective BCU board)* • *104: Error (ID sensor unable to receive light → Defective OPC belt, Dirty OPC belt, Defective ID sensor, Defective circuit, Defective BCU board)* • *105: Error (ID sensor unable to receive reflection from OPC → Same as "104")* • *254: Execution impossible (Executed while not in the ready status)* • *255: Execution aborted (due to an SC or a cover opened)*
003*	Lub_Interval		
	1	Lub_Interval	Sets the process control interval. [0 ~ 1000 / **200** / 10 sheet/step] • *0: Disables automatic process control*
004*	EnvChange		
	1	Temp	Sets the temperature/humidity change that triggers process control (process control is done if temperature or humidity has changed by this amount since the previous process control). [0 ~ 255 / **15** / 1°C/step]
	2	Humidity	[0 ~ 65535 / **15.0** / 1.0 g/m^3/step]
005*	ProconPreRound		
	1	ProconPreRound	PCU and development unit idling is done before process control. This value determines the amount of idling rotation. [1 ~ 5 / **1** / 1 turn/step] • *1 turn: A3 length*
006*	DensityAdjust		
	1	M/A AdjustLevel	Select the toner density compensation level for process control. [0 ~ 3 / **0** / 1/step] • *0: None* • *1: Weak* • *2: Medium* • *3: Strong* • *The higher the value, the darker the prints will be.*
	2	Vh_ AdjustLevel	

3	Mode No. (Class 1, 2, and 3)		Function / [Setting]
910*	DoctorIntval		
	1	Color	Sets the doctor roller reverse rotation interval. [0 ~ 50 / **50** / 1 sheet/step] • *The value indicates how many sheets are output before the doctor roller is reversed. (Sheet counts are converted into equivalent A4-LEF sheet counts.)* • *Reversing the roller removes toner blockages.* • *The sheet count is reset after reverse rotation.* • *The machine waits until the end of the job before reversing the doctor roller.* • *Decrease the value when vertical white lines appear on prints.*
	2	Black	[0 ~ 65535 / **50** / 1 sheet/step]
	3	Job end	[0 ~ 65535 / **20** / 1 sheet/step]
920*	Lub._CL_Time		
	1	Lub._CL_Time	Sets the OPC belt lubrication period. **DFU** [0 ~ 100 / **100** / 10%/step] • *When 100 is specified, the OPC belt cleaning clutch is always on whenever the OPC is turning, so the OPC gets lubricated. When 50 is specified, the clutch is only on half the time that the motor is on.*
940	JobEnd_Int		
	1	JobEnd_Int	The OPC belt is lubricated after the end of every job. This SP determines whether the lubrication is interrupted when a job arrives at the printer. • ***0: Interrupted*** • *1: Not interrupted*
941	OPC_Ide_PwrOn		
	1	Idling_Time	The image transfer belt tends to curl after a long period without rotation. To correct this, image transfer belt idling is done if the fusing temperature is not high enough to print just after the main switch is turned on. This SP determines how long the idling rotation is done. [3 ~ 5 / **3** / 1 minute/step]
	2	PrintingReady	Select when the machine can accept a print job after the idling starts. • *0: Immediately* • *1: After idling has been done for 1 minute* • *2: After idling finishes.* [0 ~ 2 / **0** / 1/step]
942	OPC_Ide_E_Svr		
	1	Idling_Time	The image transfer belt has curl tendency after long period without rotation. The image transfer belt tends to curl after a long period without rotation. To correct this, image transfer belt idling is done if the fusing temperature is not high enough to print when returning from energy saver mode. This SP determines how long the idling rotation is done. [3 ~ 5 / **3** / 1 minute/step]

3	Mode No. (Class 1, 2, and 3)		Function / [Setting]
942	2	PrintingReady	Select when the machine can accept a print job after the idling starts. • *0: Immediately* • *1: After idling has been done for 1 minute* • *2: After idling finishes.* [0 ~ 2 / **0** / 1/step]

SP5-XXX: (Mode)

5	Mode No. (Class 1, 2, and 3)		Function / [Setting]
009*	Language		
	1		Selects the language for the operation panel. After changing the setting, turn the main switch off and on for initialization. [2 ~ 16 / **2** / 1 /step] • *2: British* • *3: American* • *4: French* • *5: German* • *6: Italian* • *7: Spanish* • *8: Dutch* • *9: Norwegian* • *10: Danish* • *11: Swedish* • *12: Polish* • *13: Portuguese* • *14: Hungarian* • *15: Czech* • *16: Finnish*
045*	Counter Method		
	1	Counter Method	Switches the counter display. The setting can only be changed once. [0 ~ 1 / **0** / 1/step] • *0: Developments* • *1: Prints*
046*	RomUpdateDisp		
	1	ROM Update	Enables or disables the ROM Update utility. When enabled, this utility will be displayed in the user program mode. [0 or 1 / **1** / –] • *0: Enabled* • *1: Disabled*
101*	Energy Saver		
	3	Level 1	Sets the energy saver timers. [0 ~ 60 / **0** / 10 s/step] • *To enable Energy Saver, use the user program mode. When Energy Saver Level 1 is enabled, the value is initialized to 30 seconds.* • *0: Energy saver level 1 is disabled*
	4	Level 2	[0 ~ 3600 / **1800** / 60 s/step] • *To enable Energy Saver, use the user program mode. When Energy Saver Level 2 is enabled, the value is initialized to 1,800 seconds.* • *0: Energy saver level 2 is disabled*
104*	Double Count		
	1	Double Count	The counters count double for A3/11" x 17". [0 ~ 1 / **0** / 1/step] • *0: Normal count* • *1: Double count*

5	Mode No. (Class 1, 2, and 3)		Function / [Setting]
305*	ES Level 2 set		
	1	ES Level 2 set	Activates energy saver level 2. [0 ~ 1 / **0** / 1/step] • *0: Enables* • *1: Disables*
401*	UlimitAutoSet		
	44	ULimitAutoSet	Activates the auto user code registration function (prints are counted and logged for each user code and the counts can be viewed with SmartNetMonitor). [0 ~ 1 / **1** / 1/step]*0: Inactivated* • *1: Activated*
801	Memory Clear		
	1	All	Clears the settings from the NVRAM and initializes the settings. [0 ~ 0 / **0** / 0/step]
	2	ENG_All	Clears the engine settings. [0 ~ 1 / **0** / 1/step]
	3	SCS (System Control Service)	Clears the system settings. [0 ~ 0 / **0** / 0/step]
	4	IMH (Image Memory Handler)	Clears IMH data. **DFU** [0 ~ 0 / **0** / 0/step]
	5	MCS (Memory Control Service)	Clears MCS data. **DFU** [0 ~ 0 / 0 / 0/step] • *MCS is for network settings.*
	8	PRT	Clears the user tool settings. [0 ~ 0 / **0** / 0/step]
	11	NCS	Clears the network settings. [0 ~ 0 / **0** / 0/step]
803	InputCheck (See section 5.3.2.)		
804	OutputCheck (See section 5.3.3.)		
810	SC_Reset		
	1	SC_Reset	Resets a fusing-related SC. [0 ~ 1 / **0** / 1/step] *Resets a type A service call condition.* ***NOTE:*** *Turn the main switch off and on after using this SP.*
811	MachineSerial		
	2	Display	Displays the machine serial number. [0 ~ 1 / **0** / 1/step]
812*	FAX TEL No.		
	2	FAX TEL No.	Sets the fax or telephone number for a service representative by using the enter key and the down arrow key. [0 ~ 0 / **0** / 0/step] • *Both numbers and alphabetic characters can be input.*

5	Mode No. (Class 1, 2, and 3)		Function / [Setting]
813*	HV_SC_SensOFF		
	1	HV_SC_SensOFF	Activates/deactivates detection of SC conditions for the high voltage power supplies. [0 ~ 1 / **0** / 1/step] • *0: Activated* • *1: Deactivated* • *The following SCs are affected:* SC300, 301, 302, 350, 351, 400, 410, 411, 412, 413, 420, 421, 430
814*	Jam_OFF/ON		
	1	Jam_OFF/ON	Activates/deactivates jam detection. [0 ~ 1 / **0** / 1/step] • *0: Jam sensor activated* • *1: Jam sensor deactivated*
816*	RMS Setting		
	1	RMS Setting	Enables/disables the RMS function. **DFU** [0 ~ 1 / **0** / 1/step] • *0: Disable* • *1: Enable*
832	HDD Init		
	1	HDD Init.	Initializes the hard disk. [0 ~ 0 / **0** / 0 /step] *Use this SP mode only for hard disk error recovery.*
833*	JobLog ON/OFF		
	7	JobLog ON/OFF	Saves the results of jobs in the job log. [0 ~ 1 / **0** / 1 /step] *• If this mode is enabled, the result data is written on the HDD. If no HDD is installed, this feature is disabled even if this SP is set to "enabled".* • *0: Disabled* • *1: Enabled*
907	Plug/Play		
	1	Plug/Play	Specifies the Plug and Play setting. [0 ~ 6 / **0** / 1 /step] • *0: Ricoh Asia & EU* • *1: Ricoh US* • *2: SAVIN* • *3: GES* • *4: NRG* • *5: Infotec* • *6: LANIER*
930*	Meter_Charge		
	1	Meter_Charge	Activates the meter charge function. [0 ~ 1 / **0** / 1 /step] • *0: Off* • *1: On*
931	PM_Display		
	1	Charger	Specifies whether the PM warning for the charge corona unit is displayed when the replacement time arrives. • ***1: Displayed*** • *0: Not displayed*

5	Mode No. (Class 1, 2, and 3)		Function / [Setting]
931	2	PCU	Specifies whether the PM warning for the PCU is displayed when the replacement time arrives. • ***1: Displayed*** • *0: Not displayed*
	3	Bank_Feed	Specifies whether the PM warning for the feed rollers in the optional paper feed unit is displayed when the replacement time arrives. • *1: Displayed* • ***0: Not displayed***
945*	SetMidThickPaper		
	1	Tray1	Defines whether a tray contains 'normal' or 'middle thick' paper, when the user tool setting for the tray is set to 'plain'. [0 ~ 1 / **0** / 1 /step] • *0: Yes (Middle thick)* • *1: No (Normal)* • *The user tool setting defines whether each tray contains 'normal', thick, or OHP. SP5-945 defines what 'normal' means for each tray (either 'normal' or 'middle thick').* • *The paper thickness terminology reflects Japanese market conditions.* *Normal (plain): Use this for thin paper* *Middle thick: Use this for normal paper* *Thick: Use this for paper heavier than 105 g/m^2 (28 lb)*
	2	Tray2	
	3	Tray3	
	6	Bypass Tray	

5	Mode No. (Class 1, 2, and 3)		Function / [Setting]
955*	Test Pattern7		
	1	Pattern	Selects the test pattern. ⇒ SP2-917 [0 ~ 255 / **0** / 1 /step] • *0: Normal operation* • *1: Vertical 1 dot & 1 line* • *2: Horizontal 1 dot & 1 line* • *3: Vertical 2 dots & 1 line* • *4: Horizontal 2 dots & 1 line* • *5: Grid – 1 dot & 1 line* • *6: Grid – 1 dot & dual lines* • *7: Independent dot pattern* • *8: 2 independent dots pattern* • *9: Black* • *10: Belt pattern* • *11: Trimmed area* • *12: 2 dots & 1 trimmed area* • *13: Slant grid* • *14: 2 dots & a slant grid* • *15: Horizontal (dots & a stitch pattern)* • *16: Check Flag* • *19: 4 independent dots* • *20: Horizontal 1 dot & a line (LD 1/2 reversals)* • *21: Grid – 1 dot & a line (LD 1/2 reversals)* • *22: Grid – 1 dot & dual lines (LD 1/2 reversals)* • *23: Independent 1 dot pattern (LD 1/2 reversals)* • *24: 3 line gray scale* • *25: Horizontal gray scale* • *26: Vertical gray scale* • *29: Horizontal gray scale extended* • *30: Vertical gray scale extended* • *31: Horizontal gray scale 600 dpi* • *32: Vertical gray scale 600 dpi* • *35: Horizontal gray scale with white spots* • *36: Vertical gray scale with white spots* • *38: Horizontal gray scale extended with white spots* • *39: Vertical gray scale extended with white spots* • *40: Horizontal gray scale 600 dpi with white spots* • *41: Vertical gray scale 601 dpi with white spots* • *43: White - for process evaluation* • *50: Vertical stitch & dot pattern* • *51: 2 beam density pattern* • *52: Trimmed area & cross pattern* • *53: Grid – 1 dot & 1 line (2)* • *54: Grid – 1 dot & dual lines (2)* • *55: Independent 2 dot pattern – 40 mm sub scan* • *56: Independent 2 dot pattern – 102.5 mm sub scan* • *57: Process control pattern*
	2	Density	Adjusts the test pattern density [0 ~ 255 / **255** / 1 /step]
970	DebugSerial		
	1	DebugSerial	[0 ~ 0xff / **0x00** / 0 /step] **DFU**

Service Tables

5	Mode No. (Class 1, 2, and 3)		Function / [Setting]
990*	SP print mode		
	1	SP all print	Prints SP setting data. [0 ~ 255 / **0** / 0 /step] • SP all print: All items printed out with SPs 5-990-2, -4, -6, and -7. • All: All SP mode settings • Non-Default: SP settings that have been changed from the defaults
	2	All	
	4	Loging	
	6	Non-Default	
	7	NIB Summry	
998	ColorAdjExe		
	1	ColorAdjExe	Executes charge corona wire cleaning and forced process control. [0 ~ 1 / **0** / 1 /step]

SP7-XXX: (Data Log)

7	Mode No. (Class 1, 2, and 3)		Function / [Setting]
003*	M/C Counter		
	1	P:Total	Displays the values of the color counters. [–9999 to 9999999 / **0** / 1/step]
	7	P:B&W	
	8	P:Full Color	
	10	D:Color	• *These SP modes are development counters for meter charge mode.*
	11	D:B&W	
	20	P:Full color	• *These SP modes are used for the Japanese market only.*
	21	P:B&W/Single	
	22	P:Single	
	23	P:B&W	
	25	P:Full Color	
	28	P:Color (except for B&W)	• *These SP modes are print counters for meter charge mode.* • *These SP modes are used in all markets.*
	29	P:B&W	
	30	P:Color Total	
007*	Other Counter		
	1	Duplex	Displays counter values. [–9999 ~ 9999999 / **0** / 0 sheet/step]
	2	A3/DLT/Over420	
	3	Staple	
101*	Size Counter		
	4	A3	Displays the counter values for each paper size. [0 ~ 9999999 / **0** / 0 sheet/step]
	5	A4	
	6	A5	
	13	B4	
	14	B5	
	32	11" x 17"	
	36	8 1/2" x 14"	
	38	8 1/2" x 11"	
	44	5 1/2" x 8 1/2"	
	128	Other	
106*	WasteTnrFull		
	1	OPC	Displays the waste toner bottle counter. [0 ~ 65535 / **0** / 1 /step]
	2	Belt	[0 ~ 65535 / **0** / 1 /step]
107*	OilCounter		
	1	OilCounter	Displays the oil supply unit counter. [0 ~ 65535 / **0** / 1 /step]
204*	Feed Counter		
	1	Tray1	Displays the number of sheets fed from each paper feed station. [0 ~ 9999999 / **0** / 0 sheet/step]
	2	Tray2	
	3	Tray3	
	5	By-pass	
	6	Duplex	
401*	SC Counter		
	1	SC Counter	Displays how many times SC codes have been output. [0 ~ 9999 / **0** / 0 time/step]

7	Mode No. (Class 1, 2, and 3)		Function / [Setting]
502*	Total Jam		
	1	Total Jam	Displays the total number of jams detected. [0 ~ 9999 / **0** / 0 /step]
504*	Jam by Loc.		
	3	Tray1: ON	Displays the number of jams according to the location. where they were detected. [0 ~ 9999 / **0** / 0 /step]
	4	Tray2: ON	
	5	Tray3: ON	
	6	By-pass: ON	
	52	Tray2: OFF	
	53	Tray3: OFF	
	100	Finisher 100	
	101	Finisher 101	
	102	Finisher 102	
	103	Finisher 103	
	104	Finisher 104	
	105	Finisher 105	
	106	Finisher 106	
	133	Finisher 133	
506*	Jam Paper Size		
	4	A3	Displays the number of jams according to paper size. [0 ~ 9999 / **0** / 1 /step]
	5	A4	
	13	B4	
	14	B5	
	32	11" x 17"	
	36	8 1/2" x 14"	
	38	8 1/2" x 11"	
	44	5 1/2" x 8 1/2"	
	128	Other	
507*	Jam History		
	1		Displays the 10 most recently detected paper jams. [0 ~ 0 / **0** / 0 /step] (SMC printing only)
	2	1	
	3	2	
	4	3	
	5	4	
	6	5	
	7	6	
	8	7	
	9	8	
	10	9	
508*	Replace_Cnter		
	1	PCU	Displays how many times the parts/consumables have been replaced. [0 ~ 255 / **0** / 1 /step]
	2	Development: M	
	3	Development: C	
	4	Development: Y	
	5	Development: Bk	
	6	FuserUnit	
	7	Charger	
	8	Oil	
	9	WesteTnr: OPC	
	10	WesteTnr: Belt	

7	Mode No. (Class 1, 2, and 3)		Function / [Setting]
508*	11	Tonner: M	Displays how many times the parts/consumables have been replaced. [0 ~ 255 / **0** / 1 /step]
	12	Tonner: C	
	13	Tonner: Y	
	14	Tonner: Bk	
	15	Bank1-Feed	
	16	Bank2-Feed	
509*	Proc_Cont_Cnter		
	1	Proc_Cont_Cnter	Displays the process control counter. [0 ~ 9999999 / **0** / 1 /step]
510*	Chgr_Cln_Cntr		
	1	Chgr_Cln_Cntr	Displays the charge corona unit cleaning counter. [0 ~ 9999999 / **0** / 1 /step]
603*	Proc_ErrorLog		
	1	Log 1	Displays the process control error log. [0 ~ 9999999 / **0** / 1 /step] • *103: ID sensor unable to receive light* *Reasons: ID sensor failure or incorrect installation, BCU failure* • *104: ID sensor unable to receive reflection* *Reasons: As for 103, plus: Uneven OPC belt surface, foreign material on OPC belt* • *105: ID sensor unable to receive OPC reflection* *Reasons: As for 103, plus: Uneven OPC belt surface, foreign material on OPC belt* • *110: ID sensor defective imaging – Cyan* *Reasons: Abnormal development bias, dirty bias terminal, development unit incorrectly installed, BCU failure* • *111: ID sensor defective imaging – Magenta* *Reasons: As for 110* • *113: ID sensor defective imaging – Cyan* *Reasons: As for 110, plus: Laser writing failure, abnormal charge, loss of synchronization* • *114: ID sensor defective imaging – Magenta* *Reasons: As for 110, plus: Laser writing failure, abnormal charge, loss of synchronization* • *115: ID sensor defective imaging – Yellow* *Reasons: As for 110, plus: Laser writing failure, abnormal charge, loss of synchronization* • *116: ID sensor defective imaging – Black* *Reasons: As for 110* • *118: Black not detected* *Reasons: As for 110* • *123: ID sensor defective imaging – Black* *Reasons: As for 110, plus: Laser writing failure, abnormal charge, loss of synchronization*
	2	Log 2	
	3	Log 3	

7	Mode No. (Class 1, 2, and 3)		Function / [Setting]
803*	PM_Counter		
	1	PCU	Displays the number of sheets printed for each current unit. [0 ~ 9999999 / **0** / 1 sheet/step] • *For clearing the counters, see SP7-804.*
	2	Development: M	
	3	Development: C	
	4	Development: Y	
	5	Development: Bk	
	6	FusingUnit	
	7	Charger	
	8	Bank1-Feed	
	9	Bank2-Feed	
804	PM_Clear		
	1	PCU	Clears the PM counters. [0 ~ 1 / **0** / 1 /step] • *For displaying the counter, see SP7-803.*
	2	Development: M	
	3	Development: C	
	4	Development: Y	
	5	Development: Bk	
	6	FuserUnit	
	7	Charger	
	8	Bank1-Feed	
	9	Bank2-Feed	
	100	AllReset	
807	SC/Jam Clear		
	1	SC/Jam Clear	Clears the counters related to SC codes and paper jams. [0 ~ 1 / **0** / 0 /step]
808	Counter Clear		
	1	Counter Clear	Clears all counters except for SP7-003 and –007. [0 ~ 1 / **0** / 0 /step]
816	Tray Clear		
	1	Tray1	Clears the tray counters (SP7-204). [0 ~ 1 / **0** / 0 /step]
	2	Tray2	
	3	Tray3	
	6	Duplex	
825	Counter Reset		
	1	Counter Reset	Resets the total counter values to “0.” [0 ~ 0 / **0** / 0 /step]
832*	Diag. Result		
	1	Diag. Result	Displays the result of the diagnostics. Refer to section 4.2 for the error codes. [0 ~ 0 / **0** / 0 /step]
833	Covrage		
	1	Last:M	Displays coverage ratios. [0.00 ~ 100.0 / **0.00** / 0.01 /step] • *Coverage ratios are calculated using the paper sizes used and the toner consumption amounts calculated by the GAVD ASIC on the LD board.*
	2	Last:C	
	3	Last:Y	
	4	Last:Bk	
	5	Average: M	
	6	Average: C	
	7	Average: Y	
	8	Average: Bk	

7	Mode No. (Class 1, 2, and 3)		Function / [Setting]
901	Assert Info (Assert Information)		
	1	File Name	Records the location where the last problem (SC990) was detected in the program. The data stored in this SP is used for problem analysis. [0 ~ 0 / **0** / 0 /step]
	2	# of Lines	
	3	Location	
902*	Latest SC Info		
	1	Latest SC Info	Displays the latest SC information. [0 ~ 0 / **0** / 0 /step]
906*	PMCounter-PREV		
	1	PCU	Displays the counters for the previous units. [0 ~ 9999999 / **0** / 1 /step]
	2	Development: M	
	3	Development: C	
	4	Development: Y	
	5	Development: Bk	
	6	FuserUnit	
	7	Charger	
	8	Oil	
	9	WasteTnr: OPC	
	10	WasteTnr: Belt	
	11	Toner: M	
	12	Toner: C	
	13	Toner: Y	
	14	Toner: Bk	
910	Firmware PN		
	1	System	Displays the part numbers. [0 ~ 0 / **0** / 0 /step]
	2	Engine	
	7	Finisher	
	9	Bank1	
	11	Mail Box	
	13	Duplex	
	18	NIB	
	19	Bank2	
	200	Factory	
	204	Printer	
	209	Test	
	210	MIB	
911*	Firmware Version		
	1	Controller	Displays the firmware versions. [0 ~ 0 / **0** / 0 /step]
	2	Engine	
	7	Finisher	
	9	Bank1	
	11	Mail Box	
	13	Duplex	
	18	NIB	
	19	Bank2	
	200	Factory	
	204	Printer	
	209	Test	
	210	MIB	

7	Mode No. (Class 1, 2, and 3)		Function / [Setting]
920	PM Interval		
	1	Fusing Unit	Adjusts the PM interval for each unit. [60 ~ 120 / **120** / 5/step]
	2	Development	
	3	Charger	
	4	PCU	[60 ~ 240 / **240** /5/step]

Input Check Table

The SP numbers do not appear on the screen. Just scroll through the menu with the up/down arrow keys until the required item appears on the display.

SP5-803 -XXX		Description	Reading	
			0	1
1	Tray1	Tray set (standard tray)	Set	Not set
2	Tray1PaperEnd	Paper end sensor (standard tray)	End	Not end
3	Tray1NearEnd	Paper near-end sensor (standard tray)	Not near end	Near end
4	Tray1PaperSize	Paper size sensor (standard tray)	(See table 1.)	
5	RegistSensor	Registration sensor	Detected	Not detected
6	V Trans Sensor	Paper feed sensor	Detected	Not detected
7	ExitSensor	Exit sensor	Detected	Not detected
8	ExitFull	Paper overflow sensor	Full	Not full
9	ExitCover	Exit cover switch	Closed	Open
10	IntChngSensor	Interchange unit exit sensor	Detected	Not detected
11	By-passPaper	By-pass paper end sensor	Detected	Not detected
12	By-passSet	By-pass tray set	Not set	Set
13	FusingUSet	Fusing unit set	Set	Not set
14	OilSet	Oil supply unit set	Set	Not Set
17	TonerEnd: M	Toner end sensor: M	Not end	End
18	TonerEnd: C	Toner end sensor: C	Not end	End
19	TonerEnd: Y	Toner end sensor: Y	Not end	End
20	TonerEnd: K	Toner end sensor: K	Not end	End
21	TonerCart. M	Toner cartridge memory chip: M	Not set	Set
22	TonerCart. C	Toner cartridge memory chip: C	Not set	Set
23	TonerCart. Y	Toner cartridge memory chip: Y	Not set	Set
24	TonerCart. K	Toner cartridge memory chip: K	Not set	Set
27	WasteToner OPC	OPC belt waste toner sensor	Full	Not full
28	W.T.Bottle OPC	OPC belt waste toner bottle switch	Set	Not set
31	BeltMark	Belt mark sensor	Not detected	Detected
32	PCUNew	New PCU sensor	Not new	New
33	WasteToner Blt	Transfer belt waste toner sensor	Full	Not full
34	W.T.Bottle Blt	Transfer belt waste toner bottle switch	Set	Not set
35	LD5VCover	Interlock switch	Closed	Open
36	LeftCover	“Close Left Cover” status	Closed	Open
37	RightCover	Right cover	Closed	Open
38	FrontCover	Front cover	Closed	Open
39	Cover 24V	Interlock switch (24V)	Closed	Open
41	I’changeUnit	Interchange unit	Set	Not set

SP5-803 -XXX		Description	Reading	
			0	1
42	DevMotorLock	Development motor lock	Locked	Not locked
43	OpcMotorLock	Main motor lock	Locked	Not locked
44	PfdMotorLock	Paper feed motor lock	Locked	Not locked
45	PolyMotorLock	Polygon motor lock	Locked	Not locked
46	FusingSensor	Fusing exit	Detected	Not detected
55	DplxConnect	Duplex unit	Not connected	Connected
56	Bank1Connect	1st optional paper tray	Not connected	Connected
57	Bank2Connect	2nd optional paper tray	Not connected	Connected
58	ExitOptConnect	Exit Option Connection	Not connected	Connected
60	Fin.EntSensor	Finisher: Entrance sensor	Not detected	Detected
61	Fin.ExitSensor	Finisher: Exit sensor	Not detected	Detected
62	Fin.HPSensor	Finisher: Jogger HP sensor	Not positioned	Positioned
63	Fin.TopCover	Finisher: Top cover sensor	Closed	Open
64	Fin.PaperHgt.	Finisher: Stack height sensor	Lever is lowered	Lever is raised
65	Fin.Upper	Finisher: Tray upper limit sensor	Not uppermost	Uppermost
66	Fin.NearFull	Finisher: Stack near-limit sensor	Not near limit	Near limit
67	Fin.StplCover	Finisher: Stapler cover	Closed	Open
68	Fin.StplHP	Finisher: Stapler HP sensor	Not at HP	At HP
69	Fin.StplEmpty	Finisher: Staple end	Detected	Not detected
70	Fin.StplCtrg	Finisher: Staple cartridge	Not detected	Detected
71	Fin.StplLock	Finisher: Stapler unit lock	Not locked	Locked
72	Fin.BaseSensor	Finisher: Base sensor	Not detected	Detected
73	Fin.BaseCover	Finisher: Right cover switch	Closed	Open
74	Fin.PaperPress	Finisher: Lever sensor	Lever is raised	Lever is lowered
80	4binFeedSens1	Mailbox: Lower vertical transport sensor	Paper present	No paper
81	4binFeedSens2	Mailbox: Upper vertical transport sensor	Paper present	No paper
84	4binFullSens1	Mailbox: Tray 1 overflow	Not full	Full
85	4binFullSens2	Mailbox: Tray 2 overflow	Not full	Full
86	4binFullSens3	Mailbox: Tray 3 overflow	Not full	Full
87	4binFullSens4	Mailbox: Tray 4 overflow	Not full	Full
88	4binPaperSens1	Mailbox: Tray 1 paper	Detected	Not detected
89	4binPaperSens2	Mailbox: Tray 2 paper	Detected	Not detected
90	4binPaperSens3	Mailbox: Tray 3 paper	Detected	Not detected
91	4binPaperSens4	Mailbox: Tray 4 paper	Detected	Not detected
92	4binDoorSens	Mailbox: Door safety sw.	Open	Closed
100	BankFeedSens1	1st optional tray: Relay sensor	No paper	Paper present
101	BankFeedSens2	2nd optional tray: Relay sensor	No paper	Paper present

SP5-803 -XXX		Description	Reading	
			0	1
102	BankCover1	1st optional tray: Right cover (vertical guide switch)	Closed	Open
103	BankCover2	2nd optional tray: Right cover (vertical guide switch)	Closed	Open
104	Bank1Set	1st optional tray: Set	Not set	Set
105	Bank2Set	2nd optional tray: Set	Not set	Set
106	Bank1PaperEnd	1st optional tray: Paper end	Not end	End
107	Bank2PaperEnd	2nd optional tray: Paper end	Not end	End
108	Bank1PaperSize	1st optional tray: Paper size	(See table 2.)	
109	Bank2PaperSize	2nd optional tray: Paper size		
110	Bank1NearEnd	1st optional tray: Paper height	(See table 3.)	
111	Bank2NearEnd	2nd optional tray: Paper height		
120	DplxEntSens	Duplex: Entrance sensor	Not detected	Detected
121	DplxExitSens	Duplex: Exit sensor	Detected	Not detected
122	DplxOpen	Duplex unit open switch	Closed	Open
123	DplxCover	Duplex cover sensor	Open	Closed

Table 1: Tray 1 Paper Size

Switch	North America	Europe/Asia	Value
0000	LG SEF*	B4 SEF*	00000000
0001	DLT SEF**	A3 SEF**	00100000
0010	B5 LEF	B5 LEF	00010000
0011	B5 SEF****	B5 SEF****	00110000
0100	LT LEF***	A4 LEF***	00001000
0101	HLT LEF	A5 LEF	00101000
0110	A4 SEF	A4 SEF	00011000
0111	LT SEF	LT SEF	00111000

* : Selected with SP1-902-1 (LG SEF/B4 SEF)
** : Selected with SP1-902-2 (DLT SEF/A3 SEF)
*** : Selected with SP1-902-3 (LT LEF/A4 LEF)
**** : Selected with SP1-902-4 (B5 SEF/10.5" x 7.25" SEF)

0: pushed
1: not pushed

Table 2: 1st/2nd Bank Paper Size

The paper size is displayed in the ASAP paper size code. For example, 000001001 (0x05) is displayed for A4 LEF.

Size	North America	Europe/Asia	Code
A3 SEF	Detected	Detected	10000100
B4 SEF	None	Detected	10100100
A4 SEF	None	Detected	10100110
A4 LEF	Detected	Detected	00000101
B5 LEF	Detected	Detected	00001110
A5 LEF	None	Detected	00101100
DLT SEF	Detected	Detected	10100000
LG SEF	Detected	None	10100100
LT SEF	Detected	None	10100110
LT LEF	Detected	Detected	00100110
HLT LEF	Detected	None	00101100

Table 3: 1st/2nd Bank Near End

Remaining paper	Paper height sensor 2	Paper height sensor 1	Code
Full	ON	ON	01100100
Nearly full	OFF	ON	00110010
Near end	OFF	OFF	00001010

Output Check Table

The SP numbers do not appear on the screen. Just scroll through the menu with the up/down arrow keys until the required item appears on the display.

SP5-804 -XXX		Description
1	PF Mtr:89mm/s	Paper feed motor: 89 mm/s
2	PF Mtr:178mm/s	Paper feed motor: 178 mm/s
3	PF Mtr:240mm/s	Paper feed motor: 240 mm/s
4	PF CL (1)	Paper feed clutch (standard tray)
6	FusingMtr	Fusing unit motor
7	FusingMtr: Half	Fusing unit motor: Half Speed
8	FusingFan: High	Fusing unit fan: High speed
9	FusingFan: Low	Fusing unit fan: Low speed
12	Regist CL	Registration clutch
13	I'changeSol1	Upper gate solenoid
14	I'changeSol2	Lower gate solenoid
15	By-pass CL	By-pass paper feed clutch
16	Pick-up SOL	By-pass pick-up solenoid
17	GAPCISleepMode	GAPCIS Sleep Mode Trigger Signal
18	QL/TonerEnd	QL/Toner End
19	DevCl: M	Development clutch: M
20	DevCl: C	Development clutch: C
21	DevCl: Y	Development clutch: Y
22	DevCl: K	Development clutch: K
23	DevMtr	Development motor
24	DevMtr: Half	Development motor: Half Speed
25	DevMtr: Rev	Development motor: Reverse
26	DevMtr: RevHalf	Development motor: Reverse Half Speed
27	Lub. Cl	OPC belt cleaning clutch
28	IdsensLED	ID sensor LED
29	OPCMtr	Main motor: Regular Speed
30	OPCMtr: Half	Main motor: Half Speed
31	OPCMtr: Rev	Main motor: Reverse
32	OPCMtr: RevHalf	Main motor: Reverse Half Speed
33	PolygonMtr	Polygon motor
34	LD	LD
35	PaperTransSol	Paper transfer solenoid
36	BeltClnCl	Transfer belt cleaning clutch
37	EngineReady	Engine Ready
39	GAVDReset	GAVD Reset
40	BeltClnSol	Transfer belt cleaning contact solenoid
45	PolyMtr+LD	Polygon Motor + LD
46	Forced Lub.	Forced Lubrication to OPC belt
47	OzonFan	Ozone Fan
48	Fan3	3rd Fan (Not Used)
49	TonerEnd	Toner End LED
50	Charger	Charge corona unit output
51	Dev.Bias: KY	Development bias: K

SP5-804 -XXX		Description
52	Dev.Bias: CM	Development bias: MCY
53	Trans. Belt	Image transfer power supply
54	PaperTrans.: P	Paper transfer: +
55	PaperTrans.: N	Paper transfer: –
56	BeltCln: P	Image transfer belt cleaning: +
57	FusingBias	Fusing bias
58	QuenchingBias: L	Discharge pin power supply: L
59	QuenchingBias: H	Discharge pin power supply: H
60	Fin.AllOff	Finisher All Off
61	Fin.FeedMtr	Finisher: Main motor
62	Fin.JoggerMtr	Finisher: Jogger motor
63	Fin.PdlSol1	Finisher: Paddle roller solenoid
64	Fin.PEUSol1	Finisher: Exit unit gear solenoid
65	Fin.LeverSol	Finisher: Stack height lever solenoid
66	Fin.TrayMtr	Finisher: Output tray motor
67	Fin.StplMtr	Finisher: Stapler motor
68	Fin.FreeRun	Finisher: Free run
80	4bin AllOff	Mailbox: All Off
81	4bin Motor	Mailbox: Main motor
82	4bin SOL1	Mailbox: Turn gate solenoid 1
83	4bin SOL2	Mailbox: Turn gate solenoid 2
84	4bin SOL3	Mailbox: Turn gate solenoid 3
85	4bin FreeRun	Mailbox: Free run
100	BankCl1	1st optional paper tray unit: Paper feed clutch
101	BankCl2	2nd optional paper tray unit: Paper feed clutch
102	Bank1Mtr	1st optional paper tray unit: Paper feed motor
103	Bank1Mtr: Half	1st optional paper tray unit: Paper feed motor - half speed
104	Bank1Mtr: High	1st optional paper tray unit: Paper feed motor - high speed
105	Bank2Mtr	2nd optional paper tray unit: Paper feed motor
106	Bank2Mtr: Half	2nd optional paper tray unit: Paper feed motor - half speed
107	Bank2Mtr: High	2nd optional paper tray unit: Paper feed motor - high speed
108	Bank1,2Half	1st and 2nd optional paper tray units: Half speed
109	Bank1,2Mtr	1st and 2nd optional paper tray units: Paper feed motor
120	DplxRevMtr	Duplex: Inverter motor
121	DplxRevMtrRev	Duplex: Inverter motor - reverse
122	DplxFeedMtr	Duplex: Transport motor
123	DplxFeedMtrRev	Duplex: Transport motor - reverse
124	DplxSol	Duplex: Inverter gate solenoid
125	DplxFreeRun	Duplex: Free run

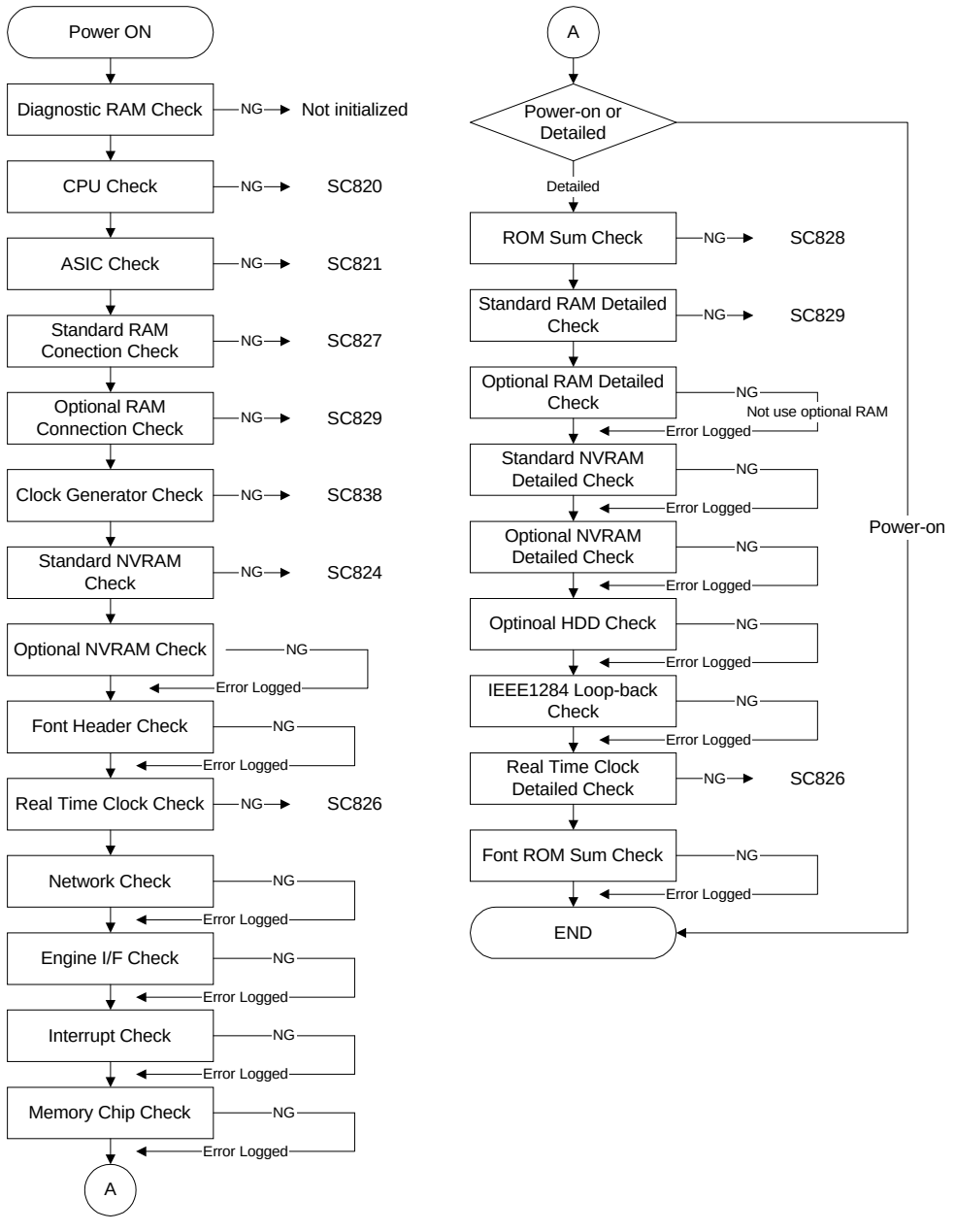
5.3 CONTROLLER SELF-DIAGNOSTICS

5.3.1 OVERVIEW

There are three types of self-diagnostics for the controller.

- Power-on self-diagnostics: The machine automatically starts the self-diagnostics just after the power has been turned on.
- Detailed self-diagnostics: The machine does the detailed self-diagnostics by using a loop-back connector (P/N G0219350)
- SC detection: The machine automatically detects SC conditions at power-on or during operation.

The following shows the workflow of the power-on and detailed self-diagnostics.



G070S516.WMF

5.3.2 DETAILED SELF-DIAGNOSTICS

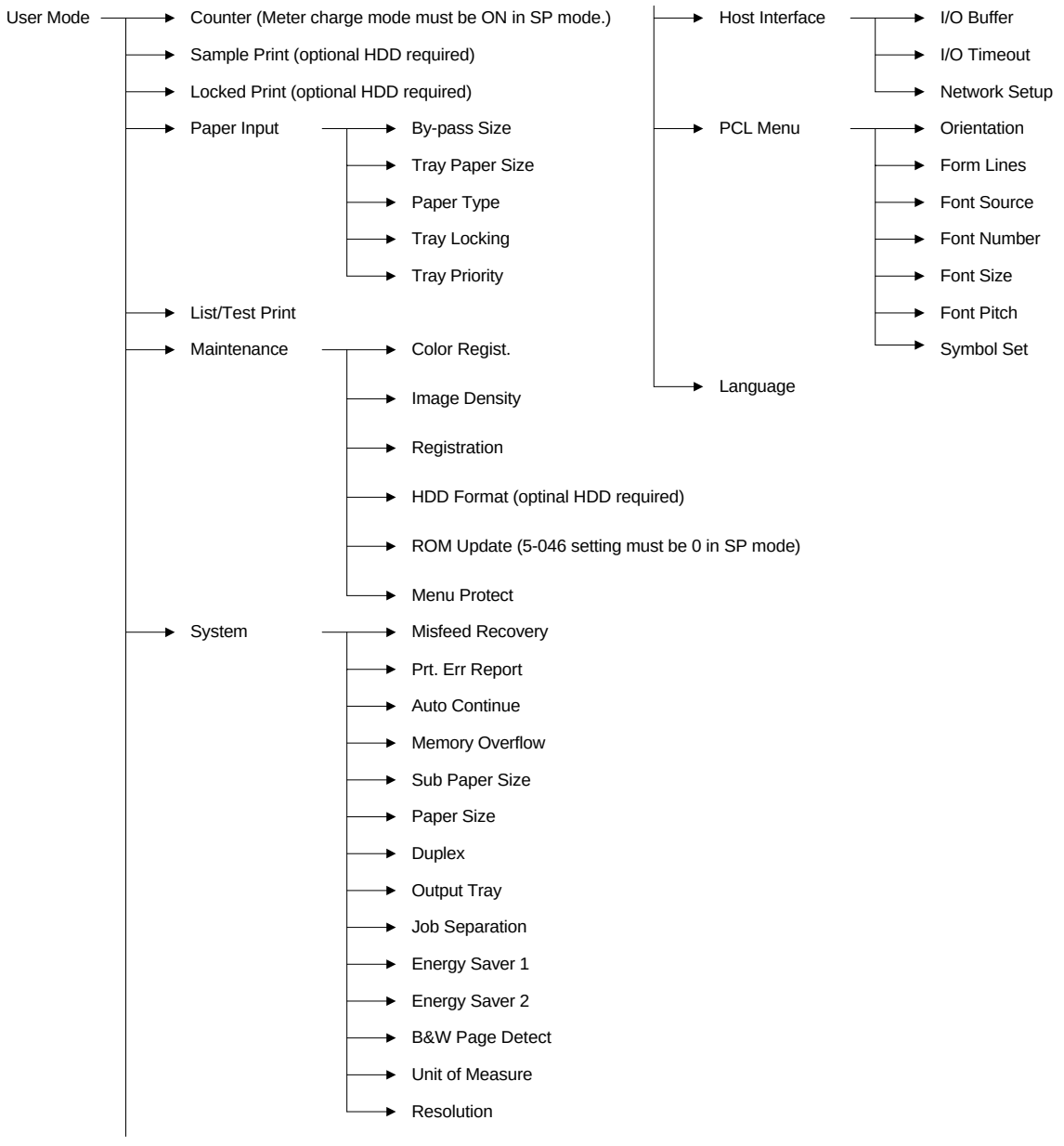
This detailed self-diagnostic test requires a loop-back connector (P/N: G0219350).

1. Turn off the machine and attach the loop-back connector to the parallel interface.
2. Turn on the machine while pressing the “Online” key and “# Enter” key together.
3. The machine automatically starts the self-diagnostics and prints the diagnostic report after completing the test.
   - Refer to the diagnostics report for the detected errors. The errors detected during self-diagnostics can be checked with SP7-832-001 (Diag. Result).
   - Refer to section 4.2 for details about the error codes.

5.4 USER PROGRAM MODE

To activate the user program mode, press the menu key and use the up/down arrow keys to scroll through the menu. To go back to a higher level, press the escape key. After changing the settings, press the online key. The user menu list can be printed using ‘menu list’ in the “List/Test Print” user mode.

User Mode Tree



G070S517.WMF

Service Tables

5.5 UPGRADING SOFTWARE

⚠CAUTION

1. **Before upgrading the software, print out the system settings and check the current software versions.**
2. **Check that your IC card contains a later version of the software. Machine performance is not guaranteed if you install an older version.**

5.5.1 OVERVIEW

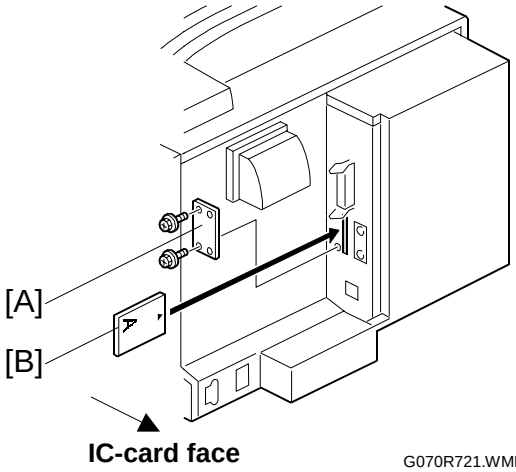
You can upgrade the following software modules:

- Engine software (BCU board software) – 1 card
- Controller system software (Controller board software) – 2 cards (no special order required)
- Network card system software – 1 card

5.5.2 UPGRADING

Procedure

1. Turn the main switch off.
2. IC card cover [A] (🔩 x 2)
3. Insert the IC card [B].



G070R721.WMF

4. Turn the main switch on. The message on the right appears on the operation panel.

```
Engine
```

G070S511.WMF

5. Press the enter key.

```
Engine
*
```

G070S512.WMF

6. Press the down arrow key.

```
Update Data
```

G070S513.WMF

7. Press the enter key.

```
Updating...
**********
```

G070S514.WMF

8. Wait until the message on the right appears on the operation panel.
9. Turn the main switch off.

```
Updated
Power Off On
```

G070S515.WMF

10. Remove the IC card.
11. If upgrading two or more software modules, insert the next IC card and repeat the steps above.
12. Put back the IC card cover.
13. Turn the main switch on.

Service Tables

Error Recovery

Installation Error

If the software upgrade is unsuccessful, “NG!” or “ERR” appears on the operation panel. When either of the messages is output, do the following:

1) Turn the main switch off.
2) Check that the IC card is correctly inserted.
3) Turn the main switch on.
4) Start upgrading software from the beginning.

Power Failure

If the power supply is interrupted, an error code may appear on the operation panel. Then, do the following:

1) Turn the main switch off.
2) Failure during BCU firmware download: Turn DIP switch 1 on the BCU board to ON
   Failure during controller, emulation, or network firmware download: Turn DIP switch 1 on the controller board to ON
3) Turn the main switch on.
4) Start upgrading software from the beginning.
5) Turn the DIP switch off again after finishing.

5.6 DIP SWITCHES

Controller Board

DIP SW No.	OFF	ON
1	Boot-up from machine	Boot-up from IC card
2 to 4	Factory Use Only: Keep these switches OFF.	

If a download attempt failed, you must boot the machine from the IC card. To do this, set DIP SW 1 on the controller board to ON.

BCU Board

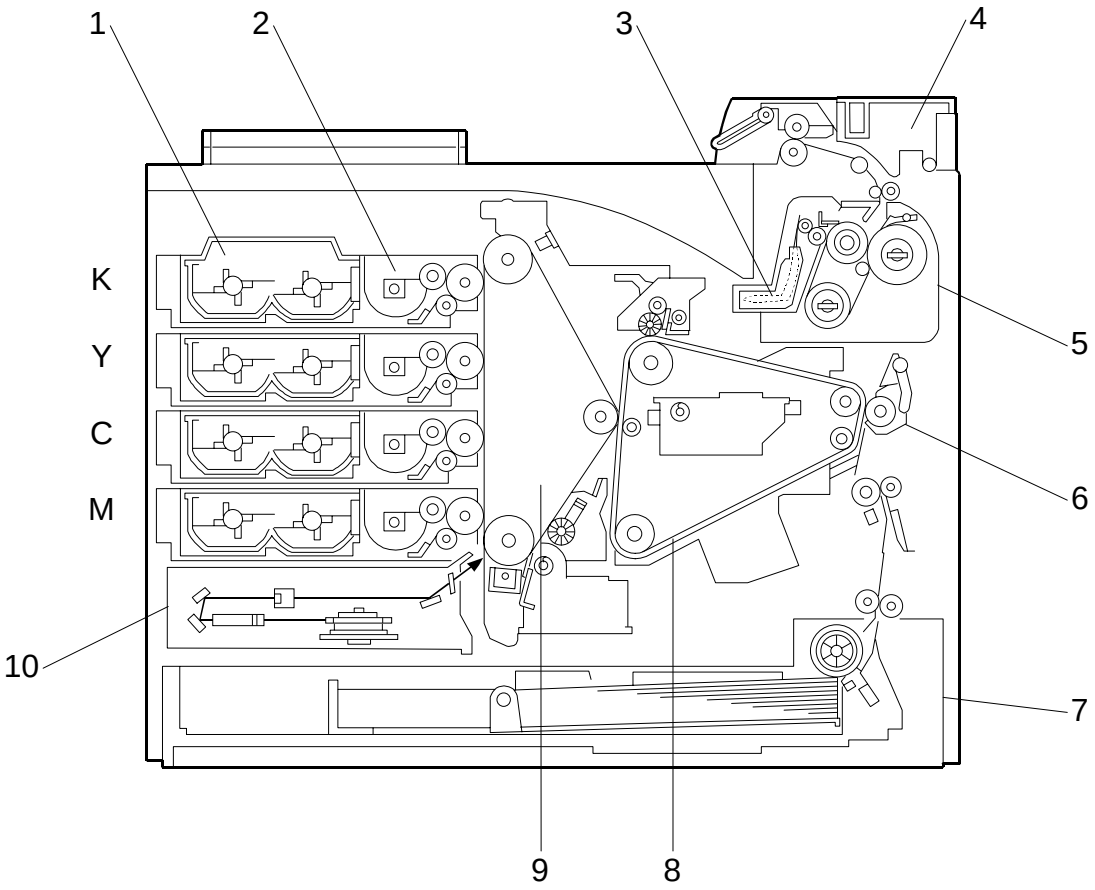
DIP SW No.	OFF	ON
1	Boot-up from machine	Boot-up from IC card
2 to 4	Factory Use Only: Keep these switches OFF.	

If a download attempt failed, you must boot the machine from the IC card. To do this, set DIP SW 1 on the BCU board to ON.

6. DETAILED SECTION DESCRIPTIONS

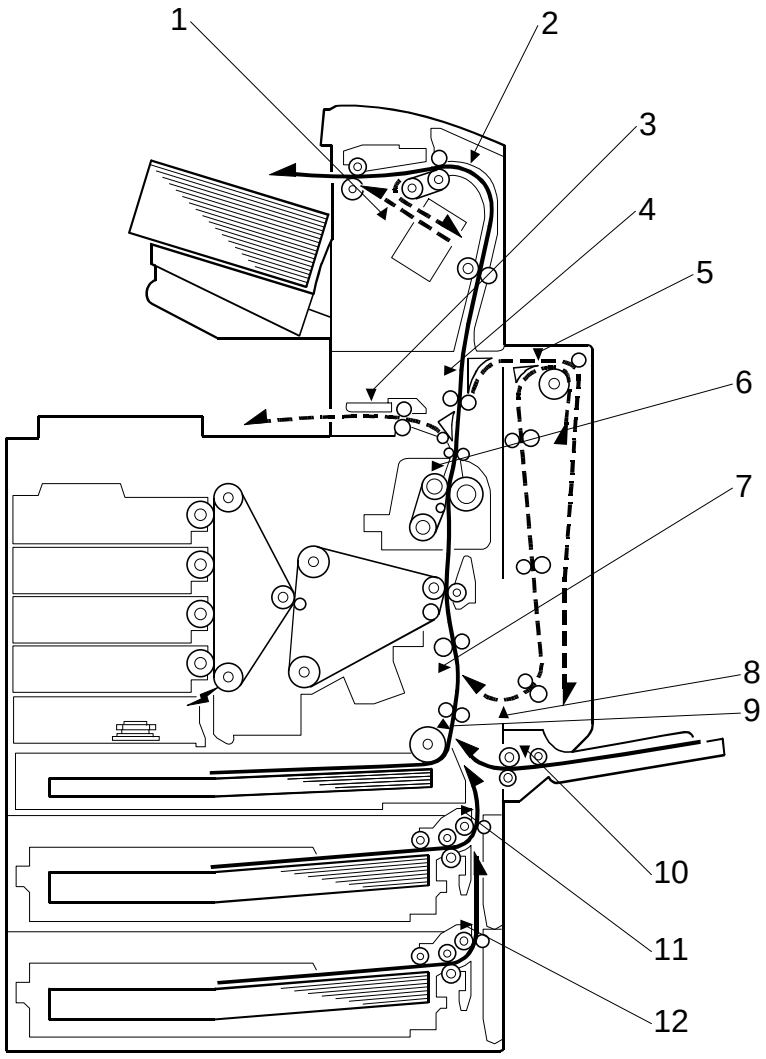
6.1 OVERVIEW

6.1.1 MAJOR COMPONENTS



1. Toner cartridge
2. Development unit
3. Oil supply unit
4. Paper exit unit
5. Fusing unit
6. Transfer roller unit
7. Paper tray
8. Transfer belt
9. OPC belt unit
10. Laser optics unit

6.1.2 PAPER PATH



G070V109.WMF

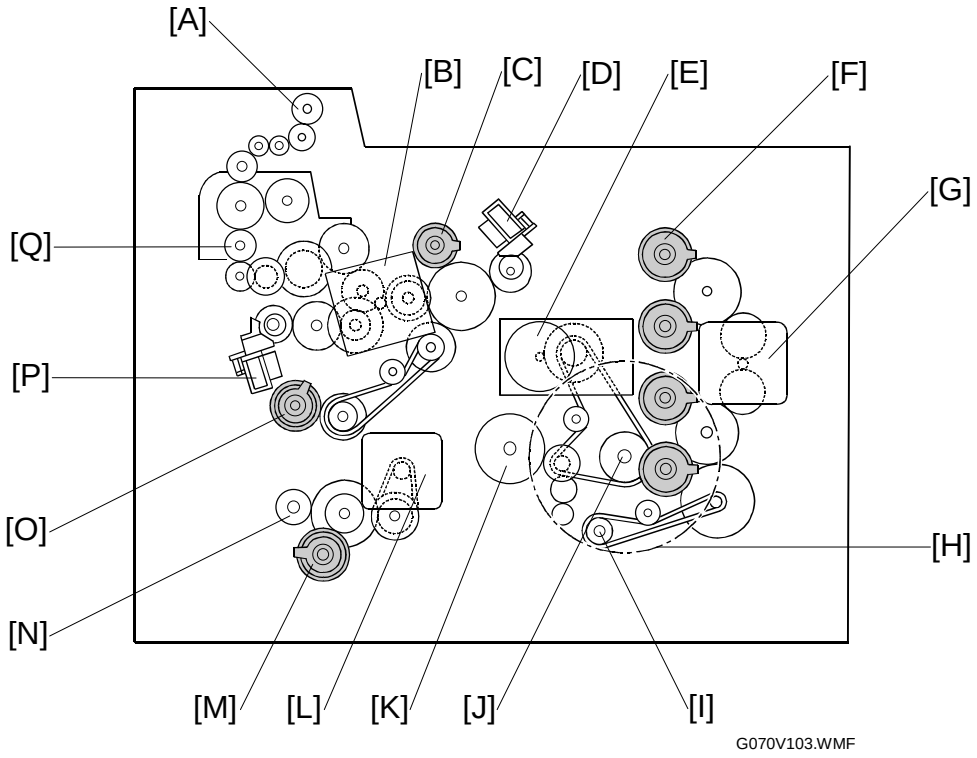
1. Finisher exit sensor
2. Finisher feed sensor
3. Exit sensor (main unit)
4. Exit sensor (interchange unit)
5. Duplex unit feed sensor
6. Fusing exit sensor
7. Registration sensor
8. Duplex unit exit sensor
9. Paper feed sensor
10. Bypass tray feed sensor
11. 1st paper tray unit feed sensor
12. 2nd paper tray unit feed sensor

The illustration shows a machine with the following equipment:

- Two paper tray units
- Interchange unit
- Duplex unit
- 500-sheet finisher

6.1.3 DRIVE COMPONENTS

This is a rear view of the machine.

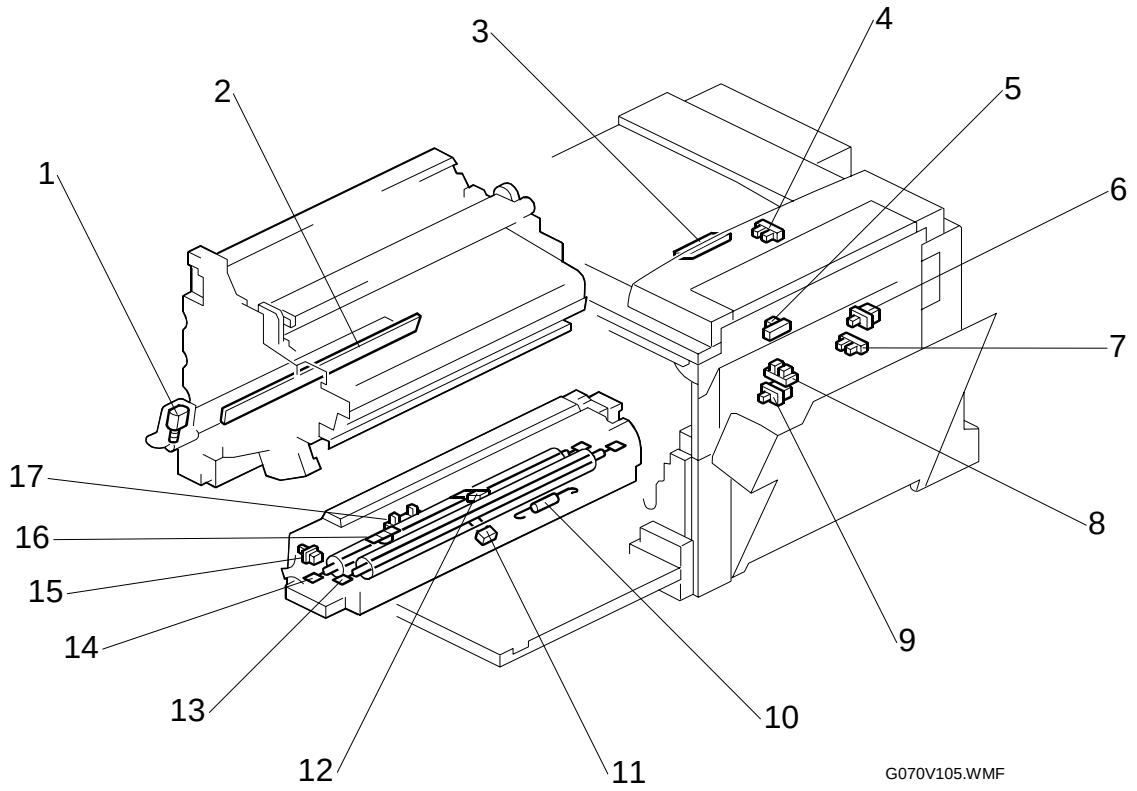


Motor name	Motor type	Drives ...
Development [G]	DC brushless	• Development units *1 • OPC belt cleaning unit [I] *2
Main [E]	DC brushless	• OPC belt [J] *3 • Transfer belt [K]
Fusing Unit [B]	DC brushless	• Fusing unit [Q] • Paper exit unit [A] • Transfer belt cleaning unit *4 • Registration roller *5 • Paper transfer roller • Transfer belt cleaning unit contact mechanism *6 • Paper transfer roller contact mechanism *7
Paper Feed [L]	Stepper	• Paper pick-up roller *8 • Vertical transport roller [N]

*1: Drive delivered through the development clutches [F]
*2: Drive delivered through the OPC belt cleaning clutch (not shown here).
*3: Stabilized by the flywheel [H]
*4: Drive delivered through the transfer belt cleaning clutch [C]
*5: Drive delivered through the registration clutch [O]
*6: Drive delivered through the belt cleaning contact solenoid [D]
*7: Drive delivered through the paper transfer solenoid [P]
*8: Drive delivered through the paper feed clutch [M]

6.1.4 ELECTRICAL COMPONENTS

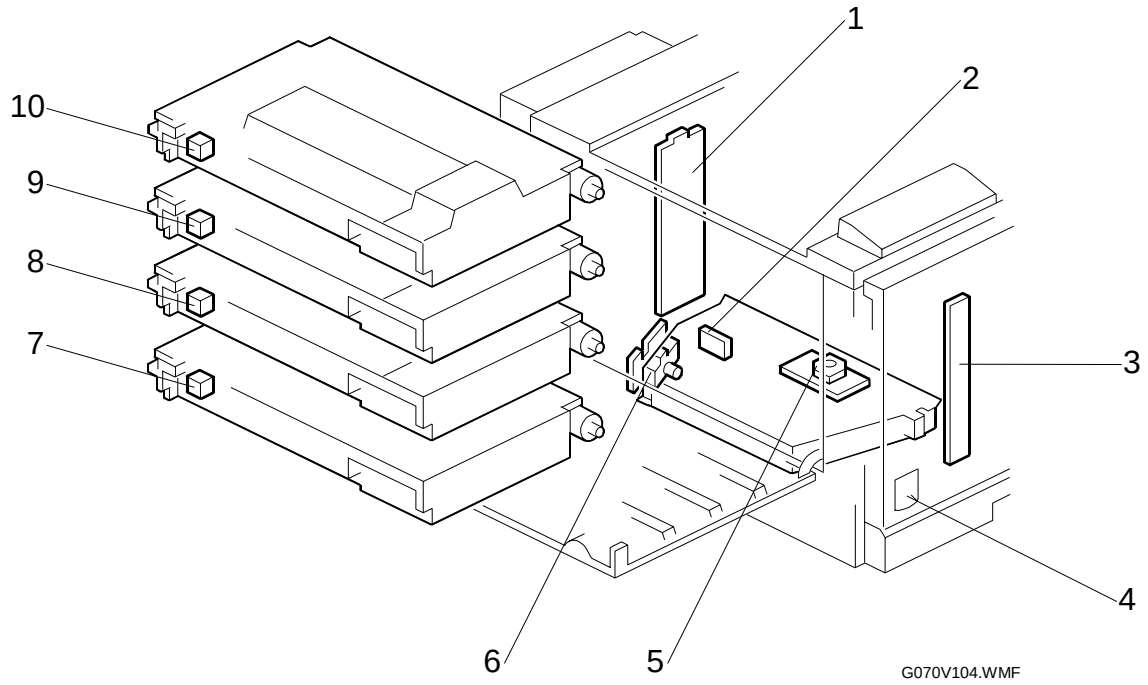
Image Transfer



1. Charge corona wire cleaner motor
2. Quenching lamp
3. ID sensor
4. New PCU sensor
5. Belt mark sensor
6. T/B waste toner bottle switch
7. T/B waste toner sensor
8. O/B waste toner sensor
9. O/B waste toner bottle switch
10. Pressure roller thermofuse
11. Pressure roller thermistor
12. Heating roller thermistor
13. Pressure roller fusing lamp
14. Heating roller fusing lamp
15. Oil unit switch
16. Heating roller thermostat
17. Oil end sensor

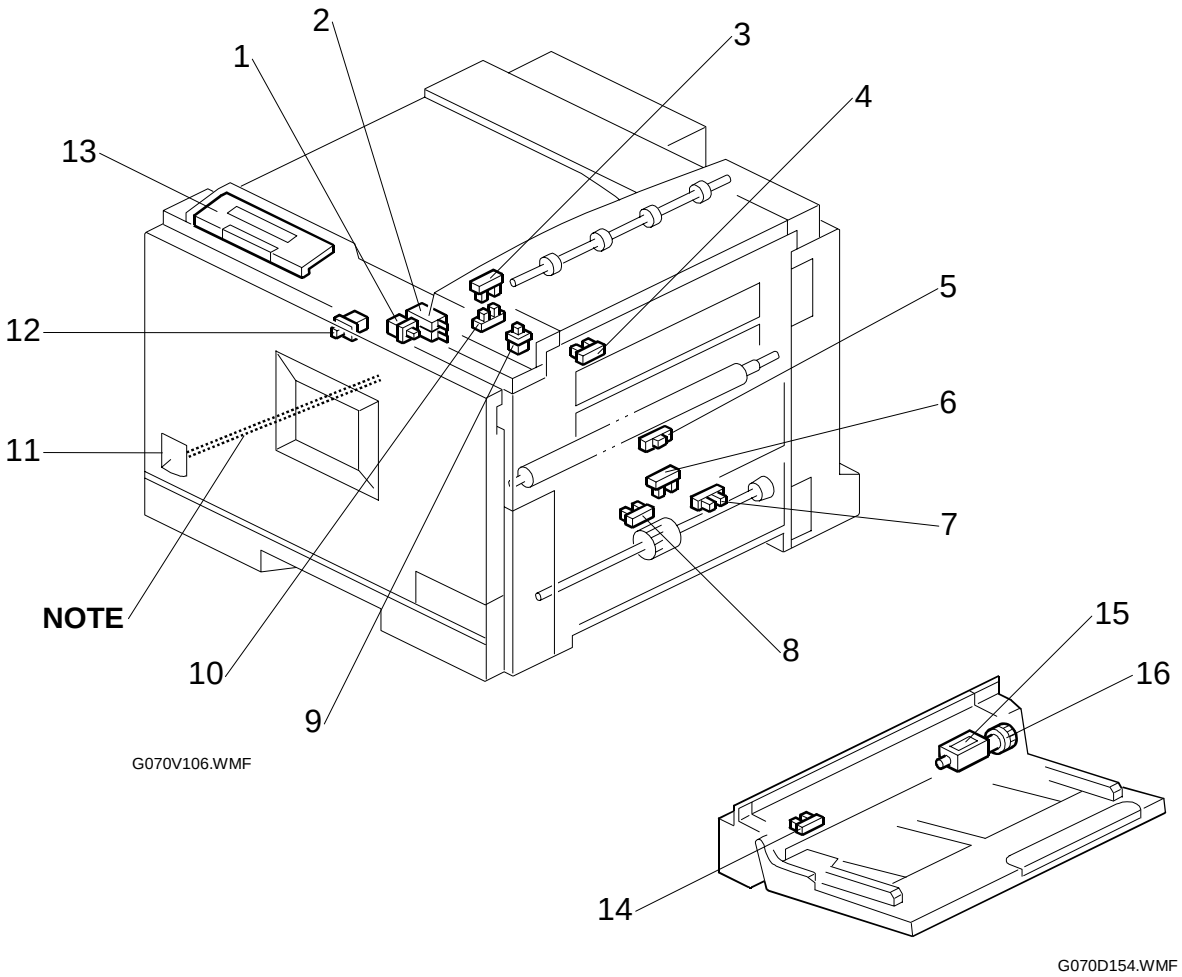
T/B: Transfer belt
O/B: OPC belt

Development Units



1. Rear development board
2. Laser sync. detection board
3. Front development board
4. Main switch
5. Polygonal mirror motor
6. LD unit
7. Memory chip M
8. Memory chip C
9. Memory chip Y
10. Memory chip K

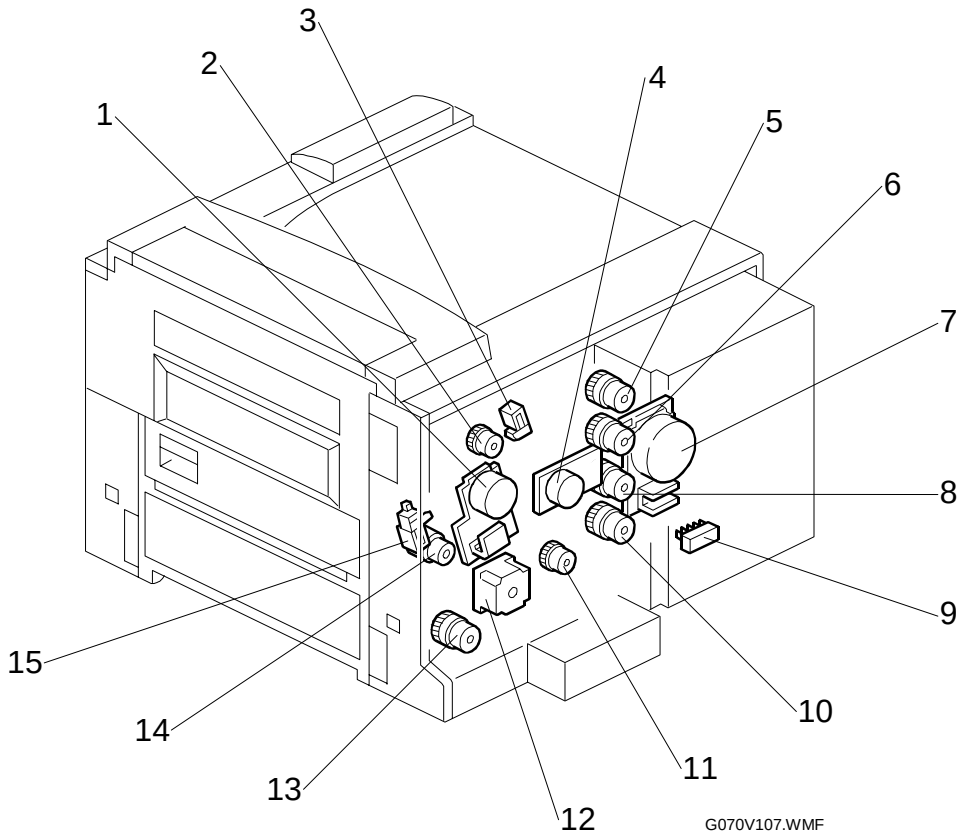
Paper Path



1. Right cover switch
2. Interlock switch
3. Paper overflow sensor
4. Fusing exit sensor
5. Registration sensor
6. Paper feed sensor
7. Paper near-end sensor
8. Paper end sensor
9. Exit cover switch
10. Paper exit sensor
11. Main switch (See the Note after the table)
12. Front cover switch
13. Operation panel
14. By-pass paper end sensor
15. By-pass pick-up solenoid
16. By-pass paper feed clutch

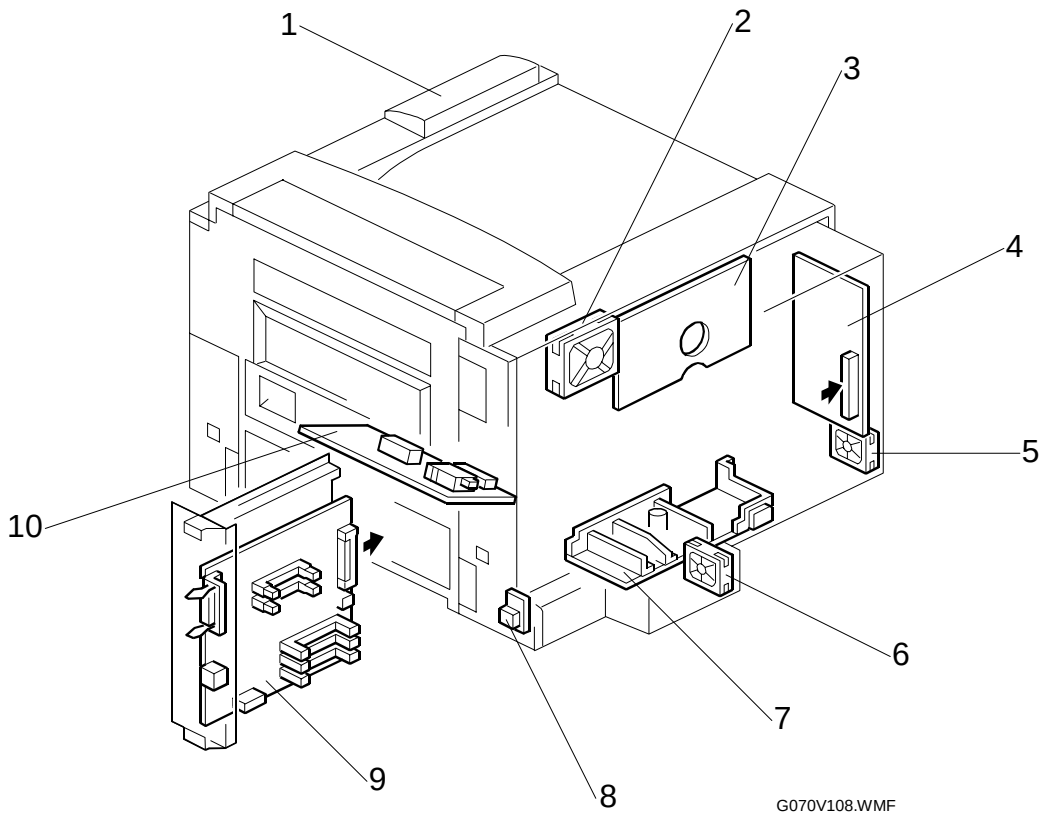
NOTE: Main Switch: The red switch at the front of the machine is connected to a switch on the PSU with a mechanical link (☛ 3.3.5).

Drive Components



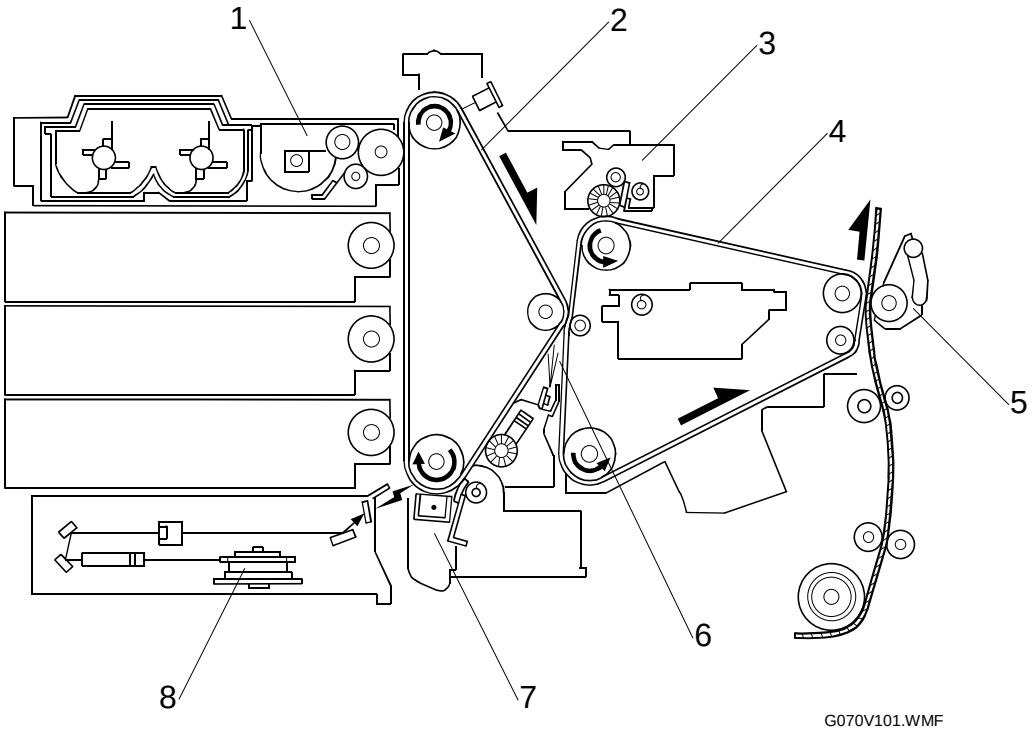
1. Fusing unit motor
2. Transfer belt cleaning clutch
3. Transfer belt cleaning contact solenoid
4. Main motor
5. Development clutch - K
6. Development clutch - Y
7. Development motor
8. Development clutch - C
9. Paper size switch
10. Development clutch - M
11. OPC belt cleaning clutch
12. Paper feed motor
13. Paper feed clutch
14. Registration clutch
15. Paper transfer solenoid

Circuit Boards



1. Operation panel
2. Fusing unit fan
3. IOB
4. BCU
5. Controller fan
6. Ozone fan
7. PSU
8. Temperature-humidity sensor
9. Printer controller
10. High voltage supply board

6.2 PRINTING PROCESS OVERVIEW



1. Development unit
2. OPC belt
3. Transfer belt cleaning unit
4. Transfer belt
5. Transfer roller unit
6. Quenching lamp
7. OPC belt cleaning unit
8. Polygonal mirror

1. **Drum Charge**
   The corona wire gives the drum a negative charge.

2. **Magenta (M) Image Creation**
   a) Laser Exposure
   The laser diode (LD) emits two laser beams. The laser beams go through the lenses and mirrors and reach the OPC belt. The laser beams create a latent image on the OPC surface.
   b) Development
   The development roller transfers negatively charged toner to the latent image. The OPC belt surface holds only one toner color at one time.
   c) Image Transfer
   The OPC belt transfers the single-color toner image to the transfer belt.
   d) Cleaning
   The OPC belt cleaning unit cleans the transfer belt.

3. **Cyan (C) Image Creation**
   Same as 2 a) through 2 d) above.

4. **Yellow (Y) Image Creation**
   Same as 2 a) through 2 d) above.

5. **Black (K) Image Creation**
   Same as 2 a) through 2 d) above.

6. **Paper Transfer**
   The paper transfer roller transfers the combined CMYK toner image to the paper.
   The OPC belt and the transfer belt can hold two A4-size LEF images on their surfaces. When printing on A4 LEF or smaller paper, the OPC and transfer belts process two images in one cycle. At this time, two sheets of paper are consecutively output with little interval between them. This speeds up color print output.

7. **Separation**
   The paper is separated from the transfer belt when the belt curves away from it. A discharge pin assists this process.

8. **Fusing**
   The fusing unit rollers fuse the image to the paper.

9. **Cleaning**
   The transfer belt cleaning unit cleans the belt.

10. **Quenching**
    The quenching lamp erases any remaining charge on the OPC belt.

6.3 PROCESS CONTROL

6.3.1 OVERVIEW

The printer adjusts the following process control parameters:

- Development bias (V_B)
- Charge corona grid voltage (V_G)

These 2 parameters maintain a consistent gamma for the engine.

NOTE: This printer uses only the ID sensor. (There is no TD or potential sensor.)

6.3.2 PROCESS CONTROL STEPS

Six Steps

Depending on the machine's condition, some or all of the following steps may occur:

①: ID sensor calibration
②: Color development bias initialization (M, then C, then Y)
③: K development bias initialization
④: M, C, Y, and K bias fine adjustment
⑤: Charge grid bias voltage adjustment
⑥: Process control interval counter reset

If the main power is turned off (or the cover opened) during a process control session, the session is aborted. Turning the power on (or closing the cover) restarts the process control session.

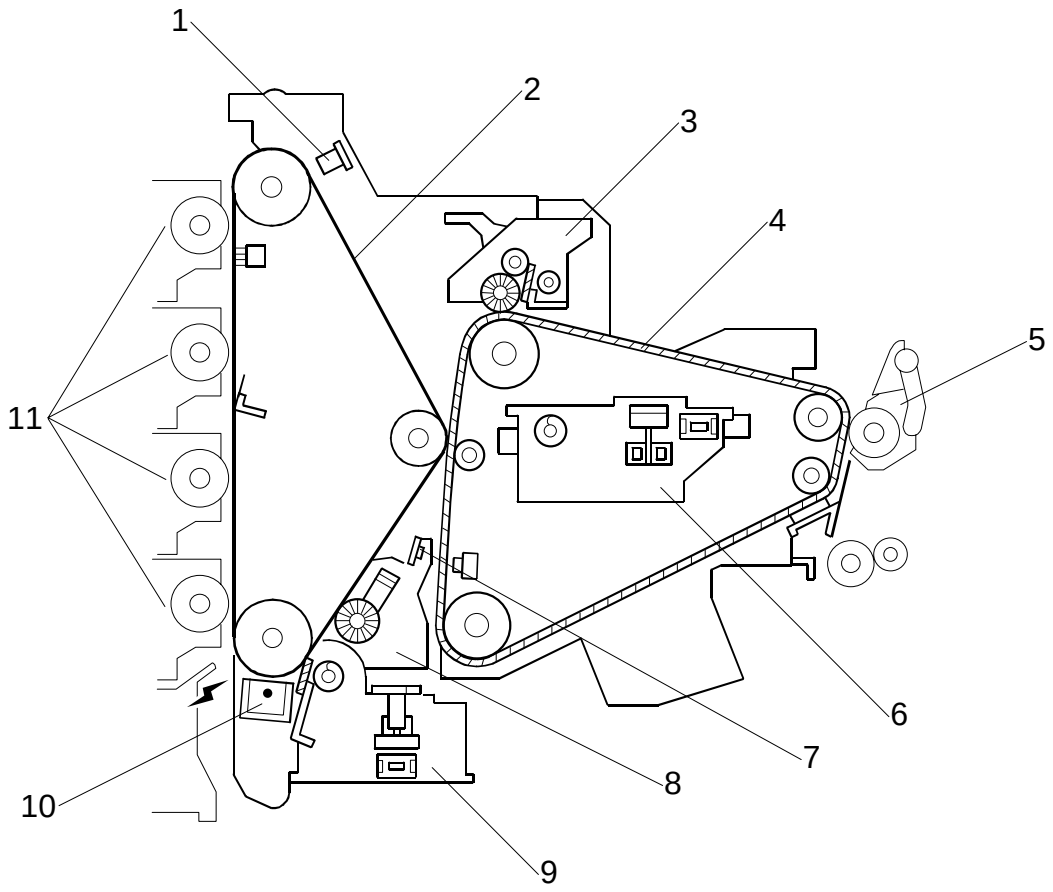
When is Process Control Done?

When an event arises, the specified steps are performed.

Event	Condition	Steps
Forced process control	When forced process control is done (engine SP mode 3-001-1)	① → ⑥
Process control regular interval	When more than 200 sheets in 4C mode (or an equivalent number of sheets in another mode) have been printed upon completion of a job. (The interval can be changed with engine SP3-003-1.)	①, ④, ⑤, ⑥
Power on	When the fusing pressure roller temperature is 60°C or lower immediately after the power is turned on.	①, ④, ⑤, ⑥
Environmental change	When the change in the temperature/humidity sensor output since the previous process control exceeds a certain value. SP3-004 can be used to change the threshold temperature and humidity values.	①, ④, ⑤, ⑥
K toner cartridge or K development unit replacement	This is done after clearing the K toner near-end state (i.e., when a new K development unit is added). The machine idles and when the development roller stops for 10 seconds, indicating that idling is over, process control occurs.	①, ③, ④, ⑤
Color development unit replacement	After the color toner end or near-end state is reset, the machine idles to transfer color toner to the development unit. After idling, process control occurs.	① → ⑥
Color toner cartridge replacement	After the color toner end or near-end state is reset, the machine idles to transfer color toner to the development unit. After idling, process control occurs.	①, ④, ⑤, ⑥
24 hours after previous process control	Same as 'power on' process control	①, ④, ⑤, ⑥
PCU replacement	After a new PCU is detected, it is lubricated (new OPC belt lubricant application mode). Then process control occurs.	① → ⑥

6.4 PHOTOCONDUCTOR UNIT (PCU)

6.4.1 OVERVIEW



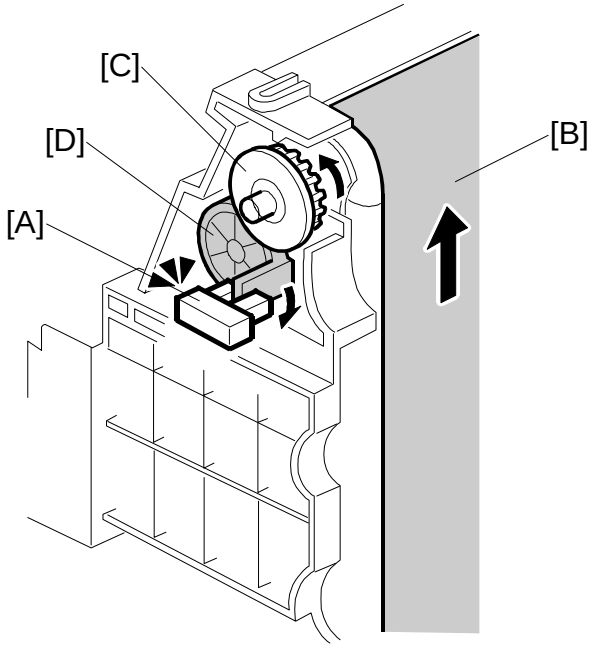
1. ID sensor
2. OPC belt
3. Transfer belt cleaning unit
4. Transfer belt
5. Transfer roller unit
6. T/B waste toner bottle
7. Quenching lamp
8. OPC belt cleaning unit
9. O/B waste toner bottle
10. Charge corona unit
11. Development unit

NOTE: The ID sensor, the transfer roller unit, and the development unit are not included in the photoconductor unit.

The photoconductor unit handles steps 2 through 6 in *Printing Process Overview* (☛ 6.2).

6.4.2 NEW PHOTOCONDUCTOR UNIT DETECTION

[A]: New PCU sensor
[B]: OPC belt
[C]: Gear 1
[D]: Gear 2



G070D321.WMF

New PCU Sensor

The new PCU sensor [A] detects when a new photoconductor unit is installed. The machine then executes process control (☛ 6.3.2).

Mechanism

When a new PCU is placed into the machine, the actuator on gear 2 [D] enters the new PCU sensor (new PCU detected). When the OPC belt starts rotating, gear 1 [C] also starts rotating. Gear 1 also turns gear 2, so the actuator moves down. Gear 2 disengages from gear 1 when the actuator reaches its lowest position, and the actuator never returns to the new PCU sensor.

PCU Counter

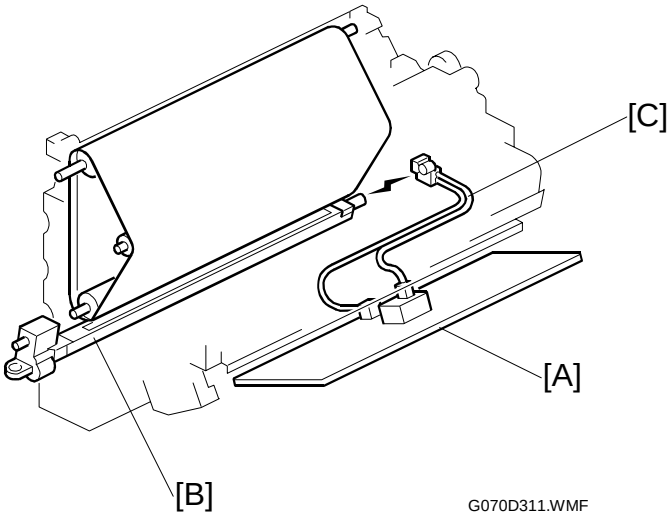
The photoconductor unit can be used for 240 kilo-developments (☛ 2.2). When the unit has been used for 240 kilo-developments, a message is displayed on the operation panel. To check the PCU counter, use SP7-803 (☛ 5.2.2).

6.4.3 CHARGE CORONA UNIT

Power Supply

High voltage supply [A] → Harness [C] → Charge corona unit [B] (negative charge)

[A]: High voltage supply
[B]: Charge corona unit
[C]: Harness

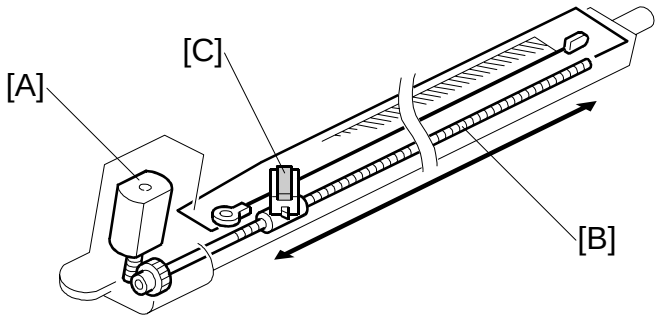


G070D311.WMF

Wire Cleaning

The motor [A] drives the bottom screw [B], which moves the wire cleaner [C] forward or backward, cleaning the corona wire.

[A]: Motor
[B]: Screw
[C]: Wire cleaner



G070D310.WMF

Cleaning Interval

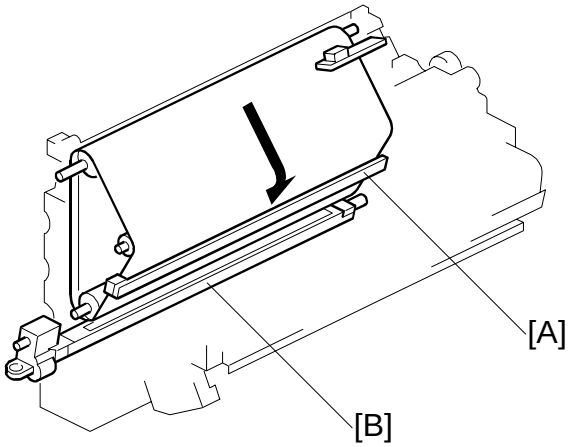
The cleaning feature is activated after 600 development counts (default), at the end of the job. However, if 1000 counts is reached in the middle of a job, printing pauses while the wire is cleaned. The counter counts up as shown in the table.

	Black & White	Color
A4 (LT) LEF (or smaller)	1 count	4 counts
Others	2 counts	8 counts

To set the counter, use SP2-801 (☛ 5.2.2).

Quenching

[A]: Quenching lamp
(☛ CT Photocopying Processes – Quenching)
[B]: Charge corona unit
(☛ CT Photocopying Processes – Charge – Corona Charge – Scorotron Method)

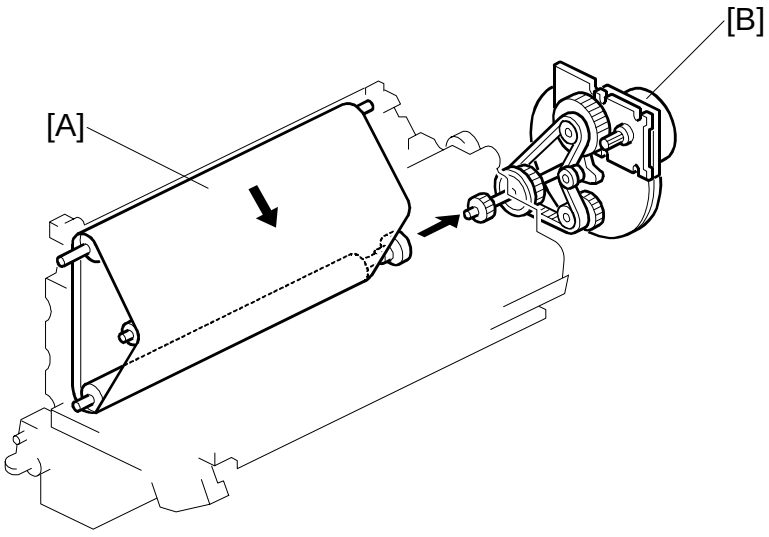


G070D309.WMF

6.4.4 OPC BELT DRIVE

Main motor [B] → Gear → Timing belt → Bottom shaft

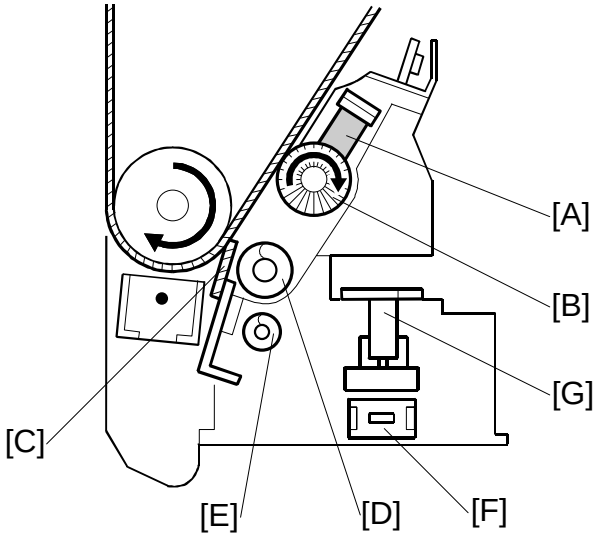
[A]: OPC belt
[B]: Main motor



G070D308.WMF

6.4.5 OPC BELT CLEANING UNIT

[A]: Lubricant bar
[B]: Lubricant brush
[C]: Counter blade
[D]: Toner collection augur 1
[E]: Toner collection augur 2
[F]: Waste toner bottle set sensor
[G]: Waste toner bottle full sensor



G070D313.WMF

Toner Collection Augurs

Toner collection augur 1 [D] collects waste toner; toner collection augur 2 [E] levels the toner in the waste toner bottle.

Counter Blade + Brush

The lubricant brush [B] applies oil to the OPC belt.

☛ CT Photocopying Processes – Cleaning – Counter Blade and Brush

Waste Toner Bottle Sensors

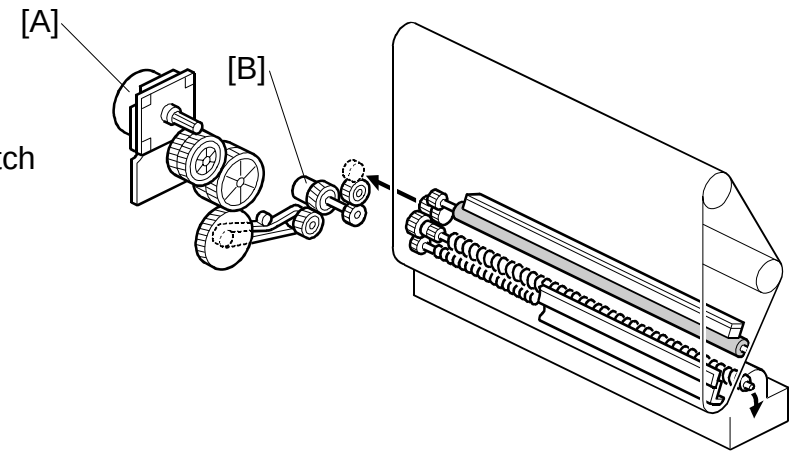
The waste toner bottle set sensor [F] and the waste toner bottle full sensor [G] are at the back of the cleaning unit. The toner bottle set sensor detects whether the toner bottle is installed correctly. The toner bottle full sensor detects when the bottle is full.

When the bottle becomes full, a message is displayed on the operation panel. After the message is displayed, the machine can output 100 prints, then further printing is disabled.

Drive

Development motor [A] → Gear → Timing belt → OPC belt cleaning clutch [B] → OPC belt cleaning unit (including the brush and toner collection coil)

[A]: Development motor
[B]: OPC belt cleaning clutch



G070D312.WMF

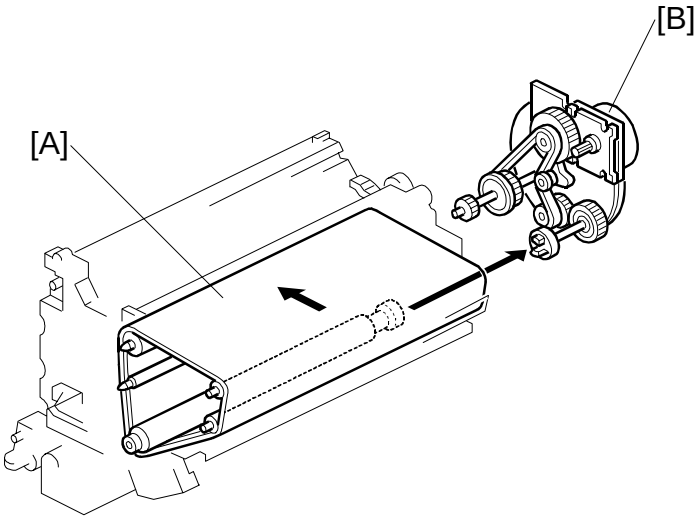
While the development motor is operating, the OPC cleaning clutch is always on.

6.4.6 IMAGE TRANSFER BELT UNIT

Drive

Main motor [B] → Gear & timing belt → Bottom shaft

[A]: Transfer belt
[B]: Main motor

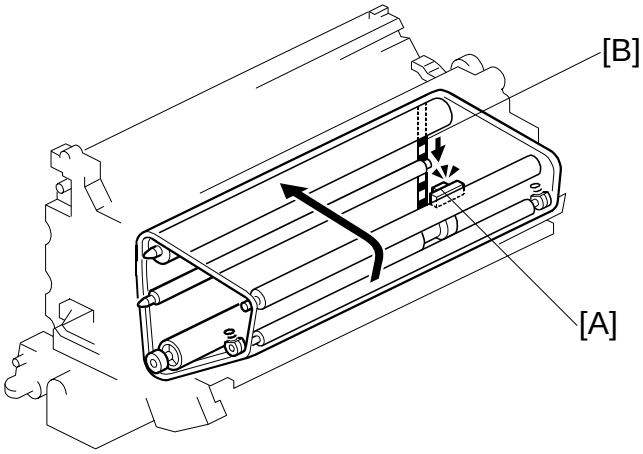


G070D314.WMF

Belt Mark Sensor

To exactly synchronize the four mono color toner images on the transfer belt, the belt mark sensor [A] monitors the belt speed. The sensor detects the marks [B] at the rear of the belt (25 marks per 1 rotation). The sensor output is used to control the belt speed.

[A]: Belt mark sensor
[B]: Mark



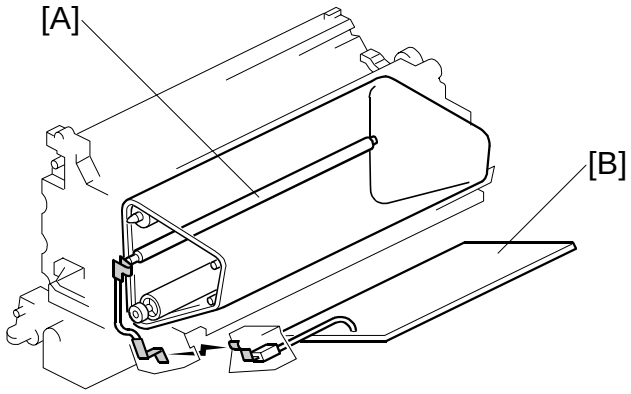
G070D315.WMF

Bias Roller

The bias roller [A] in the transfer belt unit transfers toner from the OPC belt to the transfer belt. The high voltage supply gives the roller a positive charge. The voltage is adjusted based on environmental temperature and humidity.

High voltage supply [B] → Harness → Bias roller [A]

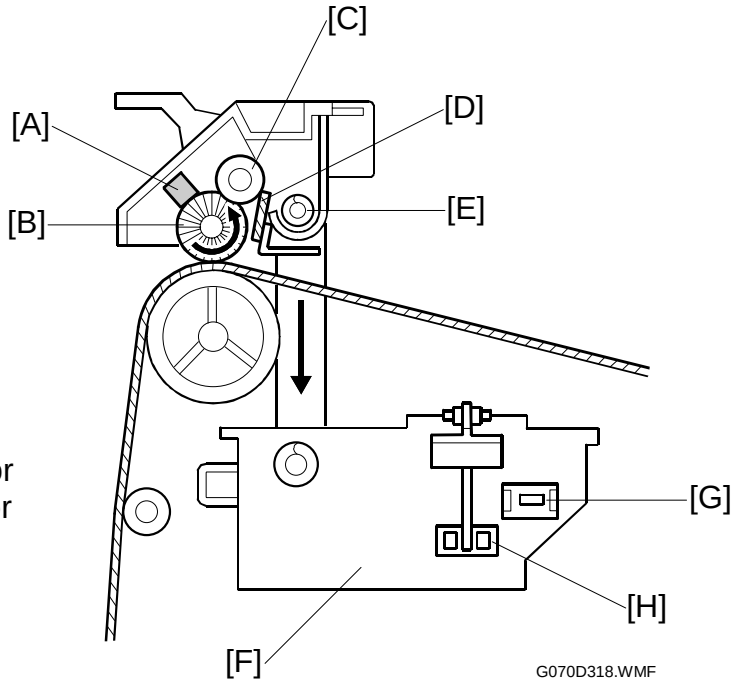
[A]: Bias roller
[B]: High voltage supply



G070D316.WMF

6.4.7 TRANSFER BELT CLEANING UNIT

[A]: Lubricant bar
[B]: Bias brush
[C]: Bias roller
[D]: Cleaning blade
[E]: Collecting coil
[F]: Waste toner bottle
[G]: Waste toner bottle set sensor
[H]: Waste toner bottle full sensor



Bias Brush

The lubricant bar [A] lubricates the bias brush [B]. The brush applies this to the transfer belt surface. The bias brush is positively charged to attract residual toner from the belt surface.

Bias Roller and Cleaning Blade

The bias roller [C] removes toner from the bias brush. The cleaning blade [D] removes the residual toner off the bias roller.

Collecting Coil

The collecting coil [E] transports waste toner to the rear of the transfer belt cleaning unit. The waste toner bottle [F] collects the toner through its opening shutter.

Waste Toner Bottle Sensors

The waste toner bottle set sensor [G] and the waste toner bottle full sensor [H] are at the back of the cleaning unit. The toner bottle set sensor detects whether the toner bottle is installed correctly.

The toner bottle full sensor detects when the bottle is full, and a message is displayed on the operation panel. After the message is displayed, 100 prints can be output then the machine stops and printing is disabled.

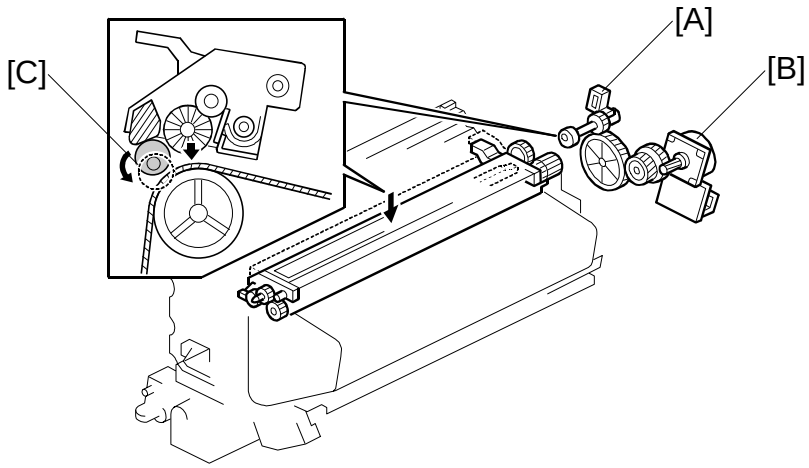
Contact Mechanism

During standby mode, the cleaning unit is away from the transfer belt.

When the toner images are being transferred from the OPC belt to the transfer belt, this mechanism holds the transfer belt cleaning unit away from the belt.

When the solenoid [A] activates, it transmits power from the fusing unit motor [B] to the gear and the cam [C]. The cam moves the bias brush roller into contact with the transfer belt.

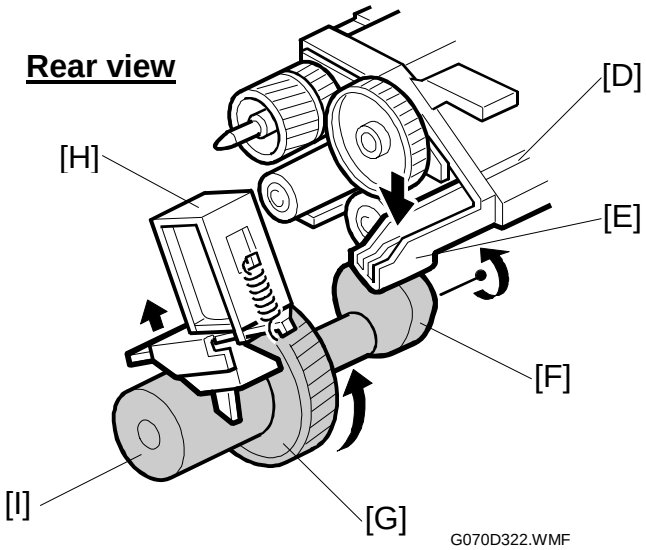
[A]: Transfer belt cleaning contact solenoid
[B]: Fusing unit motor
[C]: Cam



G070D320.WMF

The transfer belt cleaning unit [D] has a lever [E] on its rear side. When the lever rests on the high point of the cam [F], the cleaning unit is away from the transfer belt; when the lever rests on the low point, the cleaning unit contacts the transfer belt.

[D]: Transfer belt cleaning unit
[E]: Lever
[F]: Cam
[G]: Gear
[H]: Transfer belt cleaning contact solenoid
[I]: Half-turn clutch



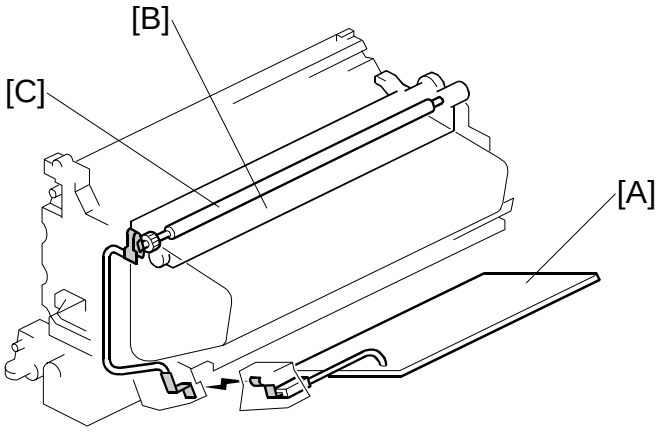
G070D322.WMF

The transfer belt cleaning contact solenoid [H] operates a half-turn clutch [I] to control the contact mechanism.

Power Supply

High voltage supply [A] (positive charge) → Bias roller [C] (conductive) → Bias brush roller [B]

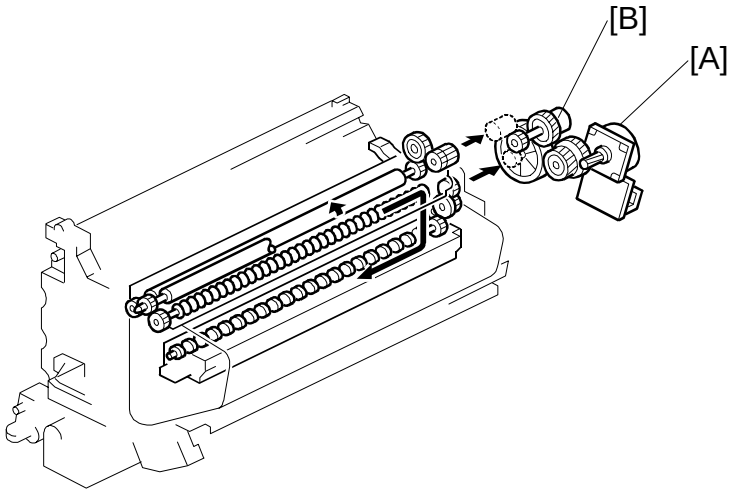
[A]: High voltage supply
[B]: Bias brush roller
[C]: Bias roller



Drive

Fusing unit motor [A] → Gear → Clutch [B] → Unit

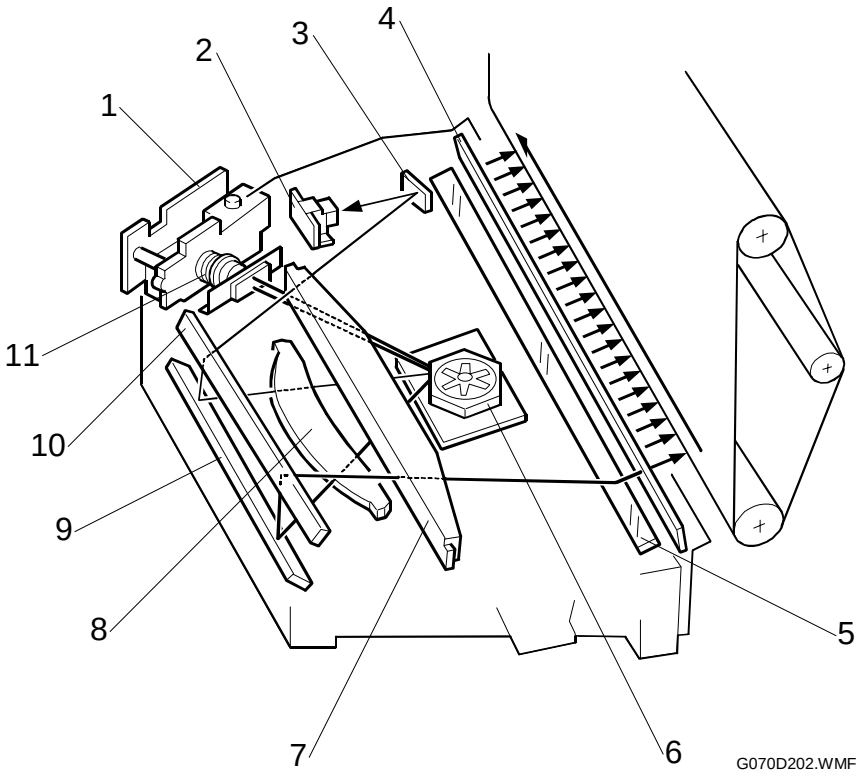
[A]: Fusing unit motor
[B]: Transfer belt cleaning clutch



G070D317.WMF

6.5 LASER EXPOSURE

6.5.1 OVERVIEW



1. LD unit
2. Laser synchronization detection board
3. Synchronization detection mirror
4. Dust shield glass
5. 3rd mirror
6. Polygonal mirror motor
7. WT lens
8. F theta lens
9. 1st mirror
10. 2nd mirror
11. Cylindrical lens

1. The LD unit simultaneously emits two laser beams. This is true both in full-color mode and in single-color mode.
2. The polygonal mirror motor rotates at 21,024 rpm (both in the full-color mode and in the single-color mode).
3. Laser beam path: LD unit → Polygonal mirror → WTL lens → F theta lens → 1st mirror → 2nd mirror → Synchronization detection mirror
   NOTE: The synchronization detection board simultaneously monitors both laser beams.

Dust Shield Glass Cleaning

The user cleans the dust shield glass by pushing and pulling the lever at the front of the cleaner.

LD Unit Adjustment

There are no field service adjustments for this LD unit.

Polygonal Mirror

☛ CT Digital Processes – Printing – Laser Printing – Optical Components

Laser Diode Power Control

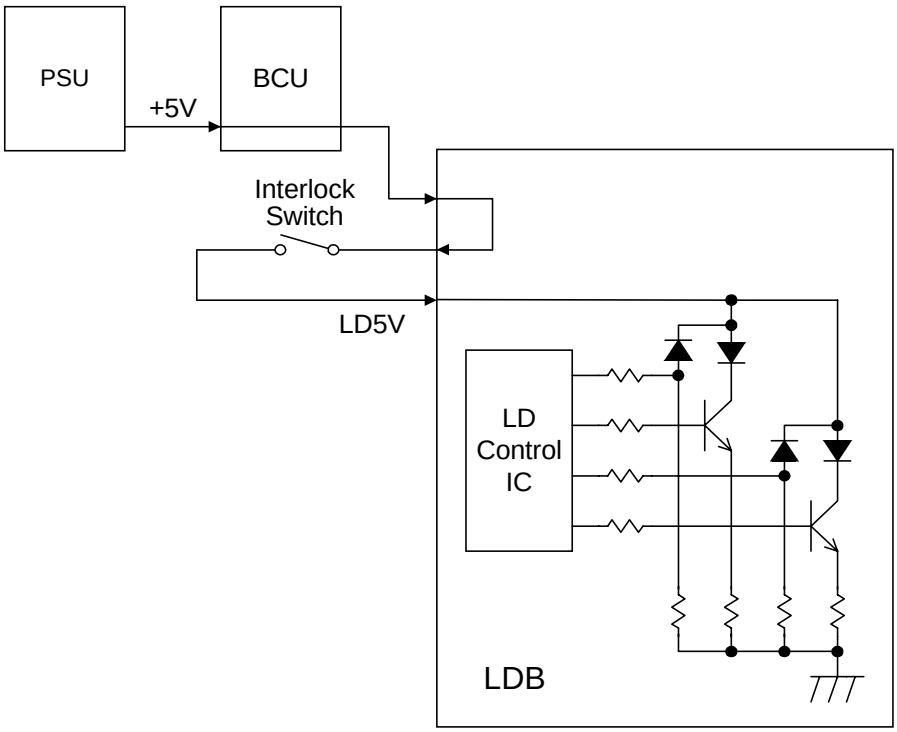
☛ CT Digital Processes – Printing – Laser Printing – Laser Diode Power Control

Done by the LD control board

Maintenance Adjustment

The LD unit does not need adjustment when replaced.

6.5.2 LD SAFETY SWITCH



G070D999.WMF

The interlock switch is at the top of the front cover.

This switch is in series with the 5-V circuit leading to the LD unit.

When the front, left, or right cover is opened, the switch interrupts the power supply, preventing laser emission.

Operation Panel Message and Switch Mechanism

If the covers are all closed, all three switches are on.

If a cover is opened, the indication on the display panel depends on the combination of signals from the interlock switch and the two cover switches.

The interlock switch turns off when any of these three covers is opened.

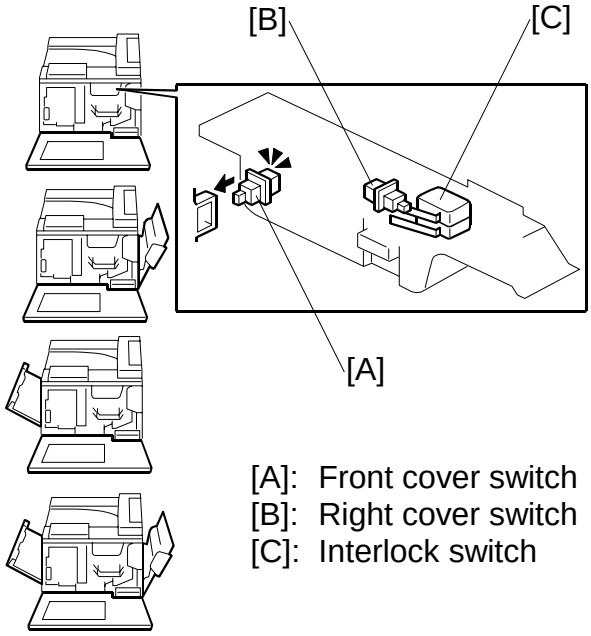
"Close Front Cover"

Front cover switch	Off
Right cover switch	On
Interlock switch	Off

Front cover switch	Off
Right cover switch	Off
Interlock switch	Off

Front cover switch	Off
Right cover switch	On
Interlock switch	Off

Front cover switch	Off
Right cover switch	Off
Interlock switch	Off



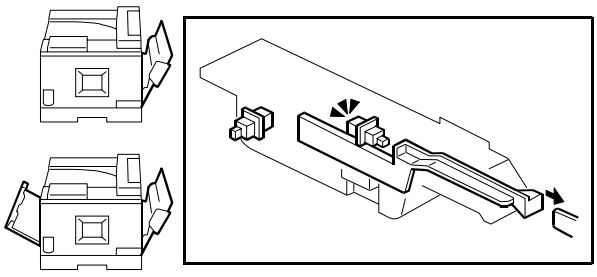
[A]: Front cover switch
[B]: Right cover switch
[C]: Interlock switch

G070D701.WMF

"Close Right Cover"

Front cover switch	On
Right cover switch	Off
Interlock switch	Off

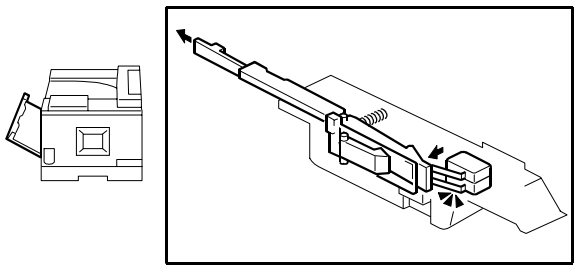
Front cover switch	On
Right cover switch	Off
Interlock switch	Off



G070D702.WMF

"Close Left Cover"

Front cover switch	On
Right cover switch	On
Interlock switch	Off



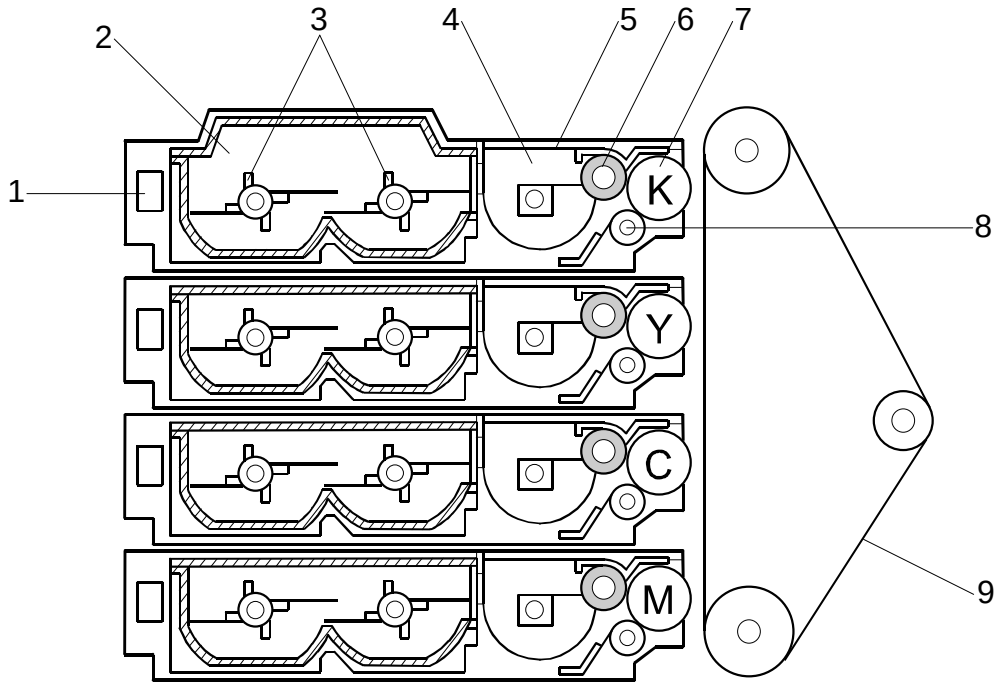
G070D703.WMF

Off: Switch open

Detailed Descriptions

6.6 DEVELOPMENT

6.6.1 OVERVIEW



G070D301.WMF

K: black, **Y**: yellow, **C**: cyan, **M**: magenta

1. Memory chip
2. Toner cartridge
3. Toner cartridge agitators
4. Development agitator
5. Development unit
6. Toner supply roller
7. Development roller
8. Doctor roller
9. OPC belt

☛ CT: Development – Mono-component Development – Double Development Roller Process

The development units operate in the following order: M → C → Y → K.

6.6.2 DEVELOPMENT UNIT

Rollers and Agitators

Each development unit has 3 rollers and 3 agitators (2 toner cartridge agitators and 1 development agitator):

Toner cartridge agitators:	Evenly mixes the toner in the cartridge, and sends it to the development unit
Development agitator:	Evenly mixes the toner in the development unit, and sends it to the toner supply roller
Toner supply roller:	Supplies the development roller with toner
Development roller:	Transfers the toner to the OPC
Doctor roller:	Regulates the amount of the toner on the development roller

Replacing Units

Near-end condition: “Replace Development Unit, xxxx-unit” is displayed when a development unit has made 120 k prints. If more than one unit reaches 120 k at the same time, the messages for each unit will be displayed one after the other.

End condition: When toner end is detected while the development unit is in a near-end condition, that unit enters the end condition. The machine cannot print. The end condition is cleared when that unit is replaced. There is no need to replace all 4 units. However, if each colour (C, M, Y) is used at the same rate, they will enter the end condition at about the same time.

The user can replace only the K unit, the color units (Y, C, and M), or all units (K, Y, C, and M) at the same time.

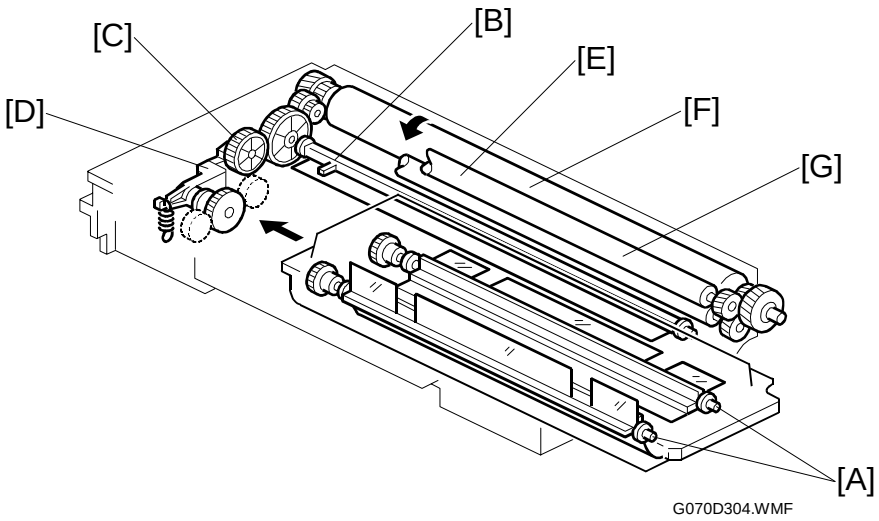
The color units are available for the user as a set, but can be replaced individually if required (individual units are available as spare parts).

Recovery: Each new development unit contains a starter toner cartridge. When the machine detects the memory chip on the new starter cartridge, it will clear the development unit end condition. The memory chip on a normal toner cartridge cannot clear the development unit end condition.

Memory Chip

Each toner cartridge contains a memory chip, which contains information on whether the cartridge is “new” or “not new”.

6.6.3 TONER SUPPLY MECHANISM



[A]: Toner cartridge agitators
[B]: Development unit agitator
[C]: Development clutch
[D]: Lever
[E]: Toner supply roller
[F]: Development roller
[G]: Doctor roller

Toner Cartridge Agitators

Each toner cartridge contains two agitators [A]. They are equipped with several mylar sheets, which agitate the toner and send it to the development unit agitator [B].

Drive Power Path

Development motor → Development clutch [C] → Lever [D] → One-way clutch → Agitators

Development Unit Agitator

The development unit agitator [B] agitates the toner and sends it to the toner supply roller [E].

Toner Supply Roller and Doctor Roller

The toner supply roller [E] sends the toner to the development roller [F]. The doctor roller [G] controls the thickness of toner on the development roller, before the toner is transported to the OPC belt.

Shutter

Each toner cartridge has a shutter. The shutter is pushed open when the cartridge is installed in the development unit.

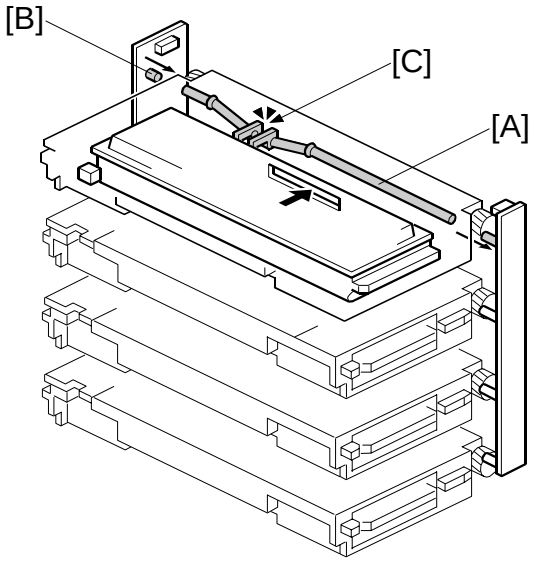
6.6.4 TONER END DETECTION

Mechanism

An optic fiber [A] in each development unit detects toner near-end. Light is emitted from the rear end [B] of the unit. The optic fiber has a junction [C] in the middle.

When the development unit is filled with toner, the toner breaks the light path through the junction. When the unit is running out of toner, the light path is not broken.

[A]: Optic fiber
[B]: Light emission
[C]: Junction



G070D306.WMF

Toner Near-end Detection

The machine counts how many pixels have been printed with each toner cartridge. When there are 500 prints remaining until the estimated toner end condition, toner near-end is indicated.

Toner End Detection

If the toner end sensor output indicates toner end persistently, the machine's operation then depends on how many prints are remaining.

250 or more prints remaining:

The development unit with the almost-empty cartridge idles for 40 s. Then, it idles again for another 20 s. During this 20 s period, the toner end sensor is checked every 10 ms. If toner end is not detected during this 20 s period, the machine returns to standby mode after idling all development units for 90 s. However, if toner end was detected during that 20 s period, the machine detects toner end and printing is disabled.

Fewer than 250 prints remaining:

Toner end is indicated immediately, and the machine stops.

Toner End Recovery

When the machine detects a new toner cartridge, it drives the development unit for that cartridge for about 3 minutes.

During this time, the development clutch is repeatedly activated for 10 s and deactivated for 1 s.

The machine checks the toner end condition every 20 s. The end and near-end conditions are cleared if the sensor detects sufficient toner. However, if the sensor does not detect sufficient toner after 5 minutes of development unit drive, the toner end condition remains and a new cartridge must be added.

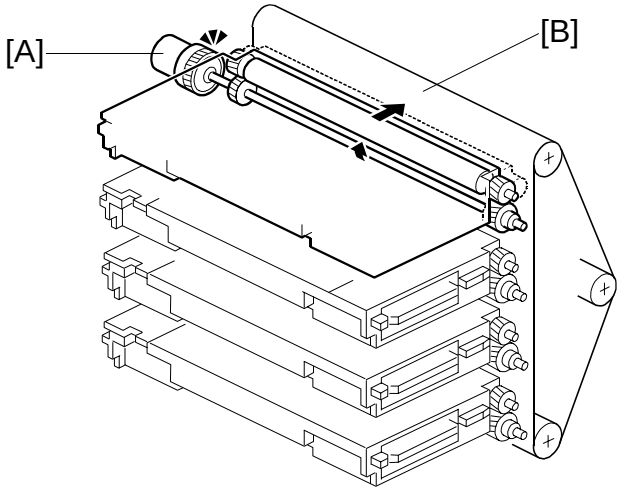
6.6.5 DEVELOPMENT UNIT CONTACT MECHANISM

Mechanism

Each development unit has an independent clutch. When a development clutch turns on, a gear under the development unit moves the development unit into contact with the OPC belt. When the clutch turns off, two springs (one at the front and one at the rear) detach the development unit from the OPC belt.

☛ CT Color Processes – Color Development – Fixed Position Development Systems – Similar to Example 2: Model G033

[A]: OPC belt
[B]: Development clutch



G070D305.WMF

Reverse Rotation

The gears reverse at intervals to prevent toner from clumping.

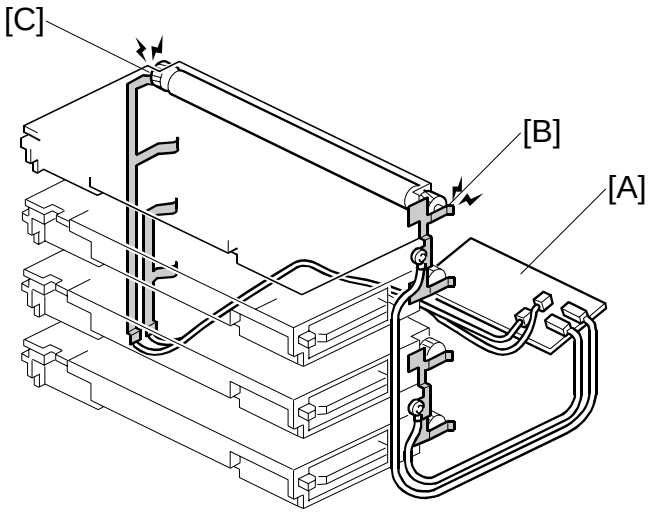
6.6.6 POWER SOURCE

Development, Toner Supply, and Doctor Rollers

When a development unit comes into contact with the OPC belt, the bias terminal [B] comes into contact with the harness terminal. Then, a negative charge is supplied to the unit. The size of the negative charge on the doctor roller is the same as the development roller charge and toner supply roller charge.

High-voltage power supply [A] → Harness → Bias terminal [B] (negative charge)

[A]: High voltage supply
[B]: Bias terminal
[C]: Rear-side terminal



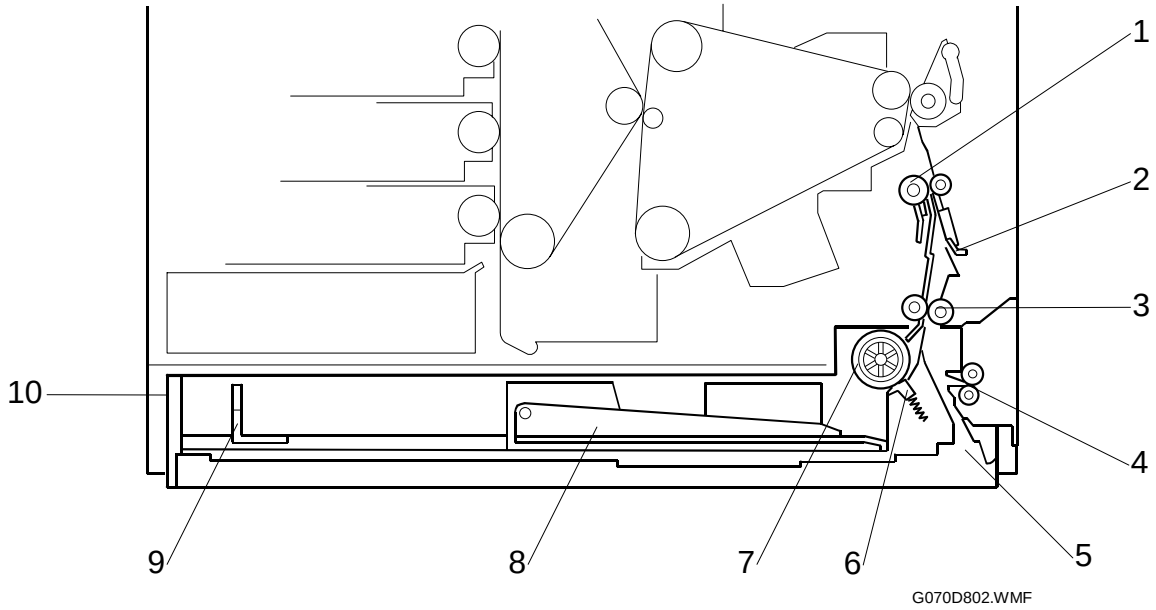
Doctor Roller

The doctor roller restricts the amount of toner on the development roller. The high voltage supply board can apply a different negative voltage to the doctor roller through the rear-side terminal cable. However, the same negative charge is applied to the doctor roller through the front side terminal at the moment.

☛ CT Mono-component Development – Toner Metering Blade (similar principle)

6.7 PAPER FEED

6.7.1 OVERVIEW



1. Registration roller
2. Path from duplex
3. Vertical transport roller
4. Path from by-pass tray
5. Path from optional paper tray
6. Friction pad
7. Feed roller
8. Base plate
9. Paper end fence
10. Standard tray

The printer comes with two paper feed stations. It can be equipped with up to four paper feed stations.

Tray	Number	Main/Optional
Standard tray	1	Main unit
Bypass tray	1	
Paper tray unit	1 or 2	Optional units

Transport Speed

Until the registration roller, the paper travels at 240 mm/s. This high initial speed ensures that the first output time is as short as possible.

From the registration roller to the exit, the paper travels at the following speeds:

178 mm/s (plain paper)
89 mm/s (thick paper or OHP films)

Friction Pad

☛ CT Handling Paper – Paper Feed – Paper Feed Methods – Friction Pad

NOTE: The roller and pad are packaged as a maintenance kit, with the fusing unit. Replace the roller and pad as a unit (not separately).

6.7.2 STANDARD TRAY DRIVE

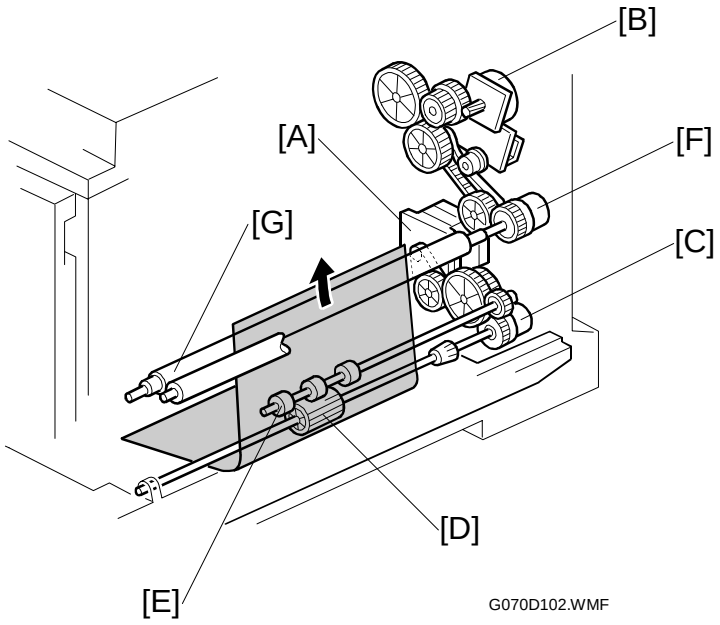
Feed and Vertical Transport Rollers

Feed motor [A] → Feed clutch [C] → Feed roller [D]/vertical transport roller [E]

Registration Roller

Fusing unit motor [B] → Registration clutch [F] → Registration roller [G]

[A]: Feed motor
[B]: Fusing unit motor
[C]: Feed clutch
[D]: Feed roller
[E]: Vertical transport roller
[F]: Registration clutch
[G]: Registration roller

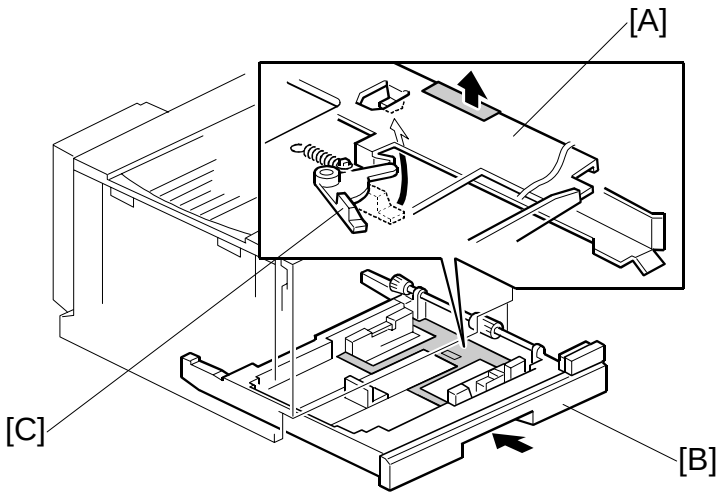


6.7.3 STANDARD TRAY – BOTTOM PLATE LIFT

Lift Mechanism

The spring under the bottom plate [A] presses the plate upward. When you press the bottom plate as far down as possible, the hook on lever [C] holds the plate. The lever releases the bottom plate when it is pressed by the protruding part on the right tray rail; this happens when the tray [B] is completely pushed into the machine.

[A]: Bottom plate
[B]: Tray
[C]: Lever



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Paper Near End Detection

The bottom plate gradually rises as paper is fed. The bottom plate position is checked with a feeler which is linked to the paper near-end sensor (☛ 6.1.4). The sensor is actuated when about 50 sheets are left in the tray, and the paper near end message appears on the operation panel.

Paper End Detection

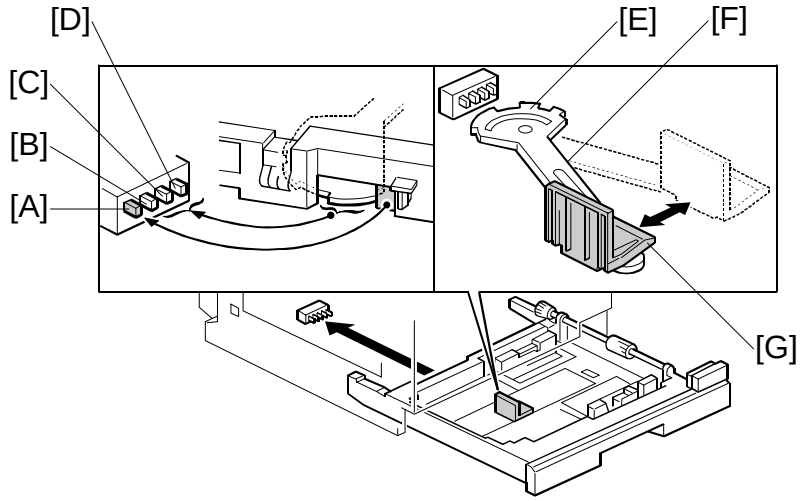
When paper runs out, the paper end sensor (☛ 6.1.4) feeler drops through the opening in the bottom plate. Then, the paper end message appears on the operation panel.

6.7.4 STANDARD TRAY - PAPER SIZE DETECTION

Mechanism

The end fence [G] moves the lever [F], which moves a different set of notches on the actuator [E] into contact with the paper size switches [B]~[D]. When you put the tray in the main unit, the rear fence of the tray and the actuator activate the switches; from this the machine detects the presence of the tray, and the paper size.

[A]: Tray set switch
[B]: Paper size switch
[C]: Paper size switch
[D]: Paper size switch
[E]: Actuator
[F]: Lever
[G]: End fence



G070D104.WMF

Switch Pattern

When the tray is pushed into the machine, the leftmost switch [A] is always activated by the rear fence of the tray; this switch detects the presence of the tray. The combination of the other 3 switches [B]~[D] detects the paper size.

Paper Size		Switch*1			
North America	**Europe/Asia**	**[A]**	**[B]**	**[C]**	**[D]**
DLT SEF*3	A3 SEF*3	On	Off	On	On
LG SEF*2	B4 SEF*2	On	On	On	On
A4 SEF	A4 SEF	On	On	Off	Off
LT SEF	LT SEF	On	Off	Off	Off
B5 SEF*5	B5 SEF*5	On	Off	Off	On
LT LEF*4	A4 LEF*4	On	On	On	Off
B5 LEF	B5 LEF	On	On	Off	On
—	A5 LEF	On	Off	On	Off
(No tray)		Off	Off	Off	Off

*1 On: Pushed Off: Not pushed
*2 Selected with SP1-902-1 (LG SEF/B4 SEF)
*3 Selected with SP1-902-2 (DLT SEF/A3 SEF)
*4 Selected with SP1-902-3 (LT LEF/A4 LEF)
*5 Selected with SP1-902-4 (B5 SEF/10.5" x 7.25" SEF)

NOTE: 1) For the input check table, ☛ 5.2.2.
2) Other paper sizes are not detected. Use the Paper Input – Tray paper Size user tool to set paper sizes.

6.7.5 BYPASS TRAY

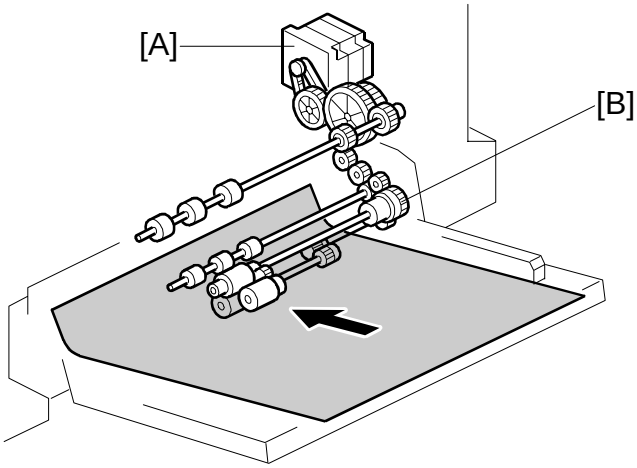
Paper Feed Mechanism

The FRR (feed and reverse roller) feed mechanism (☛ CT) is used.

Bypass Tray Drive Power Path

Paper feed motor [A] → Gears → Feed clutch [B] → Rollers

[A]: Paper feed motor
[B]: By-pass paper feed clutch

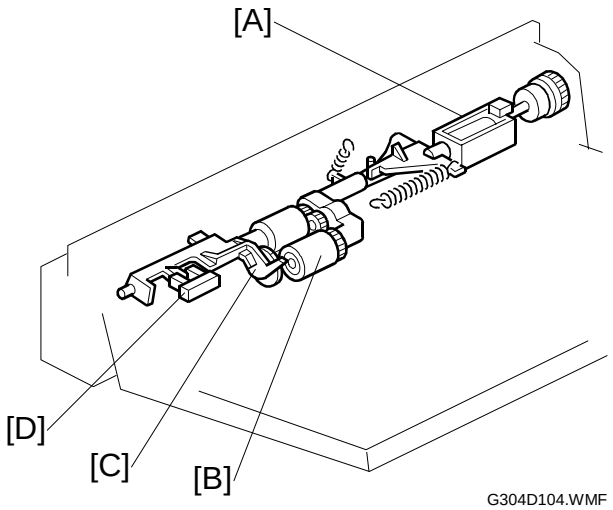


G070D153.WMF

Pick-up Solenoid

The by-pass pick-up solenoid [A] is mechanically linked to the pick-up roller [B]. When the solenoid turns on, the pick-up roller touches the top sheet of the paper.

[A]: By-pass pick-up solenoid
[B]: Pick-up roller
[C]: Feeler
[D]: Paper end sensor



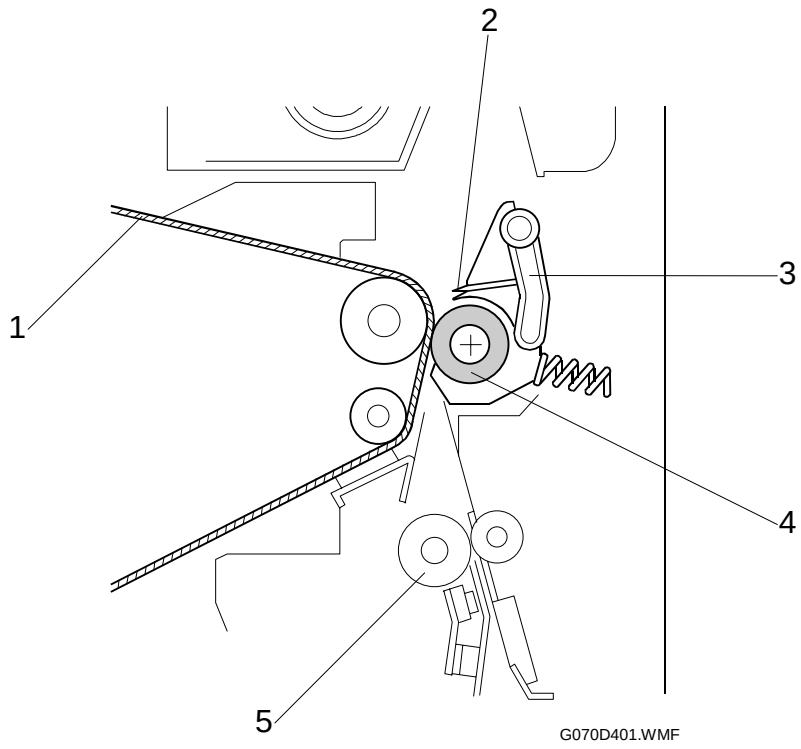
G304D104.WMF

Paper End Sensor

The feeler [C] is linked with the paper end sensor [D]. The paper end sensor functions not only as a paper end sensor but also as a paper set sensor.

6.8 PAPER TRANSFER AND SEPARATION

6.8.1 OVERVIEW



1. Transfer belt
2. Discharge plate
3. Separation lever
4. Transfer roller
5. Registration roller

Jammed Paper Release

When you open the right cover, the units release the paper. This mechanism helps quickly clear paper jams.

Image Transfer and Paper Separation

☛CT Photocopying Processes – Image Transfer and Paper Separation – Transfer Roller + Discharger – Example 2: Models A172/A199

6.8.2 MECHANISM

Contact/Separation

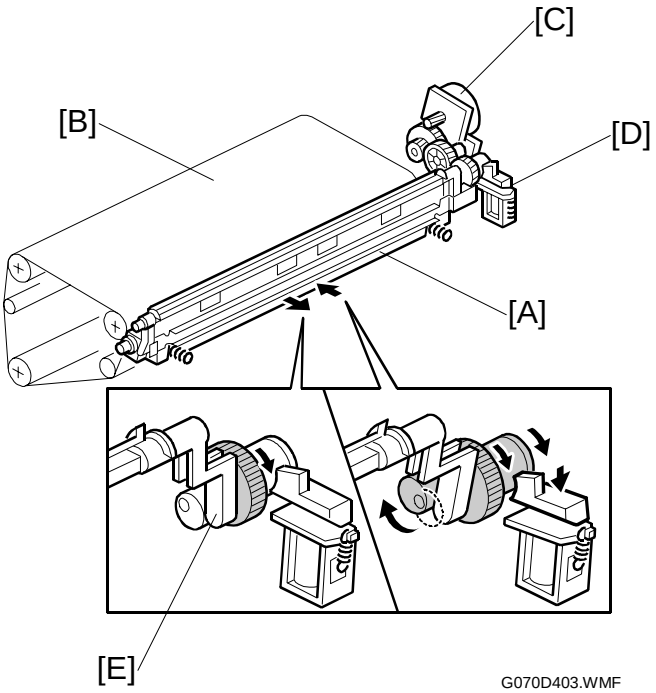
When transferring toner to paper, the unit contacts the belt. At other times during printing, the transfer roller unit [A] stays away from the transfer belt [B].

Drive Power Path

Fusing unit motor [C] → Gear → Paper transfer solenoid [D] → Cam → Contact/separation lever [E] → Paper transfer roller unit

The fusing motor also drives the paper transfer roller.

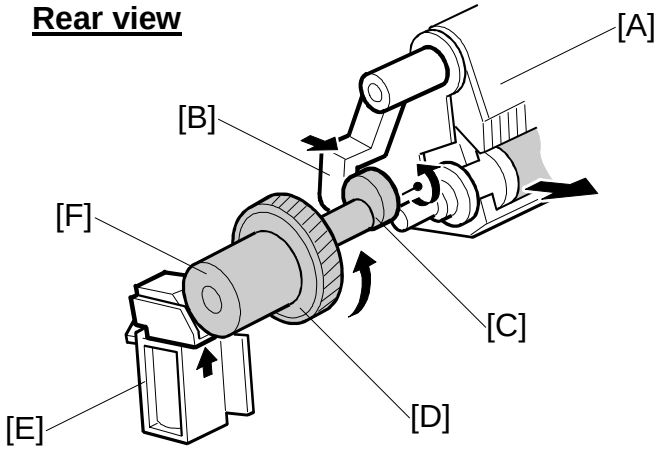
[A]: Transfer roller unit
[B]: Transfer belt
[C]: Fusing unit motor
[D]: Paper transfer solenoid
[E]: Contact/separation lever



The transfer roller unit [A] has a contact/separation lever [B] on its rear side. When the lever rests on the high point of the cam [C], the transfer roller unit is away from the transfer belt; when the lever rests on the low point, the transfer roller unit contacts the transfer belt.

[A]: Transfer roller unit
[B]: Contact/separation lever
[C]: Cam
[D]: Gear
[E]: Paper transfer solenoid
[F]: Half-turn clutch

Rear view



G070D404.WMF

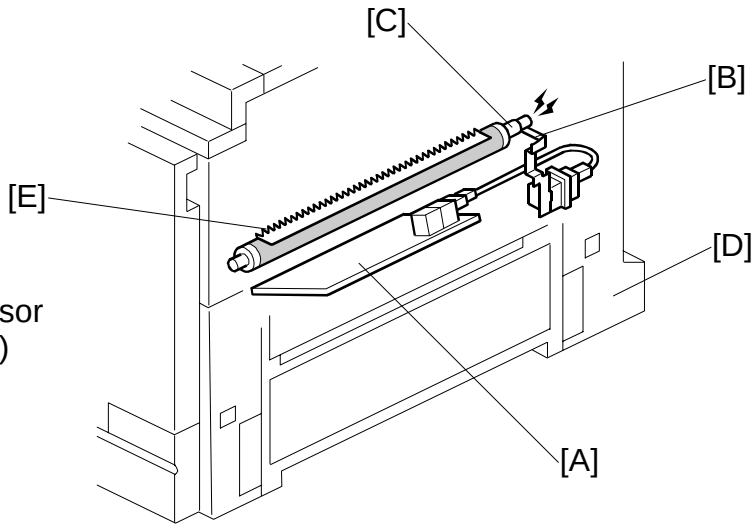
The paper transfer solenoid [E] operates a half-turn clutch [F] to control the contact When the solenoid releases the clutch, two springs on the right cover (☛ 3.8.2) push the transfer roller unit away from the transfer belt.

6.8.3 POWER SUPPLY

Electric Power Path

High voltage supply [A] → Terminal [B] → Transfer roller axis [C]

[A]: High voltage supply
[B]: Terminal
[C]: Transfer roller axis
[D]: Temperature-humidity sensor (inside the rear-right cover)
[E]: Discharge plate (negative charge)



G070D402.WMF

Transfer Roller Bias

Normally, a constant current is applied to the transfer roller shaft [C].

The conductive bearing allows the electrical connection between the bias terminal [B] and the transfer roller shaft.

The current varies with paper type, size, and thickness as well as humidity.

Discharge Plate

The discharge plate [E] discharges the remaining charge on the paper going past the transfer roller. This helps the paper separate from the transfer belt.

Temperature/Humidity Control

The temperature-humidity sensor [D] is inside the rear-right cover. The sensor is used to control the power for the transfer roller (☛ 5.2.2).

Roller Cleaning

The transfer roller is cleaned at the following times:

- After the user clears a paper jam
- After the user closes the front cover
- Just after the main power has been switched on
- While the doctor roller is reversing. This is done every 25 prints (SP 3-910), to remove toner blockages in the development unit; if the 25-print interval expires in the middle of a job, it is done at the end of the job.

After paper passes the transfer roller, the paper transfer solenoid releases the transfer roller from the image transfer belt.

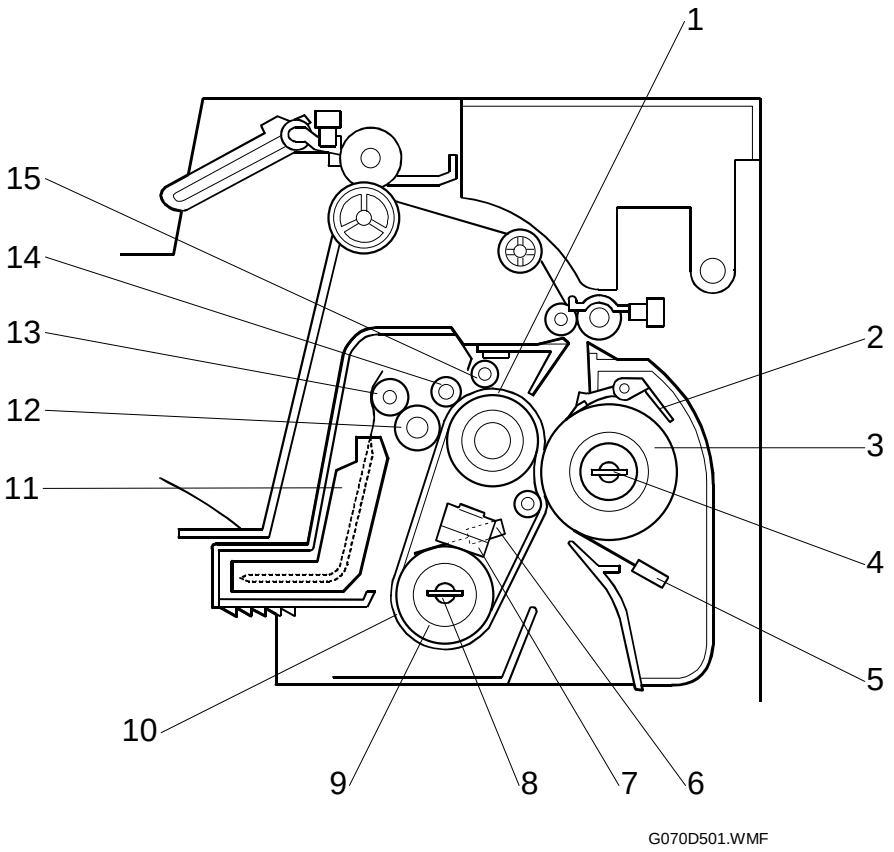
Then, a certain time after the trailing edge of the paper passes the registration sensor, the following steps occur:

1) The paper transfer solenoid turns on again, and the transfer roller contacts the transfer belt.
2) A negative charge is applied to remove toner stuck to the transfer roller.
3) Positive and negative charge is applied alternately to remove any toner that is still stuck to the transfer roller.

Toner removed from the transfer roller goes back to the transfer belt, where it is removed by the transfer belt cleaning unit.

6.9 FUSING UNIT AND OIL SUPPLY UNIT

6.9.1 OVERVIEW

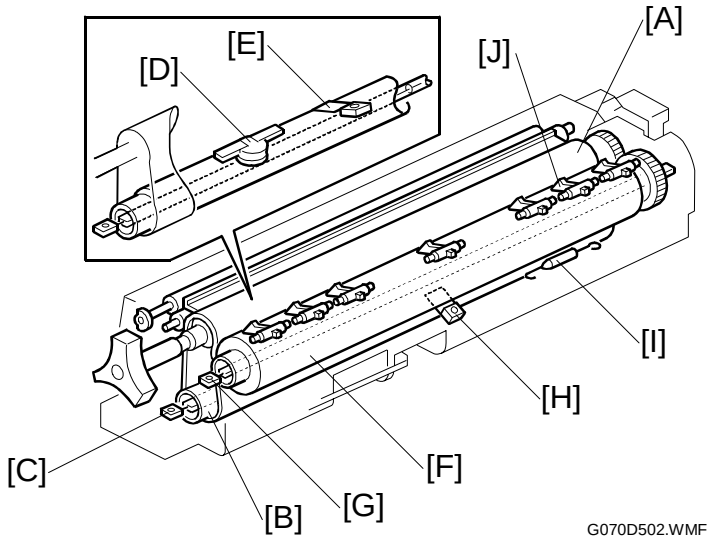


1. Hot roller
2. Pressure roller separation pawl
3. Pressure roller
4. Pressure roller fusing lamp
5. Pressure roller thermistor
6. Heating roller thermistor
7. Thermostat
8. Heating roller fusing lamp
9. Heating roller
10. Fusing belt
11. Oil supply unit
12. Oiling roller
13. Oil supply roller
14. Sponge cleaning roller
15. Metal cleaning roller

NOTE: The fusing unit and the oil supply unit are user-replaceable. After 119 k prints, fusing unit near-end is indicated. After 120 k prints, fusing unit end is indicated, and printing stops until a new unit is added and the counter has been reset.

6.9.2 FUSING UNIT CONFIGURATION

[A]: Fusing belt
[B]: Heating roller
[C]: Lamp (770 W)
[D]: Thermostat
[E]: Thermistor
[F]: Pressure roller
[G]: Lamp (350 W)
[H]: Thermistor
[I]: Thermofuse
[J]: Pawl



Fusing Belt

This machine uses a fusing belt [A]. The paper goes between the fusing belt and the pressure roller [F].

Oil Supply

The oil supply unit contains a piece of felt. The felt absorbs the silicone oil in the unit and supplies it to the oil supply roller.

Heating Roller Lamp

The center of the heating roller [B] contains a lamp (770 W) [C]. The thermostat [D] and thermistor [E] control the temperature of the roller surface. The machine cuts power to the lamp when it detects 220°C. The thermostat cutoff point is 200°C.

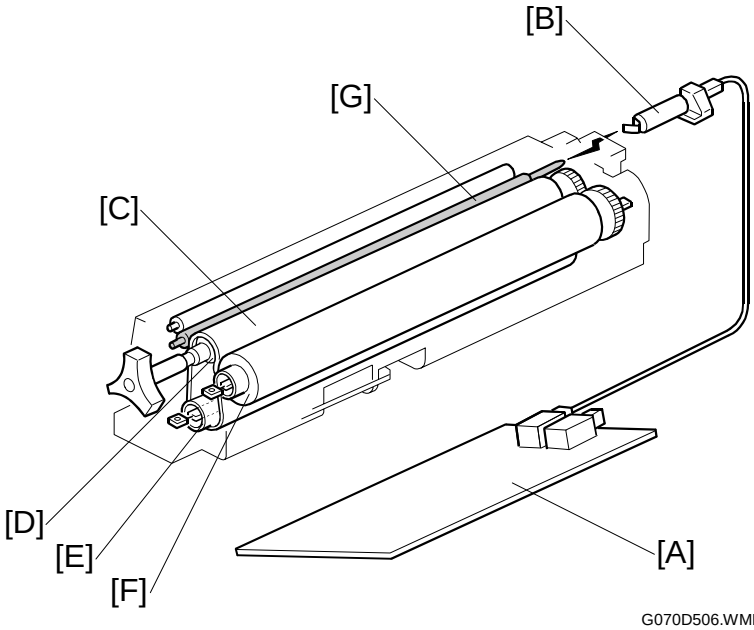
Pressure Roller Lamp

The center of the pressure roller [F] contains a lamp (350 W) [G]. The thermistor [H] and thermofuse [I] control the temperature of the roller surface. The machine cuts the lamp power when it detects 220°C. The thermofuse cutoff point is 131°C.

Pressure Roller Pawls

The pawls [J] above the pressure roller help prevent paper jams.

[A]: High voltage supply
[B]: Terminal
[C]: Fusing belt
[D]: Hot roller
[E]: Heating roller
[F]: Pressure roller
[G]: Oiling roller



G070D506.WMF

Fusing Bias

The high voltage supply [A] provides the fusing bias. The fusing bias is a negative bias. It quenches static electricity created on the belt [C] and rollers [D]~[F] by the paper. This prevents the belt and rollers from attracting dust and dirt.

Fusing Unit SCs

If a thermistor/thermostat problem occurs, a fusing unit SC may be displayed on the operation panel. Fusing unit SCs disable the machine (☛ 4.1.1). To reset fusing unit SCs, use SP5-810 (☛ 5.2.2).

6.9.3 TEMPERATURE CONTROL

The table lists default settings and variable ranges for temperature control.

External temperature (*1)			More than 15°C ~ less than 30°C		15°C or lower		30°C or higher	
Roller			Heating	Press.	Heat.	Press.	Heat.	Press.
Fusing idling start (*2)			145	30	145	30	145	30
Print ready (*3)			165	80	*+5 (variable) Heat.: SP1-105-27 Press.: SP1-105-28*		*–5 (variable) Heat.: SP1-105-29 Press.: SP1-105-30*	
Ready (standby mode)			175	130				
Energy saver		1	150	120				
		2	Room temp.	Room temp.				
Printing	Plain paper	Mono color	160	Lamp off				
		Full color	170	Lamp off				
	Middle thick (*4)	Mono color	170	Lamp off				
		Full color	180	Lamp off				
	Thick	Mono color	165	Lamp off				
		Full color	175	Lamp off				
	OHP	Mono color	170	Lamp off				
		Full color	180	Lamp off				
	Duplex (*5)	Mono color	155	Lamp off				
		Full color	165	Lamp off				
Variable range (*6)			100 ~ 190	30 ~ 200	0 ~ +20		0 ~ –20	

*1: External temperature is measured (temperature/humidity sensor) when the main switch is turned on and when a job start signal is received.

*2: The pressure and heating rollers start idling.

*3: Fusing idling stops when both roller temperatures reach the print ready condition. The printer can process jobs when the rollers reach this temperature during warm-up.

*4: A user tool specifies the paper type in each tray (plain, thick, or OHP). If 'plain' is selected, then SP5-945 defines whether the paper in the tray is 'plain' or 'middle thick'. (☛ 5.2.2).

Paper weights are specified in accordance with Japanese market conditions.

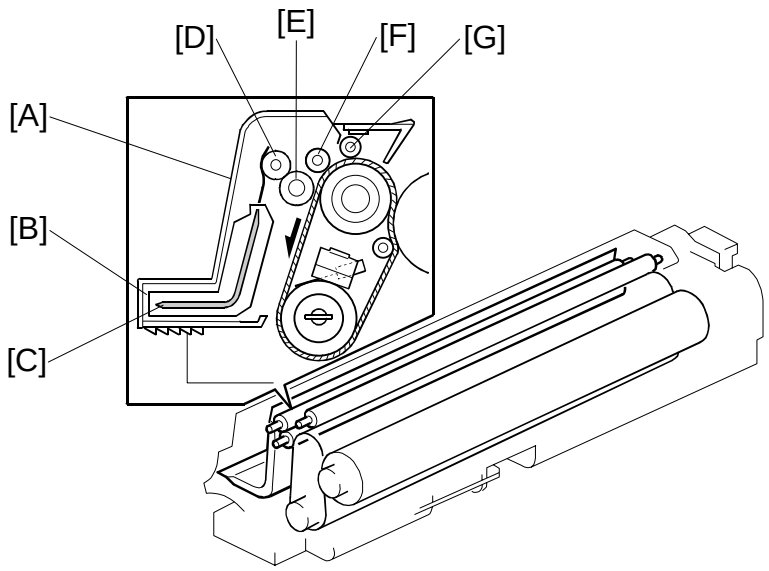
- 'Plain' means thin paper.
- 'Middle thick' means normal plain paper.
- 'Thick' means paper heavier than 105 g/m^2 (28 lb).

*5: Both sides of the paper are processed with the same roller temperatures.

*6: Use SP1-105 to adjust the fusing temperatures (☛ 5.2.2).

6.9.4 OIL SUPPLY AND CLEANING

[A]: Oil supply unit
[B]: Oil tank
[C]: Felt
[D]: Oil supply roller
[E]: Oiling roller
[F]: Sponge cleaning roller
[G]: Metal cleaning roller



G070D504.WMF

Oil Supply

☛CT Photocopying Processes – Fusing – Oil Supply

Oil Path

The oil goes to the fusing belt as follows:

Oil tank [B]:	Contains silicone oil
Felt [C]:	Absorbs oil for transfer to the oil supply roller
Oil supply roller [D]:	Supplies the oiling roller with a small amount of oil
Oiling roller [E]:	Supplies oil the fusing belt

Oil Recycling

The sponge cleaning roller [F] removes excess oil and foreign substances from the belt. This oil returns to the oil supply roller [D] via the felt on the oil roller, and is recycled. The metal cleaning roller [G] also removes foreign substances from the belt.

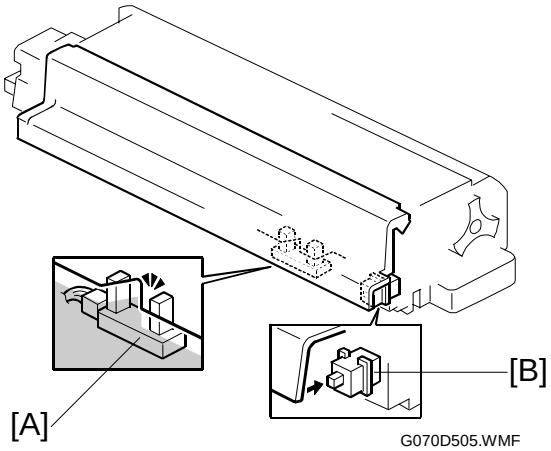
Belt Cleaning

The roller carries a negative charge that removes foreign material from the belt.

Oil End Detection

The oil supply unit has an oil tank with a capacity of 70 grams. The sensor [A] under the tank passes a beam through part of the transparent tank bottom. When the oil volume becomes low, the oil tank empty message appears on the operation panel. Then, the machine can output 200 prints. After that, the machine stops and printing is disabled.

[A]: Oil end sensor
[B]: Fusing unit switch



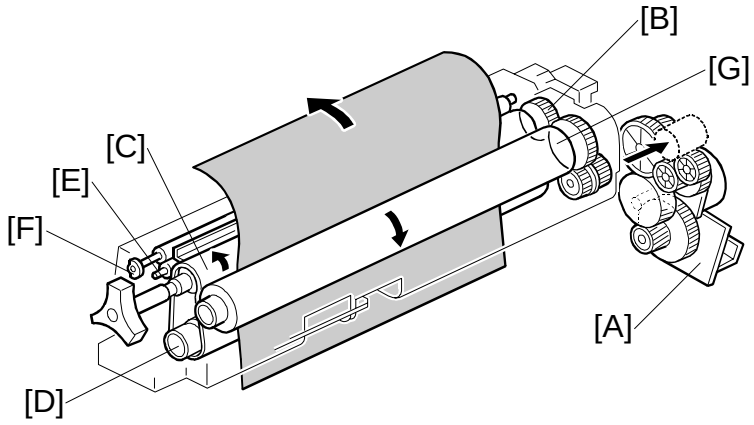
G070D505.WMF

Fusing unit switch

If the fusing unit is out of position, the fusing unit switch [B] turns off. The message "reset fusing unit correctly" is displayed on the operation panel.

6.9.5 DRIVE

[A]: Fusing unit motor
[B]: Hot roller gear
[C]: Fusing belt
[D]: Heating roller
[E]: Oiling roller
[F]: Oil supply roller
[G]: Pressure roller



G070D503.WMF

Drive Power Path (Fusing Unit and Oil Supply Roller)

Fusing unit motor [A] → Gears → Hot roller gear [B] → Fusing belt [C] → Heating roller [D] → Oiling roller [E] → Oil supply roller [F]

Drive Power Path (Pressure Roller)

Fusing unit motor [A] → Gears → Pressure roller [G]

6.9.6 ENERGY SAVER MODE

When the machine is not being used, the energy saver feature reduces power consumption by switching off the fusing lamp. This machine has two energy saver modes. To turn on energy saver modes, use the user tool. To adjust energy saver mode settings, use SP5-101 (☛ 5.2.2).

Level 1 Energy Saver Mode (default: on)

Level 1 energy saver mode starts 30 seconds after the machine has completed a print. In this mode, the fusing lamps intermittently turn on and off to keep the heating roller and pressure roller at the appropriate temperature (☛ 6.9.3).

The machine returns to ready (standby) mode when one of the following happens.

- Print command received from the PC
- Any cover opened and closed
- Any operation panel keys pressed

Level 2 Energy Saver Mode

Level 2 energy saver mode starts after the machine has been idle for a certain time. This time is specified by a user tool. During level 2 energy saver mode, both lamps switch off.

- Off (energy saver mode never activates)
- 5 minutes
- 15 minutes
- 30 minutes (default)
- 45 minutes
- 60 minutes

When the machine is in this mode, the machine turns off +24V, +12V, and +5V lines. However, only +5VE lines, for the controller and circuit (voltage monitoring) on the BCU, are still active.

The machine returns to ready (standby) mode when one of the following happens.

- Print command received from the PC
- Any operation panel keys pressed

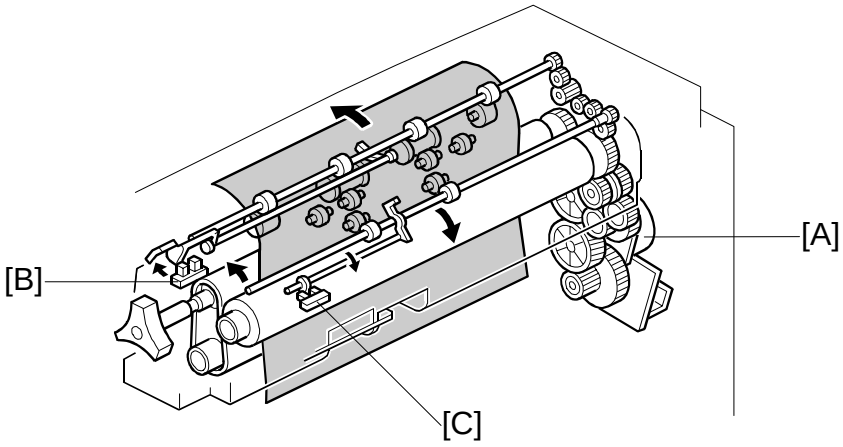
NOTE: The machine does not leave level 2 energy saver mode when covers are opened and closed, because the CPU on the BCU is not active.

Ready Mode

When an energy saver mode ends, the machine goes to the ready mode.

6.9.7 PAPER EXIT

[A]: Fusing unit motor
[B]: Paper exit sensor
[C]: Fusing exit sensor



G070D601.WMF

Drive Power Path

Fusing unit motor [A] → Gears → Rollers

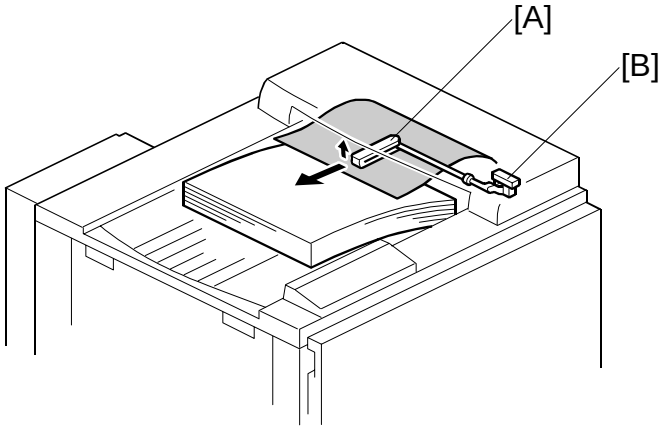
Paper Jam Detection

The paper exit sensor [B] and the fusing exit sensor [C] detect paper jams.

6.9.8 OVERFLOW DETECTION

When the paper lifts the feeler [A], the feeler turns on the sensor. If the sensor stays on for 10 seconds, the printer interrupts processing and a message is output to the PC screen.

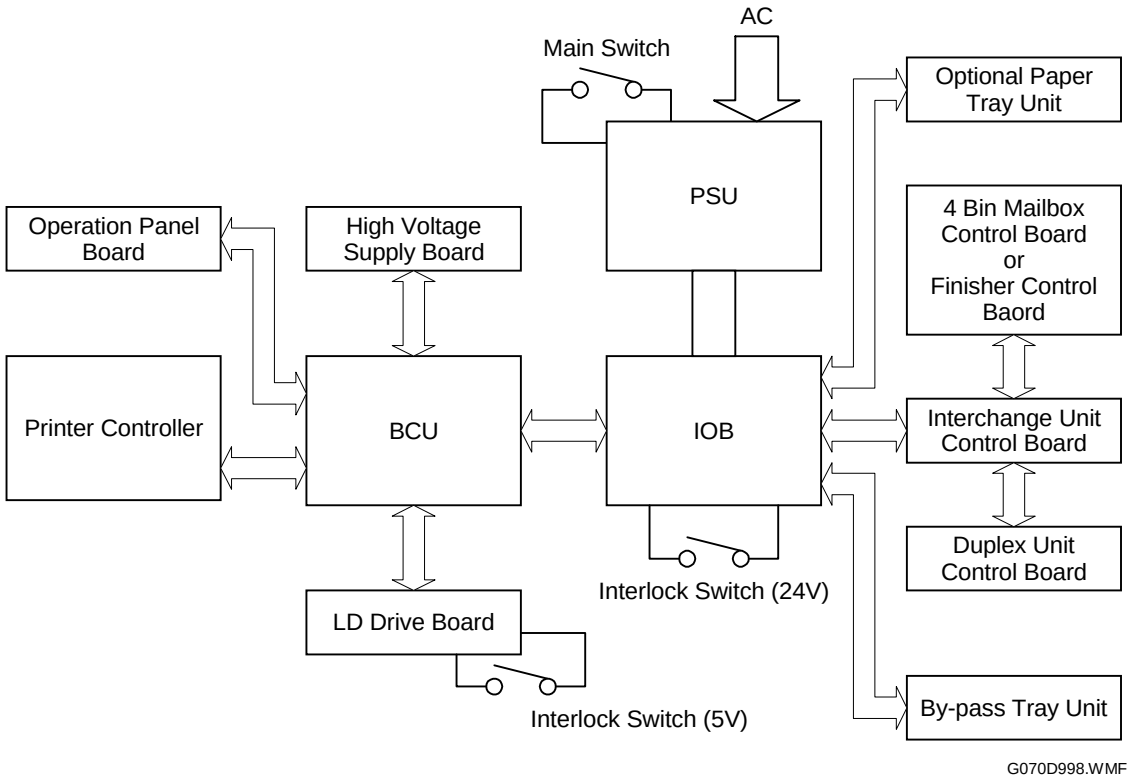
[A]: Feeler
[B]: Paper overflow sensor



G070D602.WMF

6.10 PRINTED CIRCUIT BOARDS

6.10.1 PRINTER CONTROLLER



Function

The printer controller manages the printing processes and computer interface functions.

Memory

A single, non-volatile random access memory (NVRAM) stores counter information and printer settings.

When the controller board is replaced, install the NVRAM from the old board on the new board.

Interfaces

Centronics (IEEE1284 Nibble, ECP)
Ethernet (100Base-TX/10Base-T)

Slots

There are 4 slots. Two are for memory, one is for printer application software (PostScript) and the other is for GL emulation (GL – Japan only).

Options

IEEE1394 board

Hard disk drive (HDD)

User account enhancement module

DIP Switch

DIP SW No.	OFF	ON
1	Boot-up from machine	Boot-up from IC card
2 to 4	Factory Use Only: Keep these switches OFF.	

If a controller firmware download attempt failed, you must boot the machine from the IC card. To do this, set DIP SW 1 on the controller board to ON.

LED Indicators

	On	Off
Green	Linked	Not linked
Yellow	100 Mbps	10 Mbps

6.10.2 BASE ENGINE CONTROL UNIT (BCU)

Function

The BCU is at the rear-left corner of the main unit, on the left fence. The BCU controls:

System I/O
High-voltage supply
AC supply
Optional unit operations
Engine sequence

Upgrading

To upgrade the BCU software, you must insert an IC card in the controller's IC card slot.

Nonvolatile Random Access Memory (NVRAM)

The NVRAM on the BCU stores the engine settings. These include the process control and the maintenance kit counter settings.

When the BCU board is replaced, install the NVRAM from the old board on the new board.

DIP Switch

DIP SW No.	OFF	ON
1	Boot-up from machine	Boot-up from IC card
2 to 4	Factory Use Only: Keep these switches OFF.	

If a BCU firmware download attempt failed, you must boot the machine from the IC card. To do this, set DIP SW 1 on the BCU board to ON.

6.10.3 INPUT/OUTPUT (I/O) BOARD

The board controls the following:

I/O
Motor and clutch operation
Sensors
Solenoids

6.10.4 POWER SUPPLY UNIT (PSU)

The PSU supplies power to each unit.

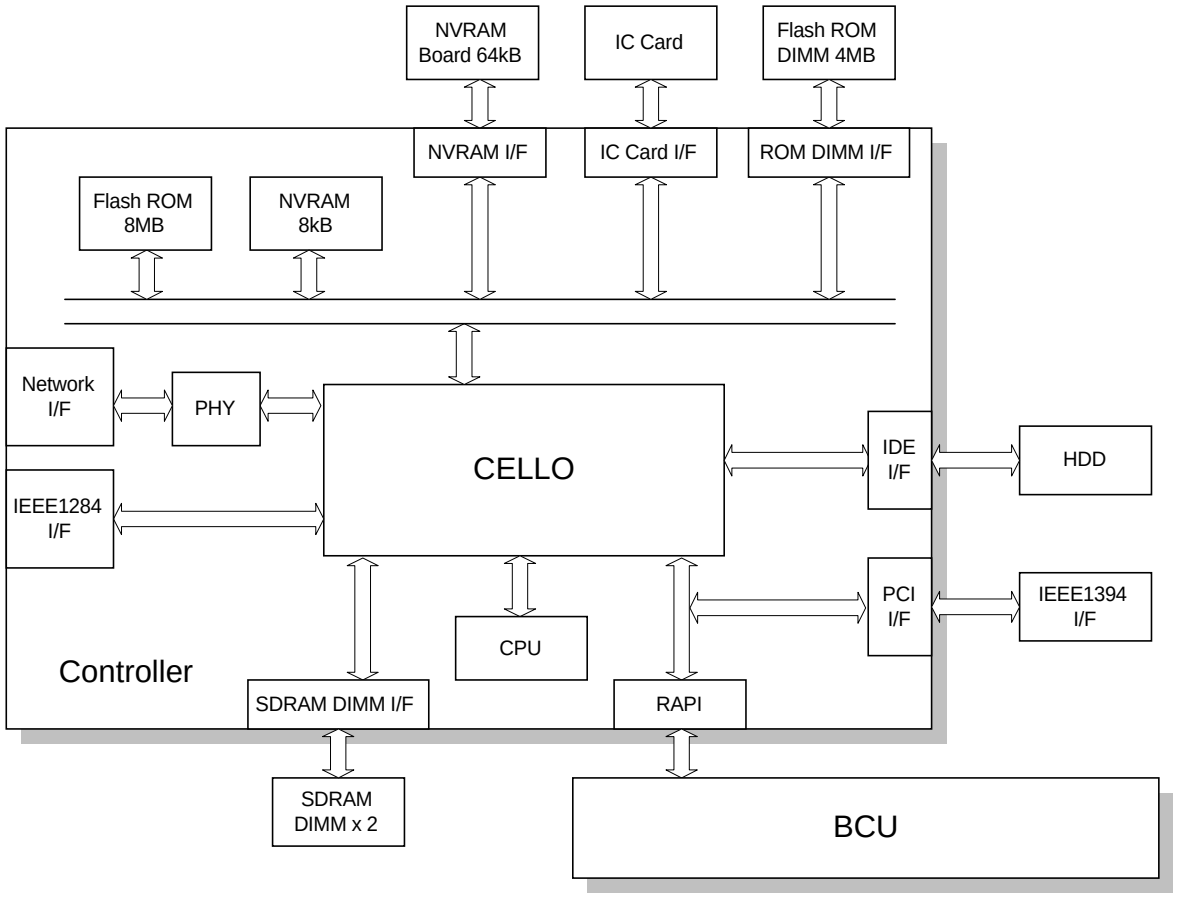
6.10.5 HIGH VOLTAGE SUPPLY

This supplies the following units with high voltage:

Charge corona unit
Image transfer unit
Image transfer belt cleaning unit
Development units
Paper transfer roller

6.11 CONTROLLER

6.11.1 OVERVIEW



G070D553.WMF

The controller uses GW (Ground Work) architecture.

1. **CPU:**
   QED RM5261 (250 MHz)
2. **CELLO:**
   GW architecture ASIC. It uses a 124 MHz bus (64 bit) for interfacing with CPU and memory. It controls the interface with the CPU and also controls the following functions: memory, local bus, interrupts, PCI bus, video data, HDD, network, operation panel, IEEE1284, and image processing.
3. **SDRAM DIMM (2 slots):** 64 MB SDRAM (resident), expandable up to 384 MB with a 64 MB, 128 MB, or 256 MB SDRAM.
4. **Flash ROM:**
   8 MB flash ROM programmed for system and network applications.

5. **ROM DIMM (2 slots):**
   The DIMM installed in the machine includes 4 MB flash ROM programmed for printer applications. This DIMM also includes 4 kB of Mask ROM for storing internal printer fonts. Currently the remaining DIMM slot is not being used.
6. **NVRAM:**
   8 kB NVRAM for storing the printer parameters and logged data
7. **IEEE1284 Interface:**
   Supports compatible, nibble, and ECP modes
8. **Network Interface:**
   100BASE-TX/10BASE-T
9. **NVRAM board (option):**
   64 kB NVRAM used for storing a record of the number of pages printed under each “User Code”.
10. **IEEE1394 Interface (option):**
    See the IEEE1394 Interface section.
11. **HDD (option):**
    A 3.5" HDD (20.5 GB) can be connected using the IDE interface. The hard disk is partitioned as shown below. The sizes cannot be adjusted.

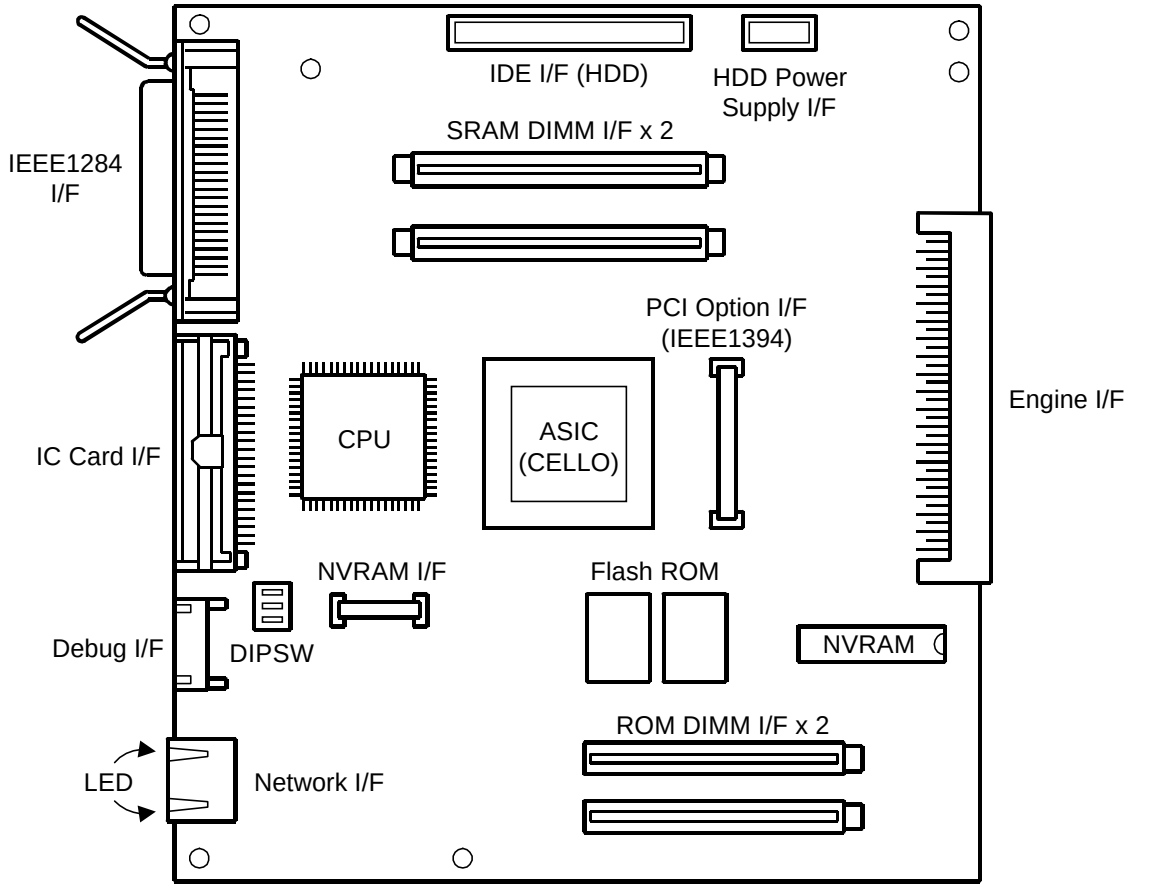
Partition	Size	Function	Comment
File System 1	500 MB	Downloaded fonts, forms.	Remain stored even after cycling power off/on.
Image TMP	9800 MB	Collation, sample print, locked print.	Commonly used area for applications, erased after power off.
Job Log	10 MB	Job log.	Remains stored even after cycling power off/on.

The system and application software for the following boards can be downloaded from the Controller IC Card.

- Controller (Flash ROM and flash ROM DIMM)
- BCU
- NIB

For details about downloading software from an IC card, see Service Tables – Firmware Update Procedure.

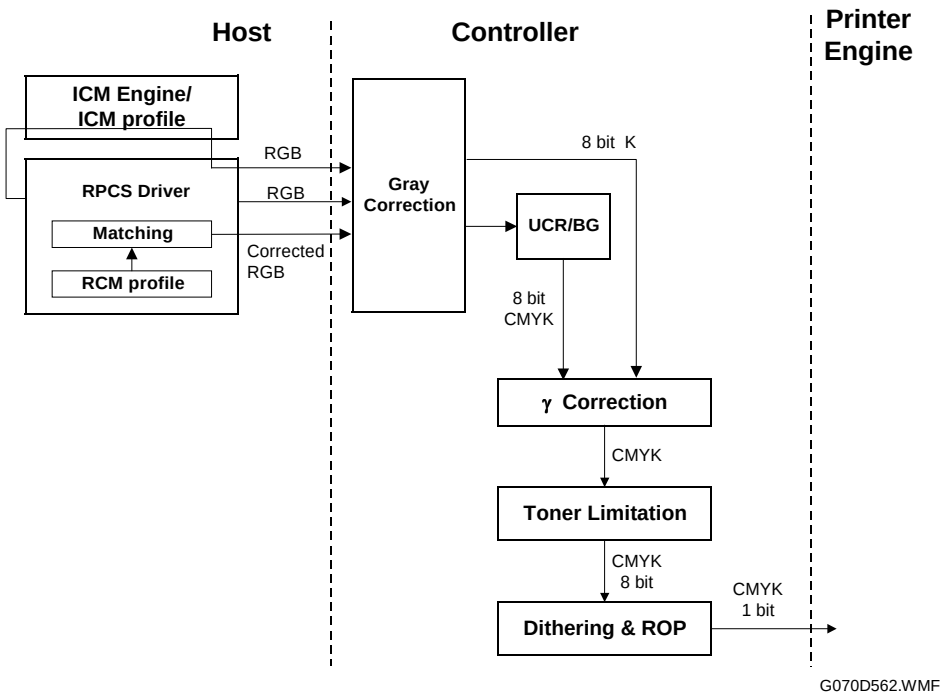
6.11.2 BOARD LAYOUT



G070D722.WMF

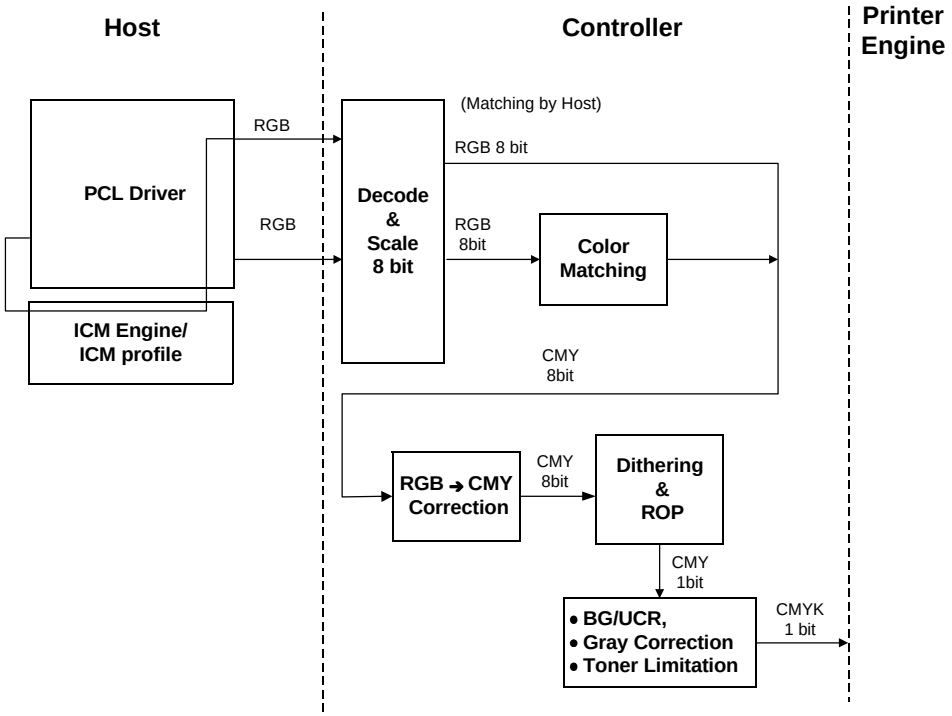
6.11.3 PRINT DATA PROCESSING

RPCS Driver



G070D562.WMF

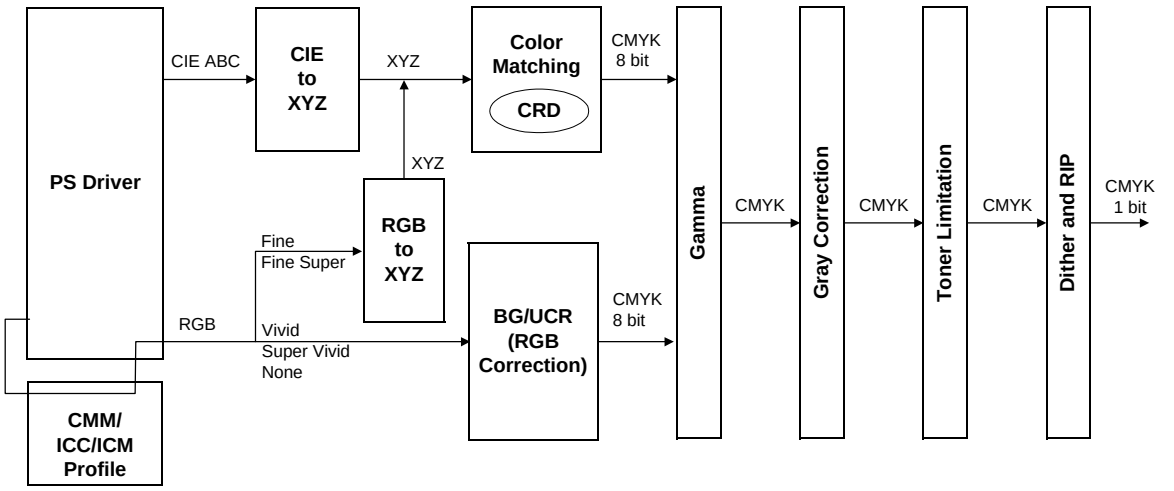
PCL5c Driver



G070D563.WMF

Detailed Descriptions

PS3 Driver



G070D564.WMF

CMS (Color Management System)

CMS optimizes the color print quality using a color profile that is based on the characteristics of the printer. With RPCS, the color profile is applied by the driver. With PS3 and PCL5c, the color profile is applied in the matching/CRD module on the controller except when using CMM/ICC/ICM profiles.

CMS is not used when the color profile setting in the printer driver is set to “Off.”

Gray Correction

Gray correction processes gray with K or CMYK toner depending on the driver settings.

BG/UCR (Black Generation/Under Color Removal)

The RGB data is converted to CMYK data with BG/UCR. During CMYK conversion, some CMY data is replaced with K data by the BG/UCR algorithm.

Gamma Correction

The printer gamma can be adjusted with controller SP mode (Gamma Adj.). For CMYK, there are15 points between 0 and 100%. The corrected gamma data is stored in NVRAM.

Toner Limitation

Toner limitation prevents toner from being scattered around text or printed lines.

Maximum values have been prepared independently for text and photo. They can be adjusted with controller SP mode (Toner Limit).

- Default: 190% for text, 260% for photo
- Adjustable range: 100% to 400%

Dither Processing and ROP/RIP

Dither patterns have been prepared for photo and text independently. Dithering converts the 8-bit data to 1-bit data. However, these dither patterns create the illusion of 256 gradations for high quality prints. The optimum dither pattern is selected depending on the selected resolution.

RIP: Raster Image Processing
ROP: Raster Operation

6.11.4 CONTROLLER FUNCTIONS

Sample Print

This feature was formerly known as “Proof Print”. It requires installing an optional HDD. This function gives users a chance to check the print results before starting a multiple-set print run.

- The size of the hard disk partition for the sample print feature is 5.8 GB. This partition is also used by the collation and locked print features.
- The partition can hold up to 30 files, including files stored using locked print.
- The partition can hold a log containing up to 20 errors, excluding jobs stored using locked print.
- The maximum number of pages is 2,000, including jobs using locked print and collation.

Locked Print

This feature requires installing an optional HDD. Using this feature, the print job is stored in the machine but will not be printed until the user inputs an ID at the machine’s operation panel. This ID must match the ID that was input with the printer driver.

- Stored data is automatically deleted after it is printed.
- Stored data can be manually deleted at the operation panel.
- The partition can hold up to 30 files, including files stored using sample print.
- The partition can hold a log containing up to 20 errors, excluding logs stored using locked print.
- The maximum number of pages is 2,000, including jobs using sample print and collation.
- Locked print uses the same hard disk partition as sample print and collation, which is 5.8 GB.

Paper Source Selection

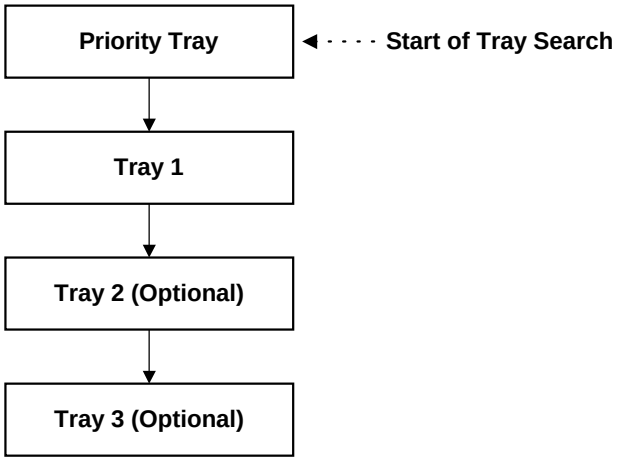
Tray Priority (Auto Tray Select)

The “Tray Priority” setting determines the start of the tray search when the user selects “Auto Tray Select” with the driver. The machine searches for a paper tray with the specified paper size and type.

When no tray contains paper that matches the paper size and type specified by the driver, the controller stops printing until the user loads the correct paper.

The “Tray Priority” setting can be specified in the “Paper Input” menu. (Menu/ Paper Input/ Tray Priority)

NOTE: The by-pass feed table is not part of the tray search.



G070D555.WMF

Tray Lock

If “Tray Lock” is enabled for a tray, the controller skips the “locked” tray in the tray search process.

The “Tray Lock” setting can be specified in the “Paper Input” menu. (Menu/ Paper Input/ Tray Lock)

NOTE: The by-pass feed table cannot be unlocked (Tray Lock is always enabled).

Manual Tray Select

If the selected tray does not have the paper size and type specified by the driver, the controller stops printing until the user loads the correct paper.

Auto Continue

Overview

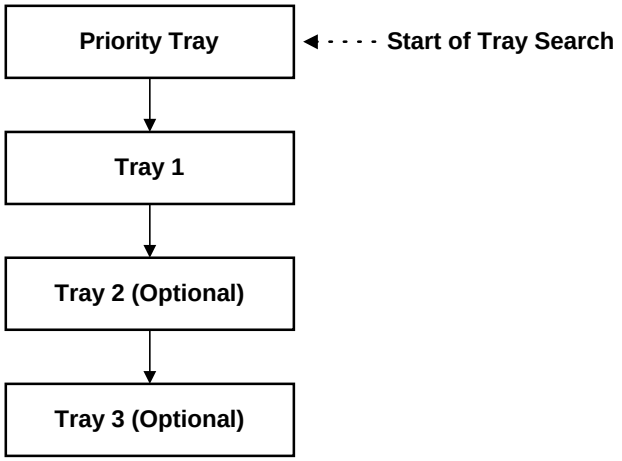
When this function is enabled, the machine waits for a specified period (0, 1, 5, 10, 15 minutes) for the correct paper size and type to be set in the tray. If the timer runs out, the machine starts printing, even if there is no paper tray which matches the paper size and paper type specified by the driver.
The machine searches for a paper tray in the following way.

- The interval can be set with the “System” menu in the User Tools. (Menu/ System/ Auto Continue)

NOTE: The default setting for this feature is ‘disabled’.

Auto Tray Select

When there is no paper tray that matches the paper size and type specified by the driver, the machine searches for any tray that has paper, and prints from the first tray it finds. The start of the tray search is the tray selected as the “Priority Tray.”



G070D555.WMF

Manual Tray Select

The machine prints from the selected tray even if the paper size and type do not match the setting specified from the driver.

If “Auto Continue” is disabled, the machine waits until the user loads the correct paper in the tray.

Paper Output Tray

The output tray can be selected with the “Output Tray” setting in the “System” menu (Menu/ System/ Output Tray).

If a print job does not specify an output tray or if the driver specifies the default tray, the output tray selected with this user tool will be used.

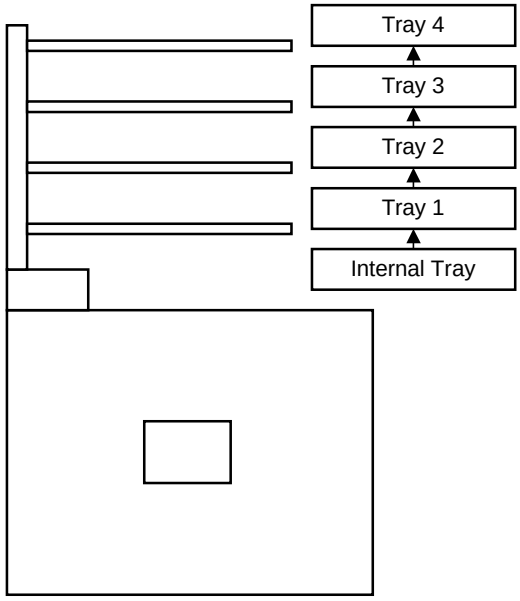
Output Tray Selected

- If the machine cannot print to the selected output tray, it prints to the default paper output tray.
- If paper overflow is detected at the selected output tray, the controller stops printing until the overflow detector goes off.

Sequential Stacking

When the 4-bin mailbox is installed, “Auto Tray SW” is selected as the output tray in the “System” menu, and “Printer Default” is specified as the output tray in the driver, the machine automatically sends the output to the lowest tray. When that tray fills up, the machine sends the output to the next lowest tray. When that tray also fills up, the machine sends the output to the next lowest tray sequentially.
This feature is called “Sequential Stacking”.

- If a tray becomes full and paper is detected in the next tray, the machine displays an error and stops printing. When paper in the next tray is removed, the machine automatically resumes printing to the next tray.
- If all trays become full (overflow detected in all trays), the machine displays an error and stops printing. This time, all paper in all trays must be removed.



Rear view

G070D556.WMF

Stapling

Stapling is available when the finisher is installed.
The finisher has only one stapling position.

- Depending on the paper orientation, the image may have to be rotated. The controller rotates the image. If the paper cannot be physically stapled as specified by the driver, it will not be stapled.
- There is a limit for the number of sheets which can be stapled. If a job has more than this number, it will not be stapled.
  A3, B4, 11" x 17", LG: 20 sheets (80 g/m^2, 20 lb)
  A4, B5 sideways, LT: 30 sheets (80 g/m^2, 20 lb)

6.12 IEEE1394 INTERFACE

6.12.1 SPECIFICATIONS

Hardware Specification

Interface: IEEE1394 (6 pins)
(no power supply, cable power repeated, IEEE1394a-2000 compliant)
Ports: 2 ports
Data rates: 400Mbps/200Mbps/100Mbps

System Requirements

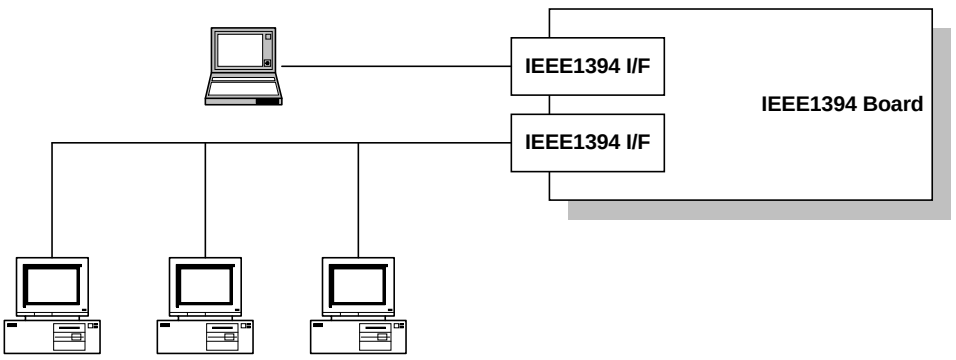
PC: Windows PC with IEEE1394 port
OS: Microsoft Windows 2000 upgraded with service pack 1
Cable length: 4.5m (15ft)

6.12.2 IEEE1394

IEEE1394, also known as FireWire (a name patented by Apple), is an easy-to-use peer-to-peer networking technology allowing speeds of up to 400 Mbps.

The current standard contains the following features, which are supported in most devices:

- Hot swapping (cables can be connected and disconnected while the computer and other devices are switched on)
- Peer-to-peer networking (no hub required)
- No terminator or device ID is required, unlike SCSI
- Automatic configuration of devices upon start-up, or “plug and play”.
- Real-time data transfer at 100, 200, and 400 Mbps
- Common connectors for different devices

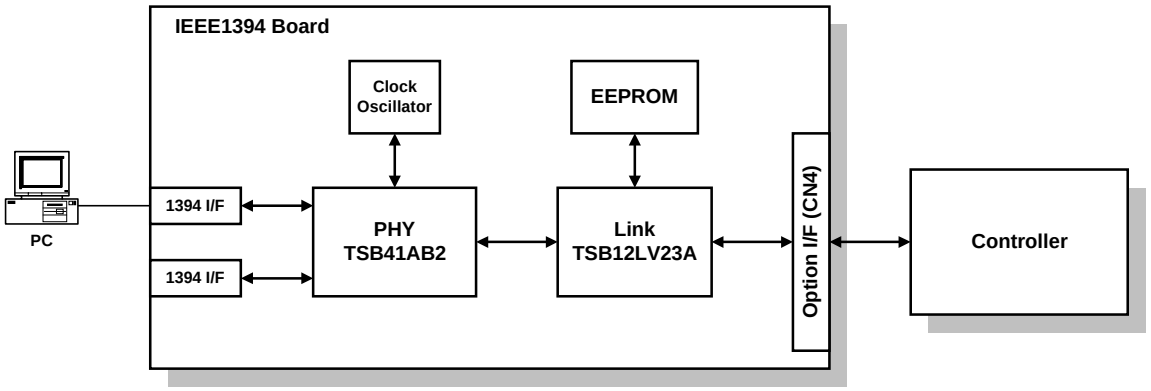


G070D559.WMF

The cable length is limited to 4.5 m (15ft). However, up to 16 cables and 63 devices can be connected to an IEEE1394 network.

IEEE1394 cables can be either 4-pin (data only) or 6-pin (data and power). IEEE1394 allows either 6-pin or 4-pin connectors. However, this machine only uses the 6-pin connectors. The machine has two 6-pin ports.

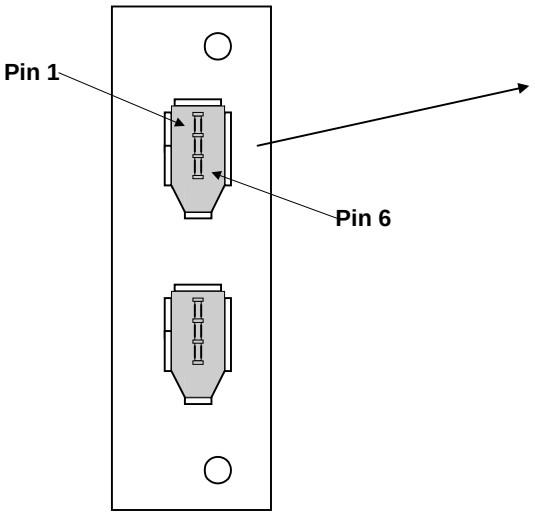
6.12.3 BLOCK DIAGRAM



G070D560.WMF

- PHY: Physical layer control device
- Link: Link layer control device
- EEPROM: 256-byte ROM

6.12.4 PIN ASSIGNMENT



Pin assignment	
Pin 1	Pin 4
Pin 2	Pin 3
Pin 5	Pin 6

G070D561.WMF

Pin No.	Signal Description
1	Cable Power
2	GND
3	Receive strobe
4	Transmit data
5	Receive data
6	Transmit strobe

6.12.5 REMARKS ABOUT THIS INTERFACE KIT

Note the following points about this unit.

- The machine does not print reports specifically for IEEE1394. Just print the Configuration Page at installation to check that the machine recognizes the card.
- There is no spooler or print queue. If a computer tries to print over the IEEE1394 while the printer is busy, the IEEE1394 interface card inside the printer will return a busy signal.
- After starting a job using IEEE1394, do not switch the printer off until the job has been completed. Even though the printer may appear to be dead, it may be in the middle of an IEEE1394 protocol exchange with the computer.
- When using IEEE1394, it is not possible to check the printer status from the computer with a utility such as Printer Manager for Client.

6.12.6 TROUBLESHOOTING NOTES

If there are problems printing using the IEEE1394 interface, check the following.

- Is the computer using Windows 2000 with service pack 1?
- Has the interface card been replaced recently? Each card has an individual address, similar to the MAC address in an Ethernet card. If the card was changed, the driver cannot find the old card. The new card is another device and a new printer appears in Windows Control panel, and this must be configured in the same way as the printer that was replaced (the old printer icon in Windows Control Panel should be deleted) has to be reconfigured.
- Is there a loop somewhere in the network? An IEEE1394 network must be a chain or a branched chain. There can be no loops.
- Try to find out where in the chain the problem is occurring. Test the machine one-to-one with the computer to determine if the printer is defective (when the printer's interface cable is plugged in, the computer should see 'Printer Ready'; when the cable is disconnected, the computer should see 'Offline').

SPECIFICATIONS

1. GENERAL SPECIFICATIONS

1.1 MAIN UNIT

Configuration: Desktop

Print Process: Laser beam scan & dry electrostatic transfer system

Resolution: 600 x 600 dpi

Warming-up Time: 99 seconds or less

1st Print (A4/LT LEF)*: Color: 18.0 seconds or less
Black & White: 7.5 seconds or less
*From the start of polygon mirror rotation.

Auto Paper Tray Switch: Available

Paper Size: Regular sizes:

	Europe & Asia	N. America
Standard tray	A6 to A3	HLT to DLT
Bypass tray	A6 to A3	HLT to DLT

Standard tray: Paper size is automatically detected
Bypass tray: Manual input at the operation panel

Custom sizes (Europe, Asia, N. America):

	Min.	Max.
Standard tray	100 x 148 mm (3.9" x 5.8")	297 x 432 mm (11.7" x 17")
Bypass tray	90 x 148 mm (3.5" x 5.8")	305 x 457 mm (12" x 18")*

*Printable area is 297 x 432 mm (11.7 x 17").

Paper Weight:

Standard tray	60 to 105 g/m^2, 16 lb. Bond to 28 lb. Bond
Bypass tray	60 to 163 g/m^2, 16 lb. Bond to 43 lb. Bond

Printing Speed:

	Plain Paper	Thick	OHP
Color	10 ppm	4 ppm	2 ppm
Black & White	36 ppm	6.5 ppm	3.2 ppm

Paper Feed:

Standard tray	Friction pad
Optional paper tray unit	FRR
By-pass	FRR

Paper Capacity:

Main	250 sheets x 1 tray
Optional paper tray unit	500 sheets x 1 or 2 trays
By-pass	100 sheets

Fusing: Heating rollers and fusing belt

Paper Output: Face down

Output Tray Full: Detected
Capacity: 400 sheets (200 for A3/DLT)

Photoconductor: OPC belt

Charging: Corona wire with grid plate

Laser Beam: Semiconductor laser

Development: Mono component toner

Transfer: Image transfer: Transfer belt with bias roller
Paper transfer: Roller

Separation: Discharge pin

Cleaning: OPC belt: Blade
Image transfer belt: Cleaning brush

Quenching: Lamp

Toner Supply: Cartridge

Waste Toner Disposal: Toner bottle

Total Counter: Electrical

Maintenance Counters:

Unit	Mechanical/ Electrical	Sheets/ Time	Reset
PCU	Electrical	240KD	Automatic
Charge Corona Unit	Electrical	120KD	Manual
Development Unit (K)	Electrical	120KD	Automatic
Development Unit (Y,M,C)	Electrical	120KD	Automatic
Waste Toner Bottle	Mechanical	30KP	Automatic
Fusing Oil	Electrical	30KP	Automatic
Fusing Unit	Electrical	120KP	Manual

Self-Diagnostics: Jam, Service Call

Memory
Standard: 64 MB
Options: 64 MB, 128 MB, 256 MB
Maximum allowable: 384 MB

Test Printing: Available

Power Source:

	Voltage	Frequency	Amperage
NA	120 V	60 Hz	11 A
EU & Asia	220 to 240 V	50/60 Hz	7 A

Power Consumption:
Regular mode: 1.2 KW (NA), 1.5 KW (EU & Asia)
Energy star mode: 35 W or less

Dimensions (W x D x H): 540 x 670 x 470 mm (by-pass tray not extended)

Weight: 60 Kg or less

Host Interfaces:
Bi-directional (Centronics) IEEE1284 parallel x 1
Ethernet (100 Base-TX/10 Base-T)
IEEE1394 (Optional)

1.2 SUPPORTED PAPER SIZES

1.2.1 MAIN TRAY, BYPASS TRAY, AND DUPLEX UNIT

Paper		Size	Main			By-pass			Duplex
			N.A.	EUR.	ASIA	N.A.	EUR.	ASIA	Common
A3	SEF	297 x 420 mm	Y#	Y	Y	Y#	Y#	Y#	Y
B4	SEF	257 x 364 mm	Y#	Y	Y	Y#	Y#	Y#	Y
A4	SEF	210 x 297 mm	Y	Y	Y	Y#	Y#	Y#	Y
A4	LEF	297 x 210 mm	Y#	Y	Y	Y#	Y#	Y#	Y
B5	SEF	182 x 257 mm	Y#	Y#	Y#	Y#	Y#	Y#	Y
B5	LEF	257 x 182 mm	Y	Y	Y	Y#	Y#	Y#	Y
A5	SEF	148 x 210 mm	Y#	Y#	Y#	Y#	Y#	Y#	Y
A5	LEF	210 x 148 mm	Y#	Y	Y	Y#	Y#	Y#	Y
B6	SEF	128 x 182 mm	Y#	Y#	Y#	Y#	Y#	Y#	N
B6	LEF	182 x 128 mm	N	N	N	N	N	N	N
A6	SEF	105 x 148 mm	Y#	Y#	Y#	Y#	Y#	Y#	N
A6	LEF	148 x 105 mm	N	N	N	N	N	N	N
DLT	SEF	11" x 17"	Y	Y#	Y#	Y#	Y#	Y#	Y
LG	SEF	8 1/2" x 14"	Y	Y#	Y#	Y#	Y#	Y#	Y
LT	SEF	8 1/2" x 11"	Y	Y	Y	Y#	Y#	Y#	Y
LT	LEF	11" x 8 1/2"	Y	Y#	Y#	Y#	Y#	Y#	Y
HLT	SEF	5 1/2" x 8 1/2"	Y#	Y#	Y#	Y#	Y#	Y#	Y
HLT	LEF	8 1/2" x 5 1/2"	Y#	Y#	Y#	N	N	N	N
Executive	SEF	7 1/4" x 10 1/2"	Y#	Y#	Y#	Y#	Y#	Y#	Y
Executive	LEF	10 1/2" x 7 1/4"	Y#	Y#	Y#	Y#	Y#	Y#	N
F	SEF	8" x 13"	Y#	Y#	Y#	Y#	Y#	Y#	Y
Foolscap	SEF	8 1/2" x 13"	Y#	Y#	Y#	Y#	Y#	Y#	Y
Folio	SEF	8 1/4" x 13"	Y#	Y#	Y#	Y#	Y#	Y#	Y
8 K	SEF	267 x 390 mm	Y#	Y#	Y#	Y#	Y#	Y#	Y
16 K	SEF	195 x 267 mm	Y#	Y#	Y#	Y#	Y#	Y#	Y
16 K	LEF	267 x 195 mm	Y#	Y#	Y#	Y#	Y#	Y#	Y
Customized	Width	100 to 297 mm	Y#	Y#	Y#	N	N	N	N
	Length	148 to 432 mm							
	Width	90 to 305 mm	N	N	N	Y#	Y#	Y#	N
	Length	148 to 457 mm							
Com10	SEF	4 1/8" x 9 1/2"	Y#	Y#	Y#	Y#	Y#	Y#	N
Monarch	SEF	3 7/8" x 7 1/2"	Y#	Y#	Y#	Y#	Y#	Y#	N
C6	SEF	114 x 162 mm	Y#	Y#	Y#	Y#	Y#	Y#	N
C5	SEF	162 x 229 mm	Y#	Y#	Y#	Y#	Y#	Y#	N
DL Env	SEF	110 x 220 mm	Y#	Y#	Y#	Y#	Y#	Y#	N

Symbols

Y: Automatically detected
Y#: Needs to be manually specified
N: Not supported

1.2.2 FINISHER, MAIL BOX, AND PAPER TRAY UNIT

Paper		Size	Finisher			Mail Box	Paper Tray Unit		
			Clear	Shift	Staple				
			Common			Common	N.A.	EUR.	ASIA
A3	SEF	297 x 420	Y	Y	Y(30)	Y	Y	Y	Y
B4	SEF	257 x 364	Y	Y	Y(30)	Y	Y#	Y	Y
A4	SEF	210 x 297	Y	Y	Y(30)	Y	Y#	Y	Y
A4	LEF	297 x 210	Y	Y	Y(30)	Y	Y	Y	Y
B5	SEF	182 x 257	Y	N	N	Y	Y#	Y#	Y#
B5	LEF	257 x 182	Y	Y	Y(30)	Y	Y	Y	Y
A5	SEF	148 x 210	N	N	N	Y	Y#	Y#	Y#
A5	LEF	210 x 148	Y	N	N	Y	Y#	Y	Y
B6	SEF	128 x 182	N	N	N	N	N	N	N
B6	LEF	182 x 128	N	N	N	N	N	N	N
A6	SEF	105 x 148	N	N	N	N	N	N	N
A6	LEF	148 x 105	N	N	N	N	N	N	N
DLT	SEF	11" x 17"	Y	Y	Y(30)	Y	Y	Y	Y
LG	SEF	8 1/2" x 14"	Y	Y	Y(30)	Y	Y	Y#	Y#
LT	SEF	8 1/2" x 11"	Y	Y	Y(30)	Y	Y	Y#	Y#
LT	LEF	11" x 8 1/2"	Y	Y	Y(30)	Y	Y	Y	Y
HLT	SEF	5 1/2" x 8 1/2"	N	N	N	N	N	N	N
HLT	LEF	11" x 8 1/2"	N	N	N	N	Y	Y#	Y#
Executive	SEF	7 1/4" x 10 1/2"	Y	N	N	Y	Y#	Y#	Y#
Executive	LEF	10 1/2" x 7 1/4"	N	N	N	Y	N	N	N
F	SEF	8" x 13"	N	N	N	Y	Y#	Y#	Y#
Foolscap	SEF	8 1/2" x 13"	Y	Y	Y(30)	Y	Y#	Y#	Y#
Folio	SEF	8 1/4" x 13"	Y	N	N	Y	Y#	Y#	Y#
Folio	LEF	13" x 8 1/4"	N	N	N	N	N	N	N
A3 Long	SEF	12" x 18"	N	N	N	N	N	N	N
8 K	SEF	267 x 390	Y	Y	Y(30)	Y	Y#	Y#	Y#
16 K	SEF	195 x 267	N	N	N	Y	Y#	Y#	Y#
16 K	LEF	267 x 195	Y	Y	Y(30)	Y	Y#	Y#	Y#
Customized	Width	100 to 305	N	N	N	N	N	N	N
	Length	148 to 458	N	N	N	N	N	N	N

Symbols

Y: Automatically detected
Y#: Needs to be manually specified
N: Not supported
(30): Up to 30 sheets

Spec.

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
PCL 5c	Yes	Yes	Yes	No
PS3	Yes	Yes	Yes	Yes
RPCS	Yes	Yes	Yes	No

NOTE: 1) The printer drivers for Windows NT 4.0 are only for the Intel x86 platform. There is no Windows NT 4.0 printer driver for the PowerPC, Alpha, or MIPS platforms.
2) The PS3 drivers are all genuine AdobePS drivers, except for Windows 2000, which uses Microsoft PS. A PPD file for each operating system is provided with the driver.
3) The PS3 driver for Macintosh supports Mac OS 8.1 or later versions.
4) The following Unix versions are supported:
Solaris 2.5.1, 2.6, 7, 8
HP-UX 8.x, 9.x, 10.x, 11.0
Red Hat Linux 6.x, 7, 7.1
SCO Open Server 5.x

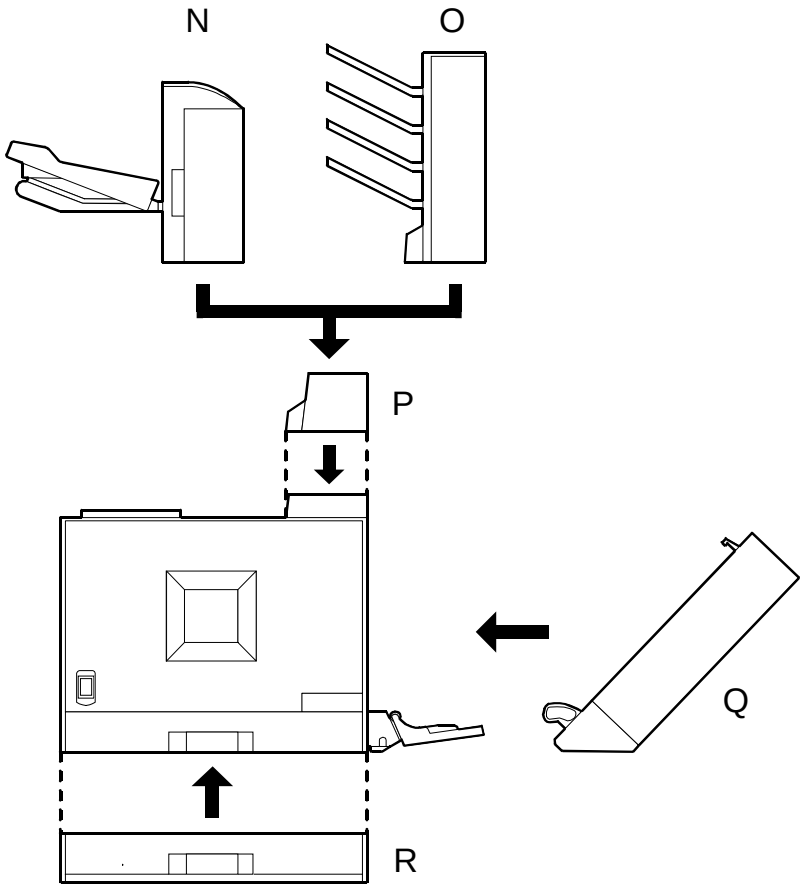
2.2 UTILITY SOFTWARE

Software	Description
Agfa Monotype Font Manager (Win 95/98/M3, NT4, W2000)	A font management utility with screen fonts for the printer.
SmartNetMonitor for Admin (Win 95/98/M3, NT4, W2000)	A printer management utility for network administrators. NIB setup utilities are also available.
SmartNetMonitor for Client (Win 95/98/M3, NT4, W2000)	A printer management utility for client users.
Printer Utility for Mac	This software provides several convenient functions for printing from Macintosh clients.

3. MACHINE CONFIGURATION

3.1 SYSTEM COMPONENTS

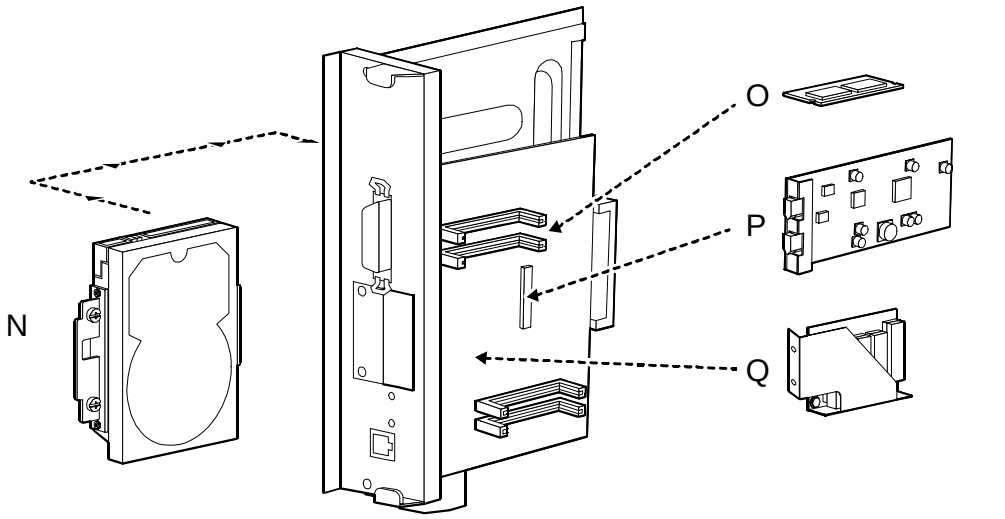
Exterior



G070V001.WMF

No.	Unit	Code
—	Main unit	G071
1	500-sheet finisher	G314
2	4-bin mailbox	G312
3	Interchange unit	G305
4	Duplex unit	G303
5	Paper tray unit	G313

Interior



G070V002.WMF

No.	Unit	Code
1	Printer hard disk	G315
2	64 MB DIMM	G330
	128 MB DIMM	G331
	256 MB DIMM	G332
3	IEEE 1394 board	G590
4	User account enhancement unit	G311

Maintenance Kits

Unit	Code
Waste toner bottle	G778
Fusing unit oil	G779
PCU	G780
Bk development unit	G781
CMY development unit	G782
Fusing unit and paper feed roller/friction pad	G783
Charge corona unit and dust filters	G785

3.2 OPTIONAL EQUIPMENT

Paper Tray Unit

Paper Feed System:	FRR
Paper Height Detection:	4 steps (100%, 50%, Near End, and Empty)
Capacity:	500 sheets x 1 (up to 59 mm)
Paper Weight:	60 to 128 g/m^2 (16 to 34 lb.)
Paper Size:	A3/11" x 17" to A5/5.5 x 8.5" (LEF)
Power Source:	DC24V, 5V (from the main frame)
Power Consumption:	Less than 50W
Dimensions (W x D x H):	540 x 600 x 120 mm
Weight:	15 kg (33 lb.)

Finisher

Paper Size:	A3, B4, A4, B5 LEF, 11" x 17", LG, LT
Paper Weight:	60 to 128 g/m^2 (14 to 34 lb.)
Staple Capacity:	20 sheets (A3, B4, 11" x 17", LG : 80g/m^2, 20 lb) 30 sheets (A4, B5 sideways, LT : 80g/m^2, 20 lb)
Stack Capacity:	500 sheets (A4/LT or smaller: 80 g/m^2, 20 lb.) 250 sheets (A3, B4, 11" x 17" and LG. 80 g/m^2, 20 lb.)
Staple Position:	1
Staple Replenishment:	Cartridge (3,000 staples/cartridge)
Power Source:	24V DC, 5V DC (from the main frame)
Power Consumption:	48 W
Weight:	8.5 Kg (18.9 lbs)
Dimensions:	506 x 164 x 328 mm (19.9" x 6.5" x 12.9")

Mail Box

Trays:	4
Capacity:	125 sheets (A4:LEF 80 g/m^2, 20 lb)
Paper Weight:	60 to 128 g/m^2 (16 to 34 lb.)
Power Source:	DC24V, 5V (from the main frame)
Power Consumption:	Less than 17 W.
Paper Size:	A3/11" x 17" to A5/LT
Dimensions (W x D x H):	440 x 520 x 370 mm (17.3" x 20.5" x 14.6")
Weight:	7 kg (15.5 lb)

Duplex Unit

Paper Size:	A3/11" x 17" to A5/5.5" x 8.5"
Paper Weight:	60 to 105 g/m^2 (17 to 28 lb.)
Power Source:	DC 24V, 5V (from the main frame)
Power Consumption:	
Dimensions (W x D x H):	121 x 479 x 504 mm (4.8" x 18.9" x 19.8")
Weight:	6 kg (13 lbs.)

Interchange Unit

Paper Size:	A3/11” x 17” to A5/5.5” x 8.5”
Paper Weight:	60 to 128 g/m^2
Dimensions (W x D x H):	508 x 159 x 110 mm (20.0" x 6.3" x 4.3")
Weight:	3 kg (6.6 lbs.)