Aficio Color 6010/6110
(Cattleya, A257/A269)
Service Manual

Issued March 30, 1999, Ricoh CO., LTD.

⚠ IMPORTANT SAFETY NOTICES

PREVENTION OF PHYSICAL INJURY

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

HEALTH SAFETY CONDITIONS

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

OBSERVANCE OF ELECTRICAL SAFETY STANDARDS

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

SAFETY AND ECOLOGICAL NOTES FOR DISPOSAL

1. Do not incinerate toner bottles or used toner. Toner dust may ignite suddenly when exposed to an open flame.
2. Dispose of used toner, developer, and organic photoconductors in accordance with local regulations. (These are non-toxic supplies.)
3. Dispose of replaced parts in accordance with local regulations.
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

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

CAUTION MARKING:

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OPTIONS

ARDF (A663)

LCT (A683)

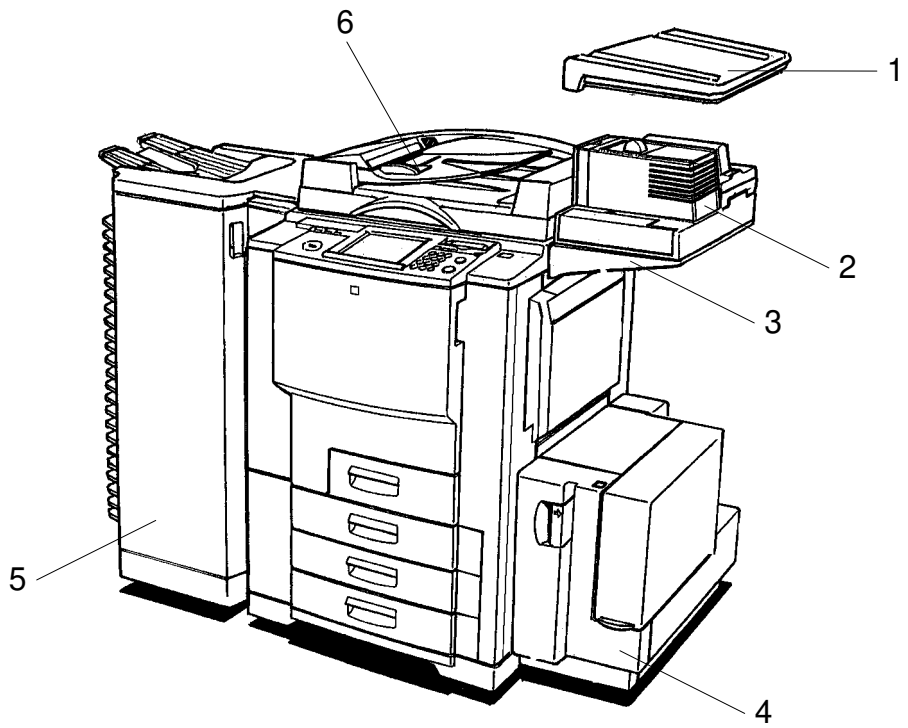
SORTER STAPLER (A831)

1. OVERALL MACHINE INFORMATION

1.1 SPECIFICATIONS

1.1.1 MAJOR UNITS

- A257 copier: Basic model
- A269 copier: Editing model



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1. Original tray (A430)
2. FPU (A846)
3. FPU table (A702-19)
4. LCT (A683) + LCT adapter (A840-01)
5. 20 bin sorter stapler (A831)
6. ARDF (A663)

Other options

- Platen cover (A749-01)
- Controller interface (A839)

1.1.2 BASIC SPECIFICATIONS

Type:	Console type
Copy process:	Dry electrostatic transfer system
Number of scans:	1 (image memory for A3/DLT full color copy is installed)
Pre-scan:	Only when Auto Original Type mode is used
Resolution:	Copy mode (read/write): 400 dpi/600 dpi Print mode (write): 600 dpi
Gradations:	256 gradations (8 bits)
Original types:	Sheet, book, object
Maximum original size:	A3/11" x 17"
Original reference position:	Left rear corner
Maximum print size:	323 mm x 473 mm
Copy paper size:	First tray Maximum: A4 (S/L)/8 1/2" x 11" (S/L) Minimum: A5 (S)/ 8 1/2" x 5 1/2" (S) Other trays Maximum: A3/11" x 17" Minimum: A5 (S)/ 8 1/2" x 5 1/2" (S) By-pass Maximum: 13" x 19" (330 x 483 mm) Minimum: Postcard (100 x 148 mm) Auto/duplex Maximum: A3/11" x 17" Minimum: A5 (S)/ 8 1/2" x 5 1/2" (S)
Paper thickness:	Tray feed (including duplex): 64 to 105 g/m^2, 17 to 28 lb By-pass feed: 64 to 256 g/m^2, 17 to 68 lb Thick paper 1 (105 ~ 157 g/m^2, 28 ~ 42 lb) Thick paper 2 (157 ~ 256 g/m^2, 42 ~ 68 lb)
Non-reproduction area:	Leading edge: 4±2 mm Left and right: 2±2 mm (4 mm or less in total) Trailing edge: 2±2 mm

Copying speed (cpm):

		Full color	C/M/ Y/K	B, G	R	K+M K+Y	K+C
Normal paper/ normal mode	A4/8 1/2" x 11" or less	10	40	13.5	10	13.5	10
	A3/11" x 17"	5	20	7	5	7	5
OHP/thick paper	A4/8 1/2" x 11" or less	4.5	7	5	4.5	5	4.5
	A3/11" x 17"	2	3.5	2.5	2	2.5	2
ARDF 1 to 1	A4/8 1/2" x 11" or less	8	31	8	8	8	8
	A3/11" x 17"	5	15	5	5	5	4
Duplex feed	A4/8 1/2" x 11" or less	10	35	13.5	10	13.5	10
	A3/11" x 17"T	5	20	7	5	7	5

Warm-up time: 8 minutes and 30 seconds or less

First copy time (A4/8 1/2" x 11"): Normal Paper:
- Full color: 16.5 seconds or less
- K, C, M, Y: 8 seconds or less
- B, G: 14 seconds or less
- R: 16.5 seconds or less

Thick paper/OHP:
- Full color: 29 seconds or less

Paper feed capacity: Tray:
- 500-sheet paper tray: 3 trays

By-pass feed:
- 50 sheets

Duplex tray:
- 50-sheets (30 sheets for A3/11" x 17"
- 20 sheets (Full color)

Paper feed system: Tray:
- FRR system (Stack height: 53 mm max.)

By-pass feed:
- FRR system (Stack height: 6 mm max.)

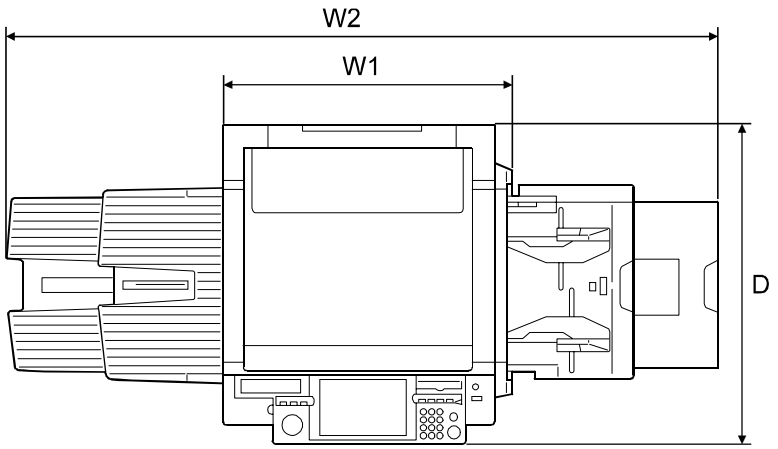
Duplex tray:
- Friction roller separation system

Reproduction Ratios:

	8 1/2" x 11"LT/11" x 17"DLT version	A4/A3 version
Enlargement	121, 129, 155, 200, 400%	115, 122, 141, 200, 400%
Full size	100%	100%
Reduction	25, 50, 65, 73, 78, 85, 93%	25, 50, 65, 71, 75, 82, 93%
Programmable	2 user ratios	2 user ratios
Zoom	25% to 400% in 1% steps	25% to 400% in 1% steps

Number of continuous copies:	1 to 999 sheets
Scanning system:	3-line 1-chip CCD sensor (400 dpi/5,000 pixels)
Light source:	1-halogen-lamp indirect lighting (frosted surface)
Print system:	Twin laser beam, 600 dpi
Development system:	2-component magnetic brush
Drum cleaning system:	Counter blade
Image Transfer system:	Belt transfer system
Fusing system:	Heat and pressure roller system with oil application

Dimensions:



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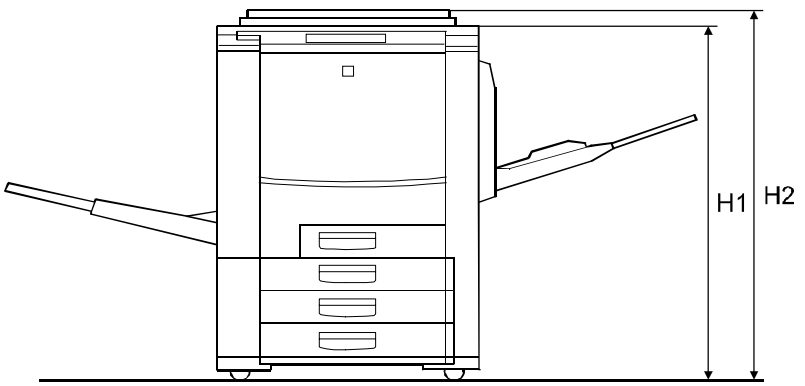

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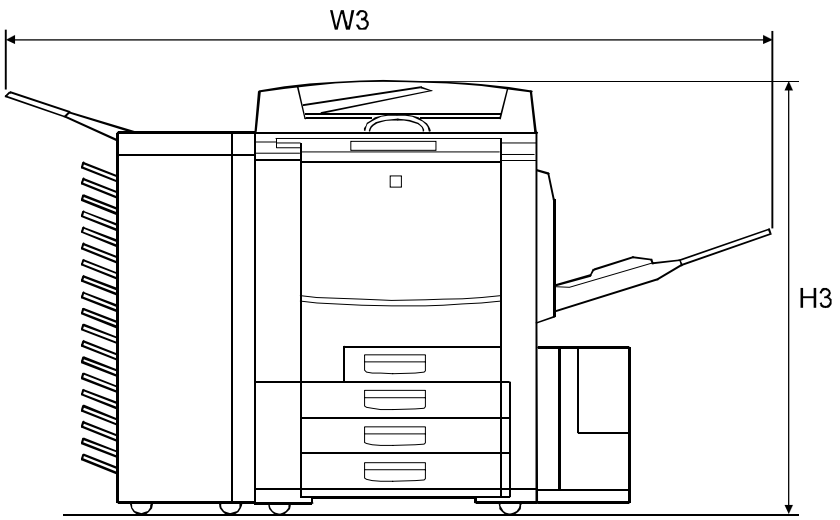
1. **Copier**
   730 mm (W1) x 780 mm (D) x 980 mm (H1)
2. **Copier + Platen Cover + Paper Exit Tray + By-pass Tray**
   1,643 mm (W2) x 780 mm (D) x 1,045 mm (H2)



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3. Copier + ARDF + LCT + Sorter Stapler + By-pass Tray
1,930 mm (W3) x 780 mm (D) x 1,110 mm (H3)

Weight:	240 kg
Power source:	120 V, 60 Hz, 16 A (North America) 220 ~ 240 V, 50 Hz, 8 A (Europe, Mid-East) 220 ~ 240 V, 50/60 Hz, 8 A (Asia)

1.1.3 PLATEN/ARDF ORIGINAL SIZE DETECTION

Size (width x length) [mm]	Platen		ARDF	
	Inch	Metric	Inch	Metric
A3 (297 x 420) L	No	Yes	No	Yes
B4 (257 x 364) L	No	Yes	No	Yes
A4 (210 x 297) L	No	Yes	Yes	Yes
A4 (297 x 210) S	No	Yes	Yes	Yes
B5 (182 x 257) L	No	Yes	No	Yes
B5 (257 x 182) S	No	Yes	No	Yes
A5 (148 x 210) L	No	Yes	No	Yes
A5 (210 x 148) S	No	Yes	No	Yes
B6 (128 x 182) L	No	No	No	Yes
B6 (182 x 128) S	No	No	No	Yes
11" x 17" (DLT)	Yes	No	Yes	Yes
11" x 15"	No	No	Yes	No
10" x 14"	Yes	No	Yes	Yes
8.5" x 14" (LG)	Yes	No	Yes	No
8.5" x 13" (F4)	Yes	Yes	Yes	Yes
8.25" x 13"	No	No	No	No
8" x 13"(F)	Yes	No	Yes	No
8.5" x 11" (LT)	Yes	No	Yes	Yes
11" x 8.5" (LT)	Yes	No	Yes	Yes
8" x 10.5"	No	No	No	No
8" x 10"	Yes	No	Yes	No
5.5" x 8.5" (HLT)	Yes	No	Yes	No
8.5" x 5.5" (HLT)	Yes	No	Yes	No
A6 (105 x 148) L	No	No	No	No

NOTE: In the above table "Inch" refers to versions of the machine that use non-metric traditional paper sizes and "Metric" refers to versions that use ISO standard paper sizes.

1.1.4 COPY PAPER SIZES

Size (width x length) [mm]	1st Tray	2nd/3rd Tray	Duplex Tray	By-pass Tray
A3 (297 x 420) L	No	Yes	Yes	Yes
B4 (257 x 364) L	No	Yes	Yes	Yes
A4 (210 x 297) L	Yes	Yes	Yes	Yes
A4 (297 x 210) S	Yes	Yes	Yes	Yes
B5 (182 x 257) L	Yes	Yes	Yes	Yes
B5 (257 x 182) S	Yes	Yes	Yes	Yes
A5 (148 x 210) L	No	No	No	Yes
A5 (210 x 148) S	Yes	Yes	Yes	Yes
B6 (128 x 182) L	No	No	No	Yes
B6 (182 x 128) S	No	No	No	Yes
13" x 19"	No	No	No	Yes
12" x 18"	No	No	No	Yes
11" x 17" (DLT)	No	Yes	Yes	Yes
11" x 15"	No	Yes	No	No
10" x 14"	No	Yes	Yes	No
8.5" x 14" (LG)	No	Yes	Yes	No
8.5" x 13" (F4)	No	Yes	Yes	No
8.25" x 13"	No	Yes	Yes	No
8" x 13"(F)	No	Yes	Yes	No
8.5" x 11" (LT)	Yes	Yes	Yes	Yes
11" x 8.5" (LT)	Yes	Yes	Yes	Yes
8" x 10.5"	No	Yes	Yes	No
8" x 10"	No	Yes	Yes	No
5.5" x 8.5" (HLT)	No	No	No	Yes
8.5" x 5.5" (HLT)	Yes	Yes	Yes	Yes
A6 (105 x 148) L	No	No	No	Yes

NOTE: The by-pass sizes shown above are those that the machine can automatically detect. When by-pass feeding other sizes, the user should select "Custom Size" and input the length and width. (Length limitations = 148 ~ 483 mm, Width limitations = 100 ~ 330 mm).

1.1.5 NOISE EMISSION

	Copier Only
Stand-by mode	54 dB (A)
Copy-mode average	70 dB (A)

1.1.6 POWER CONSUMPTION

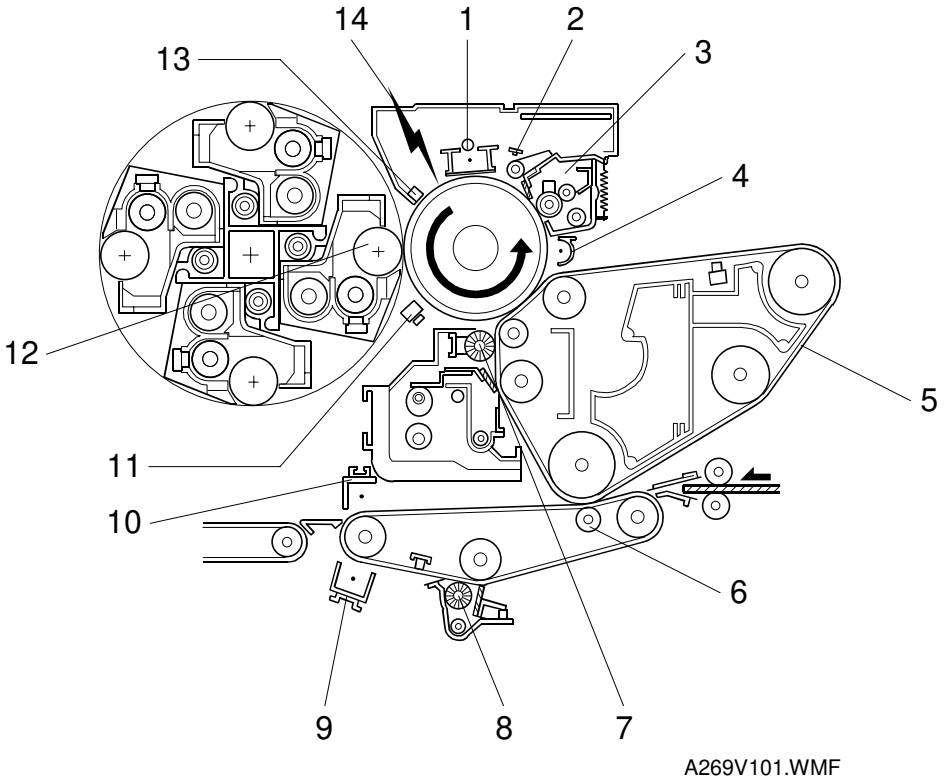
1. Maximum power consumption
   1.75 kVA

2. Average power consumption

Sleep mode	0.015 kW
Stand-by mode	0.6 kW
Warm-up time	1.7 kW
Copying	1.5 kW

1.2 MECHANISM OVERVIEW

1.2.1 IMAGE GENERATION PROCESS



1. **Drum charge**
   The charge corona applies a negative charge to the OPC drum and the grid ensures that this charge is even.

2. **Quenching**
   After cleaning, the OPC is fully exposed to light from an array of red LEDs, quenching the residual charge on the OPC drum in preparation for the next copy cycle.

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

4. **PCC (Pre-cleaning corona)**
   The PCC discharges the photoconductor drum and applies AC and negative DC discharges to reduce the charge holding the residual toner to the drum, thereby improving the efficiency of cleaning.

5. Image transfer to image transfer belt
Positive charge applied to the back of the image transfer belt transfers the toner image on the OPC drum to the image transfer belt.

6. Image transfer to paper
The negatively charged toner image is transferred to the paper by giving a positive charge to the back of the paper.

7. Image transfer belt cleaning and lubricant application
The brush applies lubricant, which makes it easier for the counter blade to scrape excess toner off the transfer belt. The lubricant improves toner transfer ability and reduces the amount of the partial blanking image.

8. Paper transfer belt cleaning
The paper transfer belt blade and brush always contact the paper transfer belt to clean the belt surface.

9. Paper transfer belt discharging
The belt discharge corona unit removes the charge on the paper transfer belt.

10. Paper Separation
A combination of curvature separation and corona discharge separate the paper from the paper transfer belt. The pick-off plate provides mechanical assistance to the separation process.

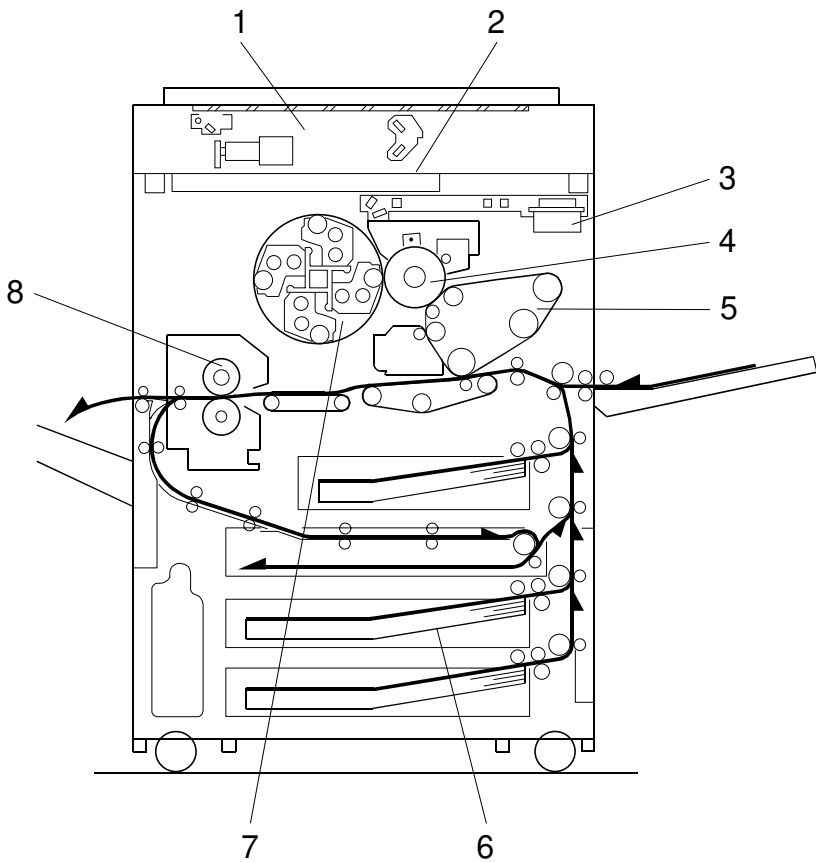
11. ID sensor
The ID sensor senses the density of the test patch patterns developed on the OPC drum.

12. Development
The latent image on the drum attracts the negatively charged toner. Toner is preferentially attracted to those places on the drum surface where the laser reduced the negative charge. (The development units for each color are included in the revolver unit.)

13. Drum potential sensor
The electrical potential on the OPC drum is sensed by the drum potential sensor for process control.

14. Laser exposure
The laser beam emitted from the laser assembly is reflected by the polygon mirror and projected onto the drum through the fθ lens, drum mirror, and toner shield glass. The laser output varies in intensity to correspond to the image data, and this forms a latent image.

1.2.2 MAJOR UNITS AND PAPER PATH



1. Scanner
- 400 dpi, 10-bit scanning in both main and sub scan directions
- 3-line CCD with reduction optics
- Halogen exposure lamp
- 5-phase micro-stepper motor drive

2. Operation panel
- 10.4-inch (640 x 480) color LCD (8 bit) touch-panel

3. Laser exposure unit
- 2 laser diode multi-beam system
- Optics: 6-sided polygon mirror + 2 fθ lenses + barrel toroidal lens (BTL)
- Polygon motor (23,622 rpm)
- 600 dpi (8 bit) print density
- Modulation: power modulation + pulse width modulation

4. Drum unit

- Drum unit contains OPC drum, charge corona unit, and cleaning unit.
- Charge corona unit: Single scorotron charge
- Quenching lamp: LED
- Drive: Synchronized with the image transfer belt (timing belt + flywheel)
- Potential sensor and ID sensor included
- Cleaning unit: Blade, brush, lubricant, and pre-cleaning corona

5. Image transfer and belt drive

- Image transfer belt: Full time contact with the drum
- Image transfer: Bias/roller indirect application
- Paper transfer: Belt transfer
- Registration: Synchronization by the belt mark detection sensor
- Image transfer belt: Driven by the image transfer belt motor
- Paper transfer belt: Driven by the paper transfer motor
- Separation: Curvature separation + corona discharge
- Belt cleaning: Counter blade system
- Lubrication: Brush roller with lubricant bar

6. Paper feed/transport system

- Paper feed: 3 front loading 500-sheet trays + by-pass transport
- Transport: Transport belt + vacuum fan
- Duplexing: Duplex unit installed

7. Development and toner supply

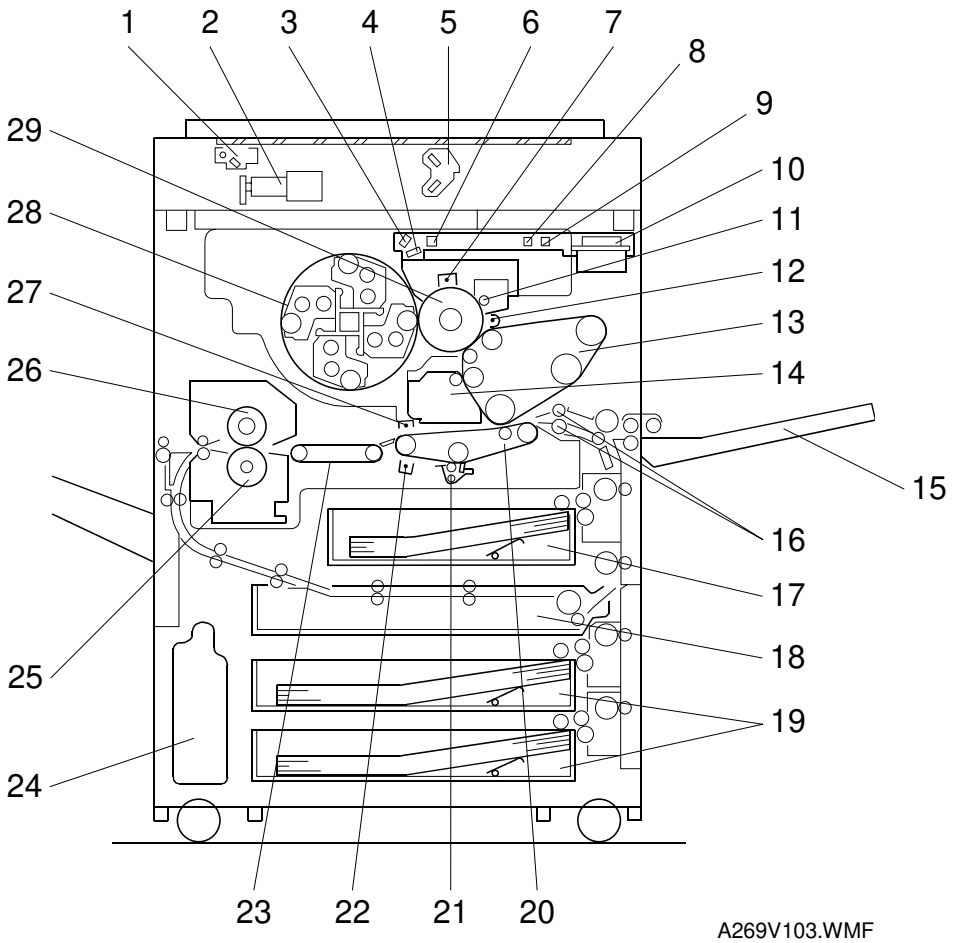
- Development: Two-component magnetic brush development
- Development color switching: Revolver system
- Image density control: TD sensor + ID sensor + process control
- Toner supply: Cartridge type
- Toner supply unit: Front of development units (on the revolver)

8. Fusing and paper exit section

- Fusing: Silicone rubber roller fusing
- Oil application method: roller
- Cleaning: Roller cleaning for hot and pressure rollers (-15, -17, -19)
  Roller cleaning for hot and cleaning blade for pressure roller (-22, -26, -27, -29)
- OHP/thick paper speed selection

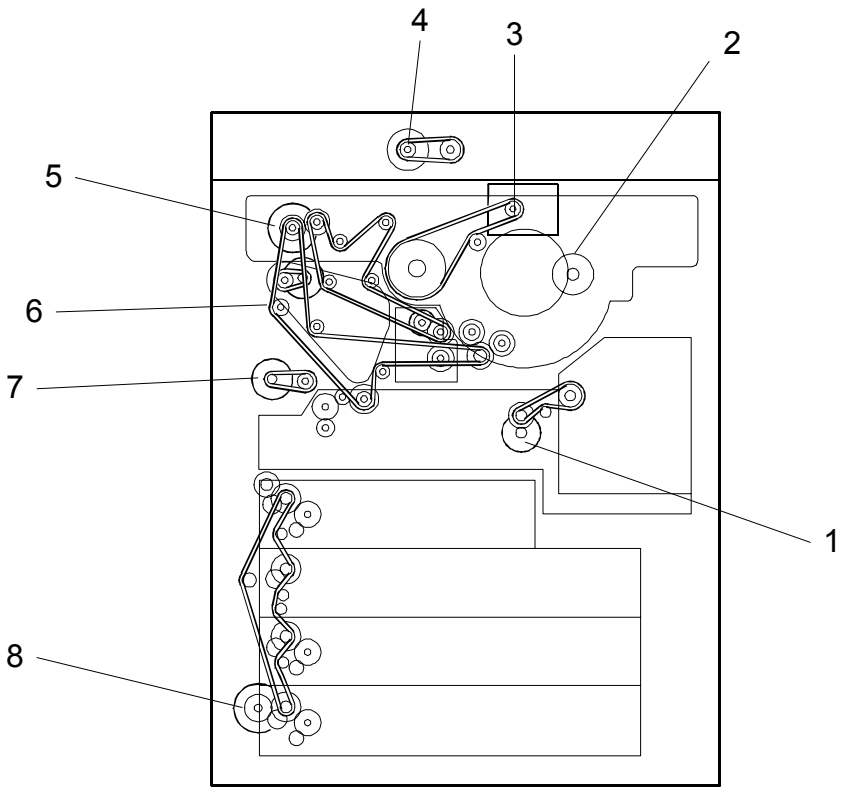
1.3 PARTS LAYOUT

1.3.1 MAJOR UNIT LAYOUT DIAGRAM



1. 1st scanner
2. Sensor board unit (SBU)
3. Drum mirror
4. Toner shield glass
5. 2nd scanner
6. Barrel toroidal lens (BTL)
7. Charge corona unit
8. 2nd fθ lens
9. 1st fθ lens
10. Polygon mirror
11. Drum cleaning unit
12. Pre-cleaning corona (PCC)
13. Image transfer unit
14. Image transfer belt cleaning unit
15. By-pass feed table
16. Registration rollers
17. 1st paper tray
18. Duplex unit
19. 2nd/3rd paper trays
20. Paper transfer belt unit
21. Paper transfer belt cleaning unit
22. Belt discharge corona unit
23. Transport belt
24. Used toner tank
25. Pressure roller
26. Hot roller
27. Separation corona unit
28. Revolver (development units)
29. OPC drum

1.4 DRIVE LAYOUT



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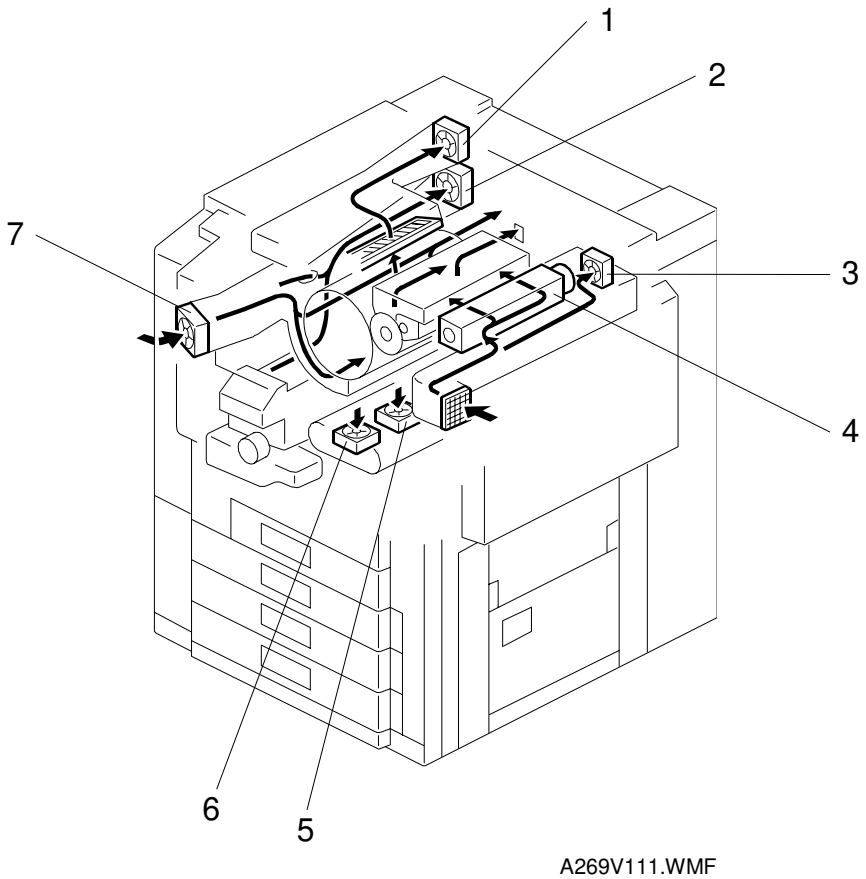
1. Fusing transport drive
2. Revolver drive
3. Drum drive
4. Scanner drive
5. Drum peripheral drive
6. Image transfer belt drive
7. Registration drive
8. Paper feed drive

1.5 AIR FLOW

1.5.1 AIR FLOW SYSTEM 1



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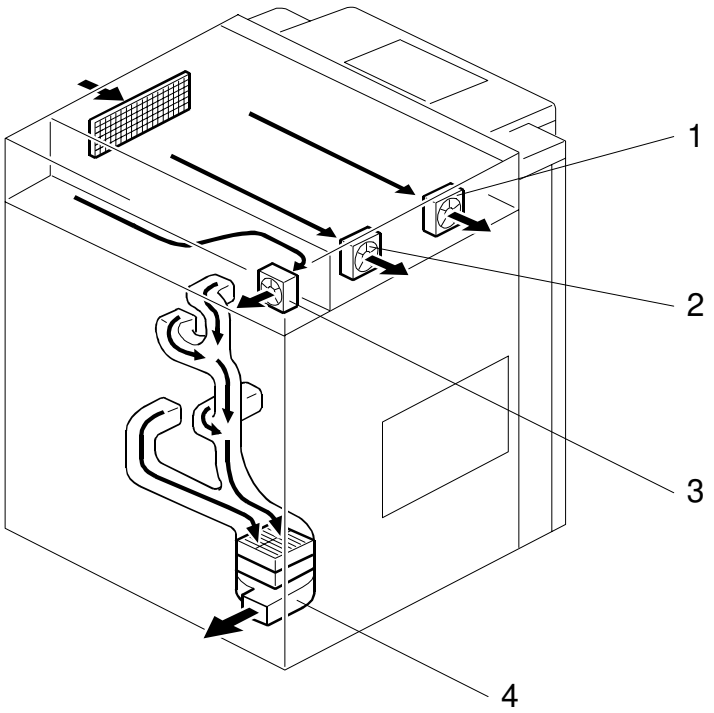
1. Fusing fan (upper)
2. Fusing fan (bottom)
3. ID sensor fan
4. Charge fan
5. Transport fan (rear)
6. Transport fan (front)
7. Development cooling fan

1.5.2 AIR FLOW SYSTEM 2



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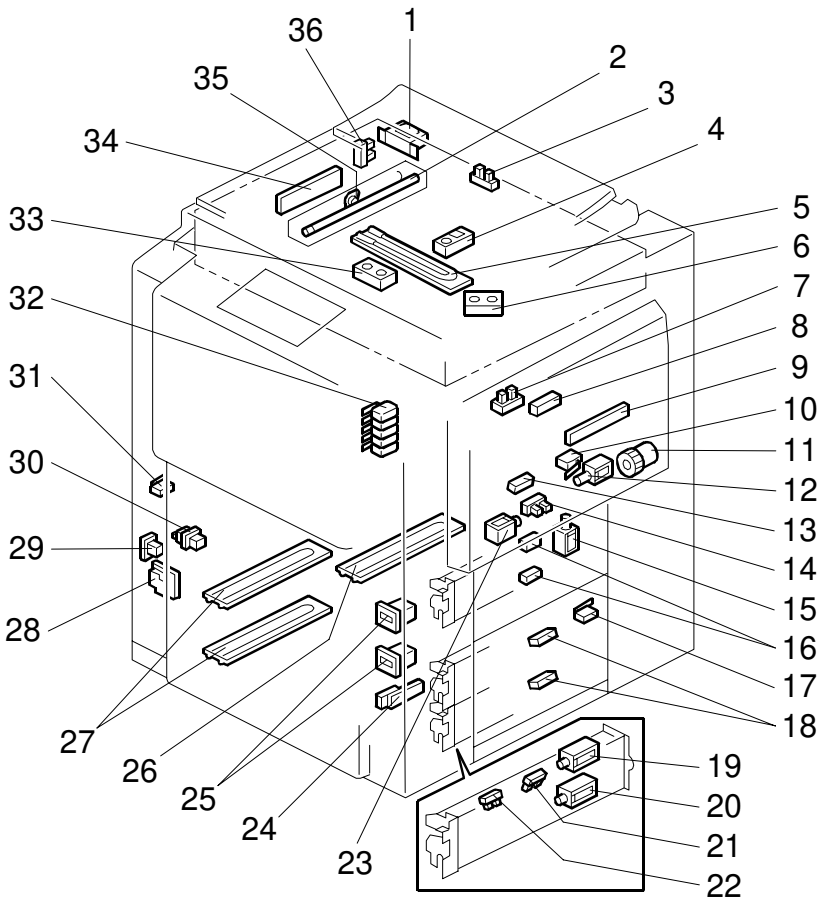
1. Optics cooling fan (front)
2. Optics cooling fan (rear)
3. IPU cooling fan
4. Exhaust fan

1.6 ELECTRICAL PARTS LAYOUT

1.6.1 ELECTRICAL PARTS LAYOUT 1



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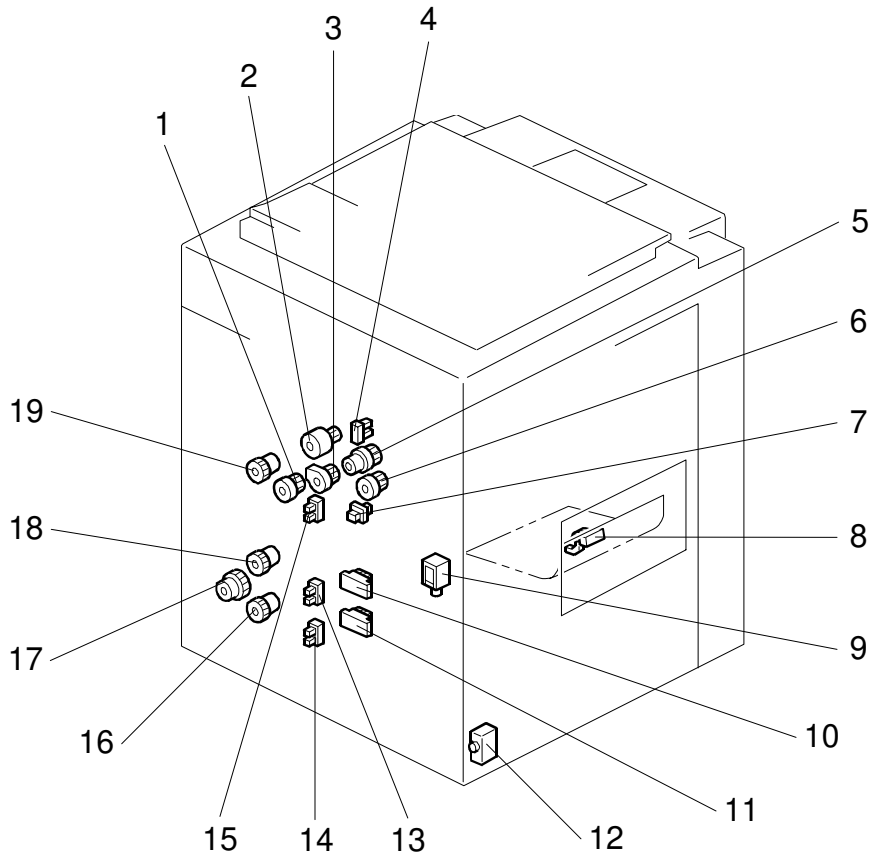
1. Choke coil
2. Exposure lamp
3. Platen cover position sensor
4. Original length sensor 2
5. Optics anti-condensation heater
6. Original length sensor 1
7. By-pass paper end sensor
8. By-pass paper length sensor
9. By-pass paper width detection board
10. By-pass feed unit switch
11. By-pass feed clutch
12. Main by-pass pick-up solenoid
13. Registration sensor
14. By-pass table sensor
15. By-pass reverse roller solenoid
16. 1st/Duplex paper feed sensor
17. Vertical transport door switch
18. 2nd/3rd paper feed sensor
19. 1st/2nd/3rd pick-up solenoid
20. 1st/2nd/3rd reverse roller solenoid
21. 1st/2nd/3rd upper limit sensor
22. 1st/2nd/3rd paper end sensor
23. Sub by-pass pick-up solenoid
24. Humidity sensor
25. Mechanical total counter
26. Paper transfer heater
27. Paper tray heaters (option)
28. Toner overflow sensor
29. Main switch
30. Paper exit door switch 2
31. Paper exit door switch 1
32. Front door switch
33. Original width sensor
34. CCD
35. Thermostat
36. Scanner H.P. sensor

1.6.2 ELECTRICAL PARTS LAYOUT 2



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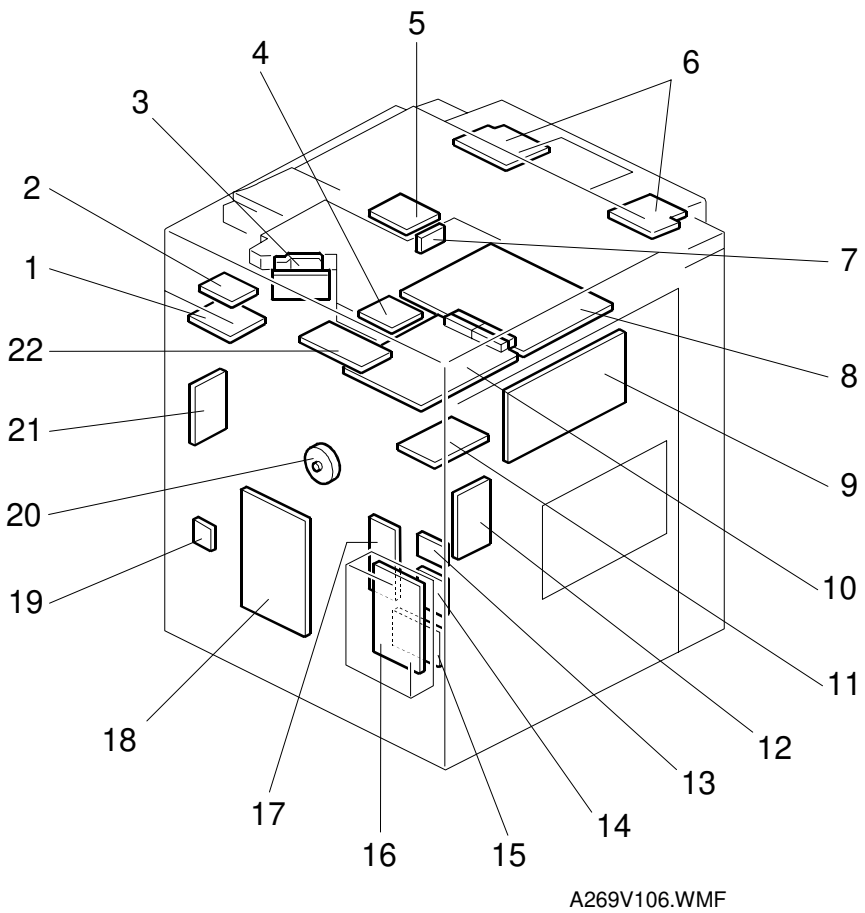
1. Paper transfer belt shift clutch
2. Image transfer belt cleaning drive clutch
3. Image transfer belt cleaning shift clutch
4. Image transfer belt cleaning H.P. sensor
5. Development clutch
6. Toner supply clutch
7. 1st tray set switch
8. Duplex turn guide sensor
9. Junction gate solenoid
10. 2nd tray paper size switch
11. 3rd tray paper size switch
12. Circuit breaker
13. 2nd paper height sensor
14. 3rd paper height sensor
15. 1st paper height sensor
16. 3rd feed clutch
17. Paper feed drive clutch
18. 2nd tray feed clutch
19. 1st feed clutch

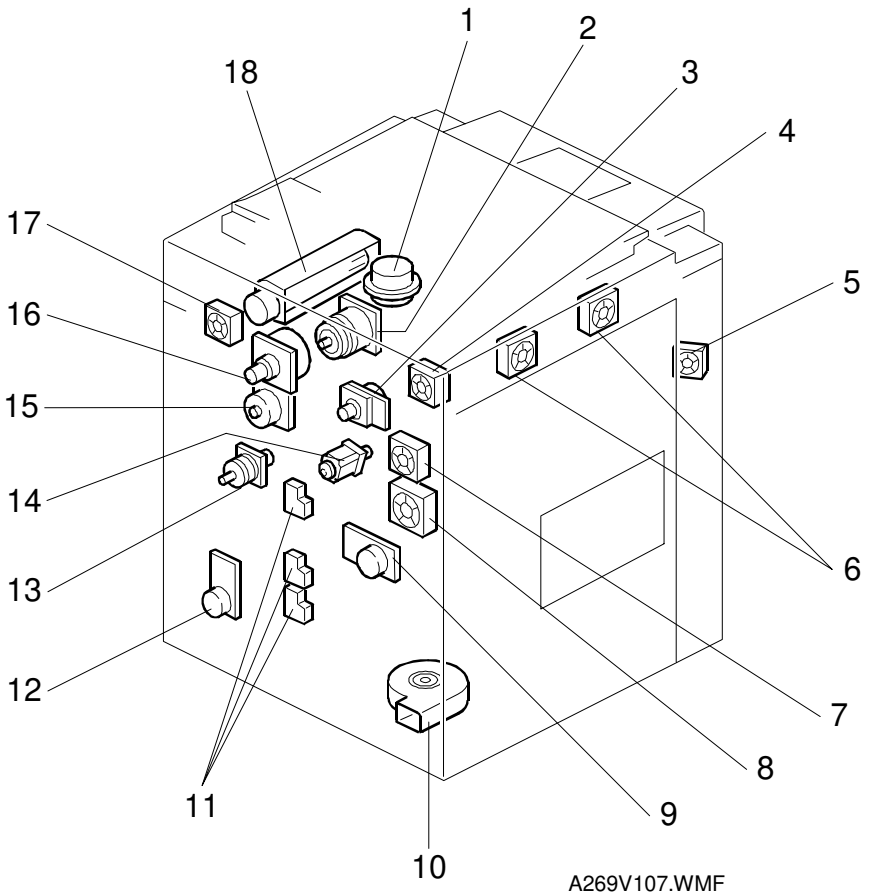
1.6.3 ELECTRICAL PARTS LAYOUT 3



A269V106.WMF

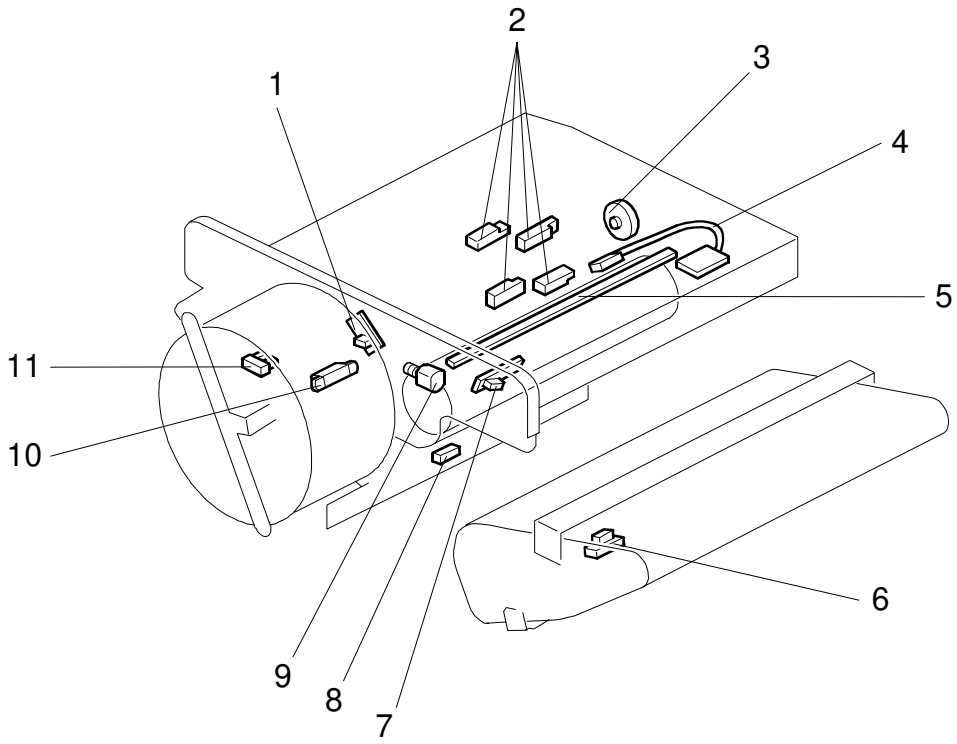
1. LD control board
2. Scanner motor drive board
3. LD drive board
4. Image detection unit
5. Polygon motor drive board
6. Operation panel board
7. Laser synchronizing detector board
8. Main scanner IPU board
9. Main control board
10. Sub scanner IPU board
11. High voltage supply board C/G/B
12. Revolver motor drive board
13. High voltage supply board Q1
14. High voltage supply board D
15. AC drive board
16. Power supply unit
17. High voltage supply board T1/PCC/BR
18. I/O control board
19. Interface board RDS/LCT
20. TD sensor interface board 1
21. Image transfer belt motor drive board
22. Lamp regulator

1.6.4 ELECTRICAL PARTS LAYOUT 4



1. Polygon motor
2. Scanner motor
3. Drum motor
4. IPU cooling fan
5. Development cooling fan
6. Optics cooling fan
7. Fusing fan (upper)
8. Fusing fan (bottom)
9. Fusing motor
10. Exhaust fan
11. Tray lift motor
12. Paper feed motor
13. Registration motor
14. Revolver motor
15. Image transfer belt motor
16. Drum peripheral component motor
17. ID sensor fan
18. Charge fan

1.6.5 ELECTRICAL PARTS LAYOUT 5



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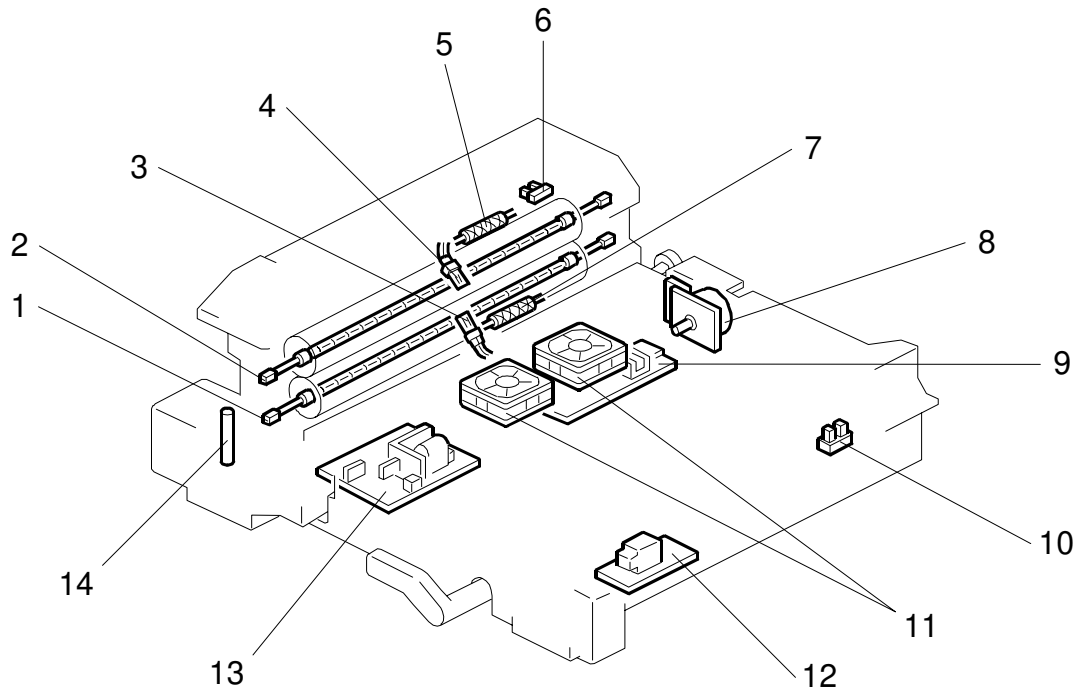
1. Toner cartridge set sensor
2. TD sensor
3. TD sensor interface board 2
4. Drum potential sensor/board
5. Quenching lamp
6. Belt mark detection sensor
7. ID sensor
8. Paper separation sensor
9. Wire cleaner motor
10. Toner end sensor
11. Revolver H.P. sensor

1.6.6 ELECTRICAL PARTS LAYOUT 6



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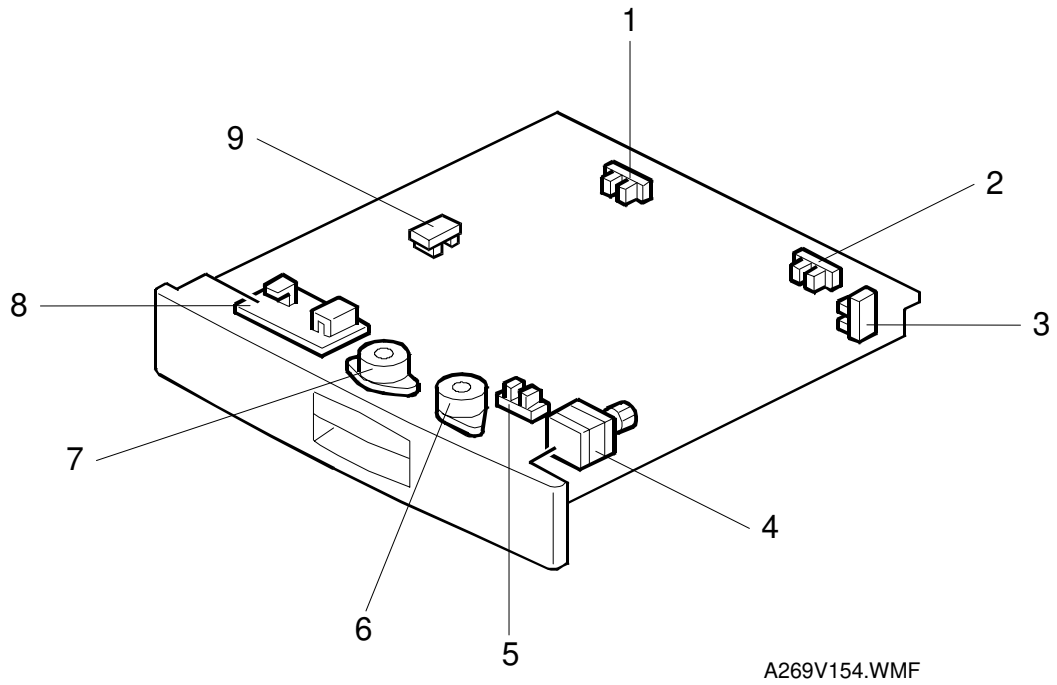
1. Pressure roller fusing lamp
2. Hot roller fusing lamp
3. Pressure roller thermistor
4. Hot roller thermistor
5. Hot roller thermofuse
6. Paper Exit sensor
7. Pressure roller thermofuse
8. Paper transfer belt motor
9. Paper transfer belt motor drive board
10. Paper transfer belt unit H.P. sensor
11. Transport fan
12. High voltage supply board T2
13. High voltage supply board Q2
14. Oil end sensor

1.6.7 ELECTRICAL PARTS LAYOUT 7



1. Duplex entrance sensor
2. Duplex turn sensor
3. Duplex paper end sensor
4. Duplex feed motor
5. Duplex side fence H.P. sensor
6. Side fence jogger motor
7. End fence jogger motor
8. Duplex control board
9. Duplex end fence H.P. sensor

1.7 ELECTRICAL PARTS DESCRIPTIONS

Symbol	Name	Function	P-to-P Location		Index No.
SENSORS					
S1	Platen Cover Position Sensor	Detects if the platen cover is opened or closed.	1/2	H5	1-3
S2	Scanner H.P. Sensor	Detects the scanner home position.	1/2	G5-H5	1-36
S3	Original Length Sensor 1	Detects the length of originals.	1/2	H7-H8	1-6
S4	Original Length Sensor 2	Detects the length of small size original.	1/2	G7-G8	1-4
S5	Original Width Sensor	Detects the width of originals.	1/2	H7-H8	1-33
S6	Revolver H.P. Sensor	Detects the revolver home position.	2/2	A3	5-11
S7	Toner Cartridge Set Sensor	Detects the presence of the toner cartridges.	2/2	A3	5-1
S8	Toner End Sensor	Detects the presence of toner in the cartridge.	2/2	A2-A3	5-10
S9	Toner Density Sensor - Y	Detects the toner density in the development unit.	1/2	B11-C11	5-2
S10	Toner Density Sensor - K		1/2	B11-C11	5-2
S11	Toner Density Sensor - M		1/2	B11-C11	5-2
S12	Toner Density Sensor - C		1/2	B11-C11	5-2
S13	Drum Potential Sensor/Board	Detects the drum surface potential.	2/2	A4	5-4
S14	ID Sensor	Detects the density of the sensor pattern developed on the drum surface.	2/2	A3	5-7
S15	Humidity Sensor	Detects the humidity and temperature to calculate absolute humidity.	2/2	A7	1-24
S16	Belt Mark Detection Sensor	Detects the belt mark on the image transfer belt for synchronizing the image of each color.	2/2	G2	5-5
S17	Image Transfer Belt Cleaning H.P. Sensor	Detects the ITB cleaning unit home position.	2/2	A4-A5	2-4
S18	Paper Transfer Belt Unit H.P. Sensor	Detects the home position.	2/2	E4	6-10
S19	By-pass Table Sensor	Detects if the by-pass table is opened or closed.	2/2	A4	1-14
S20	By-pass Paper Length Sensor	Detects whether or not paper on the by-pass tray is longer than A4 (Letter).	2/2	E2	1-8
S21	By-pass Paper End Sensor	Detects whether or not there is paper on the by-pass tray.	2/2	D2	1-7
S22	1st Upper Limit Sensor	Detects the upper limit (paper feed position).	2/2	D11	1-21
S23	Not used				
S24	2nd Upper Limit Sensor		2/2	F11	1-21
S25	3rd Upper Limit Sensor		2/2	G11	1-21
S26	1st Paper Height Sensor	Detects when the tray is nearly out of paper.	2/2	A10	2-15
S27	Not used				
S28	2nd Paper Height Sensor		2/2	A10-A11	2-13
S29	3rd Paper Height Sensor		2/2	A11	2-14
S30	1st Paper End Sensor	Detects whether or not there is paper in the tray.	2/2	D11	1-22
S31	Not used				
S32	2nd Paper End Sensor		2/2	F11	1-22
S33	3rd Paper End Sensor		2/2	F11-G11	1-22
S34	1st Paper Feed Sensor	1. Detects the paper to control the feed timing of next sheet of paper. 2. Detects paper jams at the paper feed section. 3. When a copy is made, it also controls the stop timing of feed clutch and solenoid.	2/2	D2	1-16
S35	Duplex Paper Feed Sensor		2/2	D2	1-16
S36	2nd Paper Feed Sensor		2/2	F2	1-18
S37	3rd Paper Feed Sensor		2/2	F2	1-18

Symbol	Name	Function	P-to-P Location		Index No.
S38	Registration Sensor	Detects the leading edge of paper to control start timing of the registration rollers. Also, detects paper jams in the registration area.	2/2	A5	1-13
S39	Paper Separation Sensor	Detects whether or not paper properly separates from the paper transfer belt.	2/2	A3	5-8
S40	Paper Exit Sensor	Detects paper jams at the exit section.	1/2	A1-B1	6-6
S41	Duplex Turn Guide Sensor	Detects paper jams at the turn guide section.	2/2	A10	2-8
S42	Duplex Entrance Sensor	Detects a paper jams at the entrance of the duplex tray.	2/2	E10	7-1
S43	Duplex Turn Sensor	Detects the trailing edge of paper to activate the jogger motor for jogging.	2/2	E10	7-2
S44	Duplex Paper End Sensor	Detects if there is paper in the duplex unit.	2/2	E10	7-3
S45	Duplex Side Fence H.P. Sensor	Detects the side fence home position.	2/2	E9	7-5
S46	Duplex End Fence H.P. Sensor	Detects the end fence home position.	2/2	E9	7-9
S47	Oil End Sensor	Detects whether or not the oil tank is nearly empty.	1/2	B1	6-14
S48	Toner Overflow Sensor	Detects whether or not the toner collection bottle is full.	2/2	A10	1-28
SWITCHES					
SW1	Main Switch	Turns the power to the copier on or off.	1/2	F1	1-29
SW2	Front Door Switch 1	Cuts the DC power to the I/O control board when the door is opened.	2/2	A6	1-32
SW3	Front Door Switch 2		2/2	A7	1-32
SW4	Front Door Switch 3		2/2	A7	1-32
SW5	Front Door Switch 4	Cuts the DC power to the LD control board when the door is opened.	1/2	G11	1-32
SW6	Front Door Switch 5		1/2	G11	1-32
SW7	By-pass Feed Unit Switch	Detects if the by-pass feed unit is opened or not.	2/2	A6	1-10
SW8	Vertical Transport Door Switch	Detects if the vertical transport door is opened or not.	2/2	E2-F2	1-17
SW9	1st Tray Set Switch	Detects if the paper tray is set or not.	2/2	A8-A9	2-7
SW10	Not used				
SW11	2nd Tray Paper Size Switch	Detects the size of paper in the paper tray.	2/2	A9	2-10
SW12	3rd Tray Paper Size Switch		2/2	A9	2-11
SW13	Paper Exit Door Switch 1	Detects if the exit door is opened or closed and cuts the DC power when the exit door is opened.	2/2	A6	1-31
SW14	Paper Exit Door Switch 2	Detects if the exit door is opened or closed.	2/2	A6	1-30
PCBs					
PCB1	PSU	Provides AC and DC power.	1/2	C3-F2	3-16
PCB2	AC Drive Board	Provides AC power to fusing lamps and heaters.	1/2	C3-F2	3-15
PCB3	Lamp Regulator	Provides AC power to the exposure lamp.	1/2	H5	3-22
PCB4	Scanner Motor Drive Board	Controls the scanner motor.	1/2	F5-G5	3-2
PCB5	CCD	Converts the light reflected from the original into analog signals for the three basic colors (RGB).	1/2	D7-D8	1-34
PCB6	Main Scanner IPU Board	Converts RGB image signal from the CCD to a CMYK signal data and sends the signal to the LD control board.	1/2	D6-G8	3-8
PCB7	Sub Scanner IPU Board		1/2	E6-G9	3-10
PCB8	Main Control Board	Controls the printer sequence.	1/2	B8-D11	3-9

Symbol	Name	Function	P-to-P Location		Index No.
PCB9	I/O Control Board	Interfaces the sensors, clutches, solenoids, and motors in the printer module with the main control board.	1/2 2/2	A2-A11 C11-H1	3-18
PCB10	LD Control Board	Controls laser synchronization.	1/2	F9-F11	3-1
PCB11	LD Drive Board	Controls the LD output.	1/2	D10	3-3
PCB12	Polygon Motor Drive Board	Controls the polygon mirror motor.	1/2	G11	3-5
PCB13	Laser Synchronizing Detector Board	Detects the laser beam to control the start timing of main scan writing.	1/2	G11	3-7
PCB14	IDU (Image Detection Unit)	Analyzes images for anti-counterfeiting.	1/2	G8	3-4
PCB15	High Voltage Supply Board C/G/B	Provides power to the charge corona unit and development rollers.	2/2	B1-B2	3-11
PCB16	TD Sensor Interface Board 1	Provides power to the TD sensors and transmits the output data from the sensors to the main control board.	1/2	B11	3-20
PCB17	TD Sensor Interface Board 2		1/2	B11	5-3
PCB18	Revolver Motor Drive Board	Controls the revolver motor.	2/2	D3-E3	3-12
PCB19	Image Transfer Belt Motor Drive Board	Controls the image transfer belt motor.	2/2	F1-G2	3-21
PCB20	High Voltage Supply Board T1/PCC/BR	Provides power to the image transfer belt bias roller, PCC unit, and drum cleaning bias roller.	2/2	B1	3-17
PCB21	Paper Transfer Belt Motor Drive Board	Controls the paper transfer belt motor.	2/2	D5-E5	6-9
PCB22	High Voltage Supply Board T2	Provides power to the paper transfer belt bias roller.	2/2	E4	6-12
PCB23	High Voltage Supply Board Q1	Provides power to the lubricant brush.	2/2	E6-E7	3-13
PCB24	High Voltage Supply Board Q2	Provides power to the paper transfer belt discharge corona unit.	2/2	E4	6-13
PCB25	High Voltage Supply Board D	Provides power to the paper separation corona unit.	2/2	A9-A10	3-14
PCB26	Operation Panel Board	Used to operate the copier.	1/2	C11-D11	3-6
PCB27	Interface Board RDS/LCT	Interfaces the sensors, clutches, solenoids, and motors in the LCT with the main control board.	1/2	B6-C7	3-17
PCB28	By-pass Paper Width Detection Board	Detects the width of paper.	2/2	E2	1-9
PCB29	Duplex Control Board	Controls the duplex unit.	2/2	D8-E10	7-9
MOTORS					
M1	Polygon Motor	Drives the polygon mirror.	1/2	G11	4-1
M2	Wire Cleaner Motor	Drives the charge wire cleaner.	2/2	A4	5-9
M3	Drum Motor	Drives the drum.	2/2	D5-E6	4-3
M4	Drum peripheral component Motor	Drives the drum cleaning unit, toner supply unit, development unit, and image transfer belt cleaning unit.	2/2	H2	4-16
M5	Image Transfer Belt Motor	Drives the image transfer belt.	2/2	F2	4-15
M6	Paper Transfer Belt Motor	Drives the paper transfer belt.	2/2	E5	6-8
M7	1st Tray Lift Motor	Lifts the tray bottom plate up.	2/2	D10-D11	4-11
M8	Not used				
M9	2nd Tray Lift Motor		2/2	F10-F11	4-11
M10	3rd Tray Lift Motor		2/2	G10-G11	4-11
M11	Paper Feed Motor	Drives the paper feed mechanism for all trays.	2/2	A8	4-12
M12	Fusing Motor	Drives the paper transport belts and fusing rollers.	2/2	A11	4-9
STM1	Scanner Motor	Drives the scanner.	1/2	G4	4-2
STM2	Revolver Motor	Drives the revolver unit.	2/2	E3	4-14
STM3	Registration Motor	Drives the registration roller.	2/2	A6	4-13

Symbol	Name	Function	P-to-P Location		Index No.
STM4	Duplex Feed Motor	Drives the paper feed rollers in the duplex unit.	2/2	E8	7-4
STM5	Side Fence Jogger Motor (Duplex)	Drives the duplex side jogger fences.	2/2	E9	7-6
STM6	End Fence Jogger Motor (Duplex)	Drives the duplex end jogger fence.	2/2	E9	7-7
CLUTCHES					
CL1	Toner Supply Clutch	Transmits the drive to the toner supply mechanism.	2/2	A5	2-6
CL2	Development Clutch	Transmits the drive to the development mechanism.	2/2	A5	2-5
CL3	Image Transfer Belt Cleaning Drive Clutch	Transmits the drive to the image transfer belt cleaning unit.	2/2	A5	2-2
CL4	Image Transfer Belt Cleaning Shift Clutch	Shifts/releases the cleaning brush, cleaning blade, and entrance seal against/from the image transfer belt.	2/2	A5	2-3
CL5	Paper transfer Belt Shift Clutch	Shifts/releases the paper transfer belt against/from the image transfer belt.	2/2	H2	2-1
CL6	1st Feed Clutch	Transmits drive to the paper feed mechanism.	2/2	D10-D11	2-19
CL7	Not used				
CL8	2nd Feed Clutch		2/2	F10-F11	2-18
CL9	3rd Feed Clutch		2/2	G10-G11	2-16
CL10	By-pass Feed Clutch	Transmits drive to the by-pass feed mechanism.	2/2	E2	1-11
CL11	Paper Feed Drive Clutch	Transmits drive to the paper feed mechanism.	2/2	A8	2-17
SOLENOIDS					
SOL1	1st Pick-up Solenoid	Lowers the pick-up roller onto paper.	2/2	D10-D11	1-19
SOL2	Not used				
SOL3	2nd Pick-up Solenoid		2/2	F10-F11	1-19
SOL4	3rd Pick-up Solenoid		2/2	G10-G11	1-19
SOL5	1st Reverse Roller Solenoid	Positions the reverse roller against the paper feed roller.	2/2	D10-D11	1-20
SOL6	Not used				
SOL7	2nd Reverse Roller Solenoid		2/2	F10-F11	1-20
SOL8	3rd Reverse Roller Solenoid		2/2	G10-G11	1-20
SOL9	Main By-pass Pick-up Solenoid	Lowers the pick-up roller onto paper.	2/2	D2	1-12
SOL10	Sub By-pass Pick-up Solenoid	Increases the pick-up roller pressure depending on the copy mode selected to avoid paper misfeed.	2/2	D2	1-23
SOL11	By-pass Reverse Roller Solenoid	Increases the pressure of the reverse roller against the feed roller depending on the copy mode selected to avoid paper misfeed.	2/2	E2	1-15
SOL12	Junction Gate Solenoid	Raises the junction gate to feed paper into the duplex unit.	2/2	D3-E3	2-9
FAN MOTORS					
FAN1	IPU Cooling Fan	Cools the scanner IPU board.	1/2	G5	4-4
FAN2	Optics Cooling Fan (Front)	Cools the scanner unit.	1/2	G5	4-6
FAN3	Optics Cooling Fan (Rear)		1/2	G5	4-6
FAN4	Charge Fan	Provides air flow to the charge corona unit.	2/2	A4	4-18
FAN5	Development Cooling Fan	Cools the development section.	2/2	E6	4-5
FAN6	ID Sensor Fan	Provides air flow to the ID sensor.	2/2	A4	4-17
FAN7	Transport Fan (Rear)	Holds copy paper against the transport belts.	2/2	E4	6-11
FAN8	Transport Fan (Front)		2/2	E4	6-11

Symbol	Name	Function	P-to-P Location		Index No.
FAN9	Fusing Fan (Upper)	Cools the fusing unit area.	2/2	E6	4-7
FAN10	Fusing Fan (Bottom)		2/2	E6	4-8
FAN11	Exhaust fan	Blows air out of the copier.	2/2	A11	4-10
LAMPS					
L1	Exposure Lamp	Applies high intensity light to the original for exposure.	1/2	H4	1-2
L2	Quenching Lamp (QL)	Neutralizes any charge remaining on the drum prior to the start of the copy cycle.	2/2	A4	5-5
L3	Hot Roller Fusing Lamp	Heats to the hot roller.	1/2	C1	6-2
L4	Pressure Roller Fusing Lamp	Heats to the pressure roller.	1/2	C1	6-1
HEATERS					
H1	Optics Anti-condensation Heater	Prevents moisture from forming on the optics.	1/2	E1	1-5
H2	Paper Transfer Heater	Prevents moisture from forming around the paper transfer belt.	1/2	D1	1-26
H3	Paper Tray Heater 1 (Option)	Keeps paper dry on the paper feed trays.	1/2	D1	1-27
H4	Paper Tray Heater 2 (Option)		1/2	D1	1-27
THERMISTORS					
TH1	Hot Roller Thermistor	Monitors the temperature of the hot roller.	1/2	B1	6-4
TH2	Pressure Roller Thermistor	Monitors the temperature of the pressure roller.	1/2	B1	6-3
THERMOFUSES					
TF1	Hot Roller Thermofuse	Protects against hot roller overheating.	1/2	B1	6-5
TF2	Pressure Roller Thermofuse	Protects against pressure roller overheating.	1/2	C1	6-7
THERMOSTAT					
TS1	Thermostat	Prevents the scanner unit from overheating.	1/2	H4	1-35
COUNTERS					
CO1	Total Counter 1 (Upper)	Indicates the total number of developments made by C, M, and Y.	2/2	A7	1-25
CO2	Total Counter 2 (Bottom)	Indicates the total number of developments made by K.	2/2	A7	1-25
CO3	Key Counter (Option)	Indicates the total number of developments of any color.	2/2	A7	—

2. DETAILED SECTION DESCRIPTIONS

2.1 PROCESS CONTROL

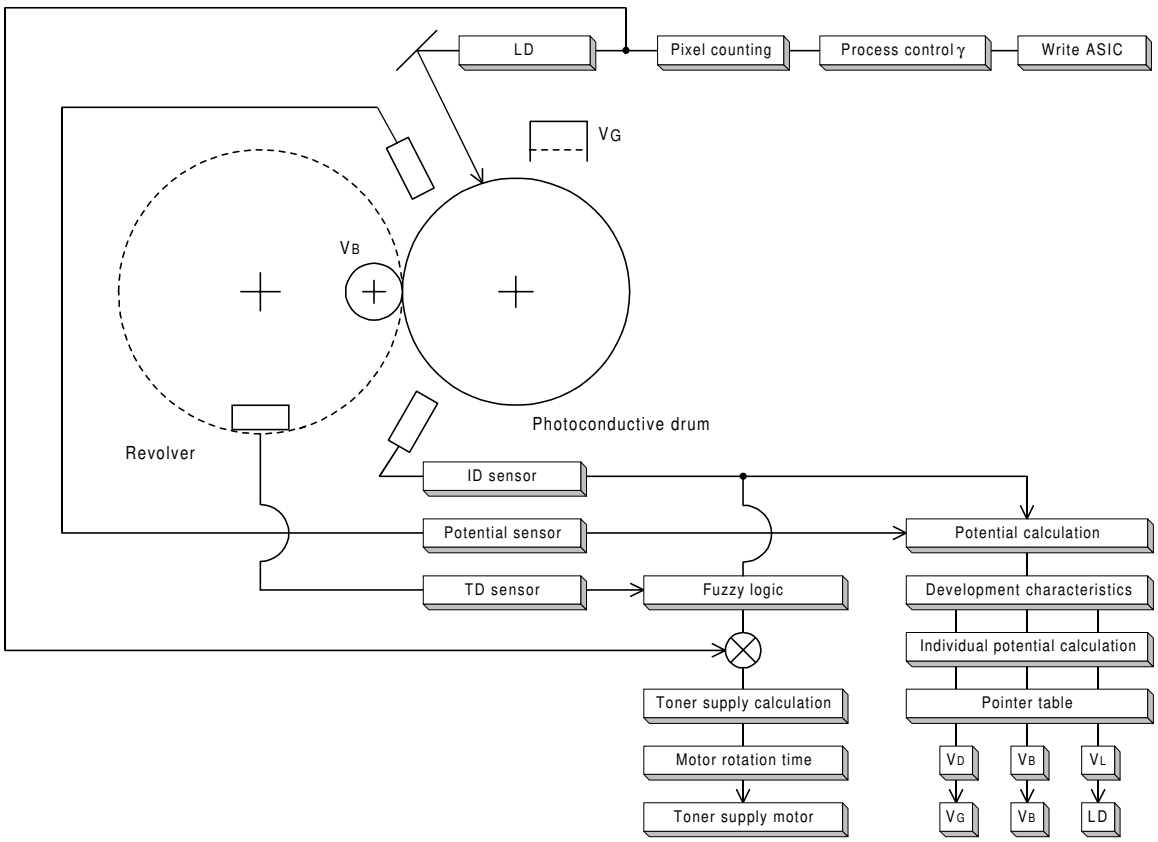
2.1.1 OVERVIEW

This copier provides the following three forms of process control:

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

The process control facilities of this copier have the following features:

- Use of a feedback measurement type drum potential sensor.
- ID sensor (a new type of sensor is used, known as a 'diffused reflection ID sensor'). The ID sensor detects the amount of toner on the drum.
- Use of a toner density (TD) sensor (non-contact communication with the copier)



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2.1.2 POTENTIAL CONTROL

Overview

Potential control is the process of controlling the development potential to maintain the density of the toner image on the drum. It does this by compensating for variations in drum chargeability and toner chargeability.

The machine uses the image density (ID) sensor to measure drum reflectivity and the density of a standard sensor pattern. It uses the drum potential sensor to detect the potential on the standard sensor pattern (before the pattern is developed). These tests are done during the process control self check, which is done at specific times (such as after replacing the developer).

The ID and drum potential sensor outputs are used to calculate the development potential. This is the difference between the development bias voltage and the voltage of areas of the drum that have been discharged by laser exposure at full power. If changes in this potential are not accounted for, the color balance will be poor.

Depending on the development potential that is calculated, the machine uses a look-up table in memory (called a pointer table) to adjust the following:

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

Potential control controls the development potential so that the maximum amount of toner applied to the drum is kept constant. However, the medium (greyscale) range is ignored. To improve this situation, a new process called ‘process control gamma correction’ is done after potential control. This process defines LD output for all 256 grades of the greyscale (development bias and charge corona grid potential are not affected).

Potential Control Timing

The machine carries out potential control using a procedure called the ‘process control self check’. Process control gamma correction (covered in section 2.1.3) is then done immediately after the process control self check. There are five types of process control self check, categorized according to their execution times. Process control takes approximately 3 minutes.

(1) Forced Process Control Self Check

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

(2) Initial Process Control Self Check

The initial process control starts automatically when the power is turned on (or when the machine returns to standby mode from sleep mode), but only if the hot roller in the fusing unit is less than 100 degrees centigrade. This process control is done only when SP3-125 (Set Potential Control Method) is set to "0 (Auto)."

(3) Interval Process Control Self Check

The copy interval process control starts automatically at the end of a copy job during which the total number of copies exceeds a preset value.

The preset value can be defined using SP3-973 (Set Process Control Self Check Interval). The factory setting is 150 sheets. The maximum possible interval is 500 sheets. Using a shorter interval reduces the machine's average copying speed. Setting the process control interval to 0 disables the interval process control.

(4) Timed Process Control Self Check

This process control self check is activated at a predetermined time interval (hours). This check is identical to the interval process control self check. This self check is initiated by entering a value (defaulting to 6 hours) in SP3-972-00. The settable range is 0 to 240. Entering a value of 0 suppresses the execution of this self check.

The timer is reset by the following conditions:

- At the finish of any other process control self-check
- At the finish of image processing (copying or printing)
- When the main switch or the operation switch is turned OFF/ON.
- When any door or cover is opened and closed.
- At the end of toner end recovery.

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

(5) ACC-Run-Time Process Control Self Check

A process control self check that is activated before the execution of ACC (auto color calibration). This check is identical to the interval process control self check.

This process control self check is done when SP4-507 (ACC process control ON/OFF) is set to “3” (Both Copy/Printer ACC). If a value of 0 is entered, this process control self check is not done.

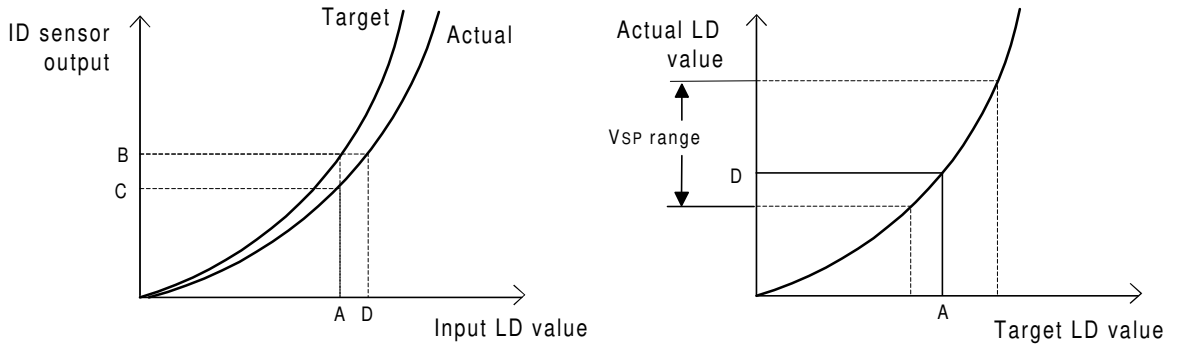
2.1.3 PROCESS CONTROL γ CORRECTION

What is process control γ?

After the process control, the proper values for V_D, V_B, V_L have been defined for the maximum laser power. However, the medium (greyscale) range is ignored. To improve this situation, a new process called 'process control gamma correction' is done after potential control. This process defines a suitable LD output for all 256 grades of the greyscale.

Process control gamma correction takes about 30 seconds.

How is it done?



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Based on the maximum laser power just defined during the process control self check, the machine writes another 16-grade sensor pattern on the drum.

NOTE: The 16-grade pattern for process control gamma is made by varying laser intensity based on the I_{LD} value just determined during the process control self check. This is different from the 16-grade pattern made earlier, which is made using 16 fixed laser power levels.

The ID sensor detects the density developed on these patterns and compares them with the target densities in ROM. The target densities and the actual densities can be plotted as shown in the diagram above left.

NOTE: To make the curve of actual densities, the machine draws a curve (interpolates values) through the density points read from the 16-grade pattern made for process control gamma.

From this, the machine determines how much to correct the LD power when attempting to write a certain density on the drum.

In the example in the diagram, for a laser power of A, the machine expected an ID of B. However, the actual result was C. To get an ID of B, the machine has to use a laser power of D. The expected ID can be plotted against the actual ID as shown in the diagram above right; this is the process control gamma curve.

Process control γ target is stored in the NV-RAM on the main control board. The CPU calculates the process control γ on the main board. The results of process control γ calculation go to the LD main control board to compensate the LD input data.

The process control gamma obtained cannot be adjusted in SP mode.

Process Control γ Correction Timing

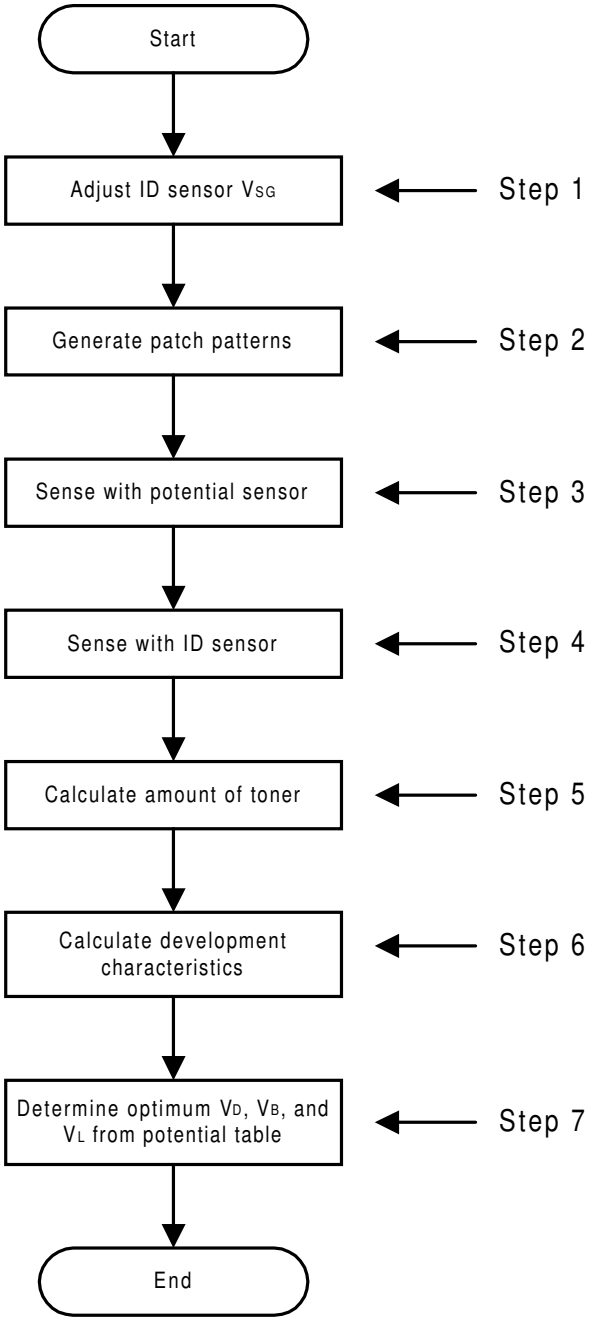
The machine automatically does process control gamma correction at the end of every process control self check.

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

Process control γ correction is executed so that the amount of toner attached to the drum against the LD write value has the intended characteristic within the process range between LD write and development section. However, the ACC correction encompasses the process range from scanning to image generation (including the scope of process control γ correction).

Potential control and process control γ correction have different goals. The ultimate purpose of potential control is to adjust the maximum amount of toner attached to the drum against the development potential to a certain target value. Process control γ correction, however, adjusts the amount of toner at all levels of the 16 gradation patterns to the target characteristics and interpolates between the 16 adjusted levels to make all 256 grayscale grades. This correction is used to make the image characteristics in low ID sections closer to the target value.

2.1.4 PROCESS CONTROL SELF CHECK OPERATION FLOW



A269D052.WMF

Step 1: V_{SG} Adjustment

The type of ID sensor used in this machine responds differently for black and color, so there are two V_{SG} values, one for black toner and one for CMY toner.

The type of ID sensor used in this machine is very sensitive, and outputs some voltage even if there is no light being reflected off the drum. This output is known as the 'offset'. It is about 1 V for black and about 0.2 V for color. For more details on this sensor (known as a 'diffused reflection ID sensor'), see 'Step 4: Sensor Pattern Density Detection'.

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

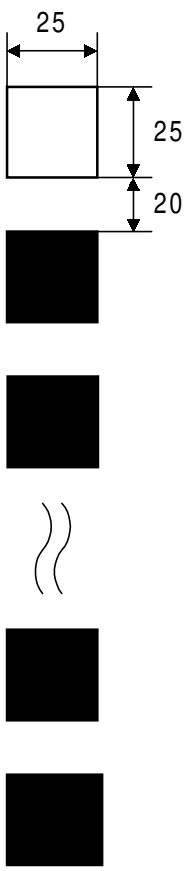
- (1.8 + offset) $\pm$ 0.05 V

This calibration compensates for the drum's condition (due to ageing) and the ID sensor condition, such as dirt on the surface of the drum or ID sensor.

Note that V_{SG} for black is less than half of that in previous models. This is due to the new type of ID sensor, which is described in a later section.

Step 2: Generating ID Sensor Patch Patterns

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



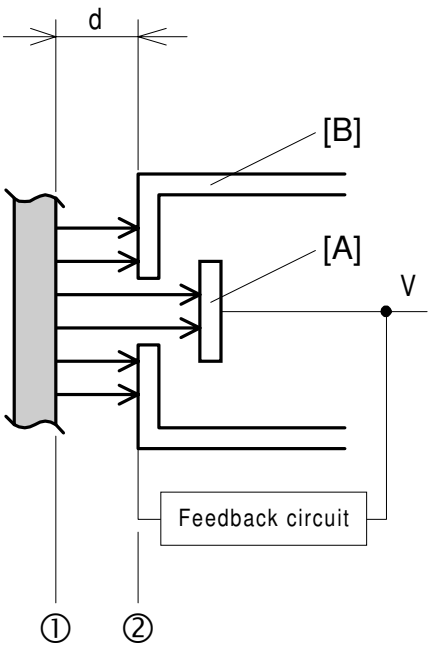
A269D054.WMF

Step 3: Sensor Pattern Potential Detection

Process

The drum potential sensor detects the potential on each grade of the 16-grade sensor pattern latent image, for each color, and the output is stored in memory.

Feedback Type Drum potential Sensor



A269D053.WMF

This copier uses a feedback drum potential sensor.

The detector [A] detects the strength of electric fields emitted from the drum surface, which depend on the surface potential of the drum. The feedback circuit applies voltage to the probe [B] until the electric field strength is offset at the detector. The level of this voltage determines the magnitude of the potential on the drum surface and is presented as output.

The major features of this measurement method are:

- Even if the distance [d] between the drum (1) and the drum potential sensor (2) fluctuates, the measurement of the drum surface potential is still accurate.
- The drum potential sensor does not have to be calibrated before the process control self check, so the calibration step required for previous models can be skipped.
- Residual voltage affected the calibration for the older type of sensor, so before process control self checks, the machine had to wait 10 minutes in standby mode for the residual voltage to disappear. For this new sensor, calibration is not needed, so the influence of residual voltage on the drum can be ignored.

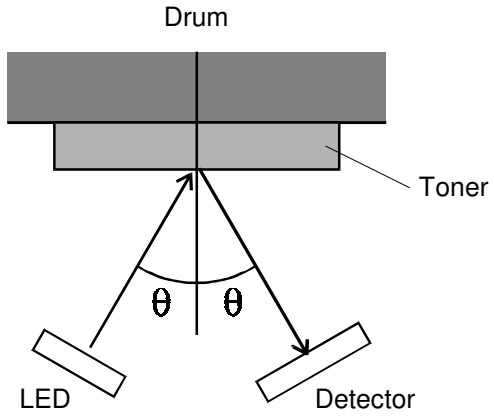
Step 4: Sensor Pattern Density Detection

Process

The development rollers of the respective colors develop the sensor pattern latent images for K, Y, C, and M generated in Step (2). In Step (4), the ID sensor detects the densities of the 16 patch patterns for each color. This data goes to memory.

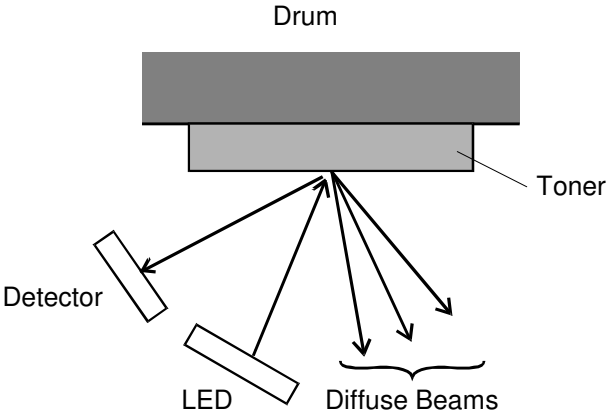
Diffused Reflection ID Sensor

Direct Reflection Type ID Sensor



A269D056.WMF

Diffuse Reflection Type ID Sensor



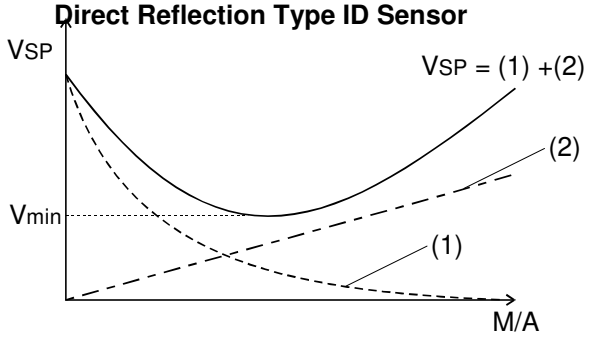
A269D057.WMF

This copier uses a diffused reflection ID sensor. In addition to the ray directly reflected from the drum, there are diffuse beams reflected at all angles from the toner on the drum. This sensor detects image density by receiving some of these diffuse beams, not by receiving the beam directly reflected from the toner.

Using this type of sensor improves the measurement accuracy of the sensor pattern densities particularly for Y, C, and M toners.

Color (Y, C, M) toners

Direct Reflection Type ID Sensor



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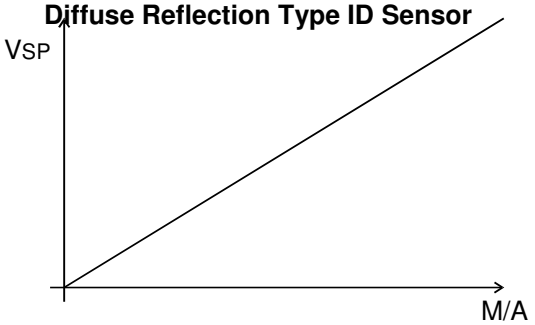
Diffuse Reflection Type ID Sensor



A269D059.WMF

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

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

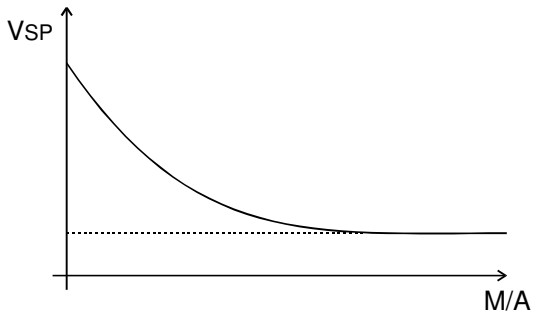
[Figure B]
Relationship between the output of the diffused reflection ID sensor and the amount of toner on the drum for C, M, and Y toners

Figure A shows the relationship between the output of the normal reflection ID sensor and the amount of Y, C, or M toner attached to the drum. This shows that the ID sensor output (Vsp) results from not only the light reflected from the toner but also the component of light reflected from the drum.

Therefore, high densities of colored toner (i.e., to the right of the minimum point in the VSP curve at Vmin) cannot be measured.

The diffused reflection ID sensor, on the other hand, picks up little light that is reflected from the drum. Therefore, the relationship between the diffused reflection ID sensor output and the amount of toner attached to the drum is linear, as shown in Figure B. This means that high densities of colored toner can be measured accurately.

K Toner:



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

The ID sensor output for K toner tends to decrease as the density of toner on the drum increases. Therefore, the relationship between the ID sensor output and the amount of K toner on the drum is as shown in Figure C.

Step 5: Toner Amount Calculation

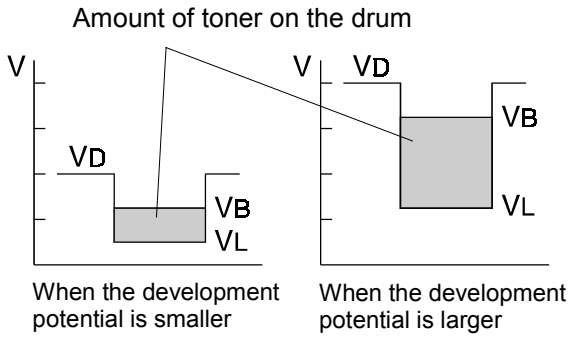
The amount of toner on the drum (M/A, mass per unit area, mg/cm^2) is calculated for each of the 16 grades of the sensor pattern from the ID sensor output value (Vsp) from each grade of the pattern.

Step 6: Development Potential Calculation

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

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

See the figure on the right for two examples.



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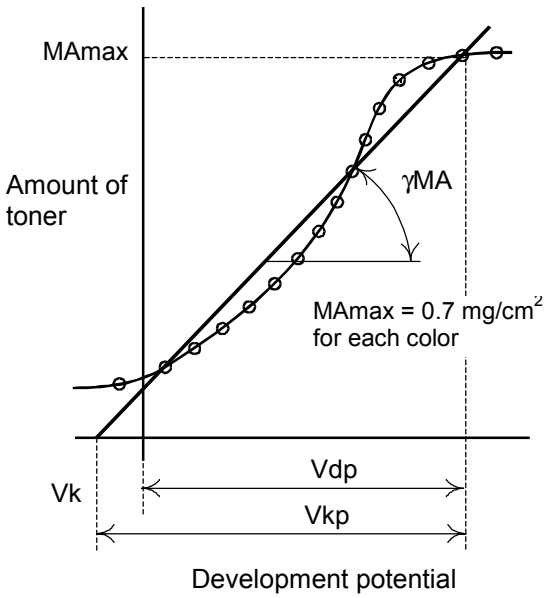
The machine determines the relationship between the drum potential (measured in step 3) and the amount of toner on the drum (calculated in step 5) for each of the 16 grades. If plotted, these values would form a curve as shown in the illustration to the right. The CPU then calculates a straight line curve through these points. The angle formed by this line is known as the development gamma factor, or γ M/A. The CPU then uses the gamma factor to calculate the development potential (V_{DP}) that would be required to obtain the ideal toner density on an area of the drum exposed with full laser power under the machine's present conditions.



A269D062.WMF

For Y, C, and M toners, the new type of ID sensor allows higher densities of toner to be measured accurately (refer to the descriptions in Step 4, Sensor Pattern density Detection). This permits the calculation of γ M/A at a higher accuracy than a normal reflection ID sensor, because the measurements at higher densities (M/A values) are more reliable.

Step 7: Selecting the Optimum V_D, V_B, V_L

The machine now adjusts V_D, V_B, and V_L to try to bring the development potential V_{DP} to the ideal value. To do this, it uses a pointer table. This is a look-up table in ROM of V_{DP} against V_D, V_B, and V_L.

The machine takes the value of V_{DP} calculated in the previous section, and looks for the value of V_{DP} in the pointer table that is closest to this. The machine reads the values of V_D, V_B, and V_L that are in this row of the pointer table.

The machine will then use these values of V_D, V_B, and V_L during copying until the next process control self check. These values are designed to bring the actual V_{DP} to the optimum value for the machine's current condition.

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

2.1.5 TONER SUPPLY CONTROL

This machine uses fuzzy logic to control the amount of toner supplied to the development unit so that the development capacity does not fluctuate due to toner consumption, toner supply, agitation, or extended periods of nonuse. This control is accomplished using the sense data from the drum potential sensor, toner end sensor, ID sensor, and TD sensor. This copier starts toner supply control by keeping the toner density in the developer constant using the TD sensor. It then senses the amount of toner on the drum using the ID sensor pattern. The ID sensor sends the pattern data back to the toner supply control mechanism and the amount of toner on the drum surface (image density) then becomes the target. The TD sensor provides a stable base point for toner supply and thus avoids runaway feedback of toner supply. The basic input/output parameters that this copier uses during toner supply control are listed below.

1. Targets to be sensed
   1) Density of the toner read by the TD sensor
   2) Amount of toner attached to the drum sensed by the ID sensor
   3) Pixel count
2. Target to be controlled
   Toner supply clutch on time

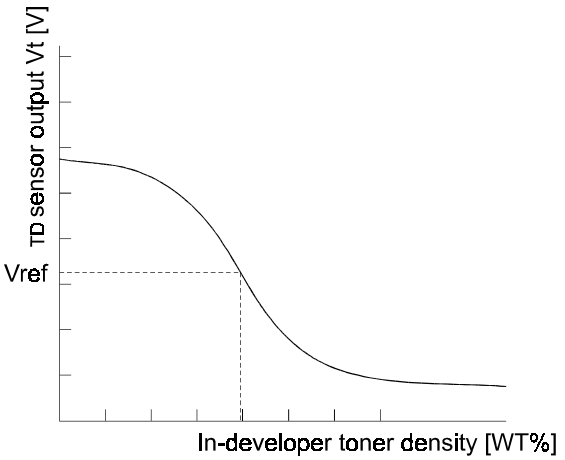
Toner Supply Control Modes

This copier controls the supply of toner in three modes.

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

TD Sensor Output

The relationship between the TD sensor output Vt and the toner density in the developer is shown in the figure on the right. The target toner density of this copier is 5 WT%. The TD sensor output for this toner density is referred to as Vref. Vref of this copier is adjusted to 2.5 ± 0.1 volts for a toner density of 5 WT% (brand-new developer) for each of the C, M, Y, and K toners. When developers are replaced, since TD sensor fluctuations can occur in such a case, it is necessary to initialize the TD sensor and adjust its gain using SP3-005-1 through SP3-005-5. Once the TD sensor is initialized, the toner density fluctuates according to toner supply control.



Relationship between toner density and TD sensor output

A269D063.WMF

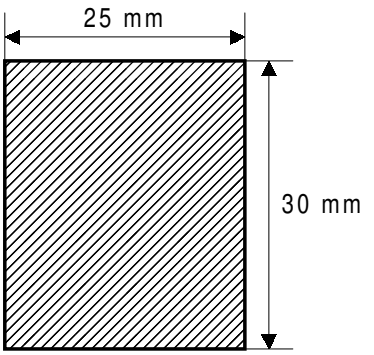
Toner Supply Calculation

In the fuzzy logic control mode, the toner supply control mechanism of this copier determines the amount of toner to be supplied based on the density of the toner in the developer, as sensed through the TD sensor, and the pixel count. In this mode, the image density is kept constant by keeping the density of toner in the developer constant while accommodating to changes in the development conditions through the potential control mechanism. The amount of toner supplied is determined by the ON time of the toner supply clutch.

Detecting VSP for Toner Supply Control

The copier generates a VSP ID sensor pattern (right illustration) using a standard laser diode power. The copier generates this pattern between the K, C, M, and Y images, and then detects the density using the ID sensor. The result is known as 'VSP for toner supply control', or 'VSP (toner)' to distinguish it from the other VSP, measured during potential control.

This process is done every ten copies.



A269D065.WMF

Calculating the Amount of Toner on the Drum

The target for the ID sensor pattern is 0.7 mg/cm^2 for the C, M, and Y toners and 0.3 mg/cm^2 for the K toner. For the procedure to calculate the amount of toner on the drum, see Step 4, “Sensor Pattern Density Detection,” and Step 5, “Toner Amount Calculation” in the section about potential control.

Toner Near End/Toner End Detection

Introduction

This copier uses the toner end sensor located in the toner hopper to detect toner near end conditions for the K, Y, C, and M toners. A toner end condition, for each color, is detected following a toner near end condition by counting the number of pixels. (See “Toner End Detection” on the next page.)

Toner Near End Detection

This copier uses an optical reflection type toner end sensor to detect two conditions—the high condition (5 V: no reflection/toner present) and the low condition (0 V: reflection detected/no toner). The copier samples the output from the toner end sensor at the development position for each toner color, for 160 samples at 4 ms intervals. A “toner absent condition” is flagged when more than 20 low sensor output conditions are detected out of 160 sampled conditions. The copier flags a “toner near end condition” when three consecutive “toner absent conditions” are detected for a toner color.

Example 1: 3 full color copies, repeat mode

- 20 sensor low conditions detected out of 160 sampled conditions while developing the first copy sheet for K
- 25 sensor low conditions detected out of 160 sampled conditions while developing the second copy sheet for K
- 24 sensor low conditions detected out of 160 sampled conditions while developing the third copy sheet for K

↓

The K toner near end LED is lit.

Example 2: 4 full color copies, repeat mode

- 20 sensor low conditions detected out of 160 sampled conditions while developing the first copy sheet for Y
- 19 sensor low conditions detected out of 160 sampled conditions while developing the second copy sheet for Y
- 21 sensor low conditions detected out of 160 sampled conditions while developing the third copy sheet for Y
- 25 sensor low conditions detected out of 160 sampled conditions while developing the fourth copy sheet for Y
- 21 sensor low conditions detected out of 160 sampled conditions while developing the fifth copy sheet for Y

↓

The Y toner near end LED is lit.

Toner End Detection

After a toner near end is indicated, the toner end condition is reached when the IPU pixel counter counts up the equivalent of 10 A4 sheets of pixels (100% coverage) for that color.

The machine can copy/print at least 10 sheets after the toner near end condition is signaled. There are two possible cases as follows:

1. The toner end condition occurs before 10 sheets are printed: In this case copying stops after 10 sheets are printed. This is true regardless of paper size.
2. Ten sheets (of any size) are printed before toner end occurs: In this case copying stops when the toner end condition occurs.

Toner End Recovery

The copier enters the recovery process in the following cases:

1. The front door is opened and a toner cartridge is removed or inserted.
   This is regarded as an ordinary replacement procedure for the toner cartridge.
   - When the door is closed, the copier moves the next to-be-replaced color toner cartridge to the replacement position.

     ↓
   - Replace the toner cartridge.

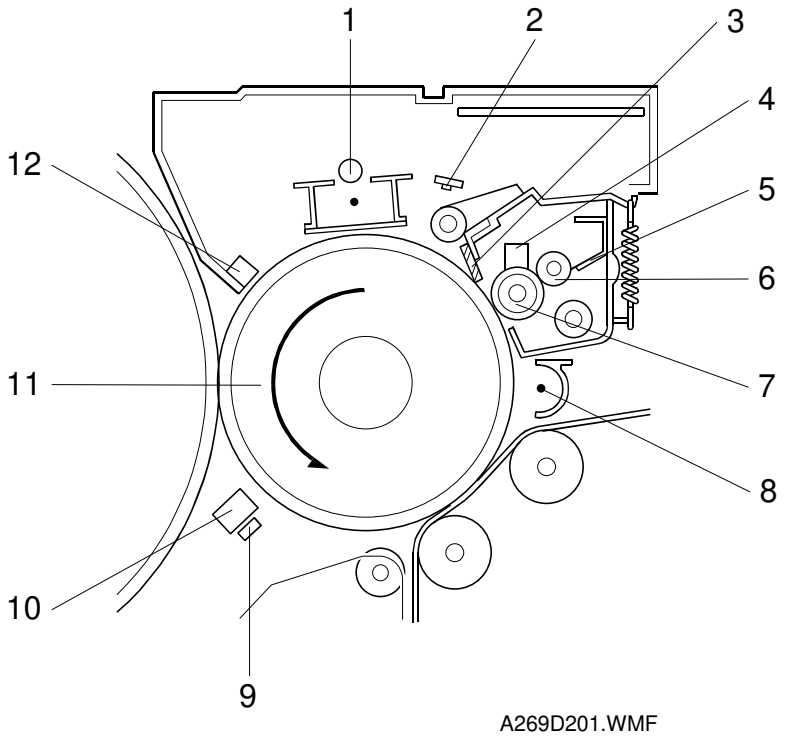
     ↓
   - The copier starts toner end recovery processing after the toner cartridge is replaced and the front door is closed.

   NOTE: If recovery is needed for two colors, the copier proceeds with the next color if the door is opened or if the user specifies at the operation panel that the first color should be skipped.

2. If the copier is turned off and on, it assumes that toner cartridges for all colors have been replaced and starts toner end recovery processing for all colors.

2.2 DRUM UNIT

2.2.1 MAJOR COMPONENTS



A269D201.WMF

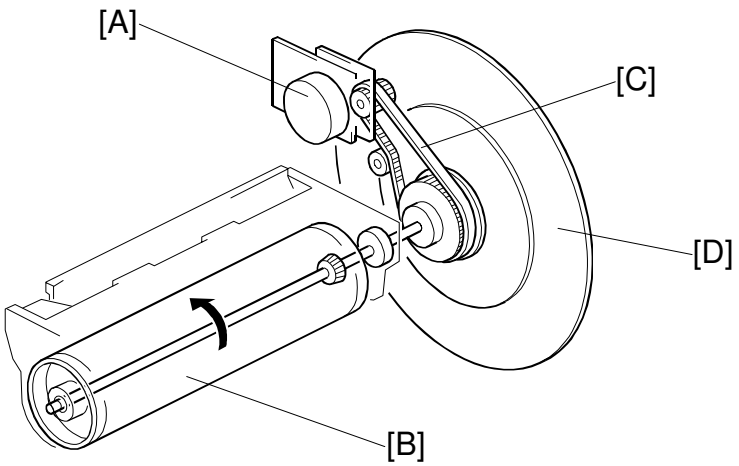
1. Charge corona unit
2. Quenching lamp
3. Cleaning blade
4. Lubricant bar
5. Bias roller blade
6. Bias roller
7. Cleaning brush
8. Pre-cleaning corona (PCC)
9. Carrier catcher
10. ID sensor
11. OPC drum
12. Drum potential sensor

This drum unit of this copier is located on the right of the revolver/drum drawer. It can easily be removed by pulling out the drawer.

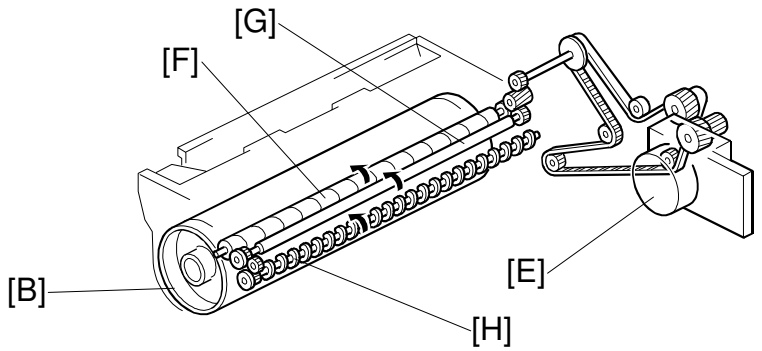
The drum unit consists of the OPC drum, charge corona unit, quenching lamp, drum potential sensor, and cleaning unit.

The cleaning unit is integrated in the drum unit because, since the cleaning unit is located in the top portion of the copier, toner would spill out of the opening if the drum unit were removed or installed by itself.
The cleaning unit contains the cleaning blade, lubricant bar, and cleaning brush.

2.2.2 DRUM UNIT DRIVE



A269D202.WMF



A269D203.WMF

Drum Drive

The drum motor [A] turns the OPC drum [B] via a timing belt [C]. Use of the timing belt reduces rotational fluctuations, thus stabilizing image quality (reduce uneven image).

The motor has a built-in rotational speed control circuit. When the rated rotational speed is not achieved, the rotational speed control circuit generates a motor clock signal, which turns on SC440 (Drum Motor Error) and stops the copier.

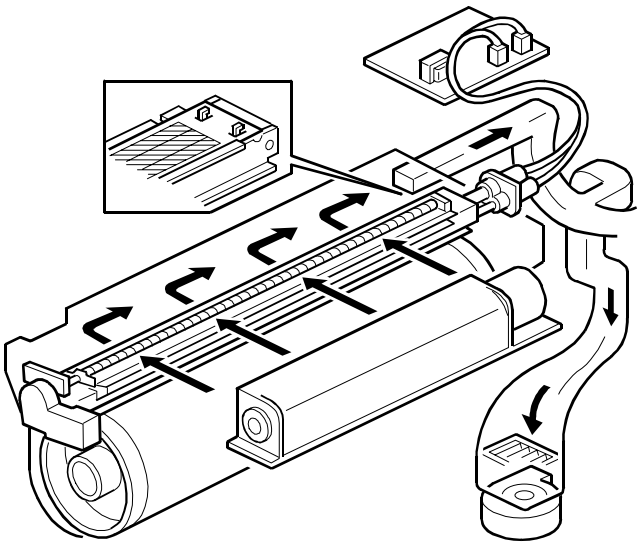
The drum is rotated in the reverse direction for 0.05 second (approx. 10 mm) to remove the toner at the tip of the drum cleaning blade at the end of the initial auto process control self check.

The drum shaft is fitted with a flywheel [D] to smooth the rotation and prevent banding of the image.

Cleaning Drive

The drum peripheral component motor [E] drives the cleaning unit (cleaning brush [F], bias roller [G], and toner collection coil [H]).

2.2.3 CHARGE CORONA UNIT



A269D204.WMF

This copier uses a single wire scorotron system to charge the drum. The output of the charge high voltage power supply is -6 kV.

A grid keeps the surface potential of the drum at –670 V (standard value).

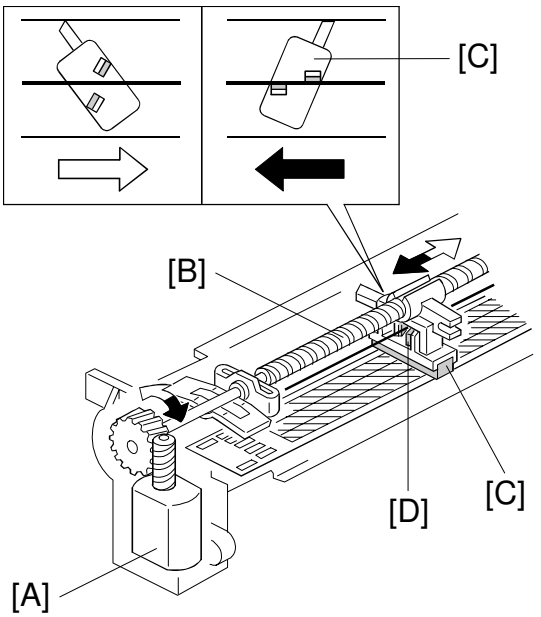
The grid bias voltage is corrected so that the surface potential remains constant by sensing the surface potential of the drum with the drum potential sensor.

The exhaust fan at the rear of the copier, causes air to flow into the charge corona unit from front to rear sides. This helps prevent uneven charging.

2.2.4 CHARGE CORONA UNIT CLEANER

The copier is provided with a charge corona unit cleaner to prevent the charge corona wire and grid from becoming contaminated by toner and paper dust near the charge corona unit.

- Drive:
  Dc motor [A] located on the copier front, via screw rod [B].
- Cleaning conditions:
  1) When the main power switch is on and the surface temperature of the hot roller is less than 100°C.
  2) When forced using SP mode (SP2-802).
- Related SP modes:
  1) SP2-02: Forced cleaning
  2) SP2-803-001:Enable cleaning when main power switch/operation switch is turned on (default is ON)
  3) SP2-803-002:Enable cleaning at specified development cycle count (default is ON)
  4) SP2-803-003: Enable cleaning at a specified time interval (hours). (Default is OFF)



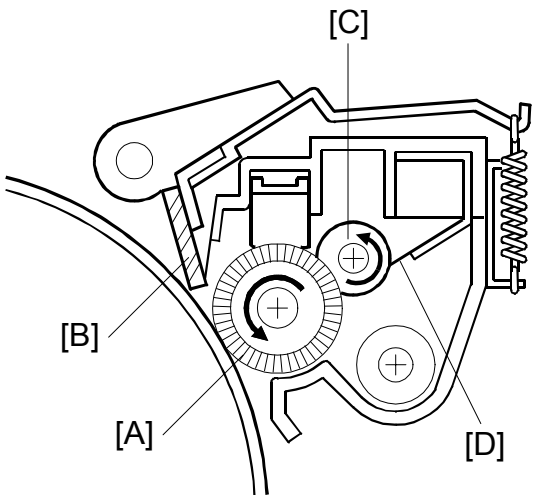
A269D251.WMF

- Cleaner pad:
  Dual-grid cleaner pad [C] and wire cleaner pads [D].
- Home position:
  Copier front
- Cleaning path:
  Copier front → Rear end point → Copier front
  Only the charge corona grid is cleaned during the traverse from copier front to rear end (white arrow).
  Both the charge corona grid and wire are cleaned during the traverse from rear end point to copier front (black arrow).
- Position detection:
  No sensor is used. The I/O control board detects the current that is being supplied to the motor. It senses the sudden change in the current value which occurs when the cleaner reaches the end point.
  At the turnaround point, the motor is reversed. If no current rise is observed in 60 seconds after motor rotation starts, the I/O control board an open circuit or disconnected condition, stops the motor, and displays SC303.

2.2.5 CLEANING MECHANISM

Cleaning

After toner is transferred to the OPC drum in the transfer process, the residual toner is removed from the drum by the drum cleaning brush [A] and blade [B]. The cleaning brush is a straight fiber brush (not looped) type. The cleaning bias system uses a rotating bias roller [C] and scraper blade [D]. The bias roller and the brush rotate opposite to each other at the point of contact. The cleaning blade is of the counter type. It is constantly held against the drum by a spring.



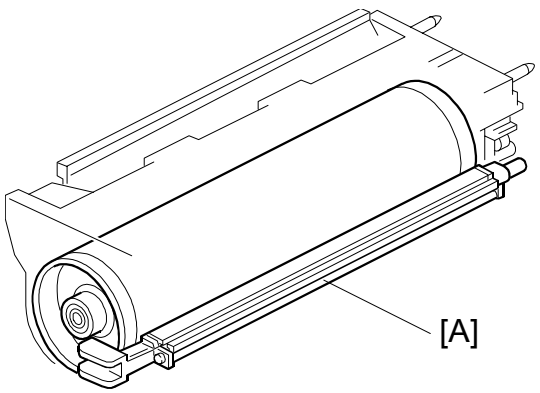
A269D205.WMF

Lubricant Application

Lubricant (Zinc stearate) is applied to the OPC drum via the cleaning brush. The lubricant bar is held against the brush by the weight of the drum lubricant bar plus spring pressure. Lubricant is applied is to improve the efficiency of cleaning and of image transfer.

2.2.6 PRE-CLEANING CORONA (PCC)

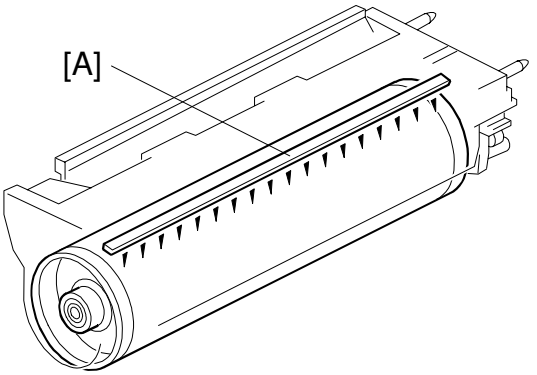
The PCC discharges the photoconductor drum and applies AC and negative DC discharges to reduce the charge holding the residual toner to the drum, thereby improving the efficiency of cleaning.



A269D206.WMF

2.2.7 QUENCHING

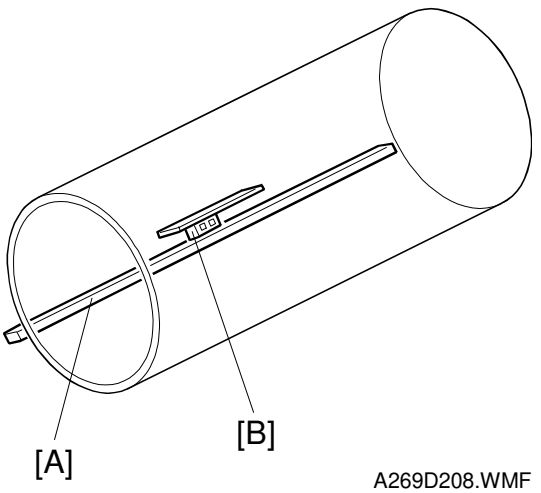
This copier employs optical quenching using LEDs. The quenching lamp [A] turns on immediately when the Start key is pressed. The quenching lamp light is in the red range to protect the drum from optical fatigue.



A269D207.WMF

2.2.8 CARRIER CATCHER

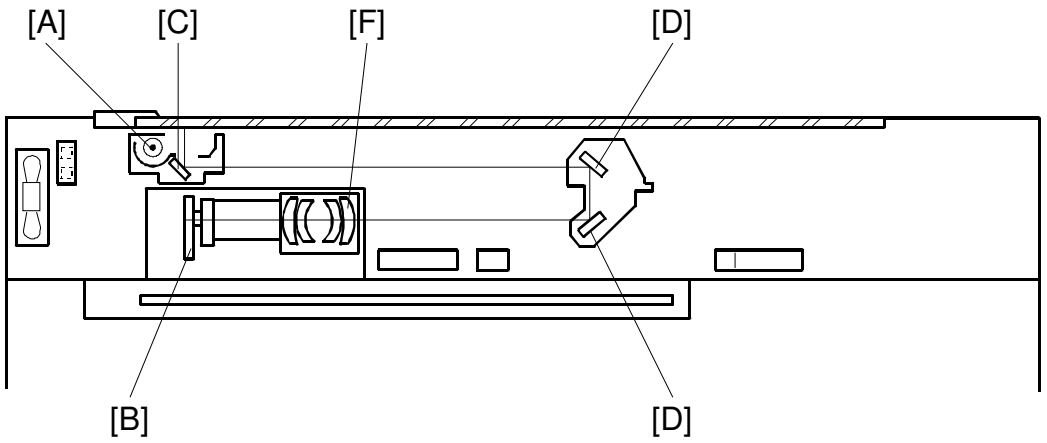
This copier has a magnet [A] installed below the ID sensor [B]. This magnet attracts carrier from the drum.



A269D208.WMF

2.3 SCANNER UNIT

2.3.1 OVERVIEW

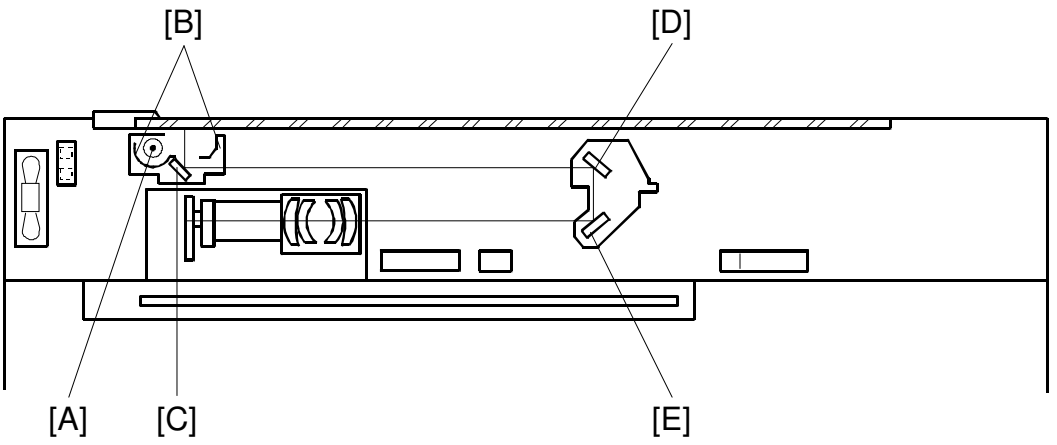


A269D001.WMF

An image of the original illuminated by the exposure lamp [A] (a halogen lamp) is reflected onto a color CCD [B] (Charge Coupled Device) via the 1st [C], 2nd [D], and 3rd [E] mirrors, filter, and lens [F]. The filter removes infra-red from the light reflected off the original; this is particularly important for glossy photos with black areas, which can appear reddish in copies.

For all copy modes except the “Auto Original Type” mode machine makes a single scan. The CCD is a one-chip color CCD with RGB color filters. The scanning resolution is 400 dpi (5,000 pixels).

2.3.2 SCANNER



A269D001.WMF

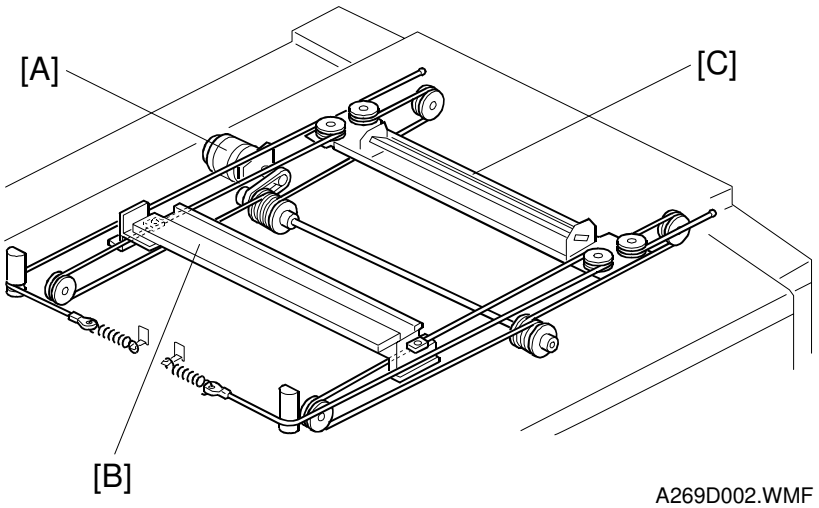
The 1st scanner consists of the exposure lamp [A], main and sub reflectors [B], and 1st mirror [C]. This model uses a halogen lamp with ten elements. The frosted surface of the exposure lamp ensures even exposure in the main scan direction.

The exposure lamp is energized by a dc supply to avoid uneven light intensity caused by power fluctuations while the 1st scanner moves in the sub-scan direction. The sub reflector is shaped so that light will expose the original evenly. This reduces shadows on pasted originals.

The 1st, 2nd [D], and 3rd [E] mirrors have glass on the reverse sides to increase their weight. This prevents the mirrors from vibrating.

A thermoswitch in the 1st scanner protects against overheating. It will open at around 140°C and cannot be reset.

2.3.3 SCANNER DRIVE



A five-phase stepper motor [A] drives the scanner. This motor drives the 1st [B] and 2nd [C] scanners via two scanner wires. The wires at the front side and the rear side are the same.

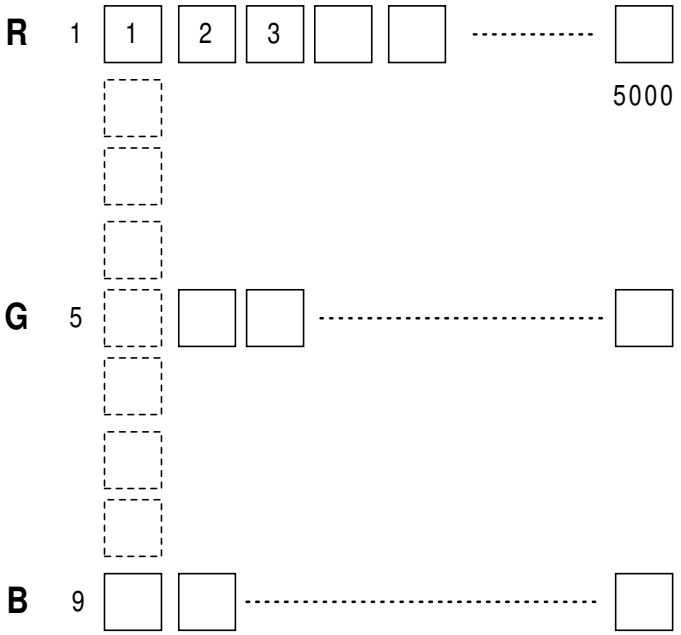
In full size mode, the 1st scanner speed is 200 mm/s during scanning, and 1,200 mm/s when the scanner returns. The 2nd scanner speed is half that of the 1st scanner.

	Forwarding Speed	Returning Speed
Full Size Mode	200 (mm/s)	1,200 (mm/s)
Reduction or Enlargement Mode	200/M (mm/s)	1,200 (mm/s)

In reduction or enlargement mode, the scanning speed depends on the magnification ratio “M”, which can vary from 0.25 to 4.0 (i.e., 200/M mm/s). The returning speed is always the same (1,200 mm/s). The image length is changed in the sub-scan direction by changing the scanner speed, and in the main scan direction by image processing on the scanner IPU board.

For all copy modes except the Auto Original Type mode the machine makes a single scan.

2.3.4 COLOR CCD



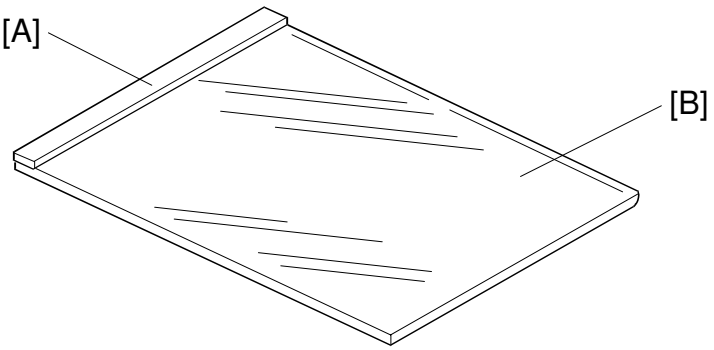
A269D150.WMF

The color CCD converts light reflected from the original into three analog signals, one for each of the three basic colors Red, Green, and Blue. The signals are called the R, G, and B signals. A single scan generates a separate set of three signals (RGB).

The CCD consists of three lines of 5000 elements at a resolution of 400 dpi (15.7 dots/mm). To make the R, G, and B signals, each line has a color separation filter (R, G, or B). The lines are spaced 4 pixels apart for full size magnification. To correct for the spacing, the R, G, and B signals must be synchronized. This is done by delaying the signals in memory buffers on the scanner IPU board (the Image Processing section contains more details).

The CCD is mounted on the board with the lens block (the assembly is known as the SBU or Sensor Board Unit). Therefore, to replace the CCD, replace the SBU.

2.3.5 WHITE PLATE SCANNING



A269D851.WMF

There is a white plate [A] for auto shading, stuck on the exposure glass [B] underneath the left scale. When this white plate is scanned, the output from all the CCD elements in a line should in theory be equal, but actually it is not, for the following reasons:

- Variations in sensitivity between elements of the CCD
- Variations in characteristics of lens and mirror reflectivity
- Loss of brightness toward the ends of the exposure lamp

To correct for this uneven output from the CCD elements, the light reflected from the white reference plate is scanned. This is known as auto shading.

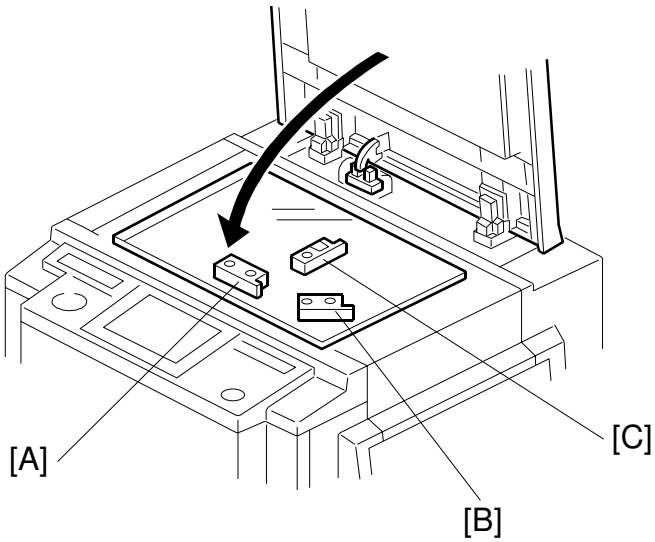
Auto shading is done every copy cycle at the scanner home position before starting the first scan.

2.3.6 SCANNER IPU

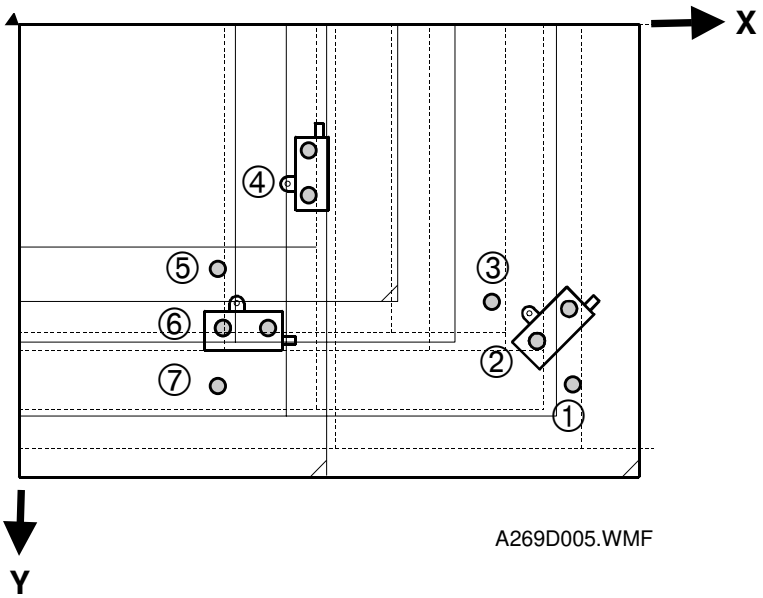
The scanner IPU processes the RGB signal received from the CCD board and has the following functions under the control of the main control board.

1. Controls exposure lamp on/off switching and voltage
2. Controls the speed of the scanner drive motor
3. Detects the original paper size
4. Controls on/off switching for the IPU cooling fan and optics cooling fans
5. Supplies the clock signals for the CCD board
6. Detects when the scanner is at home position

2.3.7 ORIGINAL SIZE DETECTION



A269D003.WMF



A269D005.WMF

Sensing Point	From rear left corner	
	X	Y
①	376.23	276.23
②	351.83	206.68
③	321.78	182.28
④	198.00	113.00
⑤	136.00	161.50
⑥	140.00	200.00
⑦	136.00	238.50

Original Size		Setting Point							Display
A4/A3 Version (metric)	LT/DLT Version (inch)	①	②	③	④	⑤	⑥	⑦	
A3	11" x 17" (11" x 15")	1	—	—	—	—	—	—	132
B4	10" x 14"	0	1	—	—	—	—	1	141
—	8 1/2" x 14"	0	1	—	—	—	—	0	164
F4	8 1/2" x 13" (8" x 13")	0	0	1	—	—	—	—	165
A4-S	11" x 8 1/2"	0	0	0	1	1	—	1	5
A4-L	8 1/2" x 11" (8" x 10")	0	0	0	1	1	1	0	133
B5-S	—	0	0	0	0	—	—	1	14
B5-L	—	0	0	0	1	1	0	0	142
A5-S	8 1/2" x 5 1/2"	0	0	0	0	1	—	0	6
A5-L	5 1/2" x 8 1/2"	0	0	0	1	0	—	—	134

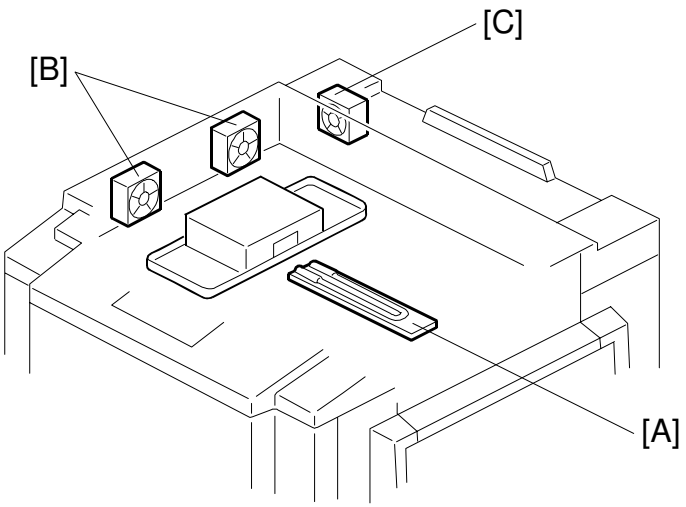
L: Lengthwise S: Sideways
0: OFF, 1: ON —: Don't care

There are three APS sensors (reflective photosensors) in the optics cavity for original size detection. The original width sensor [A] detects the original width, while the original length sensors [B] and [C] detect the original length.

The original width sensor [A] and the original length sensor [B] have three internal beams. Each beam scans a different point of the exposure glass. The other original length sensor [C] uses only one beam.

If the original or platen cover is present over the scanning point for a particular sensor, the beam is reflected, and each reflected beam activates a photoelectric device. Following diagram shows where the sensing points are.

2.3.8 OTHERS



A269D004.WMF

Anti-condensation Heater

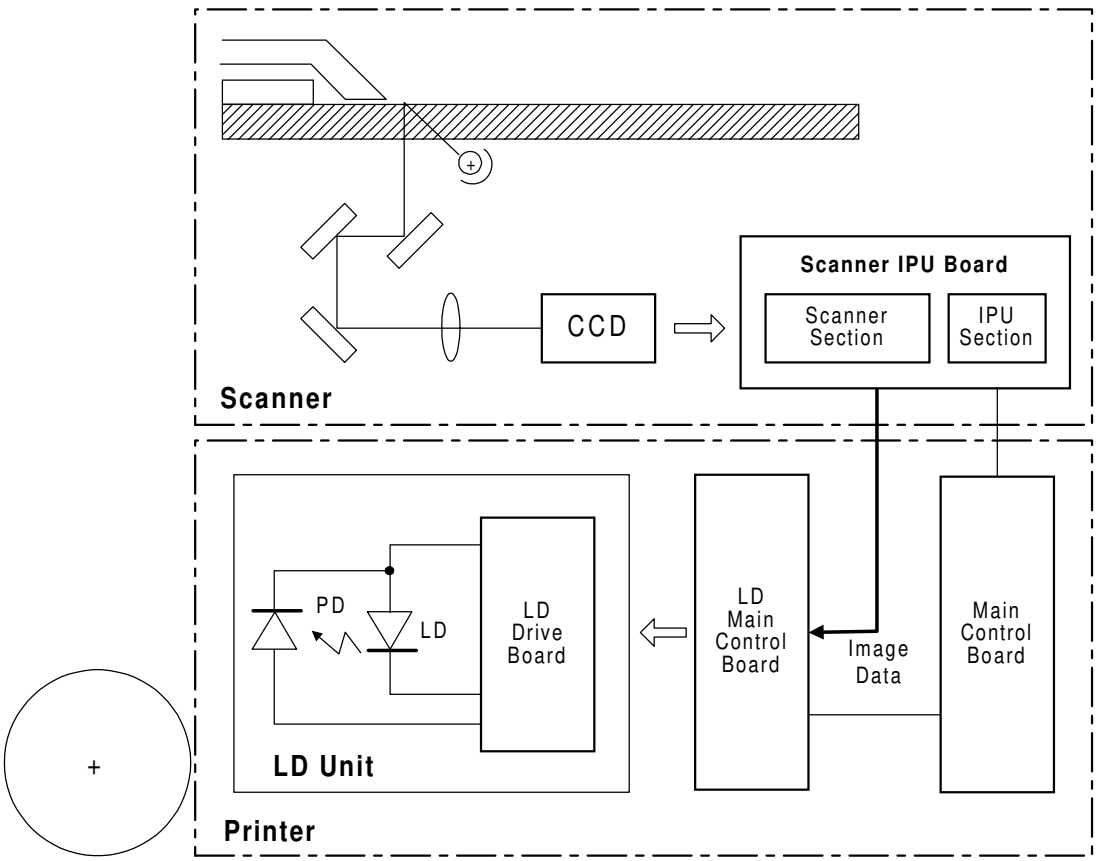
There is an anti-condensation heater [A] on the right side of the SBU. It turns on when the main switch or operation switch is off, to prevent moisture from forming on the optics.

Fans

1. Optics Cooling Fans
   The optics cooling fans [B] are on the left side of the optics cavity. There fans draw air into the optics cavity to prevent the exposure lamp and optics cavity from overheating during copy cycles. They turn on at the same time as the exposure lamp, and they turn off 10 seconds after the exposure lamp turns off.
2. IPU Cooling
   The IPU cooling fan [C] is on the left rear side of the optics cavity. This fan moves air out of the optics cavity to keep the IPU from overheating. This fan is always on when the operation switch is on. Normally it turns at half-speed. However, it goes to full-speed when the exposure lamp turns on, and it returns to half speed 10 seconds after the exposure lamp turns off.

2.4 IMAGE PROCESSING

2.4.1 OVERVIEW

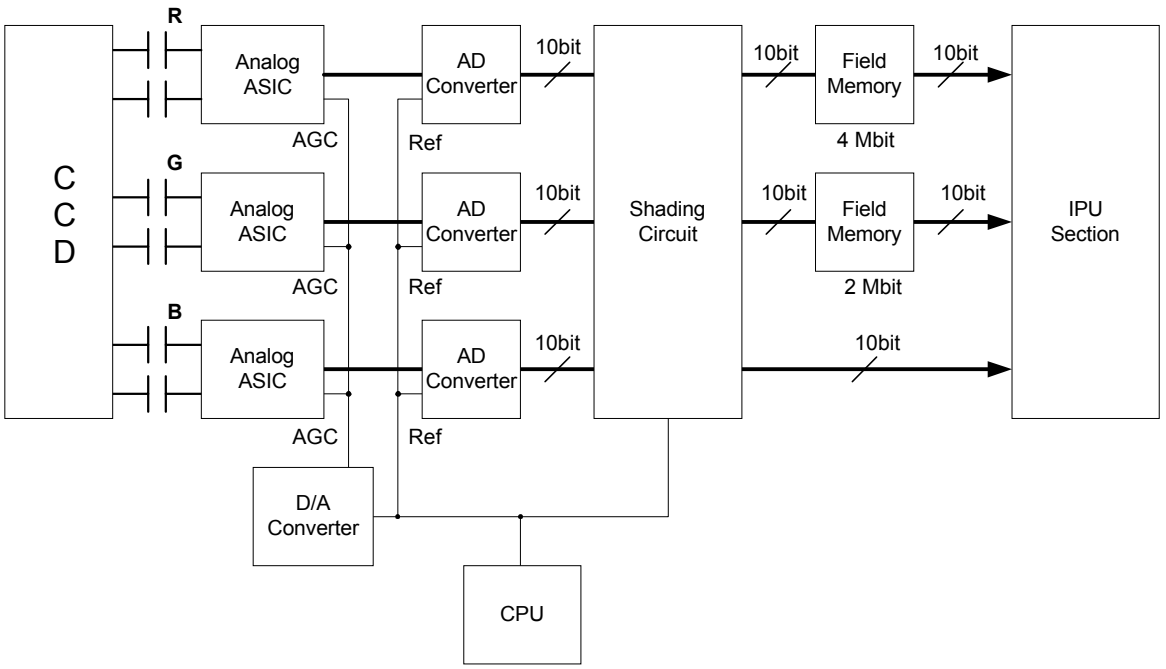


A269D066.WMF

The reflected light from the original enters the CCD via the mirrors and lens. The CCD board has a CCD chip that is provided with a filter for each of the R, G, and B colors. The reflected signal is converted to analog signals (photoelectric conversion) and sent to the scanner IPU board as image data.

The scanner IPU board performs signal processing, A-to-D conversion, shading compensation, D-to-A conversion, line correction, and image processing on the image data. The image data is finally supplied to the printer section as digital signals (8 bits per pixel).

2.4.2 SCANNER SECTION BLOCK DIAGRAM



A269D067.WMF

The RGB analog image signals from the CCD are combined and amplified by analog ASIC chips and converted to 10-bit digital signals by A/D converters. The digital signals undergo shading compensation and line correction before being sent to the IPU section.

2.4.3 SCANNER FUNCTIONS

Photoelectric Conversion

The color CCD converts the light reflected from the original into RGB analog signals (6.615 MHz for each signal: even-pixel and odd-pixel). Each CCD line has 5,000 pixels and the resolution is 400 dpi (15.7 pixels/mm).

Signal Processing (Analog ASIC)

This analog ASIC provides the following three analog signal processing functions:

(1) Signal Amplification

Odd-pixel and even-pixel RGB analog signals from the CCD are amplified by operational amplifiers.

(2) Signal Composition

The amplified signals (even-pixel and odd-pixel for each RGB color) are combined by the MPX before A/D conversion.

(3) Feedback

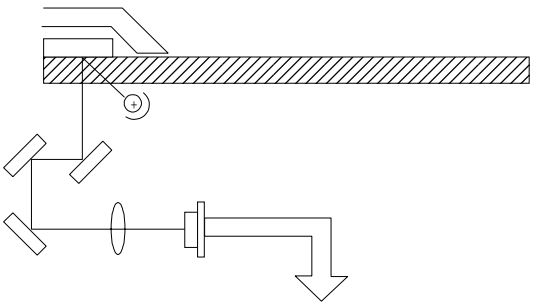
The CPU on the scanner IPU board receives the feedback data for white level and black level from the shading circuits and feeds it to the ASICs through the D/A converter. The feedback data from the CPU are updated every time the main switch is turned on.

A/D Conversion

The A/D conversion block converts the analog signals (CCD output) to 10-bit (1024 gradations) digital signals.

Shading Compensation Circuit

(1) Shading compensation

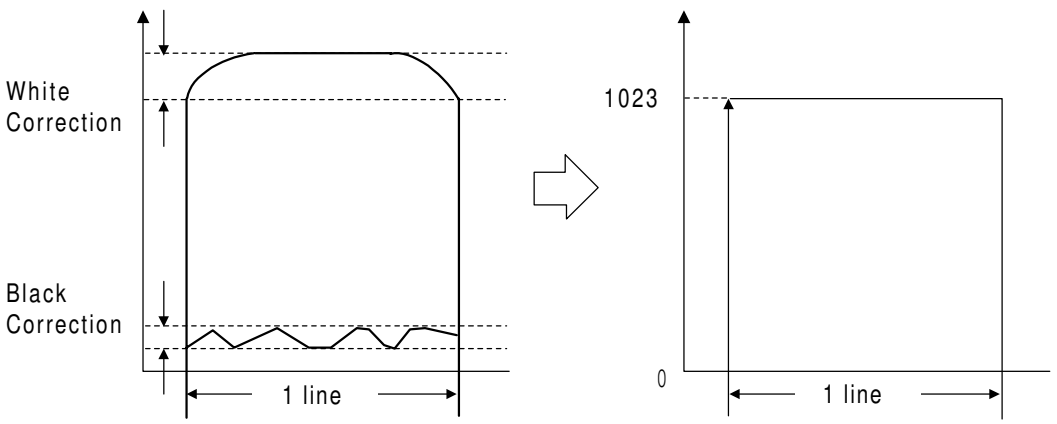


A269D068.WMF

Before scanning each original, the machine generates a reference white waveform (also known as "white shading data") by scanning 5 mm of the white reference plate [A] in the sub-scan direction (this equals 79 lines at 100% magnification).

The white shading data is calculated for each pixel across the main scan. To do this for a particular pixel, it takes the white levels for that pixel on each of the main scan lines taken from the white reference plate, and calculates a value from these. The white waveform is made by repeating this process for each pixel across the main scan.

To improve image reproduction for high density areas, the machine also measures the black shading data. It does this by reading the black video level at the first 4 pixels of the CCD, which should be black because these pixels are masked off. The average of the 4 pixels is represented as the black shading data for one CCD scan line.



A269D069.WMF

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

$$\frac{\text{(Data scanned for each pixel) - (Black correction data)}}{\text{(White correction data for each pixel) - (Black correction data)}} \times 1023$$

The white shading data are updated before every scanning. The black shading data are updated every scan line. The white shading data corrects the image data for irregularities in the CCD and the optics across the main scan. The black

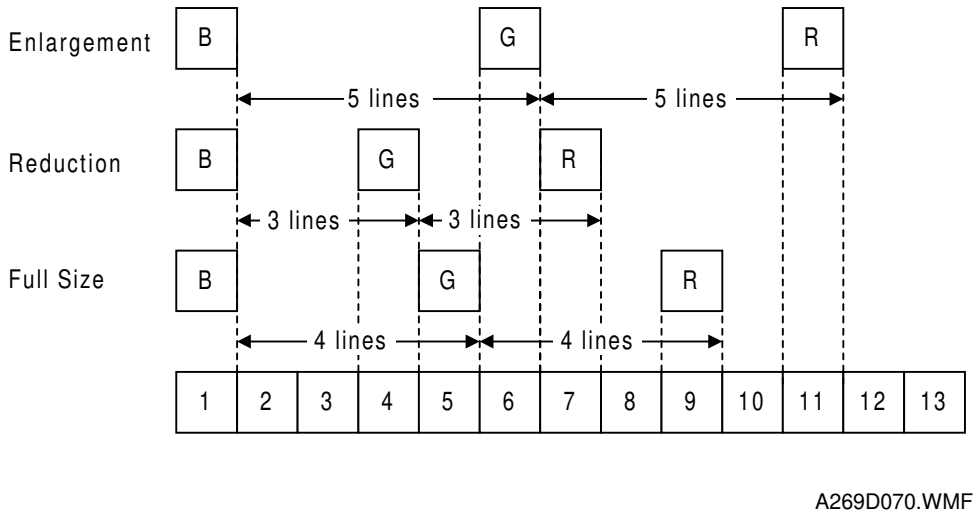
shading data corrects the image data for any changes in black level with time, as the machine scans down the page.

D/A Conversion

The CPU monitors the digital feedback signals from the shading circuits and calculates correction factors. Then the D/A circuit converts the signals from the CPU into analog signals and feeds them back to the analog ASIC chips.

The CPU feeds black shading data back to the AD converters as the reference black level. This is for done every CCD pixel to calibrate the black level, to avoid drifts in the signal with time.

Scan Line Correction Circuit



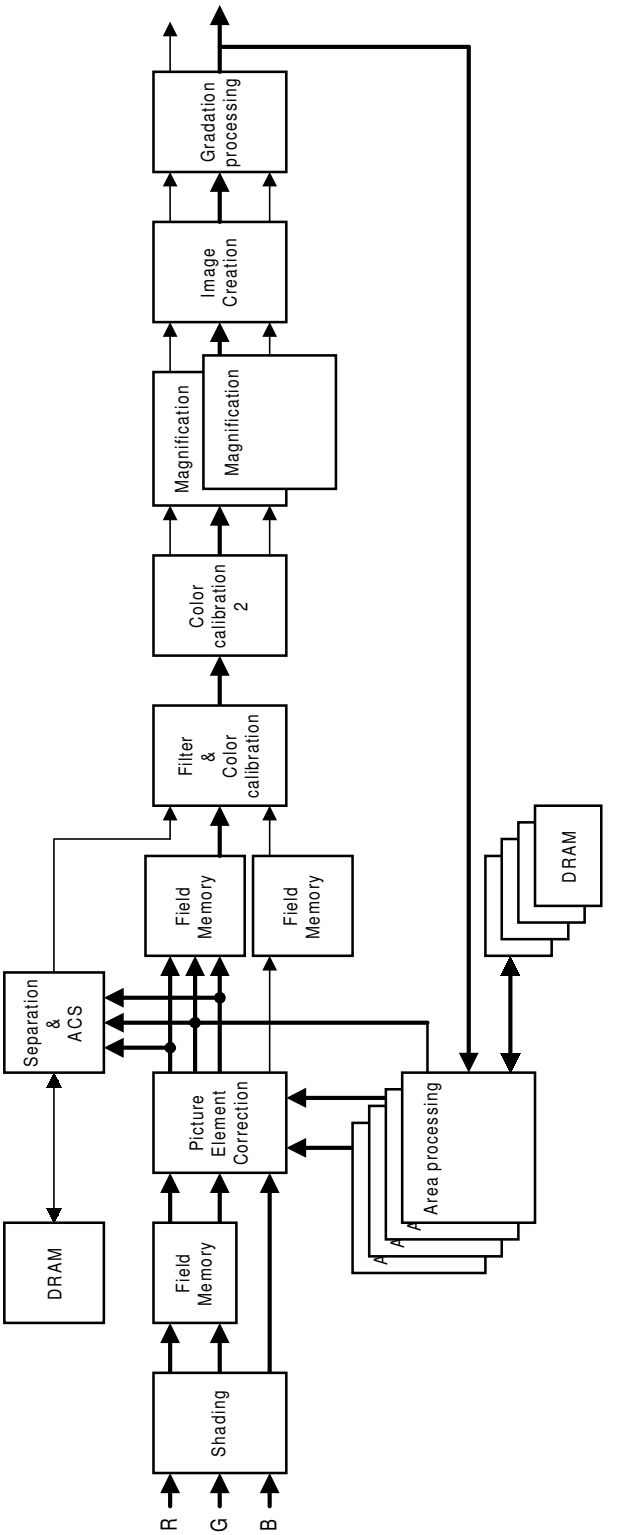
A269D070.WMF

The three CCD lines providing the RGB signals are spaced 4 lines apart (8 lines total) when full size magnification is used. To compensate for this discrepancy, the line correction circuits synchronize the output timing of the RGB signals to the IPU section by storing the scan data for each line in memory. The discrepancy between RGB video signals changes depending on the magnification ratio. The correction data for different magnifications is calculated as follows:

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

If this calculation does not result in an integer, the correction data is set to the closest integer, but further correction is needed (refer to “Picture Element Correction”).

2.4.4 IPU SECTION BLOCK DIAGRAM



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

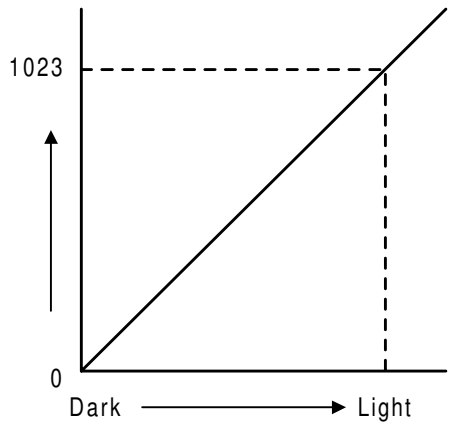
In single color mode, this memory can be used to enable image rotation.

A269D071.WMF

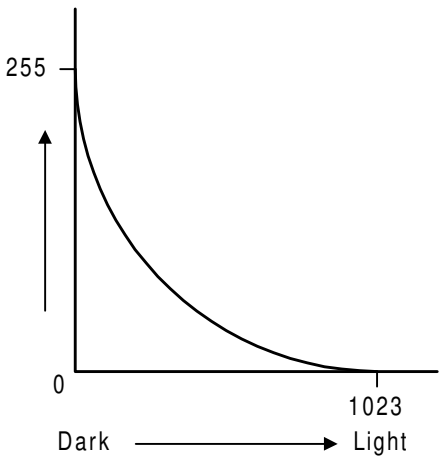
2.4.5 IPU FUNCTIONS

Scanner γ Conversion and Picture Element Correction

Scanner γConversion (RGB γConversion)



A269D072.WMF



A269D073.WMF

The RGB video signals from the CCD (10-bit signal) are sent to the IPU section. These signals are proportional to the intensity of light reflected from the original image (Fig. 1). However, the IPU section converts the signal levels as shown in figure 2 by using a gamma (γ) correction table in order to improve the accuracy of RGB to CMY color conversion, which is done later in the image process. The same table is used for R, G, and B signals.

The scanner gamma (γ) correction inverts the video signals and converts the signal from 10-bit to 8-bit as outlined in the following table:

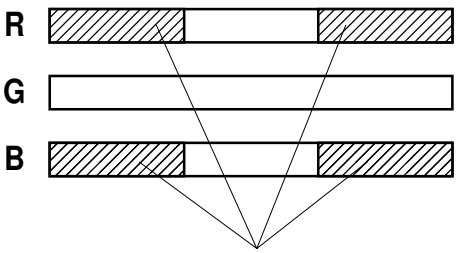
	Dark (Black) →	Light (White)
Scanner Input (RBG)	0 →	1023
After γ Correction (RGB)	255 →	0
↓		
Color Conversion		
↓		
Printer Output (CMYK)	255 →	0

Picture Element Correction

The Picture Element Correction circuit does two things.

1. Completion of the Scan Line Correction process

The discrepancy in the spacing of the RGB signals from the CCD in the sub-scan direction is corrected by the line correction circuit in the scanner section (refer to Scanner Section – Scan Line Correction). However, if the correction data corresponding to the magnification ratio is not an integer, then further correction is needed to synchronize the RGB signals.



Picture Element Correction

A269D074.WMF

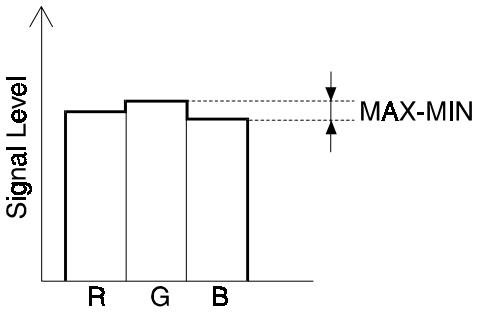
2. Correction if the CCD is not perpendicular to the light

If the CCD board is not perpendicular to the light axis, the position of each pixel is different from the original image position. This difference becomes larger towards the ends. Under this condition, vertical black lines (in the sub-scan direction) at the left and right edges of the original are colored because the Y, M, and C toner dots are not properly positioned. (This can be checked by looking at the vertical lines at the right and left edges of a copy of the C4 color chart.)

Therefore, the CCD line spacing is also corrected here. The target areas for this correction are shown above. The green CCD line is taken as a standard, and the ends of the red and blue lines are corrected.

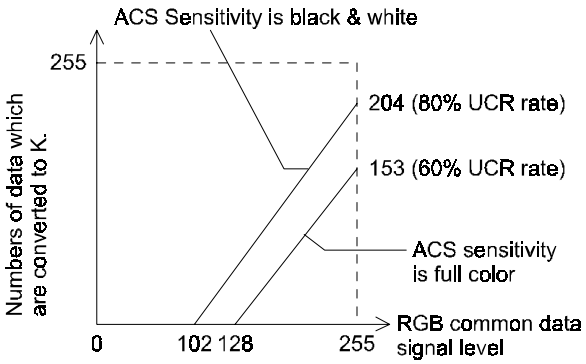
Adjust SP modes 4-932-001 to 4-932-004 to change the vertical line correction level. (See 6.7.2 Main Scan Position Dot Correction)

ACS (Auto Color Selection)



RGB Signal After Scanner γ Correction

A269D075.WMF



A269D076.WMF

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

To recognize if the original has a color area or not, the RGB video signals are compared. If the maximum difference among RGB signal levels (MAX-MIN in the above diagram) is within a certain range, the original is considered black and white.

During the 1st scanning cycle, the latent image is developed with the amount of black toner specified by the gamma (γ) corrected RGB video signals. If the original does not have any color areas, the 2nd scanning is aborted and the developed image is transferred from the transfer belt to the copy paper. Then the black & white copy comes out. If the original has a color area, copying resumes in the full color copy mode (4 scans).

Users can maximize the quality of their output by selecting priority for black and white or full color original in ACS mode, using the User Tools (ACS Priority). (The above right figure shows the effect of this setting.) The K setting prevents the UCR process from reducing the image density too much in low image density photo areas. This is explained in more detail in the section on UCR.

Automatic Original Type Selection

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

Since the copier selects the mode that is most suited to the original, the selected mode does not always match the specified mode. For example, the copier may not copy text originals in the text mode.

The copier automatically selects the following 9 original modes:

Automatically selected original modes

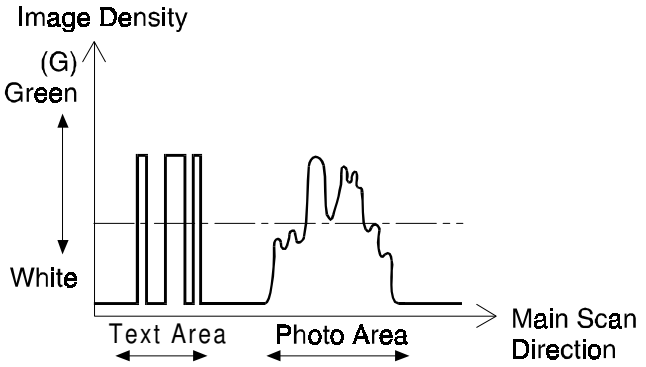
1) Text mode
2) Printed text/photo
3) Glossy text/photo
4) Copied text/photo
5) Printed photo
6) Glossy photo
7) Copied photo
8) Marker pen
9) Ink jet

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

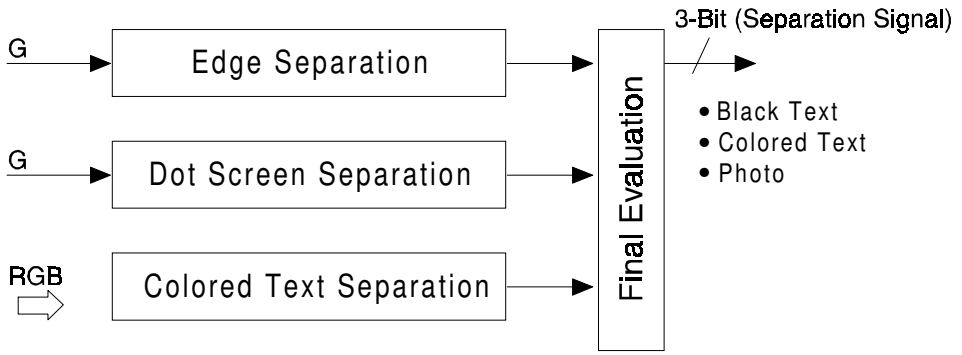
Image Separation

The copier senses and separates the original image into text and photo (dot screen) areas. Generally, The text areas feature an appreciable difference in contrast between the background and image parts. The photo (dot screen) areas feature many intermediate levels of gradation.

The copier senses these features and separates the image into black text, colored text, and photo areas.



A269D077.WMF



A269D078.WMF

(1) Edge separation

The edges of text and line diagram elements are identified by using the characteristics of strong contrast, continuity of black or color pixels, and continuity of white pixels around the black or color pixels.

The machine does this by only referring to the green signal.

(2) Dot screen separation

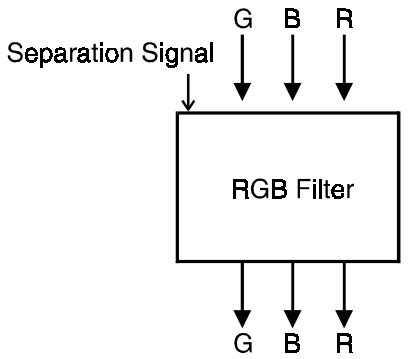
Dot screen areas are separated from non-dot screen areas (mainly text). The machine determines that if white pixels are not detected around the non-white pixels, it is a dot screen area.

The machine does this by only referring to the green signal.

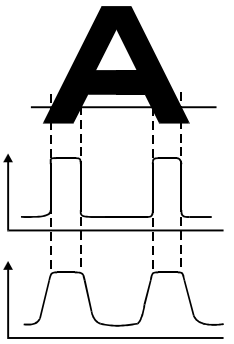
(3) Colored text separation

Black pixels and color pixels in text areas are identified by determining the difference among the RGB maximum signal levels and the output levels of the RGB video signals.

Filtering and Color Conversion



A269D079.WMF



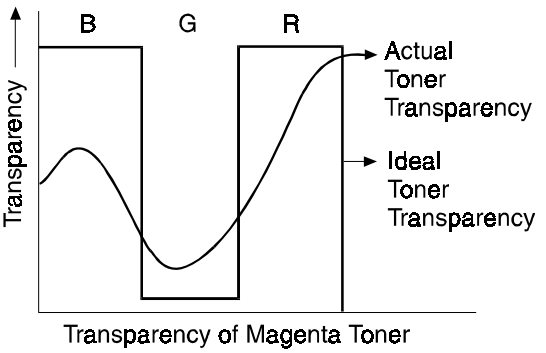
A269D080.WMF

RGB Smoothing Filter

Depending on the results of auto text/photo separation (or depending on the selected original mode), the appropriate software filters are applied to the RGB video signals. The RGB smoothing filter is applied to photo areas; an edge emphasis filter is applied to text areas.

Color Conversion

A matrix converts the RGB video signals from each scanning cycle into YMCK video signals. The content of the matrix depends on the selected mode. The transparency for each color toner is not ideal, as shown above. Color conversion compensates for the difference between ideal and actual characteristics.



A269D081.WMF

The following modes affect the matrix: color conversion mode (this is a user mode, not to be confused with the color conversion process described in this section), pastel mode, color balance mode, original mode (press print glossy photo, 2nd generation), RGB toner correction mode

The following color conversion table is an example of the results from the matrix operation, for simple color copying without any special modes applied. For example, to represent green, the yellow and cyan toners are used in a proportion of 1:1.

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

Color Conversion Table

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

Color Conversion mode
Color conversion mode is a user feature, not to be confused with color conversion (RGB to CMYK) described above. In color conversion mode, a selected color (C/M/Y/R/G/B/K/W) on an original that falls within the recognized thresholds for that color is converted into a different color on the copy. Up to 4 colors can be converted at one time. (Please refer to the operator's manual for details.)

For example, when changing Yellow to Black, the coefficients for the Yellow video signal in the color conversion table become: Y: 1, M: 1, C: 1, K: 1

Pastel mode
In pastel mode, the matrix parameters change, and the output of the combined YMCK data shifts to a value between 100 % and 25 %. There are 9 steps, and the value used depends on the user's selection.

Color balance mode
In color balance mode, the data output for each color (YMCK) can be changed independently by changing the matrix parameters. Three are nine possible values for each color.

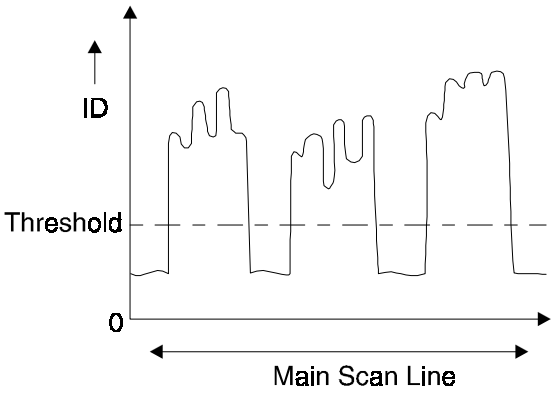
Original mode
There are three modes within photo mode (Press Print, Glossy Photo, and 2nd Generation) and three types of special original mode (Marker Pen, Inkjet, Map). The machine selects the most suitable matrix for the original type that is selected by the user at the operation panel.

For inkjet mode, the user can select one of three different inkjet gamma (γ) tables to emulate the output of three different types of inkjet printer. (This is done with the User Tools.)

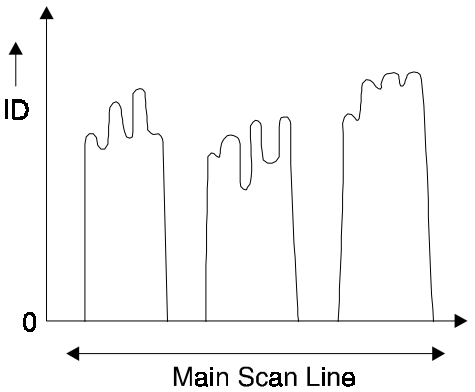
RGB toner correction mode
Two color toners are used on R, G, and B output in the single color mode. The toner mixing ratios for R, G, and B are adjustable (SP 5-611-001 to 5-611-006). The adjustments are valid for two-toner single-color (R, G, or B) copy modes only.

Twin color mode
Twin color mode separates black part area and colored areas. The machine then converts black to one color (that was selected by the user) and all the color areas another color (the output has only two colors). (Refer to the operator's manual for details.)

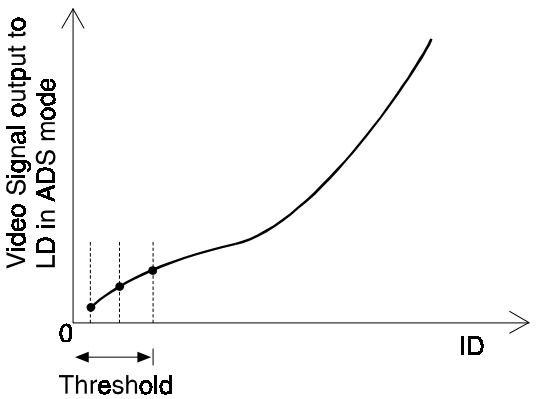
Background Density Control and ADS



A269D084.WMF



A269D085.WMF



A269D083.WMF

Background density control

This function removes low ID image signals (background) that are less than a certain threshold. The threshold that is applied depends on the color mode (single color or full color). For each of these modes, the user can select a different threshold.

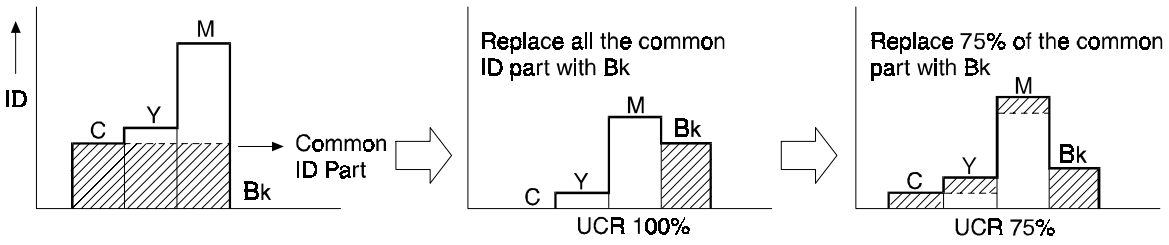
ADS (Auto Image Density Selection)

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

In full color mode, after scanning the machine calculates the threshold for removing background by referring to the RGB data taken from the entire original.

In black and white mode, the machine detects the background level for the original, also known as the peak white level, and removes this from the image, to make a white background. Peak level data is taken for each scan line to correct for changes in background density down the page. From the peak white level, the machine determines the white reference value for A/D conversion. Therefore, in black and white mode the background density is controlled before data is input to the A/D converter.

UCR (Under Color Removal)



A269D086.WMF

Obtaining the right colors using YMC toner addition does not always work perfectly. For example, if the same quantity of toner for each color (YMC) is put on the paper, ideally the image should become black, but in reality it becomes a dark color, such as dark blue.

To compensate for this, an equal portion of the common ID value for each color is subtracted. This reduces the amount of color toner on the paper, and a proportional amount of black toner is added. This process is known as UCR.

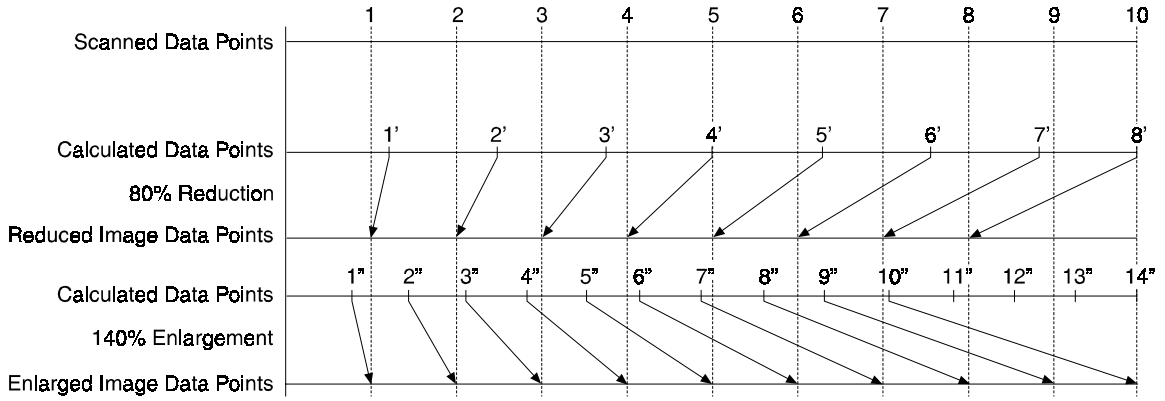
The UCR ratio is the percentage of the common ID value for YMC that is subtracted and converted to black. In the above example, where the UCR ratio is 100%; the entire common ID value is subtracted from Y, M, and C, and converted to K.

In actual use, the UCR ratio depends on the color mode and the image density. For example, when the UCR ratio is 95%, 95% of the entire common ID value is subtracted from Y, M, and C, and converted to K.

The UCR ratio can be adjusted by the user during initial setup.

Magnification Processing

Main Scan Magnification



A269D088.WMF

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

Scanning and laser writing are done at a fixed pitch (the CCD elements cannot be squeezed or expanded). So, to reduce or enlarge an image, imaginary points are calculated that would correspond to a physical enlargement or reduction of the image. The correct image density is then calculated for each of the imaginary points based on the image data for the nearest two true points. The calculated image data then becomes the new (reduced or enlarged) image data.

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

400 dpi to 600 dpi Conversion

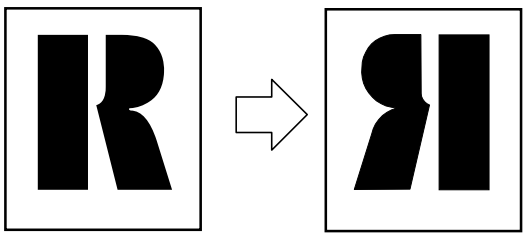
The copier converts image data that is scanned at 400 dpi to 600 dpi by performing the same processing that is explained above in “Main Scan Magnification” by applying 150% magnification processing on the image data for both main and sub scans.

Image Creation

These are some of the user selectable image processing functions.

Mirror Image

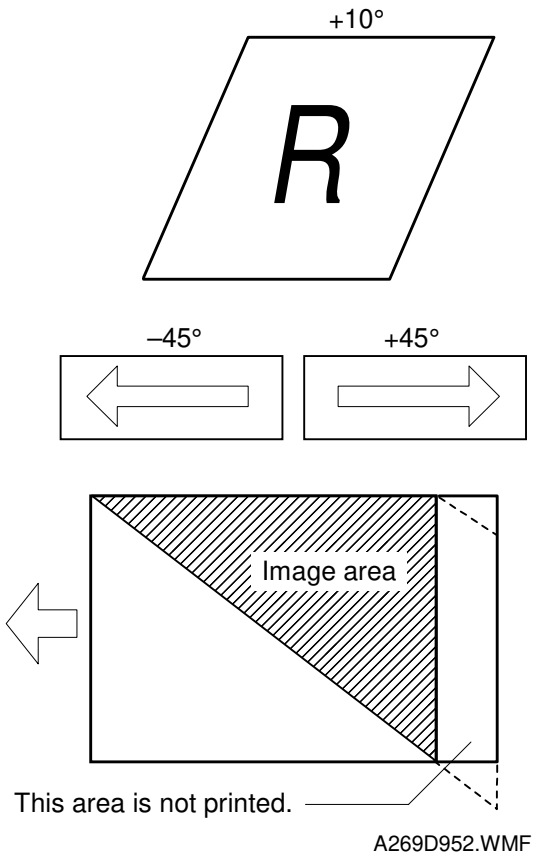
This function generates a mirror image of the original by inverting the original image in the main scan direction.



A269D951.WMF

Slanted Image

This function generates a slanted image of the original by shifting the original image in the main scan direction by a specified angle. The maximum allowable angle is ±45°.



A269D952.WMF

Repeat Image

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

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

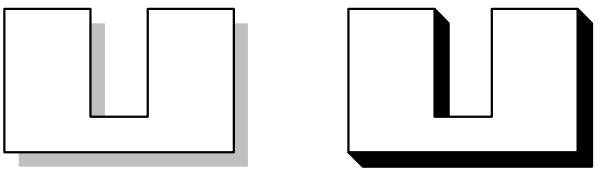
Outline Image

The copier converts the image data into binary-value data and submits the converted data into an outline image filter. The frame width may be set to 0.25, 0.5, or 0.75 mm.

A269D953.WMF

Shadow Image

The shadow is cast in the lower right direction from the original at an angle of 45 degrees. The shadow may be plane or solid and the shadow color may be the same color or specified color.



<Plane shadow> <Solid shadow>

A269D954.WMF

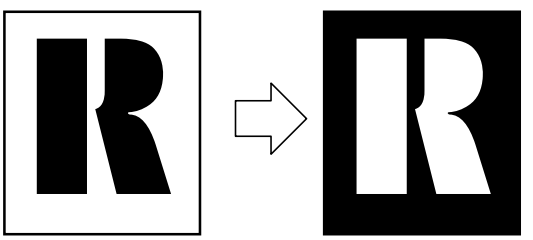
To produce a half tone of the same color, the copier identifies the color of the original and uses that color for shading.

The color may be specified from the editor (K, C, M, Y). The width of the shadow can be specified between 1 mm and 4 mm in 1 mm units. The copier does not allow the user to specify the color of the shadow when performing both outline imaging and shadowing.

Positive-Negative (Image Inversion)

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

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

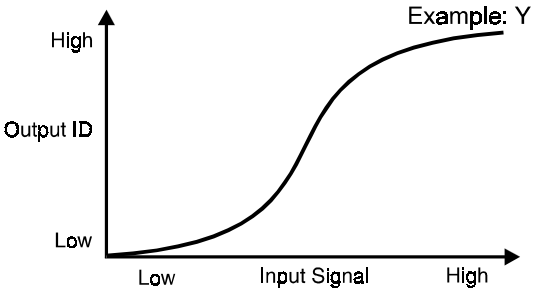


A269D955.WMF

The user may specify the area and magnification ratio.

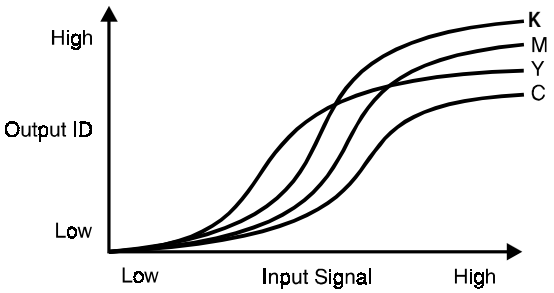
Gradation Processing

Gamma (γ) Correction (Printer γ)



[Fig. 1]

A269D089.WMF



[Fig. 2]

A269D090.WMF

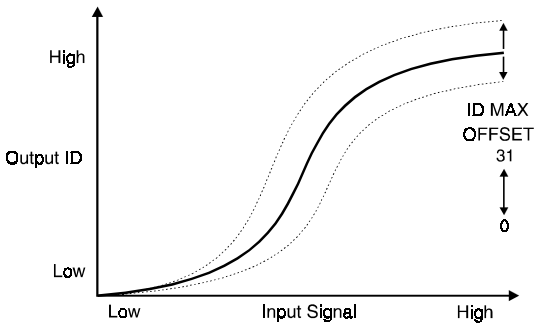
KCMY γ

Ideally, the gamma curves for Yellow, Magenta, Cyan, and Black are identical, as shown in figure 1. However, they are not because electrical components always vary slightly, resulting in varying gamma curves, as shown in figure 2.

The Auto Color Calibration (ACC) procedure can compensate for any discrepancies in color reproduction. ACC makes new gamma curves for each color in each mode (text, photo, black text). After ACC, the gamma curve for each color can be adjusted with service programs (SP4-910 to SP4-926).

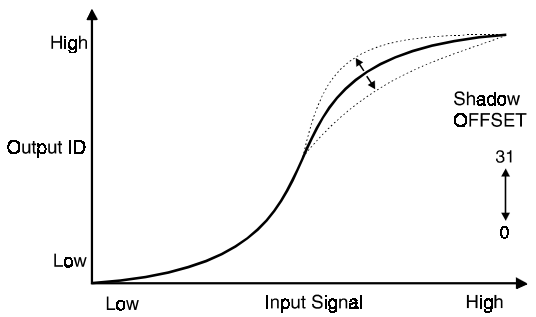
Using these programs, each gamma curve can be adjusted for 4 different modes: ID max., High ID, Middle ID, and Low ID, as shown on the following page. If the previous gamma curve was better, it can be recalled. Alternatively, the factory settings can be loaded using SP 5-610-004. In addition, the factory settings can be overwritten by the current gamma settings using SP5-610-005. SP7-904 prints the current manual γ settings.

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



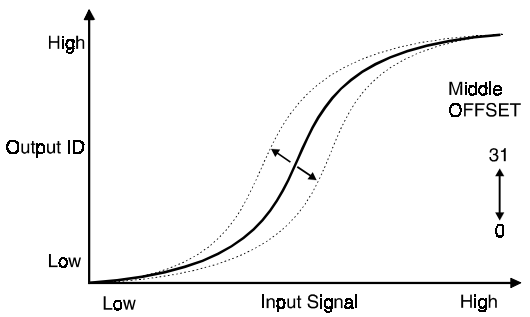
[Fig. 3] A269D091.WMF

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



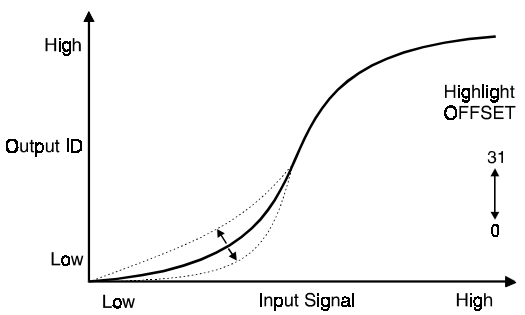
[Fig. 4] A269D092.WMF

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



[Fig. 5] A269D093.WMF

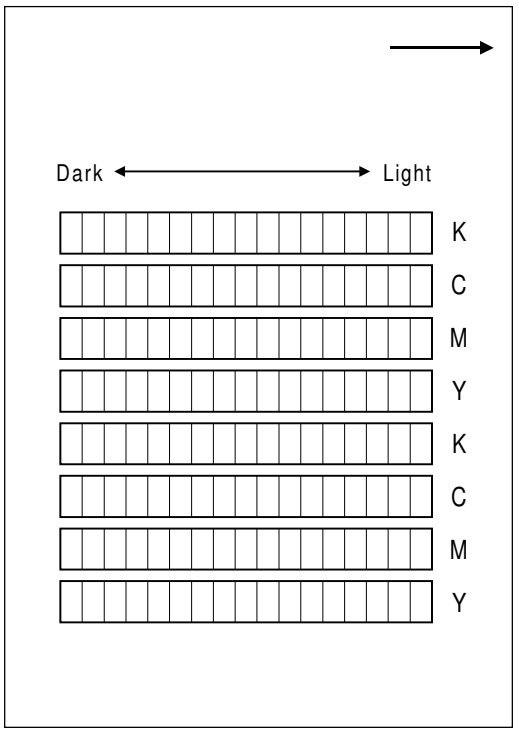
Highlight (Low ID)
The Low ID mode adjusts the image density between Level 2 and Level 5 of the color gradation scale on the C-4 test chart (figure 6).



[Fig. 6] A269D094.WMF

Auto Color Calibration Test Pattern

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



A269D095.WMF

Auto color calibration
This machine automatically calibrates the printer gamma (γ) curve when the user selects ACC.

When ACC is activated, the machine prints out an ACC Test Pattern. The user puts the test pattern on the exposure glass, then the machine scans the test pattern. The machine scans eight lines, one for each color (KCMY) in text mode, and one for each color in photo mode.

The machine corrects the printer gamma by comparing the ideal settings with the current image density. Then the machine combines the corrected gamma curve with the High, Middle, and Low ID values currently in memory (these are not reset to the defaults first, as in some earlier models)

The machine the calculates the ID max (amplitude of the gamma curve) based on data from the ACC scan.

The corrected printer gamma curves can be adjusted further using SP modes (SP4-910 to SP4-926).

ACC target:
This copier allows adjustments in 10 steps on the target base γ to be used during auto color correction.

(SP4-501-001 through SP4-501-008: For the copier)
(SP4-502-001 through SP4-502-008: For the printer)

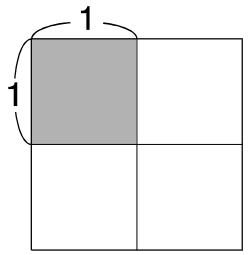
Default: 5

Adjustable range: 0 to 10

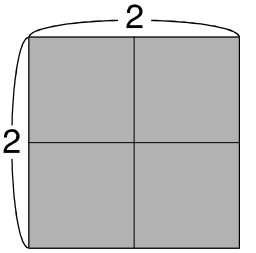
NOTE: The adjustable range is 0 to 50. However, the effective range is 0 to 10. Even when it is set to 50, it is the same level for 10.

Dither Processing

This copier provides 256 gradations by using 1 dot by 1 dot and 2 dots by 2 dots dither patterns in each of the text and photo modes, whereby ensuring high image quality. In the printer mode, the copier uses a different table for photo mode dithering from that for the copier.



A269D096.WMF



A269D097.WMF

Area Manipulation Functions

In an edit model, the image data in the areas that are specified from the operation panel and that are subject to pre-scanning are encoded in the area processor section and sent to the image processor section together with the main scan image data. The data in each area (20 areas maximum) is subject to color correction in the "color calibration 2" step of the IPU board.

The edit version of the copiers is also equipped with a composition capability.

CPU

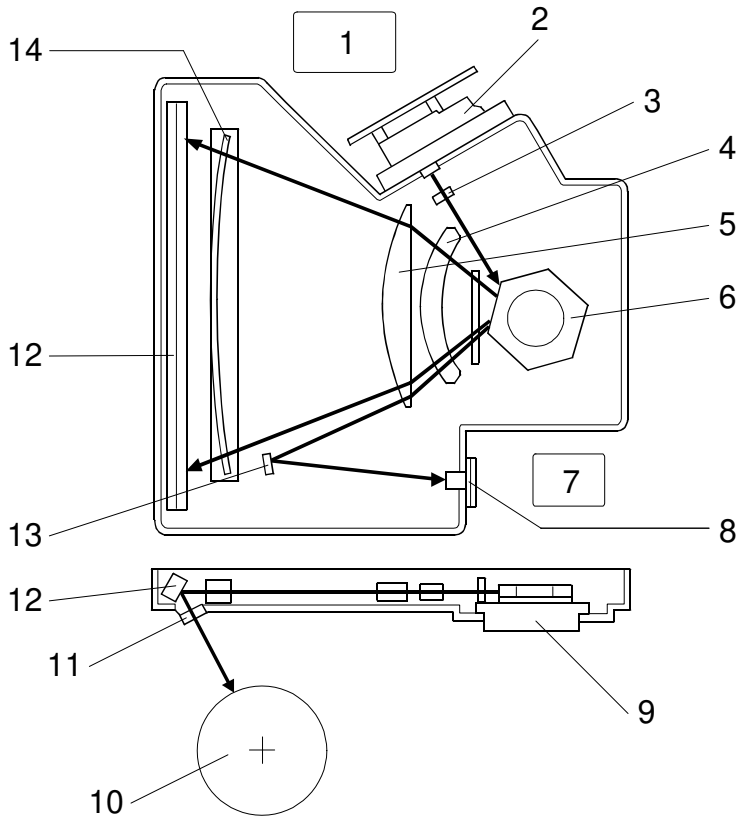
The copier incorporates a 32-bit CPU to process and control the timing of the data in the scanner and IPU sections.

IPU Board Test

The IPU consists of some LSI chips, DRAM, SRAM, and a controller block that controls these chips and RAM. They are interconnected in a way that allows IPU board tests to be run from SP mode (SP4-904-001 and SP4-094-002) and check for IPU malfunctions (ASIC diagnostics on the shading and subsequent stages).

2.5 LASER EXPOSURE

2.5.1 OVERVIEW



A269D102.WMF

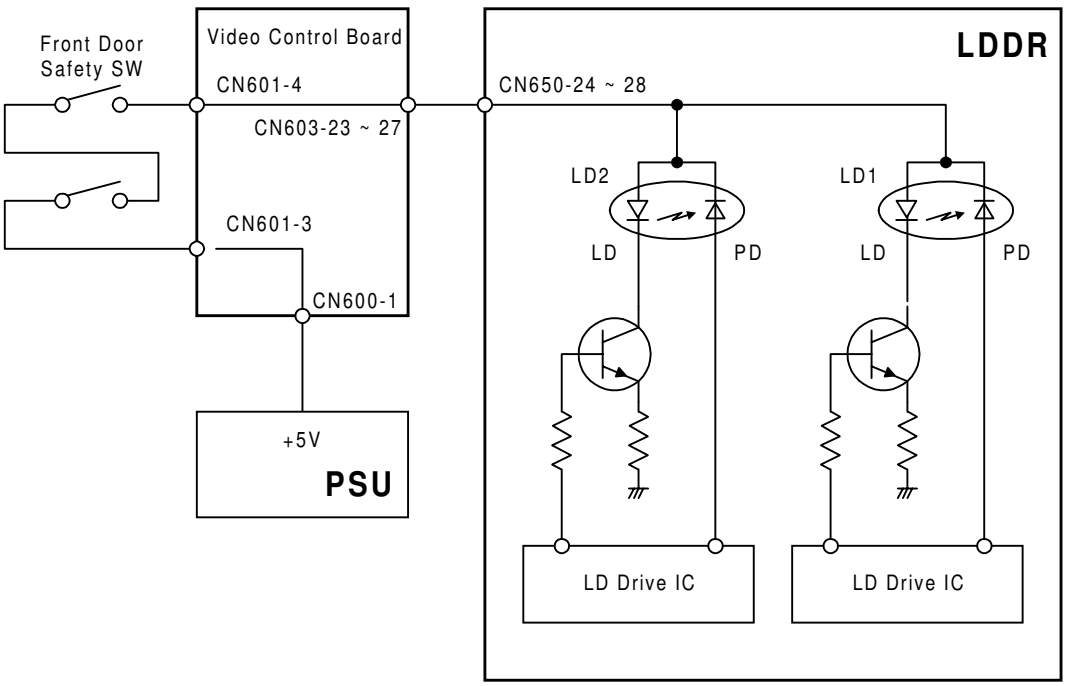
1. LD control board
2. LD unit
3. Cylindrical lens
4. 1st fθ lens
5. 2nd fθ lens
6. Polygon mirror
7. Polygon motor drive board
8. Laser synchronization detector
9. Polygon mirror motor
10. OPC drum
11. Toner shield glass
12. Drum mirror
13. Laser synchronization detector mirror
14. BTL

This machine uses laser diodes to produce electrostatic images on an OPC drum. The laser diode unit converts image data from the LD main control board into laser pulses, and the optical components direct these pulses to the drum.

For main scanning, this copier uses a polygon mirror that rotates at 23,622 rpm. The drum rotation (with a peripheral velocity of 200 mm/s) controls sub-scanning. The copier achieves 256 gradations using a combination of laser power modulation (PM) and pulse width modulation (PWM). The laser diode unit is a multi-beam type with two laser diodes and supports laser exposure at 600 dpi.

2.5.2 LD UNIT

LD Safety Switch



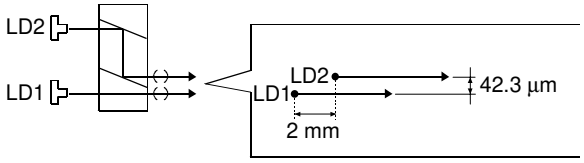
A269D250.WMF

The front door has two safety switches that ensure that the laser beam does not accidentally switch on during servicing, while the front door is open. These safety switches are installed in series on the 5V line between the PSU and the LD unit. When the front door is opened, the door switches cut off the 5V line to the LD unit.

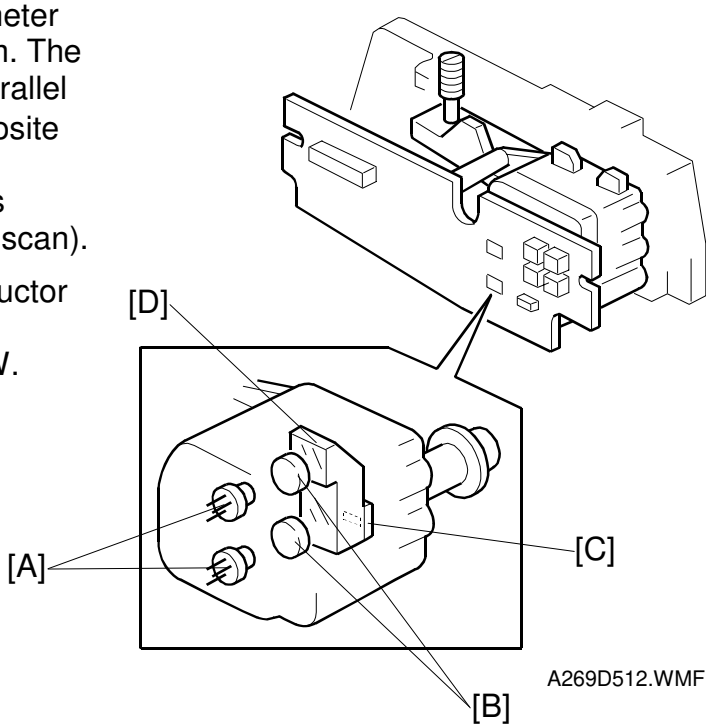
LD Unit Configuration

The LD unit is a 2LD multi-beam type. It consists of two laser diodes [A], two collimate lenses [B], two apertures [C], a composite prism [D], and an LD control board [E]. The beams from the laser diodes are converted to parallel beams by the collimate lenses. The apertures then form the laser beams to the diameter necessary for writing on the drum. The two laser beams are output in parallel 42.3 μm apart through the composite prism. Two lines are written simultaneously on the drum. This provides printing at 600 dpi (sub-scan).

The wavelength of the semiconductor laser diodes is 780 nm and the maximum output power is 15 mW.

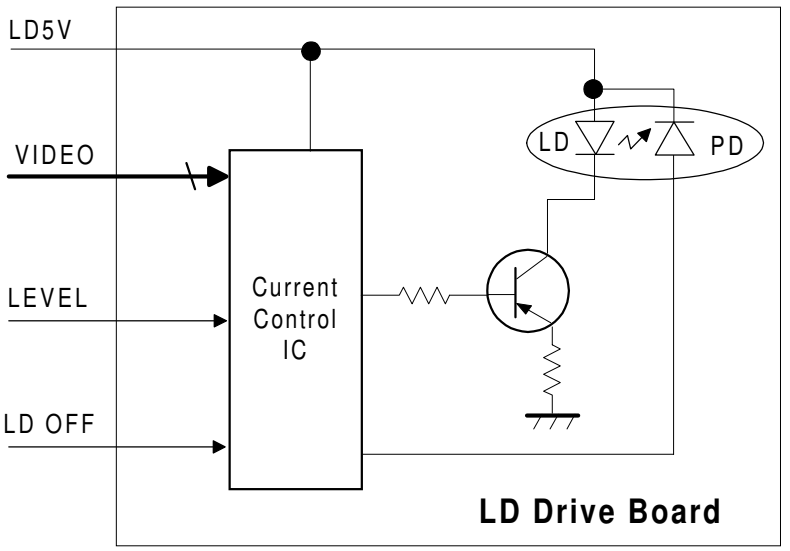


A269D103.WMF



A269D512.WMF

Auto Power Control (APC)



A259D501.WMF

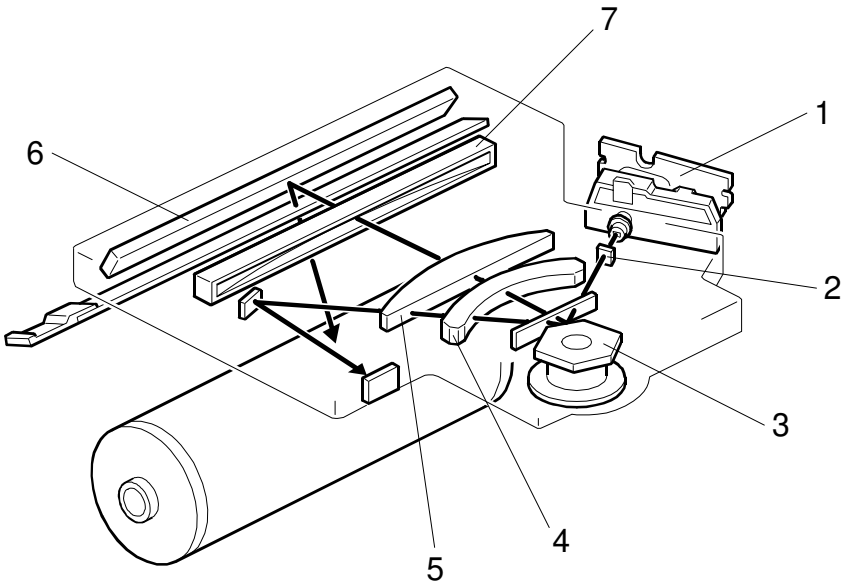
Even if a constant electric current is applied to the laser diode, the intensity of the output light changes with the temperature. The intensity of the output decreases as the temperature increases.

In order to keep the output level constant, the output light intensity is monitored through a photodiode (PD) enclosed in the laser diode. The photodiode passes an electrical current that is proportional to the light intensity. The output is not affected by temperature, so it faithfully reflects the changes in the LD output, without adding anything itself.

Just after the main switch is turned on, the current control IC on the LD drive board excites the laser diode at full power (power level 32) and stores the output of the photodiode as a reference. The current control IC monitors the current passing through the photodiode. Then it increases or decreases the current to the laser diode as necessary, comparing it with the reference level. Such auto power control is done during printing while the laser diode is active.

The laser power level is adjusted on the production line. Do NOT touch the variable resistors on the LD unit in the field.

2.5.3 LASER OPTICS SYSTEM



A269D101.WMF

1. Laser diode unit
2. Cylindrical lens
3. Polygon mirror
4. fθ Lens 1
5. fθ Lens 2
6. Drum mirror
7. Barrel toroidal lens (BTL)

Cylindrical Lens

The LD unit sends laser beams to the polygon mirror through the cylindrical lens. The cylindrical lens determines the beam diameter in the sub scan direction.

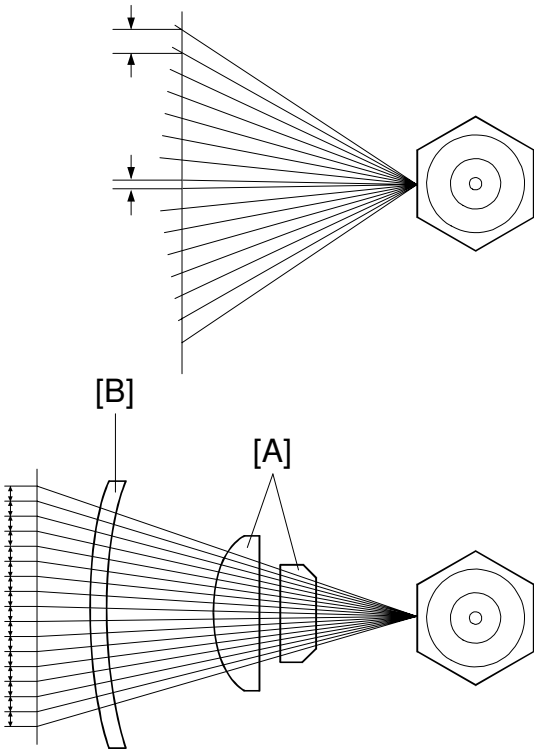
Polygon Mirror

The polygon mirror assembly consists of a motor and a polygon mirror integrated in a unit. The polygon mirror is hexahedral. The mirror surfaces have been ultra-precision machined to provide precise dot placement and increase reflection efficiency. The polygon motor rotates at 23,622 rpm and writes 12 lines per revolution (2 lines per surface). The polygon motor is always rotating while power is on to ensure fast copying.

fθ Lenses and the BTL

The angles between pixels are equal. However, if the beam were to go directly to the drum as shown in the upper illustration, the spacing between pixels would depend on the angle of the beam. The pixels near the end of the drum would be further apart than the ones near the middle, and slightly thicker toward the ends of the drum than in the middle.

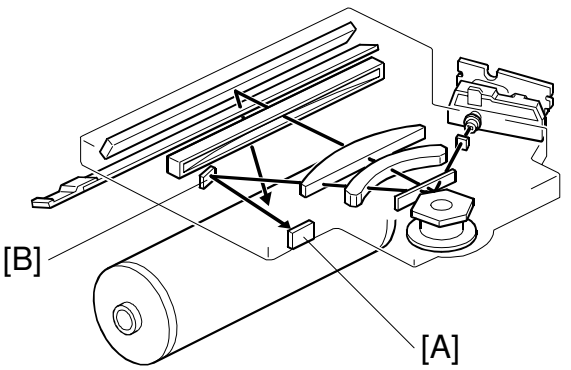
The f-theta lenses [A] and barrel toroidal lens (BTL) [B] correct for this by deflecting the beam slightly inward to ensure uniform pixel spacing and diameter. The f-theta lenses and BTL also correct for very slight deviations of the polygon mirror surfaces from being perfectly perpendicular to the plane of the laser beam.



A269D098.WMF

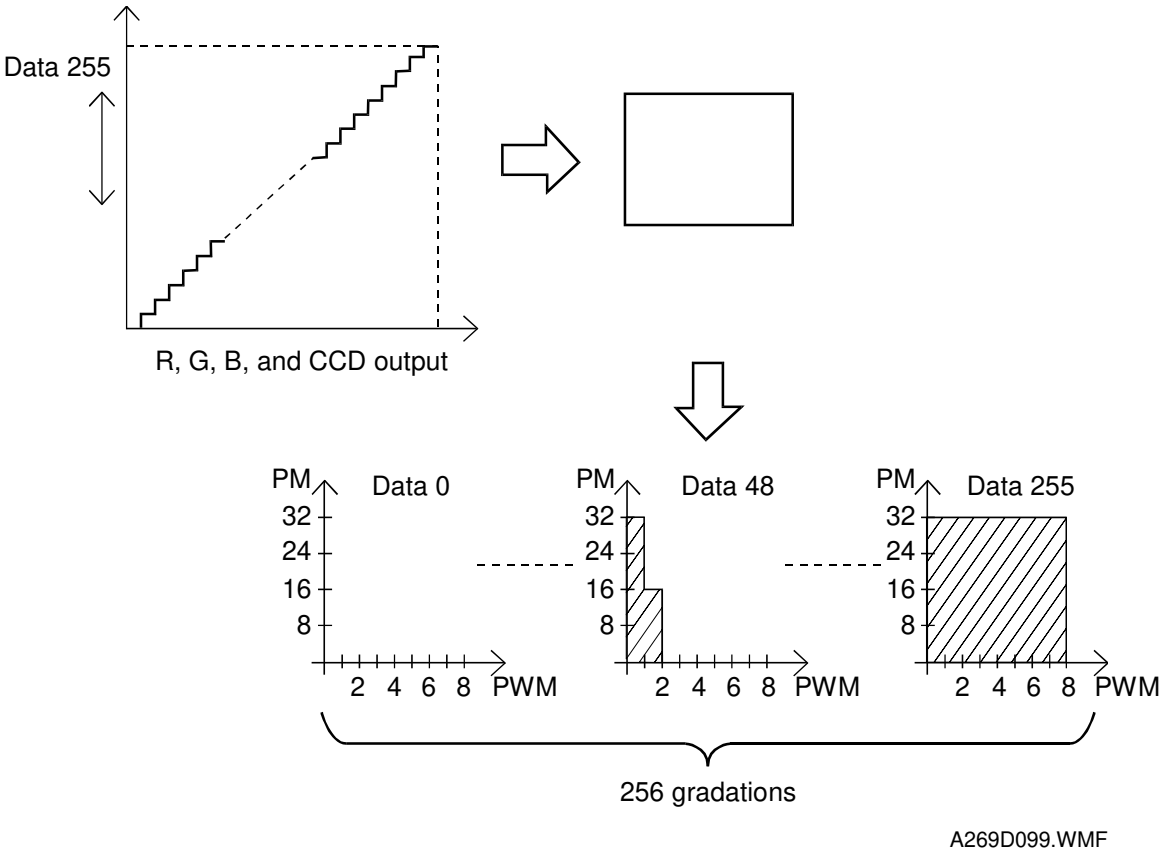
Laser Synchronization Mechanism

The laser synchronizing detector board [A] synchronizes the main scan start timing. This board generates and sends a synchronization signal when the laser synchronizing detector mirror [B] reflects the laser beam to the detector as the laser beam starts its sweep across the drum.



A269D101.WMF

Laser Exposure Control



Two modulation systems are used to produce 256 gradations of printout from the LD output. One is pulse width modulation (PWM) in which the ON time of the laser diode is adjusted. The other is power modulation (PM) in which the luminous intensity (brightness) of the laser beam is controlled.

To make the latent image, the laser beam illuminates the image area on the drum surface. The longer the laser is on and the more intense it is, the darker the developed pixel becomes. Modulating (changing) the width of the pulse makes the length of time that the laser is on longer or shorter. There are eight possible pulse width levels in this model.

While the laser is on to make one dot, the intensity of the laser is controlled by power modulation (PM). The laser's intensity is controlled by the amount of current sent to the laser diode. Modulating the power makes the laser brighter or dimmer. There are 32 possible power levels, or laser intensity levels.

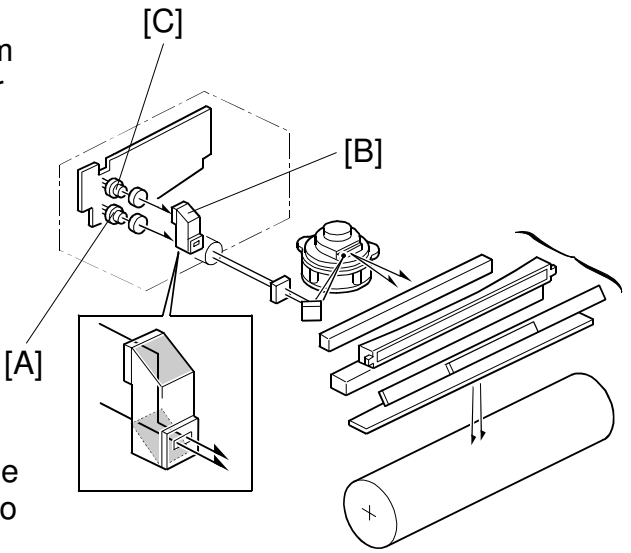
The laser engine can use the 8 pulse width levels and 32 power levels to create the 256 possible grayscale values for each pixel for each color.

In the printer mode, the machine carries out 1,200 dpi compatible smoothing.

Multibeam Laser Exposure

The employment of the 2LD multi-beam system makes it possible to print faster or at higher dot density without increasing rotational speed of the polygon mirror. Low-speed rotation of the polygon mirror contributes to prolonged service life of the polygon motor and low noise.

While the beam from LD1 [A] passes straight through the composite prism [B], the beam from LD2 [C] is reflected within the composite prism and exits the prism near the beam from LD1. The two beams intersect on the polygon mirror, and then scan over the OPC drum surface with a spacing of approximately 2 mm in the main scan direction and with a spacing of approximately 42.3 μm in the sub scan direction. This gives laser exposure at 600 dpi (sub scan).



A269D511.WMF

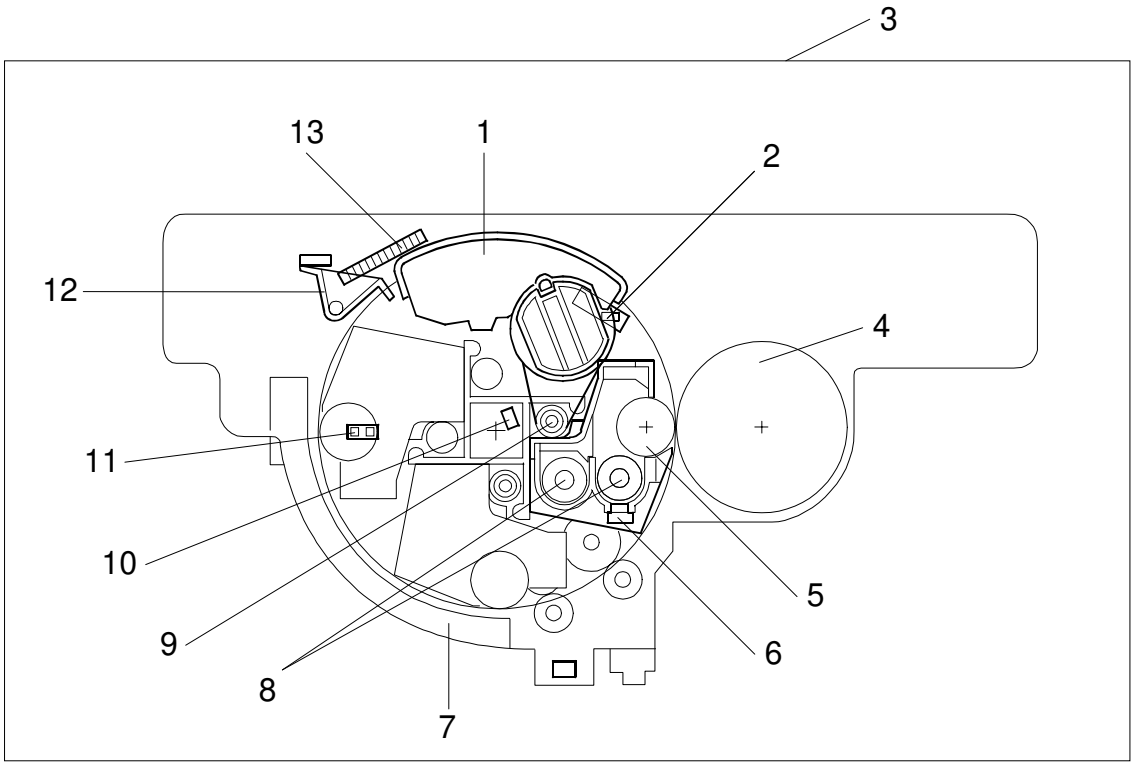
Laser Diode Control Board Functions

The laser exposure control board performs the following control functions:

- Process control γ correction
- Storing internal pattern data
- Storing character data for data output
- Performing smoothing in the 1,200 dpi printer mode
  (Smoothing processing proper is carried out by the printer controller.)
- Preserving the auto color calibration values
- Preserving the printer γ values
- Performing fine adjustment of main and sub scan magnification ratios (controller mode)
  Main scan: Adjust by changing the clock frequency (SP2-112).
  Sub scan: Adjust by changing the polygon's rotational speed (SP2-113).
  (The main scan magnification ratio must be adjusted whenever the sub scan magnification ratio is adjusted.)

2.6 DEVELOPMENT UNIT

2.6.1 OVERVIEW

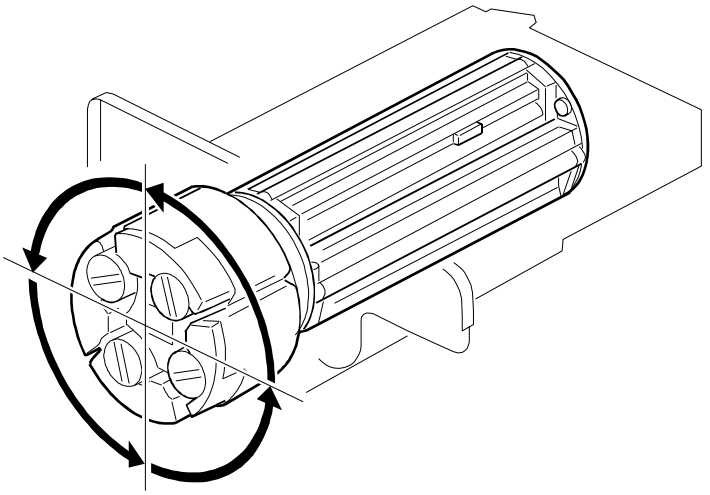


A269D301.WMF

1. Toner cartridge
2. Toner cartridge set sensor
3. Revolver/Drum drawer (without drum unit details)
4. Drum
5. Development roller
6. TD sensor
7. Toner catch cover
8. Mixing augers
9. Toner supply auger
10. Toner end sensor
11. Revolver H.P. sensor
12. Revolver lock
13. Revolver filter

This machine has four development units—one for each color (K, Y, C, and M). The development units are mounted around a rotating mechanism called the revolver. The revolver rotates counterclockwise to bring the proper color development unit to the drum. The revolver and the drum unit are mounted in a pull-out drawer (revolver/drum drawer) for easy maintenance.

2.6.2 REVOLVER MECHANISM



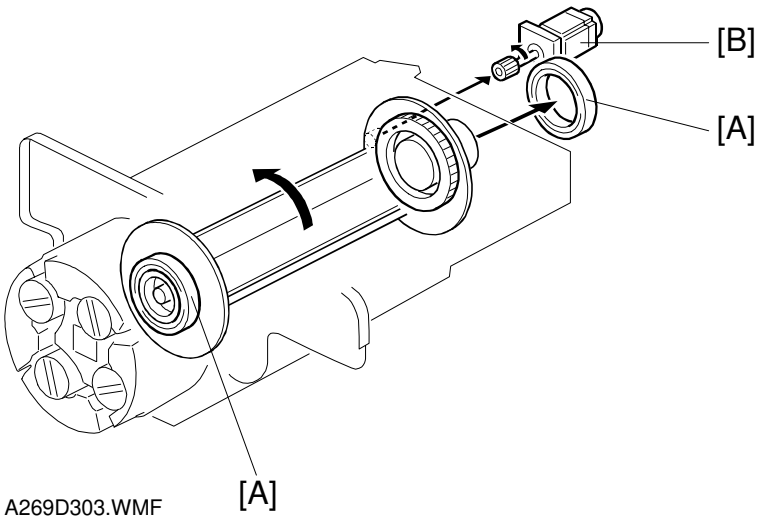
A269D302.WMF

The revolver unit is composed of four development units, one for each color (KYCM). It develops colors by rotating the revolver counter-clockwise (as viewed from the front of the copier), 90 degrees at a time, in the order of K, Y, C, and M.

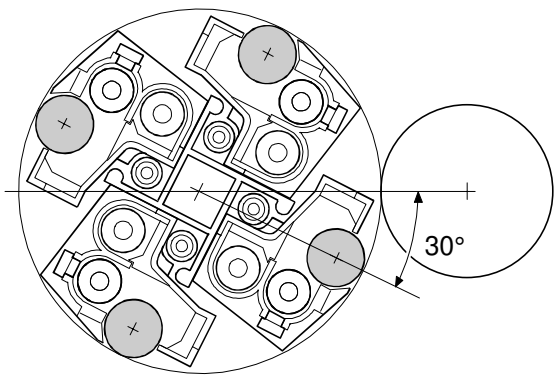
In printer mode, development is carried out in the order of Y, C, M, and K to improve the reproducibility of black letters.

The development units for each color can be removed easily.

Revolver Drive



A269D303.WMF



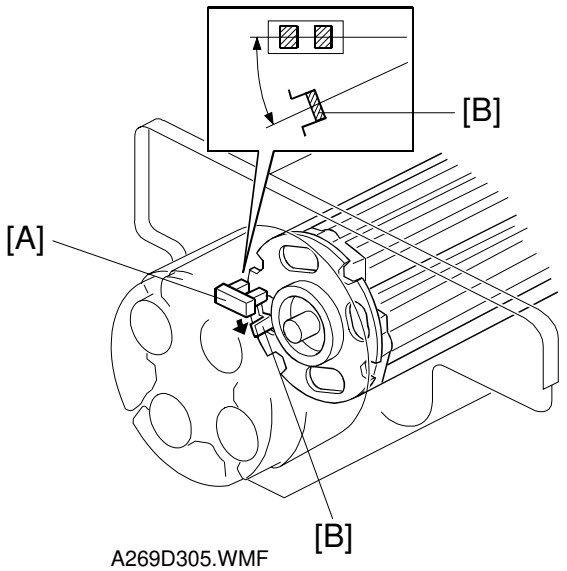
A269D304.WMF

The revolver in the drawer unit is supported by the ring bearings [A] at the front and rear of the revolver. It is rotated by the revolver drive motor [B].

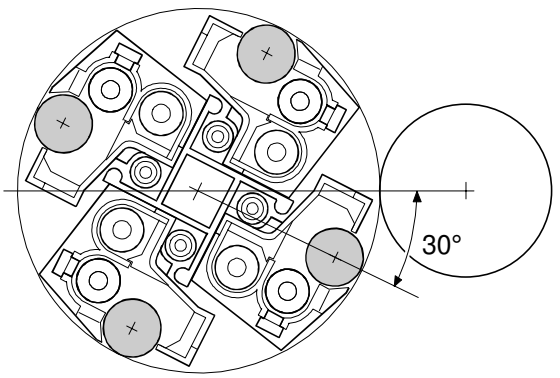
The revolver rotates counterclockwise as viewed from the front of the copier in 90 degree steps. Since the revolver's home position lies 30° before the K's development position, the revolver is rotated by 30° before starting development.

The revolver drive motor is a 2-phase stepper motor.

Revolver Home Position Detection



A269D305.WMF



A269D304.WMF

The revolver HP sensor [A], a photointerrupter, is on the front of the revolver/drum drawer. The actuator [B] is attached to the front of the revolver. The CPU detects the revolver home position when the actuator enters the HP sensor.

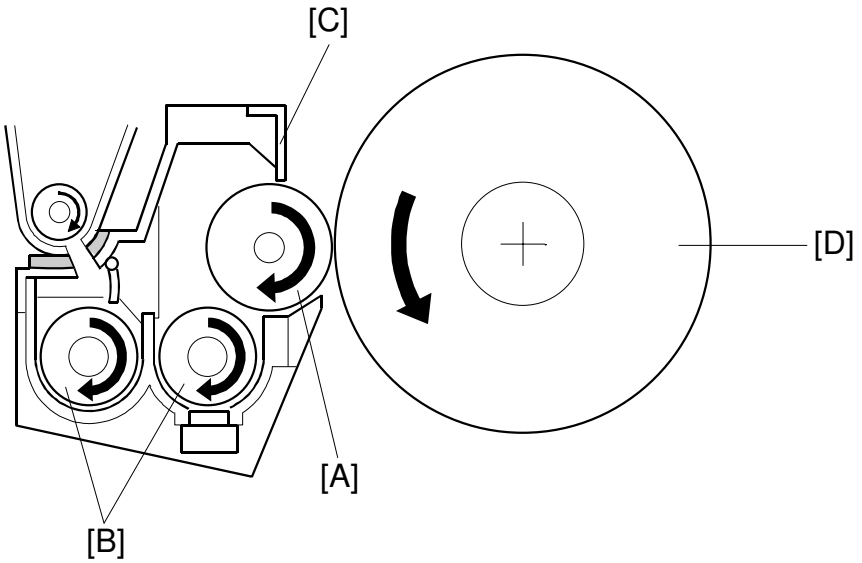
The home position is 30 degrees before the K development position for copy and printer mode. This clearance between the development sleeve and the drum prevents the drum surface from becoming dirty and minimizes toner consumption when development is not taking place.

Whenever a copy job ends, the copier returns the revolver to home position. It also does this when the copier is turned on and when the front door is opened or closed.

The toner bottle is locked so that it cannot be removed or installed. However, when there is a toner near end or toner end condition, the revolver stops at a different position in standby mode so that the toner bottle can be changed. Then, when the user makes a copy, the revolver goes to home position first, before the copy is made.

SC361 is turned on when a revolver HP sensor error occurs.

2.6.3 DEVELOPMENT MECHANISM



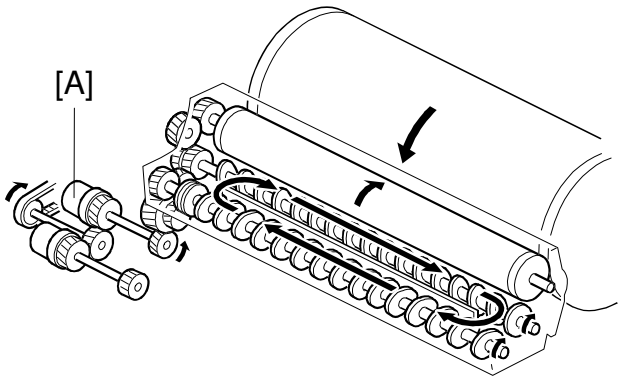
A269D306.WMF

The developer (700 g) in each development unit is supplied to the development roller [A] by the two mixing augers [B] and attracted onto the roller surface by the magnets inside the development roller.

The attracted developer is trimmed to the desired thickness by the magnetic doctor blade [C], and then carried out to the drum [D] where the latent image is developed. This copier uses a magnetic doctor blade. The magnetic doctor blade attracts the carrier and increases friction. This reduces on the time required to create the triboelectric charge on the toner carrier particles. (Reduces developer setting time.) It also maintains the image density more effectively than a non-magnetic doctor blade.

The uniform clearance (photoconductor gap: PG) between the development roller and the drum is guaranteed by the combination of the development unit locks at both ends of the development mechanisms and the drawer positioning mechanism.

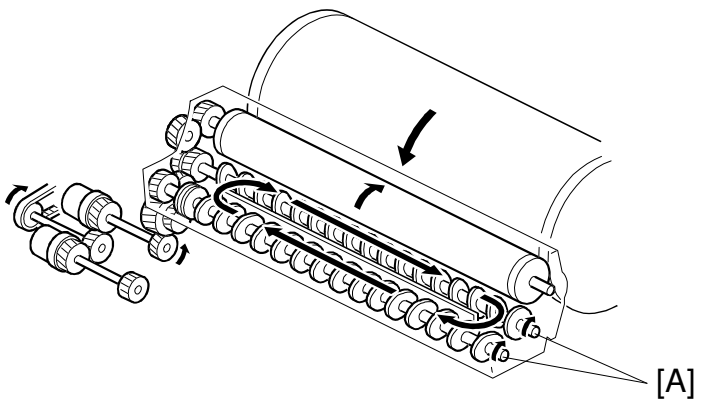
2.6.4 DEVELOPMENT DRIVE



A269D307.WMF

The revolver unit contains four development mechanisms. At any one time, only one development mechanism is driven (the one for the color that is being developed) The drum peripheral component motor drives the development roller and screws using the torque of the drum peripheral motor through development clutch [A] and idler gears.

2.6.5 DEVELOPER AGITATION



A269D307.WMF

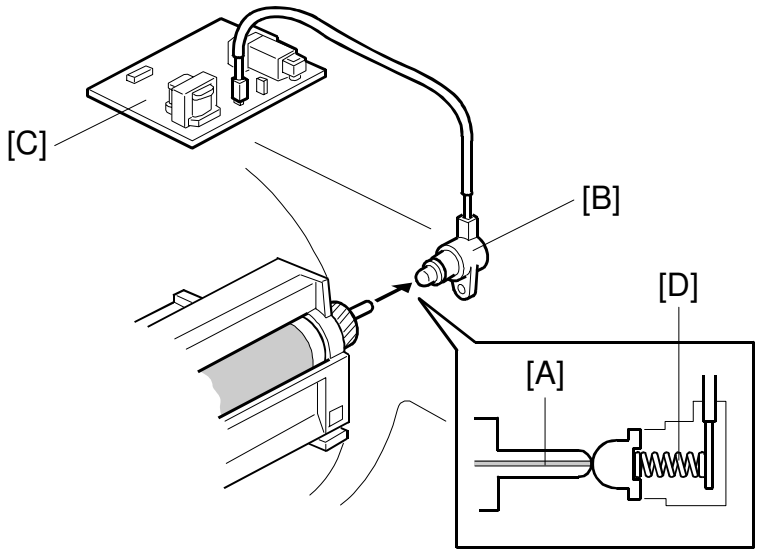
The two transfer augers [A] circulate and agitate the developer. This is a more compact system than the paddle mechanism used in older models.

Developer is agitated during the process control check, during toner supply, and during development (only for the color being used).

2.6.6 TONER AGITATION

The toner is agitated by the rotation of the revolver.

2.6.7 DEVELOPMENT BIAS



A269D308.WMF

Since this copier uses a revolver mechanism, it needs only one bias terminal.

When a development unit is at the development position, the development input shaft [A] is in contact with the bias terminal [B] at the rear of the revolver. At this time, voltage passes from the high voltage supply board [C] to the development roller shaft through the bias terminal

The bias terminal has a spring [D] to push it against the development input shaft to prevent poor terminal contact when the development unit reaches the copying position.

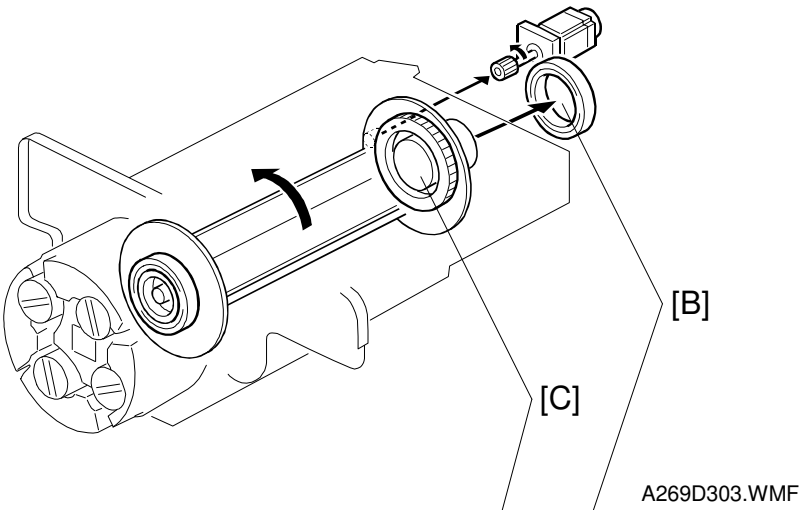
This model uses both ac and dc bias. The ac bias improves toner transfer to the drum.

- AC: Peak-to-peak 0.8 kV, 2.25 kHz
- DC: Center –500 V (depending on the process control self check)

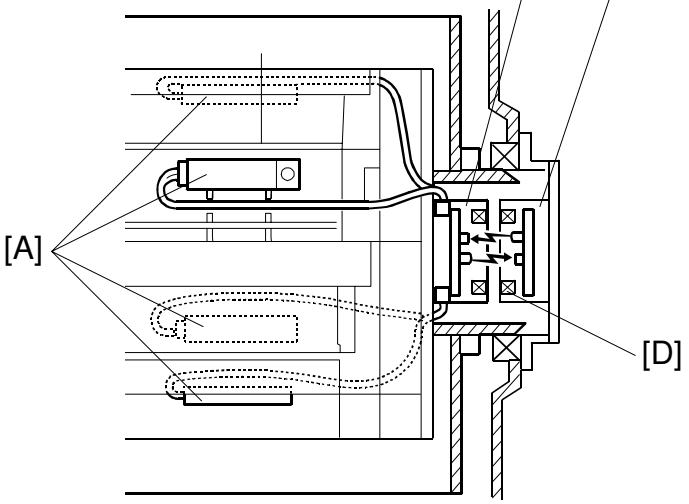
The ac bias is applied only during the copy cycle. At other times the ac bias is turned off to prevent toner from transferring to the drum and only the dc bias is applied.

SC360: Development bias (high-voltage power supply - B) error

2.6.8 TD SENSOR NONCONTACT COUPLER



A269D303.WMF



A269D309.WMF

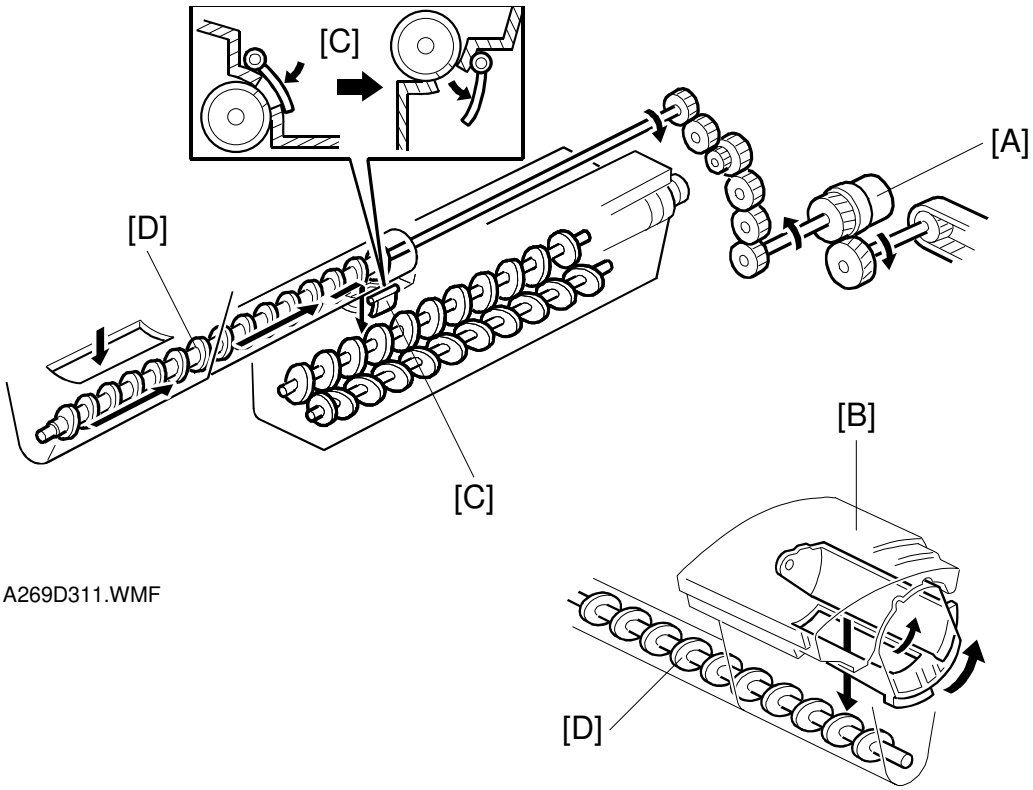
Each of the four development units has a TD sensor [A]. These sensors interface with the CPU through a single interface called a noncontact coupler. The noncontact coupler has two parts; one is mounted on the main unit [B] and the other inside the bearing ring of the revolver [C]. These two sections are separated by an air-gap.

Power for the revolver side is provided through a circular coil [D] (a small transformer) inside the coupler sections. The power transformation is:

38 Vac (main unit) ➔ 12 Vac (revolver) ➔ 12 V (for TD sensor).

The TD sensor output is conveyed through optical communication. The CPU receives TD sensor output only from the development unit at the development position.

2.6.9 TONER SUPPLY MECHANISM



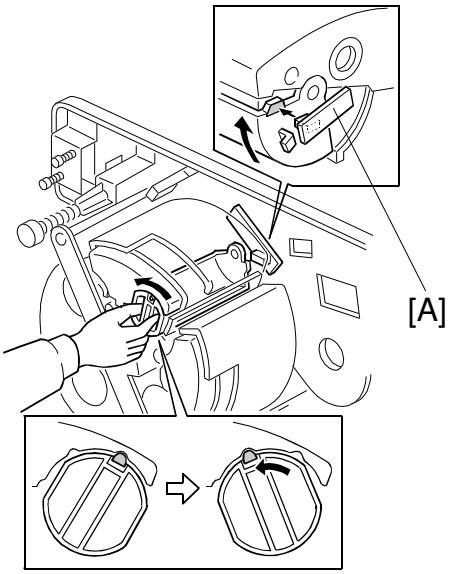
Toner is supplied to the development unit that is at the development position. Toner supply is driven by the drum peripheral components motor via the toner supply clutch [A] and a series of gears.

At the development position, toner is supplied to the toner supply section from the toner cartridge [B] and moved to the development shutter opening [C] by the toner supply auger [D]. There the toner falls into the development unit.

The development shutter closes under its own weight when the revolver rotates, thus preventing developer from being fed back from the development unit to the toner supply unit.

2.6.10 TONER CARTRIDGE DETECTION

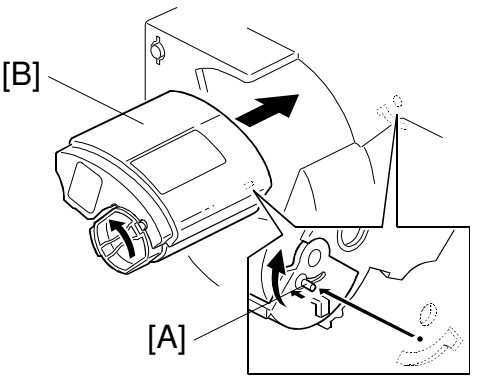
The toner cartridge set sensor [A] detects the metallic mark on the toner bottle. This sensor is on the upper front side of the drawer unit



A269D312.WMF

2.6.11 TONER CARTRIDGE SHUTTER LOCK PIN

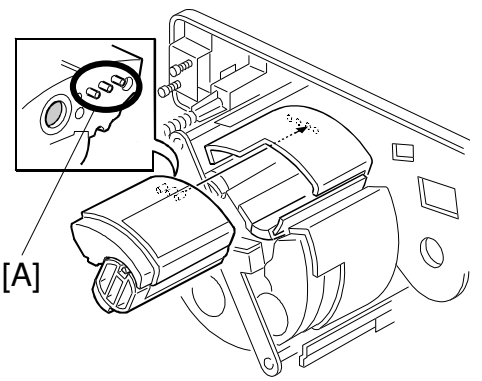
A lock pin [A] prevents the toner cartridge shutter from opening when no toner cartridge [B] is installed. This lock pin is pressed to release the lock when the toner cartridge is set in the main unit.



A269D358.WMF

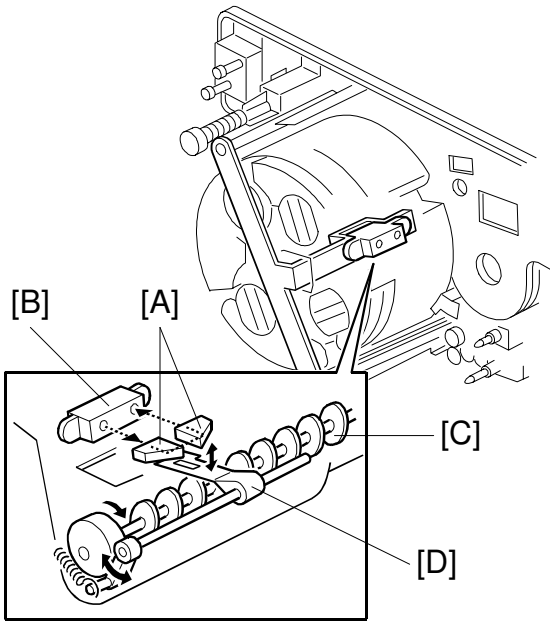
2.6.12 INCORRECT TONER INSTALLATION PREVENTION

Each toner cartridge has pins [A] to prevent it from being installed in the wrong place. The pins are at different positions for each color.



A269D313.WMF

2.6.13 TONER END SENSOR



A269D314.WMF

When a development unit moves to the copy position, the mirror blocks [A] in the toner feed hopper match up with the light emitter and receiver of the toner end sensor [B]. If there is toner in the bottle, the path of light is blocked. If there is no toner, light reflects through the mirror blocks back to the toner end sensor. (Toner end sensor output High [5 V] → Toner present. Toner end sensor output Low [0 V] → Toner absent.)

As the toner supply auger [C] rotates, a strip of Mylar [D] inside the toner supply unit swings up and down and wipes off the inner surfaces of the mirror blocks, thereby preventing toner from adhering to the mirror blocks.

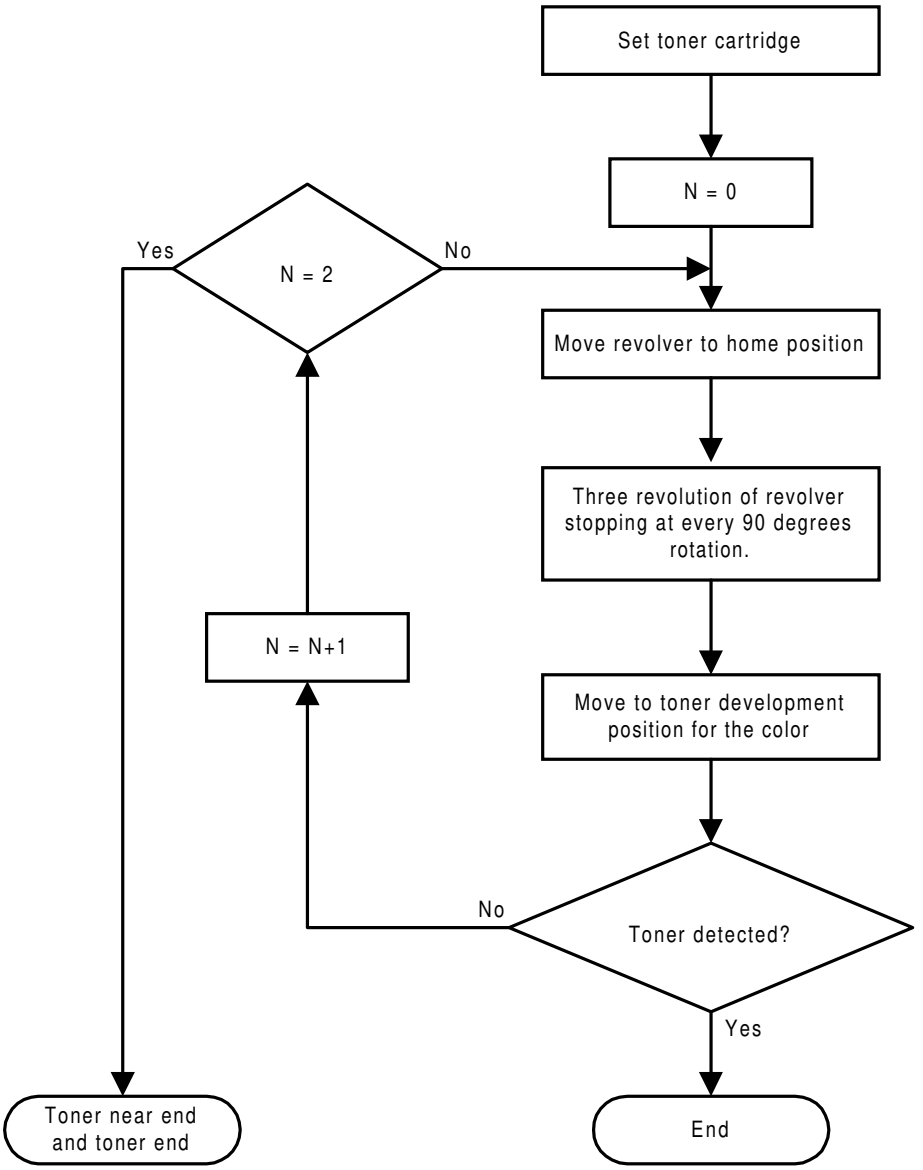
The toner sensor output is sampled 160 times every 4 milliseconds when a development unit is at the copy position. A toner absent condition is flagged when 20 or more sensor output samples are read low (no toner detected) within a 4 millisecond interval. A toner near end is signaled when this toner absent condition is detected three times in succession for the same color. After a toner near end is indicated, the toner end condition is reached when the IPU pixel counter counts up the equivalent of 10 A4 sheets of pixels (100% coverage) for that color.

The machine can copy/print at least 10 sheets after the toner near end condition is signaled. There are two possible cases as follows:

1. The toner end condition occurs before 10 sheets are printed: In this case copying stops after 10 sheets are printed. This is true regardless of paper size.
2. Ten sheets (of any size) are printed before toner end occurs: In this case copying stops when the toner end condition occurs.

2.6.14 TONER END RECOVERY

The toner end recovery processing proceeds as shown below.



A269D351.WMF

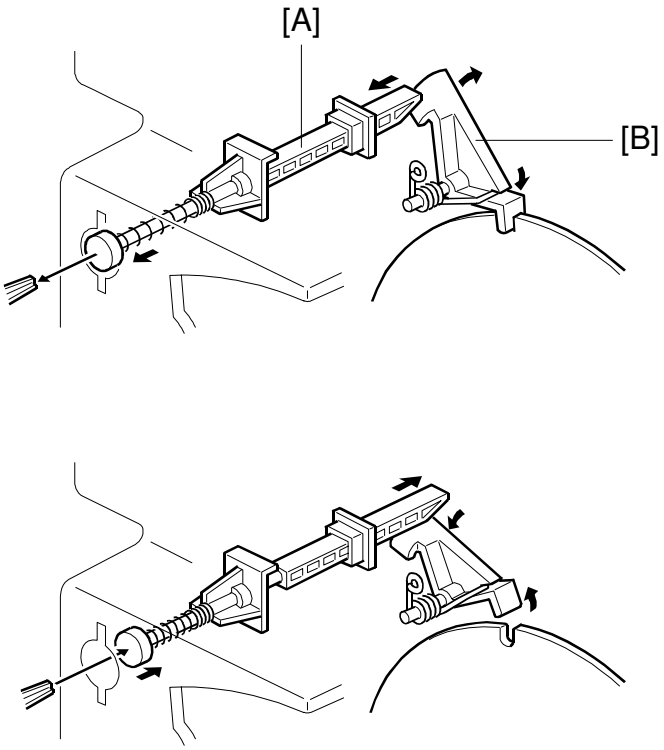
1. The copier moves the toner cartridge of the first color to be subject to toner replenishment confirmation to the toner end sensor detection position (K → Y → C → M).
2. The copier rotates the toner hopper to add toner.
3. The copier checks for the presence or absence of toner with the toner end sensor and flags OK or NG internally.
4. The copier moves the next color to the toner end sensor detection position and performs steps 2 and 3).

5. When the toner recovery cycle ends, the copier moves the revolver to the toner end sensor detection position for any cartridges that are still flagged as NG. It then performs the toner recovery cycle again. If a cartridge is flagged NG again, the copier returns the cartridge to the state before the toner recovery state (toner near end and toner end LEDs are lit).
6. The copier resets the toner near end and toner end states and resets the toner end related counters (pixel and page counters) for toners for which toner recovery was completed and flagged OK.

2.6.15 TONER LOOSENING

This copier loosens the toner in the toner cartridge by rotating the revolver 3 turns before performing the auto initial process control self check at power-on time. This prevents the toner inside the cartridge from adhering together and forming lumps of toner when the copier is not in use for a long time.

2.6.16 REVOLVER LOCK MECHANISM



A269D315.WMF

This copier is provided with a lock mechanism that prevents the revolver from rotating inadvertently during toner replacement or when the toner cartridge shutter is being opened or closed. When the front cover is opened, the push rod [A] on the front of the revolver/drum drawer is released, the lock pawl [B] rotates into the lock notch of the revolver. When the front cover is closed, a pin on the door pushes in the revolver lock button to release the lock pawl.

A lock release tool is stored inside the copier unit. It may be used to check the machine operation during maintenance.

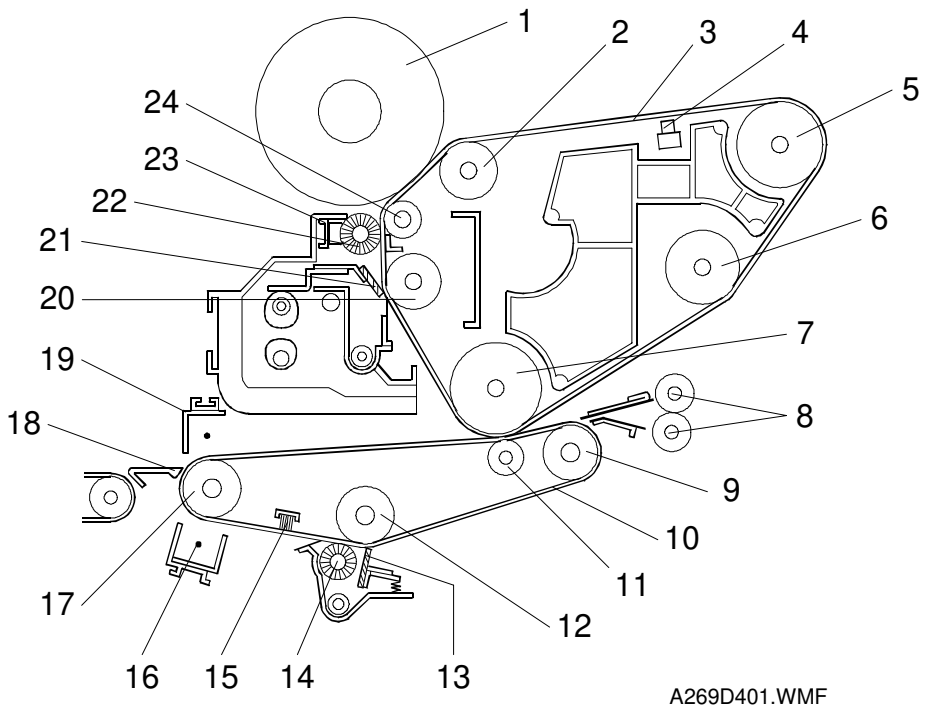
CAUTION: Concerning the safety switch actuator: Be sure to set the lock release tool before inserting the door safety switch actuator.

If the revolver rotates in the locked state, the copier displays “Revolver Motor Out-of-step” and SC361 (Revolver H.P. Error).

2.7 TRANSFER BELT UNITS

2.7.1 OVERVIEW

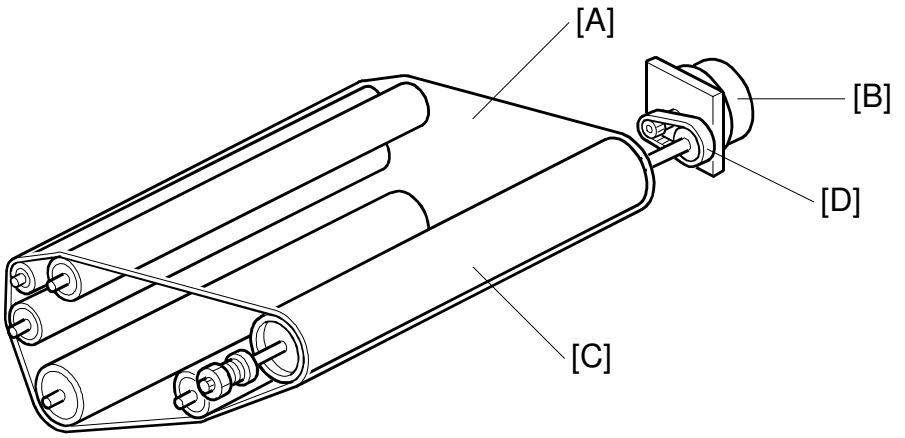
This copier uses two transfer belts—an image transfer belt and a paper transfer belt. The copier transfer belt system first develops the 4 color toner images on the transfer belt and then later transfers the complete image onto the paper. This permits the image transfer to the paper in a single operation.
For the paper transfer step, the copier employs an insulated transfer belt system to improve the efficiency of image transfer to the paper. The paper transfer belt also provides smooth paper transport as the paper passes through the image transfer area and receives the image.



1. OPC drum
2. Transfer belt bias roller
3. Image transfer belt (ITB)
4. Belt mark sensor
5. Transfer belt drive roller
6. Transfer belt tension roller
7. Paper transfer counter roller
8. Paper registration rollers
9. Paper transfer tension roller
10. Paper transfer belt (PTB)
11. Paper transfer bias roller
12. PTB blade counter roller
13. PTB cleaning blade
14. PTB cleaning brush
15. PTB back brush
16. Belt discharge corona unit
17. Paper transfer drive roller
18. Pick-off plate
19. Separation corona unit
20. ITB blade counter roller
21. ITB cleaning blade
22. ITB lubricant brush
23. ITB lubricant bar
24. Ground roller

2.7.2 IMAGE TRANSFER BELT SECTION

Image Transfer Belt Drive Mechanism



A269D402.WMF

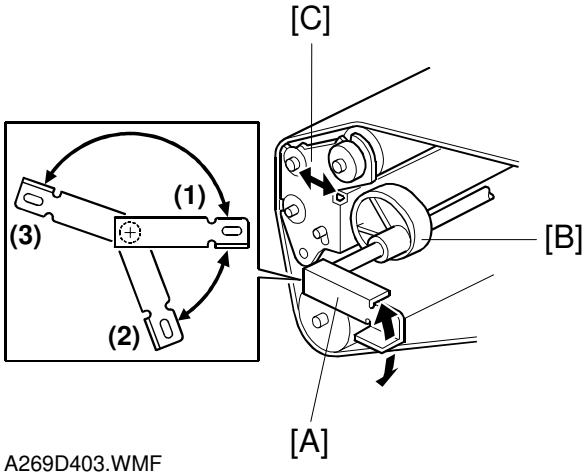
The image transfer belt [A] is always in contact with the drum, and rotates in one direction only.

This belt has its own motor—the image transfer belt motor [B]. This motor is a rotary positioning servomotor. This type of motor provides very stable drive. It compensates for the vibrations caused by the contact and release operations of the belt cleaning blade and paper transfer unit and allows image transfer operations while these actions are going on.

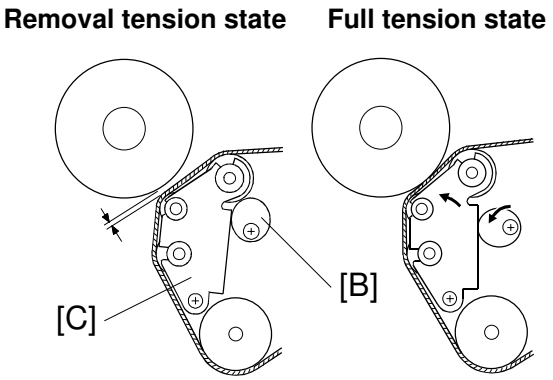
The transfer belt motor is coupled to the transfer belt drive roller [C] through a timing belt [D].

In the OHP or thick paper mode, the operation speed of the machine is reduced to half of that for the normal paper immediately before paper transfer is carried out.

Belt Tension Release Mechanism



A269D403.WMF



A269D404.WMF

Image transfer belt tension is applied or released using the belt tension lever [A] located on the front of the unit. Turning the belt tension lever rotates the eccentric cams [B] on the shaft/cam assembly, and the cams change the angle of the tension bracket [C]. This changes the amount of tension applied to the image transfer belt.

Applying full tension to the belt makes the drum and belt contact across the width of approximately 18 mm.

The belt tension lever is used to put the belt in three tension conditions—(1) the full tension state (drum contact position), (2) the removal tension state (image transfer belt unit install/uninstall position), and (3) the tension released state (image transfer belt replacement position).

Image Transfer Belt Bias

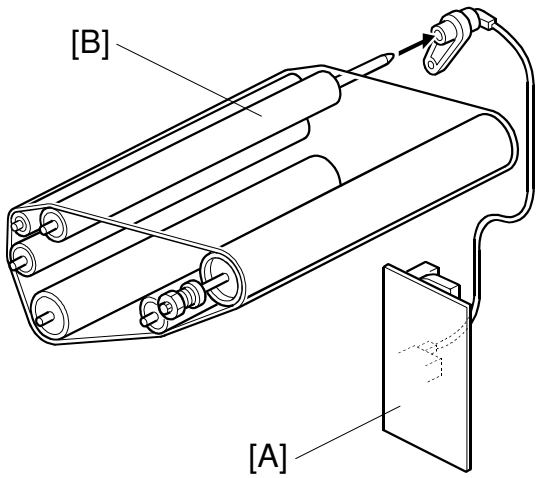
The high voltage supply board [A] applies a voltage to the transfer belt through the bias roller [B], which is inside the transfer belt.

Color toners are superimposed on the transfer belt one at a time. The transfer voltage is increased as they are superimposed.

Since the image transfer belt has a high resistance, a belt discharge system is used (see the belt cleaning section).

SP2-301: Set Primary Transfer Bias

SC400: Belt transfer bias PP (high-voltage power supply: T1, PCC) error



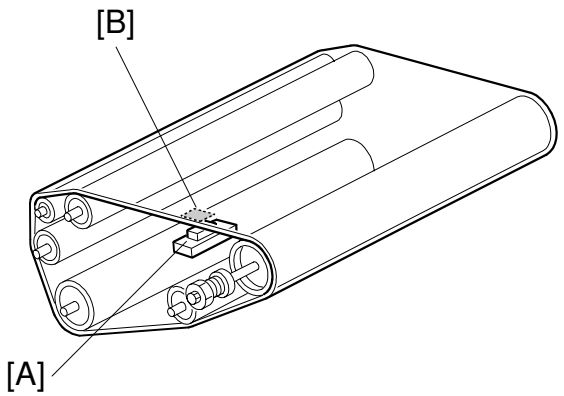
A269D405.WMF

Belt Mark Sensor Mechanism

The machine uses the belt mark detection sensor [A] to align the position of the image on the belt for each color by detecting the belt mark [B]. The belt mark is a highly reflective metallic (gold colored) patch.

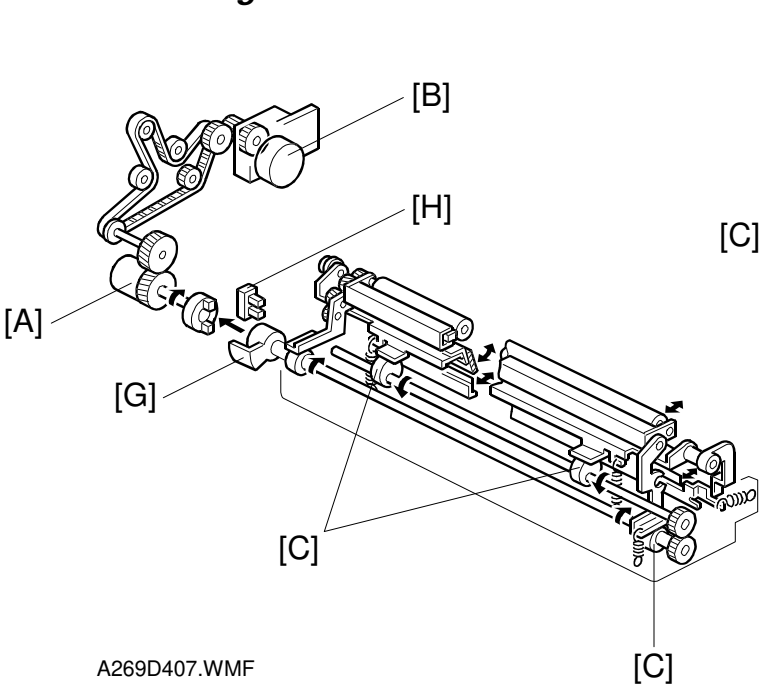
The FGATE signal is generated when the belt mark is detected, and this signal allows image data to be written to the drum.

SC452 is generated when the copier fails to detect the belt mark at the required time.

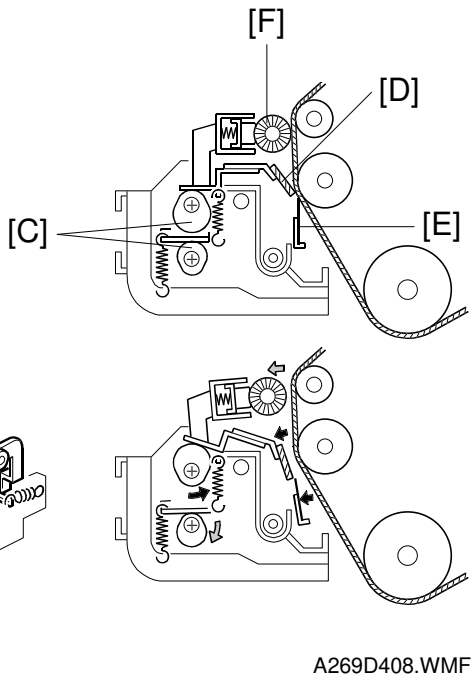


A269D406.WMF

Belt Cleaning Mechanism



A269D407.WMF



A269D408.WMF

(1) Contact/Release Mechanism

The belt cleaning shift clutch [A] (a half-turn clutch) transfers drive from the drum peripheral component motor [B] to the belt cleaning cams [C] in the cleaning unit. These cams move the cleaning blade [D], the entrance seal [E], and the lubricant brush [F] into or out-of contact with the transfer belt depending on the point in the copy/print cycle.

(2) Contact/Release Detection

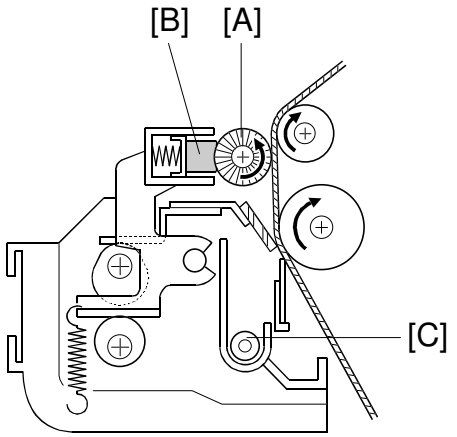
The blade contact state is detected when the actuator [G] on the cleaning contact/release drive coupler actuates the image transfer belt cleaning home position sensor [H].

If the actuator is not detected at the end of a copy job, SC457 (belt cleaner reset error) is generated and the copier stops.

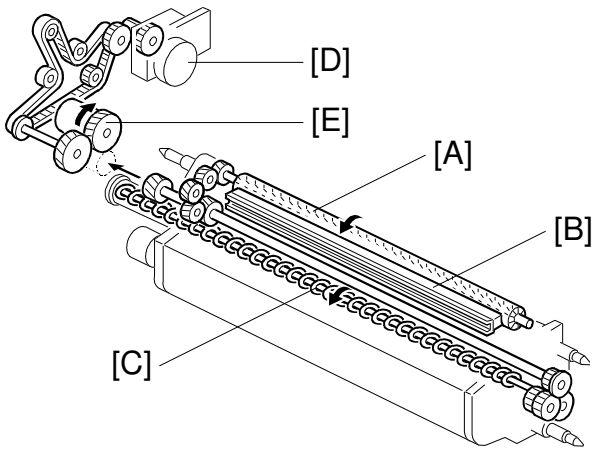
(3) Contact/Release Timing

The cleaning blade, entrance seal, and lubricant brush contact the belt when the Start key pressed. When printing two or more colors, the cleaning blade, entrance seal, and lubricant brush are released when the leading edge of the image for the color reaches the front of the entrance seal.

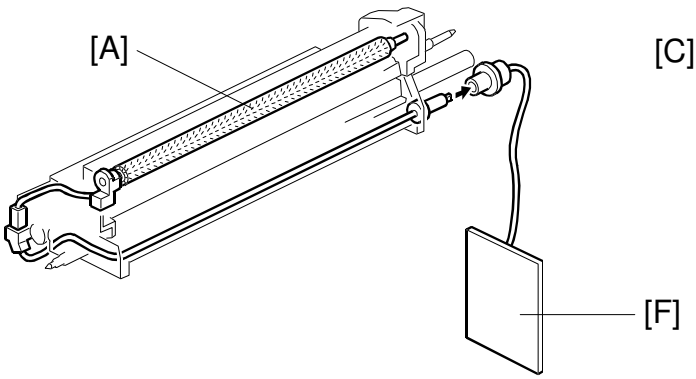
The entrance seal contacts the belt before (and releases after) the cleaning blade and lubricant brush to prevent toner from falling into the paper transfer section during contact/release. The toner pan on the bottom part of the unit is also used to prevent the toner from falling into the paper transfer section. The cleaning blade and lubricant brush contact the belt at the same time.



A269D409.WMF



A269D410.WMF



A269D419.WMF

Lubricant Application

Normal machine use generates a film of toner on the belt. Toner film reduces the ability of toner to separate from the belt. To solve this problem, the lubricant brush [A] applies a small amount of lubricant [B] to the transfer belt. The lubricant brush and the toner collection coil [C] are driven by the drum peripheral component motor [D] through the image transfer belt cleaning drive clutch. [E]

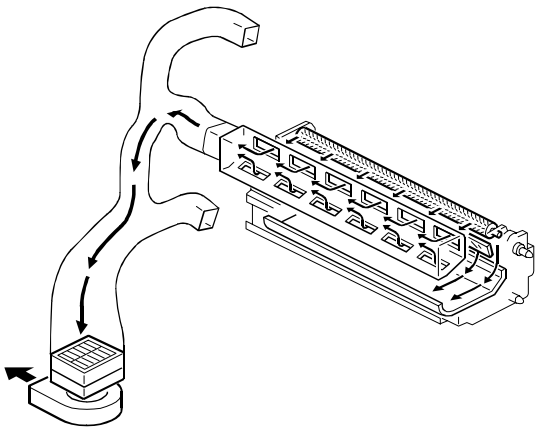
Transfer Belt discharge

Since the image transfer belt is made of high-resistance materials, a bias (DC+) is applied to the lubricant brush by high voltage supply board Q1 [F] to discharge the voltages that accumulate on the belt. Since the amount of residual charge on the image transfer belt varies depending on the environment (temperature and humidity), an appropriate bias (voltage) is applied according to the temperature and humidity.

SP2-601: Set up image transfer belt discharge DC bias
SC: SC402: Image transfer belt discharge leak

Cleaning Vacuum

The exhaust fan at the rear of the copier draws are through the image transfer belt cleaning unit to remove any toner that is scattered by the contact and release of the cleaning mechanism.

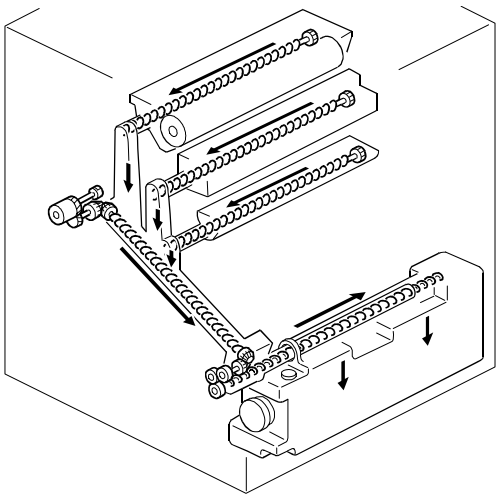


A269D421.WMF

Toner Collection Mechanism

The used toner collected in the drum cleaning unit, the image transfer belt cleaning unit, and the paper transfer belt cleaning unit is conveyed by various toner collection coils and transport coils to the used toner tank. The toner recover mechanism is shown by the illustration to the right.

The capacity of the used toner tank is approximately 6 liters.

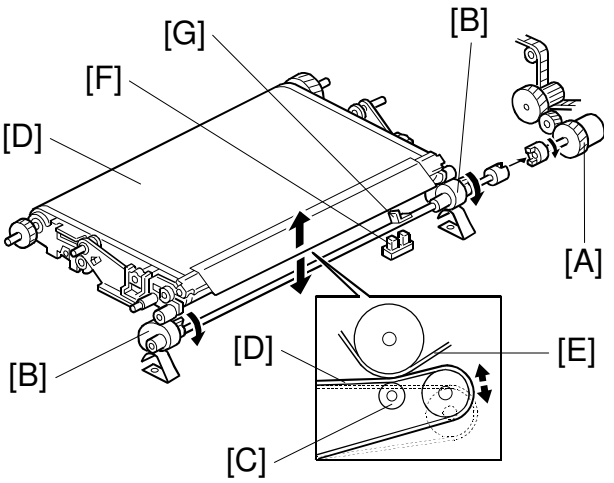


A269D411.WMF

2.7.3 PAPER TRANSFER BELT SECTION

Paper Transfer Unit Contact/Release Mechanism

When the transferred paper reaches approximately 10 mm before the transfer position, the paper transfer belt shift clutch [A] (half-turn) is turned on, rotating the shaft: cams [B]. half a turn. The cams elevate the paper transfer unit, causing the paper transfer bias roller [C] to press the paper transfer belt [D] against the image transfer belt [E]. At this moment a contact width of approximately 2 mm is formed where the image transfer belt and the paper transfer belt contact.



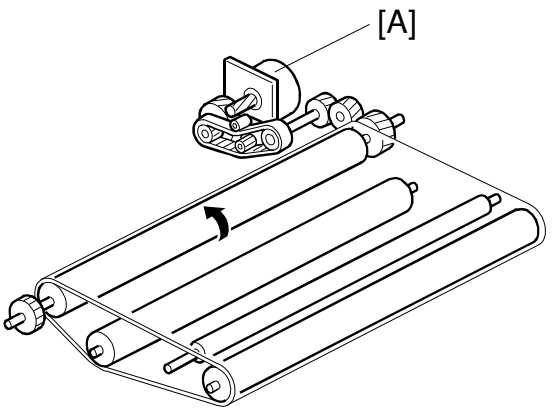
A269D412.WMF

When paper transfer ends, the paper transfer belt shift clutch is turned on again to turn the eccentric cams another half turn, which releases the the contact between the two transfer belts.

The contact or release between the paper transfer bias roller and image transfer belt is detected by the paper transfer belt home position sensor [F], which senses an actuator [G] on the camshaft.
If the actuator is not detected at the end of a copy job, SC456 (Paper transfer belt error) is generated and the copier stops.

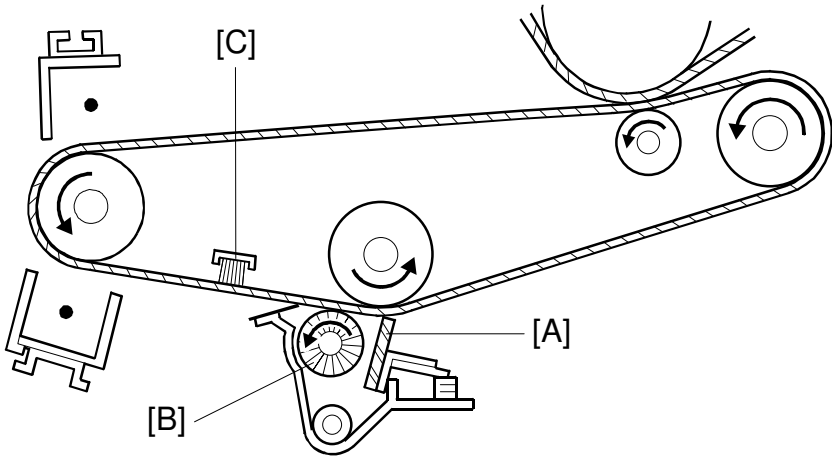
Paper Transfer Belt Drive

The paper transfer belt has a separate motor—the paper transfer belt motor [A].



A269D413.WMF

Paper Transfer Belt Cleaning



A269D415.WMF

The paper transfer belt has to be cleaned to remove paper dust and toner contamination. This is done with a blade [A] and a cleaning brush [B].

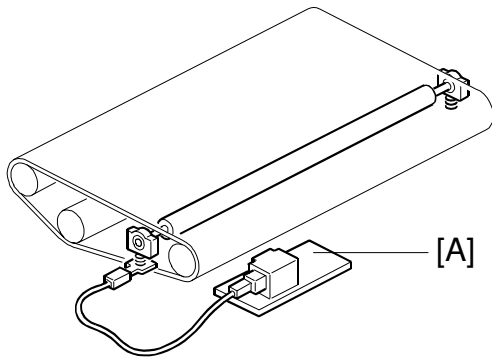
The back brush [C] contacts the back side of the paper transfer belt. This brush is actually to keep the drive roller, cleaning counter roller, paper transfer bias roller, and tension roller clean.

Paper Transfer Bias

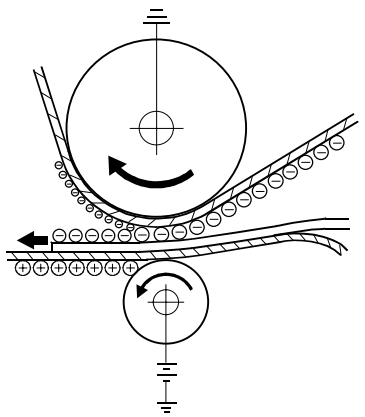
The copier transfers the toner image on the image transfer belt to the paper using a bias roller system. A constant current system is used to generate the paper transfer bias. The paper transfer bias is provided directly to the paper transfer bias roller shaft by high voltage supply board T2 [A].

The paper transfer current is modified based on the following four conditions:

1. Absolute humidity
   The current value is switched under low temperature/low humidity conditions and high temperature/high humidity conditions according to the absolute humidity that is measured by the temperature and humidity sensors [B] on the side panel of the copier main unit.
2. Trailing edge of the paper
   The transfer current is increased for the first 15 mm at the leading edge and the last 15 mm at the trailing edge. This prevents poor image transfer at the leading and trailing edges.
3. Paper transfer speed
   The current value is switched according to the process speed of the paper— for the normal paper and OHP/thick paper modes.
4. Side of the paper (duplex)
   The current value is switched for the front and back sides of the paper.

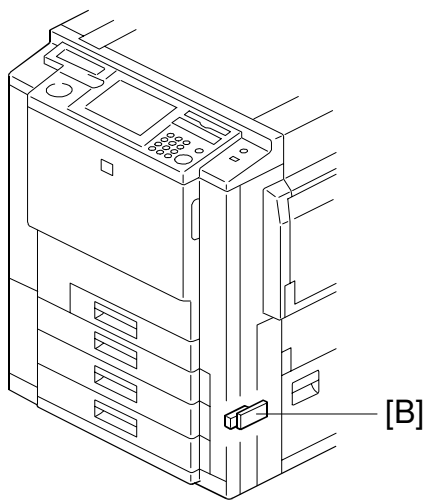


A269D416.WMF



A269D417.WMF

SP2-310: Set secondary transfer bias
SC450: Paper transfer bias PP (high-voltage power supply: T2, D) error
SC495: Temperature sensor error
SC496: Humidity sensor error

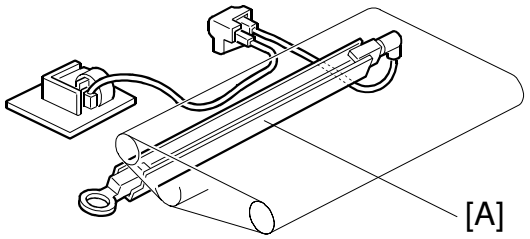


A269D422.WMF

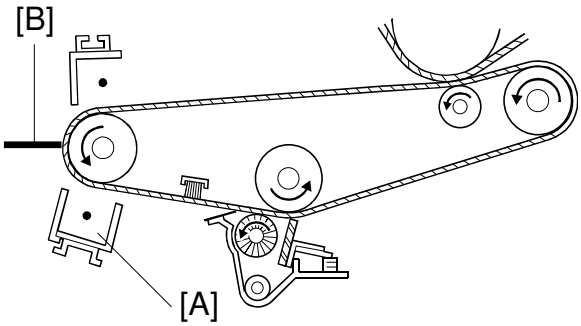
Paper Transfer Belt Discharge

To remove the charges accumulated on the paper transfer belt, a belt discharge corona unit [A] is installed under the unit near the drive roller. This corona unit removes the charges that accumulate on the paper transfer belt. The corona unit is an ac corotron with a dc component (5.8 kV ac, +600 dc). Charging starts when a point corresponding to the leading edge of the image reaches position [B] in the figure.

Since the paper transfer belt receives a static electric charge simply by being rotated, dc voltage (+300 V) is always applied to the belt when it is turning.



A269D420.WMF



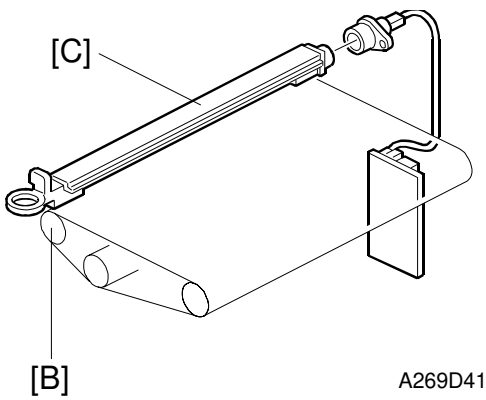
A269D415.WMF

Paper Separation Mechanism

The copier uses a combination of three standard methods to separate the paper from the transfer belt.

1. curvature separation
The paper transfer belt turns so sharply as it passes around the paper transfer drive roller [B] that paper tends to separate due to its own stiffness.

2. Separation corona
The separation corona unit [C] discharges the toner and paper to reduce the electrical attraction between the paper and the paper transfer belt.
(The separation corona is not close to the contact point of the two transfer belts; so, it does not influence the transfer of the image to the paper.)



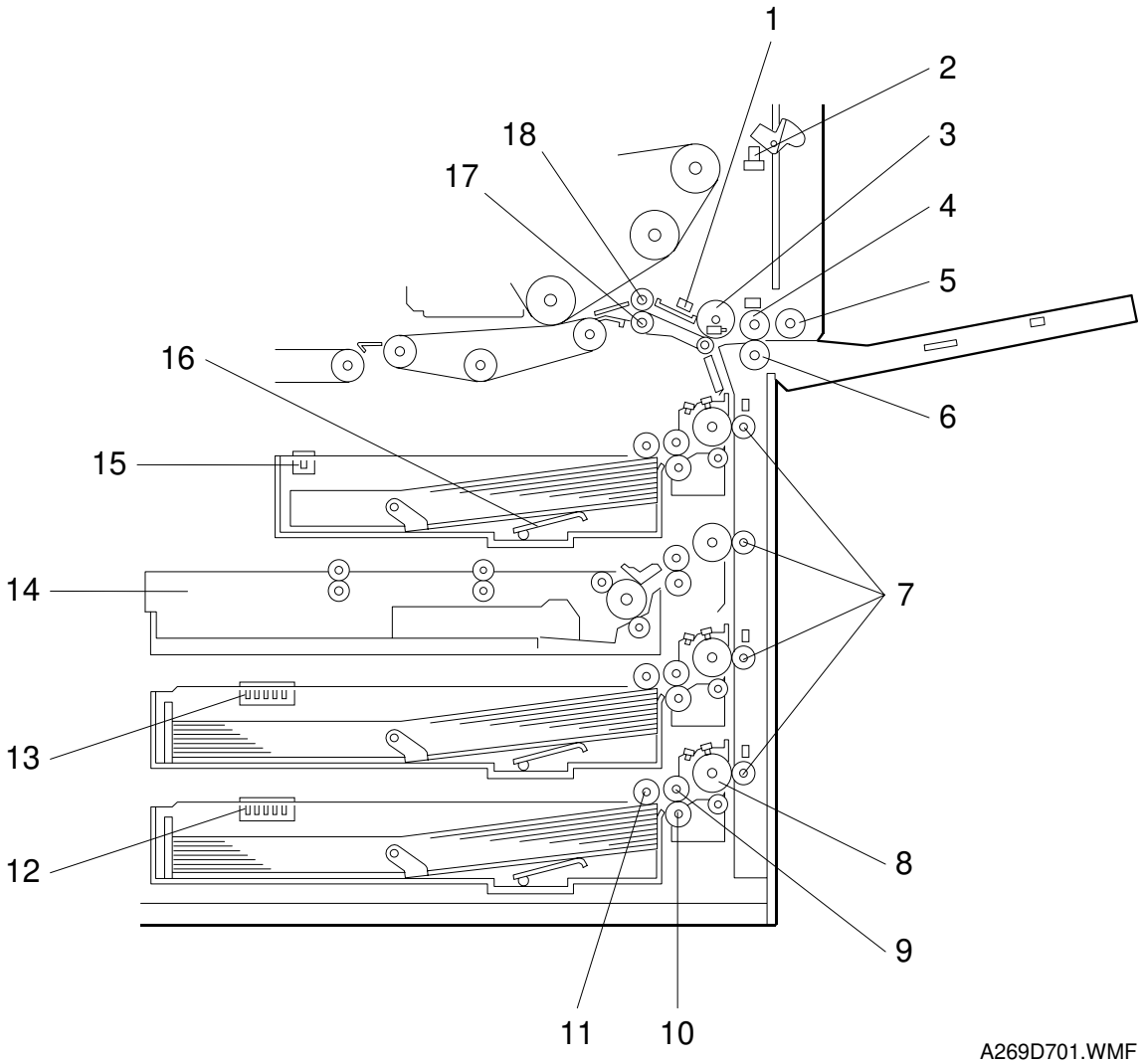
A269D418.WMF

3. Mechanical pick-off
The pick-off plate (not shown) provides mechanical assistance to help the paper separate from the paper transfer belt.

2.8 PAPER FEED AND REGISTRATION SECTION

2.8.1 MAJOR COMPONENTS

Diagram

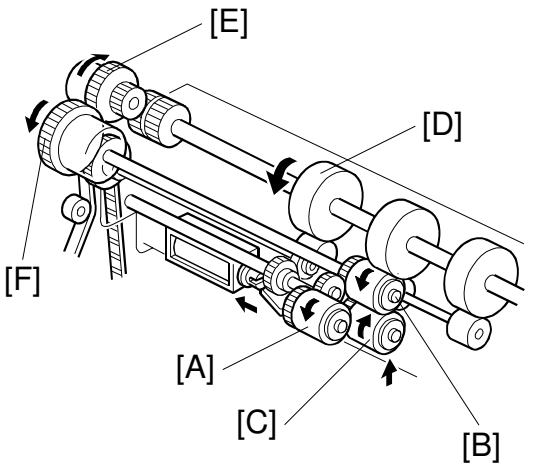


1. Registration sensor
2. By-pass open/close switch
3. By-pass grip roller
4. By-pass feed roller
5. By-pass pick-up roller
6. By-pass reverse roller
7. Vertical transport roller
8. Grip roller
9. Tray paper feed roller
10. Tray reverse roller
11. Tray pick-up roller
12. 3rd tray size sensor
13. 2nd tray size sensor
14. Duplex unit
15. 1st tray set sensor
16. Tray lift arm
17. Lower registration roller
18. Upper registration roller

2.8.2 PAPER TRAY SECTION

Paper Feed/Separation Mechanism

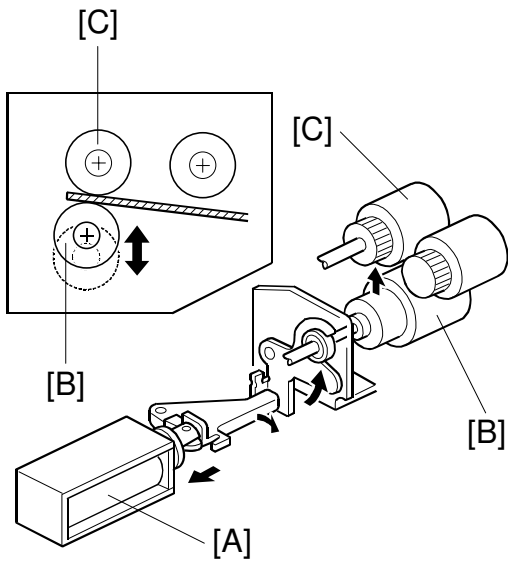
This copier employs the FRR paper feed system. The paper feed unit is made up of a pick-up roller [A], a paper feed roller [B], a reverse roller [C], and a grip transport roller [D]. When the paper feed clutch [E] turns on, the paper feed roller shaft starts rotation and drives the paper feed roller through a one-way clutch [F]. The pick-up roller also starts rotation via a relay gear.



A269D703.WMF

Reverse Roller Release Mechanism

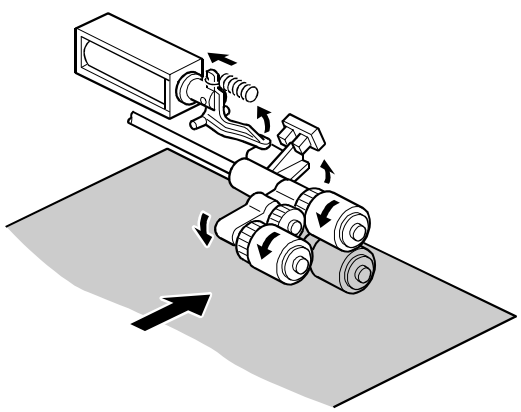
The reverse roller of this copier is kept away from the paper feed roller in the standby mode. Only during the paper feed process, the reverse roller solenoid [A] moves the reverse roller [B] up against the paper feed roller [C].



A269D705.WMF

Paper Feed Operation

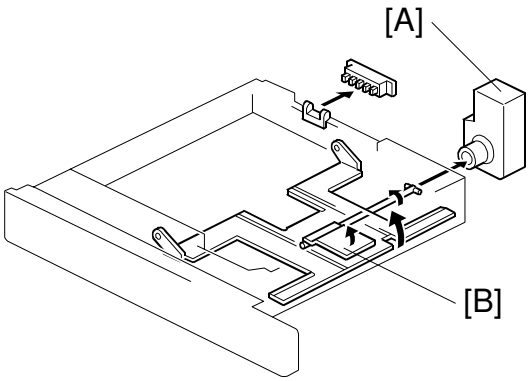
When the paper feed signal is supplied from the main control board, the pick-up roller solenoid turns on, which lowers the pick-up roller and starts feeding the paper.



A269D704.WMF

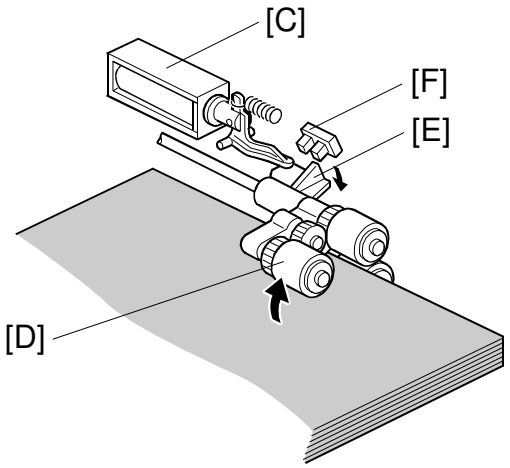
Paper Lift Mechanism

When a tray is set, the lift motor [A] to the rear of the tray engages with the pin on the bottom plate lift arm shaft and starts rotation. This causes the bottom plate lift arm [B] to rotate and lift the tray.



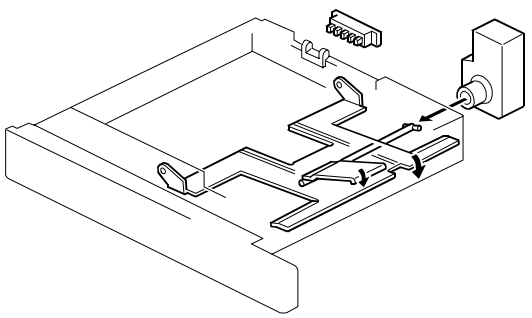
A269D706.WMF

When a tray is set, the pick-up roller solenoid [C] turns on to lower the pick-up roller [D]. When the tray bottom plate rises to the feed position, the top surface of the paper lifts the roller. When the actuator [E] moves out of the upper limit sensor [F] the sensor turns on and the lift motor turns off. As paper is used, the paper and the pick-up roller drop. When the paper drops far enough the actuator enters the upper limit sensor again. The lift motor then turns on again to lift the paper to the feed position.



A269D707.WMF

When the tray is pulled out, the bottom plate lift arm shaft is disengaged from the lift motor, causing the tray bottom plate to fall under its own weight.

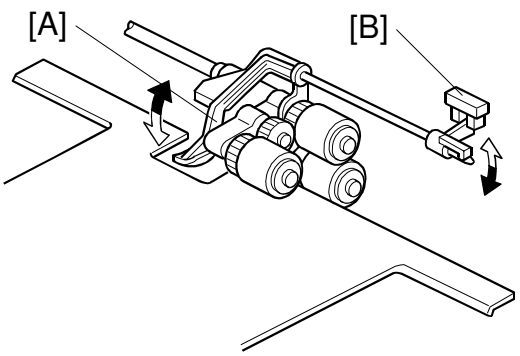


A269D708.WMF

Paper End Detection

If there is some paper in the paper tray, the paper stack raises the paper end feeler [A] and the paper end sensor [B] is deactivated.

When the paper tray runs out of paper, the paper end feeler drops into the cutout in the tray bottom plate and the paper end sensor is activated.



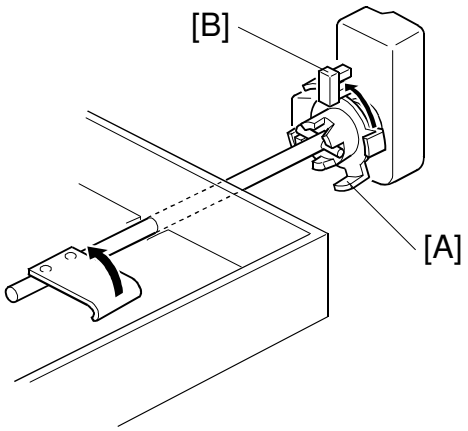
A269D709.WMF

Paper Near End Detection

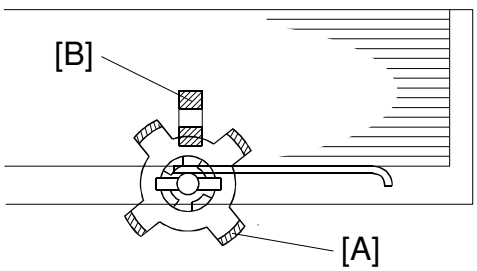
The mechanism shown to the right tells the CPU when a tray is nearly our of paper.

Actuators [A] on the output coupler of the tray lift motor actuate the paper height sensor [B]. When there is sufficient paper in the tray, the actuator is oriented as shown in the middle illustration. When the paper tray is in a near end state, the actuator rotates with the rotation of the tray lift arm and reaches a position where it blocks the paper height sensor. The sensor signals the main control board that the paper tray is in a near end state.

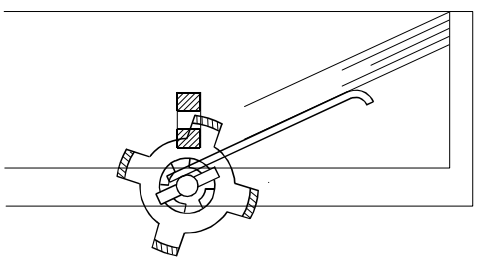
There are four actuators because there are four possible ways for the motor's the output coupler to mate with the tray lift arm shaft. However they engage, one of the actuators will be in the proper position.



A269D720.WMF



Sufficient paper in the tray



Paper near end

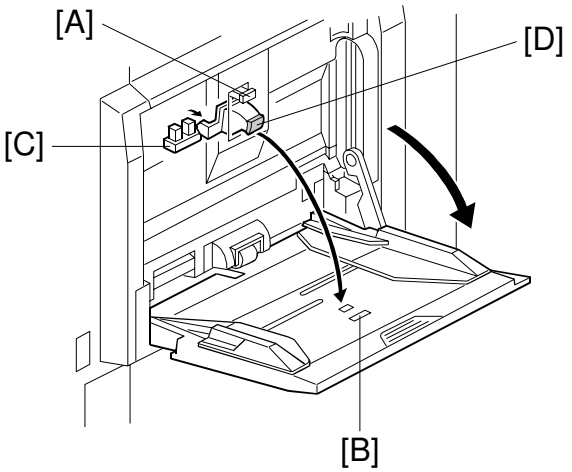
A269D721.WMF

2.8.3 BY-PASS PAPER FEED SECTION

By-pass Feed Table

The by-pass feed table has a press-release type latch. The latch [A] unhooks and the table opens when the user presses the release point on the upper left corner of the by-pass feed table.

A paper length sensor [B] detects the orientation of the paper on the by-pass feed table. The by-pass table sensor [C] detects when the by-pass feed table is opened. A cleaning pad [D] (brush) cleans the by-pass paper length sensor when the table is opened and closed.



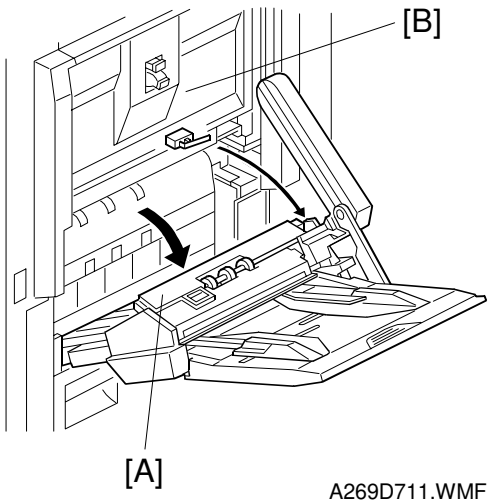
A269D710.WMF

By-pass Feed Unit

The by-pass feed unit opens as shown in the figure. It must be opened to remove paper jams in the vertical transport section.

[A]: Release lever

[B]: By-pass feed unit switch

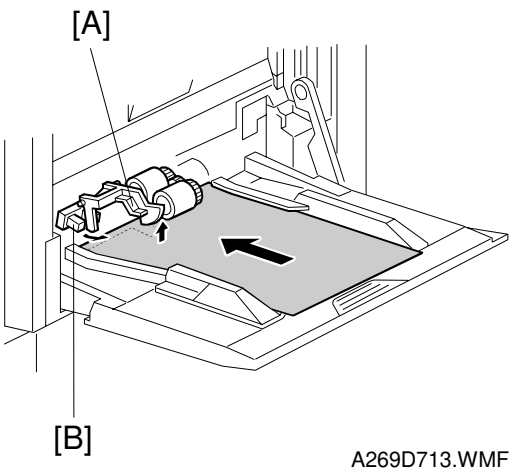


A269D711.WMF

By-pass Paper End Sensor

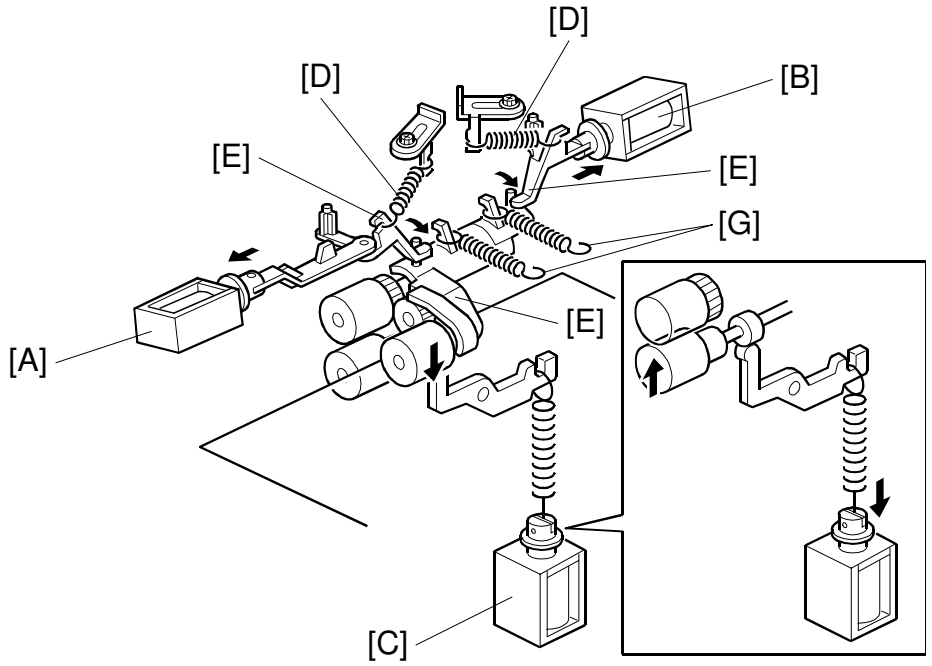
If paper is loaded in the paper tray, the paper end feeler [A] is raised by the paper stack and the paper end sensor [B] is deactivated. When the paper runs out, the paper end feeler drops and the paper end sensor is activated.

By-pass paper tray capacity is 50 sheets.



A269D713.WMF

By-pass Pick-up Roller Pressure



A269D716.WMF

This copier has to handle a wide range of feed stock, including normal, OHP, thick, and thick paper 2. For this reason it uses two pick-up solenoids—the main by-pass pick-up solenoid [A] and the sub by-pass pick-up solenoid [B]. It controls the reverse roller pressure through the reverse roller solenoid [C]. The copier controls these three solenoids and the paper feed to handle various types of paper.

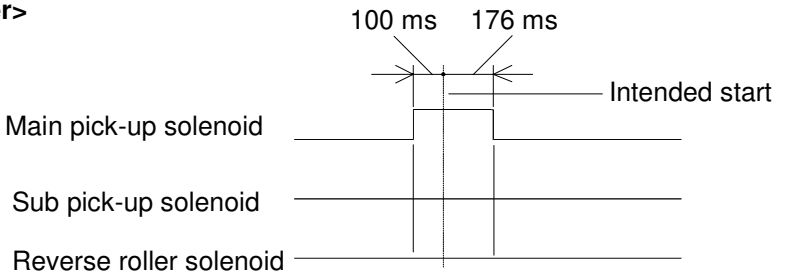
The pick-up roller is normally held in the elevated position by the force of the pick-up release springs [D]. These springs pull the pick-up release levers [E] against the projections of the pick-up roller arm [F]. When the timing for feeding the paper is reached, the pick-up solenoids turn on as shown in the timing charts on the next page (specific to the mode selected). The solenoid links rotate the pick-up release levers away from the pick-up roller arm, and one or both of the pick-up pressure springs [G] presses the pick-up roller down against the paper.

The reverse roller solenoid turns on when by-pass double-sided copies (normal or thick paper) or OHP sheets are fed. (The user must select the proper by-pass mode from the operation panel.) When the reverse roller solenoid is on, it increases the pressure between the reverse roller the paper feed roller. With normal paper, this would increase the likelihood of multiple feeding, but it decreases the chance of misfeeds of by-pass double-sided copies (normal or thick paper) or OHP sheets.

By-pass Pick-up/Reverse Solenoid Timing Chart

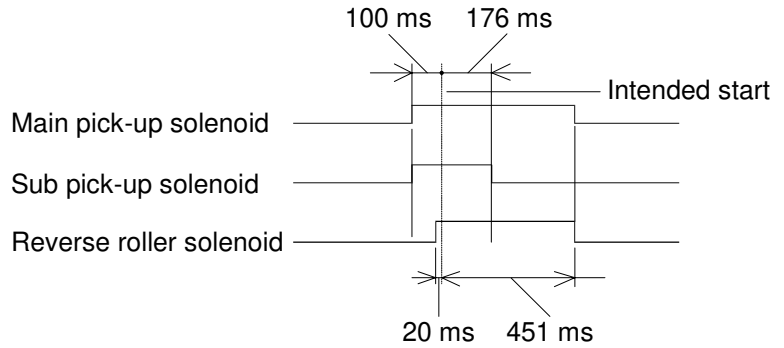
- Normal paper mode -

<Normal paper>



A269D756.WMF

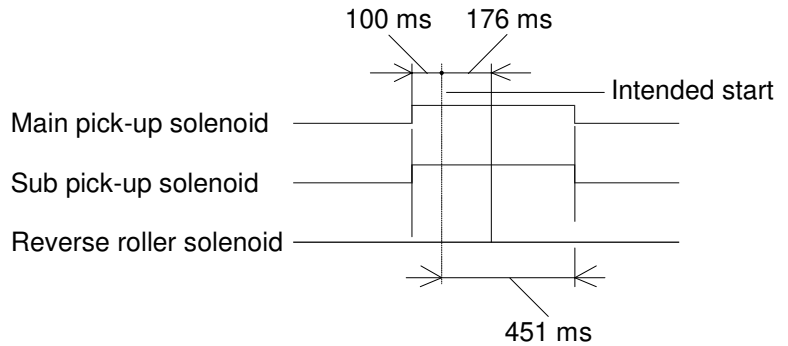
<Normal paper double-sided paper>



A269D757.WMF

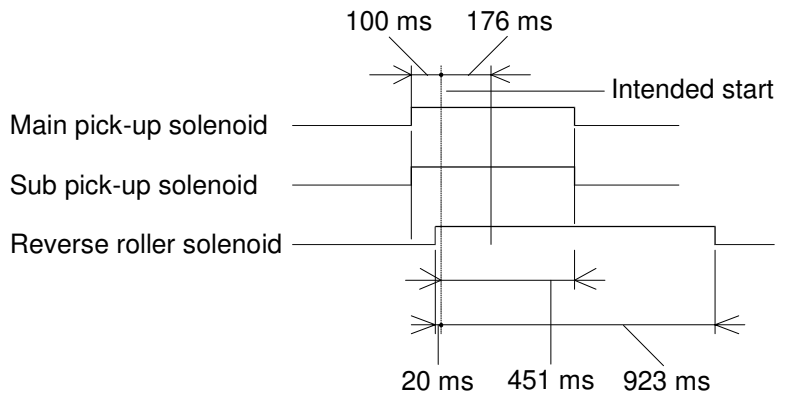
- Half-speed mode -

<Thick paper>



A269D758.WMF

<Thick paper by-pass double-sided/OHP paper>

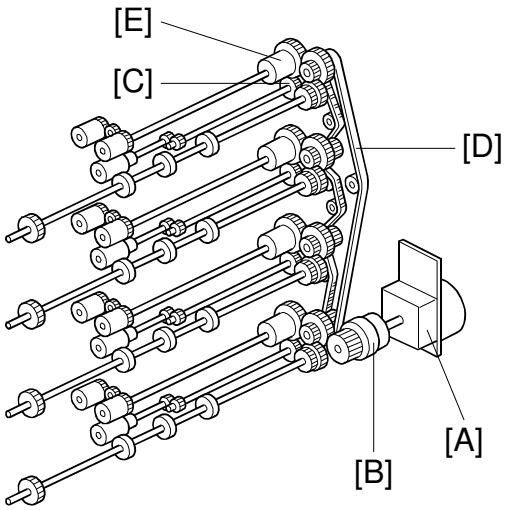


A269D759.WMF

2.8.4 PAPER FEED DRIVE

Tray Feed Unit Drive

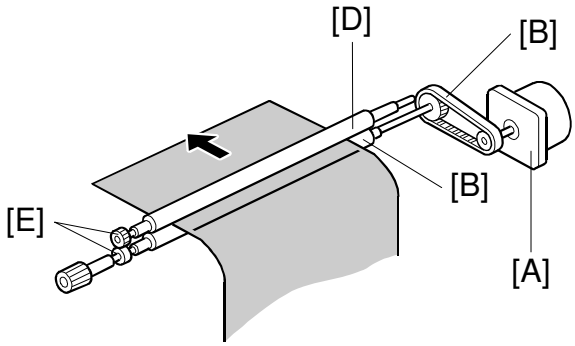
Each paper feed unit is driven by the torque of the paper feed motor [A] via the paper feed clutch [B]. This torque is conveyed to the drive gear [C] of each tray by a belt [D]. The paper feed unit controls the drive action of the paper feed rollers by turning on and off the paper feed clutch [E].



A269D718.WMF

Registration Roller Drive

The registration roller has its own drive motor [A], which drives the registration rollers through a belt [B]. Compared with drive systems using a registration clutch, this system minimizes drive fluctuations and stops registration errors which are likely to occur when feeding paper thick paper 2. The lower registration roller [C] is a rubber roller with a diameter of 20 mm while the upper registration roller [D] is a metal roller with a diameter of 18 mm. The drive force is applied to the lower roller and is conveyed to the upper roller via the gears [E] on the front end of the rollers.

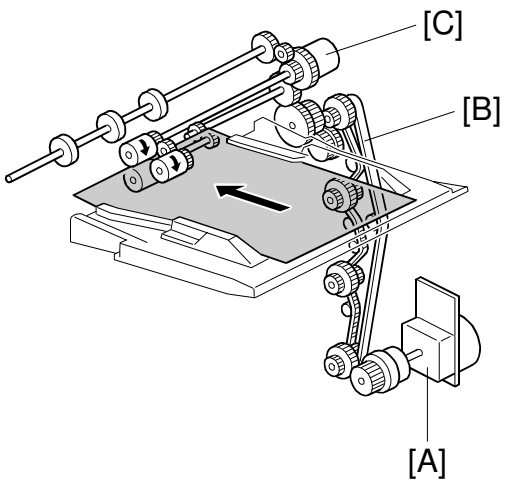


A269D717.WMF

By-pass Feed Unit Drive

The by-pass feed unit is driven by the torque of the paper feed motor [A] which is conveyed by the belt [B] and through a series of gears to the by-pass feed clutch [C].

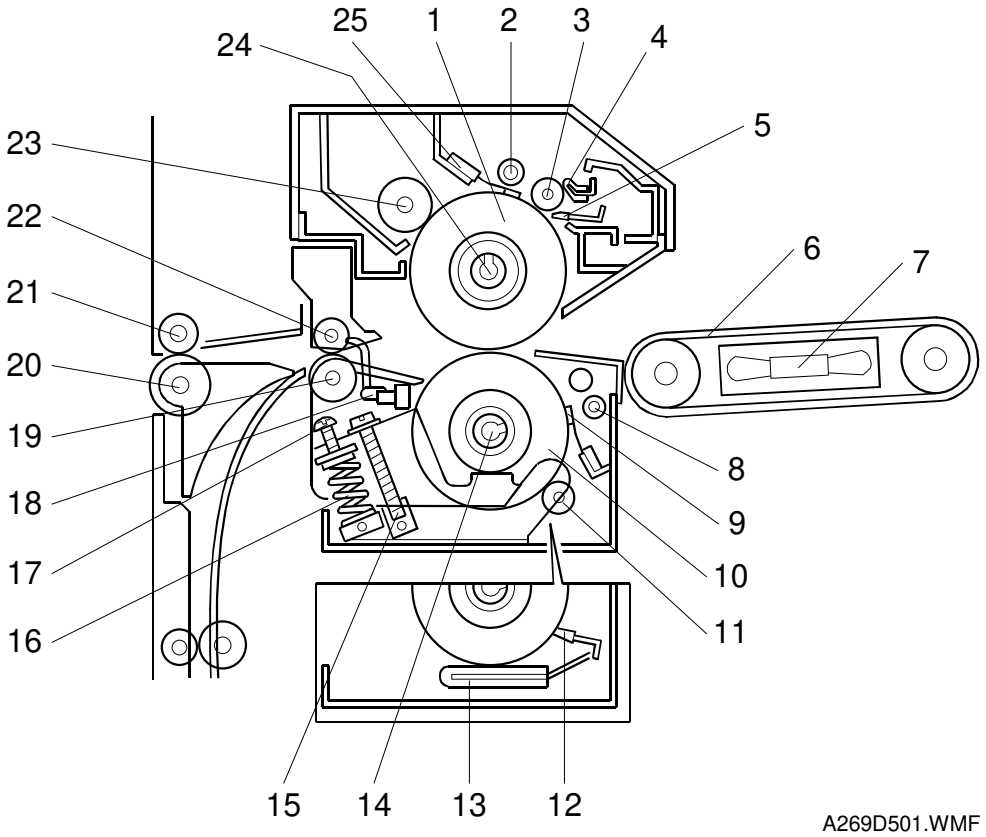
NOTE: When copying on OHPS using the by-pass tray, small spots or scratches may appear at the center of the leading edge. This is caused by the contact of OHP's leading edge with next OHP sheet.



A269D712.WMF

2.9 TRANSPORT, FUSING, AND EXIT

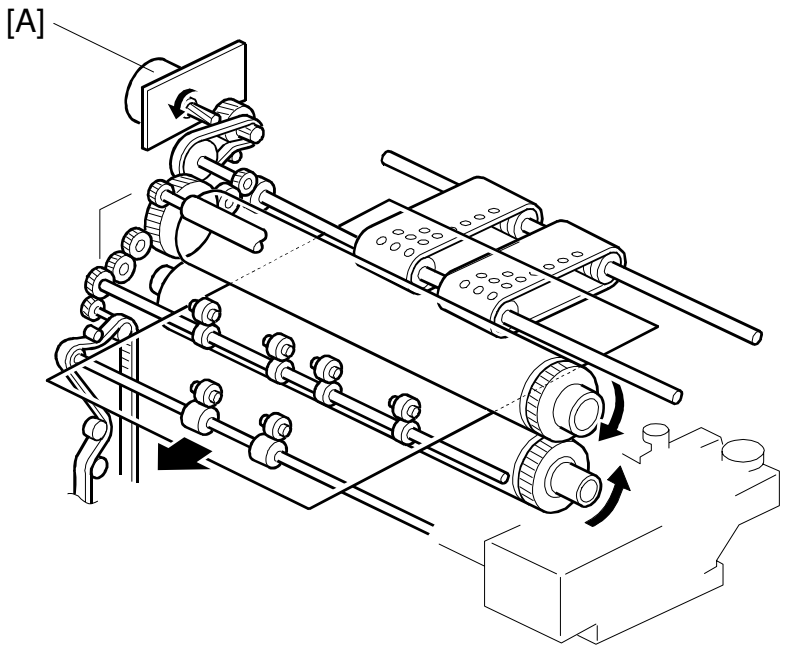
2.9.1 MAJOR COMPONENTS



1. Hot roller
2. Hot roller thermofuse
3. Oil supply roller
4. Hot roller oil supply pad
5. Hot roller blade
6. Transport belt
7. Transport fan
8. Pressure roller thermofuse
9. Pressure roller thermistor
10. Pressure roller
11. Pressure cleaning roller
12. Pressure roller blade
13. Pressure roller oil supply pad
14. Pressure roller lamp
15. Pressure release screw
16. Pressure spring
17. Pressure adjustment screw
18. Exit sensor
19. Fusing exit roller (lower)
20. Exit roller (lower)
21. Exit roller (upper)
22. Fusing exit roller (upper)
23. Hot roller cleaning roller
24. Hot roller lamp
25. Hot roller thermistor

NOTE: 1) Item 11 is only for –15, -17, -19 copiers.
2) Item 12 and 13 are only for –22, -26, 27, -29 copiers.

2.9.2 DRIVE MECHANISM



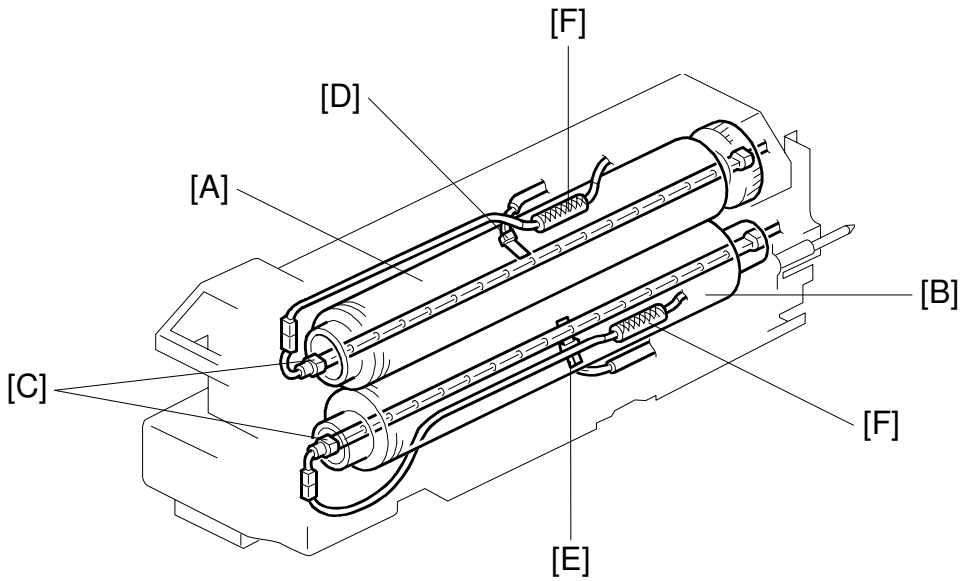
A269D502.WMF

The fusing unit, paper exit unit, and transport belt are driven by the fusing motor [A].

The fusing drive gears are released when the fusing/transfer drawer is pulled out.

Gears are also provided on the front side of the hot and pressure rollers to suppress the generation of creases in the duplex copy mode.

2.9.3 FUSING OVERVIEW



A269D503.WMF

Toner is fused onto the paper fed from the transport section by applying heat and pressure.

The hot roller [A] and pressure roller [B] each have a fusing lamp [C] (780 W for the hot roller and 400 W for the pressure roller) at the axis. Their temperatures are controlled by the hot roller thermistor [D] and pressure roller thermistor, [E] respectively.

Temperature control is accomplished normally by turning the fusing lamps on and off. Phase control can be selected using SP1-104-00.

There are two thermofuses [F] in the fusing unit—one near the hot roller and one near the pressure roller. Both thermofuses open at 152°C. These thermofuses provide fusing overheat protection.

This copier uses silicone rubber rollers as the hot and pressure rollers. The hot and pressure rollers are not covered with a tube to maintain high image reproducibility. Oil is applied to the rollers, however, to reduce the tendency of toner to stick to the rollers.

2.9.4 FUSING TEMPERATURE CONTROL

The fusing temperature is controlled to one of the surface temperatures listed below according to the copy mode and operating condition.

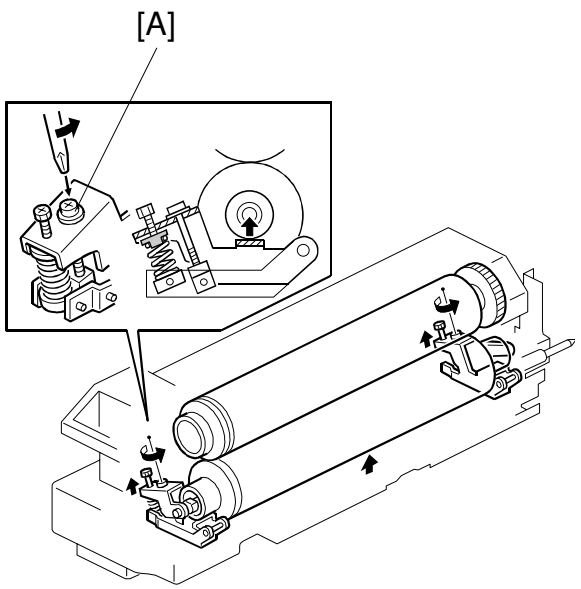
	Stand-by Mode	Copy Mode					
		Normal		OHP/ Thick Paper 1		Thick Paper 2	
		Single Color	Full Color	Single Color	Full Color	Single Color	Full Color
Fusing: simplex	190°C	165°C	175°C	175°C	175°C	175°C	175°C
Fusing: duplex	190°C	165°C	175°C	175°C	175°C	175°C	175°C
Pressure: simplex	160°C	145°C	155°C	155°C		155°C	165°C
Pressure: duplex	160°C	145°C	155°C	155°C		155°C	165°C

In this copier:

- Paper with a weight greater than 105 g/m^2 (28 lb) and not greater than 157 g/m^2 (42 lb) is called “thick paper 1” (thick paper).
- Paper with a weight greater than 157 g/m^2 (42 lb) and not greater than 256 g/m^2 (68 lb) is called “thick paper 2” (ultrathick paper).

2.9.5 FUSING PRESSURE

The pressure roller is pressed against the hot roller by a spring and a bracket. The hot roller is pressed by unscrewing the pressure release screw [A]. Then the pressure lever presses up the pressure roller.

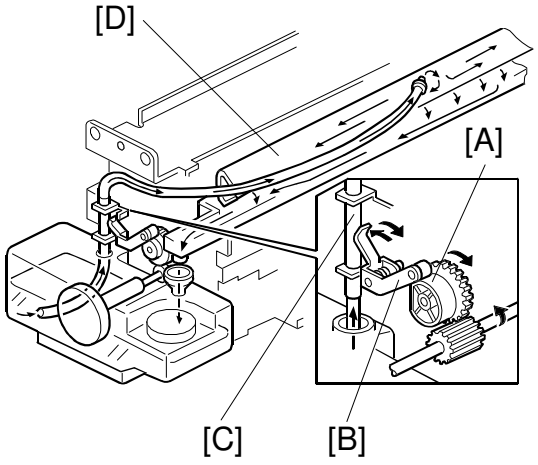


A269D504.WMF

2.9.6 OIL SUPPLY

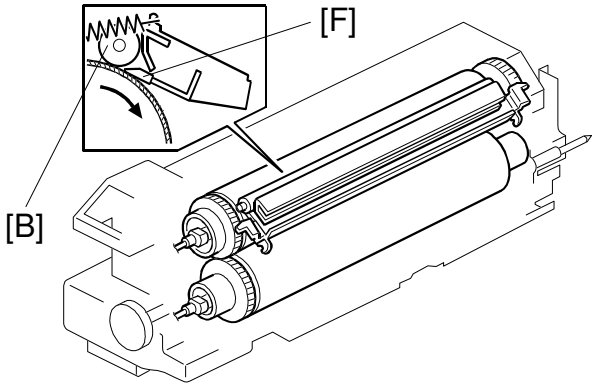
The gear on the fusing knob shaft on the front side of the fusing unit is always engaged with the oil cam gear [A]. The roller of the oil pump lever [B] is in contact with this cam gear.

When the fusing motor turns on it drives the fusing knob shaft which rotates the oil cam gear. The roller of the oil pump lever follows the surface of the cam, and the lever alternately presses and releases the sleeve of the oil pump [C]. This action pumps oil to the oil supply pad [D]. Surplus oil is returns to the oil tank.



A269D505.WMF

The oil supply pad presses against the oil supply roller [E]. The oil supply roller applies oil to the hot roller and the hot roller applies oil to the pressure roller. The hot roller blade [F] spreads the oil evenly on the hot roller.



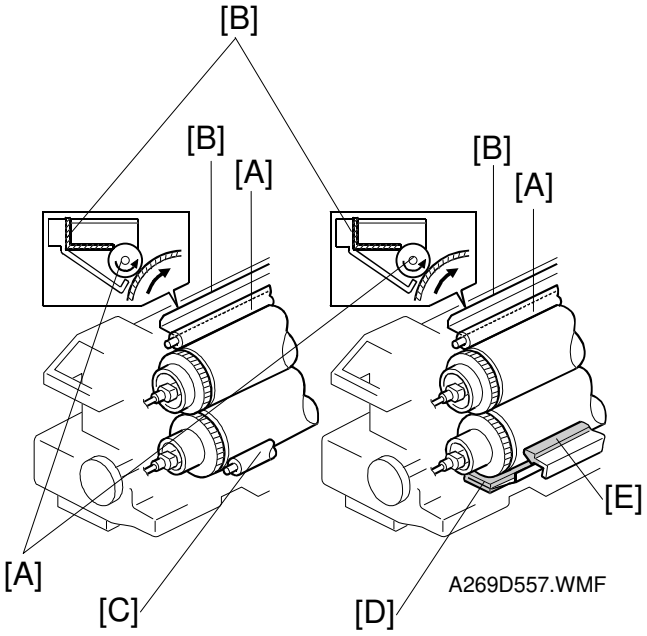
A269D506.WMF

2.9.7 CLEANING MECHANISM

The hot roller cleaning roller [A] removes toner and dust from the hot roller. A scraper [B] removes the toner and dust from the hot roller cleaning roller.

[-15, 17, 19 copier]
The pressure roller cleaning roller [C] cleans the pressure roller.

[-22, 26, 27, 29 copier]
Pressure roller oil supply pad [D] supplies the oil to the pressure roller. Pressure roller blade [E] scrapes the paper dust from the pressure roller.

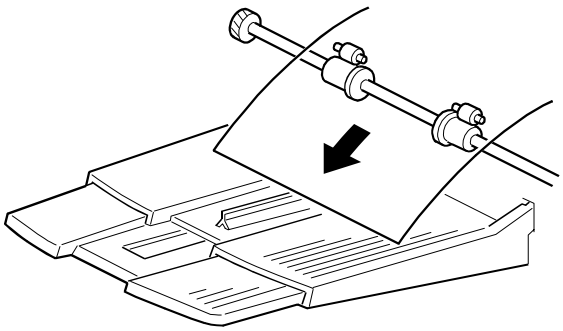


A269D557.WMF

2.9.8 PAPER EXIT AND PAPER INVERSION

Paper Exit Mechanism

The exit rollers have ridges toward the inside to increase the stiffness of the paper fed from the fusing section and improve paper stacking.

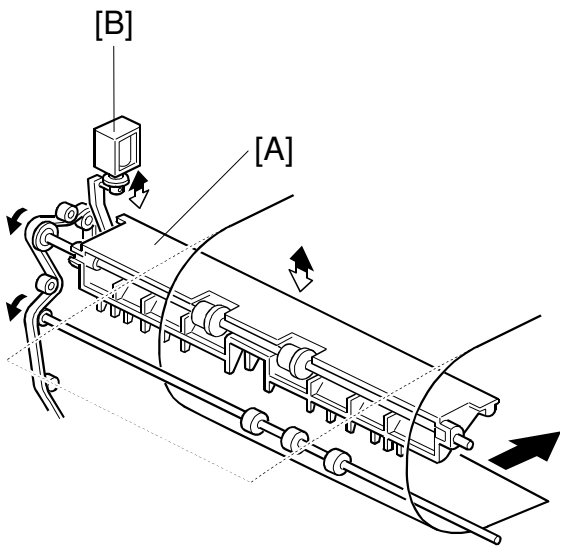


A269D508.WMF

Junction Gate Mechanism

After fusing, the paper is directed either to the paper exit tray or to the duplex section by the junction gate [A]. The junction gate is actuated by the junction gate solenoid [B].

- To the paper exit tray:
  The junction gate solenoid is off.
- To the duplex tray:
  The junction gate solenoid is on

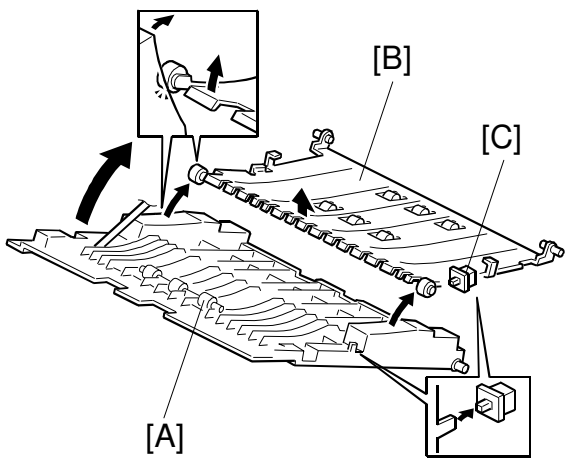


A269D509.WMF

Paper Exit Cover

The paper exit door [A] is designed to open or close for jam removal. The transport roller plate [B] is released when the paper exit door is opened.

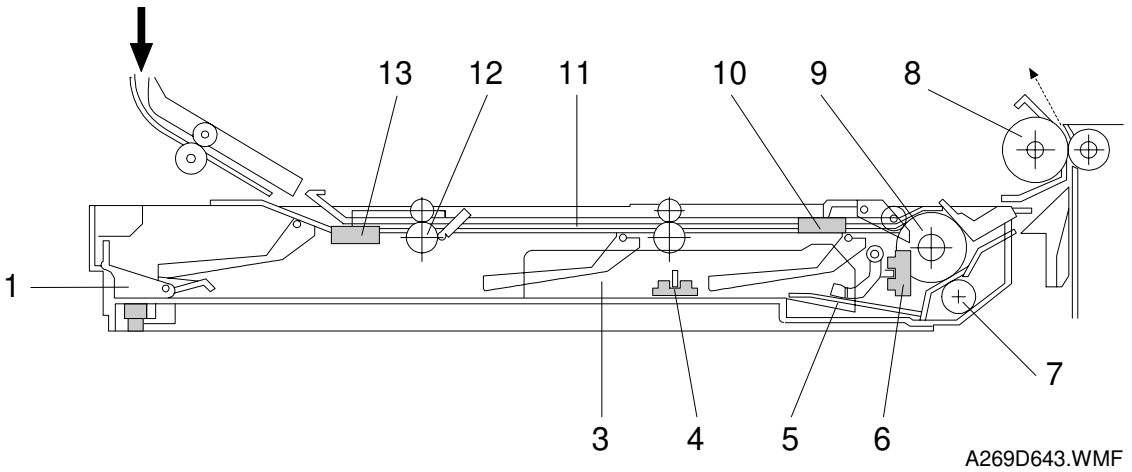
The paper exit door switch [C] is provided to detect the set state of the paper exit cover.



A269D510.WMF

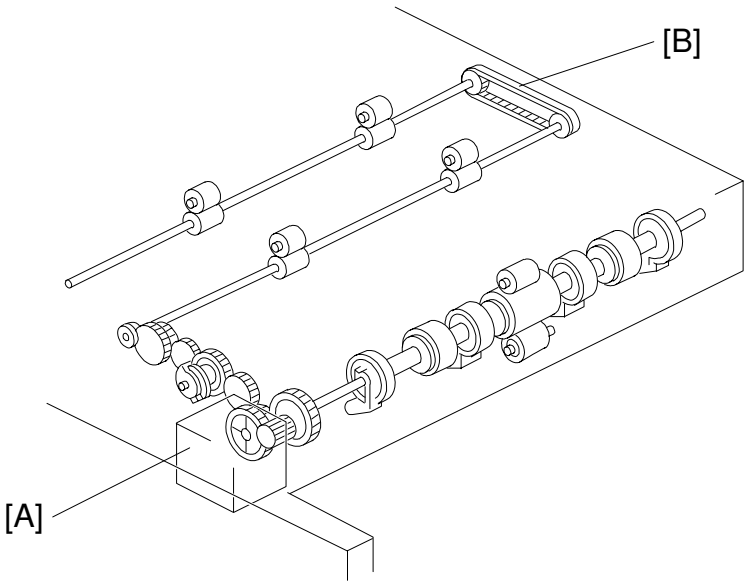
2.10 DUPLEX TRAY

2.10.1 OVERVIEW



1. End fence
2. End fence jogger H.P. sensor
3. Side fence jogger
4. Side fence jogger H.P. sensor
5. Bottom plate
6. Duplex paper end sensor
7. Separation roller
8. Vertical transport roller
9. Paper feed roller
10. Duplex turn sensor
11. Transport path
12. Duplex entrance roller
13. Duplex entrance sensor

2.10.2 DRIVE MECHANISM



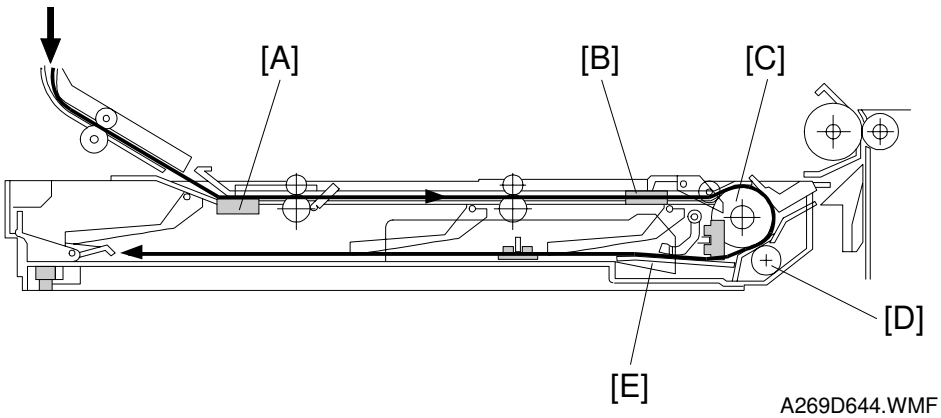
A269D667.WMF

The duplex feed motor [A] drives all the rollers in the duplex tray using a series of gears and a timing belt [B]. Helical gears are used to reduce noise. The duplex feed motor also drives the duplex bottom plate up and down.

2.10.3 PAPER FEED INTO THE DUPLEX TRAY

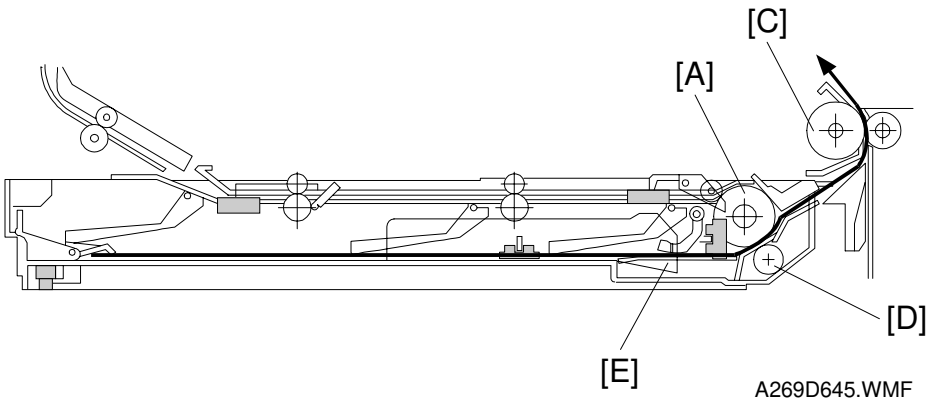
The duplex feed motor is a stepper motor. The direction that the motor turns depends on whether the duplex unit is stacking or feeding.

Duplex Stacking



Paper enters the duplex unit passing the entrance sensor [A], the duplex turn sensor [B], the paper feed roller [C], and the separation roller [D]. Then, it is stacked while the bottom plate [E] is in the lower position.

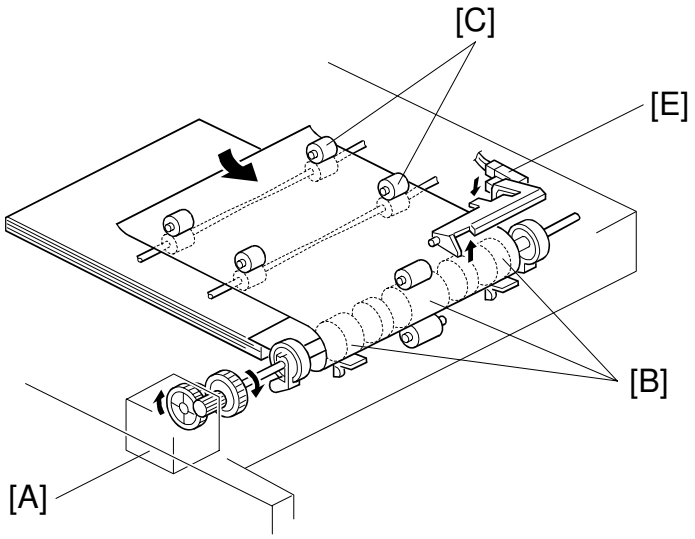
Paper Feed from the Duplex Tray



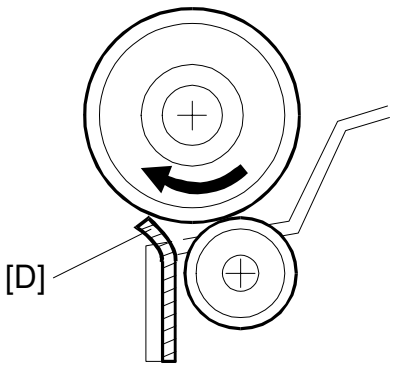
The paper stacked in the duplex unit is in contact with the paper feed roller [A] after the bottom plate [B] is lifted up. Then, the paper feed roller feeds the paper to the registration rollers in the copier main body via the vertical transport roller [C].

The separation roller [D] has a one-way clutch. During paper stacking, the separation roller turns with the paper feed roller. During paper feed, the separation roller does not turn, so that it can separate the sheets of paper.

Duplex Entrance to Duplex Tray



A269D646.WMF



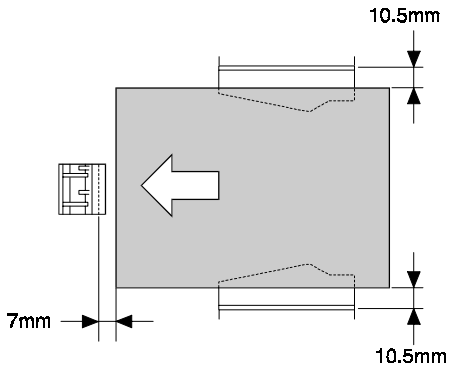
A269D654.WMF

The duplex feed motor [A] starts after the leading edge of the paper activates the paper exit sensor. This motor drives the duplex feed rollers [B] and the duplex entrance rollers [C]. These rollers direct the paper from the junction gate into the duplex tray.

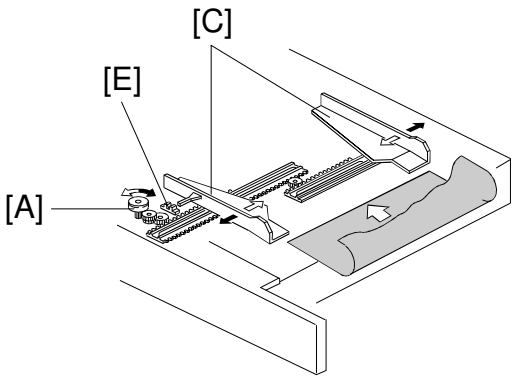
The tip of the flip mylar [D] moves to the left (front view) when the duplex feed rollers rotate to feed the copy into the duplex tray. The mylar presses the paper against the duplex feed rollers, ensuring that the trailing edge of the paper clears the guide plate.

The duplex turn sensor [E] detects the trailing edge of the paper as it enters the tray.

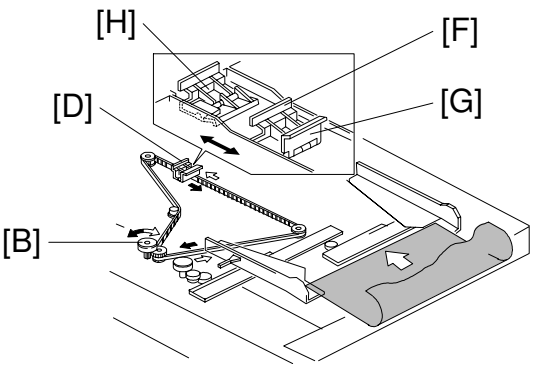
2.10.4 JOGGER MECHANISM



A269D648.WMF



A269D649.WMF



A269D650.WMF

There are two motors for driving the fences. The side fence jogger motor [A] drives the side jogger fences. The end fence jogger motor [B] drives the end jogger fence. Using two separate motors for the side and end fences allows the duplex tray to handle all paper sizes from A3/11" x 17" to A5/ 8 1/2" x 5 1/2" sideways.

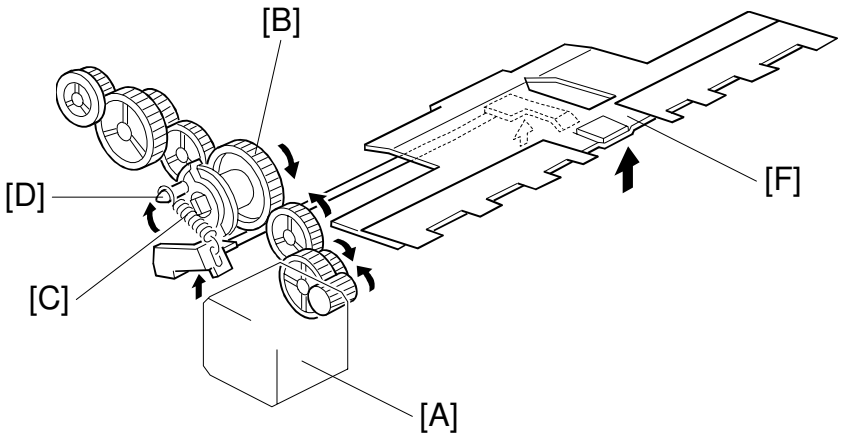
There are two home position sensors. One is for the side jogger fences [C], and the other is for the end fence [D]. When the main switch turns on, the side fence jogger motor and the end fence jogger motor move the side jogger fences and the end fence to their home positions.

When the registration clutch turns on, the side fences move 10.5 mm, and the end fence moves 7 mm away from the selected paper size. Then when the copy paper is delivered to the duplex tray, the jogger fences move inward to square the paper. (This is done 690 ms after the duplex turn sensor detects the trailing edge of the paper. The duplex turn sensor [E] is in the diagram on the previous page.) Shortly after this, the jogger fences move back to their previous positions. After the last copy of the first side copy run enters the duplex tray, the jogger fences remain against the paper stack.

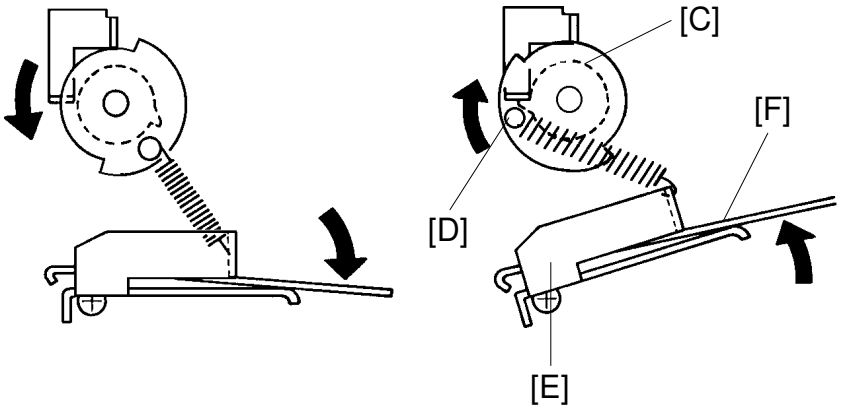
There are two end fences. One [F] is for A3/ 11" x 17" size paper. The other [G] is for sizes smaller than B4. They are included as a unit. When A3/11" x 17" size paper is in the duplex tray, the end fence unit moves to the left and the B4 end fence rotates down as it is pressed against the end fence stopper [H].

2.10.5 PAPER FEED FROM THE DUPLEX TRAY

Bottom Plate Lift Mechanism



A269D653.WMF



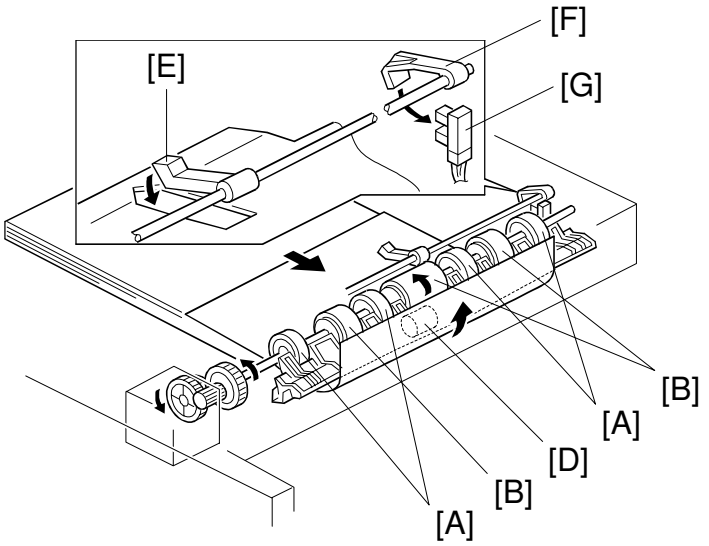
A269D655.PCX

While the first side is being copied, the duplex feed motor [A] turns clockwise and the cam clutch gear [B] turns counter-clockwise (see the above drawing). Then all copies are stacked in the duplex tray unit.

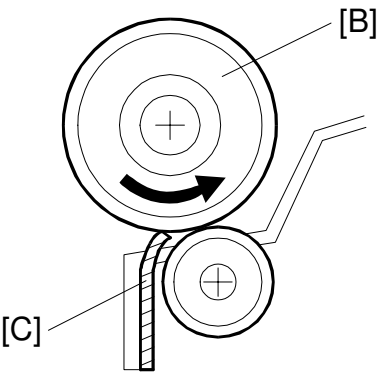
After the first side copies are done, the duplex feed motor [A] changes direction, and the cam clutch gear [B] turns clockwise. The cam clutch [C] also turns clockwise because of a spring inside the clutch. The pin [D] on the clutch lifts up the duplex lever [E] through a spring, raising the duplex bottom plate [F].

Then the duplex feed rollers feed the stacked copies to begin reverse side copying.

2.10.6 PAPER FEED-OUT MECHANISM



A269D651.WMF



A269D647.WMF

While paper is stacking in the duplex tray, the paper flatteners [A] correct curl at the leading edge of the paper.

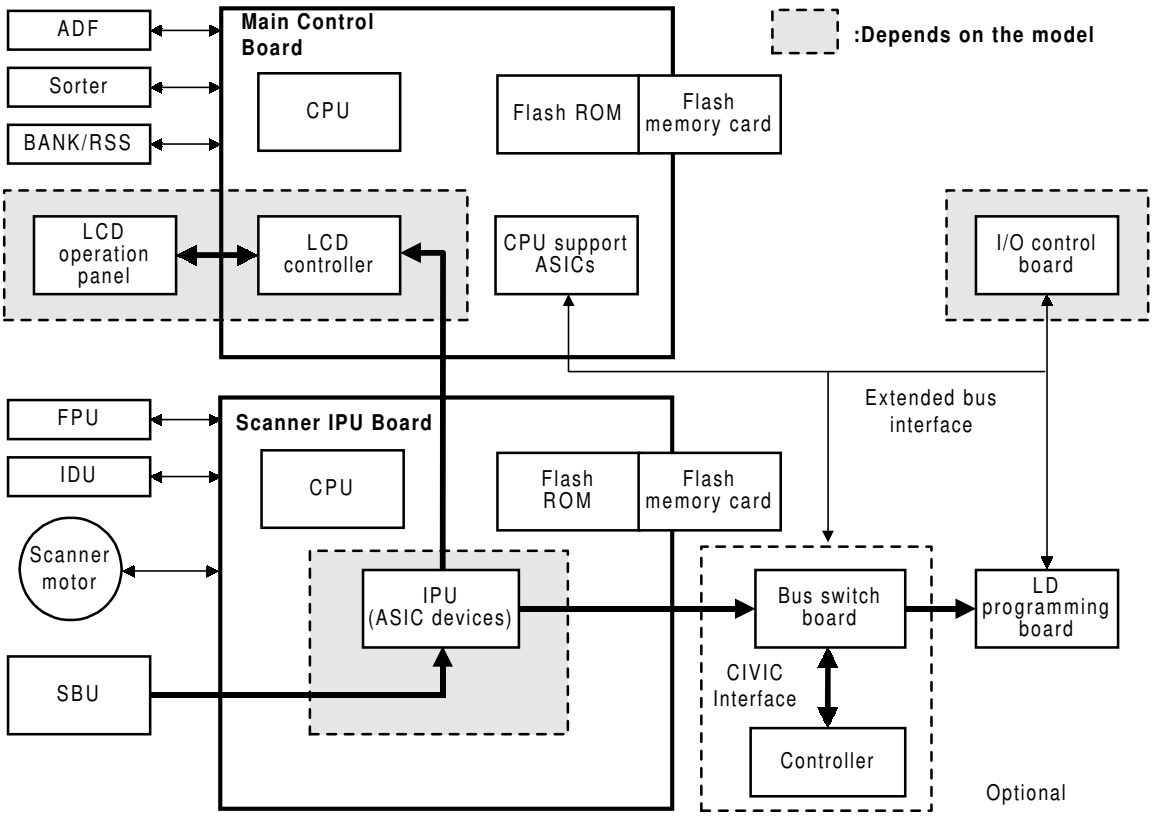
After all the paper is stacked in the duplex tray, the jogger fences square the paper and the duplex feed motor turns counter-clockwise briefly to prepare to feed the paper from the duplex tray. At this time, the bottom plate rises and the duplex feed rollers [B] move the flip mylars [C] back to the right (front view).

The duplex paper feed system consists of three sets of duplex feed rollers and a separation roller [D]. The separation roller has a one-way bearing inside, so it rotates freely during paper stacking and locks during paper feeding. The duplex feed rollers can feed only the top sheet of the stack because the separation rollers function in the same way as a friction pad does.

After the duplex tray runs out the final copy, the paper end feeler [E] drops through a slot in the duplex bottom plate. The duplex paper end actuator [F], which is on the same shaft as the duplex paper end feeler, pivots into the duplex paper end sensor [G]. Then the sensor signals the CPU to stop the next paper feed cycle.

2.11 SYSTEM CONFIGURATION

2.11.1 CONFIGURATION



A269D806.WMF

The main control board CPU manages the scanner, operation panel, and printer engine to control the entire copier system.

The scanner IPU board CPU controls the scanner motor and image data processing. Both the main control board and the scanner IPU board have flash memory so that their programs can be replaced using a flash ROM card.

The main control board manages printer controller options through the extended bus interface.

2.11.2 NORMAL COPY MODE

This copier has three power supply modes.

Main Power Switch Off State

When the main power switch is turned off, the power to the following heaters is turned on to prevent condensation.

These heaters are powered off by relays on the AC drive when the main power switch is turned on.

- Optics auto condensation heater
- Paper transfer heater
- Paper tray heaters

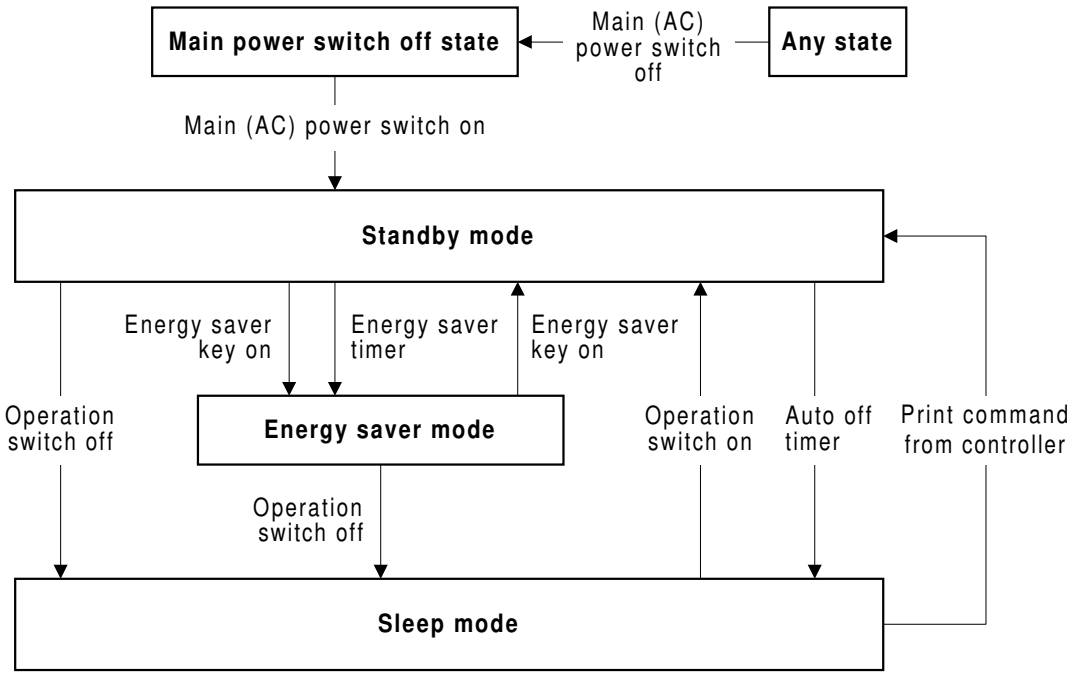
Power-off (Sleep) State

The power-off state of this copier conforms to the International Energy Star standard for “Sleep Mode”. Of the DC outputs (VAA, VCA, VCB, VCC1, and VCC2) from the PSU, only VCC2 is turned on; all of the other outputs are held off. In this state, power is applied only to the main control board and the operation switch, so that the machine can detect when the operation switch is pressed. In this state, the fusing lamps are off.

When the main board detects that the operation switch was pressed, the machine goes back to standby mode.

Copier Modes

This machine has three different modes it can assume when the main power switch is on and the machine is not copying. This is shown by the following illustration.



A269D807.WMF

Stand-by Mode

- Operation panel ON
- Fusing power ON (stand-by temperature)

Energy Saver Mode

- Operation panel OFF except for the Main Power indicator, Operation Switch on indicator, and “Energy Saver” key indicator.
- Fusing power ON (stand-by temperature)

Sleep Mode

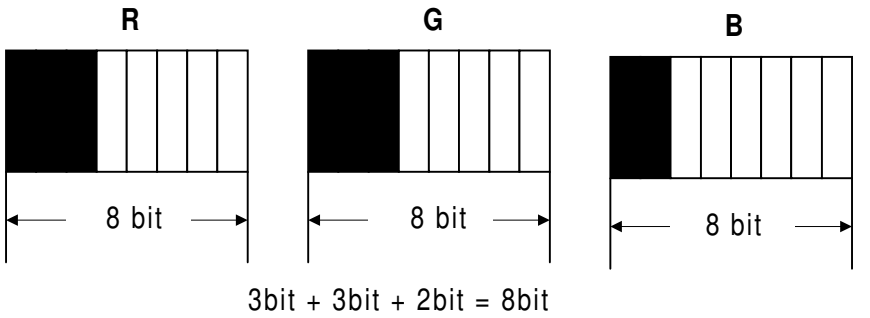
- Operation panel OFF except for the Operation Switch on indicator.
- Fusing power OFF
- +5 volts is supplied to the main control board

2.11.3 OPERATION PANEL

This copier integrates a large-sized full-color LCD (640 x 480 dot) operation panel. This operation panel is controlled by the CPU (LCD controller) on the main control board.

The display image data generated during area manipulation is stored by the scanner IPU directly (DMA mode) in the VRAM on the main control board before being transferred to the operation panel. Image data can be displayed in 256 colors using an 8-bit color scheme (3 bits for R, 3 bits for G, and 2 bits for B).

The area manipulation information specified on the operation panel is sent to the area manipulation section in the scanner IPU and used for image processing in synchronization with the scan data generated in the copy mode.



A269D855.WMF

The following table shows the resolution of the data. For example, if the user selects Zoom 1, the scale of the display in the editor window on the operation panel is 200%, so the machine generates 50 dpi data to display in the editor window.

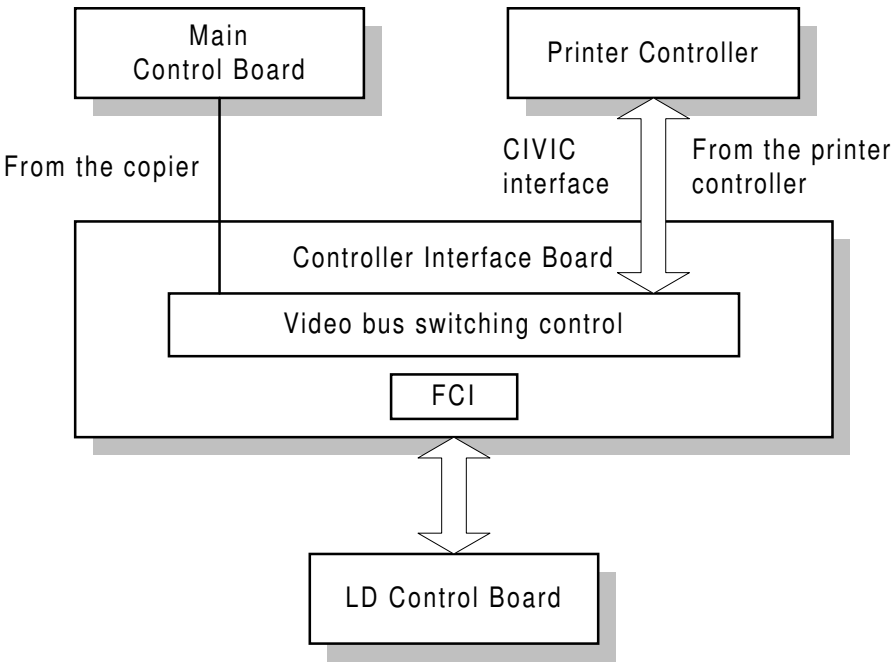
	Resolution	Scale
Full display	25 dpi	100%
Zoom 1	50 dpi	200%
Zoom 2	67 dpi	264%
Zoom 3	100 dpi	400%
Zoom 4	132 dpi	528%

2.11.4 PRINTER CONTROLLER INTERFACE

The printer controller is an option for this copier. The printer controller interface board interfaces the copier with the controller.

The CIVIC interface between the controller unit and the bus switch board transfers image data on an 8-bits/pixel basis for each color.

The FCI (Fine Character and Image) chip performs image smoothing and line correction. When the user selects smoothing, the FCI converts the image data (8 bits) to 7 bits of image and 1 bit of pixel positioning data, to simulate 1200 dpi resolution across the page (see Laser Exposure - Smoothing for more details).



A269D811.WMF

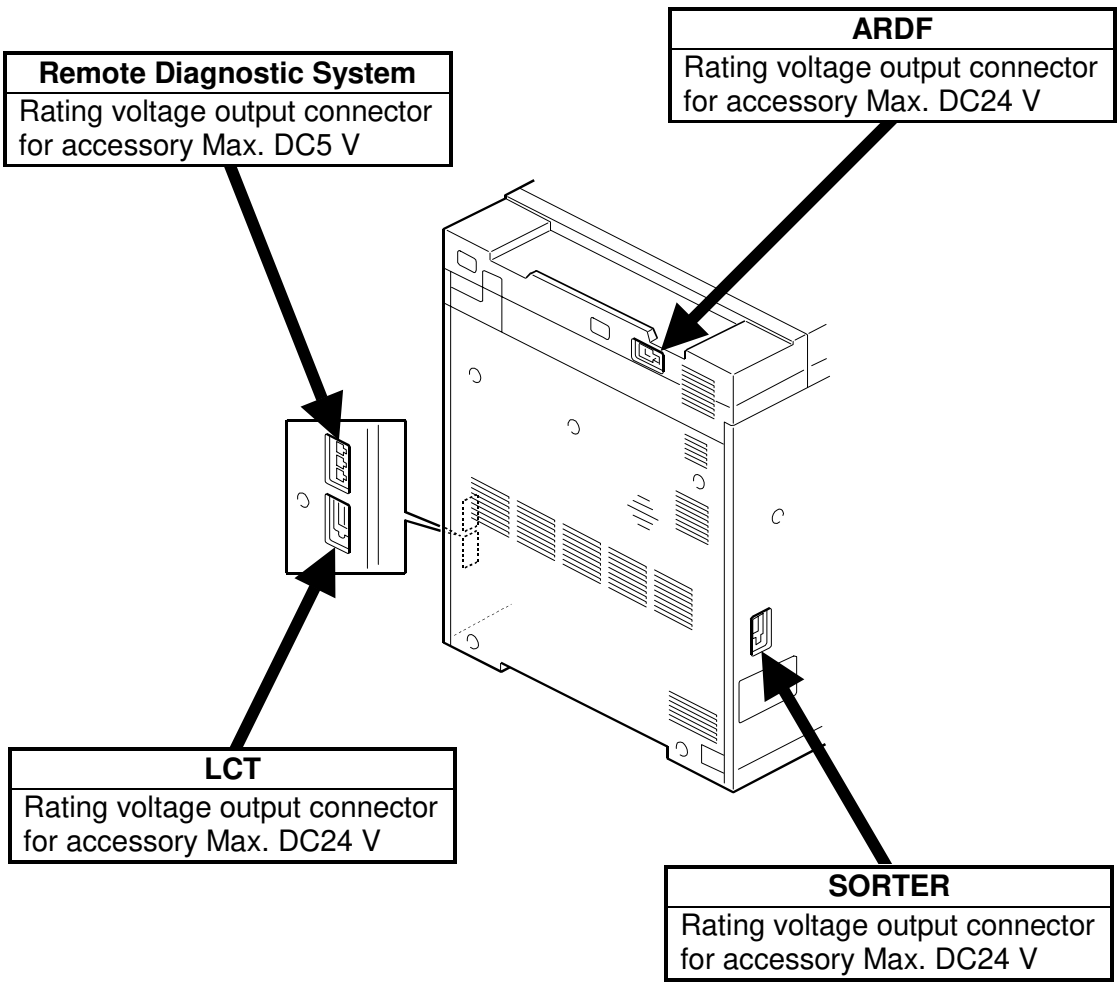
3. INSTALLATION PROCEDURES

3.1 INSTALLATION REQUIREMENTS

3.1.1 DIMENSIONS

⚠CAUTION

Rating voltage for Peripherals



A269I921.WMF

3.1.2 ENVIRONMENT

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

Environmental Requirements

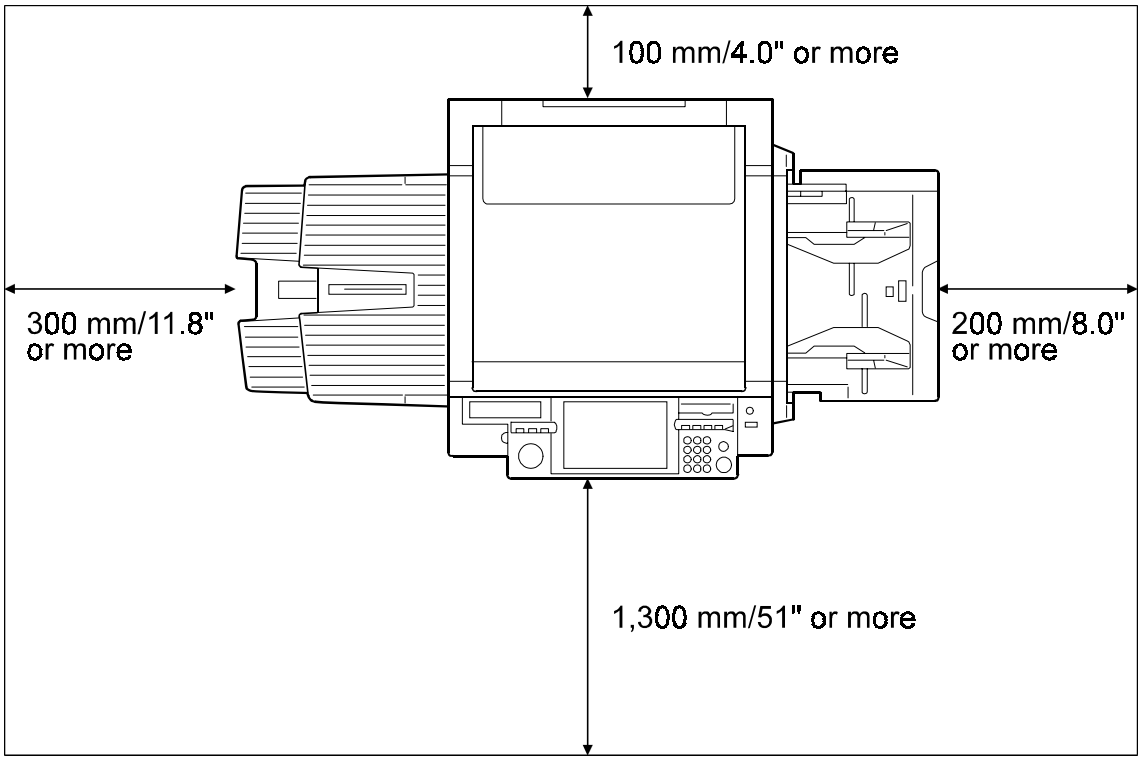
1. Avoid an area which is exposed to direct sunlight or is excessively illuminated (the illumination should not exceed 2,000 lux).
2. Avoid an area which is too hot and humid or too cold and dry.
   Standard temperature range: 10°C to 32°C
   Standard humidity range: 15% to 90%
   Limit of high temperature and humidity: 30°C/90% or 32°C/80%
3. Avoid an area near fire or heat.
4. Avoid an area which is exposed to sudden temperature changes. This includes areas where the machine will not be directly exposed to:
   1) Cool air from an air conditioner
   2) Heat from a heater.
5. Avoid a dusty area (maximum allowable amount of dust: 0.15 mg/m^3).
6. Avoid a poor-ventilated area (required minimum ventilation: 30 m^3/hr/man
7. Do not place the machine where it will be exposed to corrosive gases.
8. Place the machine on a level floor (the inclination on any side should be no more than 5 mm).
9. Do not place the machine where it may be subjected to strong vibrations.
10. Do not install the machine at any location over 2,000 m (6,500 feet) above sea level.
11. If the machine is installed close to other electronic equipment, they may interfere with each other. To avoid this problem:
    1) Keep the machine as far away as possible from television sets or radios.
    2) Reorient the receiving antenna of television sets and radios as needed.
    3) Use a separate outlet for the machine.

⚠CAUTION

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

Minimum Space Requirements

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



A269I157.WMF

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

Power Requirements

⚠WARNING

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

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

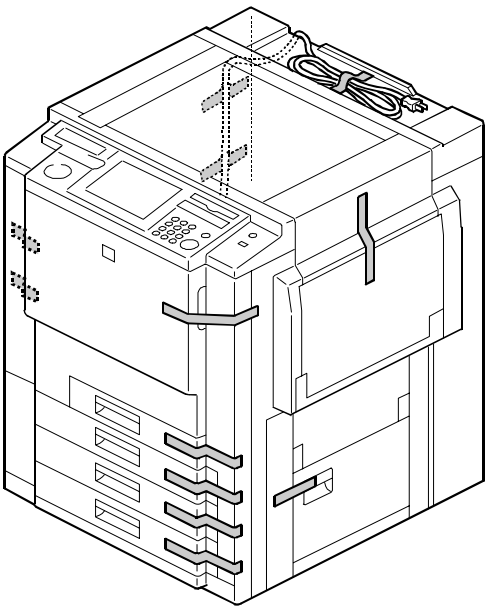
3.2 COPIER

3.2.1 ACCESSORY CHECK

Description	Q'ty
1. Operating Instructions Quick Reference	1
2. Operating Instructions manual	1
3. Touch panel pen	1
4. Copy tray	1
5. Tray size decal	1
6. Image samples	1
7. Factory data sheet	1

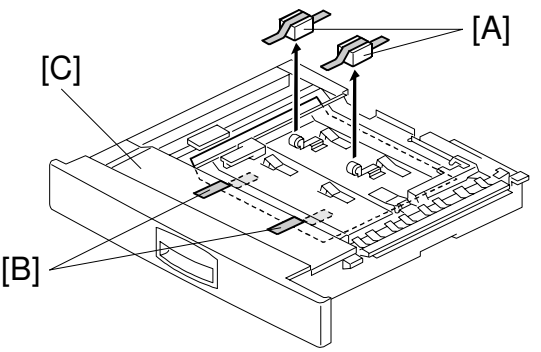
3.2.2 PREPERATION

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



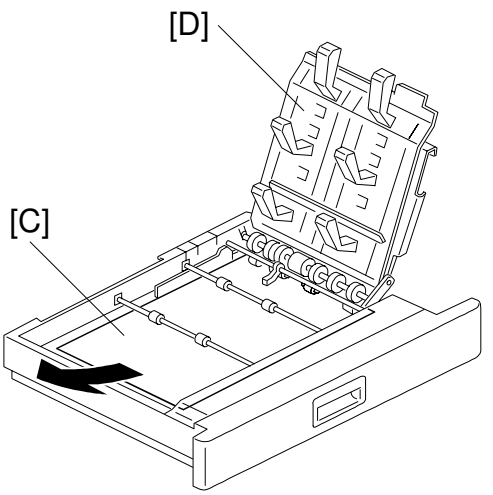
A269I101.WMF

2. Remove the protectors [A] from the metal rollers.
3. Peel off the two strips of filament tape [B] and remove the protective sheet [C].



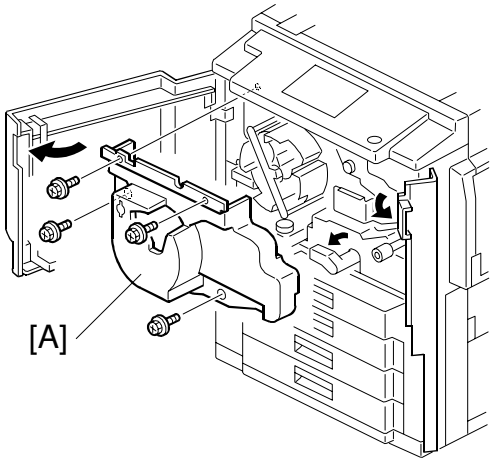
A269I154.WMF

4. Lift the lower guide plate [D] and take out the protective sheet.



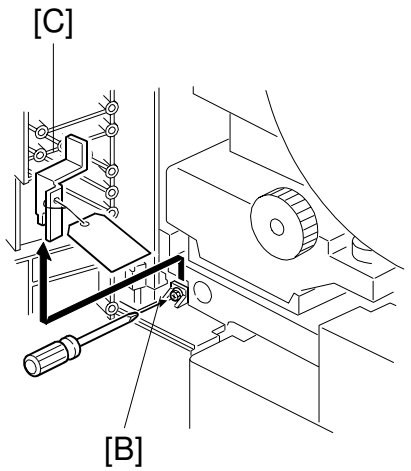
A269I152.WMF

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



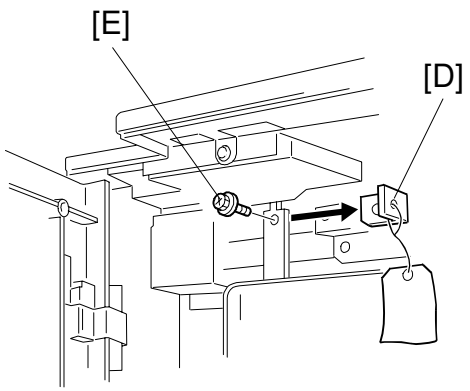
A269I102.WMF

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



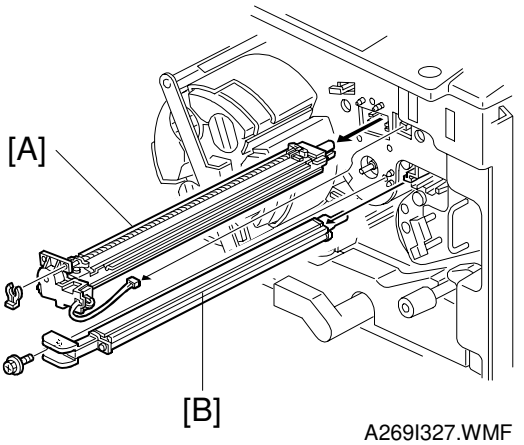
A269I140.WMF

8. Remove the scanner unit clamp [D] (1 screw [E]).
   NOTE: Keep the scanner unit clamp and the screw in a safe location as it will be reused when relocating the copier.
   Part No.: A2691114



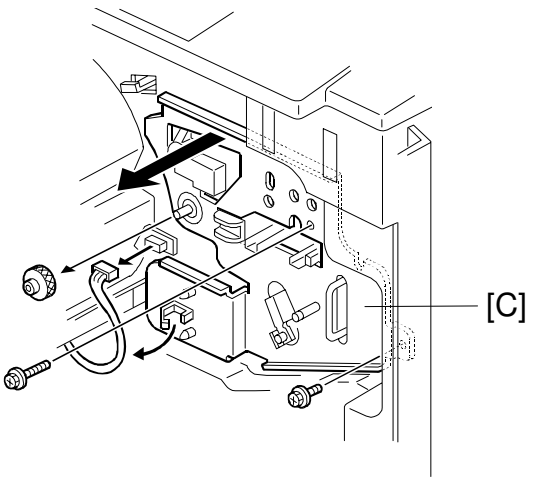
A269I138.WMF

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



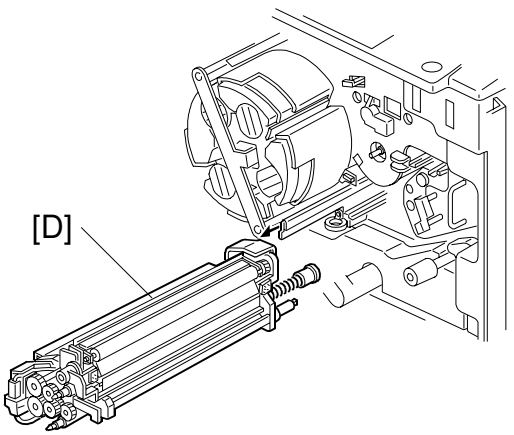
A269I327.WMF

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



A269I390.WMF

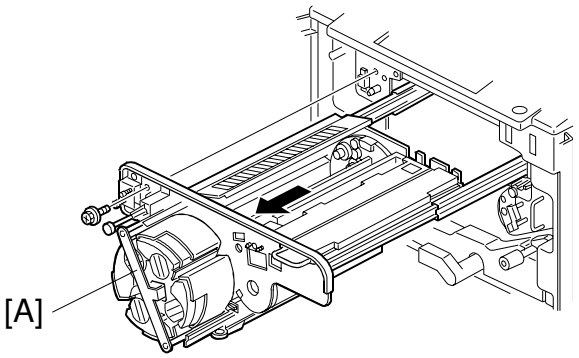
12. Remove the image transfer belt cleaning unit [D].



A269I302.WMF

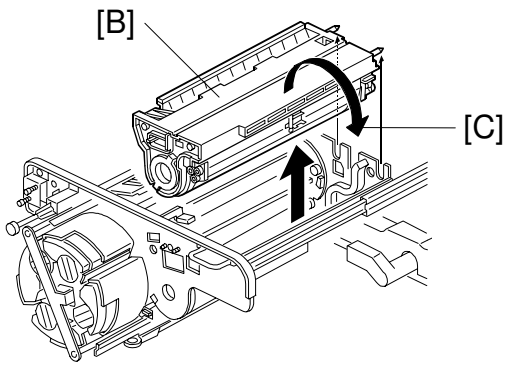
13. Pull out the revolver/drum drawer [A] (1 black screw).

    NOTE: Do not keep the drawer unit pulled out with the drum unit attached (without shielding the drawer unit). If the drawer unit were left out, the drum would be exposed to light. This would cause optical fatigue, resulting in image anomalies. Shield the drum unit with 5 or more sheets of paper).



A269I305.WMF

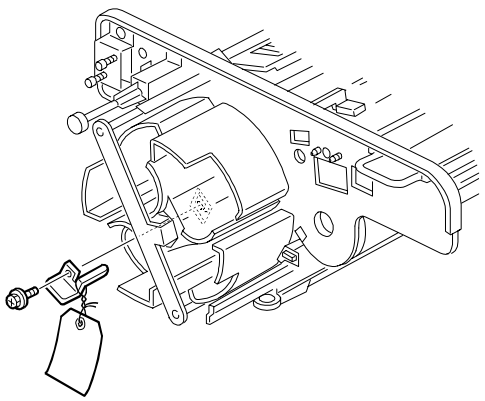
14. Pull out the revolver/drum drawer.
15. Lift the drum unit [B] out of the revolver/drum drawer.
16. Rotate the drum unit clockwise as shown by the arrow [C] and set it upside-down.



A269I306.WMF

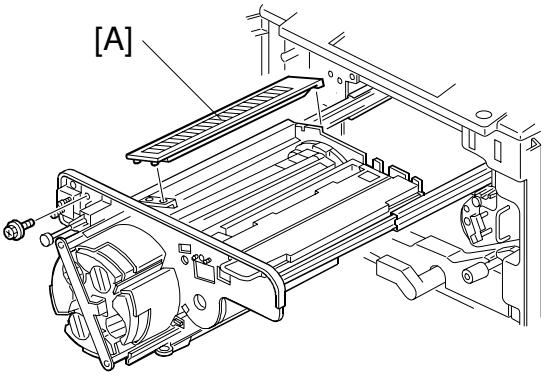
NOTE: 1) It is important to rotate the drum unit as shown by arrow. This prevents toner spillage.
2) Shield the drum unit with 5 or more sheets of paper. Otherwise, the drum will be exposed to light, which would cause optical fatigue, resulting in image anomalies.

17. Remove the revolver clamp (1 screw).
    NOTE: Keep the revolver clamp in a safe location as it will be reused when relocating the copier.
    Part No.: A2573256

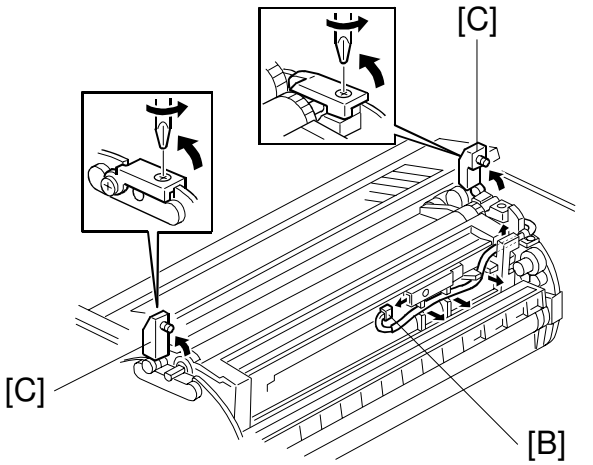


A269I110.WMF

3.2.3 DEVELOPER INSTALLATION



A269R325.WMF



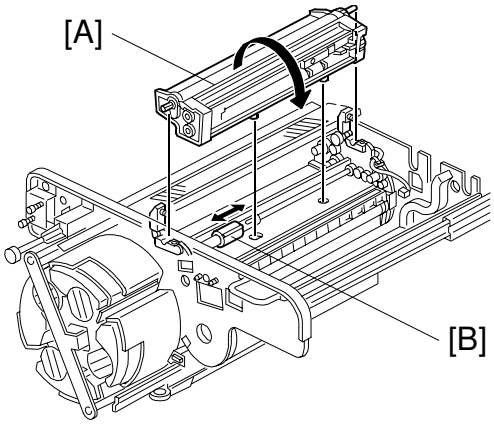
A269R308.WMF

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

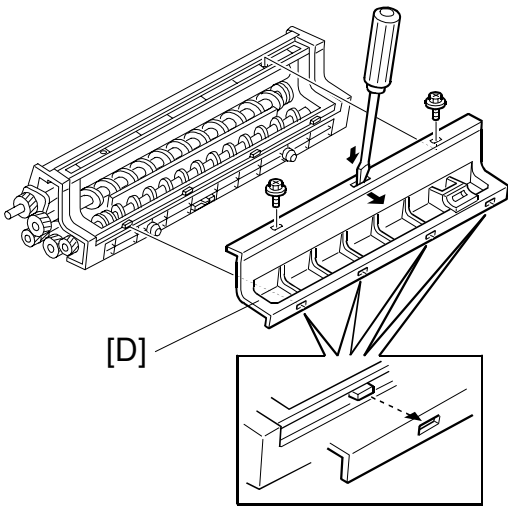
1. Remove the revolver filter [A].
2. Remove the toner density sensor connector [B] and open the development unit locks [C] at both ends of the revolver.

⚠CAUTION

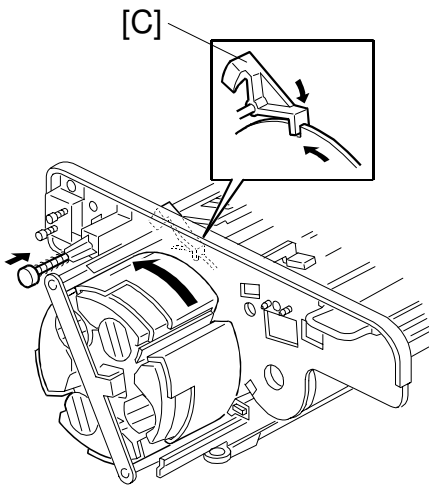
Do not push the revolver/drum drawer into the copier with developer locks left open. Otherwise, the revolver locks may strike the main unit frame, resulting in permanent damage to the revolver.



A269R309.WMF



A269R151.WMF



A269I357.WMF

3. Remove the development unit [A] and close the toner supply unit shutter [B].

⚠CAUTION

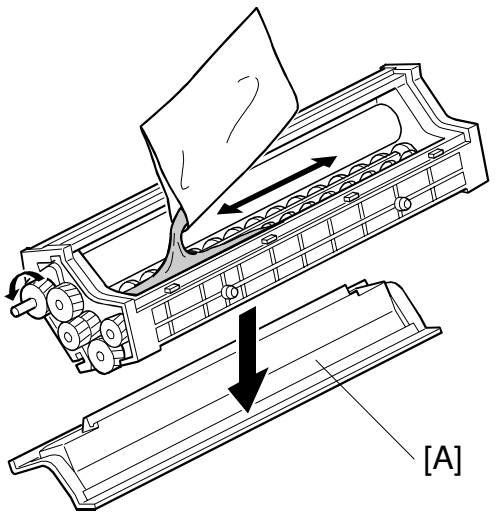
Be sure to the pawl of the revolver lock [C] is engaged before removing a development unit. Failure to observe this precaution may rotate the revolver, causing permanent damage to the development unit or its locks.

NOTE: When you remove a development unit, be sure to rotate in the direction shown in the figure. Rotating a development unit in the wrong direction may cause the revolver unit to be damaged.

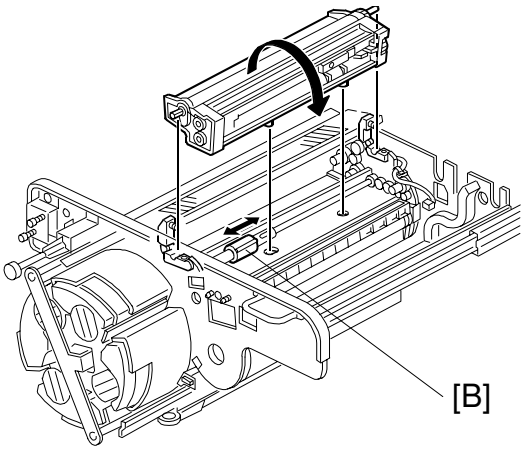
⚠CAUTION

Remove the development unit, for one color at a time. Removing two or more development units at the same time may unbalance the revolver. This will cause the revolver to turn, possibly catching your fingers.

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

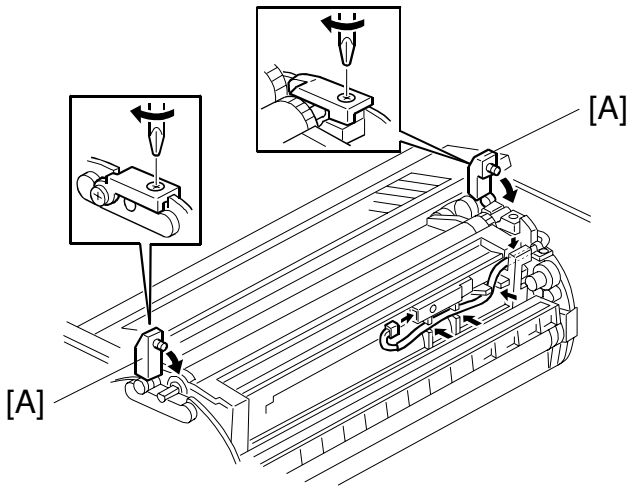


A269I351.WMF

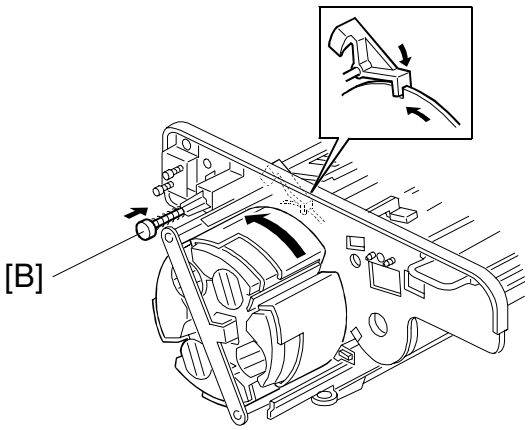


A269I359.WMF

1. Set the developer cover [A] as shown in the figure and place the development unit on it.
2. Pour 1 bag (700 g) of developer in the developer assembly.
3. Turn the sleeve in the forward direction several rotations to give it a smooth layer of developer.
4. Replace the developer cover (2 screws).
5. Open the toner supply unit shutter [B] and set the developer assembly in the revolver/drum drawer (2 lock screws and 1 sensor connector).



A269I353.WMF



A269I357.WMF

⚠CAUTION

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

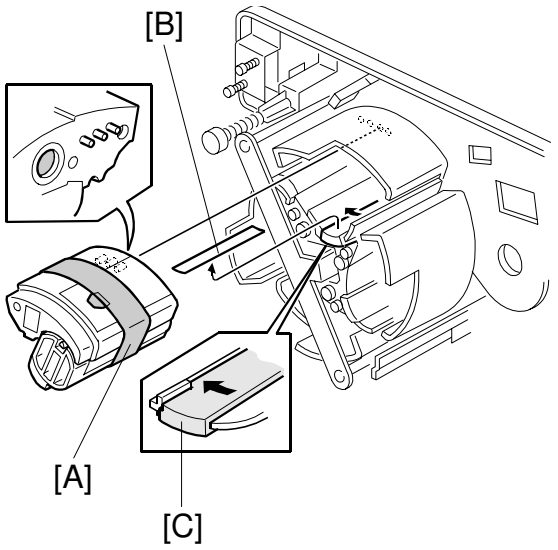
6. Press the revolver lock button [B] to release the revolver lock, rotate the revolver to the next color and install the new developer.

⚠CAUTION

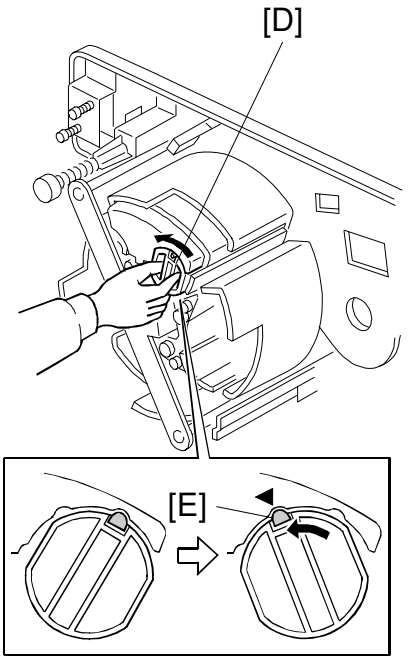
1. **Be sure to set the revolver locks before removing the development unit. Failure to observe this precaution may allow the revolver to rotate, causing permanent damage to the development unit or its locks.**
2. **Always rotate the revolver in the direction shown in the figure. Otherwise, the developer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

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

3.2.4 LOADING TONER CARTRIDGES



A269I118.WMF



A269I119.WMF

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

⚠CAUTION

Only remove the toner supply shutter tape when the toner cartridge holder is at the toner replacement position. Otherwise, toner will be spilled.

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

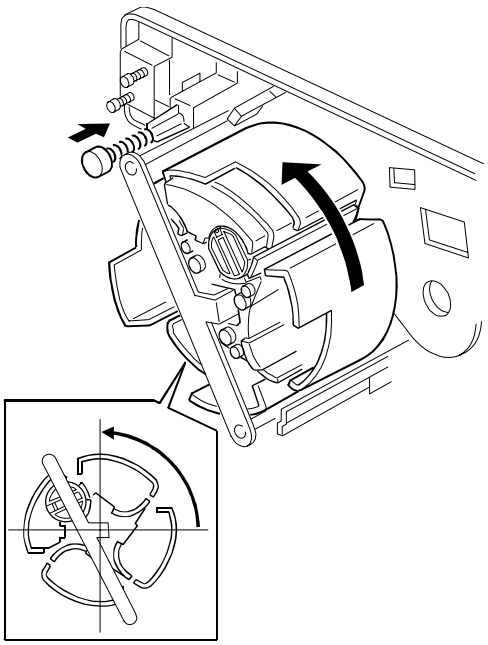
⚠CAUTION

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

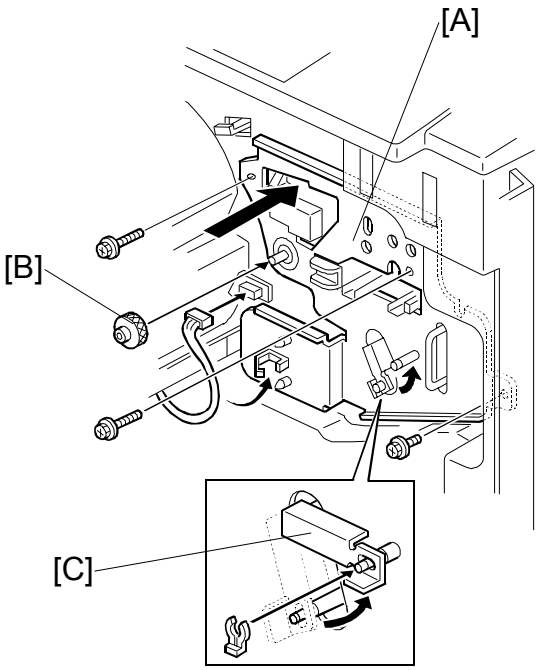
4. Confirm that the toner cartridge has the same color as the toner supply shutter and set the toner cartridge in the cartridge holder.
5. Turn the cartridge lever to the left [D].

⚠CAUTION

1. **Only install the toner cartridge when the cartridge holder is in the toner replacement position.**
2. **When setting up the toner cartridge lever, make sure that the lock is set as shown in the figure [E].**



A269I120.WMF



A269I160.WMF

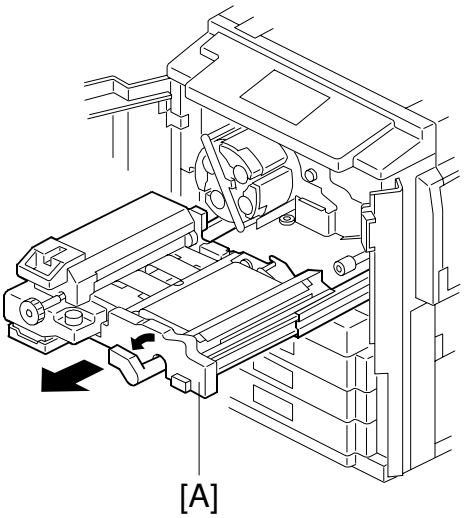
⚠CAUTION

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

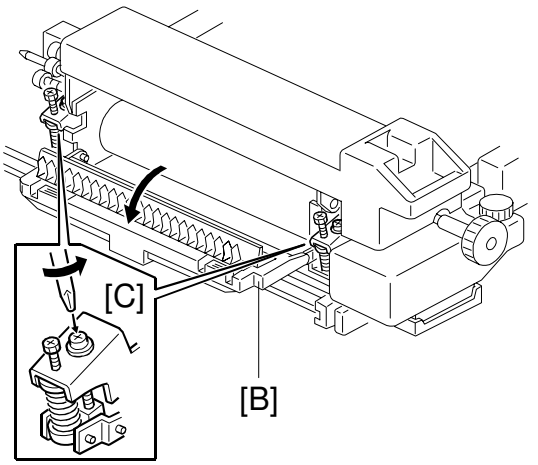
6. Press the revolver lock release lever and turn the revolver 90 degrees counterclockwise. Then install the toner cartridge of the next color following the above steps.
7. While pushing the image transfer belt to the right, reinstall the image transfer belt cleaning unit.
8. Reinstall the transfer faceplate [A] (3 black screws, 1 knob, 1 connector, and 2 clamps). Set the transfer belt tension lever [B] to the image transfer position (1 snap ring). Then reinstall the charge and PCC coronas.

   NOTE: 1) When re-installing the transfer face plate, tighten the knob [B] at first before tightening other screws.
   2) After re-installing the transfer faceplate, be sure to set the transfer belt tension lever [C] to the image transfer position (1 snap ring).

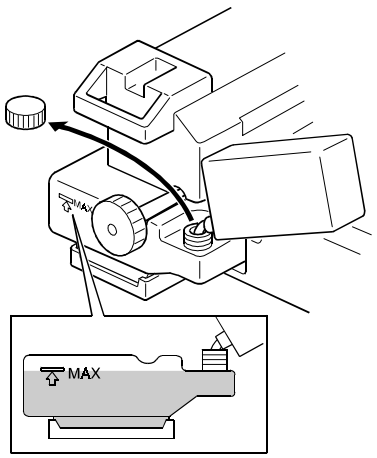
3.2.5 FUSING UNIT



A269I123.WMF



A269I125.WMF



A269I124.WMF

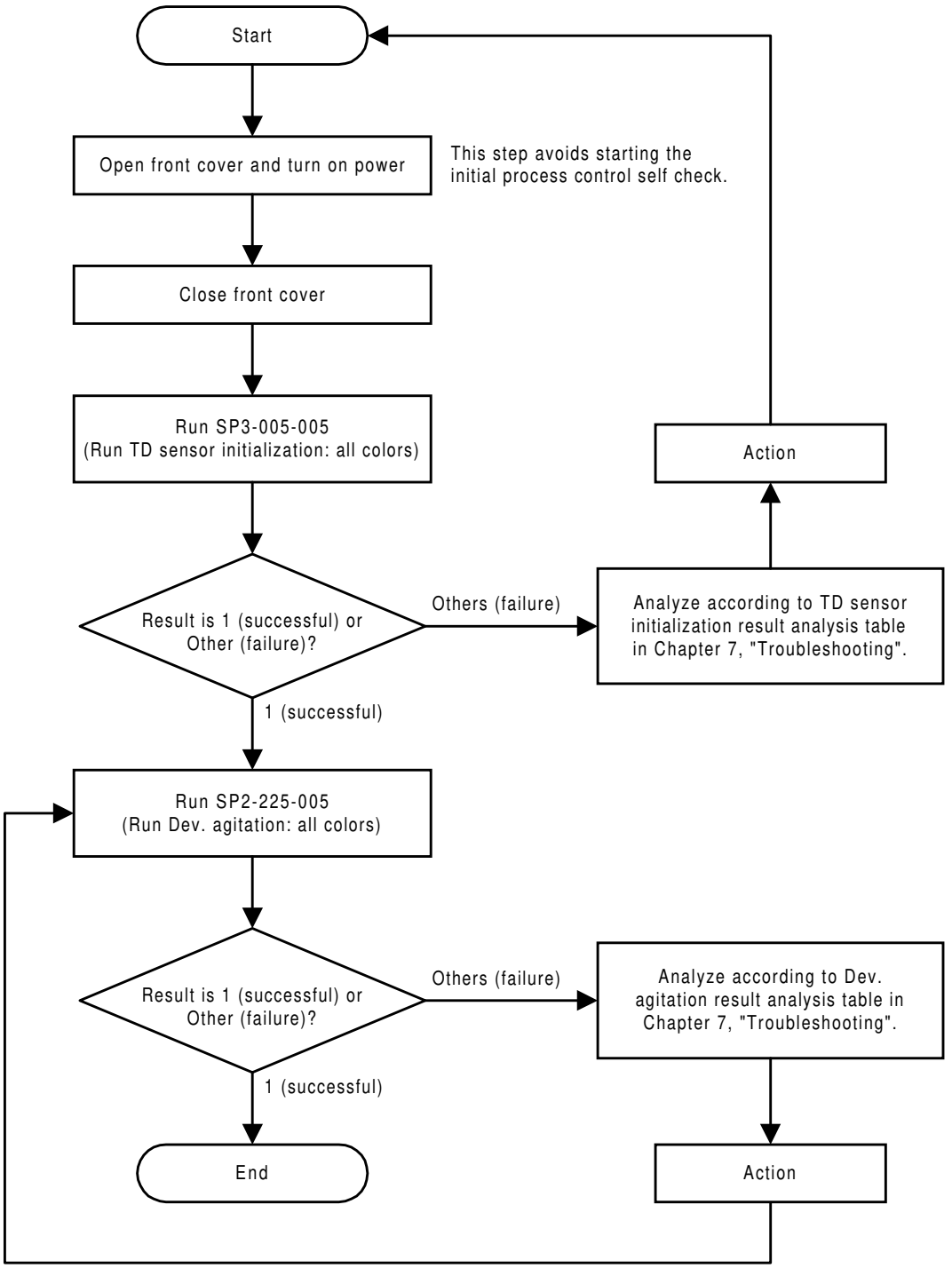
1. Pull out the fusing/transfer drawer [A].
2. Open the paper exit cover [B] and completely loosen (don't remove) the fusing pressure release screws [C] (2 black screws).
3. Fill the oil tank with silicone oil up to the "MAX" mark.

⚠CAUTION

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

3.2.6 DEFAULT SETTINGS AND OPERATION CHECKS

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



A269I153.WMF

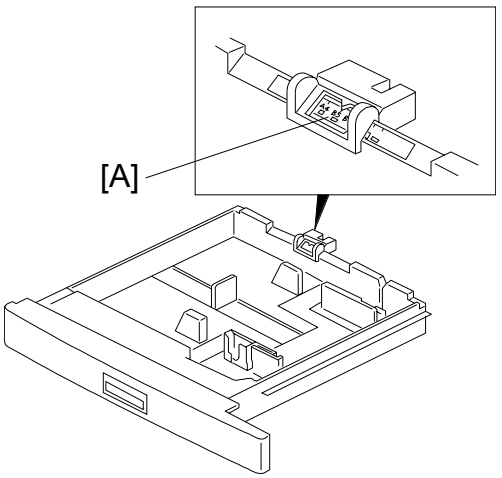
3. Load paper in the paper trays and set the paper tray sizes.

1st Tray

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

2nd and 3rd Tray

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



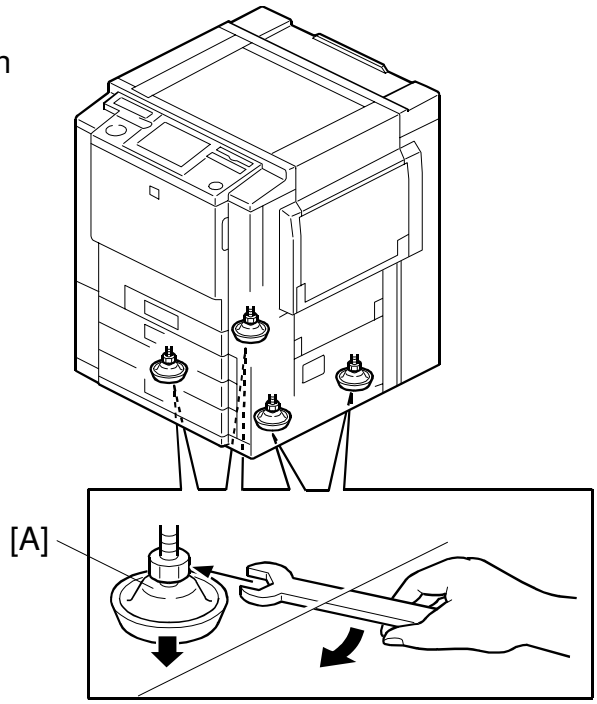
A269I159.WMF

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

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

3.2.7 HEIGHT ADJUSTMENT

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



A269I129.WMF

3.2.8 COUNTER DISPLAY SETTING

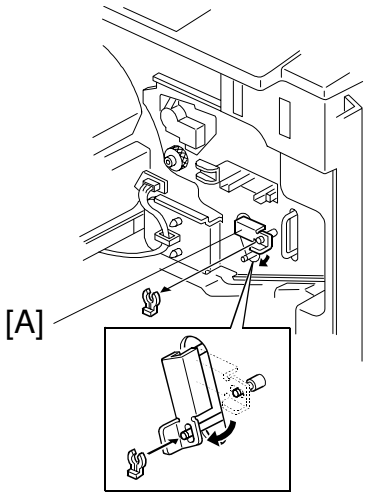
1. Enter the SP mode.
2. Run SP7-008-000, “Counter Display Setting”.
3. Select which counter to be displayed.
   1=counter based on developments
   2=counter based on copies/prints

NOTE: The setting can be changed only once. The setting cannot be changed any more after it has been changed. If the setting is changed by mistake, contact you key person.

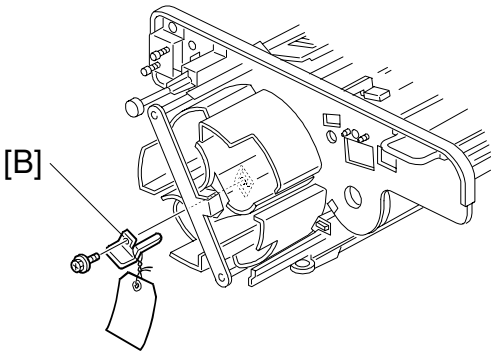
3.2.9 RESETTING THE ELECTRONIC TOTAL COUNTER

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

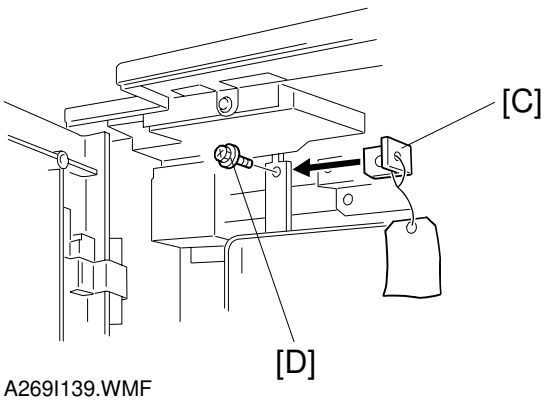
3.2.10 PREPARATION FOR TRANSPORT



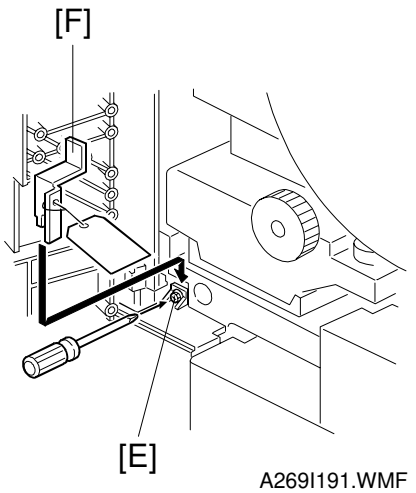
A269I127.WMF



A269I110.WMF



A269I139.WMF

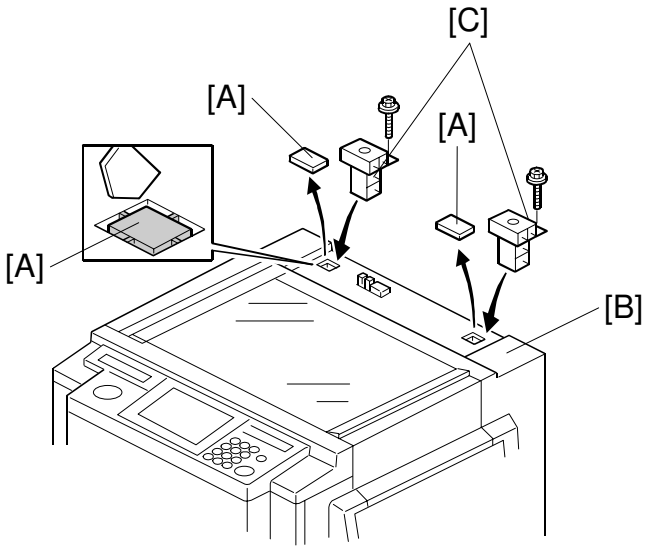


A269I191.WMF

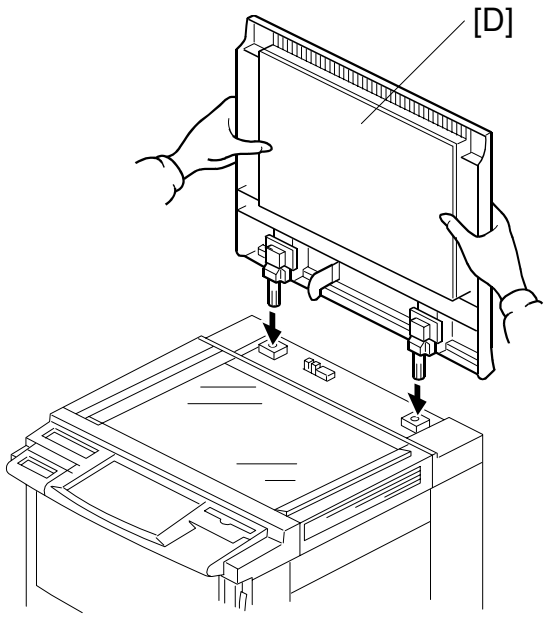
1. Remove the revolver cover and release the transfer belt tension lever [A] (one snap ring).
2. Install the revolver clamp [B]. The revolver must be at its home position.
   NOTE: Keep the revolver clamp in a safe location as it will be reused when relocating the copier.
   Part No.: A2573256
3. Re-install the scanner unit clamp [C] (1 screw [D]).
   NOTE: Keep the scanner unit clamp and the screw in a safe location as it will be reused when relocating the copier.
   Part No.: A2691114
4. Loosen the screw [E] (don't remove) and re-install the fusing/transfer drawer clamp [F]. Then tighten the screw [E] again.
   NOTE: Keep the fusing/transfer drawer clamp in a safe location as it will be reused when relocating the copier.
   Part No.: A2691115

3.3 PLATEN COVER (A749-01)

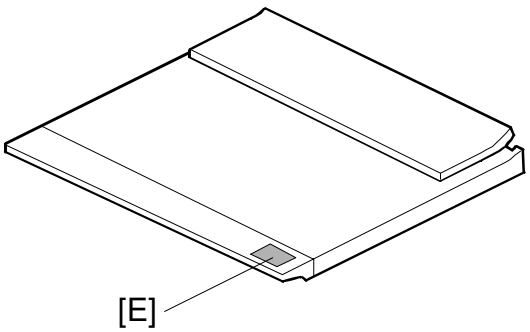
3.3.1 INSTALLATION



A749I504.WMF



A749I500.WMF



A749I503.WMF

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

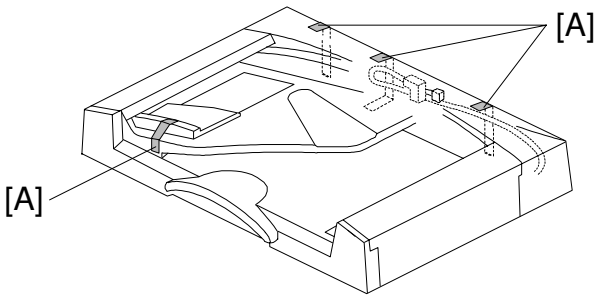
3.4 ARDF (A663)

3.4.1 ACCESSORY CHECK

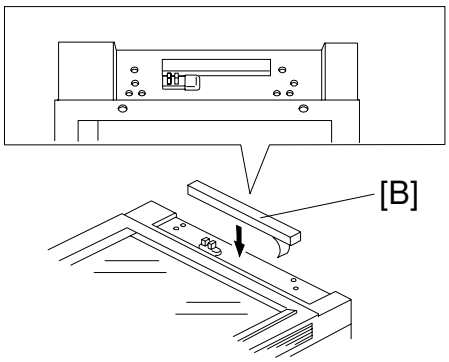
Check the quantity and condition of the accessories in the box with the following list:

Description	Q'ty
1. New equipment Condition Report	1
2. Installation Procedure	1
3. Stud Screw	1
4. Philips Screw with Flat Washer - M4 x 10	1
5. Sponge Retainer	1

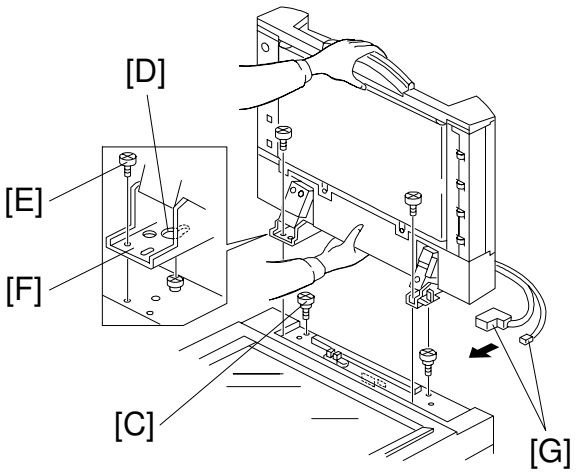
3.4.2 INSTALLATION



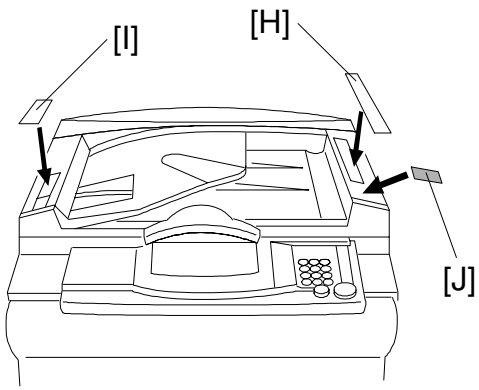
A663I500.WMF



A663I501.WMF



A663I502.WMF



A663I503.WMF

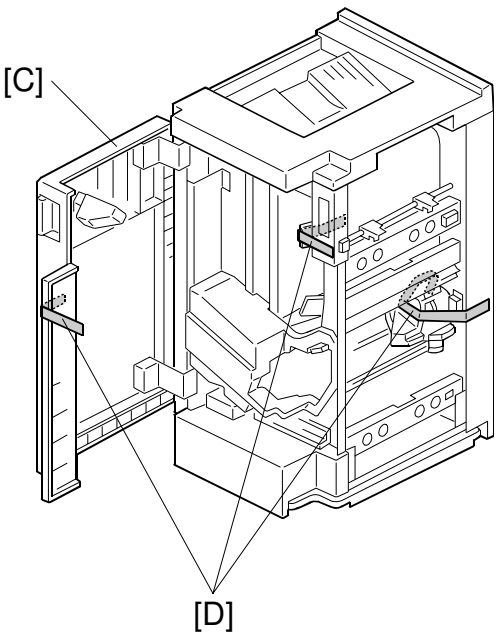
⚠CAUTION

Unplug the copier power cord before starting the following procedure.

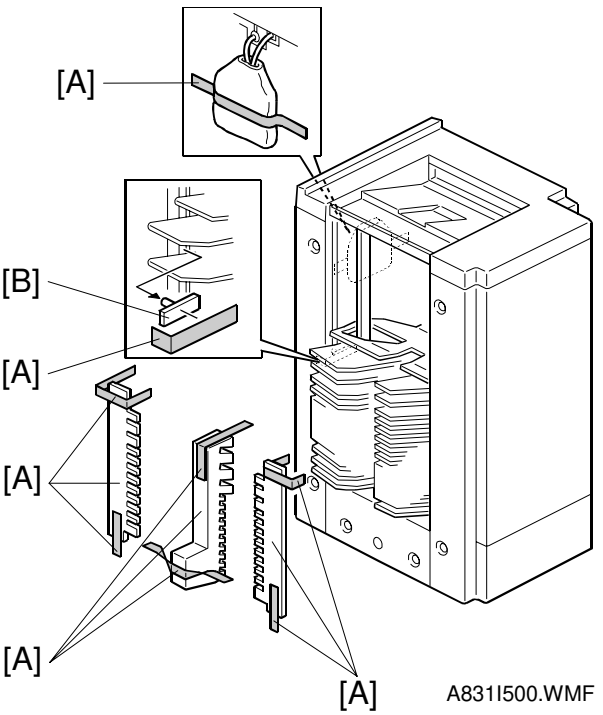
1. Remove the strips of tape [A].
2. Stick the sponge retainer [B] on the top cover of the copier as shown.
3. Tighten the two stud screws [C].
4. Mount the ARDF by aligning the holes [D] in the ARDF and the stud screws [C], then slide the ARDF to the front as shown.
   NOTE: When mounting the ARDF,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

3.5 SORTER STAPLER (A831)

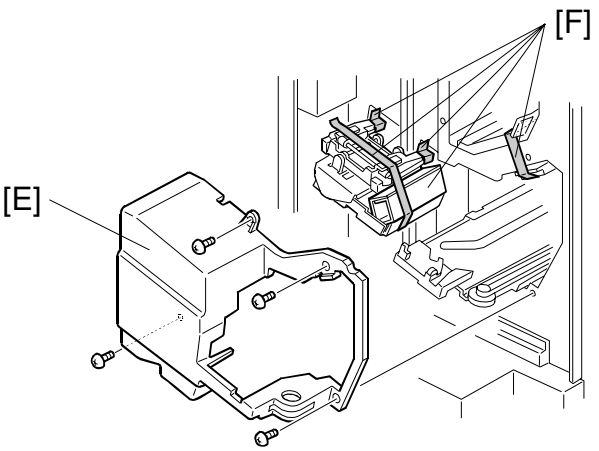
3.5.1 INSTALLATION



A831I501.WMF



A831I500.WMF

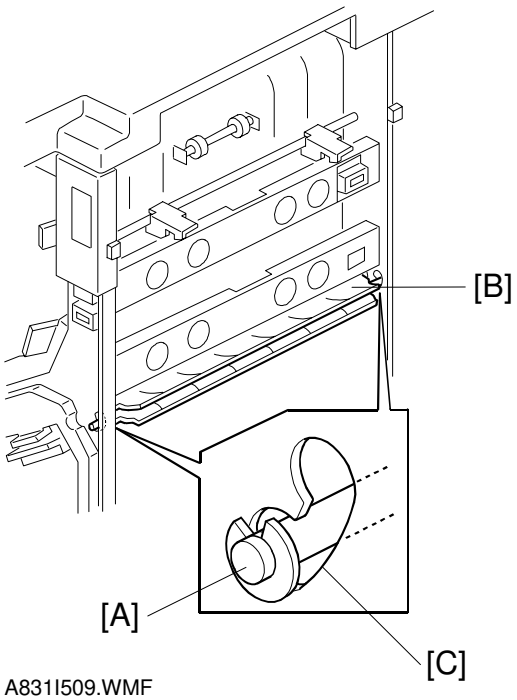


A831I502.WMF

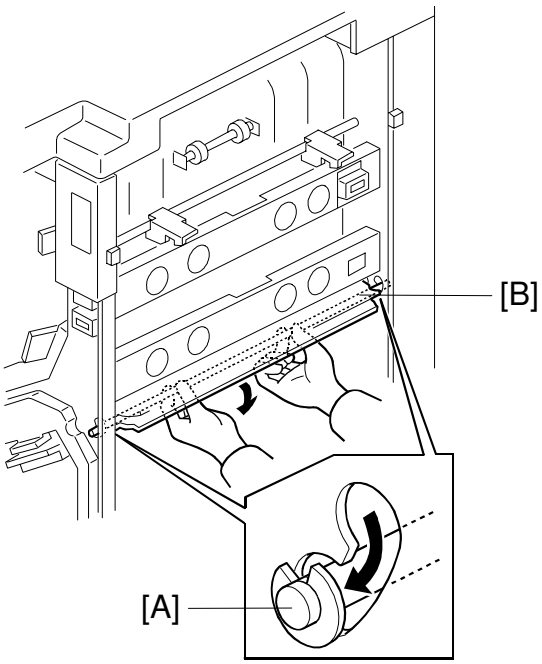
⚠CAUTION

Unplug the copier power cord before starting the following procedure.

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



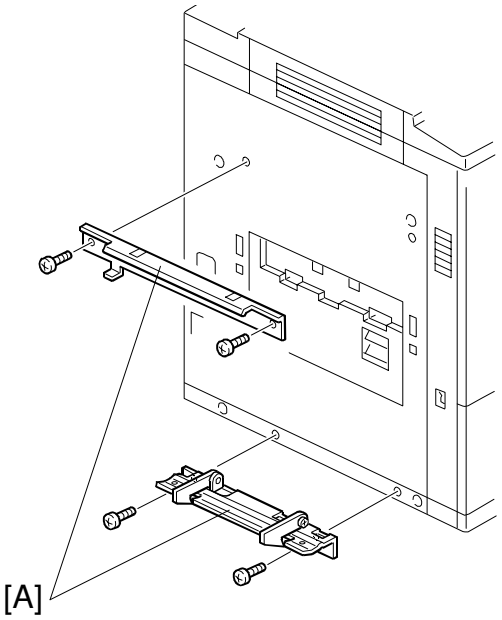
A831I509.WMF



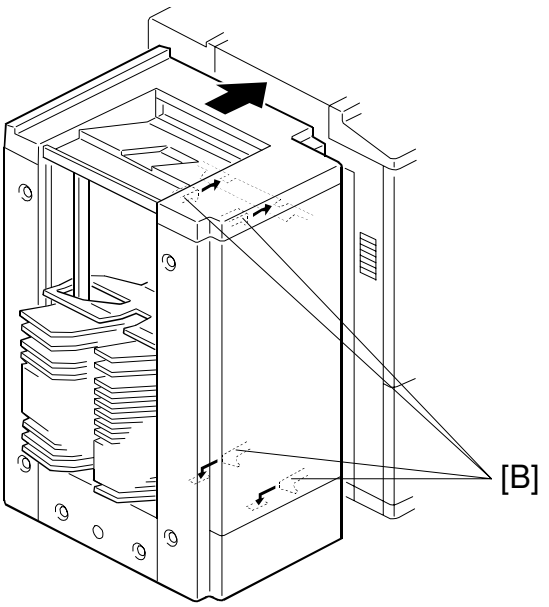
A831I508.WMF

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

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

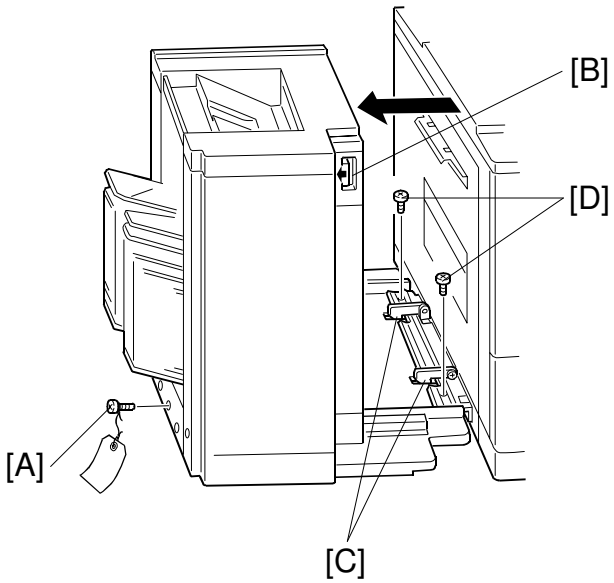


A831I503.WMF

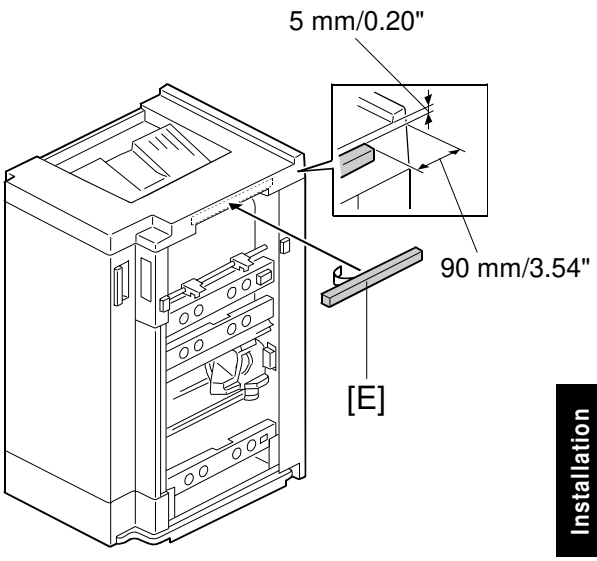


A831I504.WMF

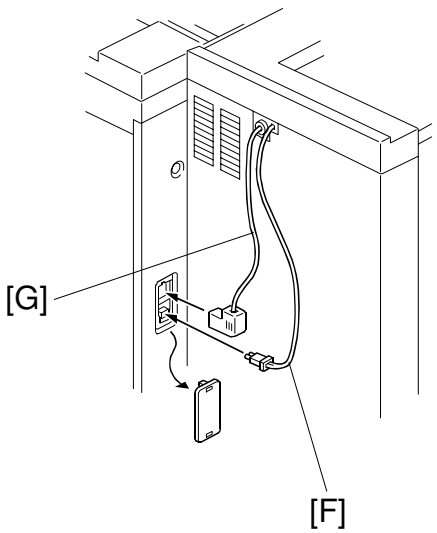
5. Mount the sorter stapler mounting brackets (2 types) [A] on the copier as shown (2 screws for each bracket).
6. Set the sorter stapler to the copier temporarily (4 hooks [B]).



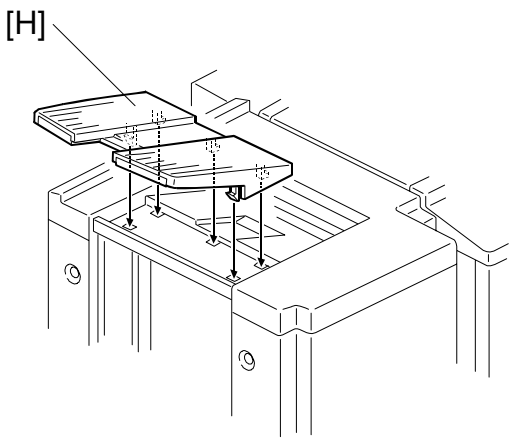
A831I505.WMF



A831I510.WMF



A831I506.WMF



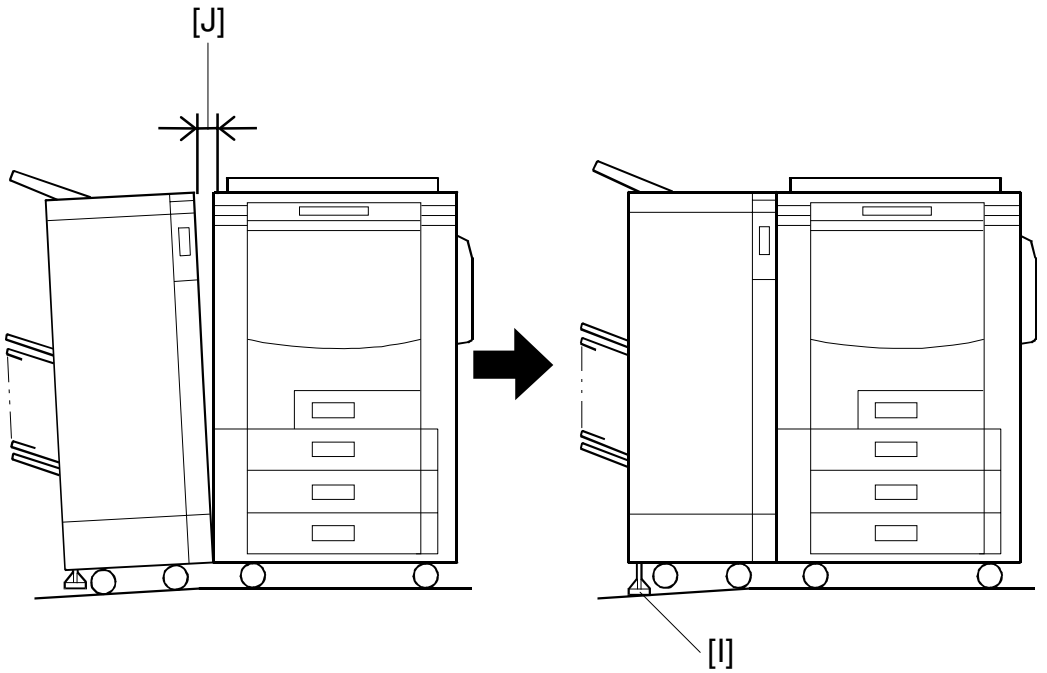
A831I511.WMF

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

⚠CAUTION

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

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

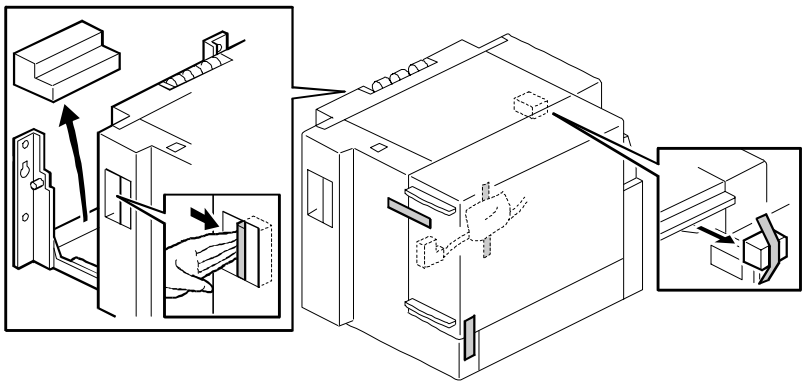


A831I507.WMF

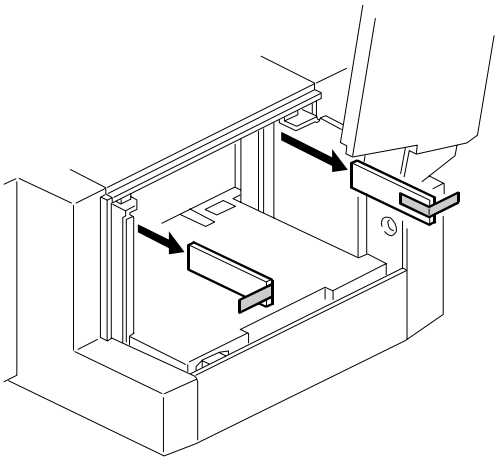
11. Use the height adjuster [I] to eliminate any gap [J] between the sorter stapler and the copier.

3.6 LCT (A683)

3.6.1 INSTALLATION



A683I501.WMF



A683I500.WMF

⚠CAUTION

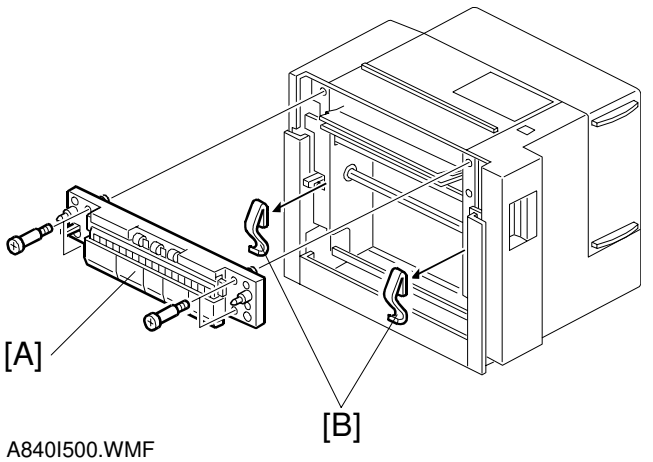
Unplug the main machine power cord before starting the following procedure.

1. Unpack the LCT and remove the tapes.

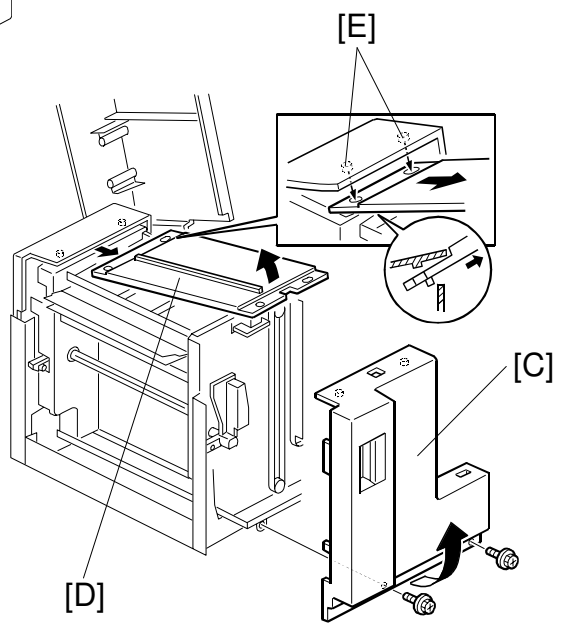
NOTE: For A257/A269 copiers, the LCT Adapter (A840) must be installed at the same time. See the installation procedure of the LCT Adapter (A840) when installing this LCT (A683).

3.7 LCT ADAPTER (A840)

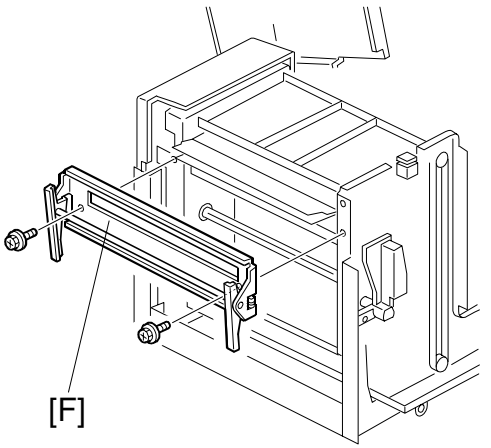
3.7.1 INSTALLATION



A840I500.WMF



A840I501.WMF



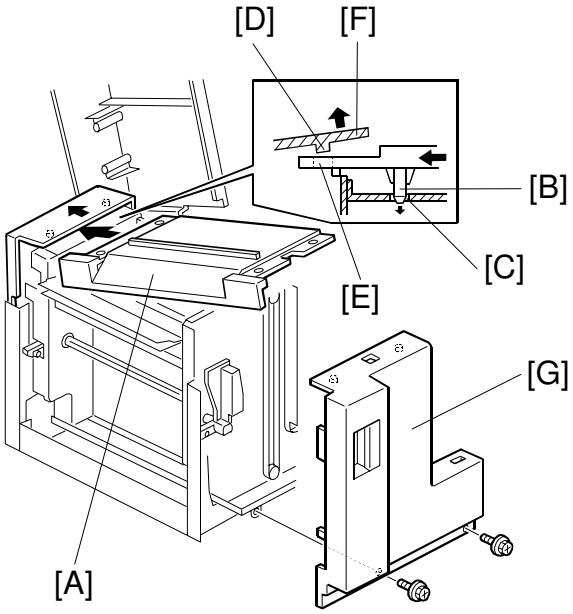
A840I502.WMF

⚠CAUTION

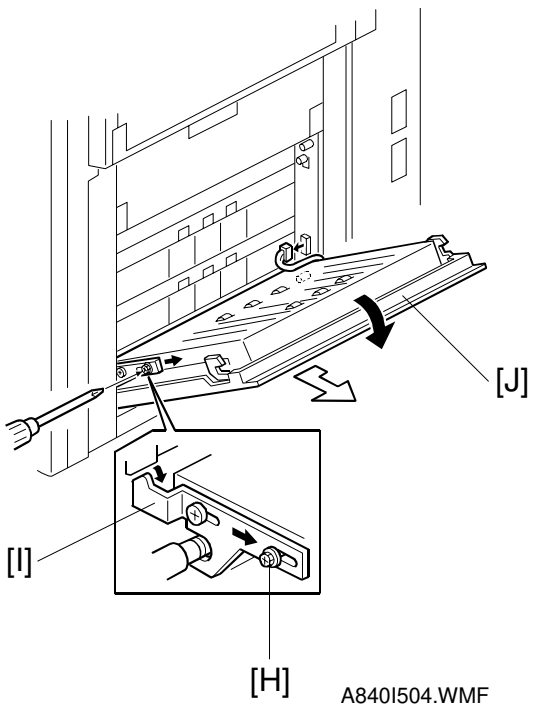
Unplug the copier power code before starting the following procedure.

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

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

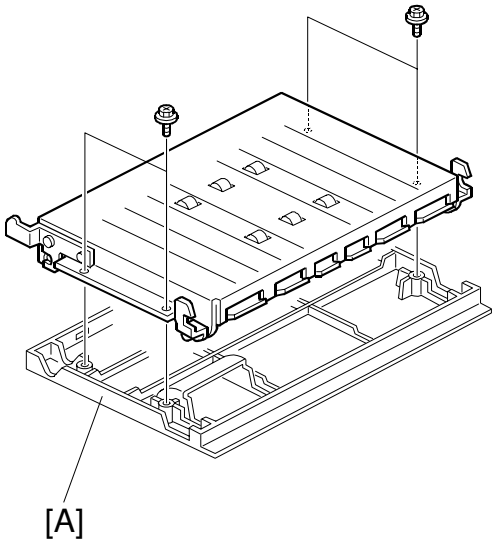


A840I503.WMF

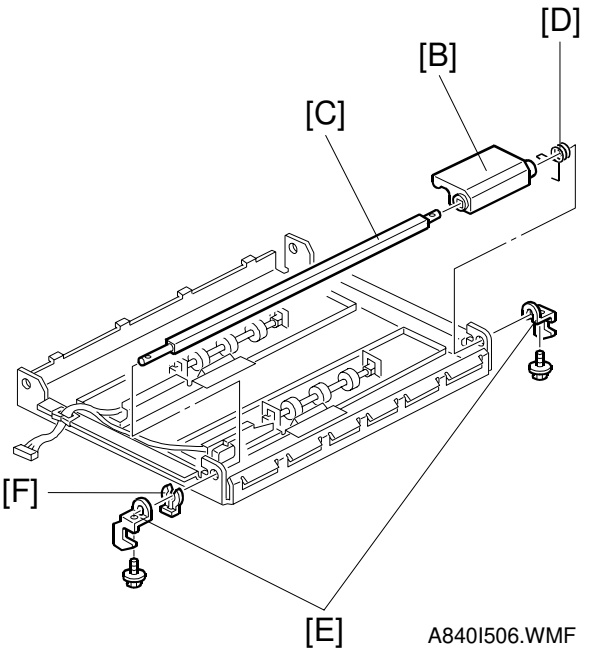


A840I504.WMF

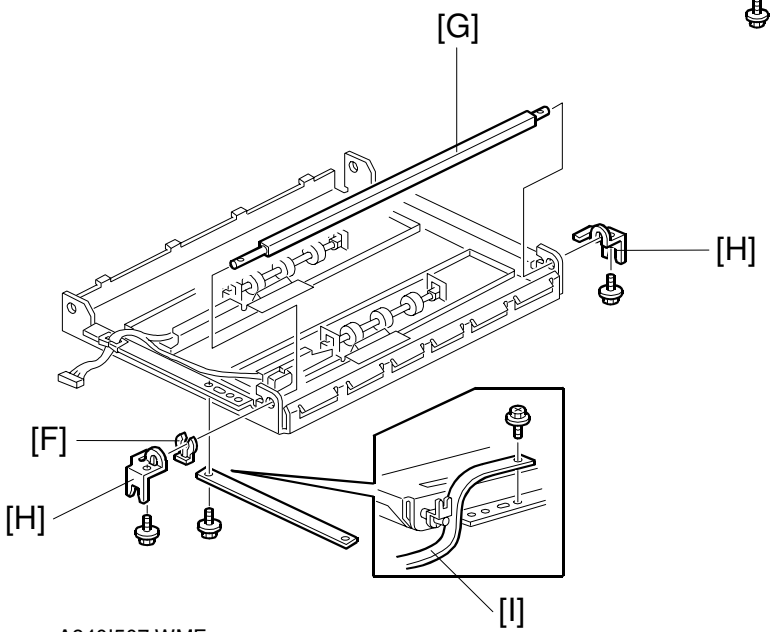
4. Install the upper cover [A], which is included in the LCT adapter kit onto the LCT while lifting up the front side (putting the bosses [B] in the opening [C] at first, then bosses [D] in the openings [E] while lifting the end of cover [F]).
5. Reinstall the LCT front cover [G] (2 screws).
6. Loosen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



A840I505.WMF

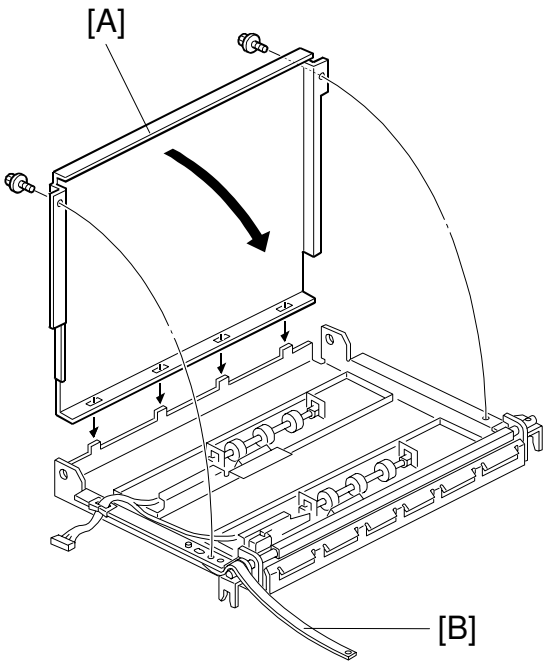


A840I506.WMF

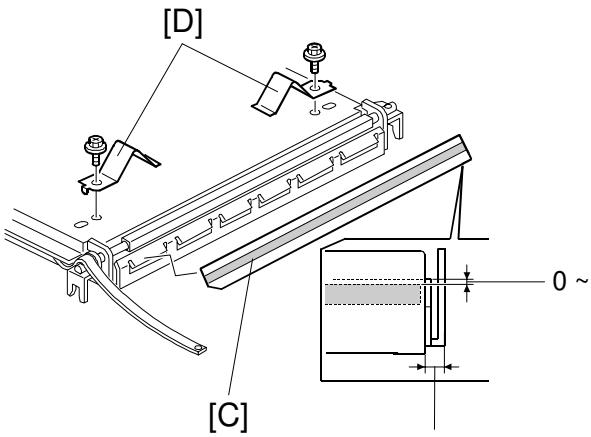


A840I507.WMF

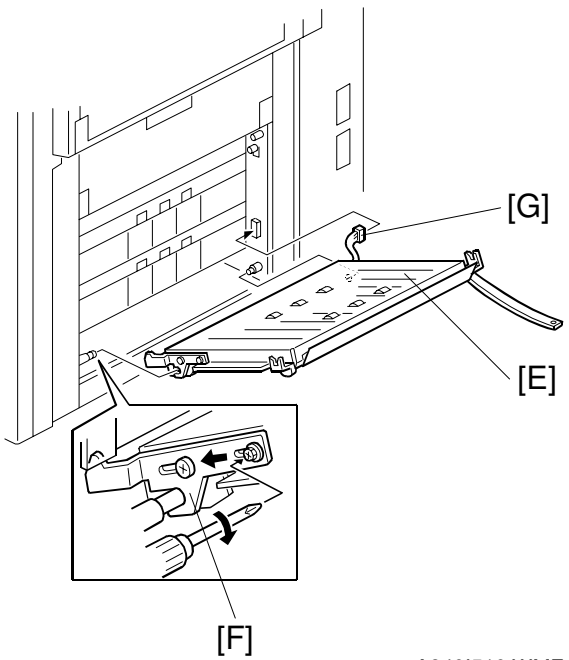
7. Remove the cover [A] from the vertical transport unit (4 screws).
8. Remove the following parts from the vertical transport unit.
   1) Release lever [B]
   2) Release lever shaft [C]
   3) Spring [D]
   4) Hooks [E] (2 screws)
   5) Snap Ring [F]
9. Re-install the release lever shaft [G] using the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



A840I508.WMF

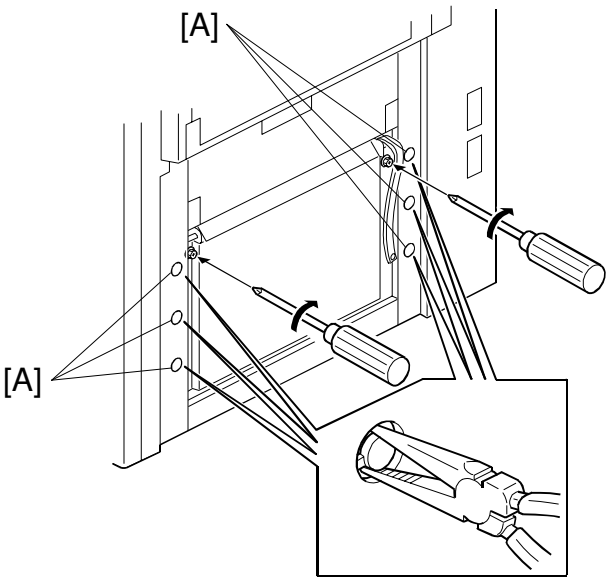


A840I509.WMF

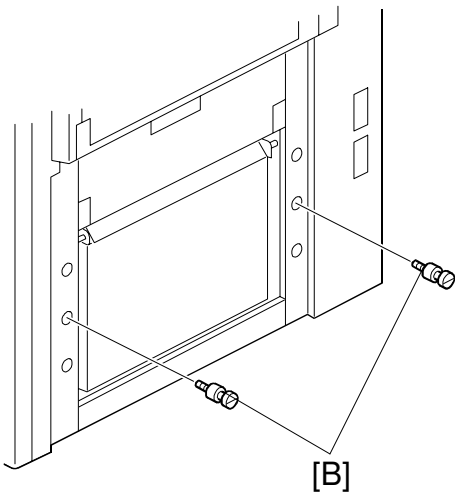


A840I510.WMF

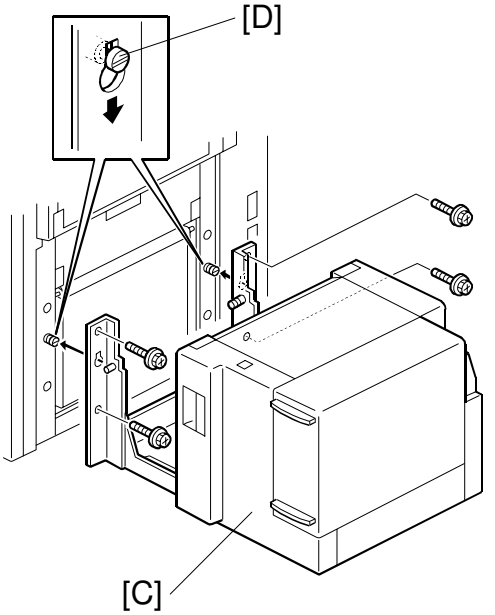
10. Re-install the cover [A] to the vertical transport unit (lightly tighten the 2 screws). Then set the band [B] as shown.
11. Affix the mylar [C] to the vertical transport unit as shown.
    Screw the springs [D] onto the vertical transport unit (1 screw for each spring).
12. Re-install the vertical transport unit [D] to the copier (1 lock plate [E] and 1 connector [F]).



A840I511.WMF

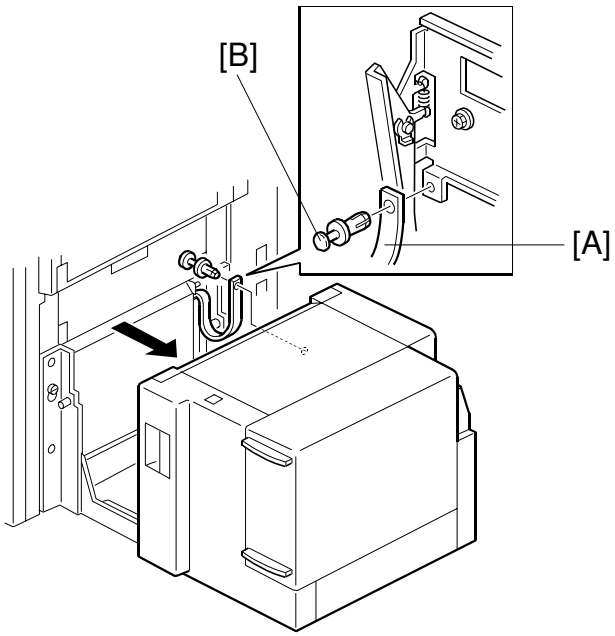


A840I512.WMF

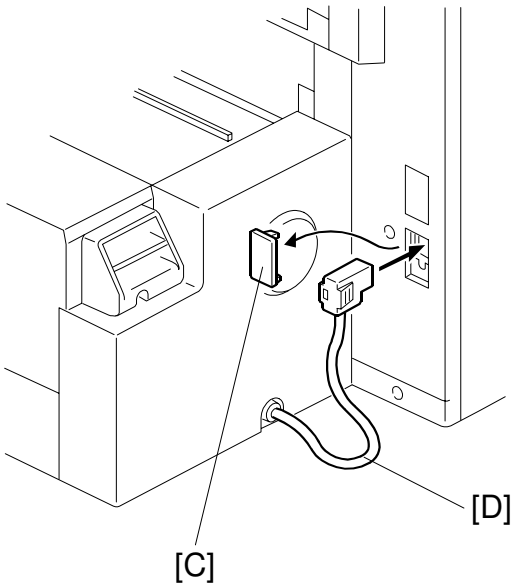


A840I513.WMF

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



A840I515.WMF

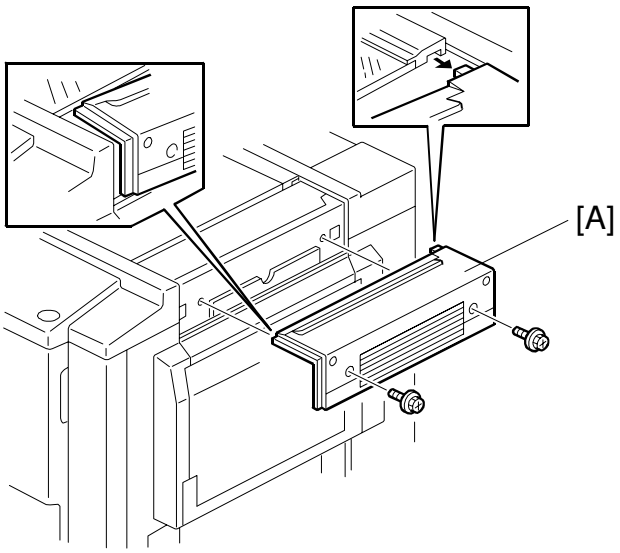


A840I514.WMF

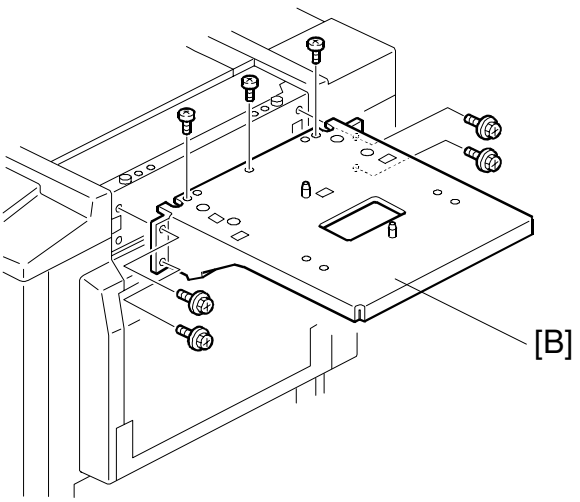
16. Fix the band [A] to the LCT as shown by using the nylon rivet [B].
17. Remove the plastic cap [C] and connect the LCT cable [D] to the copier.

3.8 FILM PROJECTOR TABLE (A702-19)

3.8.1 INSTALLATION

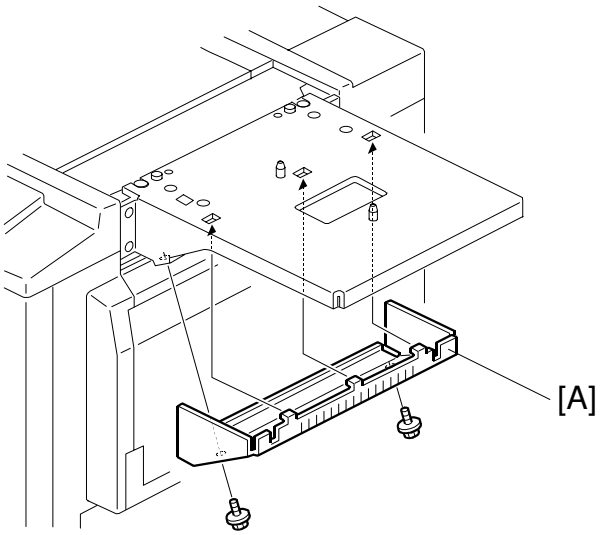


A702I151.WMF

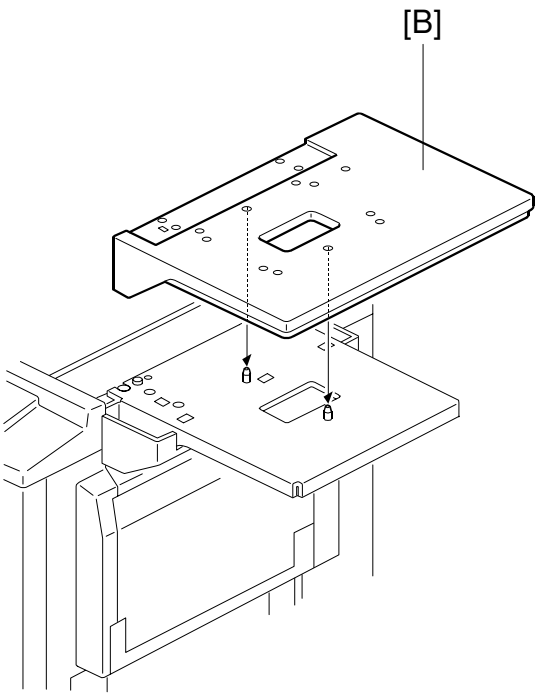


A702I152.WMF

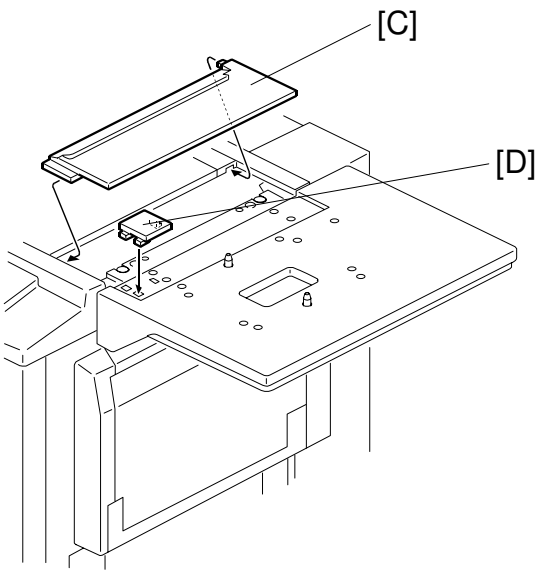
1. Remove the upper right cover [A] (1 screw).
2. Install the table [B] (7 screws).



A702I153.WMF



A702I154.WMF



A702I155.WMF

3. Install the lower cover [A] (2 screws).
4. Install the table cover [B].
5. Install the joint cover [C], and [D].

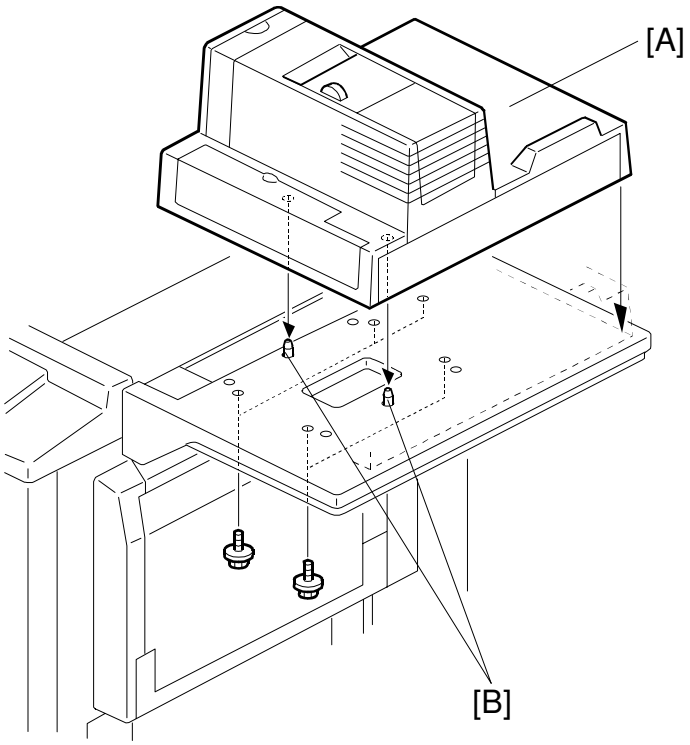
3.9 FILM PROJECTOR UNIT(A846)

3.9.1 ACCESSORY CHECK

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

Description	Q'ty
1. Mirror Unit	1
2. Power Cord	1
3. Film Strip Holder	1
4. Slide Holder	1
5. Glass Mount Holder	1
6. Base Film (FUJI, KODAK, AGFA)	3
7. Slide Mount	1
8. Correction filter (P, N)	2
9. Blower Brush	1
10. Projection Lamp	1
11. Film Position Sheet	2
12. Philips Pan Head Screw - M3 x 12	5
13. Installation Procedure	1

3.9.2 INSTALLATION



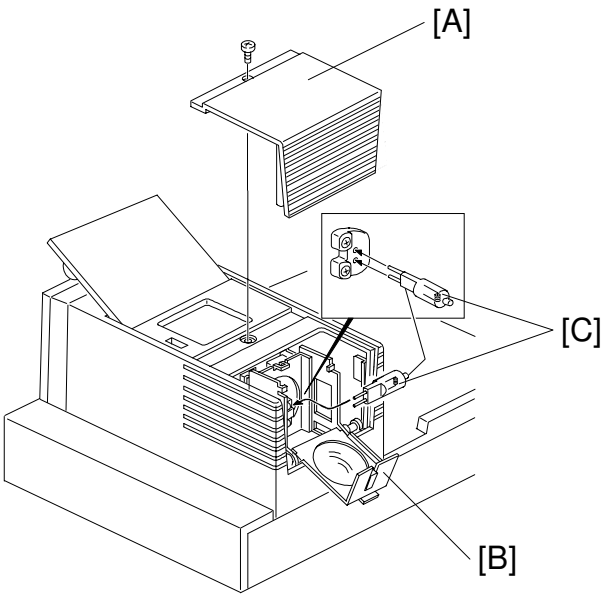
A846I514.WMF

⚠CAUTION

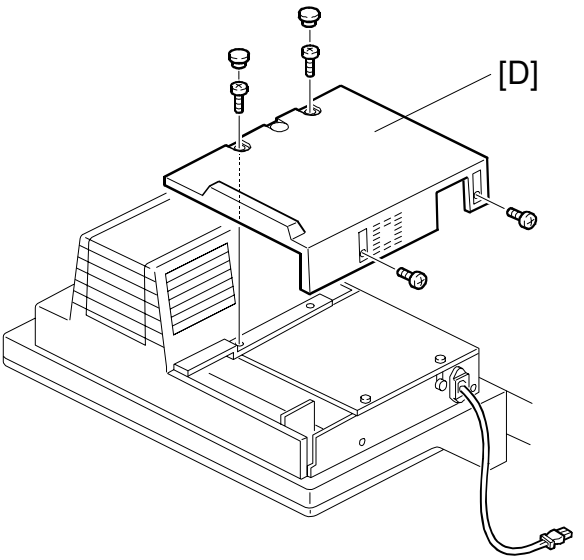
Unplug the copier power cord before starting the following procedure.

NOTE: The film projector table (A702-19) must be installed before starting the following procedure.

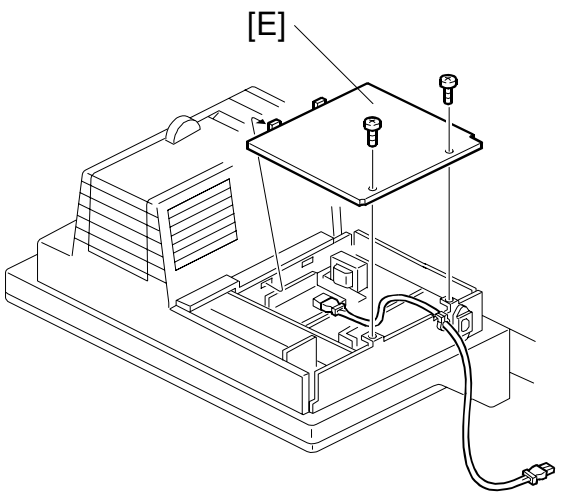
1. Place the projector unit [A] on the Table by aligning the holes of the projector base plate with the positioning pins [B]. Then secure the projector unit with five M3 x 12 screws.



A846I500.WMF

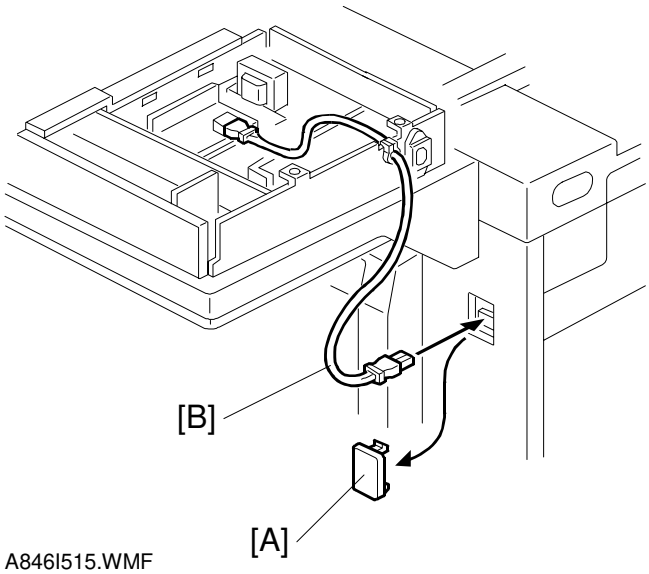


A846I510.WMF

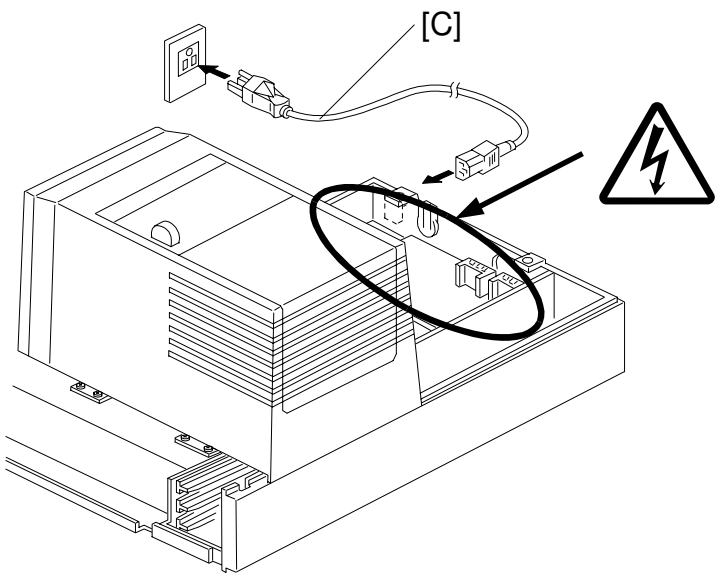


A846I511.WMF

2. Remove the lamp cover [A] (1 screw) and open the reflector cover [B]. Then, plug the projector lamp [C] into the socket. Then close the reflector cover.
   NOTE: The projector lamp should be inserted horizontally until it stops.
3. Remove the cover [D] (2 rubber caps, 4 screws).
4. Remove the inner cover [E] (2 screws).



A846I515.WMF

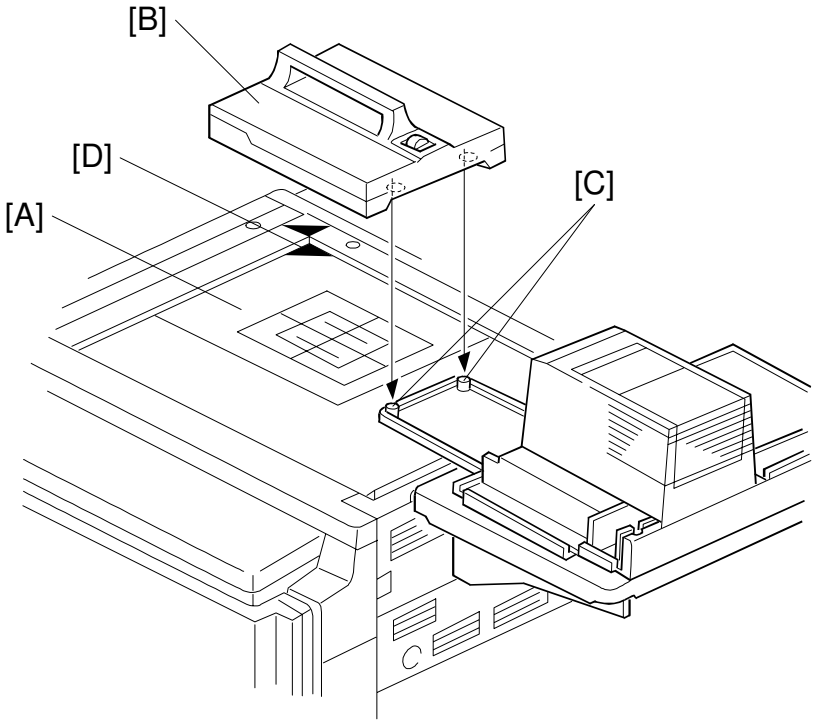


A846I501.WMF

5. Remove the plastic cap [A] and connect the optical fiber cable [B] to the copier.
6. Connect the power cord [C] to the power inlet and plug it into the wall outlet.

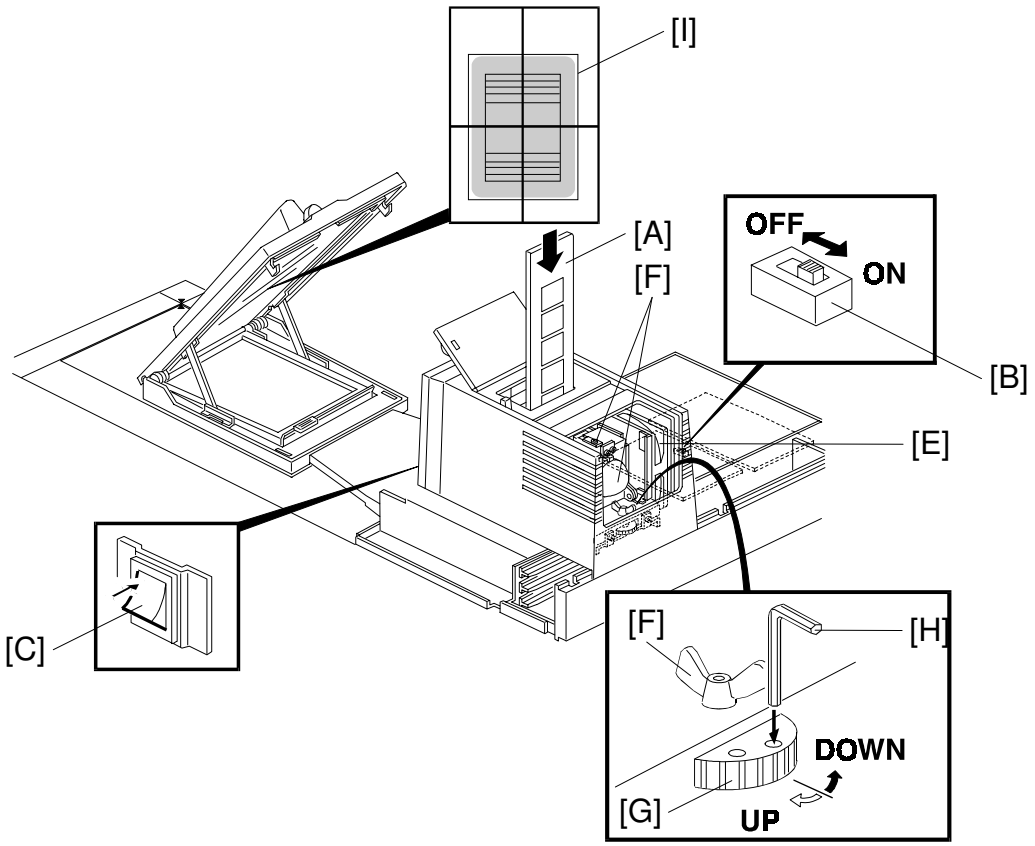
⚠WARNING

After plugging the power cord into the wall outlet, do not touch the electrical components inside the projector unit. Otherwise, you might receive an electrical shock. ⚠



A846I502.WMF

7. Perform the height adjustment as follows.
   1) Place the film position sheet [A] on the exposure glass, aligning it at the rear left corner.
      NOTE: “C” is written at the corner mark [D] on the film position sheet for the A257/A269 copiers.
   2) Put the mirror unit [B] on the exposure glass by aligning the holes with the positioning pins [C] on the lens cover.



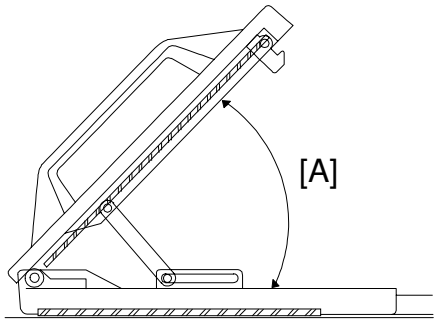
A846I503.WMF

3) Set the film strip holder [A] into the film projector unit at the base film setting position.
   NOTE: Push the film strip holder lightly to confirm that the film strip holder is set correctly.
4) Turn on the test switch [B] on the projector control board and turn on the projector unit main switch [C].

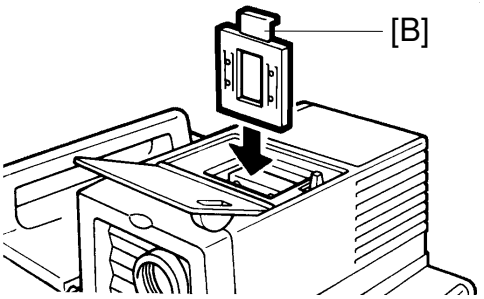
⚠CAUTION

The lamp housing and reflector [D] will become very hot. The lamp cooling fan [E] will start turning suddenly when the lamp housing temperature becomes high. Keep hands away from those components to avoid any injury.

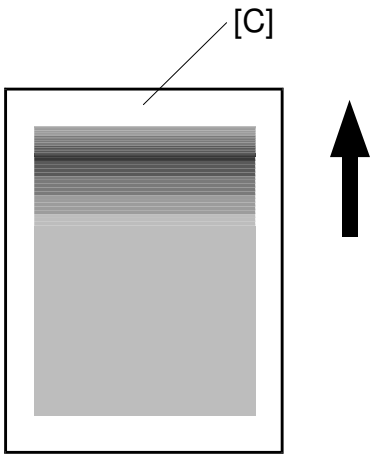
5) Loosen the wing nut [F].
6) Adjust the position of the projected light by turning the dial [G] with a hexagon wrench [H] until it is at the center of the 4" x 5" frame [I] which is reflected in the mirror unit.
7) Tighten the wing nut [F].
8) Turn off the projector main switch and the test switch.
9) Reinstall the lamp cover and other covers.



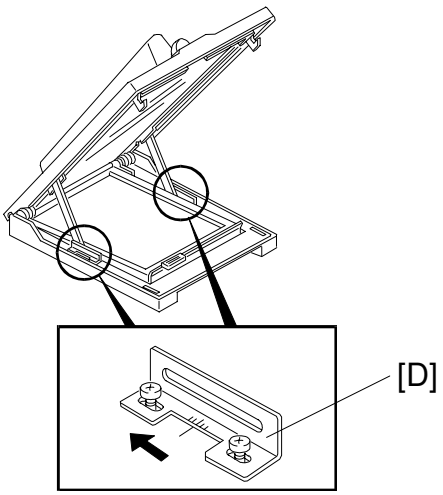
A846I504.WMF



A846I505.PCX

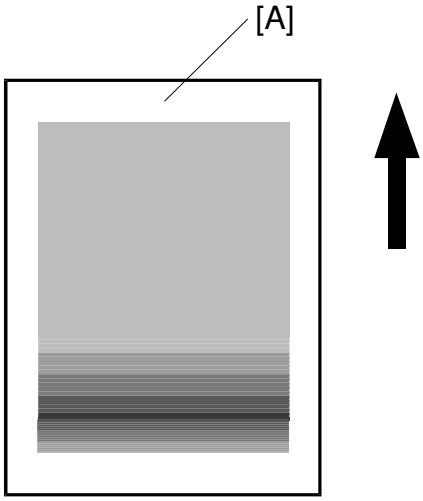


A846I507.WMF

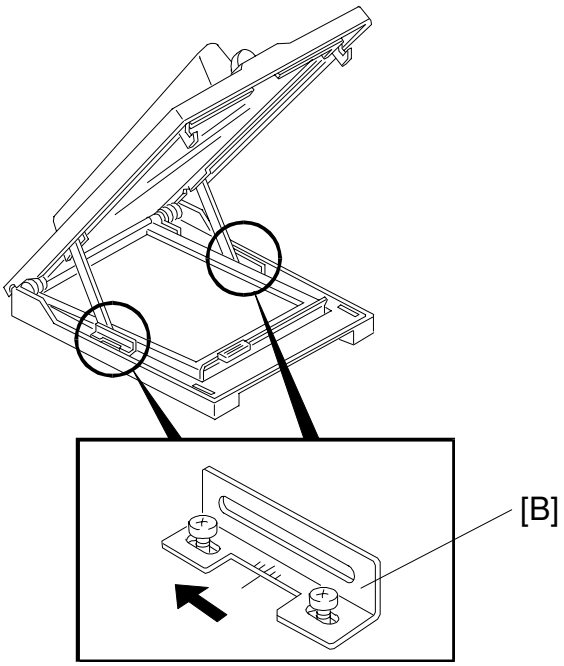


A846I506.WMF

8. Adjust the angle [A] of the mirror unit as follows:
   1) Turn on the copier main switch and wait for the ready condition.
   2) Open the lens cover and position the mirror unit on the exposure glass.
   3) Set the correction filter [B] for positive films in the filter slot.
   4) Turn on the projector main switch and press the option key.
   5) Perform shading using the positive 35 mm slides mode.
   6) Set one of the orange base films in the slide holder and position it in the projector unit.
   7) Make a copy of the orange film.
   8) Check if the orange image is even or not. If the image is uneven, adjust the mirror angle as follows:
      8-1) When the leading part is dark [C].
         a) Move the front and rear arm guides [D] to the left so that the mirror angle is increased (2 screws each).
            NOTE: Position the arm guides at the same location at front and rear, using the ruler decals. This prevents the mirror from being twisted.
         b) Make a copy of the orange film.
         c) Repeat a) and b) until the orange image becomes even.



A846I508.WMF



A846I506.WMF

8-2) When the trailing part is dark [A].

d) Move the front and rear arm guides [B] to the right so that the mirror angle is reduced (2 screws each).

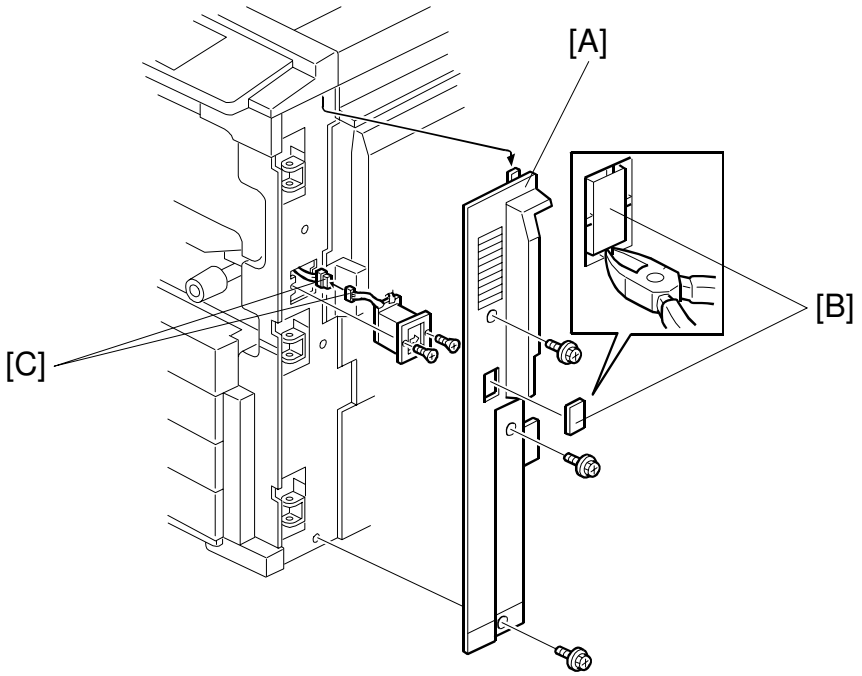
NOTE: Position the arm guides at the same location at front and rear, using the ruler decals. This prevents the mirror from being twisted.

e) Make a copy of the orange film.

f) Repeat a) and b) until the orange image becomes even.

9. Check some copy images from positive or negative films.

3.10 KEY COUNTER HOLDER

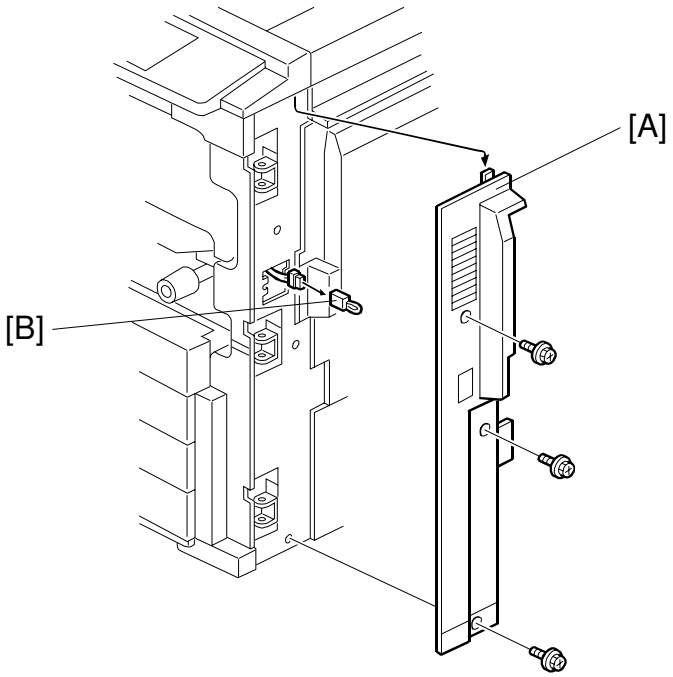


A269I130.WMF

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

3.11 USER CODE SETTING

When “User Code Setting” is used, following procedure is required. (About the “User Code Setting”, see the user tools section of operating instruction.)



A269I200.WMF

1. Remove the right-side front cover [A].
2. Remove the connector coupler [B].
3. Replace the right-side front cover.
4. Set the SP5-113-000 (Key counter/Key card/Coin lock) to 2 (Key counter).
   NOTE: Key counter is not required.

4. SERVICE TABLES

4.1 SERVICE PROGRAM (SP) MODES

4.1.1 HOW TO ENTER AN SP MODE

Follow the procedure below to enter an SP mode.

Reset — Press and hold down for 3 seconds

How to make a copy in SP mode:
The screen switches to the copy mode when you press the Interrupt key ( ) in SP mode. After the copy job is finished, the screen goes back to the SP mode screen when the Interrupt key is pressed again.

A service program number is composed of the 3 levels (first, second and third). There are two ways to access a desired SP mode as follows.

Example; 5 – 009 – 002

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

Method 1. Enter the specific number (first, second, and third levels) of a SP mode using the numeral keys; and then, press the Enter (#) key. You can go directly in the specific SP mode.

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

Method 2. Select a specific SP mode by scrolling down or up and press the OK key to go into the next level.

(Example)
Select “5” by pressing the Next key; then press the OK key. Select “009” by pressing the Next key, then press the OK key. Select “002” by pressing the Next key.

Method 1 & 2. Enter the specific number of a SP mode up to the second level and scroll up or down the screen by pressing Next or Previous key.

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

Pop-up Screen

When the OK key is pressed after the second level of one of the following SP modes is opened on the screen, another screen is popped up on the screen. In total, 11 kinds of pop-up screens are available in the SP mode. (This kind of screen is not used for all SP modes.) A group of related SP modes are displayed on the pop-up screens.

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

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

4.1.2 SP MODE TYPES

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

1) Paper feed/transport/fusing	(1. Feed)
2) Drum unit	(2. Drum)
3) Process control	(3. Process)
4) Scanner unit	(4. Scanner)
5) Operating mode/system	(5. Mode)
6) Peripherals	(6. Periphs)
7) Logged data	(7. Log)
8) Others (special modes)	(8. Special Mode)

( ): Mode name displayed on the screen.

4.1.3 SP MODE CHART

See Appendix for a detailed description of the SP mode items.

4.1.4 SP4-301 APS OPERATION CHECK DETAILS

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

Code	Paper Size
0	No Original
1	A0, Sideways
2	A1, Sideways
3	A2, Sideways
4	A3, Sideways
5	A4, Sideways
6	A5, Sideways
7	A6, Sideways
8	A7, Sideways
9	B0, Sideways
10	B1, Sideways
11	B2, Sideways
12	B3, Sideways
13	B4, Sideways
14	B5, Sideways
15	B6, Sideways
16	B7, Sideways
17	Double postcard, Sideways (200 mm x 148 mm)
18	Postcard, Sideways (A6)
19	Line slider 1, Sideways (210 mm x 170 mm)
20	Line slider 2, Sideways (300 mm x 250 mm)

Code	Paper Size
133	A4, Lengthwise
134	A5, Lengthwise
135	A6, Lengthwise
136	A7, Lengthwise
137	B0, Lengthwise
138	B1, Lengthwise
139	B2, Lengthwise
140	B3, Lengthwise
141	B4, Lengthwise
142	B5, Lengthwise
143	B6, Lengthwise
144	B7, Lengthwise
145	Double postcard, Lengthwise (148 mm x 200 mm)
146	Postcard, Lengthwise (A6)
147	Line slider 1, Lengthwise (170 mm x 210 mm)
148	Line slider 2, Lengthwise (210 mm x 340 mm)
149	Book card 1 (six-folded), Lengthwise (225 mm x 276 mm)
150	Book card 2 (six-folded), Lengthwise (250 mm x 300 mm)
151~159	Not used
160	11" x 17"
161	11" x 14"

Code	Paper Size
21	Book card 1 (six-folded), Sideways (276 mm x 225 mm)
22	Book card 2 (six-folded), Sideways (300 mm x 250 mm)
23~31	Not used
32	17" x 11"
33	14" x 11"
34	15" x 10"
35	14" x 10"
36	14" x 8 1/2"
37	13" x 8 1/2"
38	11" x 8 1/2"
39	14" x 8 1/4"
40	13" x 8 1/2"
41	13" x 8"
42	10 1/2" x 8"
43	10" x 8"
44	8 1/2" x 5 1/2"
45~127	Not used
128	Unidentifiable size
129	A0, Lengthwise
130	A1, Lengthwise
131	A2, Lengthwise
132	A3, Lengthwise

Code	Paper Size
162	10" x 15"
163	10" x 14"
164	8 1/2" x 14"
165	8 1/2" x 13"
166	8 1/2" x 11"
167	8 1/4" x 14"
168	8 1/4" x 13"
169	8" x 13"
170	8" x 10 1/2"
171	8" x 10"
172	5 1/2" x 8 1/2"
173~191	Not used
192	FPU MAX SIZE (145mm x 217.2mm)
193	35mm film S
194	35mm film M
195	4" x 5"
196	60mm x 45mm
197	60mm x 60mm
198	60mm x 70mm
199	60mm x 80mm
200	60mm x 90mm

NOTE: The above table shows the relationship between the registered code numbers and the available paper sizes. This does not mean that all of the above paper sizes can be recognized by APS. For the paper sizes that APS can recognize, see Chapter 1, Section 1.2, “Basic Specifications,” and Chapter 2, Section 3, “Scanner.”

4.1.5 TEST PATTERN

NOTE: The data selected for the test pattern in the following SP modes will not be automatically reset to the default “000” when you go out from the SP mode. Make sure that the data is reset to “000” after the test is finished.

IPU Test pattern (SP 4-417)

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

LD control board test pattern (SP 4-907)

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

4.1.6 SP5-803 INPUT CHECK

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

COPIER

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

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

LCT

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

SORTER

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

ADF

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

4.1.7 SP5-804 OUTPUT CHECK

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

COPIER

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

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

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

OPTIONS (FPU, SORTER, ADF)

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

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

4.1.8 SP5-955 PRINTER INTERNAL PATTERN

5-955-018: Internal Pattern Types

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

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

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

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

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

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

4.2 USER TOOLS

4.2.1 HOW TO ENTER USER TOOLS

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

4.2.2 DETAILED DESCRIPTION OF USER TOOLS

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

4.3 TP/SW/LED/FUSE

4.3.1 MAIN CONTROL BOARD TEST PINS

TP NO.	Signal Name	Description	Stand-by (V)	Remarks
TP101	GND	Ground terminal	0	
TP102	GND	Ground terminal	0	
TP103	/FGATE	/BFGATE signal from the LD control	0 to 5.0	Active L
TP104	ENGY	Save Energy mode	0 to 5.0	Active H
TP105	FB_T2	PTB bias (T2) feedback signal	0 to 5.0	
TP106	FB_T1	ITB bias (T1) feedback signal	0 to 5.0	
TP107	FB_G	Grid bias (G) feedback signal	0 to 5.0	
TP108	BLTPTN	Transfer belt mark detection signal	0 to 5.0	
TP109	FB_C	Charge corona bias (C) feedback signal	0 to 5.0	
TP111	FB_BDC	Development bias (DC) feedback signal	0 to 5.0	
TP112	TMP	Temperature	0 to 5.0	
TP113	HUM	Humidity	0 to 5.0	
TP114	P_SEN2	ID sensor: YMC	0 to 5.0	
TP115	P_SEN1	ID sensor: K	0 to 5.0	
TP116	V_SEN	Potential sensor	0 to 5.0	
TP117	UPHT_TH	Hot roller thermistor	0 to 5.0	
TP118	LWHT_TH	Pressure roller thermistor	0 to 5.0	
TP120	/Z_CROSS	Zero-cross signal	0 to 5.0	Active L
TP121	+5V	5V line	5	
TP122	CLK	System clock	0 to 5.0	Set to 20 MHz when the CPU starts.
TP123	/IACK	**Factory use**		
TP124	/RESET	**Factory use**		
TP125	GND	Ground terminal	0	
TP130	/DSACK1	**Factory use**		
TP131	/DSACK0	**Factory use**		
TP133	/AS	**Factory use**		
TP136	/DME	This signal is generated when the IPU sends all lines of the image data used in the editing function to the main control board.	0 to 5.0	If the screen is blank after scanning the image, check this point. Active L
TP137	/VRAM	**Factory use**		
TP140	Y-	Touch panel Y-axis: Ground	0 to 5.0	
TP141	X-	Touch Panel X-axis: Ground	0 to 5.0	
TP142	X+	Touch Panel X-axis: Power source	0 to 5.0	
TP143	Y+	Touch panel Y-axis: Power source	0 to 5.0	
TP144	YD	**Factory use**		
TP145	LP	**Factory use**		
TP147	GND	Ground terminal	0	
TP148	XCK	**Factory use**		
TP900	+5VB	5V line	5.0	(Held off in the Energy Star mode)

4.3.2 LD MAIN CONTROL BOARD TEST PINS

Pin No.	Signal Level	Signal	Function
TP 1	0~5V	Laser synchronizing signal	When beam reaches to the detector, it outputs 0V. The detector outputs 2 signals at 420 µsec frequency during image writing.
TP 6	0V	Signal ground	Signal ground (can be used as GND during test)
TP17	0~5V	Printer line synchronizing signal	Low (0V) pulses are generated at 210 µsec frequency during image writing.
TP22	0~5V	FGATE signal based on belt mark	Frame gate (FGATE) signal is generated at LD control based on the belt mark signal
TP29	0V	Signal ground	Signal ground (can be used as GND during test)
TP31	0~5V	Belt mark detection signal	Belt mark signal from the image transfer belt

4.3.3 I/O CONTROL BOARD TEST PINS

Location	TP No.	IN/OUT	Name	Stand-by(V)	Remarks
B-1	TP101	IN	Potential sensor		
A-1	TP102	IN	Registration sensor	0 to 5.0	Paper present: High, No paper: Low
A-1	TP103	OUT	ID sensor LED (same function as TP164)	5V pulse	5V: LED OFF Less than 5V: LED ON
B-1	TP104	IN	Fusing motor: OK signal	5.0 to 0	Constant-seed motor rotation: Low
B-1	TP105		GND (5 V)	0	
A-1	TP106	IN	Belt mark detection	0 to 5.0	Mark detection: High
A-2	TP107	IN	Revolver H.P. sensor	0 to 5.0	H.P. position: High
C-1	TP108	IN	ITB cleaning unit H.P. sensor	5.0 to 0	Unit contact: High, Unit released: Low
D-2	TP109	OUT	Not used	5.0 to 0	
B-2	TP110	IN	Registration motor: Clock	5V pulse	
B-2	TP111	OUT	Wire cleaner motor: trigger	5.0 to 0	
D-2	TP112	OUT	Fusing motor	5.0 to 0	Low: Standard speed, High: Half speed
B-2	TP113	OUT	Wire cleaner motor: forward/reverse		Forward: High Reverse: Low
D-2	TP114	OUT	Fusing motor: Trigger	5.0 to 0	ON: Low, OFF: High
B-2	TP115	IN	Registration motor: trigger	5.0 to 0	
B-2	TP116	IN	Toner end sensor	0 to 5.0	ON: Low, OFF: High
C-3	TP117	IN	By-pass table open/close	5.0 to 0	Open: Low, Close: High
D-2	TP118	OUT	Fusing fan (upper)	0 to 5.0	ON: LOW, OFF: High
D-2	TP119	OUT	PTB shift clutch	5.0 to 0	ON: Low
B-2	TP120	IN	Charge current leak detection	5.0 to 0	Leak detected: Low
D-2	TP121	-	—		
D-2	TP122	OUT	Transport fan	5.0 to 0	ON: Low
D-2	TP123	IN	Drum peripheral component motor: OK signal	5.0 to 0	ON: Low
D-2	TP124	OUT	Drum peripheral component motor: trigger	5.0 to 0	ON: Low
D-2	TP125	OUT	PTB motor: trigger	5.0 to 0	ON: Low

Location	TP No.	IN/OUT	Name	Stand-by(V)	Remarks
B-2	TP126	IN	Separation sensor	0 to 5.0	Paper present: High, No paper: Low
D-2	TP127	-	—		
E-2	TP128		GND (5 V)	5	
B-2	TP129		GND (24 V)	24	
C-2	TP130	OUT	Wire cleaner motor: Power up	5.0 to 0	
D-2	TP131	OUT	PTB motor: half speed	5.0 to 0	ON: Low
B-2	TP132	IN	Toner cartridge set sensor	5.0 to 0	Cartridge present: Low, No cartridge: High
D-2	TP133	OUT	PTB discharge corona (Q2): PWM	5.0 to 0	
D-2	TP134	OUT	PTB discharge corona (Q2): trigger	5.0 to 0	ON: Low
B-2	TP135	IN	Drum motor: OK signal	5.0 to 0	Motor constant-speed rotation: Low
C-2	TP136	IN	Wire cleaner motor: over current detection	5.0 to 0	
B-3	TP137	IN	ITB lubricant brush bias (Q1): leak detection	5.0 to 0	
B-3	TP138	OUT	ITB bias (T2): PWM	5V pulse	
B-3	TP139	OUT	Drum motor: brake	0 to 5.0	ON: High, OFF: Low
C-3	TP140	OUT	Charge grid (G): PWM	5.0 to 0	
C-3	TP141	OUT	Development bias (DC): PWM	5.0 to 0	
C-3	TP142	OUT	PTB bias (T2): trigger	5.0 to 0	
C-3	TP143	OUT	Charge corona fan	5.0 to 0	
B-3	TP144	OUT	Drum motor: forward/backward	0 to 5.0	
C-3	TP145	OUT	Charge grid (G): trigger	5.0 to 0	
C-3	TP146	OUT	Development bias (DC): trigger	5.0 to 0	
B-3	TP147	OUT	Drum motor: trigger	5.0 to 0	ON: Low, OFF: 5 V
C-3	TP148	IN	PTB unit H.P. sensor	5.0 to 0	Unit up (contact): Low, Down (release): High
C-3	TP149	IN	PTB discharge corona (Q2): leak detection	5.0 to 0	Leak detection: Low
B-3	TP150	OUT	ITB lubricant brush bias (Q1): PWM	5.0 to 0	
C-3	TP151	OUT	Development cooling fan: half speed	5.0 to 0	ON: Low, OFF: 5 V
C-3	TP152	OUT	ITB cleaning drive clutch	50 to 0	ON: Low, OFF: 5 V
C-3	TP153	IN	ITB motor: OK signal	5.0 to 0	Motor constant-speed rotation: Low
C-3	TP154	IN	PTB motor: OK signal	5.0 to 0	Motor constant-speed rotation: Low
B-3	TP155	OUT	ITB lubricant brush bias (Q1): trigger	5.0 to 0	
D3	TP156	IN	By-pass feed unit switch	5.0 to 0	
B-3	TP157	OUT	Drum motor: half speed	5.0 to 0	Half speed: Low, OFF: 5 V
C-3	TP158	OUT	Development cooling fan: full speed	5.0 to 0	ON: Low, OFF: 5V
C-3	TP159	OUT	Development CL	5.0 to 0	ON: Low, OFF: 5 V
E-3	TP160		5 V	5	
B-3	TP161	OUT	Revolver motor current switch: 2 A	0 to 5.0	High: 2A
B-3	TP162	OUT	Revolver motor current switch: 1 A	0 to 5.0	High: 1A
A-4	TP163	IN	Paper exit sensor	5.0 to 0	Paper present: High, No paper present: Low
B-3	TP164	OUT	ID sensor LED (same function as TP103)	5V pulse	5V: LED OFF Less than 5V: LED ON
B-3	TP165	OUT	Charge (C): trigger	5.0 to 0	ON: Low, OFF: 5 V
B-3	TP166	OUT	Development bias (AC): trigger	5.0 to 0	ON: Low, OFF: 5 V
C-3	TP167	OUT	Fusing fan (bottom)	5.0 to 0	ON: Low, OFF: 5 V
C-3	TP168	OUT	Junction gate SOL	5.0 to 0	ON: Low, OFF: 5 V

Location	TP No.	IN/OUT	Name	Stand-by(V)	Remarks
E-4	TP169	IN	Bypass: paper width sensor: 1	5.0 to 0	Open: High Detection: Low
A-4	TP170	IN	Oil end sensor	5.0 to 0	Oil present: High, Empty: Low
B-4	TP171	IN	Development bias (DC): feedback		
C-4	TP172	IN	PTB bias (T2): feedback		
C-4	TP173	IN	Charge grid (G): feedback		
C-4	TP174		—		
C-4	TP175		—		
E-4	TP176	IN	By-pass: paper width sensor: 2	5.0 to 0	Open: High Detection: Low
B-4	TP177	IN	**Factory use**		
C-4	TP178	OUT	QL	5.0 to 0	ON: Low
C-4	TP179	OUT	Development cooling fan: half speed	5.0 to 0	
C-4	TP180	OUT	Development cooling fan: full speed	5.0 to 0	ON: Low, OFF: 5 V
C-3	TP181	OUT	ITB cleaning shift CL	5.0 to 0	ON: Low
C-4	TP182		—		
C-3	TP183	OUT	Toner supply CL	5.0 to 0	ON: Low, OFF: 5 V
C-4	TP184	OUT	ID sensor fan	5.0 to 0	ON: Low
E-4	TP185	IN	By-pass paper width sensor: 3	5.0 to 0	Open: High Detection: Low
E-4	TP186	IN	By-pass paper width sensor: 4	5.0 to 0	Open: High Detection: Low
A-4	TP187	IN	ID sensor: YMC		
A-4	TP188	IN	ID sensor: K		
B-4	TP189	IN	**Factory use**		
D-4	TP190	OUT	By-pass paper feed clutch	5.0 to 0	ON: Low
D-4	TP191	OUT	Main by-pass pick-up solenoid	5.0 to 0	ON: Low
B-4	TP192	IN	**Factory use**		
D-4	TP193	OUT	Sub by-pass pick-up solenoid	5.0 to 0	ON: Low
D-4	TP194	OUT	By-pass reverse roller Solenoid	5.0 to 0	ON: Low
E-4	TP195		—		
D-4	TP196	OUT	ITB motor: trigger	5.0 to 0	ON: Low
D-4	TP197	OUT	ITB motor: half speed	5.0 to 0	ON: Low
D-4	TP198	OUT	ITB motor: forward/reverse	0 to 5.0	Forward: High, Reverse: Low
E-4	TP199		—		
D-4	TP200	IN	Registration motor: power down	5.0 to 0	
C-4	TP201	IN	Registration motor: current	5.0 to 0	
B-5	TP202		5 V	5	
C-5	TP203	IN	By-pass paper length sensor	0 to 5.0	Sensed: High
C-5	TP205	IN	By-pass paper end sensor	0 to 5.0	Paper present: Low, No paper present: High
C-5	TP206	IN	1st paper feed sensor	0 to 5.0	Paper present: High, No paper present: Low
C-5	TP207	IN	Duplex paper feed sensor	0 to 5.0	Paper present: High, No paper present: Low
C-5	TP208	OUT	1st paper feed clutch	5.0 to 0	ON: Low
D-5	TP209		—		
C-5	TP210	OUT	2nd paper feed clutch	5.0 to 0	ON: Low
D-5	TP211	OUT	1st pickup Solenoid	5.0 to 0	ON: Low
D-5	TP212		—		
C-5	TP213		—		
D-5	TP214	OUT	1st reverse roller Solenoid	5.0 to 0	ON: Low
D-5	TP215	IN	1st upper limit sensor	5.0 to 0	Lift sensed: Low

Location	TP No.	IN/OUT	Name	Stand-by(V)	Remarks
A-5	TP216	IN	Zero-cross signal	5V pulse	
B-5	TP217		**Factory use**		
C-5	TP218		—		
D-5	TP219	OUT	2nd reverse roller solenoid	5.0 to 0	ON: Low
D-5	TP220		—		
B-5	TP221		**Factory use**		
B-5	TP222		**Factory use**		
C-5	TP223	IN	1st paper end sensor	0 to 5.0	Paper present: Low, No paper present: High
C-5	TP225	OUT	1st tray lift motor: forward	0 to 5.0	ON: High
C-5	TP226	OUT	1st tray lift motor: backward	0 to 5.0	ON: High
D-6	TP227	IN	Total counter: 1(K): OK	5.0 to 0	
D-6	TP228	IN	Total counter: 2 (CMY): OK	5.0 to 0	
B-5	TP229	IN	Duplex entrance sensor	5.0 to 0	Paper present: Low
B-5	TP230	IN	Toner overflow sensor	5.0 to 0	Toner full: Low
D-6	TP231	IN	2nd paper height sensor	0 to 5.0	Many: Low, Few: High
A-6	TP232	IN	Pressure roller thermistor		
D-6	TP233	IN	3rd paper height sensor	0 to 5.0	Many: Low, Few: High
A-6	TP234	IN	Hot roller thermistor		
D-6	TP235		—		
A-6	TP236	IN	Humidity sensor		
D-6	TP237	OUT	Total counter: 1	5.0 to 0	ON: Low
D-6	TP238	OUT	Key counter	5.0 to 0	Key counter connected: Low
D-6	TP239	IN	Key counter: OK	5.0 to 0	OK: Low
A-5	TP240	OUT	Pressure roller fusing lamp: trigger	5.0 to 0	
C-6	TP241	OUT	3rd tray lift motor: forward	0 to 5.0	ON: High
C-6	TP242	OUT	3rd tray lift motor: reverse	0 to 5.0	ON: High
D-6	TP243	OUT	Total counter: 2	5.0 to 0	ON: Low
D-6	TP244	OUT	Key card count signal	5.0 to 0	ON: Low
D-6	TP245		—		
D-6	TP246	IN	1st paper height sensor	0 to 5.0	Many: Low, Few: High
A-6	TP247	IN	Temperature sensor		
A-5	TP248	OUT	Hot roller fusing lamp: trigger	5.0 to 0	
C-6	TP249	OUT	2nd tray lift motor: reverse	0 to 5.0	ON: High
C-6	TP250	OUT	2nd tray lift motor: forward	0 to 5.0	ON: High
B-6	TP251	OUT	Side fence jogger motor: phase A	5V pulse	
B-6	TP252	OUT	Paper separation corona (D): PWM	5V pulse	
B-6	TP253	OUT	Side fence jogger motor: phase B	5V pulse	
B-6	TP254	OUT	Paper separation corona (D): trigger	5.0 to 0	ON: Low OFF: 5v
B-6	TP255	OUT	Drum cleaning bias roller (BR): trigger	5.0 to 0	
C-6	TP256	OUT	2nd reverse roller solenoid	5.0 to 0	ON: Low
C-6	TP257	OUT	3rd reverse roller solenoid	5.0 to 0	ON: Low
B-6	TP258		—		
B-6	TP259		—		
C-6	TP260	OUT	3rd feed clutch	5.0 to 0	ON: Low
C-6	TP261	OUT	3rd pick-up solenoid	5.0 to 0	ON: Low
D-6	TP262		GND (5 V)	0	
B-6	TP263		—		
A-5	TP264	IN	ITB bias (T1): feedback		
C-6	TP265	OUT	PCC (AC): trigger	5.0 to 0	
B-6	TP266	OUT	Power relay: printer	5.0 to 0	
B-6	TP267		—		
C-6	TP268	OUT	PCC (DC): trigger	5.0 to 0	
D-6	TP269	IN	Paper feed motor: OK signal	5.0 to 0	

Location	TP No.	IN/OUT	Name	Stand-by(V)	Remarks
B-7	TP270	OUT	Exhaust fan	5.0 to 0	
C-7	TP271	OUT	Paper feed motor: Clock	5V pulse	
B-7	TP272	OUT	ITB bias (T1): PWM	5V pulse	
C-7	TP273	OUT	Paper feed motor: trigger	5.0 to 0	ON: Low
B-7	TP274	OUT	ITB bias (T1): trigger	5V pulse	
B-6	TP275	IN	PCC: leak detection	5.0 to 0	
B-6	TP276	IN	Paper separation corona (D): leak detection	5.0 to 0	Leak sensed: Low, Normal: 5v
B-6	TP277	OUT	Power relay: scanner	5.0 to 0	
C-7	TP278	IN	Key card: OK	5.0 to 0	Key card connected: Low
E-7	TP279	IN	3rd paper end sensor	0 to 5.0	Paper present: Low, No paper: High
E-7	TP280	IN	3rd upper limit sensor	5.0 to 0	Lift sensed: Low
B-8	TP281	IN	Duplex turn sensor	5.0 to 0	Paper present: High, No paper: Low
E-7	TP282	IN	2nd upper limit sensor	5.0 to 0	Lift sensed: Low
B-8	TP283	IN	Duplex entrance sensor	5.0 to 0	Paper present: Low, No paper: High
E-8	TP284	IN	2nd paper end sensor	0 to 5.0	Paper present: Low, No paper: High
B-8	TP285	IN	Duplex paper end sensor	5.0 to 0	Paper present: Low, No paper: High
B-8	TP288	IN	Duplex end fence H.P. sensor	5.0 to 0	HP: Low
B-8	TP289	OUT	End fence jogger motor: phase XA	5V pulse	
B-8	TP293	IN	Duplex side fence H.P. sensor	5.0 to 0	HP: Low
B-8	TP294	OUT	End fence jogger motor: phase A	5V pulse	
C-5	TP295	IN	3rd paper feed sensor	0 to 5.0	Paper present: High, No paper: Low
B-8	TP296	IN	Duplex set detection	0 to 5.0	Set sensed: Low, Not set: 5v
B-8	TP297	OUT	Side fence jogger motor: phase XB	5V pulse	
B-8	TP298	OUT	Side fence jogger motor: phase XA	5V pulse	
B-8	TP299	IN	3rd tray paper size switch: 1	5.0 to 0	ON: Low OFF: 5 V
B-8	TP300	IN	3rd tray paper size switch: 2	5.0 to 0	ON: Low OFF: 5 V
B-8	TP301	IN	3rd tray paper size switch: 3	5.0 to 0	ON: Low OFF: 5 V
B-8	TP302	OUT	Duplex feed motor: power down	5.0 to 0	
B-8	TP305	IN	3rd tray paper size switch: 4	5.0 to 0	ON: Low OFF: 5 V
B-8	TP306	OUT	End fence jogger motor: phase B	5V pulse	
B-8	TP307	OUT	Duplex feed motor: trigger	5.0 to 0	ON: Low (open collector)
B-8	TP312	IN	3rd tray paper size switch: 5	5.0 to 0	ON: Low OFF: 5 V
B-8	TP313	OUT	End fence jogger motor: phase XB	5V pulse	
B-8	TP314	OUT	Duplex feed motor: forward/reverse	5.0 to 0	Forward: Low (open collector), Reverse: High
D-5	TP315	IN	3rd paper feed sensor	0 to 5.0	Paper present: High, No paper present: Low
B-8	TP316		—		
B-8	TP317	OUT	Duplex feed motor: Clock	5V pulse	
B-8	TP318	IN	1st tray set switch	5.0 to 0	Set: Low
A-5	TP319	OUT	Sleep Mode ON	5.0 to 0	
B-8	TP321	IN	2nd tray paper size switch: 5	5.0 to 0	ON: Low OFF: 5 V
B-8	TP322	IN	2nd tray paper size switch: 4	5.0 to 0	ON: Low OFF: 5 V
B-9	TP325	IN	2nd tray paper size switch: 3	5.0 to 0	ON: Low OFF: 5 V
B-9	TP326	IN	2nd tray paper size switch: 2	5.0 to 0	ON: Low OFF: 5 V
B-9	TP327	IN	2nd tray paper size switch: 1	5.0 to 0	ON: Low OFF: 5 V

Location	TP No.	IN/OUT	Name	Stand-by(V)	Remarks
D-3	TP333		GND (24 V)	0	
C-8	TP340		+12 V	12.0 V	
C-8	TP341		– 12 V	12 V	
D-8	TP342		GND (24 V)	0	
C-6	TP343	IN	Paper exist door open/close	5.0 to 0	
D-8	TP344	IN	Vertical transport door open/close	5.0 to 0	
D-8	TP345	IN	Front door open/close	5.0 to 0	
C-8	TP346		24 V (VAA2)	24	
D-8	TP347		GND (38 V)	0	
C-8	TP348		5 V	5	
D-8	TP349		38 V	38	
C-8	TP350		24 V (VAA1)	24	
C-8	TP351		24 V (VAA3)	24	
C-8	TP352		5 V (VCC1A)	5	
C-9	TP353		GND (5 VA)	0	
B-9	TP354		GND (5 V)	0	
B-9	TP355		5VE	5	
E-1	TP356		ITB motor FG signal	5V pulse	

4.3.4 FUSE SPECIFICATIONS

Fuse No.	NA	EU AA	Line	Rating	Major Load	Condition	Fusing Lamps	Exposure Lamp
101	Used	Not used	AC	250V/15A	Fusing lamps	SC558 is displayed.	OFF	OFF
102	Used	Used	AC	NA: 125V/10A EU: 250V/6.3A	Main switch	Copier does not function at all.	OFF	OFF
103	Not used	Used	AC	250V/4A	Main Switch	Copier does not function at all.	OFF	OFF
301	Used	Used	AC	NA: 125V/5A EU: 250V/4A	Scanner lamp, anti-condensation heater	SC101 is displayed after the warm-up of the development unit is completed.	Normal function	OFF
1	Used	Used	DC24V	NA: 125V/6.3A EU: 250V/6.3A	Drum motor, revolver motor	SC440 is displayed after the machine warm-up starts.	OFF	OFF
2	Used	Used	DC24V	NA: 125V/6.3A EU: 250V/6.3A	High-voltage power supply boards, ITB/PTB motors	Front door open stays ON.	OFF	OFF
3	Used	Used	DC24V	NA: 125V/6.3A EU: 250V/6.3A	Solenoid, fan, clutches, sensors. Etc.	Door open (By-pass feed unit and vertical transport doors) stays ON.	OFF	OFF
4	Used	Used	DC24V	NA: 125V/6.3A EU: 250V/6.3A	S/S, ADF, LCT	S/S and ADF are not detected. SC505 is detected when LCT is equipped.	Normal function	Normal function
5	Used	Used	DC24V	NA: 125V/6.3A EU: 250V/6.3A	Scanner, printer	SC101 is displayed after the warm-up of the development unit is completed.	Normal function	OFF
6	Used	Used	DC38V	NA: 125V/6.3A EU: 250V/6.3A	Revolver motor, fusing motor, etc.	Power goes down just after the scanner starts moving.	OFF	OFF
7	Used	Used	DC17V	NA: 125V/2A EU: 250V/2A	Main scanner IPU	SC172 is displayed.	OFF	OFF
31	Used	Used	5V, 5VE	NA: 250V/3.15A EU: 250V/2A	All 5V, 5VE	Copier does not function at all.	OFF	OFF
71	Used	Used	DC -12V	250V/2A	Operation panel, I/O	SC302 is displayed just after the warm-up starts.	OFF	OFF
81	Used	Used	DC12V	NA: 125V/3.15A EU: 250V/3.15A	Operation panel, I/O, etc.	No indicators on the operation panel lit. Copier stops just after the warm-up starts.	OFF	OFF
71, 81	When both the fuses are blown					Same as Fuse 81	OFF	OFF
3, 7						Same as Fuse 3	OFF	OFF
3, 31						Same as Fuse 31	OFF	OFF
3, 71						Same as Fuse 3	OFF	OFF
3, 81						No indicators on the operation panel lit and the copier does not start warm-up.	OFF	OFF
Vcc1	When the power line is opened				5V lines for normal copy	Copier does not function at all.	OFF	OFF
Vcc2					5V line for sleep mode		OFF	OFF

Service Tables

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

4.3.5 LED/SW SPECIFICATIONS OF SCANNER IPU BOARD

LED Specifications

LED	Condition at check timing		
	Software Up-grade from IC card	**After scanner startup**	**AGC (at shading)**
LED1	Blinking: IC card/flash memory verification error	–	Blinking (400 ms intervals): Black level O/E difference correction error (1st NG) Blinking (1.6 s intervals): Black level O/E difference correction error (2nd NG)
LED2	Blinking: Data polling error	–	Blinking (400 ms intervals): Black level correction error (1st NG) Blinking (1.6 s intervals): Black level correction error (2nd NG)
LED3	Light: Installation in progress Blinking: Flash memory erase error	–	Blinking (400 ms intervals): NG condition on white level correction error
LED4	–	Blinking: Normal operation Light (or OFF): Scanner functioning error	–
LED5	FGATE signal monitor LED lights when receiving the FGATE signal from the LD control board to control the image output timing.		
LED6	Image data signal monitor Monitors 8th bit of the Image data sent from IPU to the LD control board; and, LED lights when the data in 8th bit is “1”.		

SW Specifications

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

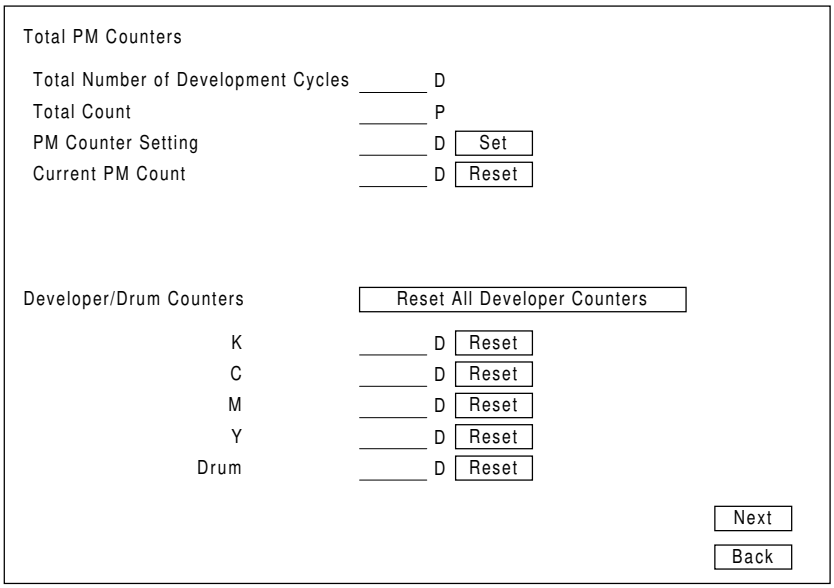
5. PREVENTIVE MAINTENANCE

5.1 PM PROCEDURES

5.1.1 PM-RELATED COUNTERS

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

SP7-803 (PM Counter Display)



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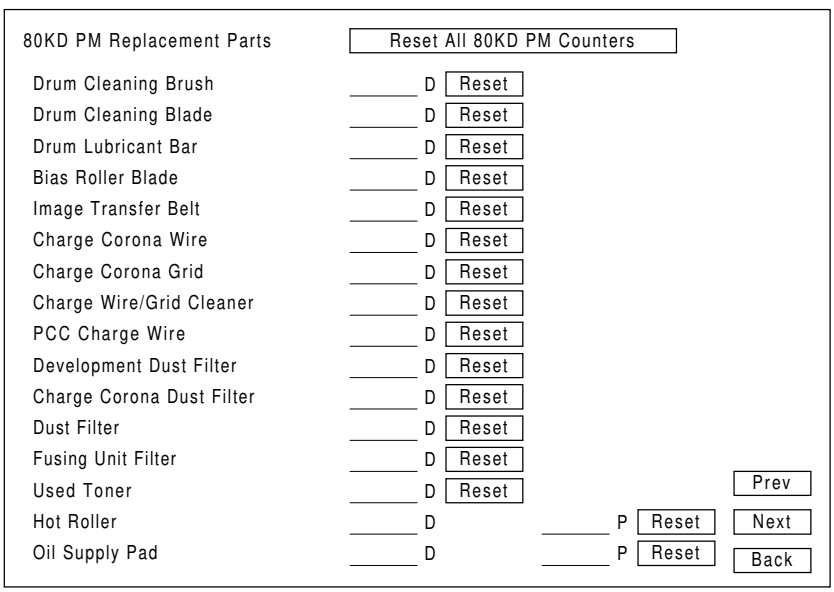

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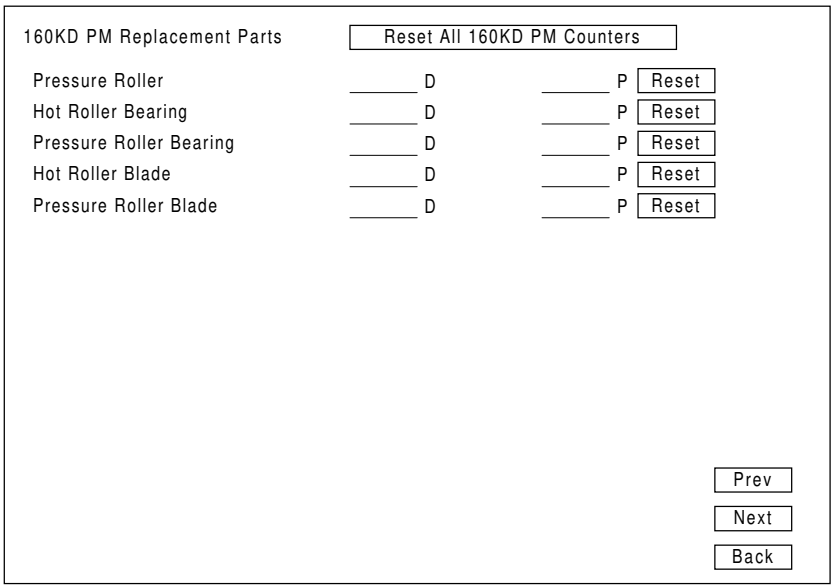

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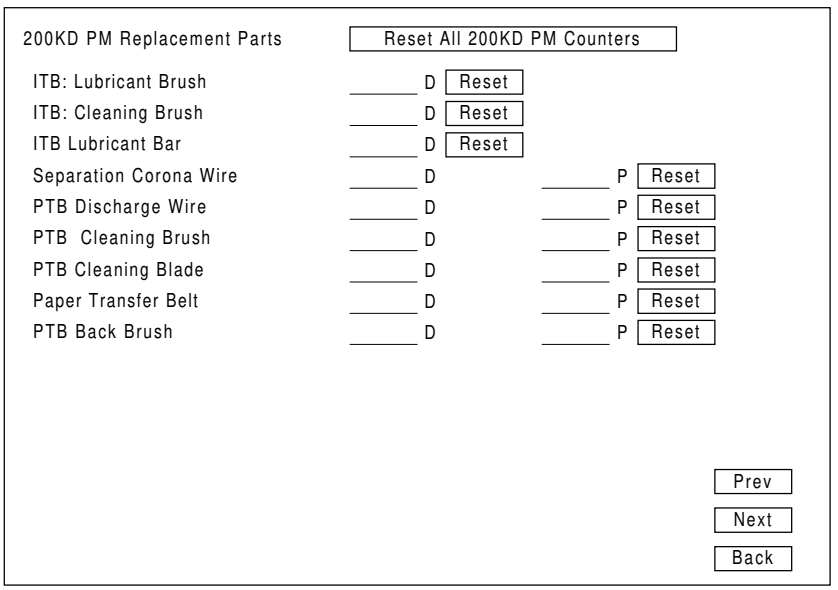

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400KD PM Replacement Parts		Reset All 400KD PM Counters			
1st Tray	Pick-up Roller	0000000 D	0000000 P	Reset	
1st Tray	Feed Roller	0000000 D	0000000 P	Reset	
1st Tray	Reverse Roller	0000000 D	0000000 P	Reset	
2nd Tray	Pick-up Roller	0000000 D	0000000 P	Reset	
2nd Tray	Feed Roller	0000000 D	0000000 P	Reset	
2nd Tray	Reverse Roller	0000000 D	0000000 P	Reset	
3rd Tray	Pick-up Roller	0000000 D	0000000 P	Reset	
3rd Tray	Feed Roller	0000000 D	0000000 P	Reset	
3rd Tray	Reverse Roller	0000000 D	0000000 P	Reset	
Duplex Unit	Feed Roller	0000000 D	0000000 P	Reset	
Duplex Unit	Reverse Roller	0000000 D	0000000 P	Reset	
Duplex Unit	Bottom Plate Pad	0000000 D	0000000 P	Reset	
		0000000 D	0000000 P	Reset	Prev
		0000000 D	0000000 P	Reset	Next
					Back

A269P508.WMF

Others		Reset All Counters			
By-pass Tray	Pick-up Roller	0000000 D	0000000 P	Reset	
By-pass Tray	Feed Roller	0000000 D	0000000 P	Reset	
By-pass Tray	Reverse Roller	0000000 D	0000000 P	Reset	
LCT	Pick-up Roller	0000000 D	0000000 P	Reset	
LCT	Feed Roller	0000000 D	0000000 P	Reset	
LCT	Reverse Roller	0000000 D	0000000 P	Reset	
ARDF	Transport Belt	0000000 O		Reset	
ARDF	Separation Belt	0000000 O		Reset	
ARDF	Separation Roller	0000000 O		Reset	Back
Print PM counter		Print			Prev
					Back

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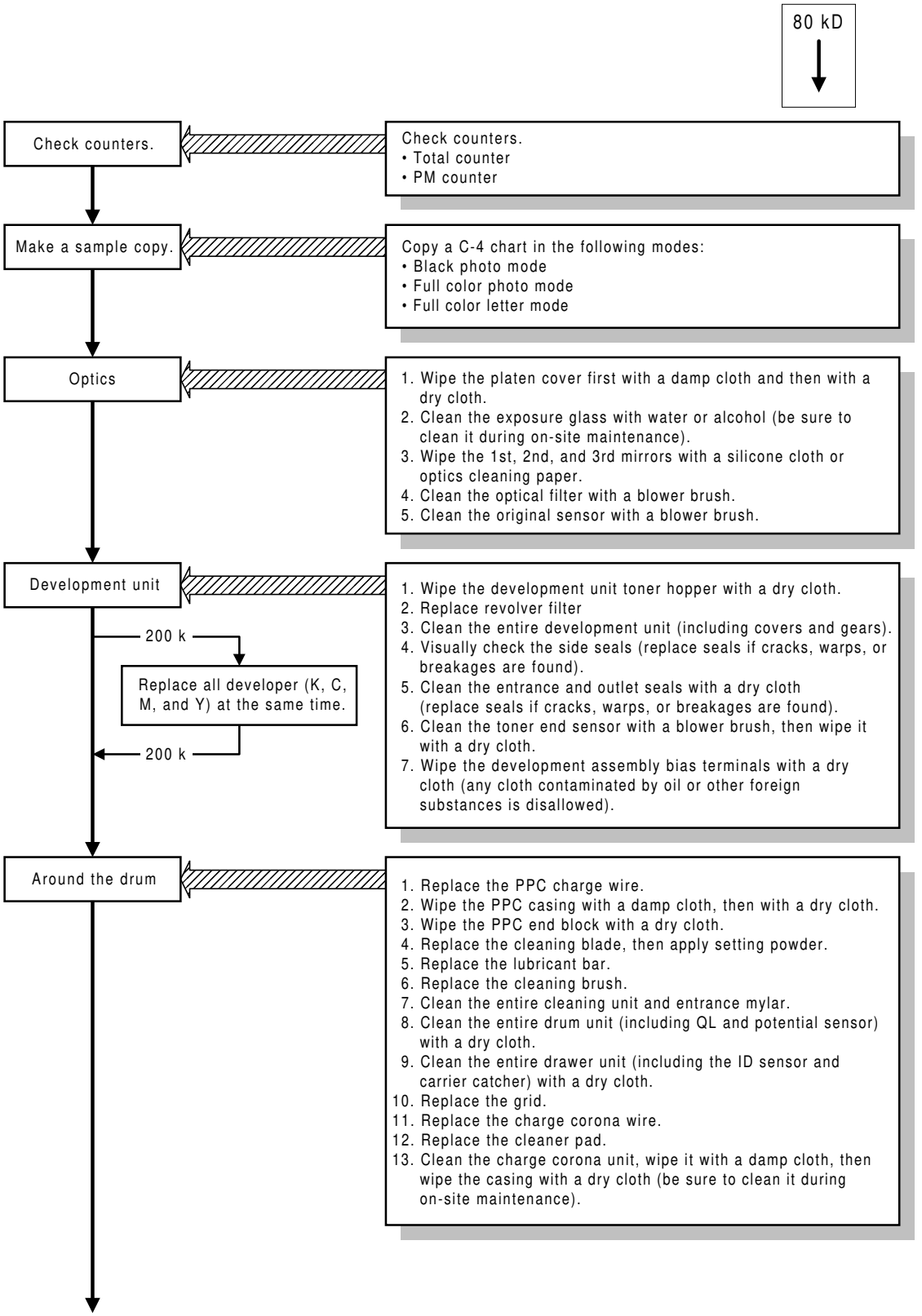
Preventive Maintenance

5.1.2 REGULAR PREVENTIVE MAINTENANCE FLOW DIAGRAM



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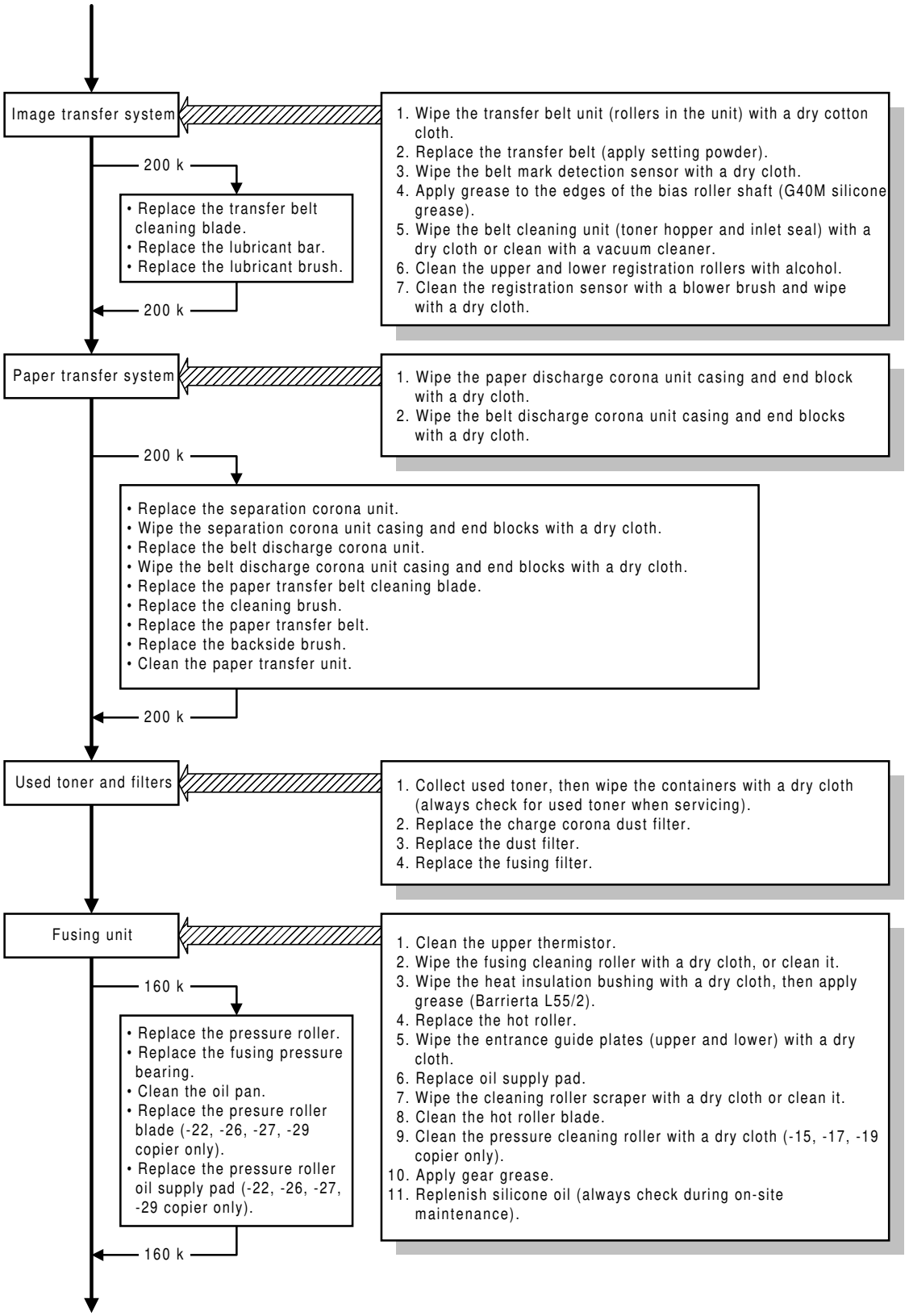

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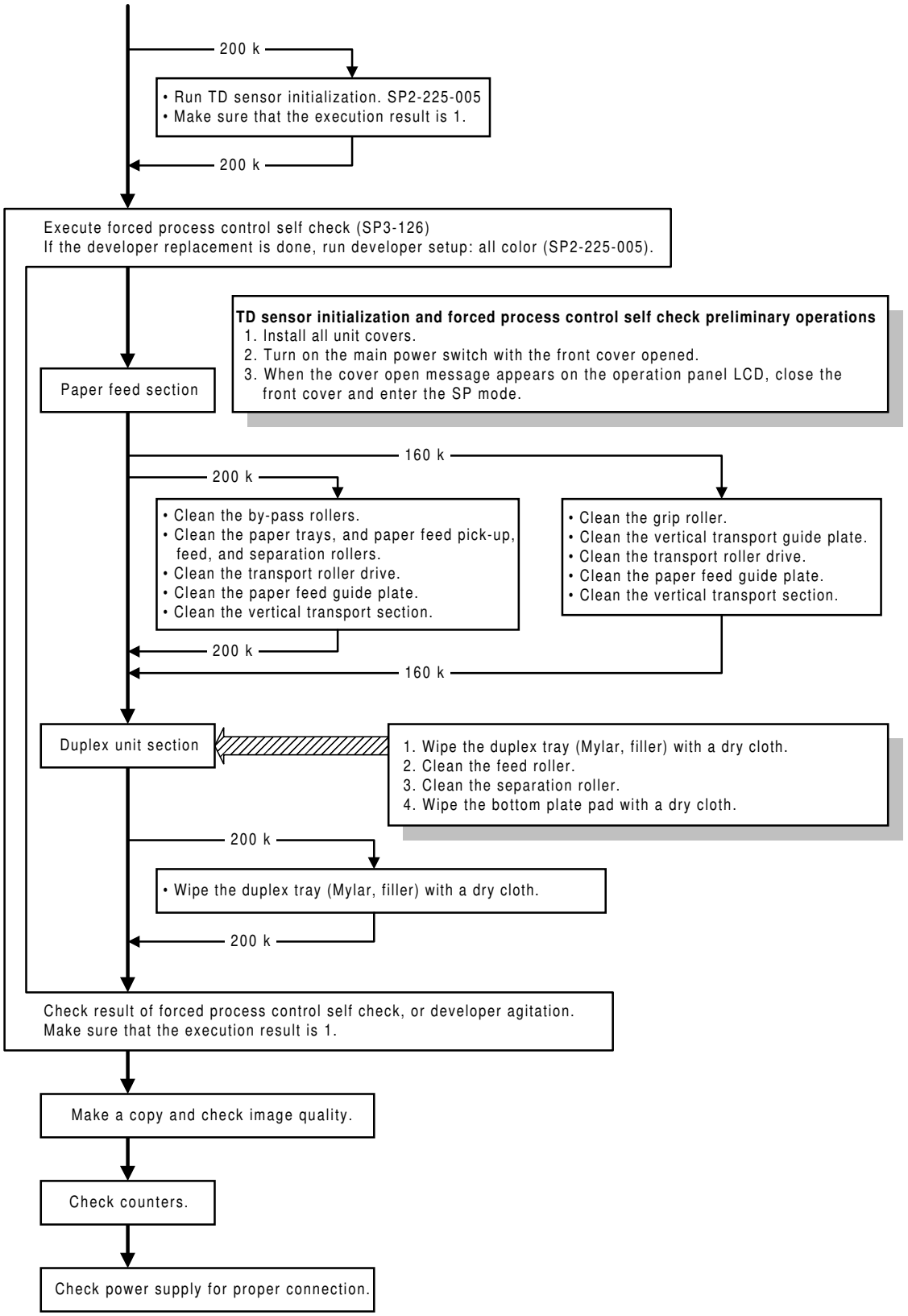

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5.2 REGULAR PM ITEMS

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

5.2.1 REGULAR PM TABLE

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

❍: Inspect Δ: Lubricate ❑: Replace ●: Clean ▲: Adjust

Block	PM item	EM	Schedule						Remarks
			80 kD	160 kD	200 kD	240 kD	320 kD	400 kD	
Scanner unit	1st, 2nd, 3rd mirrors and Reflector		●	●		●	●	●	Wipe with a silicone cloth or optics cleaning paper.
	Optical filter		●	●		●	●	●	Clean with a blower brush.
	Original sensor		●	●		●	●	●	Wipe with a dry cloth.
	Slide rail		●	●		●	●	●	Clean with a blower brush
	Exposure glass	●	●	●		●	●	●	Wipe with a dry cloth moistened with alcohol or water.
	Platen cover	●	●	●		●	●	●	Wipe with a dry cloth moistened with water, then with a dry cloth.
Transport Unit	Transport belt					●			Wipe with a dry cloth moistened with alcohol.
Optics Unit	Toner shield glass		●	●	●	●	●	●	Wipe with a dry optics cleaning cloth (A0129111).
Development unit	Development unit toner hopper		●	●		●	●	●	Wipe with a dry cloth or vacuum-clean.
	Toner cartridge unit		●	●		●	●	●	Wipe with a dry cloth or vacuum-clean.
	Developer (K)								Developer life is 60 kD. (See PM counter SP7-803) Replace K, C, M, Y at the same time.
	Developer (C, M, Y)								Developer life is 48 kD for each color. (See PM counter SP 7-803) Replace K, C, M, Y at the same time.
	Development unit (including covers and gears)		●	●	●	●	●	●	Cover: Wipe with a dry cloth. Gears: Clean with a blower brush.
	Side seal, entrance seal		❍	❍	❍	❍	❍	❍	Visually check. Replace if cracks, warps, or breakages are found.
	Toner set sensor		●	●	●	●	●	●	Clean with a blower brush, then wipe with a dry cloth.
	Toner end sensor		●	●	●	●	●	●	Clean with a blower brush, then wipe with a dry cloth.
	Revolver filter		❑	❑		❑	❑	❑	Wipe with a dry cloth (should be free of oil or foreign matter).
	Bias terminal		●	●	●	●	●	●	Wipe with a dry cloth (should be free of oil or foreign matter).

Block	PM item	EM	Schedule						Remarks
			80 kD	160 kD	200 kD	240 kD	320 kD	400 kD	
Drum peripheral components	PCC casing and end block	●	●	●	●	●	●	●	Wipe with a damp cloth. Then wipe with a dry cloth.
	PCC wire		❑	❑		❑	❑	❑	
	Cleaning blade		❑	❑		❑	❑	❑	Apply setting powder when replacing.
	Lubricant bar		❑	❑		❑	❑	❑	Replace if chips or creases are found.
	Cleaning brush		❑	❑		❑	❑	❑	
	Bias roller blade		❑	❑		❑	❑	❑	
	Bias roller terminal		Δ	Δ		Δ	Δ	Δ	Apply a small amount of KS660 silicone grease.
	Cleaning unit and entrance mylar	●	●	●	●	●	●	●	Clean with a blower brush, then wipe with a dry cloth.
	Drum		❑	❑		❑	❑	❑	Apply setting powder when replacing.
	Drum unit (including QL and potential sensor)		●	●	●	●	●	●	Wipe with a dry cloth.
	Revolver drawer (including ID sensor and carrier catcher)		●	●	●	●	●	●	Wipe with a dry cloth.
	Charge corona unit casing and end blocks	●	●	●	●	●	●	●	Wipe with a dry cloth.
	Charge corona wire	●	❑	❑	●	❑	❑	❑	Wipe with a damp cloth, then with a dry cloth.
	Charge corona grid	●	❑	❑	●	❑	❑	❑	Wipe with a damp cloth, then with a dry cloth.
	Wire cleaner pad		❑	❑		❑	❑	❑	
	Charge corona filter		❑	❑		❑	❑	❑	
Image transfer unit	Belt cleaning unit (toner hopper and entrance seal)	●	●	●	●	●	●	●	Wipe with a dry cloth or vacuum-clean.
	ITB Cleaning blade				❑			❑	During replacement, apply setting powder to the transfer belt.
	ITB Lubricant bar				❑			❑	Replace if chips or creases are found.
	ITB Lubricant brush				❑			❑	Clean with a vacuum cleaner if it is found to be too dirty during inspection.
	Transfer belt mark sensor		●	●		●	●	●	Clean with a blower brush, then wipe with a dry cloth.
	Apply grease to bias terminal		Δ	Δ		Δ	Δ	Δ	Apply a small amount of G40M silicone grease.
	Transfer belt unit (with inner rollers)		●	●		●	●	●	Wipe with a dry cloth moistened with alcohol, then with a dry cotton cloth.
	Transfer belt		❑	❑		❑	❑	❑	Apply setting powder when replacing.
Paper transfer unit	Paper transfer belt				❑			❑	
	Belt discharge wire	●	●	●	❑	●	●	❑	Wipe with a damp cloth, then with a dry cloth.
	Belt discharge corona unit casing and end block	●	●	●	●	●	●	●	Wipe with a dry cloth.
	PTB: Separation corona wire	●	●	●	❑	●	●	❑	Wipe with a damp cloth, then with a dry cloth.
	PTB: Separation corona unit casing and end block	●	●	●	●	●	●	●	Wipe with a dry cloth.
	PTB: Cleaning blade				❑			❑	
	PTB: Cleaning brush				❑			❑	

Block	PM item	EM	Schedule						Remarks
			80 kD	160 kD	200 kD	240 kD	320 kD	400 kD	
Paper transfer unit	PTB: Back brush				❑			❑	
	Paper transfer section				●			●	Wipe with a dry cloth.
Fusing unit	Hot roller		❑	❑		❑	❑	❑	
	Hot roller Oil supply pad		❑	❑		❑	❑	❑	
	Pressure roller			❑			❑		
	Hot roller bearing			❑			❑		
	Pressure roller bearing			❑			❑		
	Apply grease to heat insulating bushing		Δ	Δ		Δ	Δ	Δ	Wipe with a dry cloth, then apply grease (Barrierta A0289300).
	Apply grease to fusing drive/fusing gears		Δ	Δ		Δ	Δ	Δ	Apply Mobile Temp 1.
	Fusing/pressure thermistors		●	●		●	●	●	Clean with suitable solvent, then apply silicone oil to the contact surface.
	Fusing/pressure cleaning rollers		●	●		●	●	●	Clean with suitable solvent. -15, -17, -19 copier only
	Scraper		●	●		●	●	●	Clean with suitable solvent.
	Hot roller blade		●	❑		●	❑	●	Clean with a dry cloth while taking care not to damage the edge.
	Pressure roller blade			❑			❑		-22, -26, -27, -29 copier only
	Pressure roller oil supply pad			❑			❑		-22, -26, -27, -29 copier only
	Oil pan			●			●		Clean with a dry cloth, then wipe with a dry cloth moistened with alcohol.
	Silicone oil	❍	Δ	Δ	Δ	Δ	Δ	Δ	Any precipitates in the oil tank may be left there.
Paper feed unit	Paper pick-up rollers, paper feed rollers, paper separation rollers				●			❑	Wipe with a damp cloth, then with a dry cloth.
	By-pass pick-up roller, by-pass feed roller, by-pass separation roller				●			●	Wipe with a dry cloth moistened with alcohol or water.
	Registration rollers		●	●		●	●	●	Wipe with a dry cloth moistened with alcohol or water.
	Registration sensor: vertical transport		●	●		●	●	●	Clean with a blower brush, then wipe with a dry cloth.
	Relay rollers			●			●		Wipe with a dry cloth moistened with alcohol or water.
	Registration guide plate			●			●		Wipe with a dry cloth moistened with alcohol or water.
	Vertical transport guide plate			●			●		Wipe with a dry cloth moistened with alcohol or water.
	Vertical transport rollers			●			●		Wipe with a dry cloth moistened with alcohol or water.

Block	PM item	EM	Schedule						Remarks
			80 kD	160 kD	200 kD	240 kD	320 kD	400 kD	
Others	Used toner tank	❍	● / ❑	● / ❑	❍	● / ❑	● / ❑	● / ❑	Collect used toner, then wipe the containers with a dry cloth, or replace the used toner tank.
	Exhaust dust filter		❑	❑		❑	❑	❑	
	Fusing unit filter		❑	❑		❑	❑	❑	
Duplex unit	Paper feed separation roller		●	●		●	●	❑	Wipe with a damp cloth, then with a dry cloth.
	Paper feed roller		●	●		●	●	❑	Wipe with a damp cloth, then with a dry cloth.
	Duplex bottom plate pad		●	●		●	●	❑	Wipe with a dry cloth.
	Spring clutch		Δ	Δ		Δ	Δ	Δ	Apply Mobile Temp 1.
	Duplex unit		●	●	●	●	●	●	Wipe with a dry cloth.

Peripherals

❍: Inspect Δ: Lubricate ❑: Replace ●: Clean ▲: Adjust

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

❍: Inspect Δ: Lubricate ❑: Replace ●: Clean ▲: Adjust

Block	PM item	EM	Schedule					Remarks
			80 k	160 k	240 k	320 k	400 k	
ARDF (A663)	Transport belts	●	❑	❑	❑	❑	❑	Wipe with a damp dry cloth.
	Separation belts	●	❑	❑	❑	❑	❑	Wipe with a damp dry cloth.
	Separation rollers	●	❑	❑	❑	❑	❑	Wipe with a damp dry cloth.
	Registration sensor		●	●	●	●	●	Clean with a blower brush.
	Size sensor		●	●	●	●	●	Clean with a blower brush.
	Paper exit sensor		●	●	●	●	●	Clean with a blower brush.

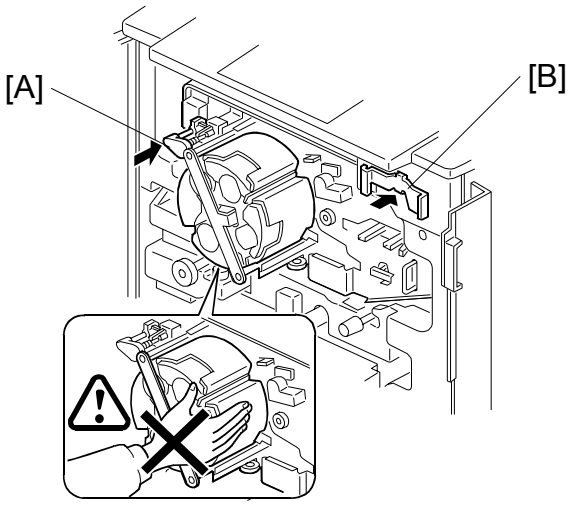
NOTE: 1) For ARDF, schedule is counted by number of originals.
2) Number of original is displayed by SP7-803.

6. REPLACEMENT AND ADJUSTMENT

6.1 PM-RELATED COUNTERS

PM counters are available using SP7-803. After performing a PM related replacement or adjustment procedure, reset the PM counter. (See 5.1.1).

6.2 SERVICE REMARKS



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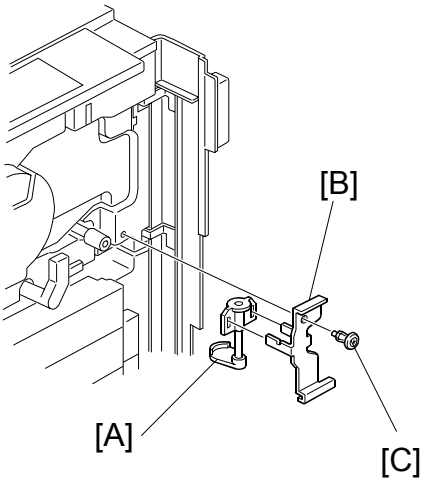

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⚠WARNING

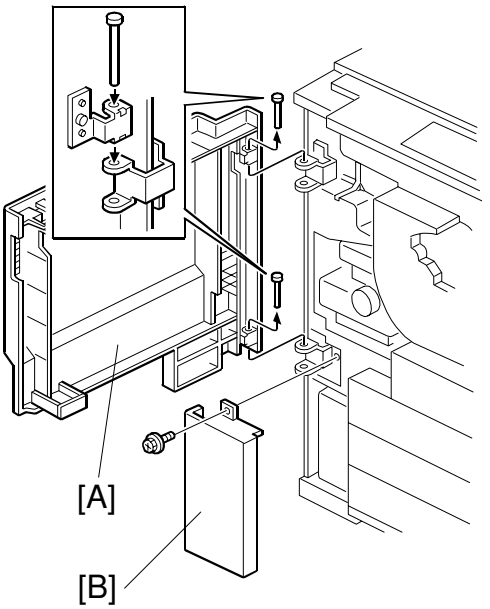
1. **Turn the copier main switch off when setting the revolver lock release tool [A] and door safety switch actuator [B].**
2. **Set the revolver lock release tool [A] first when setting the revolver lock release tool and door safety switch actuator [B]. If the copier starts without the revolver lock release tool [A], revolver will be locked and SC361 (Revolver H.P. sensor error) will display.**
3. **Never touch the area around the revolver after turning on the copier main switch while using the door safety switch actuator and revolver lock release tool. In case of rotation of revolver, your hands may be injured.**
4. **Check and note down the setting of "Timed Process Control Self Check" (SP3-972-000) before using release tools. If the "Timed Process Control Self Check" starts suddenly, your hands may be injured. (See Section 2.1.2 about the timing of starting the "Timed Process Control Self Check". Enter the value 0 in SP3-972-000 (Entering a value of 0 surpresses the execution this self check). The default interval of "Timed Process Control Self Check" is 6 hours.)**
5. **After using these tools [A], [B], secure them to the upper right inner cover with a plastic screw [C] as shown.**
6. **Enter the previous setting of "Timed Process Control Self Check" (SP3-972-000) again.**

6.3 COVERS AND FILTERS

6.3.1 UPPER AND LOWER FRONT COVER

1. Remove the front door [A] (two pins).
2. Remove the lower front cover [B] (one screw).

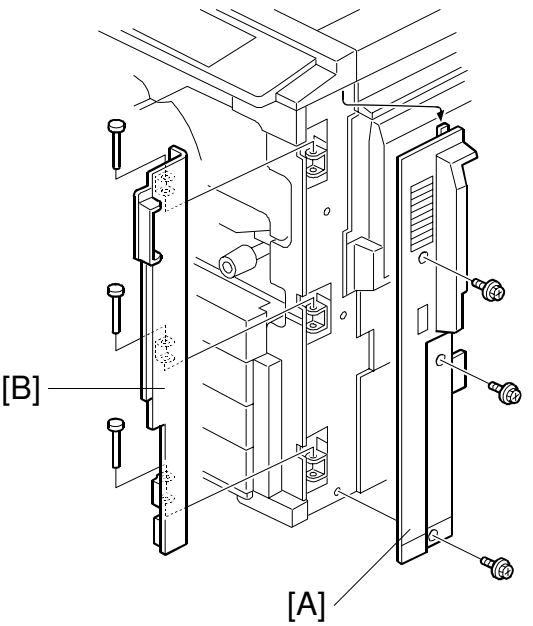
NOTE: Set the door part of the hinge immediately above the hinge of the main unit before inserting the pin.



A269R901.WMF

6.3.2 RIGHT-SIDE FRONT COVER AND RIGHT EDGE COVER

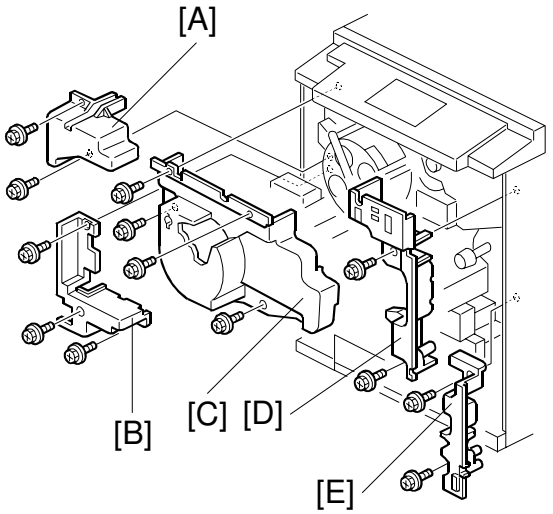
1. Remove the right-side front cover [A] (3 screws).
2. Remove the right edge door [B] (3 pins).



A269R902.WMF

6.3.3 INNER COVERS

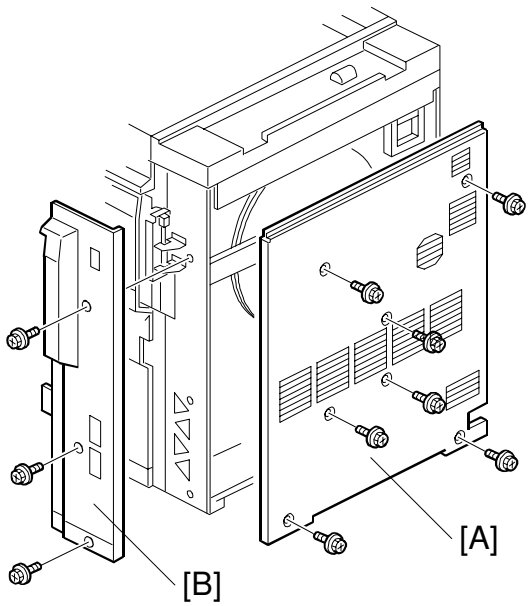
1. Remove the front door.
2. Remove the five inner covers as follows:
   - Upper left inner cover [A] (2 screws)
   - Lower left inner cover [B] (3 screws)
   - Revolver cover [C] (4 screws)
   - Upper right inner cover [D] (2 screws)
   - Lower right inner cover [E] (2 screws)



A269R903.WMF

6.3.4 REAR COVERS

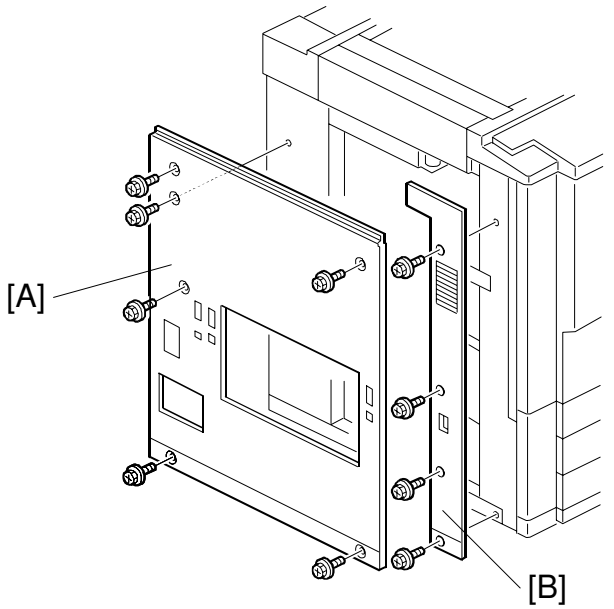
1. Remove the rear cover [A] (7 screws).
2. Remove the right-side rear cover [B] (3 screws).



A269R904.WMF

6.3.5 LEFT COVERS

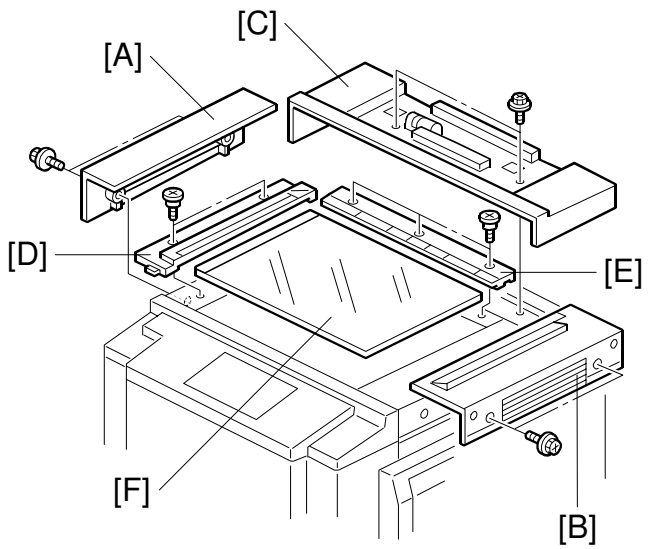
1. Remove the left cover [A] (6 screws).
2. Remove the left front cover [B] (4 screws).



A269R905.WMF

6.3.6 EXPOSURE GLASS

1. Remove the left upper cover [A], right upper cover [B], and rear upper cover [C].
2. Remove the vertical scale [D] (2 screws).
3. Remove the horizontal scale [E] (3 screws).
4. Remove the exposure glass [F]. (When reinstalling the exposure glass, ensure that the white plate faces down and to the left.)

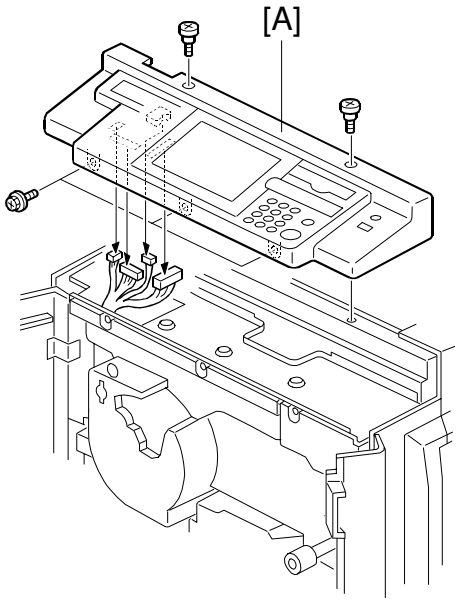


A269R906.WMF

6.3.7 OPERATION PANEL

1. Remove the operation panel [A] (4 screws and 4 connectors).

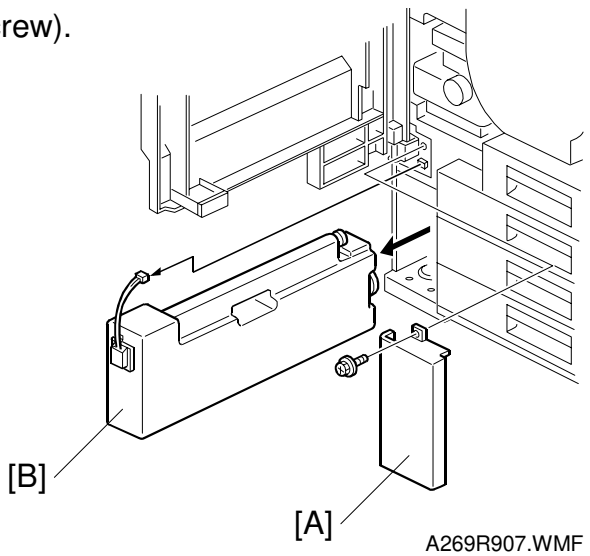
NOTE: Perform the touch panel calibration procedure after replacing the operation panel. (See "Touch Panel Calibration".)



A269R911.WMF

6.3.8 USED TONER TANK

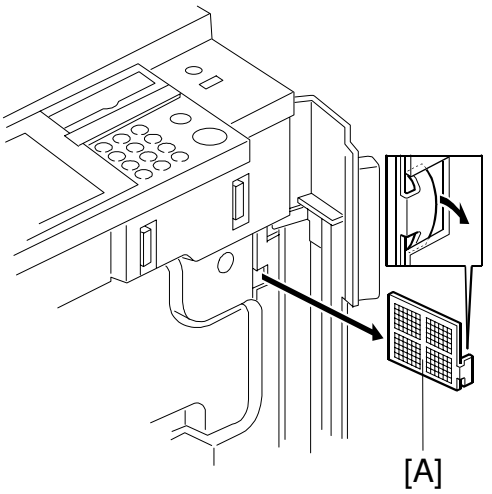
1. Remove the lower front cover [A] (1 screw).
2. Remove the used toner tank [B] (1 connector).



A269R907.WMF

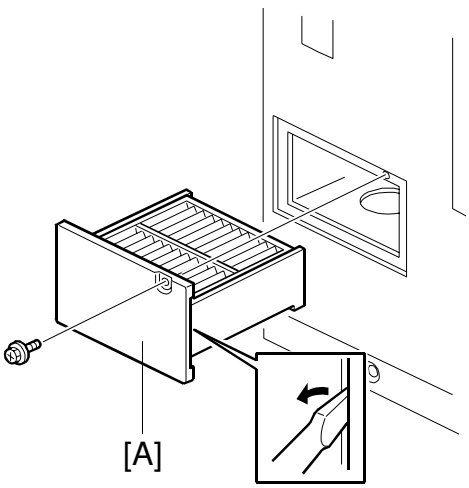
6.3.9 CHARGE CORONA FILTER

1. Open the right edge door.
2. Replace the charge corona filter [A] as shown in the illustration.

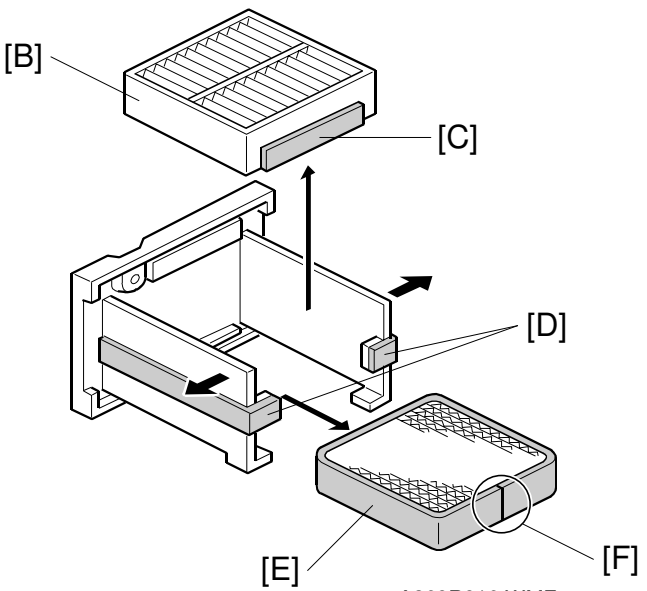


A269R908.WMF

6.3.10 DUST AND OZONE FILTERS



A269R909.WMF

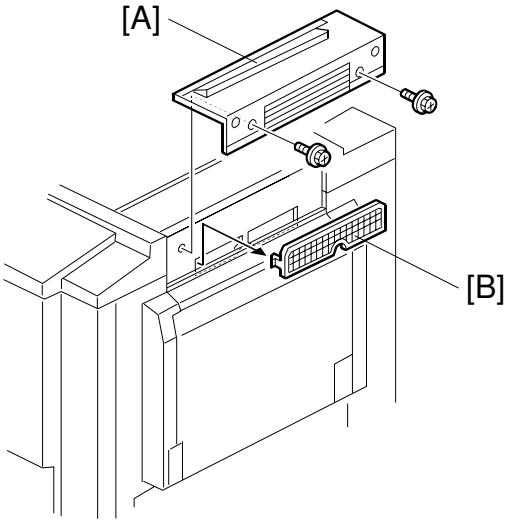


A269R916.WMF

1. Remove the screw retaining the filter box (left side).
2. Loosen the filter box [A] with a screwdriver as shown and then pull it out.
3. Replace the exhaust dust filter [B].
   NOTE: When re-installing the exhaust dust filter, align the sponge seal [C] and [D].
4. Replace the ozone filter [E].
   NOTE: When re-installing the ozone filter, the parting line [F] should be at the position shown in figure.

6.3.11 SCANNER FILTER

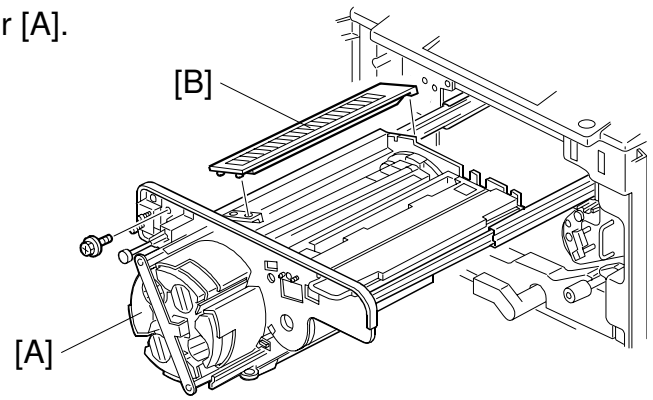
1. Remove the upper right cover [A] (2 screws).
2. Replace the scanner filter [B].



A269R910.WMF

6.3.12 REVOLVER FILTER

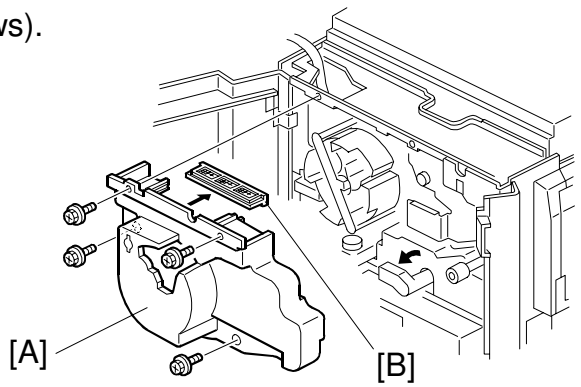
1. Pull out the revolver/drum drawer [A]. (See 6.2.1.)
2. Replace the revolver filter [B].



A269R325.WMF

6.3.13 INNER COVER FILTER

1. Remove the revolver cover [A] (4 screws).
2. Replace the inner cover filter [B].

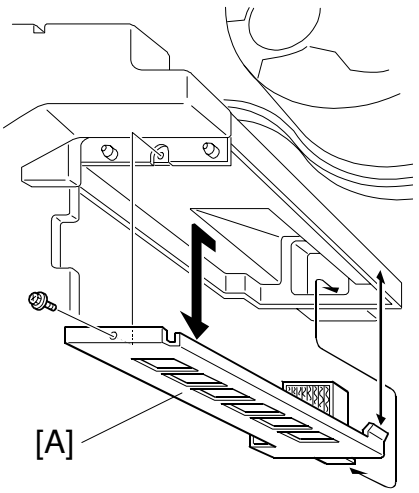


A269R917.WMF

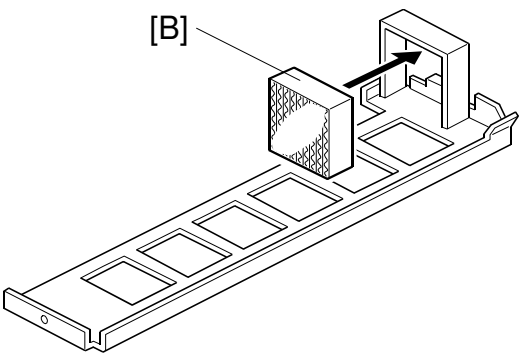
6.3.14 FUSING UNIT FILTER

1. Lower release lever B2 and pull out the fusing/transport unit.
2. Remove the fusing unit filter bracket [A] (1 screw and 2 hooks).
3. Replace the fusing unit filter [B].

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



A269R919.WMF

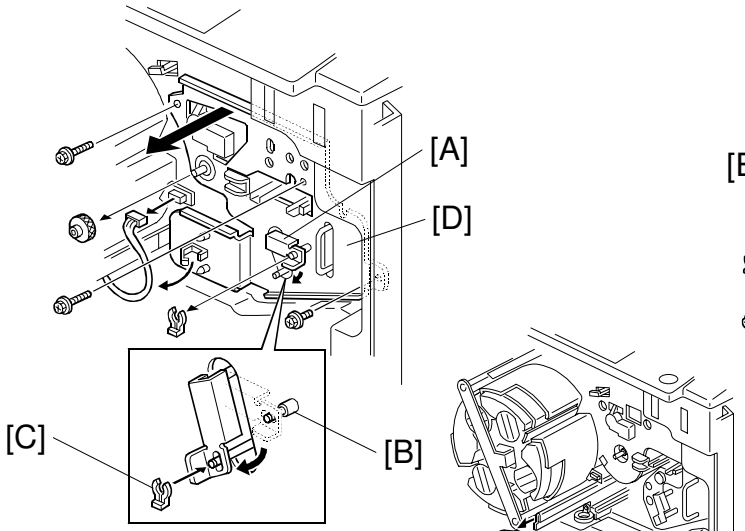


A269R918.WMF

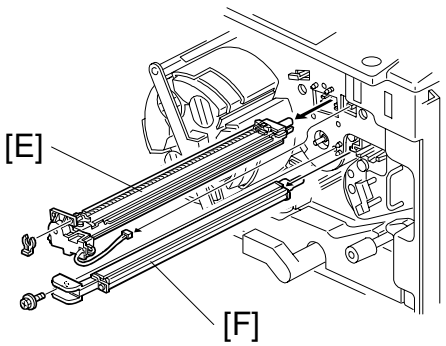
6.4 UNIT REMOVAL

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

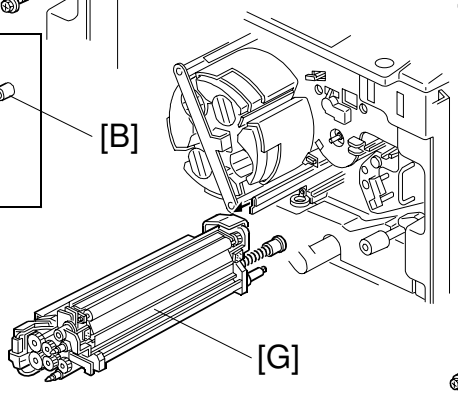
6.4.1 REVOLVER/DRUM DRAWER



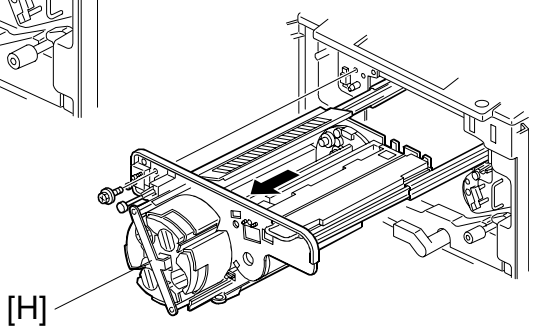
A269R326.WMF



A269R327.WMF



A269R302.WMF



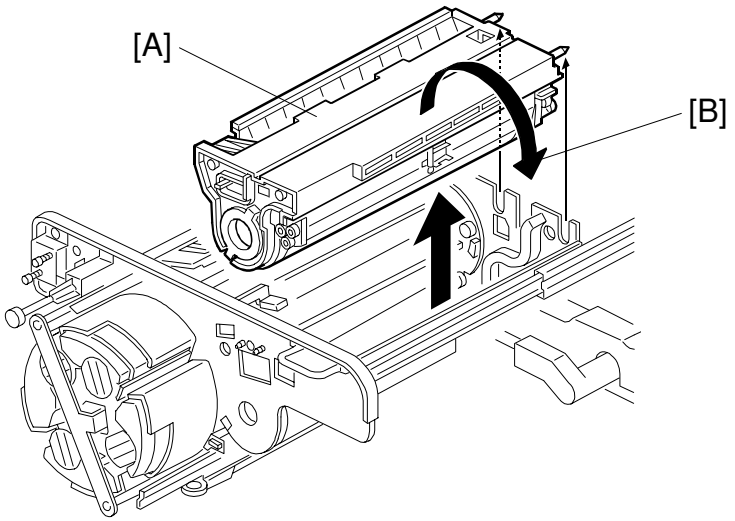
A269R305.WMF

1. Remove the revolver cover (4 screws).
2. Move the transfer belt tension lever [A] from the copy position stud [B] to the tension stud [C] (1 snap ring and 1 connector).
3. Remove the transfer faceplate [D] (3 black screws, 1 knob, 1 connector, and 2 clamp).
4. Remove the charge corona unit [E] (1 snap ring and 1 connector).
5. Remove the pre-cleaning corona unit [F] (1 screw).
6. Remove the image transfer belt cleaning unit [G].
7. Pull out the revolver/drum drawer [H] (1 black screw).

NOTE: Do not keep the drawer unit pulled out with the drum unit attached (without shielding the drawer unit). If the drawer unit were left out, the drum would be exposed to light. This would cause optical fatigue, resulting in image anomalies. Shield the drum unit with 5 or more sheets of paper).

6.4.2 DRUM UNIT REMOVAL

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

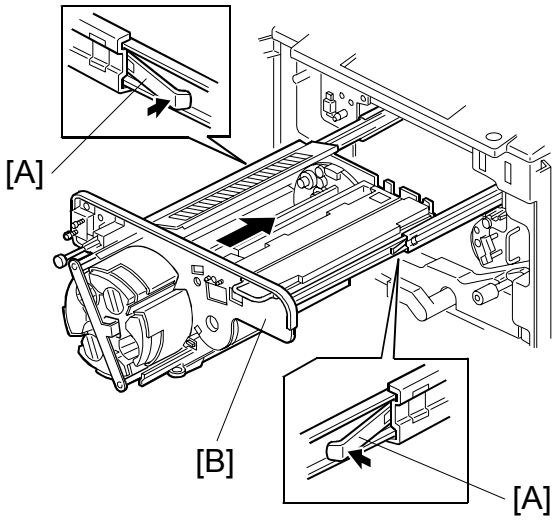


A269R306.WMF

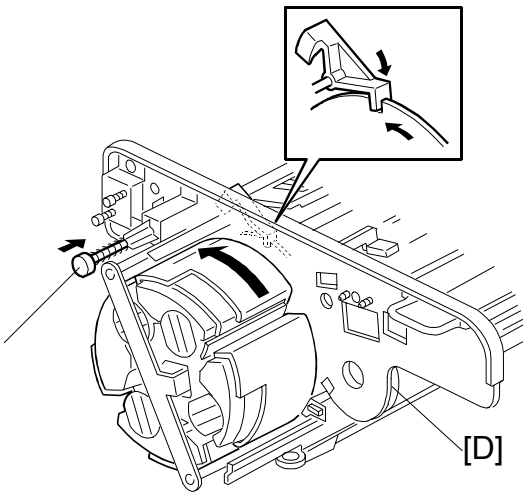
1. Pull out the revolver/drum drawer.
2. Lift the drum unit [A] out of the revolver/drum drawer.
3. Rotate the drum unit clockwise as shown by the arrow [B] and set it upside-down.

NOTE: It is important to rotate the drum unit as shown by arrow. This prevents toner spillage.

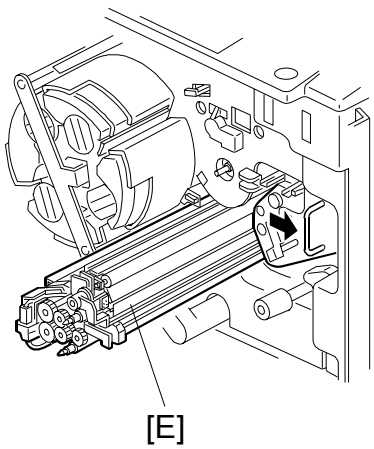
6.4.3 REINSTALLING THE REVOLVER/DRUM DRAWER



A269R329.WMF



A269R307.WMF

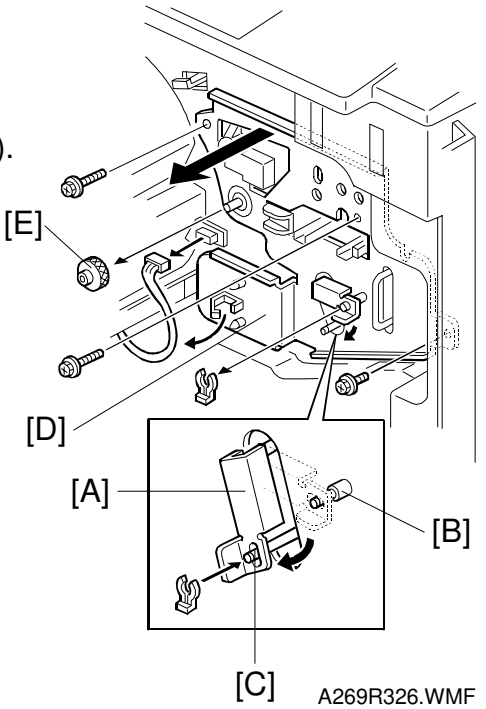


A269R411.WMF

1. Press in the drawer rail stoppers [A] and slide the revolver/drum drawer [B] into the machine. (1 screw).
   NOTE: 1) Do not apply excessive force if the drawer does not fit in place. Press the revolver lock button [C] to release the revolver lock, turn the revolver slightly counterclockwise to release any catch in the revolver motor gear assembly and then reinsert the drawer.
   2) Push the flange [D] of the OPC drum to the rear side of the copier. Then confirm that the gears between the drum and the drum shaft are engaged correctly.
2. Install the charge corona unit (1 snap ring) and PCC and (1 screw).
3. Install the image transfer belt cleaning unit [E].
   NOTE: Be sure to shift the image transfer belt unit to the right before installing the cleaning unit. Failure to observe this caution may damage the image transfer belt.

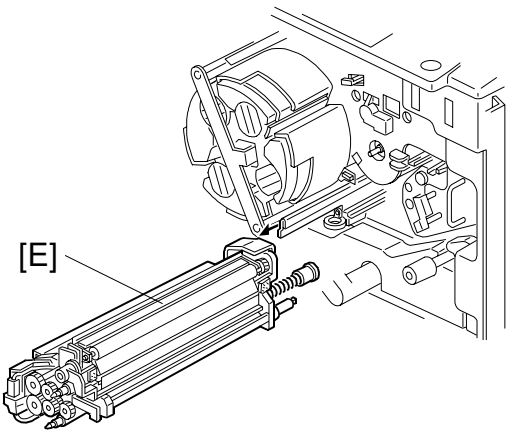
6.4.4 IMAGE TRANSFER BELT UNIT REMOVAL

1. Remove the revolver cover (4 screws).
2. Move the transfer belt tension lever [A] from the image transfer position stud [B] to the tension stud [C] (1 snap ring and 1 connector).
3. Remove the transfer faceplate [D] (3 black screws, 1 knob, 1 connector, and 2 clamp).
   NOTE: 1) When re-installing the transfer faceplate, tighten the knob [E] at first before tightening other screws.
   2) After re-installing the transfer faceplate, set the transfer belt tension lever to the image transfer position stud [B] again.



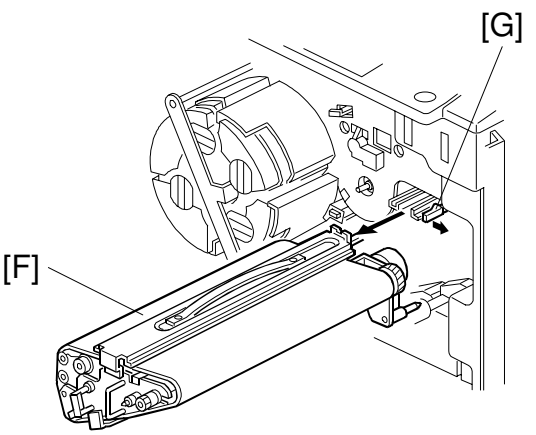
A269R326.WMF

4. Remove the image transfer belt cleaning unit [E].



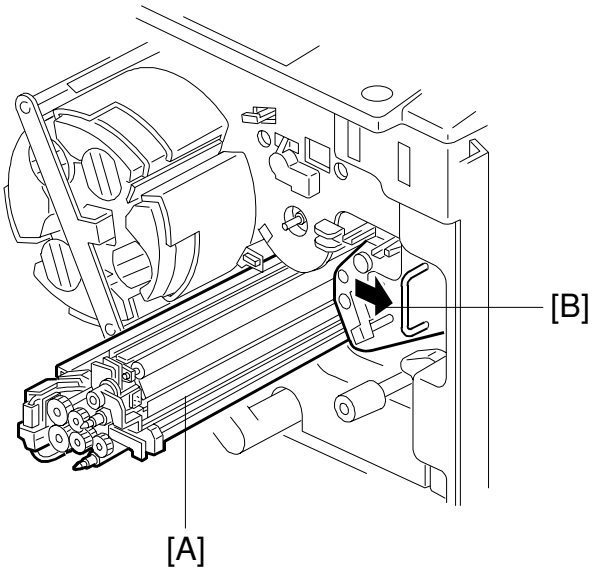
A269R302.WMF

5. Pull out the image transfer belt unit [F] until it stops. Then, release the stopper [G] and remove the transfer belt unit from the main unit.



A269R401.WMF

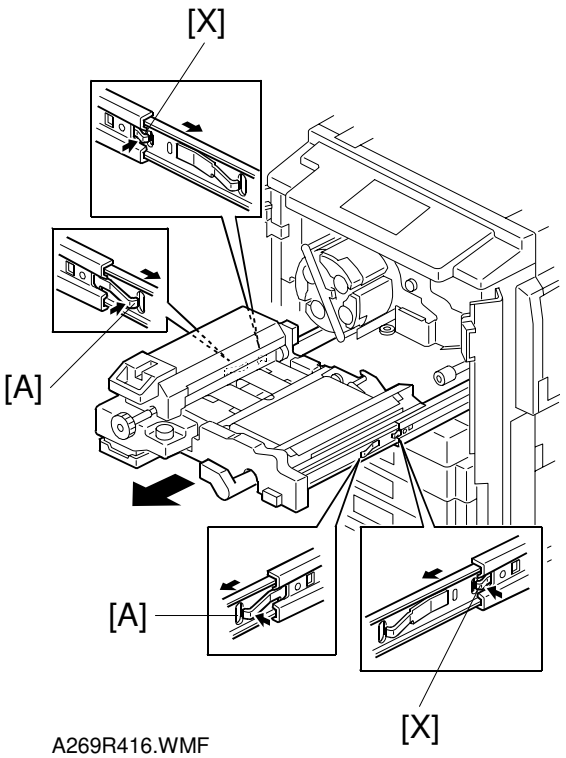
Reinstalling the Image Transfer Belt Unit



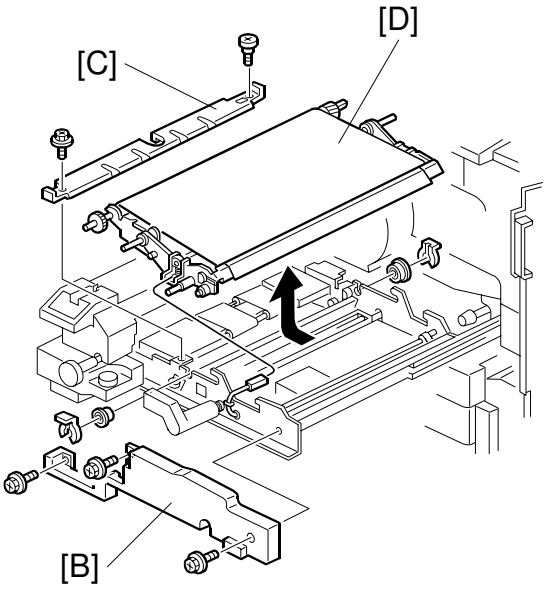
A269R411.WMF

1. Set the transfer belt unit.
   NOTE: Before reinstalling the transfer belt unit, make sure the tension lever is set on the tension stud.
2. Install the image transfer belt cleaning unit [A].
   NOTE: Be sure to shift the image transfer belt unit to the right [B] before installing the image transfer belt cleaning unit. Failure to observe this caution may damage the image transfer belt.
3. Mount the transfer faceplate (1 knob, 2 black screws, 1 connector, and 1 clamp).
   NOTE: When mounting the transfer faceplate, tighten the knob before tightening the screws. Otherwise, the transfer faceplate may not be set properly.

6.4.5 PAPER TRANSFER UNIT REMOVAL



A269R416.WMF



A269R406.WMF

⚠WARNING

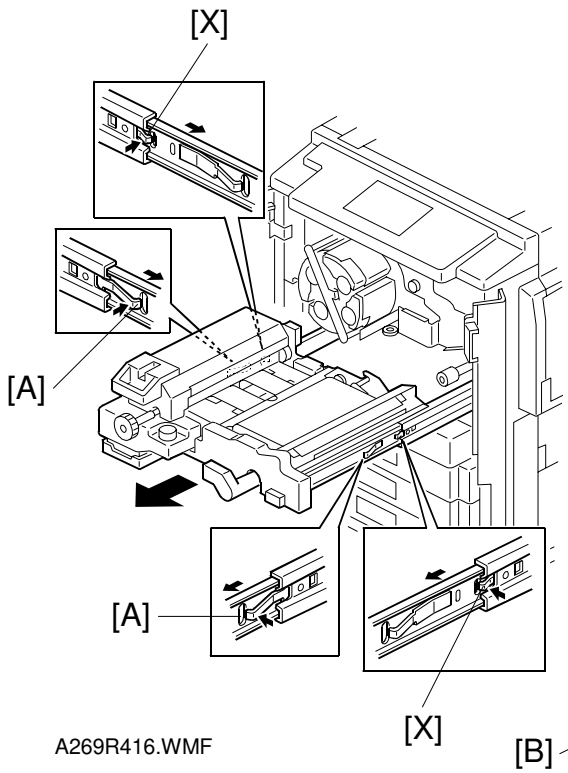
Do not press rail release springs [X] which are just behind the rail stoppers. Pressing them may cause the fusing/transfer drawer to come off together with the rails. This is dangerous because the drawer is heavy.

1. Press the stoppers [A] on both sides of the fusing/transfer drawer rail and pull out the drawer.
2. Remove the fusing/transfer drawer cover [B] (3 screws).
3. Remove the separation plate [C] (1 shoulder screw and 1 screw).
   NOTE: Keep the separation plate in a safe location to prevent it from being accidentally deformed.
4. Remove the paper transfer unit [D] (bias terminal, 2 snap rings, 2 bearings).

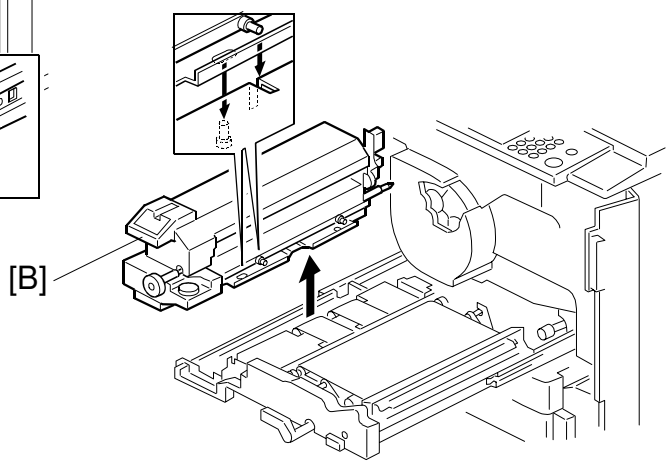
6.4.6 REMOVING THE FUSING UNIT

⚠WARNING

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



A269R416.WMF



A269R511.WMF

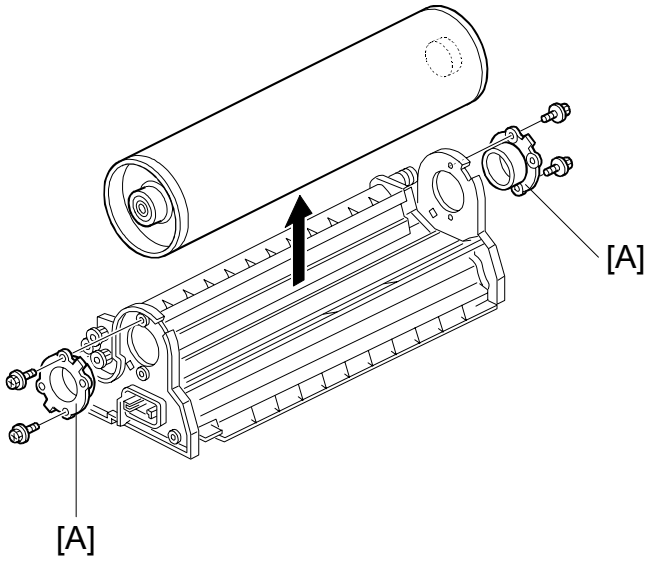
⚠WARNING

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

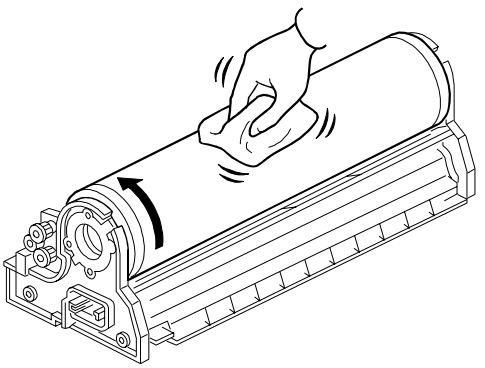
1. Press the stoppers [A] on both sides of the fusing/transfer drawer rail and pull out the drawer.
2. Lift and remove the fusing unit [B].
   When reinstalling the fusing unit, align two positioning pins with two positioning keys.

6.5 DRUM UNIT

6.5.1 DRUM REPLACEMENT



A269R201.WMF

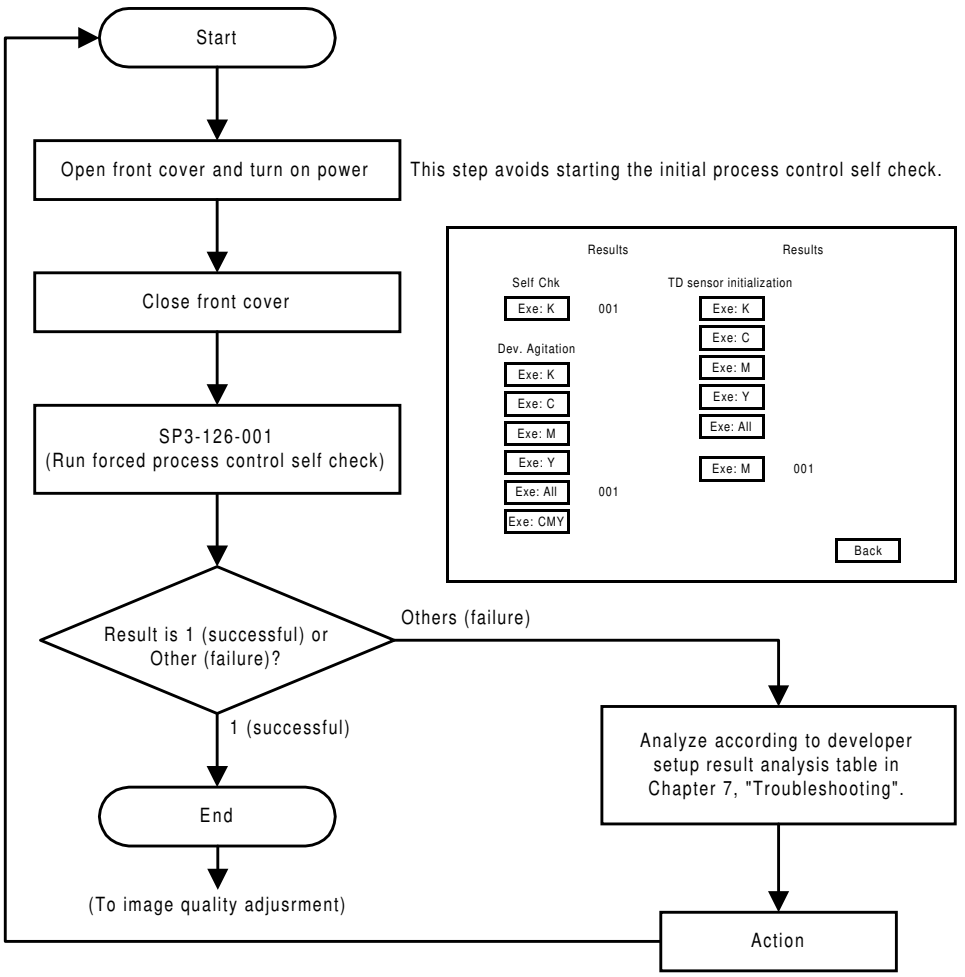


A269R202.WMF

1. Pull out the revolver drum drawer. (See 6.4.1.)
2. Remove the drum unit. (See 6.4.2.)
3. Remove the drum support bushing [A] (2 screws each) and remove the drum.
4. Install the new drum and apply setting powder to the entire drum surface.
   NOTE: Be sure to apply the setting powder over the entire drum. This prevents the cleaning blade from catching on the drum surface.
5. Turn the drum forward two or three rotations to settle the setting powder between the drum surface and cleaning blade.
   NOTE: Do not touch the drum beyond 10 mm from the edge.
6. Perform the process control self-check on the new drum.
   (See the post-replacement process on the next page.)

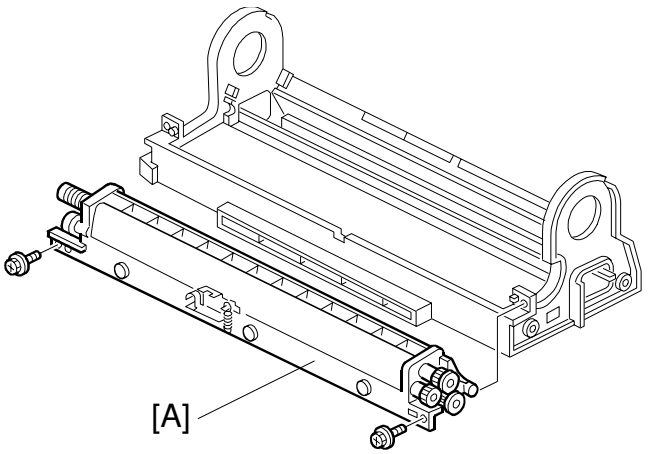
Post-replacement Procedure

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

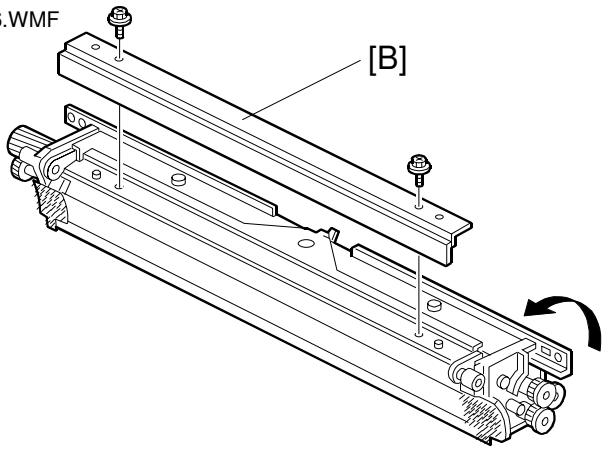


A269R552.WMF

6.5.2 CLEANING BLADE REPLACEMENT



A269R206.WMF

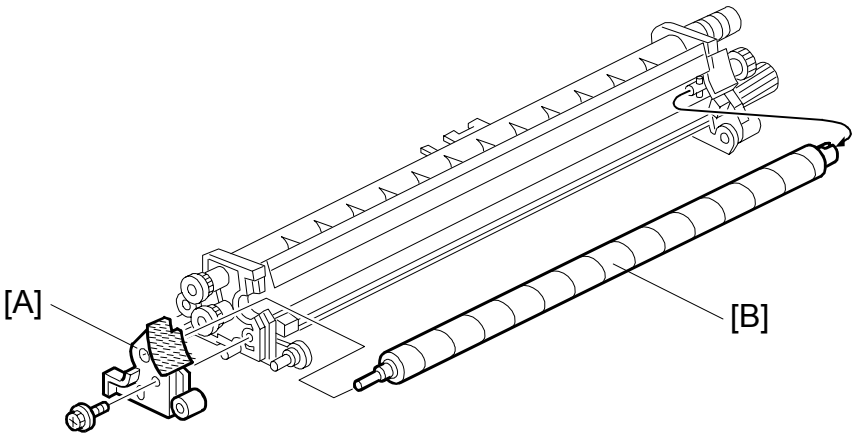


A269R204.WMF

1. Remove the drum unit. (See the previous procedure.)
2. Remove the cleaning unit [A] from the drum unit (2 screws).
3. Remove the cleaning blade [B] from the cleaning unit (2 screws).

NOTE: 1) After installing a new blade, be sure to apply setting powder over the entire drum. This prevents the cleaning blade from catching on the drum surface.
2) Rotate the drum forward two or three rotations to settle the setting powder between the drum surface and cleaning blade.

6.5.3 CLEANING BRUSH REPLACEMENT

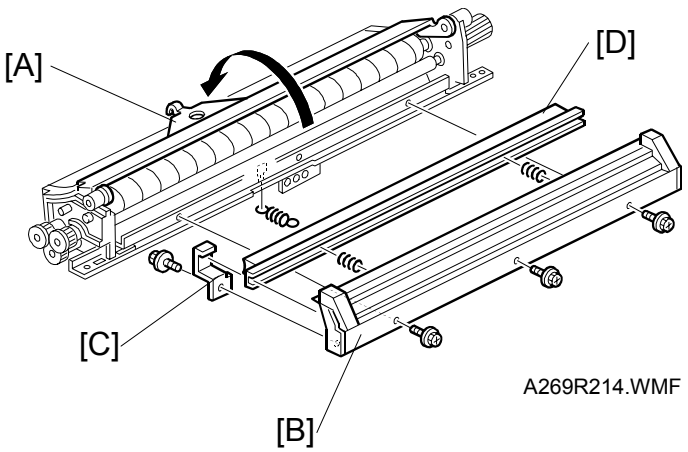


A269R203.WMF

1. Remove the drum unit. (See 6.5.1)
2. Remove the cleaning unit from the drum unit (2 screws) and remove the cleaning blade (2 screws). (See 6.5.2.)
3. Remove the brush holder [A] (1 screw) and the cleaning brush [B].

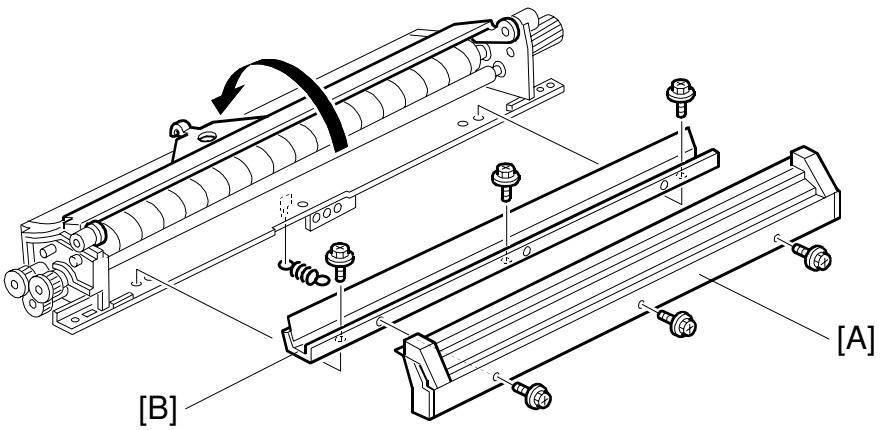
6.5.4 LUBRICANT BAR REPLACEMENT

1. Remove the cleaning blade. (See 6.5.2.)
2. Remove the spring and flip the blade holder [A] up.
3. Remove the lubricant bar holder [B] (3 screws).
4. Remove the lubricant bar clamping bracket [C] (1 screw) and the lubricant bar [D].



A269R214.WMF

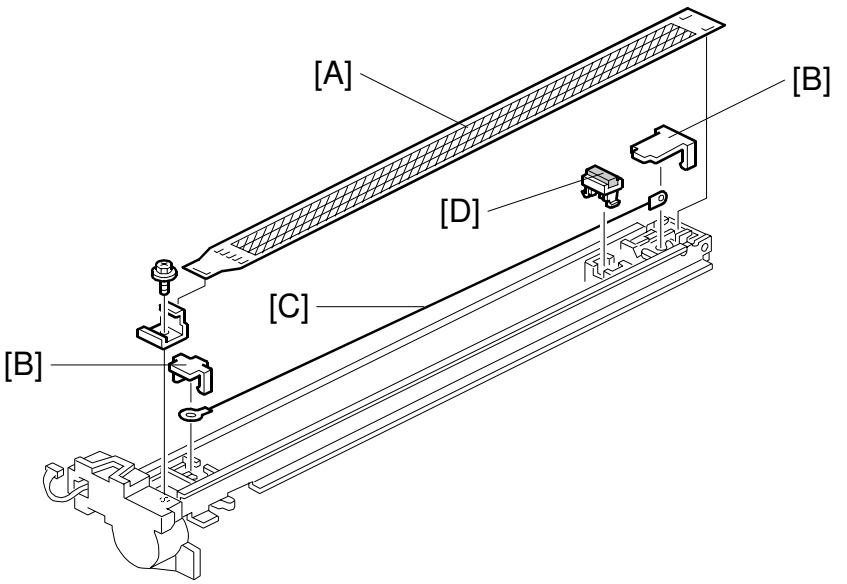
6.5.5 BIAS ROLLER BLADE REPLACEMENT



A269R211.WMF

1. Remove the lubricant bar holder [A] (3 screws).
2. Remove the bias roller blade [B] (3 screws).

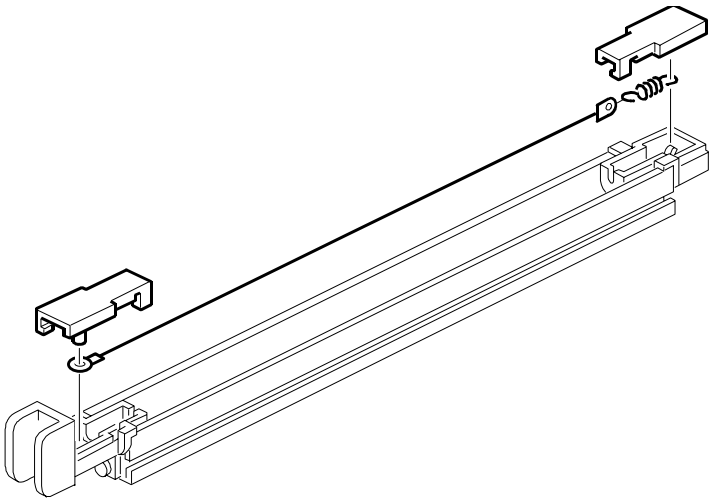
6.5.6 CHARGE GRID AND CORONA WIRE REPLACEMENT



A269R210.WMF

1. Remove the charge grid [A] (1 screw).
2. Remove the front and back end block covers [B].
3. Replace the corona wire [C] and the cleaner pad [D].
   NOTE: Do not touch the corona wire directly. Skin oils can deteriorate the corona wire over time, causing uneven charging.

6.5.7 PCC REPLACEMENT



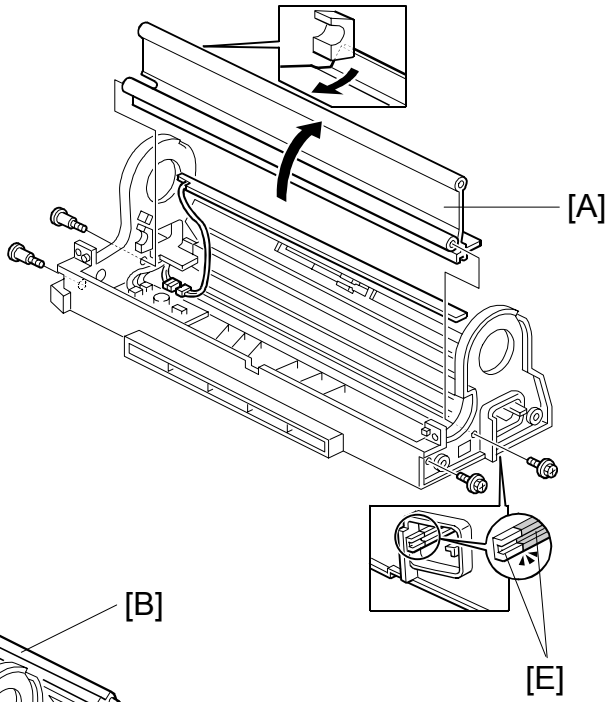
A269R209.WMF

1. Remove the PCC from the main unit.
2. Remove the front and rear end blocks and replace the PCC wire.

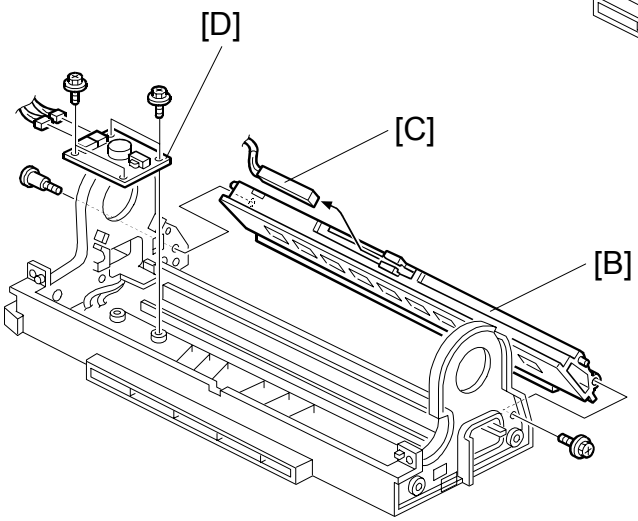
NOTE: Do not touch the PCC wire directly. Skin oils can deteriorate the corona wire over time, causing uneven charging.

6.5.8 DRUM POTENTIAL SENSOR REPLACEMENT

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



A269R207.WMF

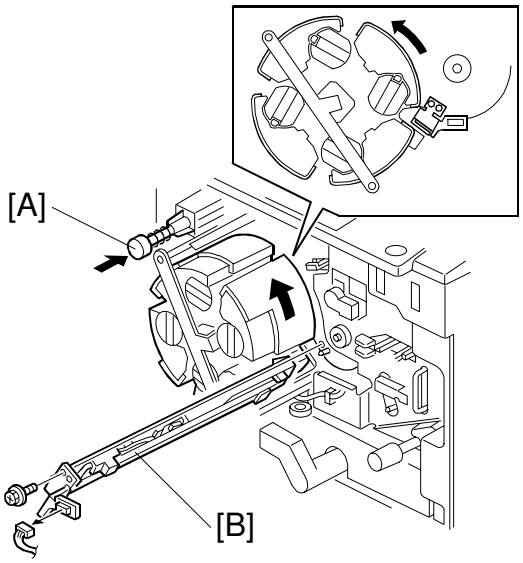


A269R208.WMF

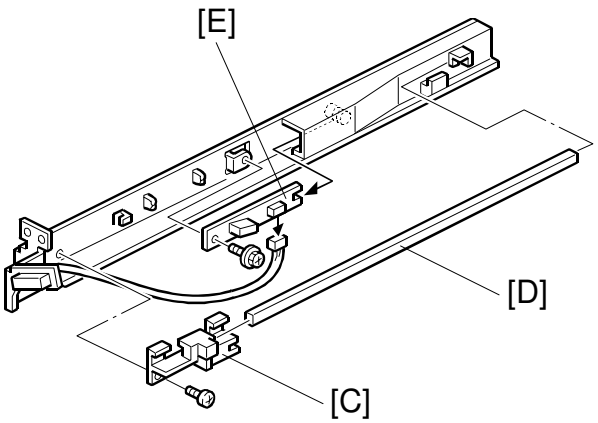
1. Remove the OPC drum. (See 6.5.1.)
2. Replace the cleaning unit.
3. Remove the duct cover [A] (4 screws) and the duct [B] (2 screws).
4. Remove the sensor [C] and sensor board [D] (2 screws).

NOTE: 1) When re-installing the duct cover, be sure to align the guide rails [E] for the main charge corona unit.
2) When cleaning the metal part of the potential sensor, blow off dirt with a blower brush, then wipe with dry cotton (do not use a vacuum cleaner). Use a vacuum cleaner to clean the potential sensor parts other than the metal part.

6.5.9 ID SENSOR REPLACEMENT



A269R212.WMF

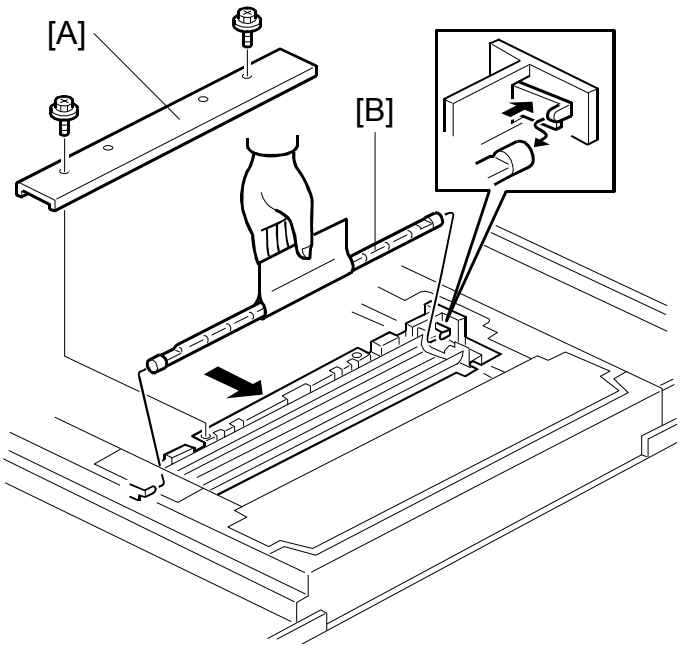


A269R213.WMF

1. Press the revolver lock release button [A] and rotate the revolver to the position indicated in the figure.
2. Unplug the ID sensor connector and remove the ID sensor holder [B] (1 screw).
3. Remove the bracket [C] (1 screw) of the developer catcher [D] and remove the carrier catcher.
4. Remove the ID sensor [E] (1 screw).

6.6 SCANNER UNIT

6.6.1 EXPOSURE LAMP REPLACEMENT

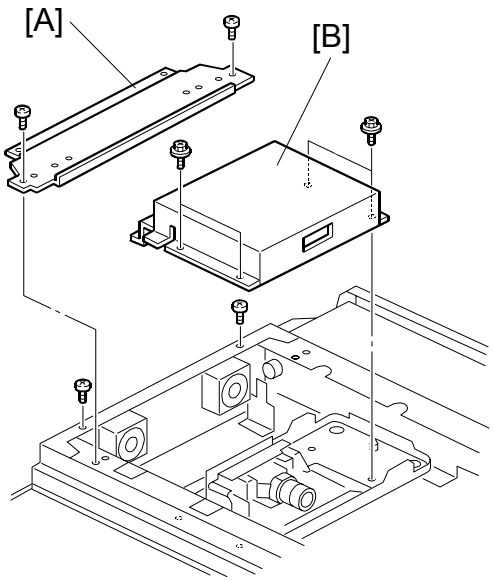


A269R001.WMF

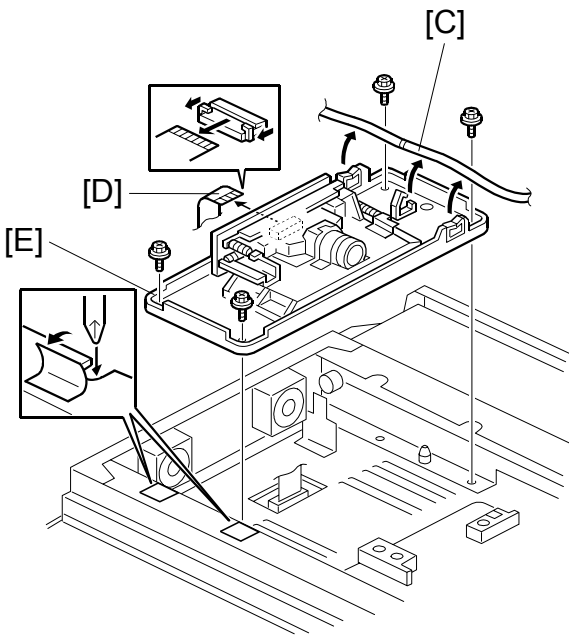
1. Remove the exposure glass. (See 6.3.6.)
2. Position the first scanner at the cut-out on the frame.
3. Remove the lamp holder cover [A] (2 screws) and remove the exposure lamp [B].

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

6.6.2 SBU REPLACEMENT



A269R002.WMF



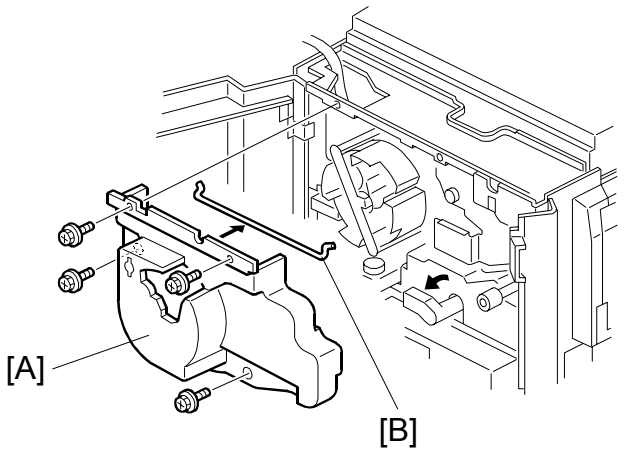
A269R003.WMF

1. Remove the exposure glass. (See 6.3.6.)
2. Remove the left upper stay [A] (4 screws).
3. Remove the SBU cover [B] (4 screws).
4. Remove the harness [C] from the 3 clamps.
5. Disconnect the flat cable [D] from the SBU connector.
6. Remove the SBU [E]. (4 screws)

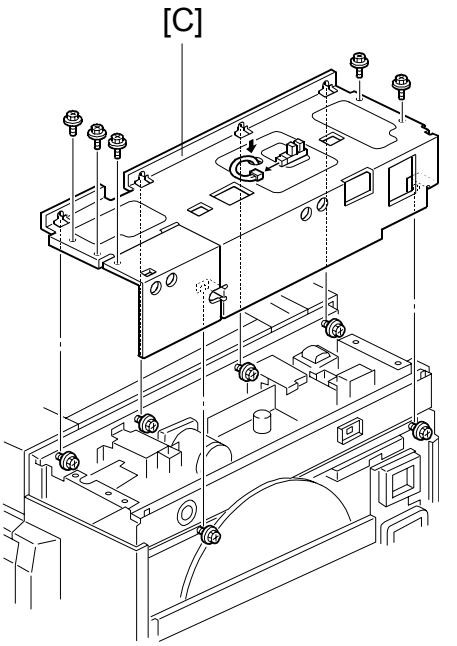
NOTE: Never remove the screws securing the SBU lens assembly to the SBU base. This SBU lens assembly is precisely positioned with respect to the SBU base at the factory.

6.6.3 OPENING THE SCANNER UNIT

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

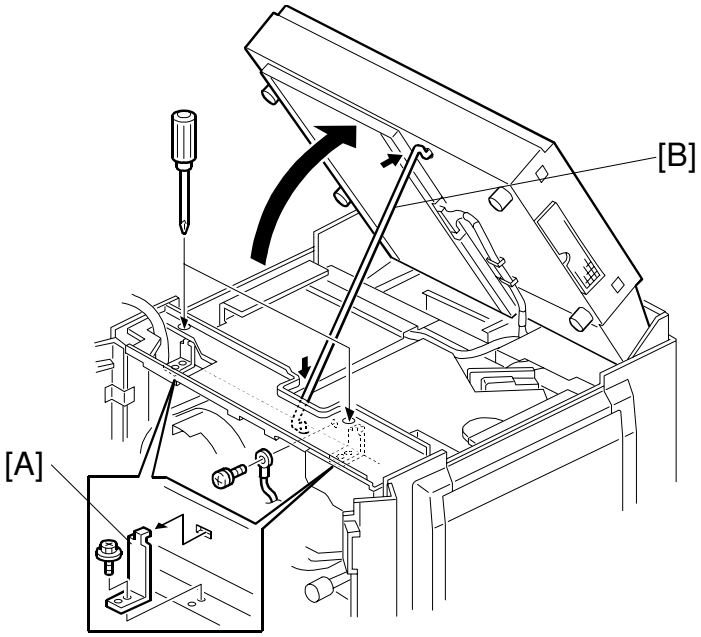


A269R006.WMF



A269R112.WMF

1. Remove the following covers (see “6.3 Covers and Filters”):
   - Operation panel
   - Rear cover
   - Upper rear cover,
2. Remove the revolver cover [A] (4 screws) and remove the support rod [B] from the rear side of the revolver cover.
3. Remove the pressure plate bracket [C] (5 screws to remove, 6 screws to loosen, and 1 connector).



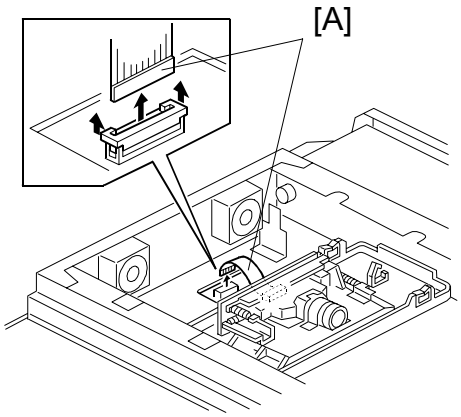
A269R007.WMF

4. Remove two scanner lock brackets [A] (1 screw each) and disconnect the ground cable (1 screw).
5. Lift the scanner unit as shown in the figure and prop it up with the support rod [B].

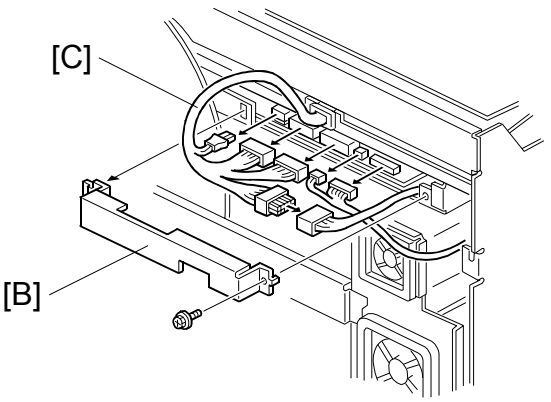
⚠CAUTION

Take care not to knock the support rod [B] while the scanner unit is open. If the support rod is disengaged, the scanner unit may suddenly fall into the closed position.

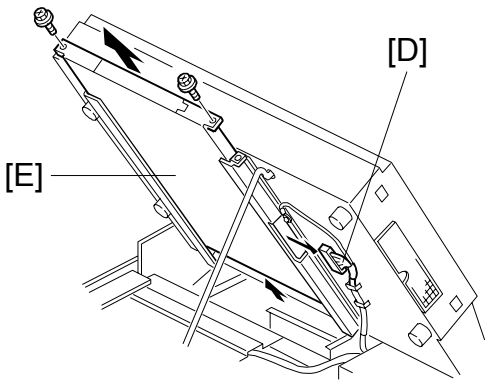
6.6.4 SCANNER IPU MAIN/SUB BOARD REPLACEMENT



A269R004.WMF



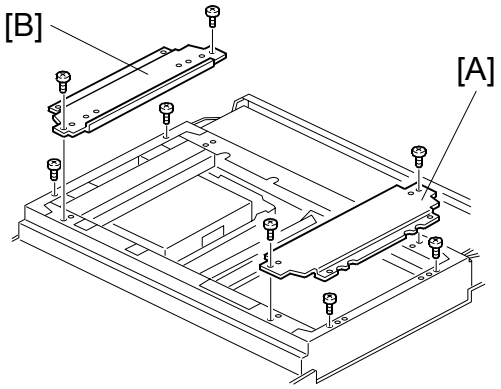
A269R005.WMF



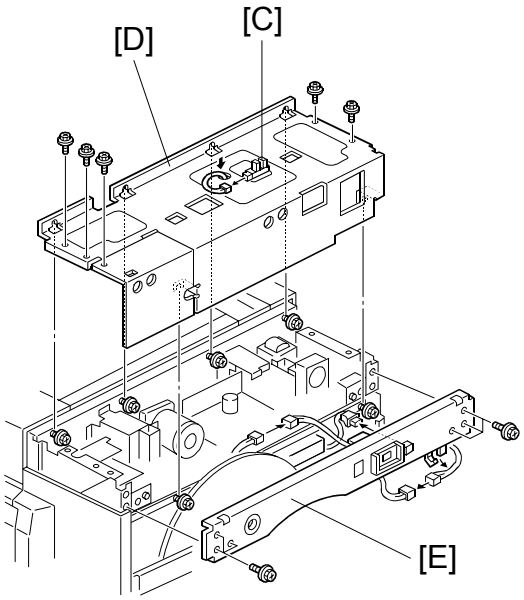
A269R008.WMF

1. Remove the following covers:
   - SBU cover (See 6.6.2.)
   - Rear cover (see 6.3.4.)
   - Upper rear cover (See 6.3.6.)
   - Pressure plate bracket (See 6.6.3.)
2. Disconnect the flat cable [A] from the scanner IPU main-board.
   NOTE: Do not remove the flat cable from the SBU.
3. Remove the rear IPU cover [B] (1 screw).
4. Remove the harness [C] from the scanner IPU sub-board (6 connectors).
5. Open the scanner unit. (See 6.6.3.)
6. Remove the write harness [D].
7. Remove the IPU base [E] as shown in the figure (4 screws).
   NOTE: Before removing the IPU base, confirm that the flat cable between the scanner IPU main-board and the SBU is disconnected.

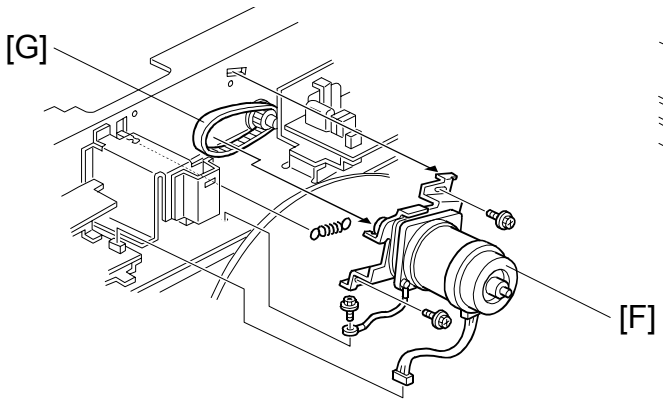
6.6.5 SCANNER WIRE REPLACEMENT



A269R011.WMF



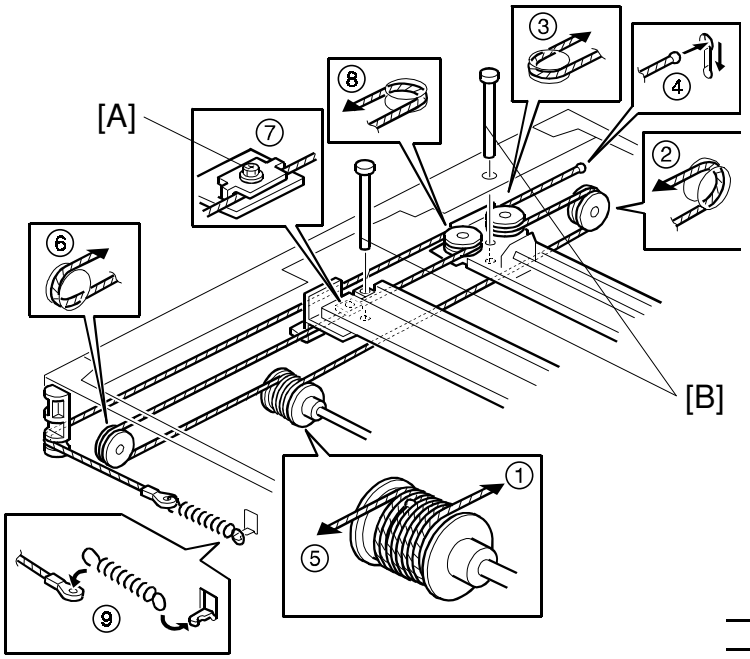
A269R012.WMF



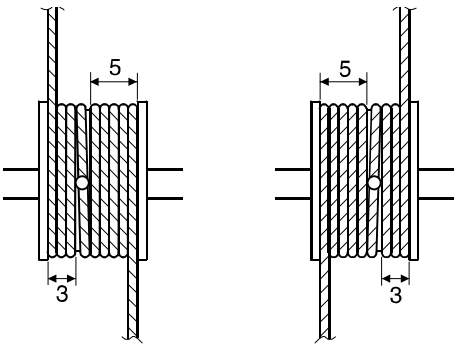
A269R013.WMF

1. Remove the scales (vertical/horizontal), exposure glass, and the upper covers (left, right, and rear). (See 6.3.6.)
2. Remove the upper right stay [A] (4 screws) and the upper left stay [B] (4 screws). Remove the parts from the frame on the side where the scanner wire to be replaced is located.
   On the front side: remove the operation panel.)
   On the rear side, do the following:
   1) Disconnect the connector for the pressure plate release sensor [C] and remove the bracket pressure plate [D] (remove 5 screws and loosen 6 screws).
   2) Remove the upper rear stay [E] (2 harnesses, 1 fiber-optics cable, and 6 screws).
   3) Remove 1 connector, 2 screws and the tension spring; then, remove the scanner motor [F] and timing belt [G].

NOTE: When reinstalling the scanner motor, engage the timing belt with the motor drive gear and then attach the tension spring. This moves the motor to the correct position and tightens the timing belt properly. Then tighten the screws to secure the scanner motor.



A269R014.WMF



A269R016.WMF

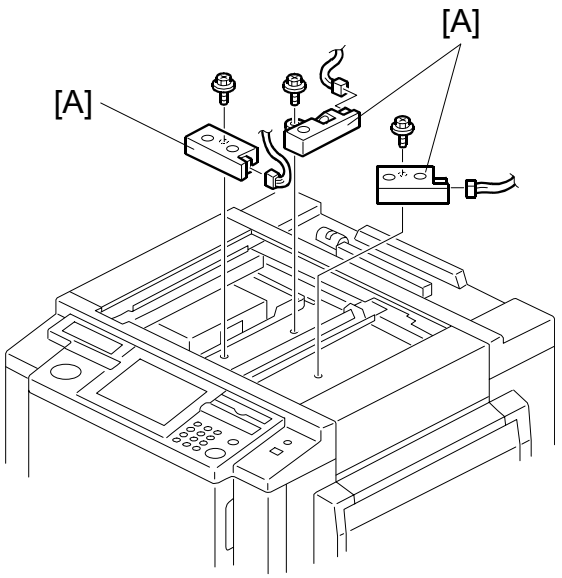
3. Loosen the first scanner wire clamp screw and remove the scanner wire. At this moment, loosen the clamp screw on the side from which the wire is not to be removed.
4. Route the new scanner wire as shown in the figure. Take care to orient the wire correctly before threading it on the pulleys–there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

Winding procedure: Wind 3 turns outward from the ball at the center of the wire (up to the red mark), then 5 turns inward (up to the black mark). There will be a total of 8 turns including the one for the center ball.

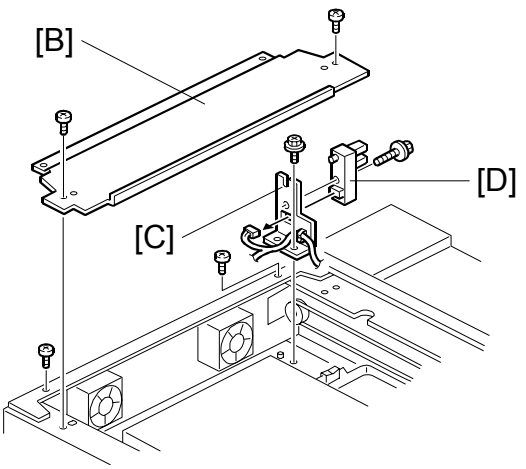
   3) Route the ball side part of the wire on the pulleys as shown in the figure (②, ③), then the ball into the hole in the frame (④).
   4) Route the ring side part of the wire on the pulley (⑤, ⑥, ⑦, ⑧), then hook the ring on the wire tension bracket (⑨).

5. Hook the spring on the wire tension bracket and tighten the screw permanently.
6. Clamp the wire.
7. Remove the scanner locking pins.
8. Replace all parts except those removed in step 1.
9. After tensioning the wire by executing a scanner free run (SP 4-013-0022), reset the scanner locking pins, then loosen and reset the scanner wire clamp.
10. Assemble in the reverse order of disassembly.

6.6.6 APS AND H.P. SENSOR REPLACEMENT



A269R015.WMF



A269R017.WMF

1. Remove the exposure glass. (See 6.3.6.)
2. Remove the APS sensors [A] (1 screw, 1 connector, each).
3. Remove the left upper stay [B] (2 screws).
4. Remove the H.P. sensor bracket [C] (1 screw and 1 connector).
5. Remove the H.P. sensor [D] (1 screw).

6.7 COPY IMAGE ADJUSTMENT

6.7.1 PRINTER γ ADJUSTMENT

Auto Color Calibration (ACC)

Make use of the ACC function (see the installation procedure).

KCMY Color Balance Adjustment

The printer γ curve created during the auto color calibration can be modified using SP modes. The adjustment uses only “Offset” values.

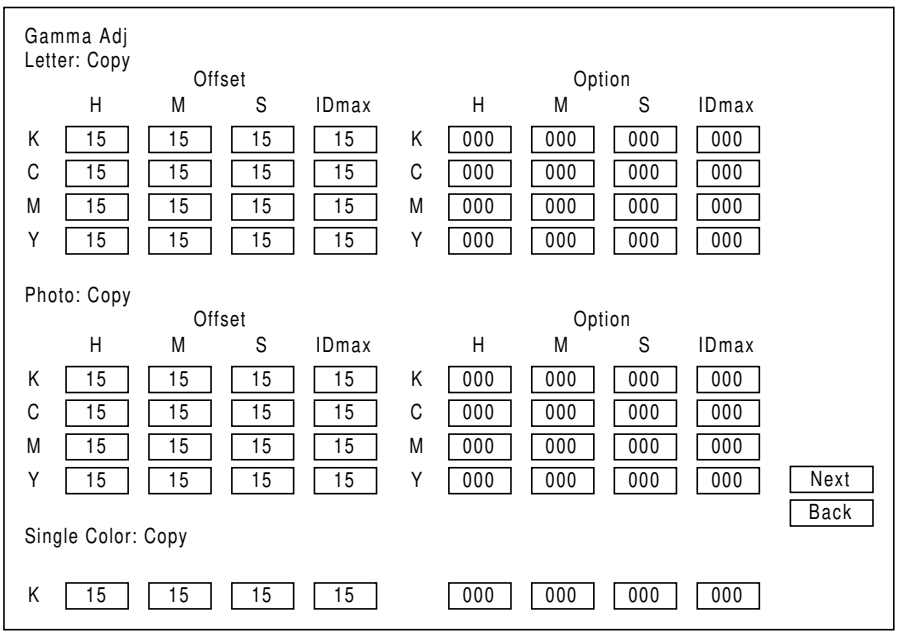
NOTE: Never change “Option” values (default value is 0).

Highlight (Low ID)	Levels 2 through 5 in the C4 chart 10-level scale
Middle (Middle ID)	Levels 3 through 7 in the C4 chart 10-level scale
Shadow (High ID)	Levels 6 through 9 in the C4 chart 10-level scale
ID max	Level 10 in the C4 chart 10-level scale (affects the entire image density.)
Offset	The higher the number in the range associated with the low ID, middle ID, high ID, and ID max, the greater the density.

There are three adjustable modes:

- Text (Letter) mode
- Photo mode
- Single color mode

SP4-910 screen



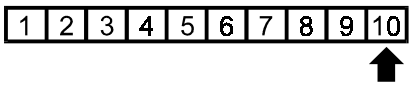
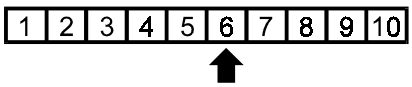
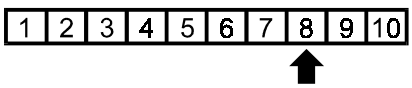
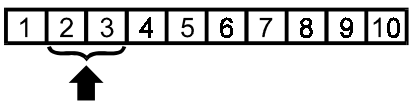
A269R553.WMF

Adjustment Procedure

1. Enter the SP mode.
2. Open the 4-910 screen.
3. Adjust the offset values until the copy quality conforms to the standard.

NOTE: Never change “Option” value (default value is 0).

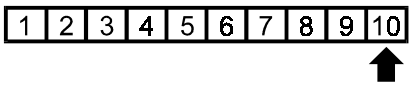
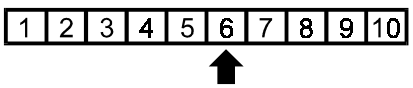
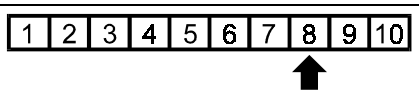
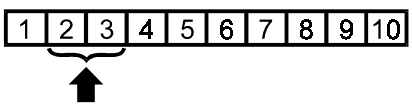
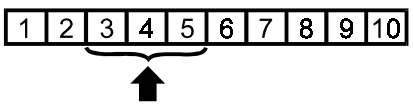
<Standard Copy Quality in Text Mode>

Standard Copy Quality in Text Mode			
Step	**Item to Adjust**	**Level on the C-4 chart**	**Adjustment Standard**
1	ID max: (K, C, M, and Y)		Adjust the offset value so that the density of level 10 matches that of level 10 on the C-4 chart.
2	Middle (Middle ID) (K, C, M, and Y)		Adjust the offset value so that the density of level 6 matches that of level 6 on the C-4 chart.
3	Shadow (High ID) (K, C, M, and Y)		Adjust the offset value so that the density of level 8 matches that of level 8 on the C-4 chart.
4	Highlight (Low ID) (K, C, M, and Y)		Adjust the offset value so that level 2 is not visible on the copy and the density of level 3 matches that of level 3 on the C-4 chart.

4. Copy the C-4 chart in the text mode.
5. Open the 4-910 screen.
6. Adjust the offset values until the copy quality conforms to the standard.

NOTE: Never change “Option” value (default value is 0).

<Standard Copy Quality in Photo Mode>

Standard Copy Quality in Photo Mode			
Step	**Item to Adjust**	**Level on the C-4 chart**	**Adjustment Standard**
1	ID max: (K, C, M, and Y)		Adjust the offset value so that the density of level 10 matches that of level 10 on the C-4 chart.
2	Middle (Middle ID) (K, C, M, and Y)		Adjust the offset value so that the density of level 6 matches that of level 6 on the C-4 chart.
3	Shadow (High ID) (K, C, M, and Y)		Adjust the offset value so that the density of level 8 matches that of level 8 on the C-4 chart.
4	Highlight (Low ID) (K, C, M, and Y)		Adjust the offset value so that level 2 is not visible on the copy and the density of level 3 matches that of level 10 on the C-4 chart.
5	K Highlight (Low ID) (C, M, and Y) <on the full color copy>		Adjust the offset value so that the color balance of black scale levels 3 through 5 in the copy is seen as gray.

7. Copy the C-4 chart in the [Photo] mode.
8. Examine the photo part (lower half of the image) on the C-4 chart. Compare the copy with the chart. Proceed to the next step if color displacement errors are found. Terminate the adjustment if the check proves normal.
9. Adjust the offset for Low ID within the range of ±2.

ACC Target Modification

It is possible to adjust the image that is generated after the execution of ACC (Automatic Color Calibration) (an image that has been subject to automatic color calibration) by modifying the ACC target in SP modes. This adjustment must be performed when the scanner characteristics change after the CCD is replaced, causing the target to be displaced.

SP Modes for ACC Target Density Adjustment

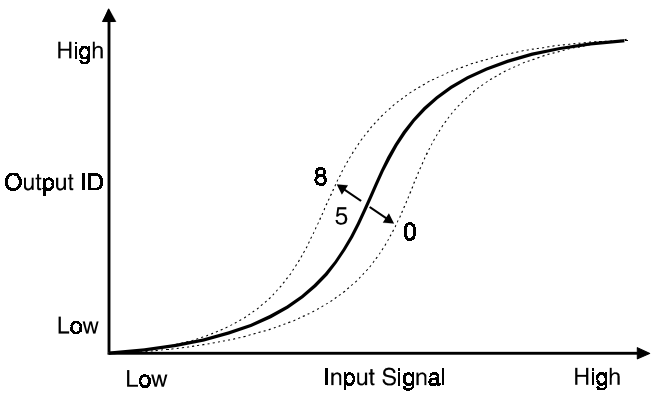
SP Number	Output Type	Original Type	Color
SP4-501-001:	Copy	Text	K
SP 4-501-002:	Copy	Text	C
SP 4-501-003:	Copy	Text	M
SP 4-501-004:	Copy	Text	Y
SP 4-501-005:	Copy	Photo	K
SP 4-501-006:	Copy	Photo	C
SP 4-501-007:	Copy	Photo	M
SP 4-501-008:	Copy	Photo	Y
SP 4-502-001:	Print:	Text	K
SP 4-502-002:	Print	Text	C
SP 4-502-003:	Print	Text	M
SP 4-502-004:	Print	Text	Y
SP 4-502-005:	Print	Photo	K
SP 4-502-006:	Print	Photo	C
SP 4-502-007:	Print	Photo	M
SP 4-502-008:	Print	Photo	Y

Default: 5
Adjustable range: 0 to 10

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

Values:
Values smaller than 5 (standard): The ACC target gets lighter.
Values greater than 5 (standard): The ACC target gets darker.

The effect of the setting is similar to the middle ID sub-adjustment in the manual printer gamma adjustment



A269R554.WMF

6.7.2 MAIN SCAN POSITION DOT CORRECTION

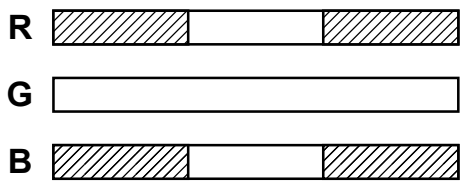
NOTE: Before adjusting the scanner, perform the printer registration adjustment (see procedure 8.11.11).

1. Enter the SP mode and open SP4-010 and SP4-011.
2. Check that each value corresponds to the factory-set value.
3. Press the Interrupt key and copy the C-4 chart in the full-color photo mode.

   NOTE: It is necessary to copy the C-4 chart in photo mode. In letter mode, color displacement cannot be checked properly.
   Be sure to perform the following procedure for both the left and right edges of the C-4 chart.

4. Check the yellow and cyan vertical lines. (Use a Magnification Scope to do this.) If they overlap the black line at the edges of the copy, exit the SP mode to end the adjustment. If the yellow and cyan lines significantly extend beyond the black line, proceed to the next step.
5. Press the interrupt key to return to the SP mode and open SP4-932. The following table shows the location of the current values.

4-932-1	Dot correction R left edge
4-932-2	Dot correction R right edge
4-932-3	Dot correction B left edge
4-932-4	Dot correction B right edge



A269D074.WMF

CCD lines

6. Change the values in accordance with the following tables.

Condition	Sub condition	Location of new value
The yellow line is to the left of the black line, and the cyan line is to the right of the black line.	The edges of the yellow and cyan lines deviate evenly from the black line.	The new value is in the middle row, to the left of the current value's column.
	The cyan line's edge is the most distant edge from the black line.	The new value is in the middle row, to the left of the current value's column.
	The yellow line's edge is the most distant edge from the black line.	The new value is in the middle row, to the left of the current value's column.
The cyan line is to the left of the black line, and the yellow line is to the right of the black line.	The edges of the yellow and cyan lines deviate evenly from the black line.	The new value is in the middle row, to the right of the current value's column.
	The cyan line's edge is the most distant edge from the black line.	The new value is in the middle row, to the right of the current value's column.
	The yellow line's edge is the most distant edge from the black line.	The new value is in the middle row, to the right of the current value's column.

Top Row		18		27		36		45		65		74		83		92	
Middle Row	19		28		37		46		55		64		73		82		91
Bottom Row		29		38		47		56		54		63		72		81	

NOTE: In the above table:
The first digit represents the value of the red correction
(4-932-1: R left, 4-932-2: R right)
The second digit represents the value of the blue correction
(4-932-3: B left, 4-932-4: B right)

Example:

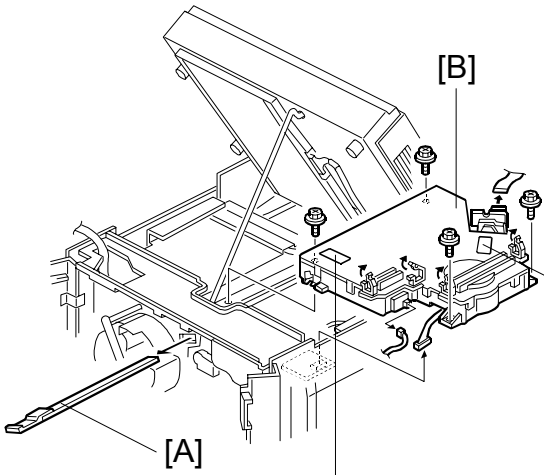
1. The C-4 chart's vertical lines do not overlap properly. On the right side of the chart, the yellow line is to the left of the black line and the cyan line is to the right of the black line. The yellow line's edge is the most distant edge from the black line. These conditions are used to determine what the new values should be. The new value is located in the bottom row, to the left of the current value's column. For the right side of the chart, the machine's current red correction value is 6 (4-932-2), and the blue correction value is 5 (4-932-4). Therefore, the current value in the chart is 65. The new value (bottom row to the left) is 56.
2. On the left side of the chart, the cyan line is to the left of the black line and the yellow line is to the right of the black line. The edges of the yellow and cyan lines deviate evenly from the black line. These conditions are used to determine what the new values should be. The new value is located in the middle row, to the right of the current value's column. For the left side of the chart, the machine's current red correction value is 6 (4-932-1), and the blue correction value is 4 (4-932-3). Therefore, the current value in the chart is 64. The new value (middle row to the right) is 73.

6.8 LASER OPTICS SECTION

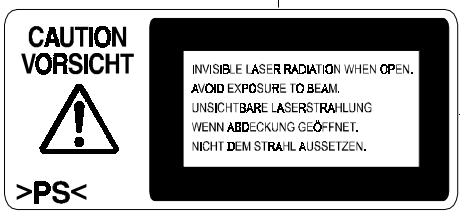
⚠WARNING

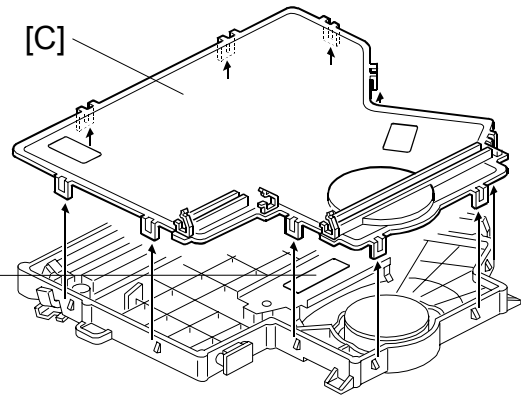
Be sure to turn off the main switch and disconnect the power plug from the power outlet before attempting any disassembly or adjustment of the laser unit. This copier uses a class 3B laser beam with a wavelength of 780 nm and an output of 15 mW. Laser beams can seriously damage your eyes.

6.8.1 POLYGON MIRROR MOTOR REPLACEMENT



A269R105.WMF





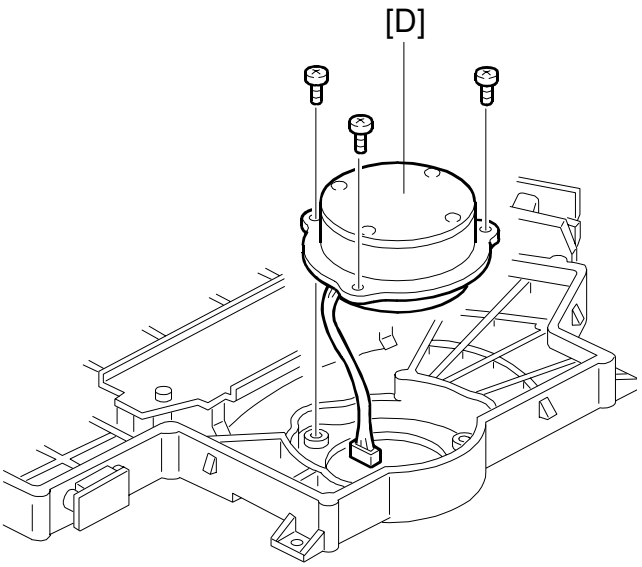
A269R106.WMF

1. Remove the operation panel and upper rear cover, then open the scanner unit.

⚠CAUTION

Take care not to remove the support rod while the scanner unit is open. Disengagement of the support rod may cause the scanner unit to fall down.

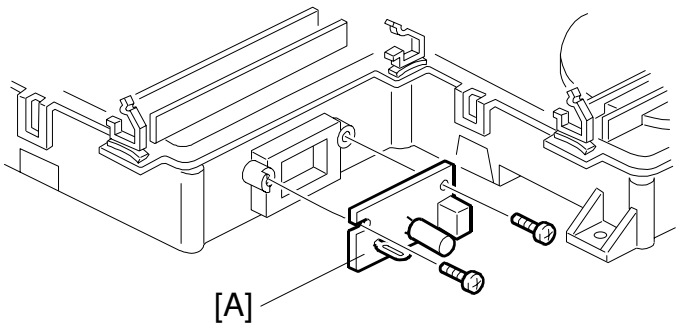
2. Remove the toner shield glass [A].
   NOTE: Remove the toner shield glass before removing the optical housing unit. This is to prevent the toner shield glass from inadvertently broken.
3. Remove the optical housing unit [B] (4 screws, 3 connectors, and 4 clamps).
4. Remove the optical housing cover [C] (10 hooks).



A269R107.WMF

5. Remove the polygon motor [D] (3 screws and 1 connector).
6. Reassemble in the reverse order of disassembly.

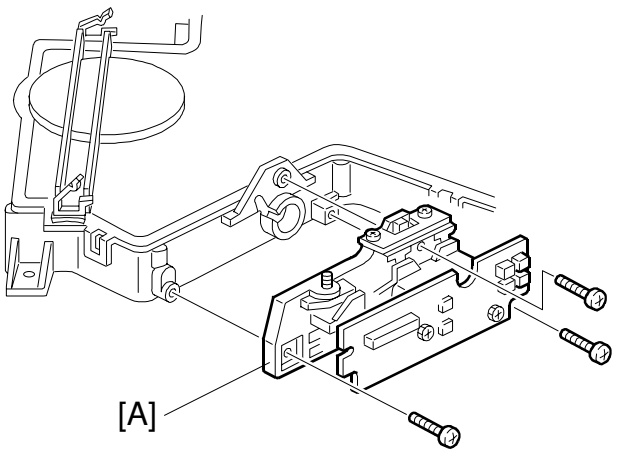
6.8.2 LASER SYNCHRONIZING DETECTOR REPLACEMENT



A269R109.WMF

1. Remove the optical housing unit (4 screws, 3 connectors, and 2 clamps).
2. Remove the laser synchronizing detector board [A] (2 screws).
3. Reassemble in the reverse order of disassembly.

6.8.3 LD UNIT REPLACEMENT



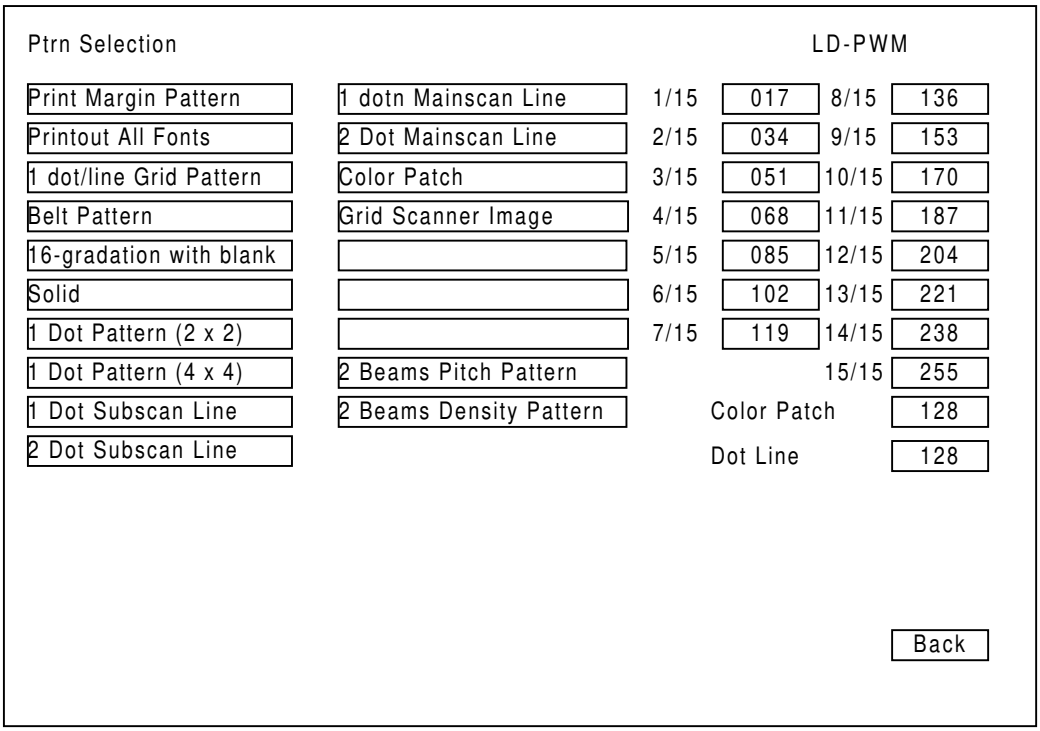
A269R108.WMF

1. Remove the optical housing unit (4 screws, 3 connectors, and 2 clams).
2. Remove the LD unit [A] (3 screws).
3. Reassemble in the reverse order of disassembly.
4. Check and adjust the LD pitch (see the next page).

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

LD Pitch Check and Adjustment]

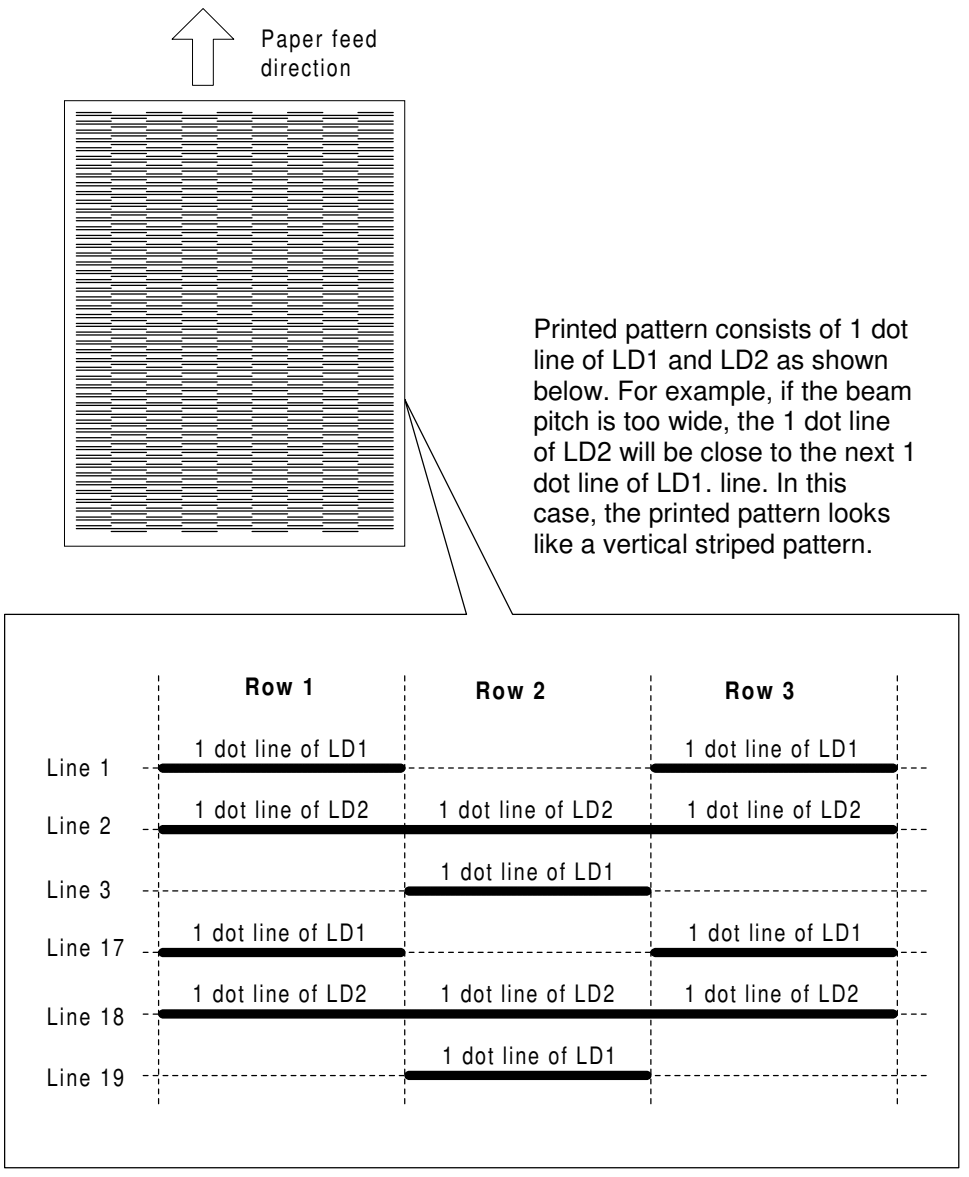
1. Enter SP5-955 (the following display will appear); then, select the "2-Beams Pitch Pattern" and enter 100 for the "Dot Line" value (default value is 128). Then press the [Interrupt] key, select "Black & White", and print on A3/11" x 17" paper.



A269R520.WMF

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

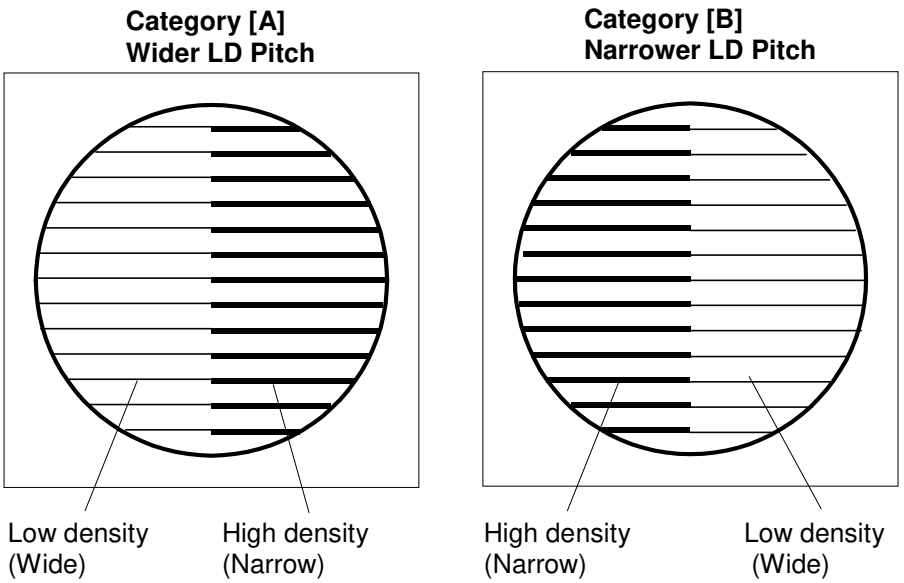
[Printed pattern]



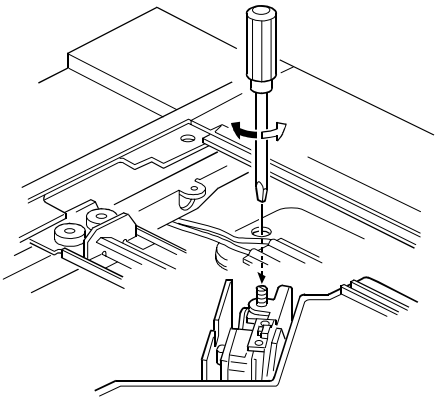
A269R522.WMF

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

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



A269R523.WMF



A269R111.WMF

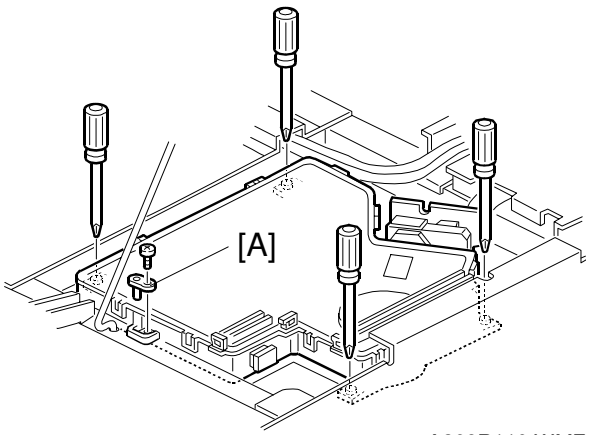
4. If the image that is checked with a magnifier comes under category [A], “Wider LD Pitch”:
   1) Remove the exposure glass.
   2) Insert an adjusting screwdriver into the scanner unit LD angle adjustment access hole and turn the screw clockwise half a turn. Then, regenerate the test pattern (1 turn of adjusting screw corresponds to 5 μm).
   3) Write (–2.5 μm, –0.5 turn) in the sample output.
   4) Turn the screw another half a turn (clockwise) and regenerate the test pattern.
   5) Write (–5 μm, –1 turn) in the sample output.
   6) Turn the screw another half a turn (clockwise) and regenerate the test pattern.
   7) Write (–7.5 μm, –1.5 turn) in the sample output.
   8) From the four sample output sheets, select the one in which the vertical stripes are least prominent. Turn the adjusting screw back to the positon of the selected sample output.
5. If the image that is checked with a magnifier comes under category [B], “Narrower LD Pitch”:
   1) Remove the exposure glass.
   2) Insert an adjusting screwdriver into the scanner unit LD angle adjustment access hole and turn the screw counterclockwise half a turn. Then, regenerate the test pattern (1 turn of adjusting screw corresponds to 5 um).
   3) Write (+2.5 μm, +0.5 turn) in the sample output.
   4) Turn the screw another half a turn (counterclockwise) and regenerate the test pattern.
   5) Write (+5 μm, +1 turn) in the sample output.
   6) Turn the screw another half a turn (counterclockwise) and regenerate the test pattern.
   7) Write (+7.5 μm, +1.5 turn) in the sample output.
   8) From the four sample output sheets, select the one in which the vertical stripes are least prominent. Turn the adjusting screw back to the position of the selected sample output
6. Paint-lock the screw.

6.8.4 SQUARENESS ADJUSTMENT

The purpose of this adjustment is to finely adjust the obliqueness of the image that is caused by the laser unit.

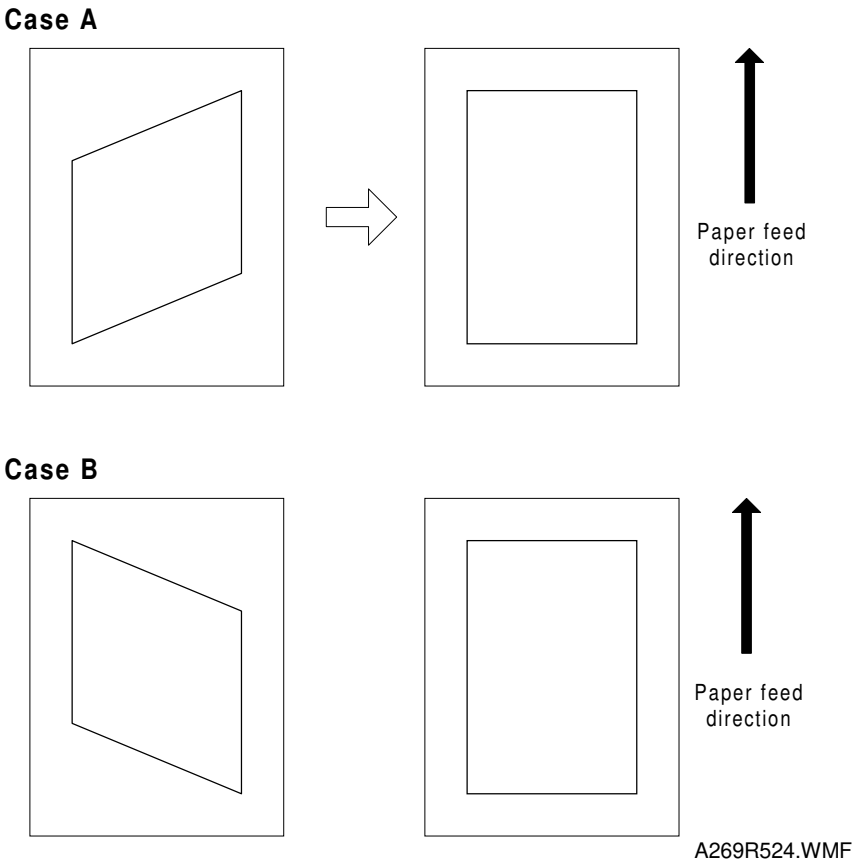
NOTE: This procedure is used to finely adjust the inclination of the lines in the horizontal direction (horizontal lines) in the image by turning the laser unit and therefore tilting the scanning line of the laser beam.

1. Generate the “Print Margin Pattern” in the SP mode (SP5-955-17) and measure its squareness. (When the squareness of the laser unit is poor, the lines in the horizontal scanning direction are inclined and the lines in the feed direction (vertical lines) stand upright.
2. Loosen (4) screws securing the optical housing unit.
3. Remove the vertical reference pin [A] located on the left front side of the optical housing unit.



A269R110.WMF

4. Turn the optical housing unit (clockwise or counterclockwise) according to the inclination of the lines in the horizontal scanning direction (see the figure below for guidelines).
5. Tighten the 4 screws and the vertical reference pin again.



A. In this case, turn the unit clockwise.

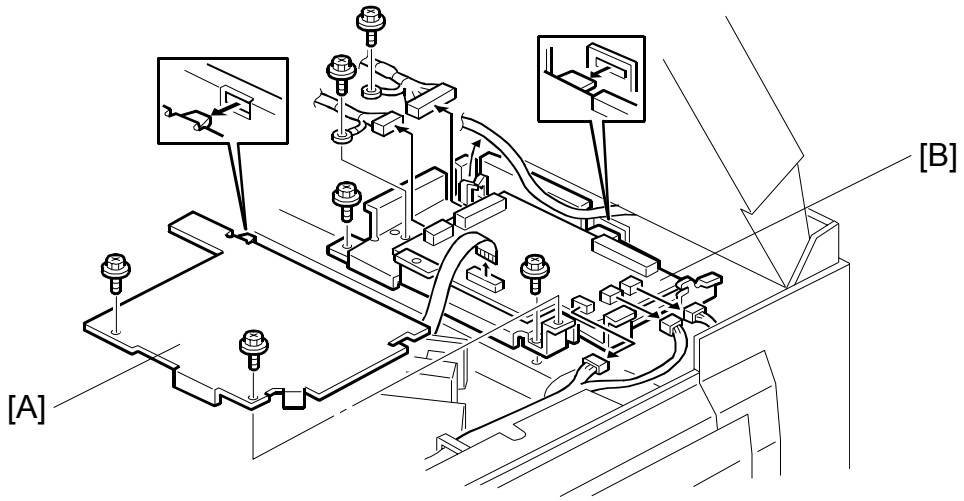
B. In this case, turn the unit counterclockwise.

Amount of inclination:
The amount of inclination of the lines in the horizontal scanning direction in the image is almost proportional to the angle by which the optical housing unit is turned.

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

You can make fine squareness adjustments within this range.

6.8.5 LD CONTROL BOARD REPLACEMENT



A269R010.WMF

1. Open the scanner unit. (See 6.6.3.)

⚠CAUTION

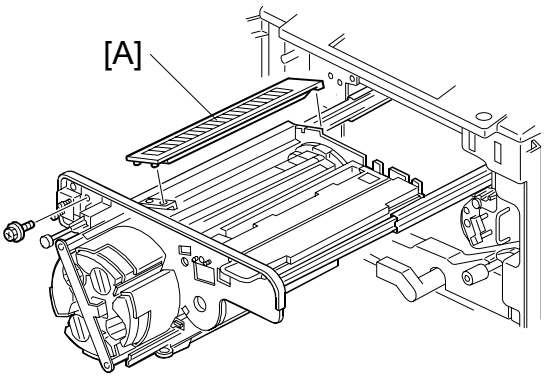
Take care not to remove the support rod while the scanner unit is open. Disengagement of the support rod may cause the scanner unit to fall down.

2. Remove the laser control board cover [A] (2 screws).
3. Remove the laser control board [B] (1 flat cable connector, 5 connectors, 4 screws, and 1 clamp).

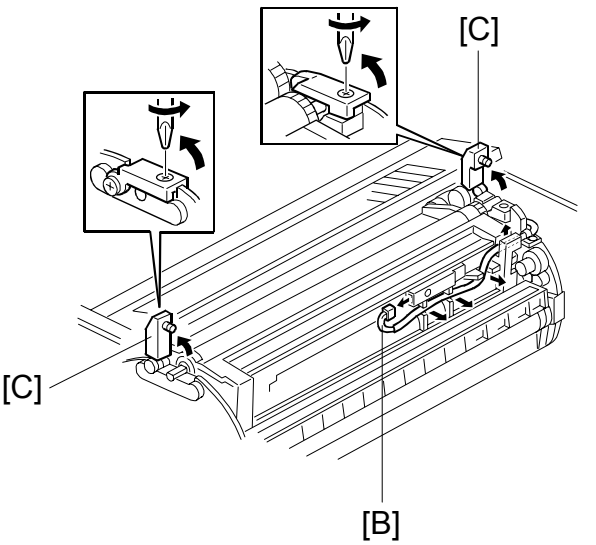
6.9 DEVELOPMENT UNIT

6.9.1 DEVELOPER REPLACEMENT

Developer Collection



A269R325.WMF



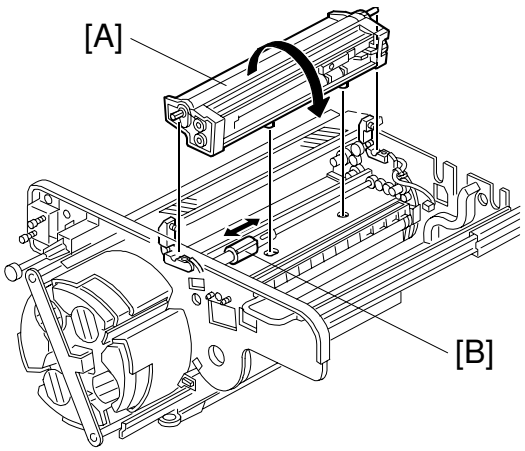
A269R308.WMF

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

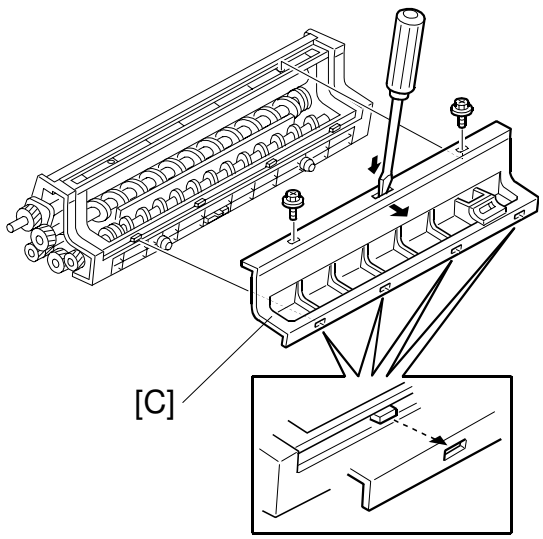
1. Pull out the revolver/drum drawer. (See 6.4.1.)
2. Remove the revolver filter [A].
3. Remove the drum unit and shield. (See 6.4.2.)
4. Remove the connector [B] of the toner density sensor and open the development unit locks [C] at both ends of the revolver.

⚠CAUTION

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



A269R309.WMF



A269R151.WMF

1. Remove the development unit [A] and close the toner supply unit shutter [B].

⚠CAUTION

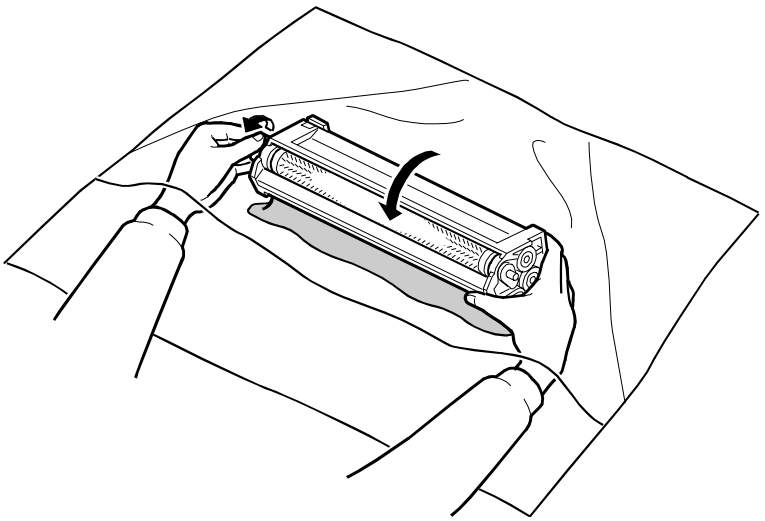
Be sure the pawl of the revolver lock is engaged before removing a development unit. Failure to observe this precaution may rotate the revolver, causing permanent damage to the development unit or its locks.

NOTE: When you remove a development unit, be sure to rotate in the direction shown in the figure. Rotating the development unit in the wrong direction may cause the developer to spill.

⚠CAUTION

Remove the development units for one color at a time. Removing two or more development units at the same time may unbalance of the revolver. This will cause the revolver to turn, possibly catching your fingers.

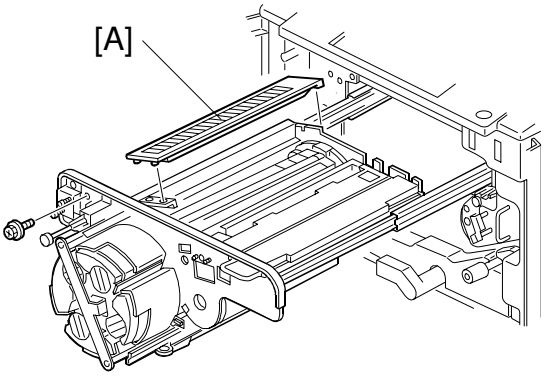
2. Remove the developer cover [C] (2 screws, 4 hooks). (Release the hooks with a screwdriver.).



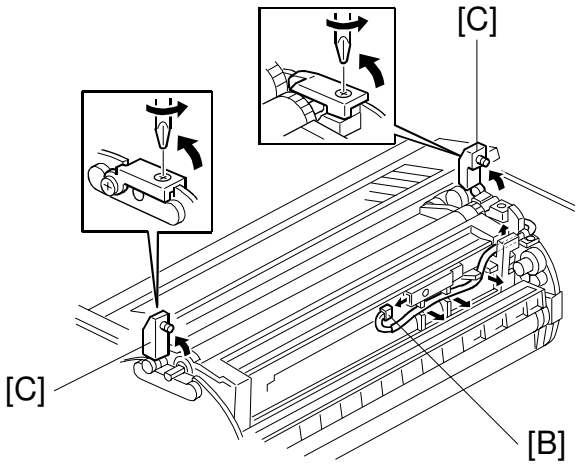
A269R310.WMF

3. Hold the development unit inside a collection bag, rotate the unit until the opening faces downward, and shake the unit slightly to dump the developer.
4. When the agitator section gets almost empty, orient the development sleeve face up and rotate the sleeve in the reverse direction.
5. When no more developer falls down, rotate the sleeve in the forward direction several turns while maintaining the sleeve's orientation.
6. Tilt the developer assembly so that its bottom faces upward to dump the remaining developer out of the agitator section.
7. Repeat steps 3 to 6 until no more developer is collected. (A small amount of developer will remain in the development unit—about 10 grams. This is all right.)

6.9.2 DEVELOPER INSTALLATION



A269R325.WMF



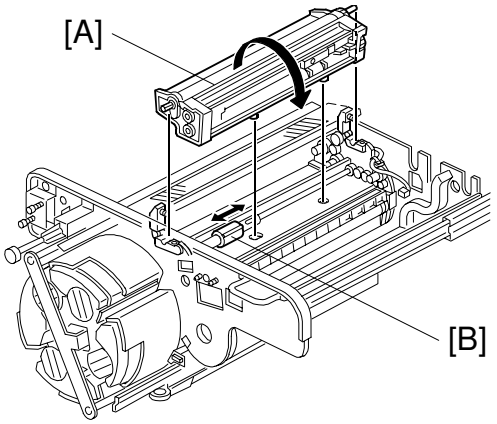
A269R308.WMF

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

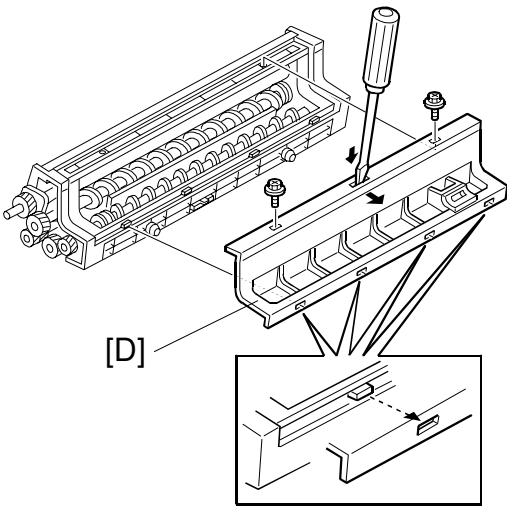
1. Remove the revolver filter [A].
2. Remove the toner density sensor connector [B] and open the development unit locks [C] at both ends of the revolver.

⚠CAUTION

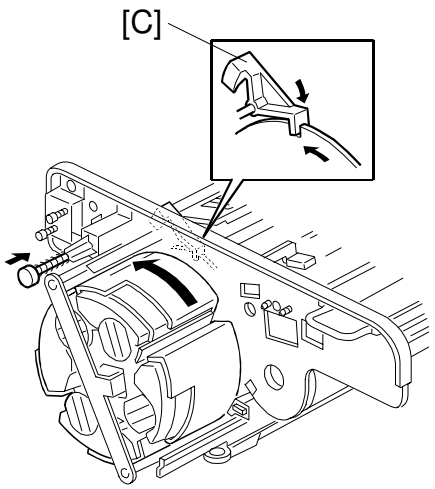
Do not push the revolver/drum drawer into the copier with developer locks left open. Otherwise, the revolver locks may strike the main unit frame, resulting in permanent damage to the revolver.



A269R309.WMF



A269R151.WMF



A269I357.WMF

3. Remove the development unit [A] and close the toner supply unit shutter [B].

⚠CAUTION

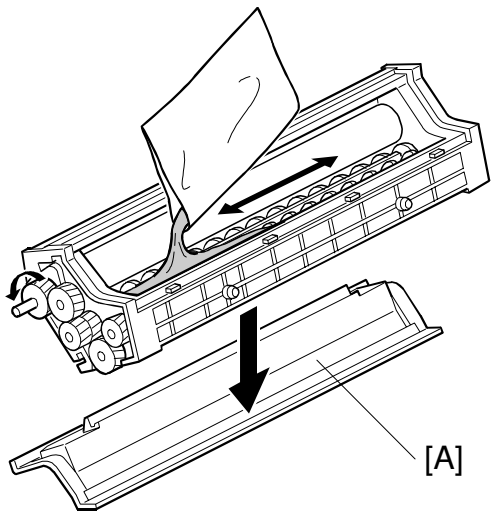
Be sure to the pawl of the revolver lock [C] is engaged before removing a development unit. Failure to observe this precaution may rotate the revolver, causing permanent damage to the development unit or its locks.

NOTE: When you remove a development unit, be sure to rotate in the direction shown in the figure. Rotating a development unit in the wrong direction may cause the revolver unit to be damaged.

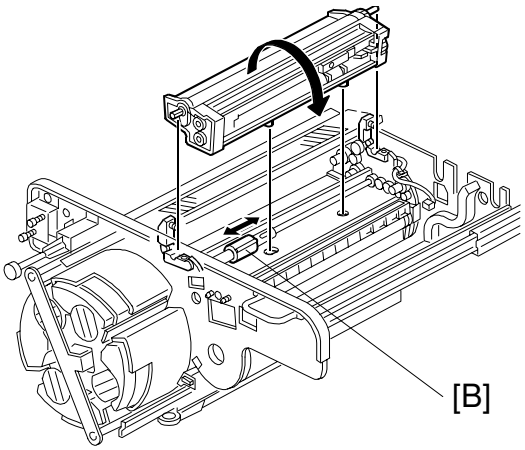
⚠CAUTION

Remove the development unit, for one color at a time. Removing two or more development units at the same time may unbalance the revolver. This will cause the revolver to turn, possibly catching your fingers.

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

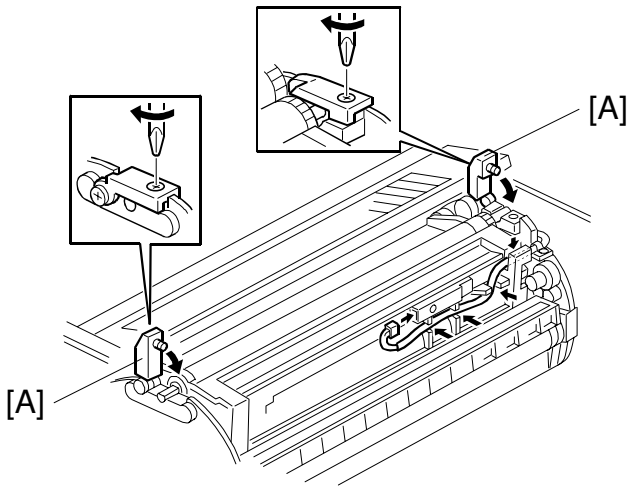


A269I351.WMF

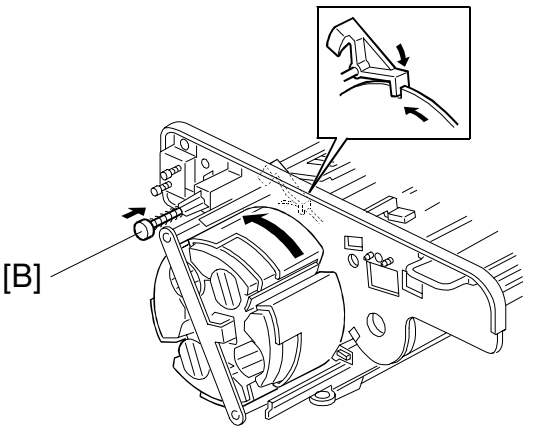


A269I359.WMF

1. Set the developer cover [A] as shown in the figure and place the development unit on it.
2. Pour 1 bag (700 g) of developer in the developer assembly.
3. Turn the sleeve in the forward direction several rotations to give it a smooth layer of developer.
4. Replace the developer cover (2 screws).
5. Open the toner supply unit shutter [B] and set the developer assembly in the revolver/drum drawer (2 lock screws and 1 sensor connector).



A269I353.WMF



A269I357.WMF

⚠CAUTION

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

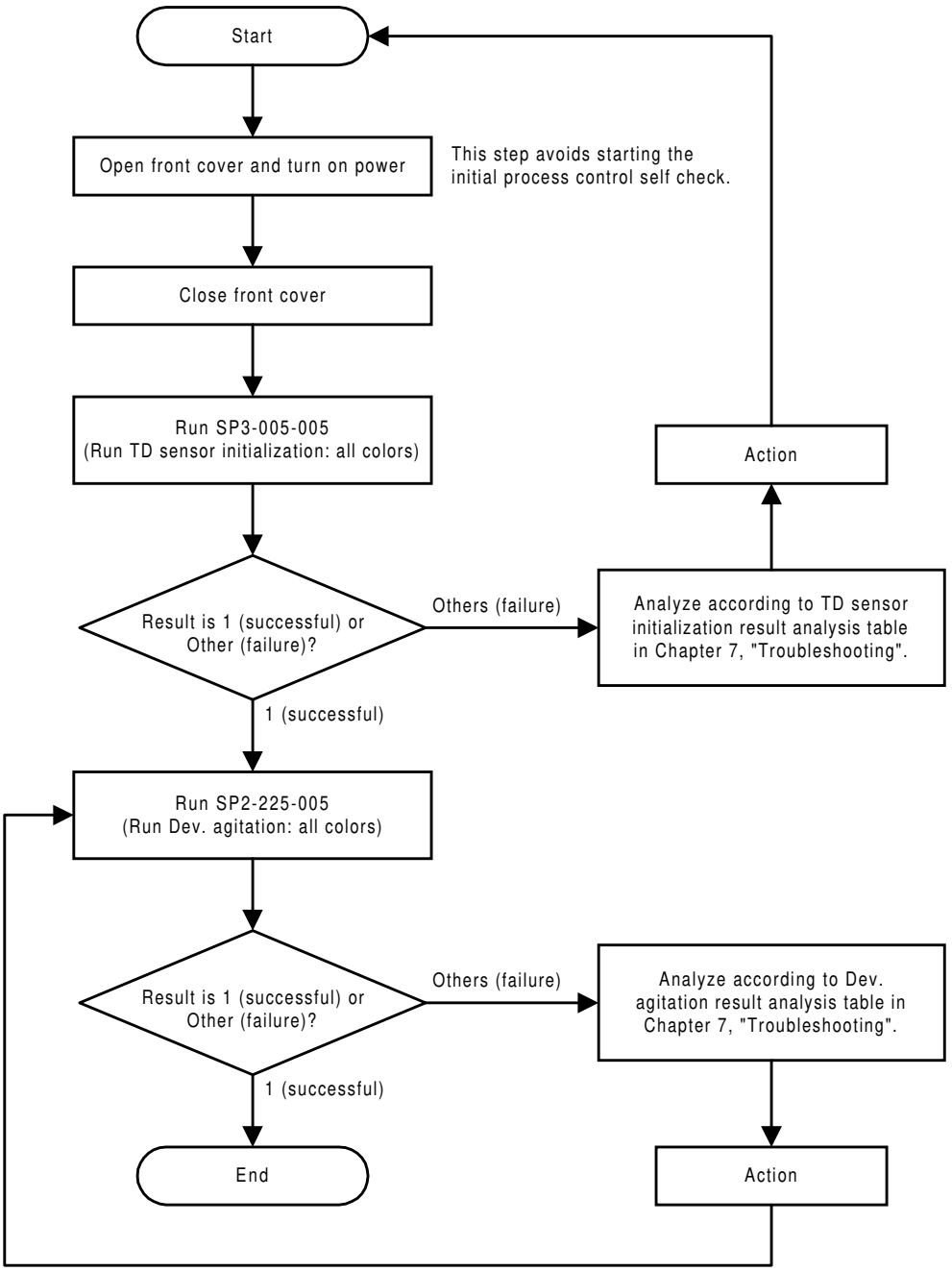
6. Press the revolver lock button [B] to release the revolver lock, rotate the revolver to the next color and install the new developer.

⚠CAUTION

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

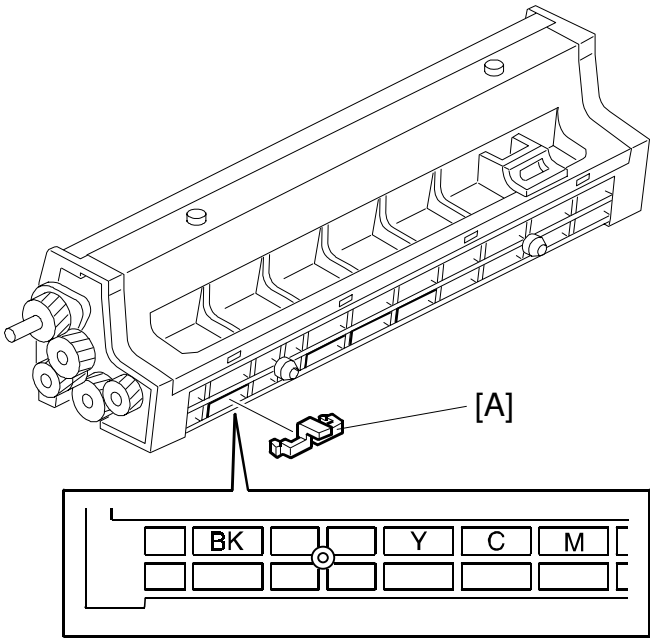
7. Re-install the revolver filter. Then re-install the revolver drum drawer.

8. Follow the flow chart below.



A269I153.WMF

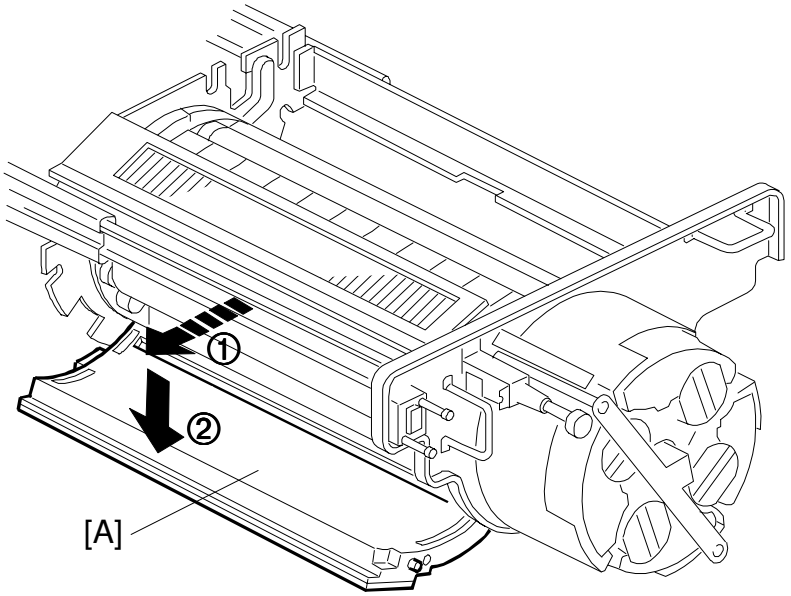
6.9.3 DEVELOPMENT UNIT REPLACEMENT



A269R312.WMF

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

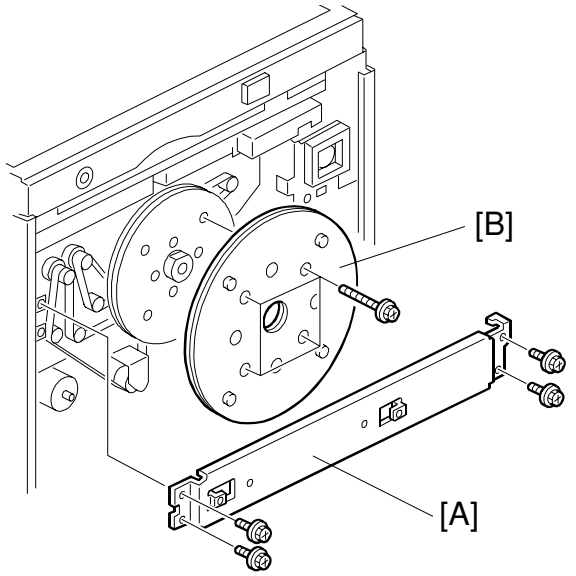
6.9.4 TONER CATCH COVER CLEANING



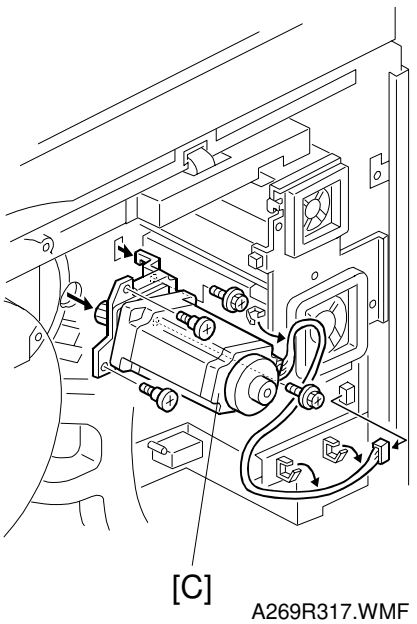
A269R315.WMF

1. Pull out the revolver/drum drawer.
2. Remove the drum unit and cover the OPC drum with 5 or more sheets of paper.
   NOTE: Failure to observe this precaution may expose the drum to external or reflected light and cause optical fatigue.
3. Open the toner catch cover [A] and clean it.

6.9.5 REVOLVER MOTOR REPLACEMENT



A269R316.WMF

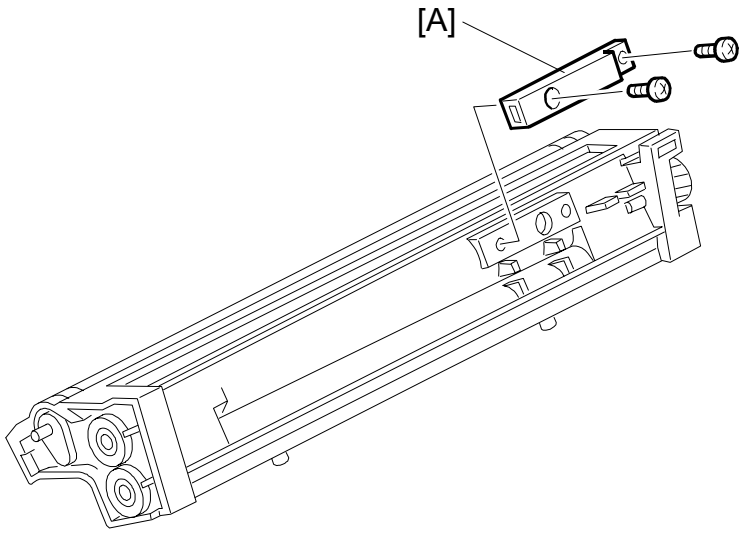


A269R317.WMF

1. Remove the rear cover (4 screws).
2. Remove the rear stay [A] (4 screws).
3. Remove the larger flywheel [B] (4 gold color screws).
4. Remove the revolver motor [C] with the motor bracket.

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

6.9.6 TONER DENSITY SENSOR REPLACEMENT



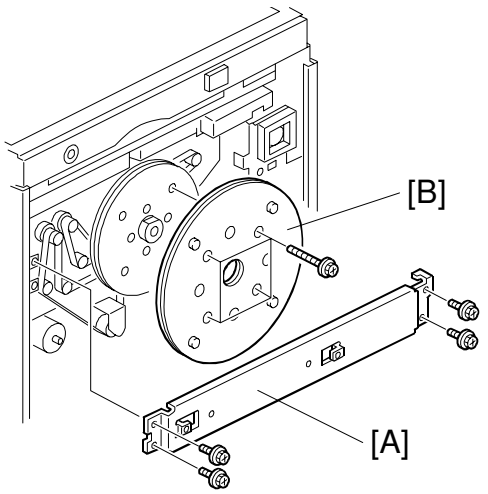
A269R318.WMF

1. Collect the developer. (See 6.9.1.)
2. Replace the toner density sensor [A] (2 screws).
3. Install new developer.
4. Follow the flow chart at the end of the developer installation procedure. (See 6.9.2.)

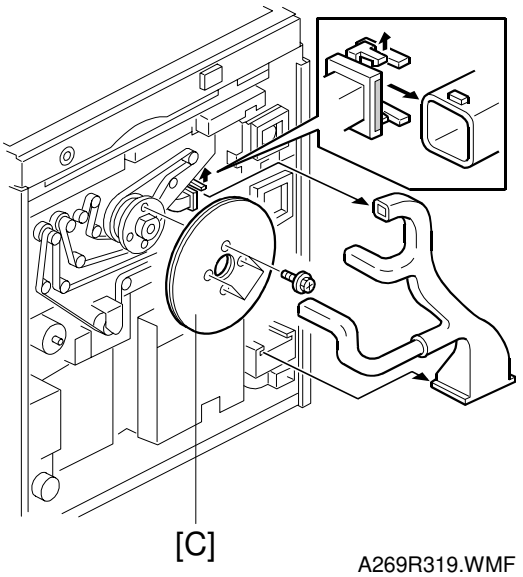
NOTE: In this case, “TD sensor initialization” and “Developer agitation” are required only for the color whose TD sensor and developer are replaced.

6.9.7 TD SENSOR NONCONTACT COUPLER REPLACEMENT

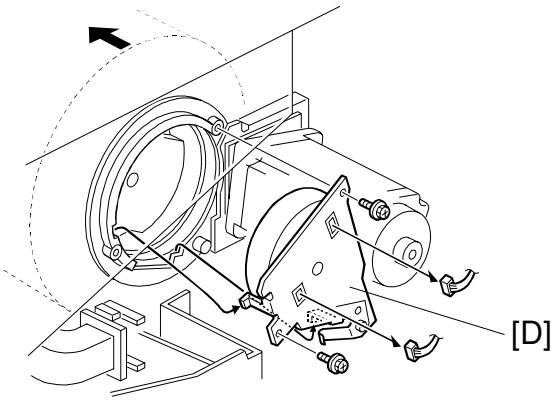
Main Unit Element



A269R316.WMF



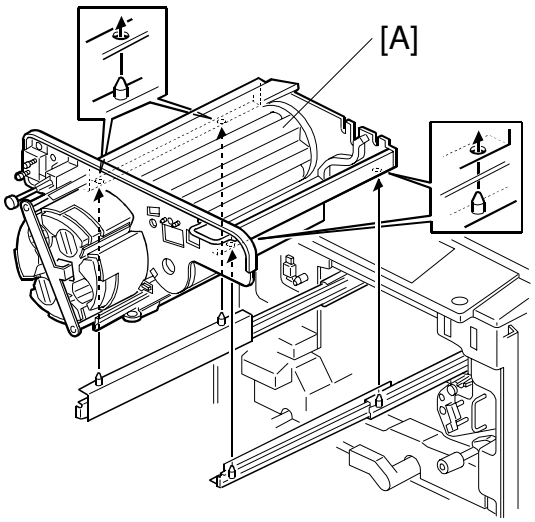
A269R319.WMF



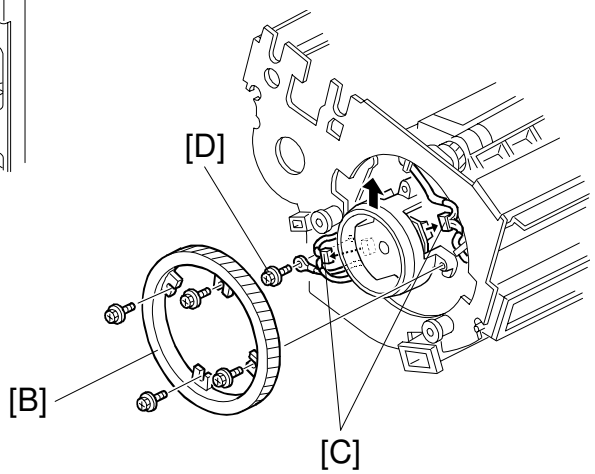
A269R320.WMF

1. Pull out the drawer unit, remove the drum unit, and cover the drum.
   NOTE: Failure to cover the drum may expose the drum to external or reflected light and cause light fatigue. (See 7.3 Drum Light Fatigue in the "Troubleshooting" section.)
2. Remove the rear cover (4 screws).
3. Remove the rear stay [A] (4 screws).
4. Remove the larger flywheel [B] (4 gold color screws).
5. Remove the smaller flywheel [C] (4 gold color screws).
6. Remove the TD sensor I/F board 1 [D] (2 screws and 2 connectors).

TD Sensor Interface (I/F) Board



A269R321.WMF



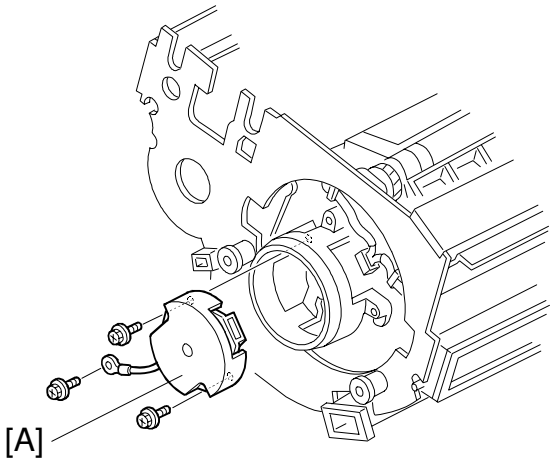
A269R322.WMF

1. Remove the paper discharge corona unit.
2. Pull out the revolver/drum drawer, remove the drum unit, and cover the drum.
   NOTE: Failure to cover the drum may expose the drum to external or reflected light and cause optical fatigue.
3. Lift the revolver/drum drawer [A] off of the slide rails.

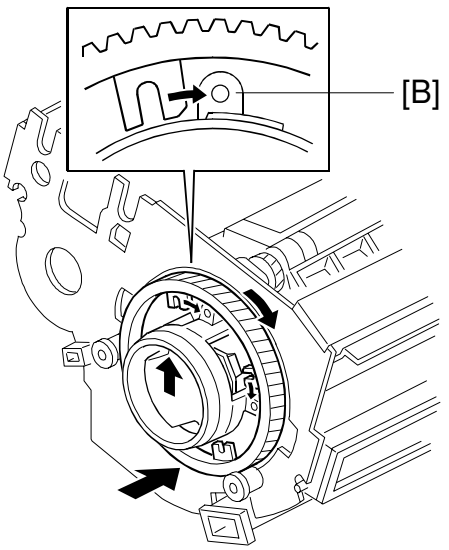
⚠CAUTION

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

4. Remove the revolver gear [B] (4 screws).
5. Disconnect the two TD sensor I/F board 2 connectors [C] and remove the ground screw [D].



A269R323.WMF

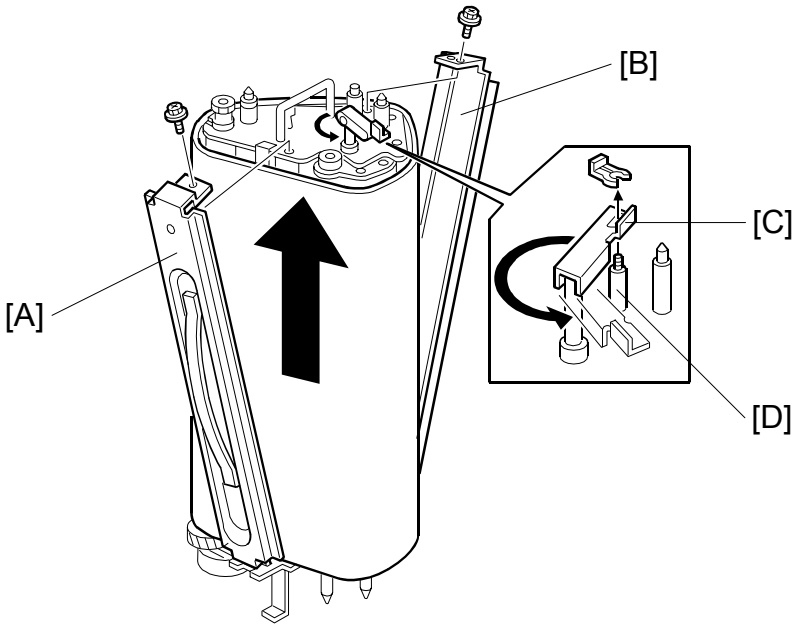


A269R324.WMF

6. Remove the TD sensor I/F board 2 [A] (2 screws).
   NOTE: When installing the revolver gear, slide and align the gear with the screw hole as shown in the figure [B].

6.10 IMAGE TRANSFER SECTION

6.10.1 IMAGE TRANSFER BELT REPLACEMENT

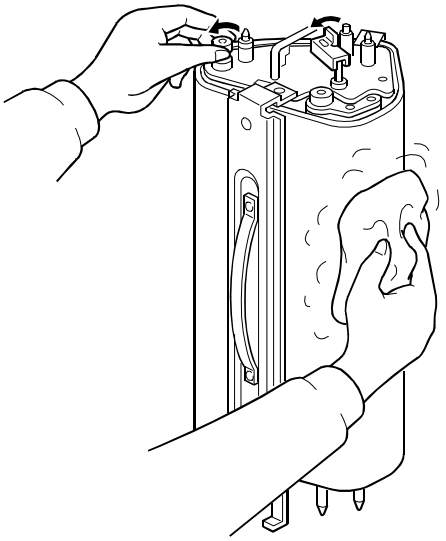


A269R402.WMF

1. Remove the transfer belt unit. (See “6.4.4 Transfer Unit Removal”.)
2. Place the transfer belt unit upright as shown in the figure and remove the rail [A] and upper entrance guide plate [B] (1 screw, each).
3. Release the transfer belt tension lever [C] from the tension stud [D] (1 snap ring) and rotate the lever completely counterclockwise as shown in the illustration. (This releases all tension from the belt so that it can be replaced.).
4. Slide off the transfer belt and replace it with a new one.

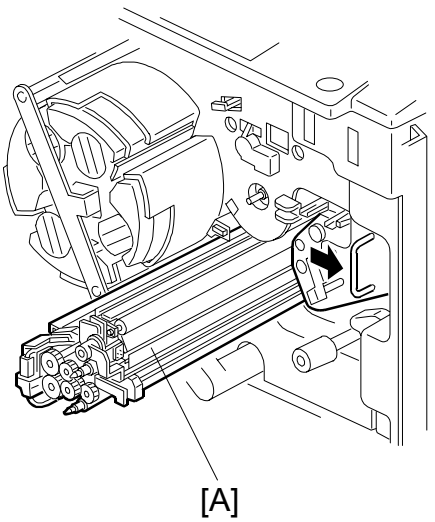
NOTE: 1) Be sure to hold the transfer belt at its ends and never touch the belt surface. Any contamination on the belt might result in poor copy quality.
2) When installing a new transfer belt, make sure that the alignment ridges along both edges of the belt do not ride on the rollers. (They should fit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

5. Move the transfer belt tension lever slightly to the left of the tension stud as shown in the illustration to the right (so you can turn the belt). Then apply setting powder to the entire belt surface while rotating the belt.
   NOTE: After replacing the transfer belt, be sure to apply setting powder as instructed above. Failure to do so may cause the belt to be caught by the blade, resulting in an SC452 condition (belt mark detection error) or a bent blade bracket.



A269R412.WMF

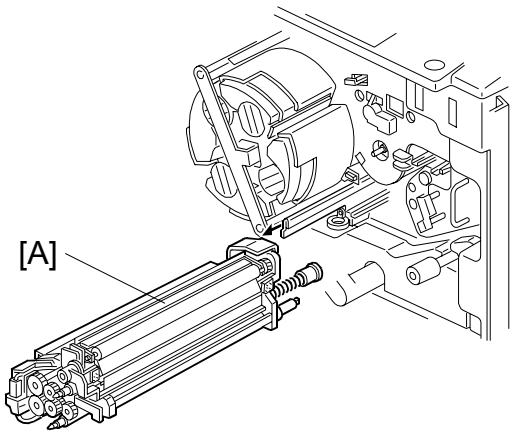
6. Reset the belt tension lever on the tension stud and install the image transfer belt unit.
7. Install the image transfer belt cleaning unit [A].
   NOTE: Be sure to shift the image transfer belt unit to the right before installing the cleaning unit. Failure to observe this caution may damage the image transfer belt.



A269R411.WMF

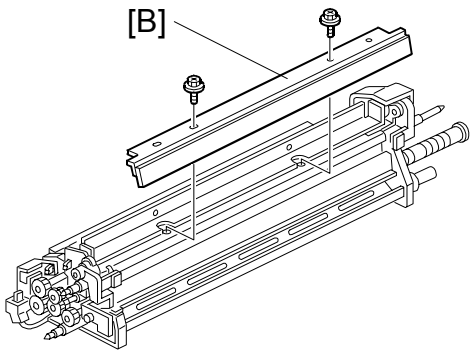
6.10.2 IMAGE TRANSFER BELT BLADE REPLACEMENT

1. Remove the transfer faceplate and remove the transfer belt cleaning unit [A].



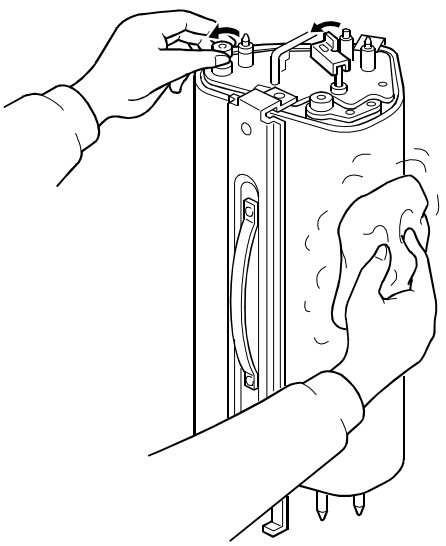
A269R302.WMF

2. Remove the lubricant brush holder (See 6.10.3)
3. Replace the blade [B] (2 screws).
   NOTE: Do not touch the rubber part of the cleaning blade assembly. Handle only the bracket.



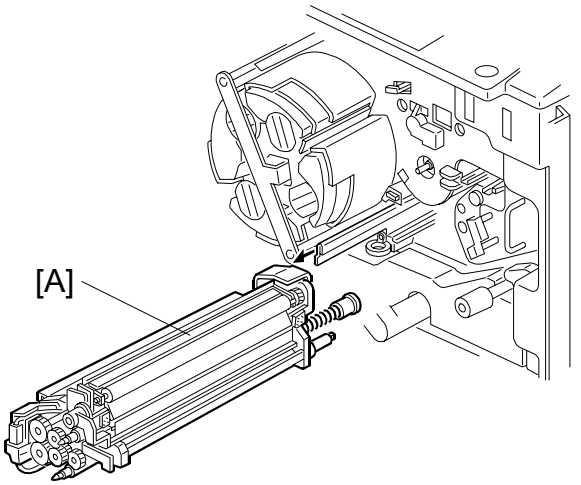
A269R404.WMF

4. After replacing the blade, remove the transfer belt unit from the main unit and apply setting powder to the entire belt surface while rotating the belt.
   NOTE: After replacing the transfer belt, be sure to apply setting powder as instructed above. Failure to do so may cause the belt to be caught by the blade, resulting in an SC452 condition (belt mark detection error) or a bent blade bracket.
5. Reconnect the transfer belt tension lever to the tension stud and install the transfer belt unit.
6. Install the image transfer belt cleaning unit.

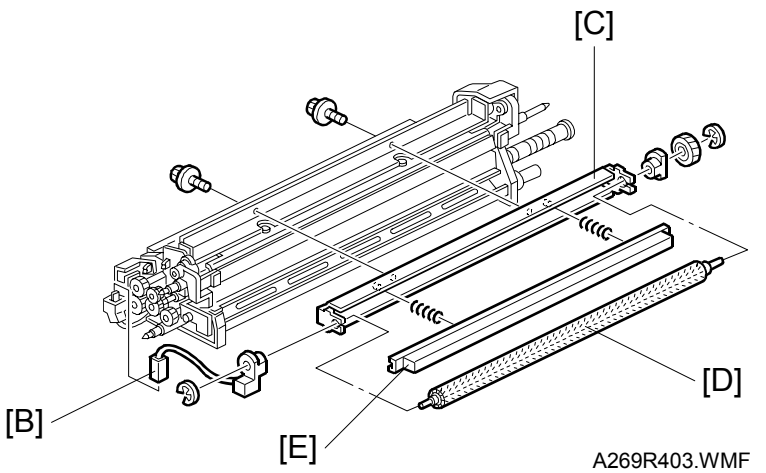


A269R412.WMF

6.10.3 TRANSFER BELT LUBRICANT BAR AND LUBRICANT BRUSH REPLACEMENT



A269R302.WMF



A269R403.WMF

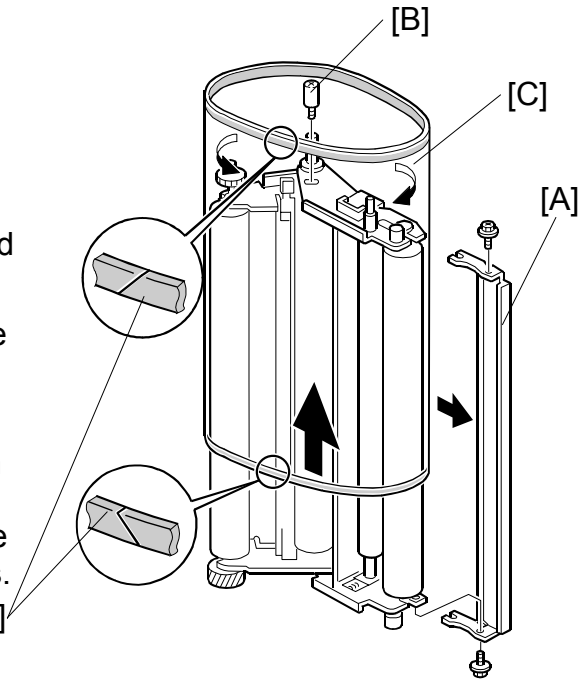
1. Remove the transfer faceplate and remove the transfer belt cleaning unit [A].
2. Remove the bias connector [B].
3. Remove the lubricant brush holder [C] (2 screws).
4. Remove the lubricant brush [D] and lubricant bar [E] (2 e-rings).

NOTE: When reinstalling the lubricant bar, make sure that the springs are set properly.

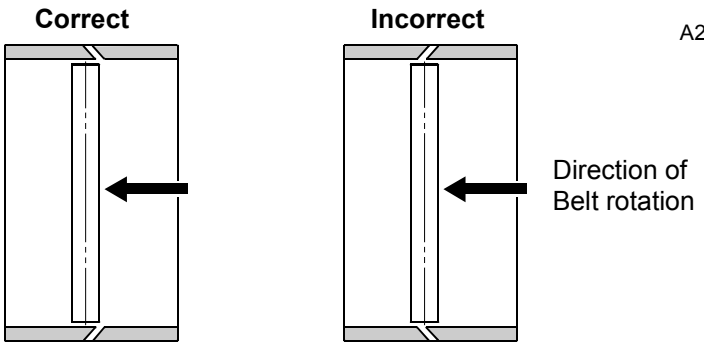
6.10.4 PAPER TRANSFER BELT REPLACEMENT

1. Remove the paper transfer unit. (See “6.4.5”.)
2. Remove the entrance guide plate [A] (2 screws).
3. Place the paper transfer unit upright, and remove the lock pin [B].
4. Remove the paper transfer belt [C] while rotating the belt.

NOTE: The parting line of the belt shoulder [D] should be the direction shown in figure. Incorrect direction of parting line may cause the peeling off of the belt shoulders by the edge of rollers.



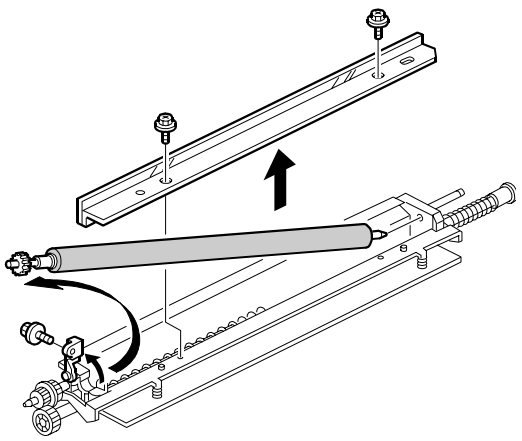
A269R407.WMF



A269R491.WMF

6.10.5 PAPER TRANSFER BELT BLADE/CLEANING BRUSH REPLACEMENT

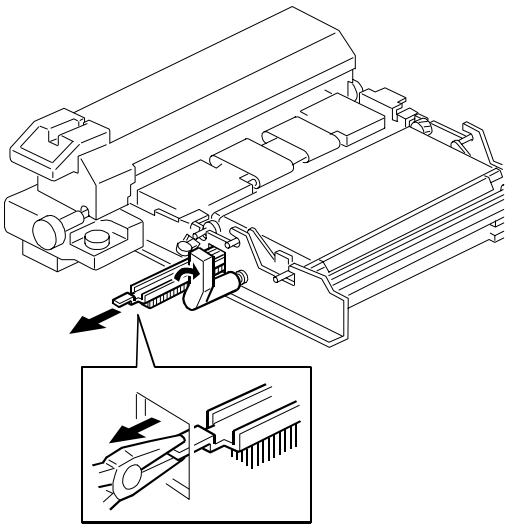
1. Remove the paper transfer belt unit.
2. Remove the cleaning blade [A] (2 screws).
3. Remove the brush [B] (1 screw).



A269R410.WMF

6.10.6 BACK BRUSH REPLACEMENT

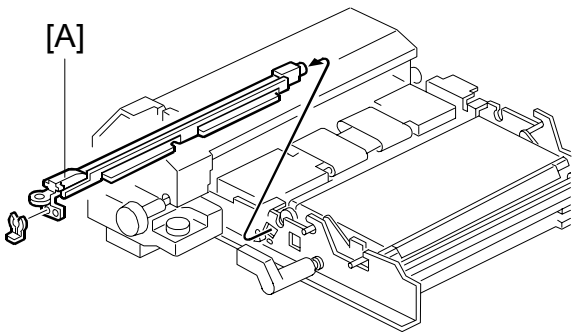
1. Pull out the fusing/transfer drawer [A] and remove the fusing/transfer drawer cover (3 screws).
2. Lift the drawer knob and pull out the belt back brush [B].



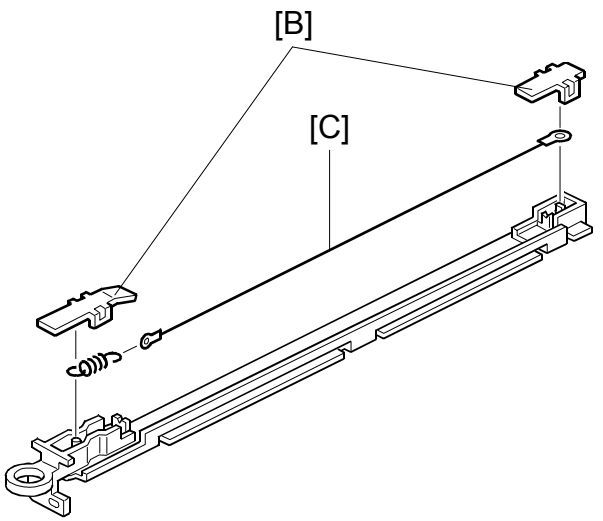
A269R405.WMF

6.10.7 PAPER TRANSFER BELT DISCHARGE CORONA WIRE REPLACEMENT

1. Remove the belt discharge corona unit [A] (1 snap ring).
2. Release and remove the front and rear end block covers [B].
3. Replace the corona wire [C].

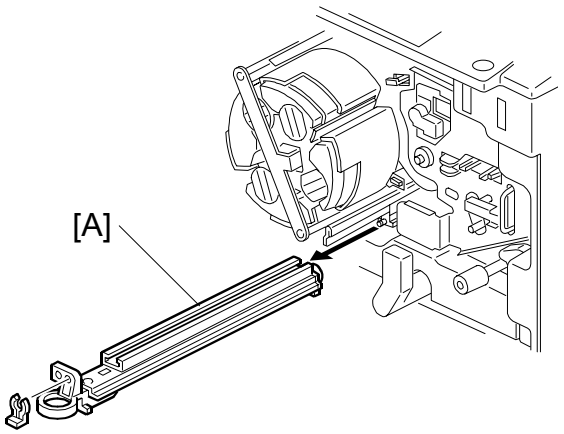


A269R408.WMF

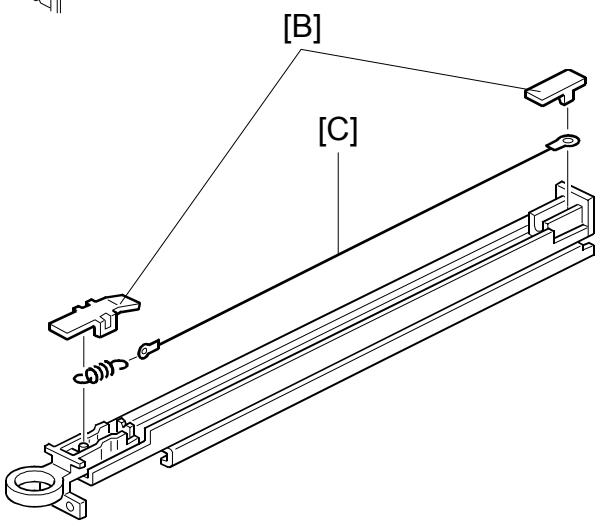


A269R415.WMF

6.10.8 PAPER DISCHARGE CORONA WIRE REPLACEMENT



A269R413.WMF

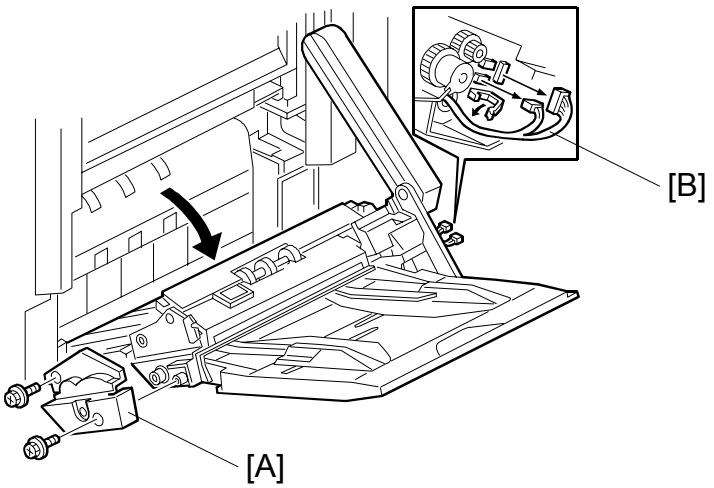


A269R414.WMF

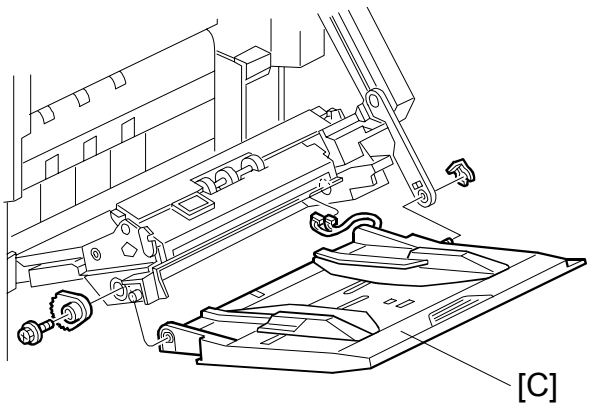
1. Remove the paper discharge corona unit [A] (1 snap ring).
2. Release and remove the front and rear end block covers [B].
3. Replace the corona wire [C].

6.11 PAPER FEED AND REGISTRATION SECTION

6.11.1 BY-PASS FEED TABLE REMOVAL



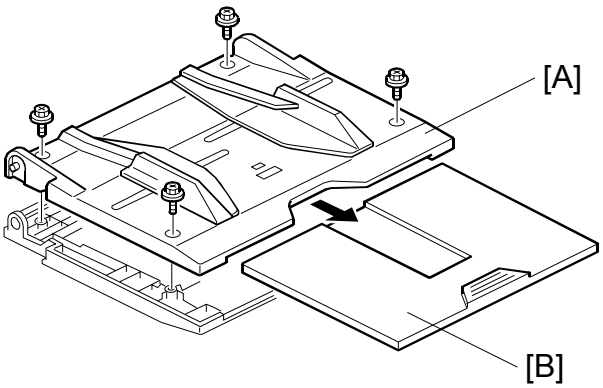
A269R701.WMF



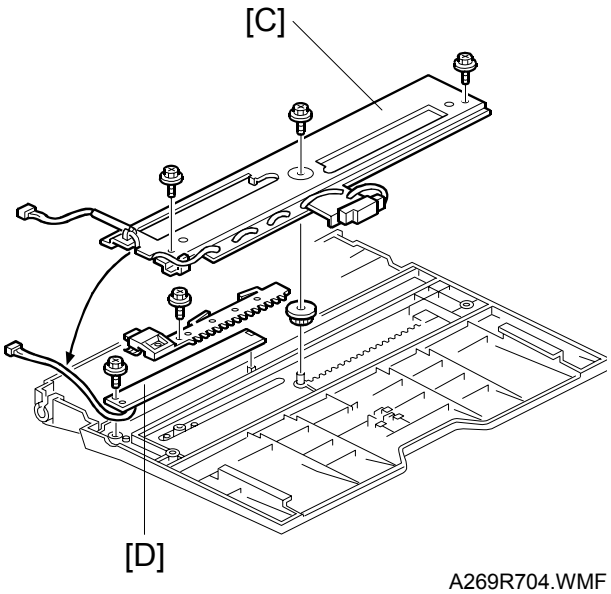
A269R702.WMF

1. Open the by-pass unit.
2. Remove the smaller cover [A] (2 screws).
3. Disconnect two connectors [B].
4. Remove the by-pass feed table [C] (1 snap ring and 1 sectoral gear).

6.11.2 BY-PASS FEED PAPER WIDTH SENSOR REPLACEMENT



A269R703.WMF

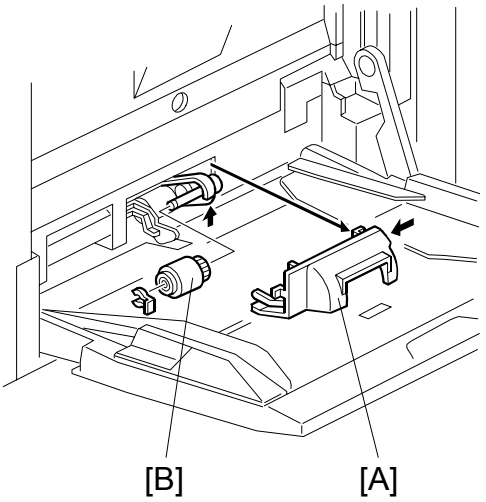


A269R704.WMF

1. Remove the by-pass feed table. (See the previous procedure.)
2. Remove the by-pass feed table cover [A] (4 screws)and the by-pass table extender [B].
3. Remove the by-pass paper length sensor bracket [C] (3 screws).
4. Remove the by-pass paper width sensor [D] (1 screw).

6.11.3 BY-PASS PICK-UP ROLLER REPLACEMENT

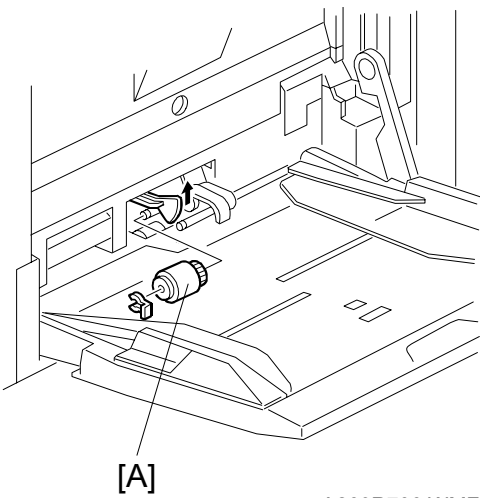
1. Open the by-pass feed table.
2. Remove the roller cover [A] (squeeze and pull).
3. Remove the by-pass pick-up roller [B] (1 snap ring).



A269R705.WMF

6.11.4 BY-PASS FEED ROLLER REPLACEMENT

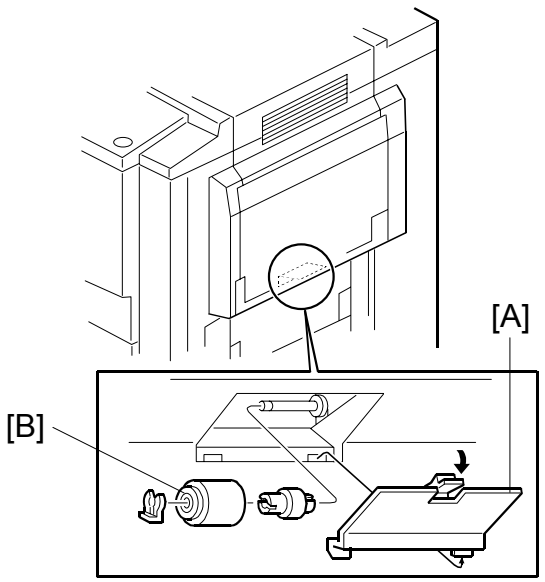
1. Open the by-pass feed table.
2. Remove the roller cover. (See above.)
3. Remove and replace the by-pass feed roller [A] (1 snap ring).



A269R706.WMF

6.11.5 BY-PASS SEPARATION ROLLER REPLACEMENT

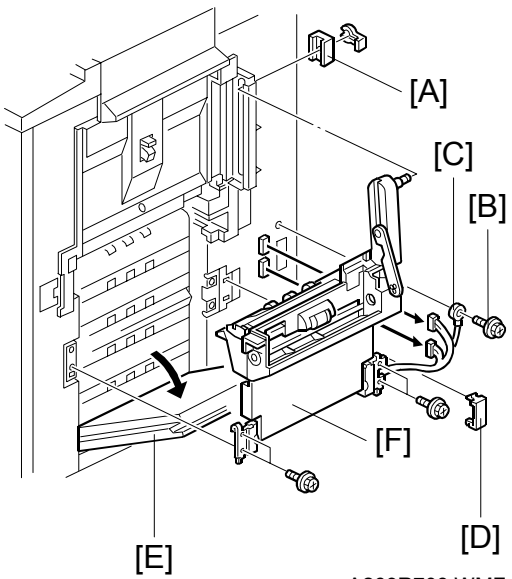
1. Remove the cover beneath the by-pass feed table [A].
2. Remove and replace the by-pass separation roller [B] (1 snap ring).



A269R707.WMF

6.11.6 BY-PASS PAPER FEED UNIT REMOVAL

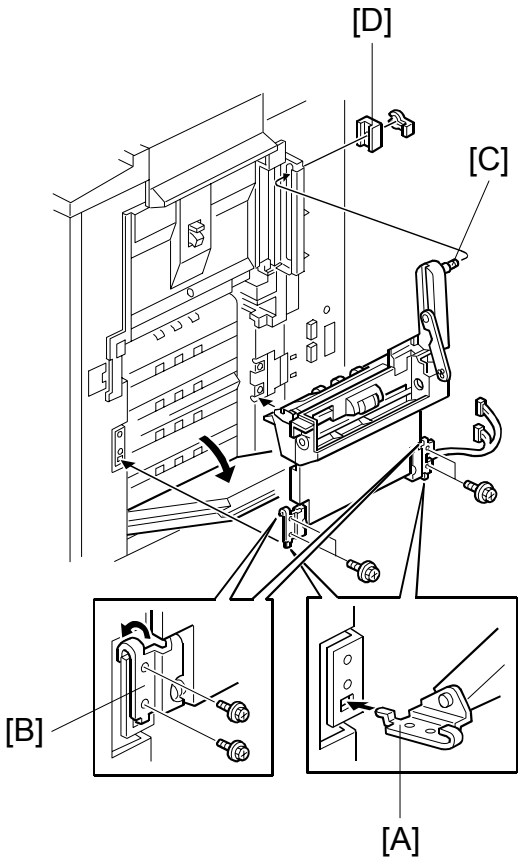
1. Remove the right front and right rear covers.
2. Remove the by-pass feed table.
3. Remove the slider [A] from the by-pass paper feed unit (1 snap ring).
4. Remove the ground cable [B] (1 screw), 2 connectors [C], and harness holder [D] from the rear of the copier.
5. Open the copier's vertical transport unit [E].
6. Remove four by-pass paper feed unit mounting screws and remove the by-pass paper feed unit [F] (4 hooks).



A269R708.WMF

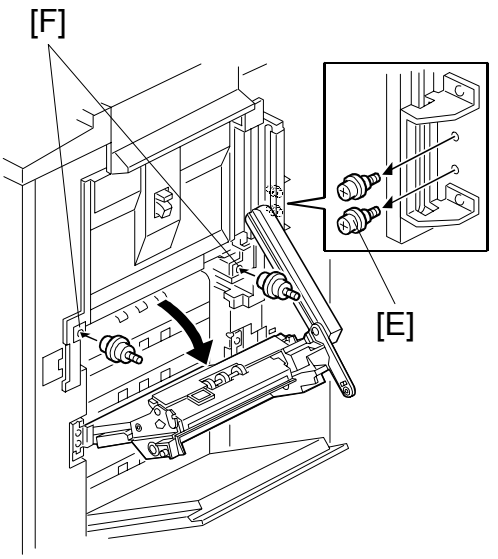
6.11.7 BY-PASS PAPER FEED UNIT INSTALLATION

1. Open the vertical transport unit.
2. Fit the 2 lower hooks [A] into the mating holes in the copier.
3. Close the by-pass unit (need not set completely).
4. Fit the 2 upper hooks [B] in the copier's structure.
5. Temporarily secure the supporting plate with two screws on each side.
6. Thread the link's shaft [C] into the hole in the slide bracket; then, fit the slider [D] on the shaft and secure it with a snap ring.



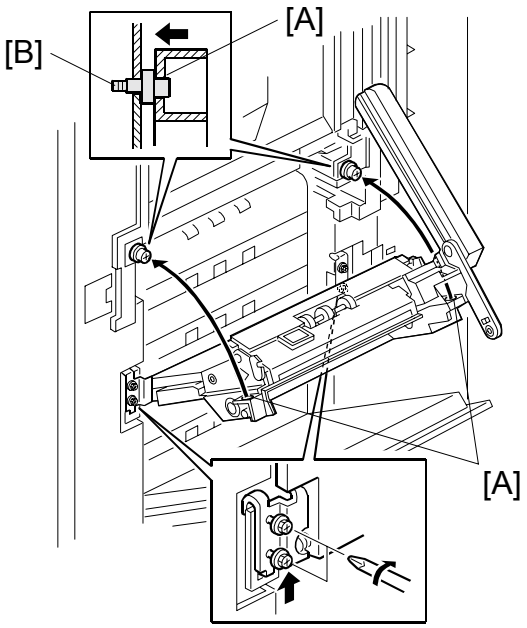
A269R717.WMF

7. Remove the two positioning pins [E] that are threaded in the copier's frame in the locations shown in the figure.
8. Open the by-pass unit and insert the positioning pins into the holes [F] in the figure.



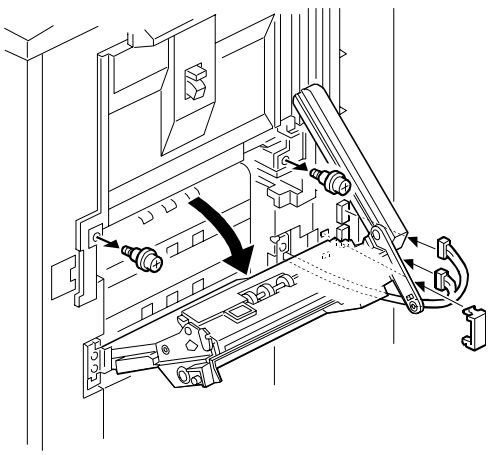
A269R718.WMF

9. Close the by-pass unit again and align holes [A] with the positioning pins [B].
10. While keeping aligned with the positioning pins, tighten the four screws while slightly lifting the front and rear supporting plates.



A269R719.WMF

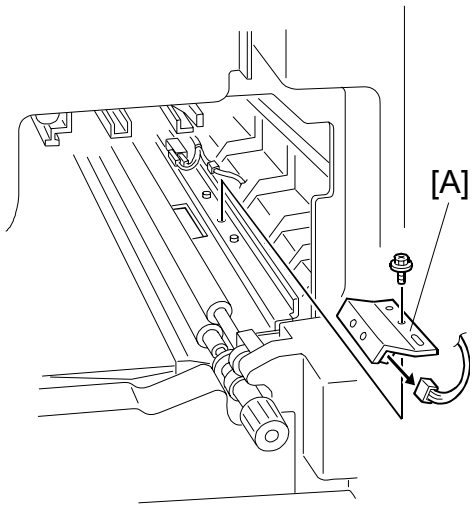
11. Open the by-pass unit, remove the front and rear positioning pins and store them in the original locations.
12. Connect two harness connectors and the ground wire, and install the harness holder.



A269R720.WMF

6.11.8 REGISTRATION SENSOR REPLACEMENT

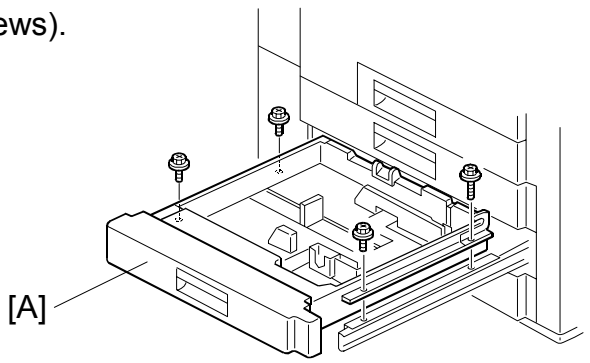
1. Remove the image transfer belt unit. (See “Image Transfer Unit Removal”.)
2. Remove and replace the registration sensor [A] from the front of the copier using a stubby screwdriver (1 screw, 1 connector.



A269R714.WMF

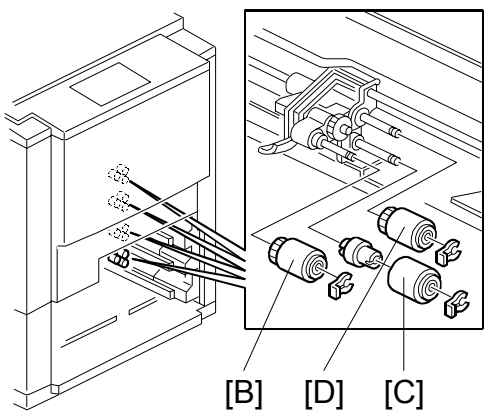
6.11.9 PAPER TRAY ROLLER REPLACEMENT

1. Remove the paper feed tray [A] (4 screws).



A269R716.WMF

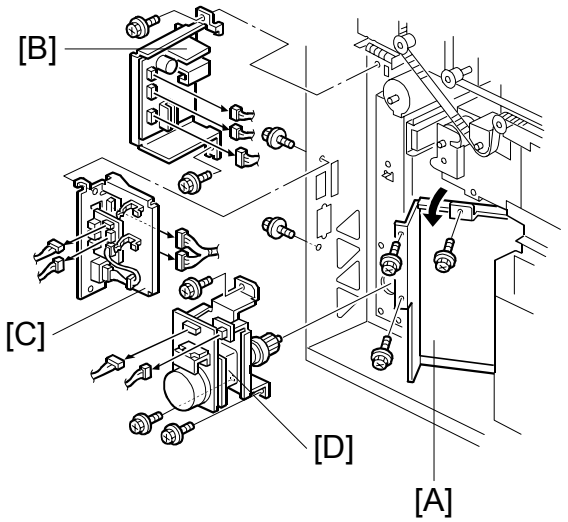
2. Remove the pick-up roller [B], feed roller [C], and separation roller [D] for the paper feed tray you removed (1 snap ring for each roller).



A269R710.WMF

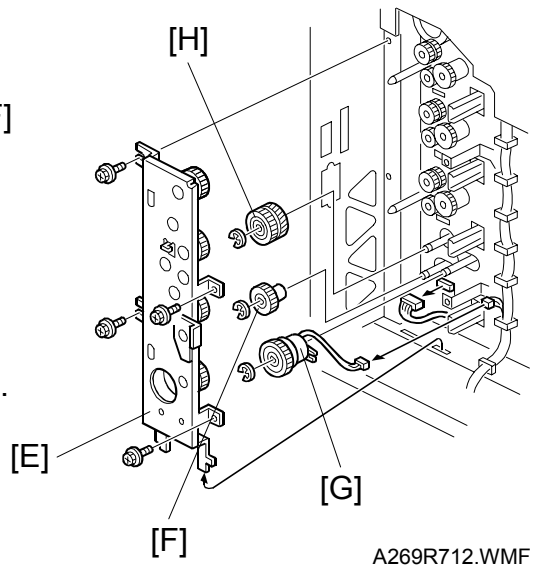
6.11.10 PAPER FEED UNIT AND PAPER FEED CLUTCH REPLACEMENT

1. Remove the rear cover.
2. Open the I/O control board [A] (3 screws).
3. Remove the following three boards:
   - Image transfer belt motor drive board [B] (2 screws and 3 connectors).
   - CSS/LCT board [C] (2 screws and 2 hooks).
   - Paper feed drive motor [D] (3 screws and 2 connectors).



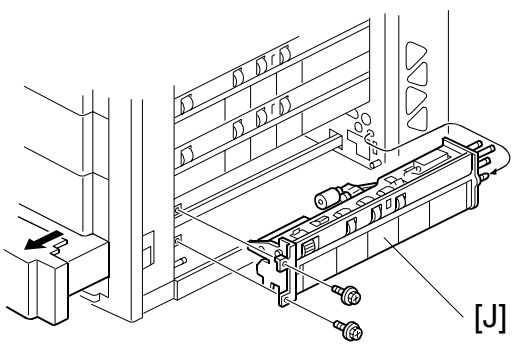
A269R711.WMF

4. Remove the paper feed unit drive gear assembly [E] (4 screws and 2 hooks).
5. Remove the separation roller drive gear [F] (1 E-ring).
6. Remove the paper feed clutch [G] (1 E-ring).
7. Remove the vertical transport roller drive gear [H] (1 E-ring).
8. Uncouple the paper feed unit connector [I].



A269R712.WMF

9. Pull out the paper feed tray of the unit to be removed and remove the paper feed unit [J] (2 screws).



A269R713.WMF

6.11.11 COPY IMAGE AREA ADJUSTMENT

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

Adjustment standards:

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

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

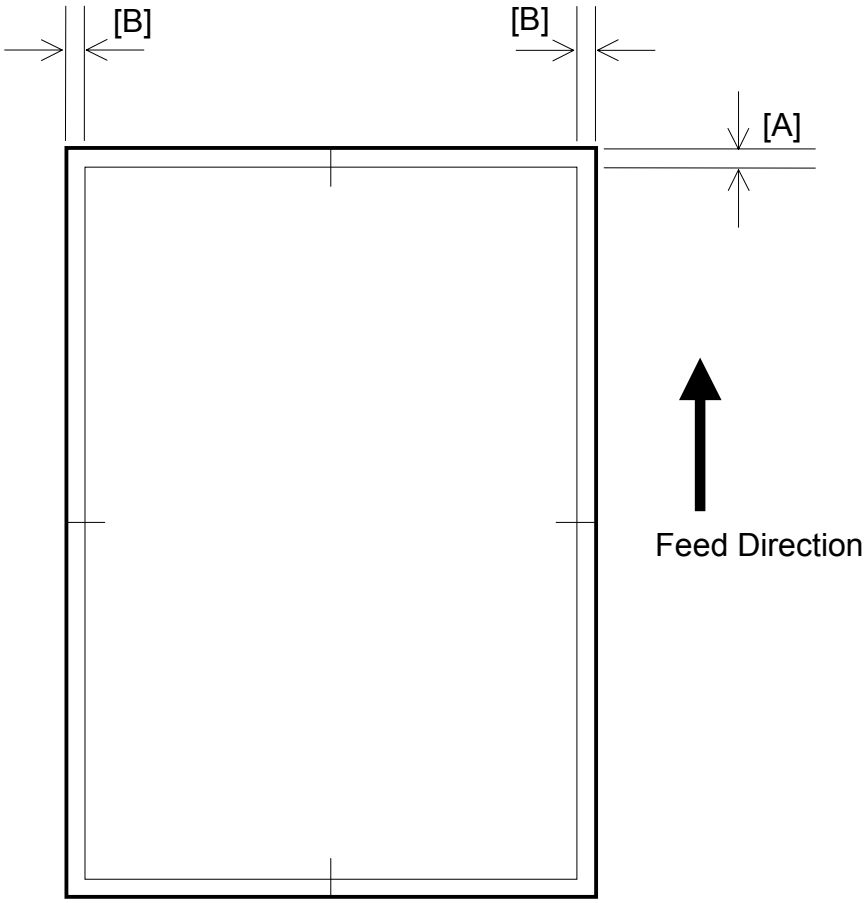
      Input value range: –4.9 to 4.9

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

        [•/*] → [1] → [4]

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

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



5. Perform the side to side registration adjustment.

   Standard value: 1.5 ±0.5 mm

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

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

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

     [•/✳] → [1] → [4]

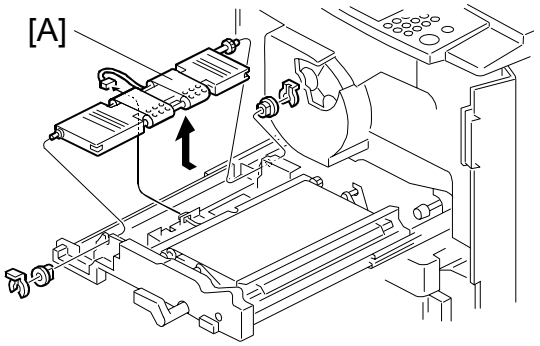
3) After entering a number, press (#) (Enter key) to save the number in “Set Data”.
4) Check the side-to-side registration adjustment by generating the crop mark trim pattern (step 3).
5) Repeat until margin [B] in the trim pattern is within the standard value.

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

6.12 PAPER TRANSPORT, FUSING, AND PAPER EXIT

6.12.1 TRANSPORT UNIT REMOVAL

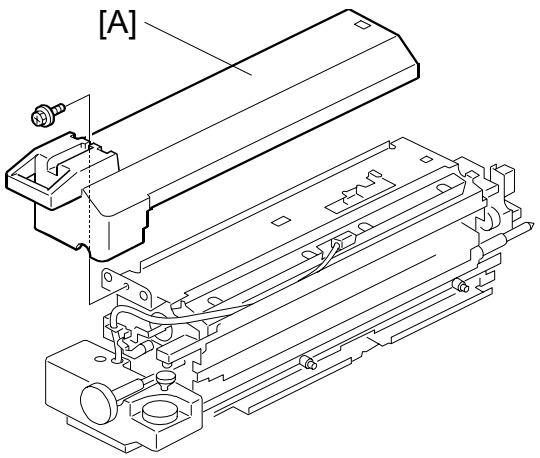
1. Remove the fusing unit from the copier's main unit. (See section "6.4.6".)
2. Remove the transport unit [A] (1 connector, 1 bearing, and 1 snap ring).



A269R512.WMF

6.12.2 FUSING UNIT TOP COVER REMOVAL

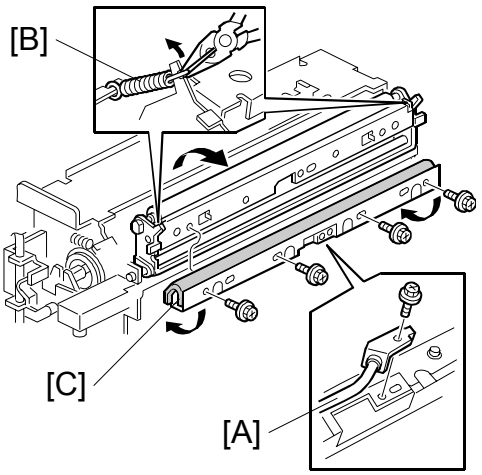
1. Remove the fusing unit from the copier's main unit. (See section "6.4.6".)
2. Remove the fusing unit top cover [A] (1 screw).



A269R501.WMF

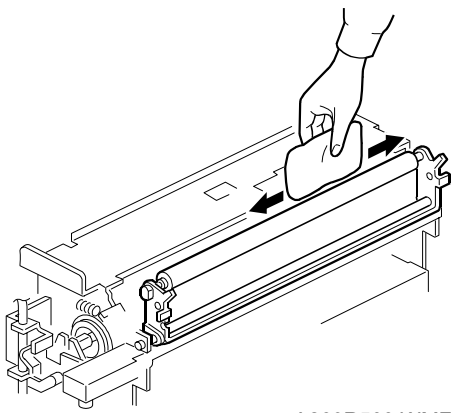
6.12.3 OIL SUPPLY UNIT REPLACEMENT AND CLEANING

1. Remove the fusing unit top cover. (See 6.12.2.)
2. Remove the oil supply tube [A] (1 screw).
3. Remove the 2 oil supply unit pressure springs [B].
4. Remove four lock screws and remove the oil supply pad [C] while turning it in the direction shown by the arrows.



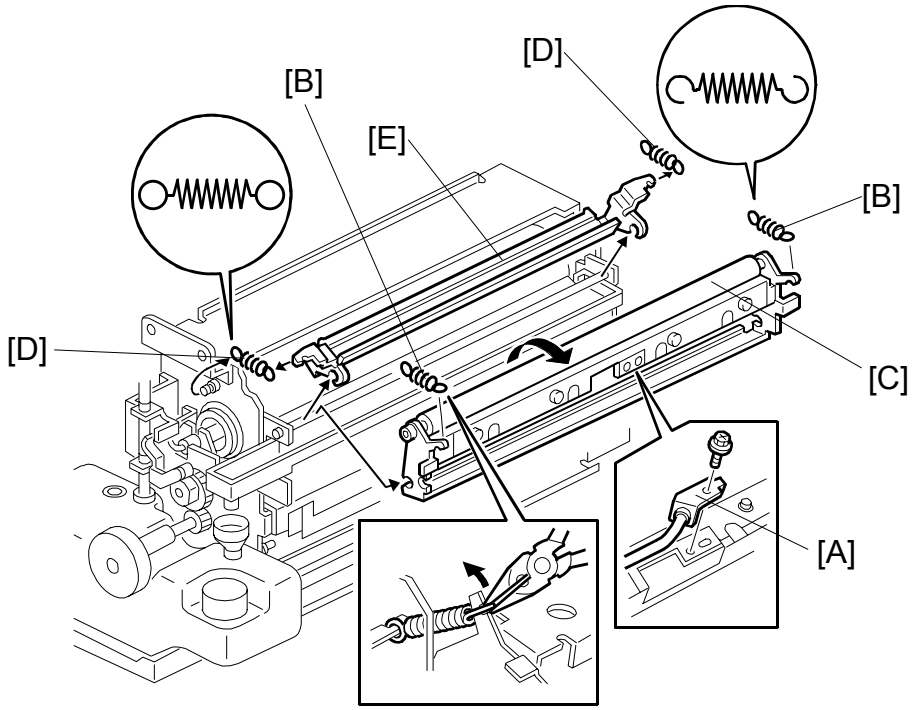
A269R502.WMF

5. Clean the oil application roller with cotton.



A269R503.WMF

6.12.4 HOT ROLLER BLADE REPLACEMENT

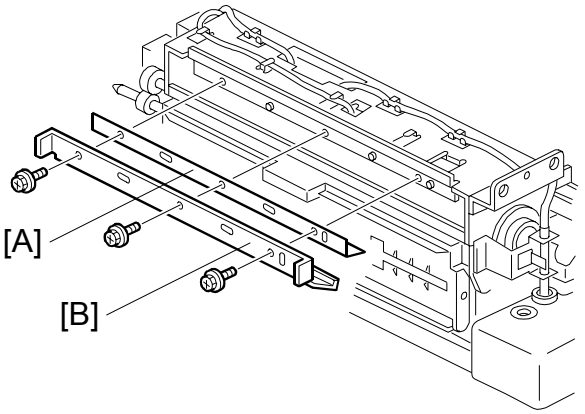


A269R516.WMF

1. Remove the fusing unit top cover. (See 6.12.2.)
2. Remove the oil supply tube [A] (1 screw).
3. Remove the 2 oil supply pressure springs [B]; then, remove the oil supply assembly [C].
4. Remove the 2 hot roller blade pressure springs [D]; then, remove the hot roller blade [E].

6.12.5 CLEANING THE CLEANING ROLLER SCRAPER

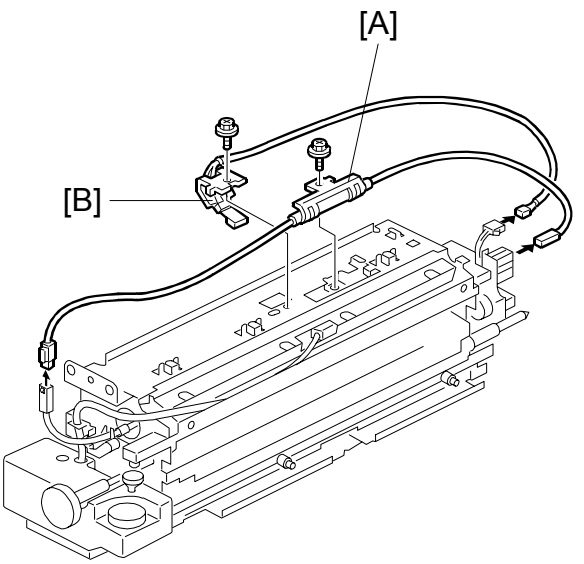
1. Remove the fusing unit top cover. (See 6.12.2.)
2. Remove the cleaning roller scraper [A] with the bracket [B] (3 screws).
3. Clean the cleaning roller scraper with clean cloth.



A269R513.WMF

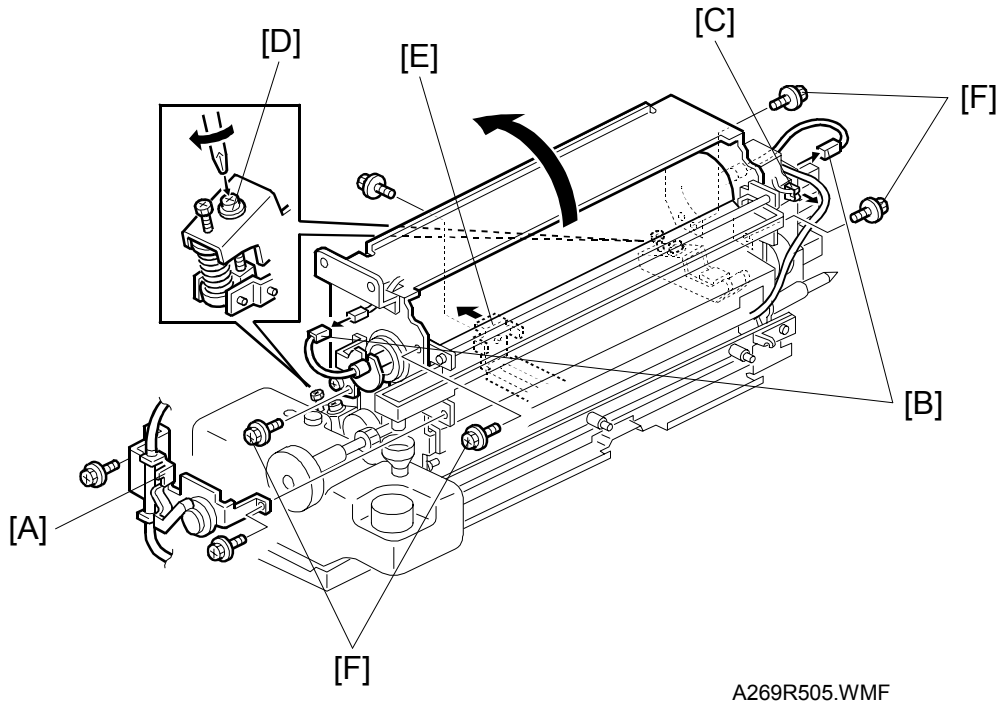
6.12.6 FUSING THERMOFUSE AND THERMISTOR REPLACEMENT

1. Remove the fusing unit top cover. (See 6.12.2.)
2. Remove the fusing thermofuse [A] (1 screw and 2 connectors).
3. Remove the fusing thermistor [B] (1 screw and 1 connector).



A269R504.WMF

6.12.7 FUSING UNIT DISASSEMBLY

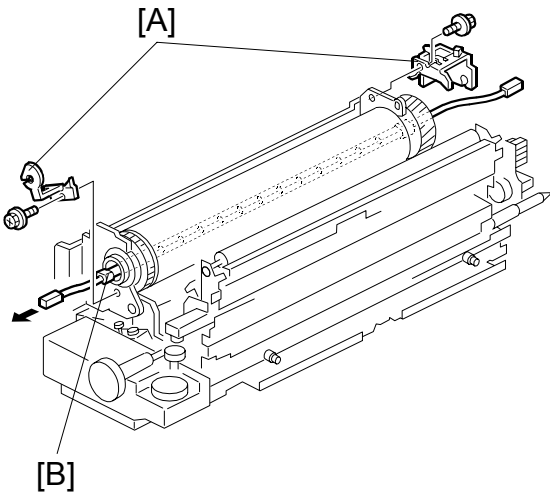


1. Remove the fusing unit top cover. (See 6.12.2.)
2. Remove the oil supply tube and the oil supply pad assembly. (See 6.12.3.)
3. Remove the hot roller blade.
4. Remove the oil pump assembly [A] (2 screws). Then disconnect the oil end sensor connectors.
5. Remove the hot roller lamp connectors [B]. Then, remove the pressure thermofuse harness from the clamp [C].
6. Turn the pressure releasing screws [D] (black screws) clockwise to release the fusing pressure.
7. Pull out the unit support stay [E] (1 screw).
8. Remove the lock screws (2 screws on the front and 2 screws on the rear) and rotate the upper section of the fusing unit away from the lower section as shown in the figure.

NOTE: 1) Be sure to remove the hot roller lamp harness connectors. An attempt to disassemble the fusing unit with the harness connectors attached may cause permanent damage to the hot roller lamp.
2) Black screws are used as pressure releasing screws. Turning a golden color screw would alter the nip width.

6.12.8 FUSING LAMP REPLACEMENT

1. Disassemble the fusing unit into two parts. (See 6.12.7.)
2. Remove the front and rear fusing lamp holders [A] (1 screw each).
3. Replace the fusing lamp [B].

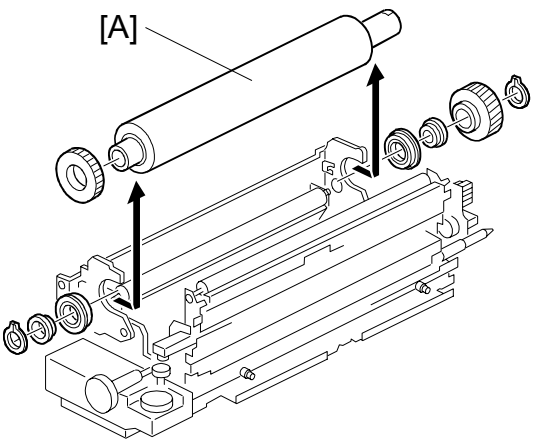


A269R506.WMF

6.12.9 HOT ROLLER REPLACEMENT

1. Disassemble the fusing unit into two parts. (See 6.12.7.)
2. Replace the hot roller [A] (2 C-rings, 2 heat-insulating bushings, 2 gears, and 2 ball bearings).

NOTE: Apply Barrierta L55/2 grease to the inner and outer surfaces of the front and rear hot roller bushings every 80K scans. (Barrierta grease: A0289300)



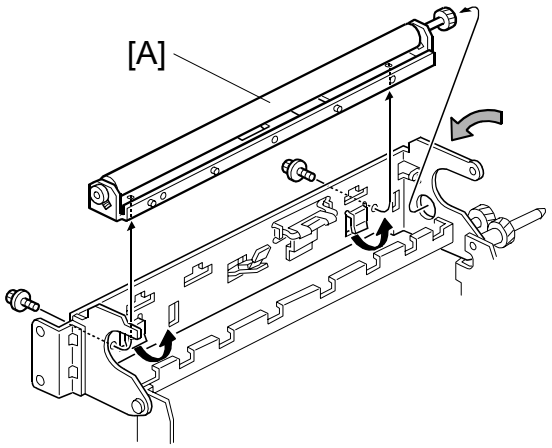
A269R507.WMF

⚠CAUTION

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

6.12.10 HOT ROLLER CLEANING ROLLER CLEANING

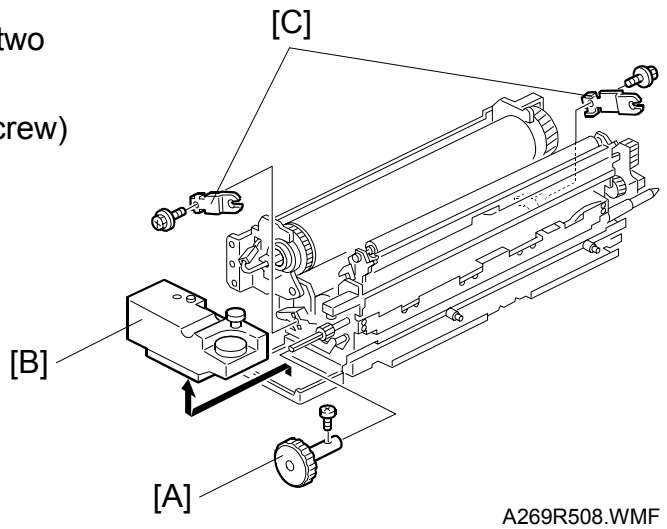
1. Disassemble the fusing unit into two parts. (See 6.12.7.)
2. Remove the hot roller. (See 6.10.9.)
3. Remove the fusing cleaning roller assembly [A] (2 screws).
4. Clean the surface of the hot roller cleaning roller.



A269R514.WMF

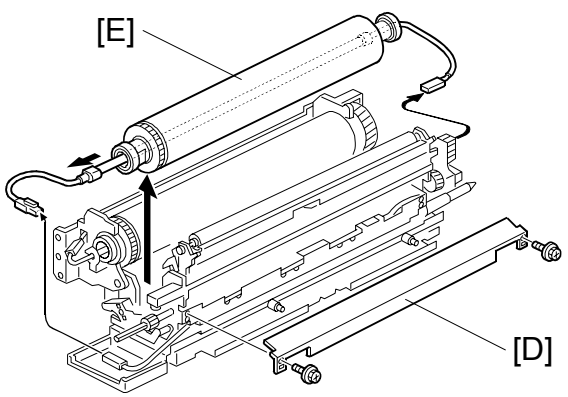
6.12.11 PRESSURE ROLLER LAMP/ROLLER REPLACEMENT

1. Disassemble the fusing unit into two parts. (See 6.12.7.)
2. Remove the fusing knob [A] (1 screw) and the oil tank [B].
3. Remove the pressure roller lamp holders [C] (1 screw each).



A269R508.WMF

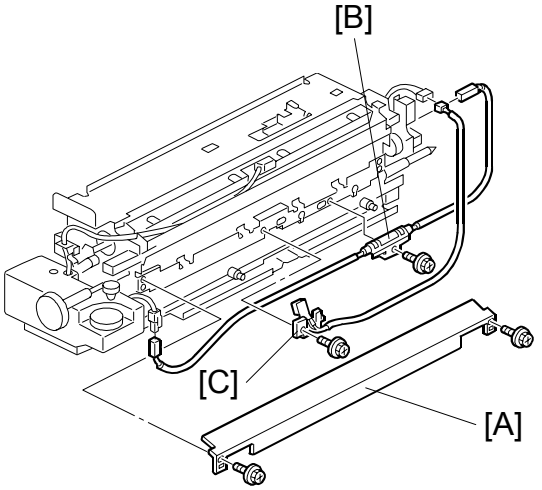
4. Uncouple the front and rear connectors of the pressure roller lamp.
5. Remove the lower entrance guide plate [D] (2 screws).
6. Lift the pressure roller [E] together with the pressure roller lamp and then take out the lamp.
7. Replace the pressure roller (1 gear and 2 ball bearings).



A269R509.WMF

6.12.12 PRESSURE THERMOFUSE AND THERMISTOR REPLACEMENT

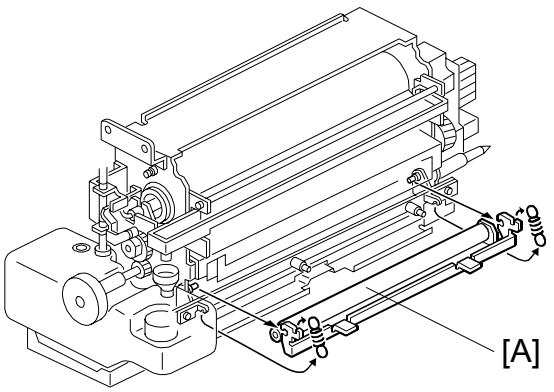
1. Remove the fusing unit top cover. (See 6.12.2.)
2. Remove the fusing unit lower entrance guide plate [A] (2 screws).
3. Remove and replace the pressure thermofuse [B] (2 connectors) and pressure thermistor [C] (2 connectors).



A269R510.WMF

6.12.13 PRESSURE CLEANING ROLLER CLEANING

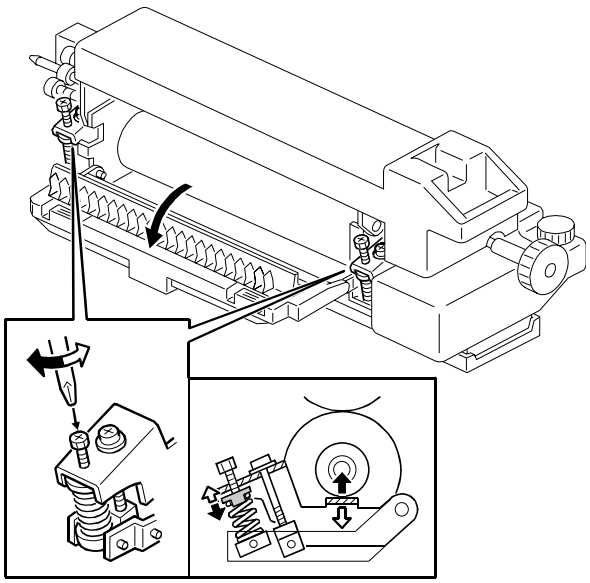
1. Remove the pressure cleaning roller assembly [A] (2 springs).
2. Clean the pressure cleaning roller.



A269R515.WMF

6.12.14 NIP BAND WIDTH ADJUSTMENT

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



A269R551.WMF

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

   Standard value
   Center: 9.3 ±0.3 mm
   Edges: Nip width within 0.5 mm of the same value on both edges (0.5 mm maximum deviation)
4. If the measured nip width does not correspond to the standard value, correct the nip width using the pressure adjustment screw.

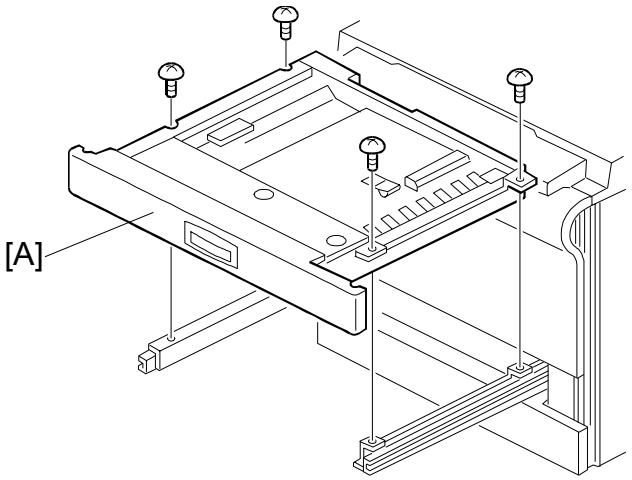
6.12.15 CAUTIONS TO BE TAKEN WHEN USING A FUSING UNIT THAT HAS BEEN IN STOCK FOR A LONG PERIOD

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

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

6.13 DUPLEX UNIT

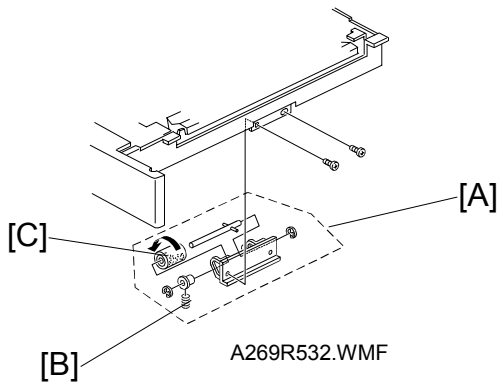
6.13.1 DUPLEX UNIT REMOVAL



A269R531.WMF

1. Open the duplex unit [A].
2. Remove the duplex unit (4 screws).

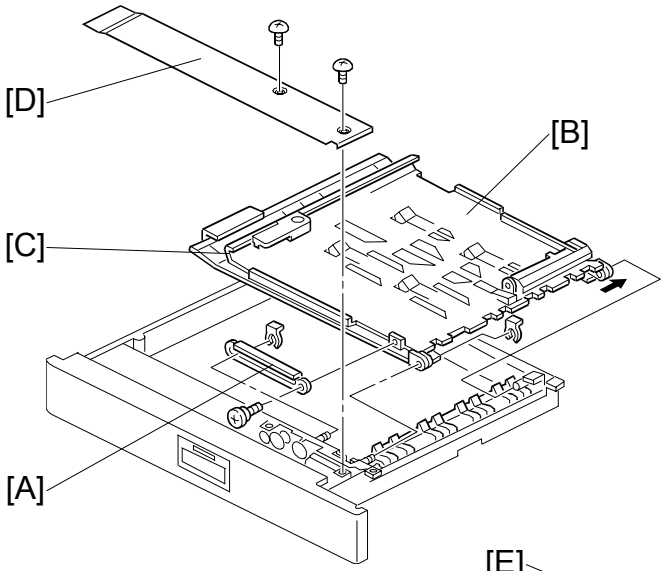
6.13.2 SEPARATION ROLLER REPLACEMENT



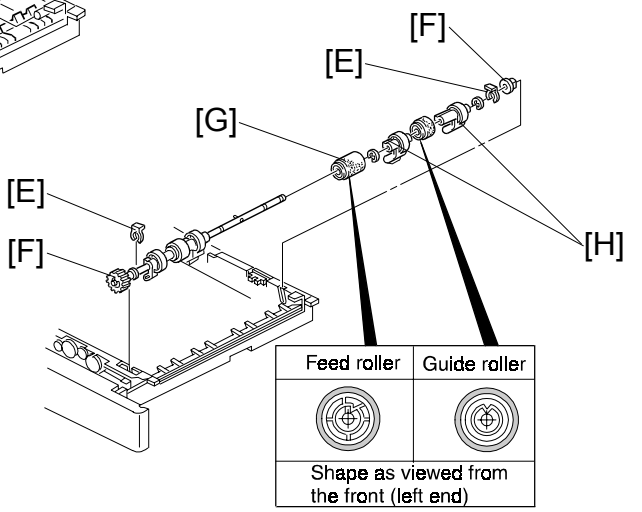
A269R532.WMF

1. Remove the duplex unit (see procedure 10.1).
2. Remove the separation roller assembly [A] (2 screws).
3. Remove the spring [B].
4. Replace the separation roller [C] (2 E-rings and 2 bearings).
   NOTE: Be sure to install the separation roller (one-way clutch) so that the clutch is visible.

6.13.3 FEED ROLLER REPLACEMENT



A269R533.WMF

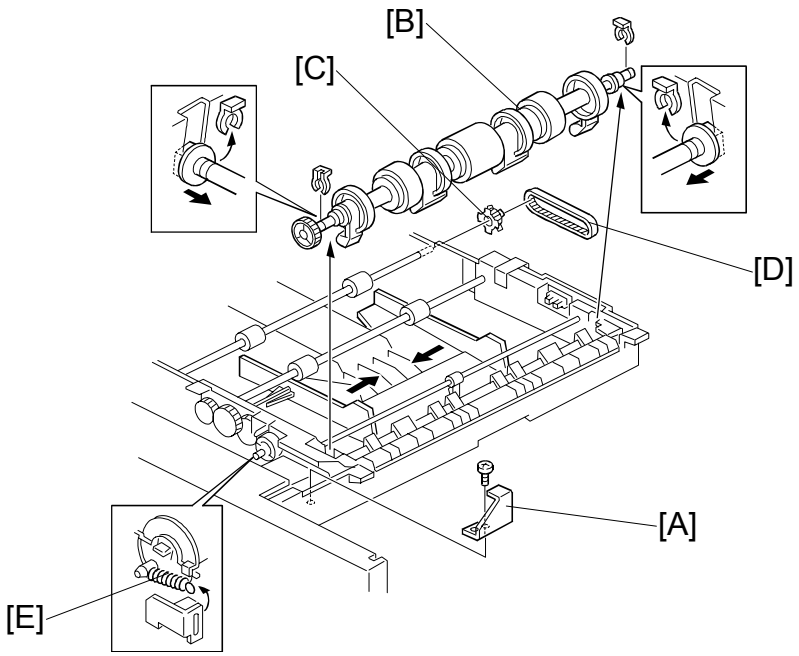


A269R534.WMF

1. Open the duplex unit.
2. Remove the guide rail [A] (1 screw and 1 snap-ring).
3. Remove the upper guide plate [B] and lower guide plate [C] (1 snap-ring).
4. Remove the inner cover [D] (2 screws).
5. Remove the 2 snap-rings [E] from the both ends of the feed roller shaft.
6. Slide the bearings [F] inward.
7. Replace the feed roller [G] (2 E-rings, 2 paper flatteners [H], and 1 guide roller [I]).

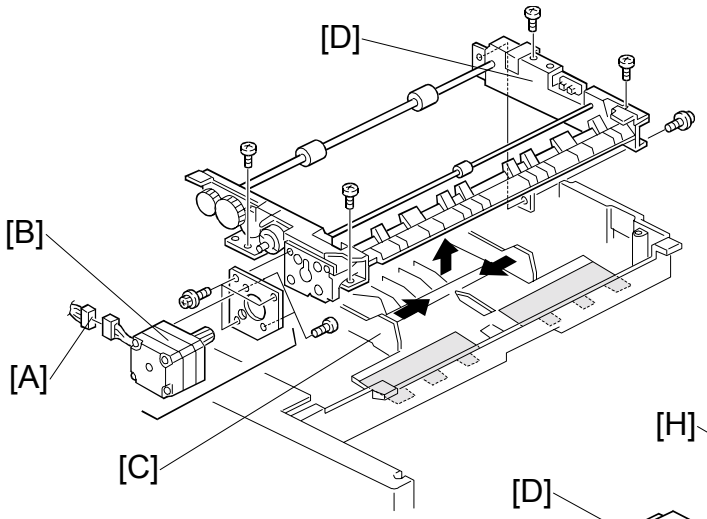
NOTE: 1) Be sure to install the feed and guide rollers correctly.
2) The feed roller is made of silicone rubber and is not compatible with the non-silicone rubber feed rollers used in some previous models.

6.13.4 DUPLEX FEED MOTOR REPLACEMENT

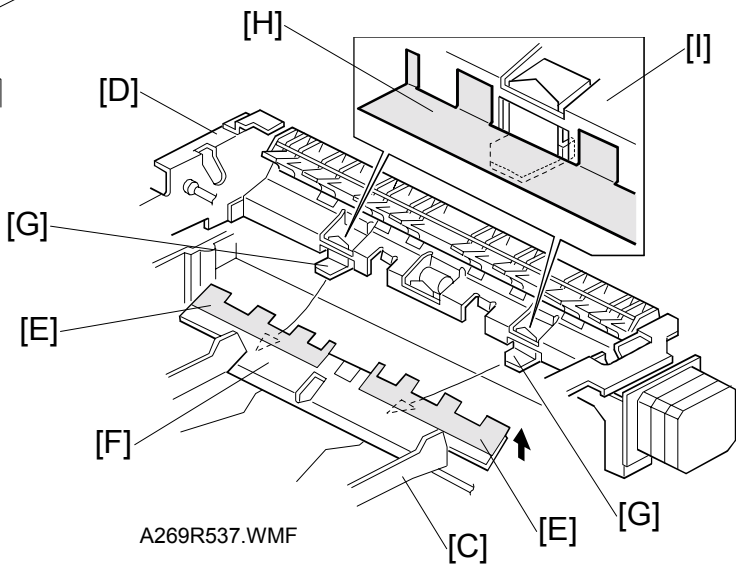


A269R535.WMF

1. Perform steps 1 through 4 in procedure 10.3.
2. Remove the bracket [A] (1 screw).
3. Remove the feed roller shaft assembly [B] (2 snap-rings).
4. Remove the pulley [C] and the timing belt [D].
5. Remove the pressure spring [E].



A269R536.WMF



A269R537.WMF

6. Disconnect the connector [A] of the duplex feed motor [B].
7. Close the side fences [C] and remove the duplex feed assembly [D] (5 screws).
8. Remove the duplex feed motor assembly (3 screws).
9. Replace the duplex feed motor (2 screws).

NOTE: 1) When installing the duplex feed assembly [D] on the base unit, place the bottom plate [F], with the mylar strip [E], above the bracket tabs [G].
2) Ensure the base unit's mylar strip [H] is placed on the guide plate [I], as shown.

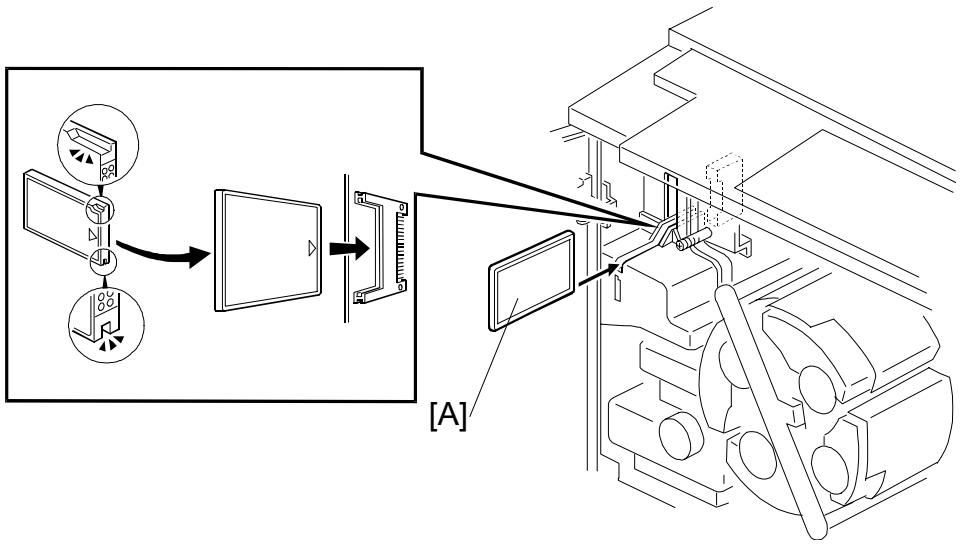
6.14 SYSTEM AND ELECTRONICS

6.14.1 SOFTWARE UPDATE USING AN IC CARD

Care of the IC Card

- Never insert an IC card with the main power switch set to ON or remove it when main power is on.
- Do not set the main power switch to OFF during the software installation process.
- Since the IC card is a precision part, it must not be exposed to high temperature, humidity, or direct sunlight.
- Never bend, scratch, or apply excessive shock to an IC card.

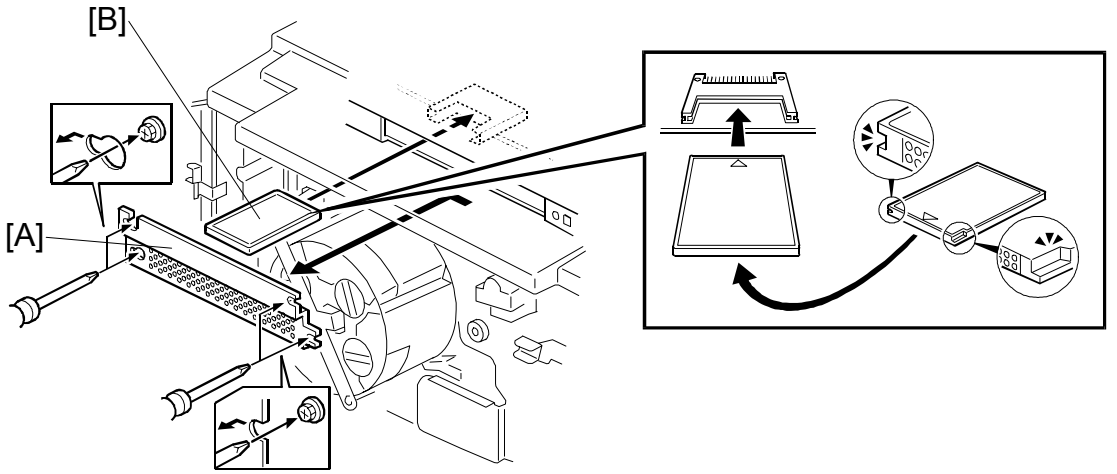
Upgrading the Main Control Board Software



A269R152.WMF

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

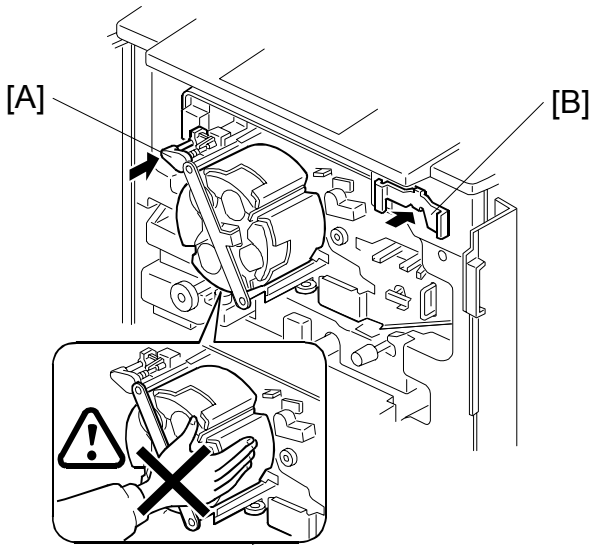
Upgrading the Scanner IPU Software



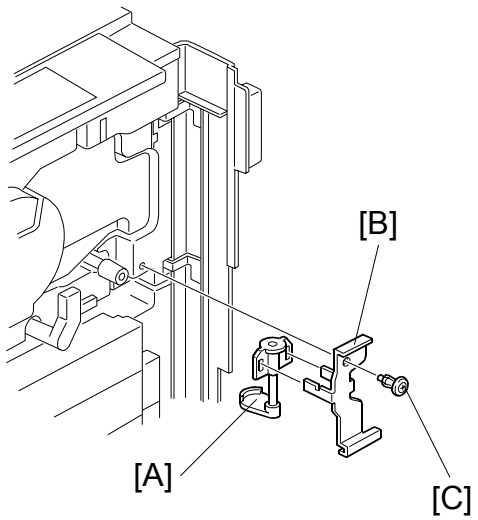
A269R912.WMF

1. Enter SP7-801 and check the current version of scanner IPU software.
2. Turn off the main power switch on the copier.
3. Open the front cover and remove the revolver cover (4 screws).
4. Loosen the 4 screws holding the IPU cover [A] and slide the cover to the left to remove it.
5. Insert the required IC card as shown in figure.
   NOTE: Confirm the direction of IC card.

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



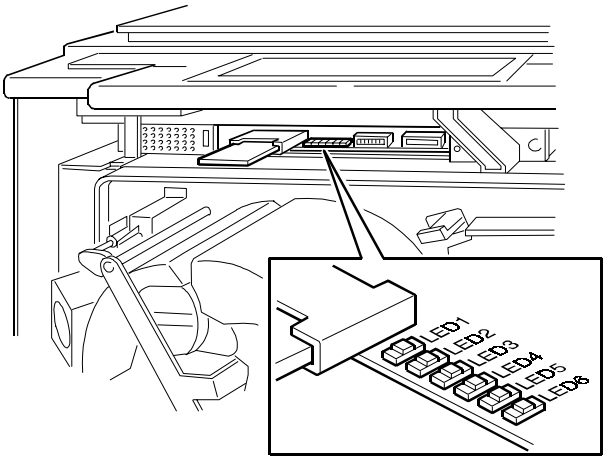
A269R330.WMF



A269R331.WMF

⚠WARNING

1. **Turn the copier main switch off when setting the revolver lock release tool [A] and door safety switch actuator [B].**
2. **Set the revolver lock release tool [A] first when setting the revolver lock release tool and door safety switch actuator [B]. If the copier starts without the revolver lock release tool [A], revolver will be locked and SC361 (Revolver H.P. sensor error) will display.**
3. **Never touch the area around the revolver after turning on the copier main switch while using the door safety switch actuator and revolver lock release tool. In case of rotation of revolver, your hands may be injured.**
4. **Check and note down the setting of "Timed Process Control Self Check" (SP3-972-000) before using release tools. If the "Timed Process Control Self Check" starts suddenly, your hands may be injured. (See Section 2.1.1 about the timing of starting the "Timed Process Control Self Check". Enter the value 0 in SP3-972-000 (Entering a value of 0 surpresses the execution this self check). The default interval of "Timed Process Control Self Check" is 6 hours.)**
5. **After using these tools [A], [B], secure them to the upper right inner cover with a plastic screw [C] as shown.**
6. **Enter the previous setting of "Timed Process Control Self Check" (SP3-972-000) again.**



A269R920.WMF

7. Turn on the main power switch. A program download sequence will start automatically. (LED3 on the scanner IPU turns on while the program is being rewritten).
   NOTE: Do not attempt to remove the IC card or turn off the main power switch while program downloading is in progress.
8. When the program rewrite ends, LED3 goes off and LED4 goes on.
9. After confirming that LED3 is off, turn off the main power switch. (Keeping the main power switch on will cause SC690. In such a case, turn off the main power switch and proceed with the next step).
10. Turn off the main power switch and remove the IC card.
    NOTE: Never remove the IC card before turning off the main power switch.
11. Turn on the main power switch again. Then enter the SP7-801 and verify that the software has been upgraded properly.

NV-RAM Uploading and Downloading

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

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

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

Upload/download procedure

1. Print the copier settings using the SP7-902 mode.
2. Set the main power switch to OFF and insert an IC card which contains the main control board software into the main control board. (See the first illustration in section 6.14.1.)
3. Set the main power switch to ON and select either SP5-824 (to upload) or SP5-825 (to download).
4. Start uploading or downloading.
5. Wait until end of processing is indicated on the screen (approximately 1 to 3 minutes, depending on the size of the software).
6. When the end of processing message appears, set the main power switch to OFF and remove the IC card.
   NOTE: Never remove the IC card before turning off the main power switch.
7. Replace all covers and turn on the main power switch.
8. In the case of a download, display the settings in the SP7-902 mode and compare them against the old values to verify that the downloading was successful.

6.14.2 RAM CLEAR

RAM Clear Procedure

NOTE: Clearing the RAM resets all SP and UP values, except the serial number and main counter value, to the defaults. It is, therefore, important to perform this step using the procedure shown below.

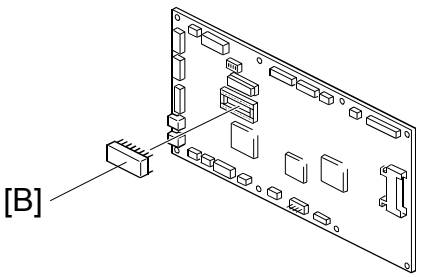
1. Before clearing the RAM, either:
   execute SP7-902 to output the SP mode values that have been changed from their default values;
   or
   Upload the settings from the NV-RAM onto the flash ROM on main control board using the SP5-824 mode. (See “NV-RAM uploading and downloading”.)
2. Use the SP5-801 mode to clear the NV-RAM.
3. Perform the touch panel calibration.
   NOTE: After the NV-RAM clearing, the touch panel is not effective. Therefore, the “Touch Panel Calibration” is required (See 6.14.5 Touch Panel Calibration).
4. Run the forced process control self-check (SP3-126). (Potential table optimization is required since RAM clearing also initializes the process control data.)
5. Enter the SP mode changes that were output in step (1), or download the NV-RAM values from the flash ROM on main control board. (See “NV-RAM Uploading and Downloading”.)
6. Perform the ACC procedure.
7. If the color balance after the ACC is not correct, adjust the ACC target using SP4-502 (for copier mode) and SP4-503 (for printer mode).

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

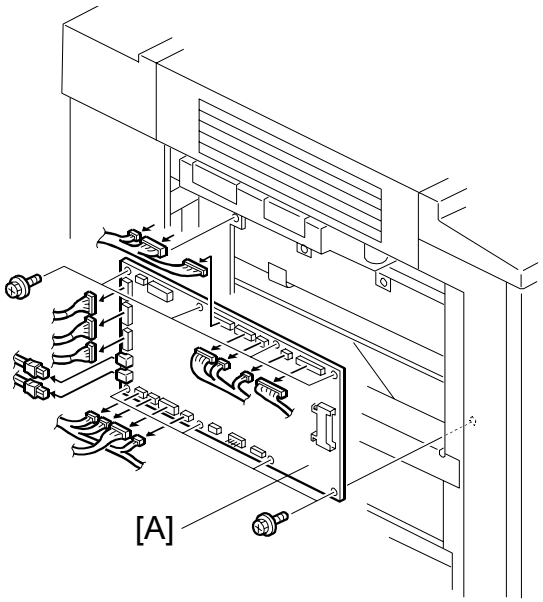
6.14.3 MAIN CONTROL BOARD

Main Control Board Replacement Procedure

The NV-RAM on the main control board retains the device number information, counter information, and other settings. For this reason, it is necessary to take the NV-RAM from the old main control board and install it on the new main control board when the main control board is replaced. (The main control board that is supplied as a service part has no NV-RAM.)



A269R915.WMF



A269R914.WMF

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

6.14.4 COUNTERS

About the Total Counter

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

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

Mechanical Counter

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

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

NV-RAM Replacement Procedure

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

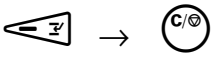
1. Use the SP7-902 mode to output the SP mode values that have been modified from their default value.
2. Set the main power switch to OFF and unplug the power cord.
3. Replace the NV-RAM (IC115) on the main board. (Refer to “Main Control Board Replacement Procedure”.
4. Reassemble the machine. Then,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

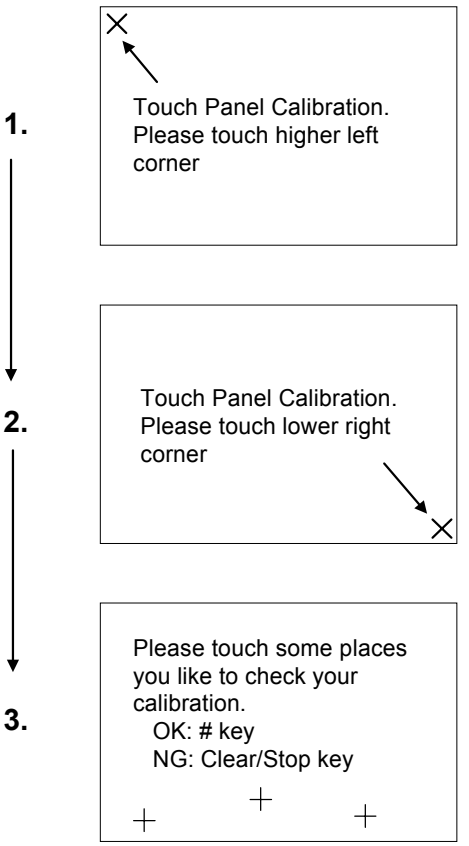
- The factory-set value of the total counter NV-RAM supplied as a part (A2579099) is –2000±20 for K (development cycles) and –3000±20 for CMY (development cycles).

6.14.5 TOUCH PANEL CALIBRATION

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

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





A269R525.WMF

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

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

7. TROUBLESHOOTING

7.1 PROCESS CONTROL ERROR CONDITIONS

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

Self Check Results 03-975-00

Displayed Value	Item	Related SP No.	Major Cause	Remarks
1	Successful	None		
99	Forced termination (door opened, etc.)	None	Power is turned off during self-check. Temporary main power failure	
100	ID sensor offset error		ID sensor connector disconnected	SC385 is indicated.
110	Vsg adjustment error	3-2-xx	Dirty ID sensor, dirty drum, foreign materials or flaws on the drum	SC385 is indicated.
120	Coating weight calculation error	None	ID sensor noise interference, defective development unit, incorrect charge control unit setup, development bias error	
130	Vmin error		ID sensor noise interference, K toner density too low	
20✱	γ calculation error, invalid γ or Vk value	3-121-xx 3-122-xx	Development unit error, mixed colors	
300	Residual potential error	3-111-00	Drum anomaly, faulty LD unit, poor grounding	
31✱	Vd adjustment error	None	Drum deterioration, optical fatigue	
32✱	Vpl adjustment error	None	Drum anomaly, faulty LD unit	
40✱	Self check process control γ error (unable to calculate)			
41✱	Self check process control γ error (out of range condition)			

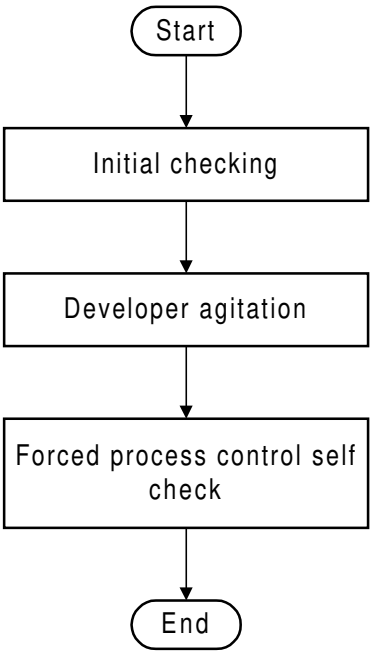
NOTE: 1: K, 2: Y, 3: C, and 4: M are displayed for the respective colors for items identified by "✱" in the "Displayed value" column of the table.

7.1.2 DEVELOPER SETUP RESULTS (SP3-964-00)

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

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

"Developer Agitation (SP2-225)" OPERATION FLOW



A269R526.WMF

7.1.3 TD SENSOR INITIALIZATION RESULTS (SP3-005-006)

Displayed Value	Item	Related SP No.	Major Cause	Remarks
1	Successful			
1✱	TD sensor output error		TD sensor output cannot be adjusted within 2.5 ± 0.1 V	
20	TD sensor initialization error			
2✱	TD sensor communication error			

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

7.1.4 SELF-CHECK PROCESS CONTROL RELATED SCS

SC385: Vsg Adjustment Error

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

NOTE: Vsg adjustment timing:

- When a process control self-check is done (forced, power-on time, or fixed interval).
- When developer initialization is done (SP2-225-1 to SP2-225-5).
- When the output is differs from the Vsg value measured during the preceding Vsg adjustment by more than ±0.05 V.

7.2 SC CODE TABLE

Refer to Appendix-1 for the detailed SC code table.

7.2.1 SC TYPES AND RESETTING PROCEDURES

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

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

All SCs are logged.

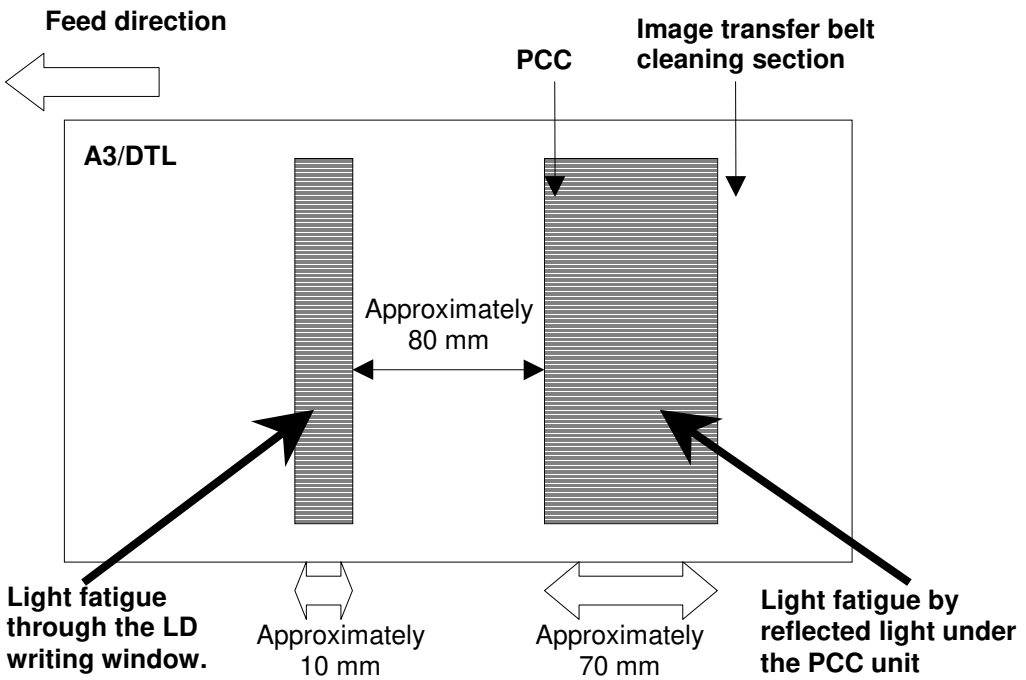
7.3 DRUM LIGHT FATIGUE

Leaving the drum exposed to direct sunlight will cause it damage. This damage creates light fatigue on the drum, an effect that will be visible on the print out. When the drawer unit is slid out, even if the drum remains in the drawer unit, it will be exposed to direct and reflected light. Light fatigue will occur if the drum is exposed for more than 2 minutes.

This section will show how to determine where light fatigue occurred on the image.

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

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



APPENDIX-1

SC CODE TABLE

SC CODE TABLE

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

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

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Troubleshooting Procedure	Type
SC130	Scanner start error	- Timing - • Scanning start • During scanner motor ON - Condition - The scanning start signal is generated while the motor is moving. Total number of steps calculated based on the signal from the stepping motor is out of range. The H.P. sensor stays OFF when the scanner starts moving.	Same as SC120 or sequence error		Same as SC120 or Replace the sub and/or main scanner IPU board(s).	D
SC150	Scanner ROM mismatch	- Timing - After software installation or when the main switch turned on - Condition - Main scanner IPU detects that the software installed is not specific one.	• An invalid IC card used (such as a different model IC card) • Replace the main scanner IPU board.		Reinstall the correct IC card. Replace the main scanner IPU board.	D

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

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

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

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

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

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

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Troubleshooting Procedure	Type
SC327	FGATE2 error	- Timing & Condition - In the double image mode, the main control board does not receive the 2nd FGATE signal from the LD control board while the image transfer belt makes 3 revolution after the Start key is pressed or at certain timing during copy cycle.	Same as SC326	SC326	Same as SC326.	D
SC350	TD sensor communication error	- Timing - When the main switch is turned on, during printing process, or process control self-check - Condition - The main control board cannot communicate with TD sensors	• Poor connection of connectors • Defective TD sensor interface board 1 and/or 2 • Defective I/O control board • Defective main control board		1. Check if the connectors on the TD sensor interface board 1 (copier) and the main control board (CN353) are properly connected. 2. Check if 5V and 38V are provided to the TD sensor interface board 1 from I/O control board (CN218). 3. Check if the harnesses are damaged. 4. Check if TD sensor interface board 1 and 2 are properly installed. 5. Replace TD sensor interface board 1, 2, main control board, and/or I/O control board.	D
SC351	TD Sensor Failure	- Timing - During printing process or process control self-check - Condition - The main control board does not receive the TD sensor output or receive wrong data 4 times continuously.	• Poor connection of connector • Defective TD sensor • Defective TD sensor interface board 2 • Defective main control board		1. Check if the connectors on the TD sensor interface board 2 (revolver) and TD sensor are properly connected. 2. Check if the harnesses is damaged. 3. Replace TD sensor. 4. Replace the TD sensor interface board 2. 5. Replace the main control board.	D

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Troubleshooting Procedure	Type
SC360	Development bias error	- Timing - When the development DC bias turns ON during printing process or process control - Condition - The feedback voltage is 4.8V or higher, or PWM value becomes 80% or higher for 500 ms continuously.	• Poor connection of connectors • Dirty terminals • Defective high voltage supply (C/G/B) • Defective I/O control board • Defective main control board		1. Clean the development roller shaft (terminal) if it. 2. Clean the bias terminal if it is dirty. 3. Replace the bias terminal if it does not move smoothly. 4. Check the connectors of high voltage supply cable and trigger lines are properly connected on the high voltage supply board (C/G/B), I/O control board, and main control board. 5. Replace the high voltage supply board (C/G/B) 6. Replace the I/O control board. 7. Replace the main control board. [Signal Check] • Feedback signal: CN217-2, TP171, or CN211-A5 on I/O control board / CN302-A5 or TP111 on main control board • PWM: CN217-3 or TP141 on I/O control board	D
SC361	Revolver HP sensor error	- Timing & Condition - The home position is not detected during 3 revolution of the revolver unit after the revolver motor turns on.	• Poor connection of connector • Dirty sensor • Defective sensor • Defective revolver motor • Defective revolver drive board • Defective I/O control board • Defective main control board		1. Check if the connector of sensor is properly connected. 2. Replace the revolver H.P. sensor if the voltage at CN216-B5 on the I/O control board does not change when covering the sensor with a piece of paper. **NOTE:** Make sure that the revolver unit is locked in this step. 3. If the revolver unit does not rotate; 1 Replace the revolver motor. 2 Replace revolver motor drive board. 3 Replace the I/O control board. 4 Replace the main control board. [Signal Check] • Revolver H.P.: CN216-B5 or TP107 on I/O control board	D

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Troubleshooting Procedure	Type
SC370	TD sensor detection abnormal (K)	- Timing - When communicating with TD sensors, during printing process, or process control self-check - Condition - TD sensor output exceeds 4.5V or becomes lower than 0.5V.	• Poor connection of TD sensor harness • Dirty sensor surface • Defective TD sensor • Toner density is out of range		1. Check if the TD sensor connector is properly connected. 2. Clean the surface of the TD sensor. 3. Replace the TD sensor. If it becomes OK after the sensor is replaced, replace the developer of color related to the problem. If the problem is related to the toner density (too low or high), find a cause and fix it.	D
SC371	TD sensor detection abnormal (Y)	Same as SC370			Same as SC370	
SC372	TD sensor detection abnormal (C)	Same as SC370			Same as SC370	
SC373	TD sensor detection abnormal (M)	Same as SC370			Same as SC370	
SC385	ID sensor VSG adjustment error	- Timing - During process control self check, the main control board detects that the signal of Vsg fed-back from the ID sensor is out of range.	• Dirty ID sensor • Poor connection of connector • Defective ID sensor • Poor cleaning		1. Clean the ID sensor. 2. Check if the sensor connector is properly connected. 3. Replace the ID sensor. 4. Check the drum cleaning unit. [Signal Check] • ID sensor LED: CN216-B7 or TP103 on I/O control board • ID sensor 1 (K): CN216-B8 or TP188 on I/O control board / TP115 on main control board. • ID sensor 2 (CMY): CN216-B9 or TP187 on I/O control board / TP114 on main control board.	D

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Troubleshooting Procedure	Type
SC387	Drum potential error	- Timing - During initial process control check or interval (number of copies) process control self check - Condition - While the revolver unit returns to the home position, the following condition is detected. VD < VG – 200V VD > VG + 200V	• Uneven charge • Deteriorated drum • Defective potential sensor		1. Clean the charge unit or replace the charge wire and grid plate. 2. Reinstall the drum unit. 3. Check the drum counter (SP 7-803) and replace the drum if necessary. 4. Replace the potential sensor.	D
SC400	Image transfer belt bias error	- Timing - While the image transfer belt bias is ON - Condition - The feedback voltage is 4.8V or higher, or PWM value is 50% or higher for 500ms continuously.	• Poor connection of connectors • Defective high voltage supply board (T1/PCC/BR) • Defective I/O control board • Defective main control board		1. Check if the connectors of high voltage cable and trigger lines are properly connected on the high voltage supply board, I/O control board, and main control board. 2. Replace the high voltage supply board (T1/PCC/BR). 3. Replace the I/O control board. 4. Replace the main control board. [Signal Check] • Feedback signal: CN209-9, TP264, or CN211-A4 on I/O control board / CN302-A6 or TP106 on main control board. • PWM: CN209-10 or TP272 on I/O control board.	D

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Troubleshooting Procedure	Type
SC401	Image transfer belt motor lock	- Timing & Condition - • The feedback signal from the motor is still out of range 2 seconds after the trigger signal is sent. • The feedback signal becomes out of range for 2 seconds while the trigger signal is ON.	• Defective image transfer belt motor • Defective image transfer belt motor drive board • Mechanical problem (drive transmission)		1. Check if the connectors on the image transfer belt drive board (CN740 and 741) and I/O control board (CN220) are properly connected. 2. Check the harnesses are damaged. 3. Replace the image transfer belt motor control board. 4. Replace image transfer belt motor. 5. Check if anything causes the load of the belt motor to be increased. [Signal Check] • Motor OK: CN220-A2 or TP153 on the I/O control board	D
SC402	Image transfer belt lubricant brush current leak	- Timing & Condition - The current leak is detected more than 2 seconds.	• Defective high voltage supply board (Q1). • Defective I/O control board • Defective main control board		1. Check if the connectors on the terminal and high voltage supply board (Q1) are properly connected and if the harnesses are damaged. 2. Clean the receptacles. 3. Replace the high voltage supply board (Q1). 4. Replace the I/O control board. 5. Replace the main control board. [Signal Check] • Leak detection: CN215-B7 or TP137 on I/O control board	D

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Troubleshooting Procedure	Type
SC410	Paper separation current leak	- Timing & Condition - When the current leak is detected for 2 seconds, leak detection starts 1 second after the paper separation corona turns on. The leak signal is monitored twice at every 1 second. When the leak condition is detected twice continuously, this SC is displayed.	• Discharge unit not properly set • Corona wire broken • Defective high voltage supply board (D) • Defective I/O control board • Defective main control board		1. Check if the discharge corona unit is properly set. 2. Replace the discharge corona wire if it is broken. 3. Check if the connectors on the terminal and high voltage supply board (D) are properly connected and if the harnesses are damaged. 4. Clean the receptacle. 5. Replace the high voltage supply board (D). 6. Replace the I/O control board. 7. Replace the main control board. [Signal Check] • Leak detection: CN208-1 or TP276 on I/O control board	D
SC422	PCC leak	- Timing & Condition - When the current leak is detected for 2 seconds, leak detection starts 1 second after the PCC turns on. The leak signal is monitored twice at every 1 second. When the leak condition is detected twice continuously, this SC is displayed.	• PCC unit not properly set • Corona wire broken • Defective high voltage supply board (T1/PCC/BR) • Defective I/O control board • Defective main control board		1. Check if the PCC unit is properly set. 2. Replace the discharge wire if it is broken. 3. Check if the connectors on the terminal and high voltage supply board (T1/PCC/BR) are properly connected and if the harnesses are damaged. 4. Clean the receptacle. 5. Replace the high voltage supply board (T1/PCC/BR). 6. Replace the I/O control board. 7. Replace the main control board. [Signal Check] • Leak detection: CN209-6 or TP275 on I/O control board	D

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Troubleshooting Procedure	Type
SC440	Drum motor error	- Timing & Condition - • The feedback signal from the motor is still out of range 1 second after the trigger signal is sent. • The feedback signal becomes out of range for 2 seconds while the trigger signal is ON.	• Poor connection of connector • Defective drum motor • Defective I/O control board • Defective main control board		1. Check if the drum is locked by the cleaning blade. If yes, replace the cleaning blade. 2. Check if the connector (CN215) on the I/O control board is properly connected. 3. Check if the drum motor works properly in SP 5-804-001 to 003. If not, replace the drum motor. 4. Replace the I/O control board. 5. Replace the main control board. [Signal Check] • Motor OK: CN215-A7 or TP135 on the I/O control board	D
SC441	Drum peripheral component motor lock	- Timing & Condition - • The feedback signal from the motor is still out of range 1 second after the trigger signal is sent. • The feedback signal becomes out of range for 2 seconds while the trigger signal is ON.	• Defective motor • Defective motor dive board • Mechanical problem (drive transmission problem)		1. Check if the connector (CN220) on I/O control board is properly connected. 2. Check if there is any mechanical problem by rotating the motor manually. 3. Replace the drum peripheral component motor. 4. Replace the I/O control board. 5. Replace the main control board. [Signal Check] • Motor OK: CN220-B9 or TP123 on I/O control board	D

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Troubleshooting Procedure	Type
SC450	Paper transfer bias current error	- Timing - When the paper transfer bias turns on during printing process - Condition - The feedback voltage is 4.8V or higher, or PWM value is 50% or higher for 500ms continuously.	• Defective high voltage supply (T2) • Defective I/O control board • Defective main control board • When the paper transfer belt does not touch with the image transfer belt and the paper transfer belt bias is ON		1. Check if the paper transfer belt unit moves up and touch with the image transfer belt during copy cycle properly. 2. Check if the connectors of high voltage cable and trigger lines are properly connected on the high voltage supply board (T2), I/O control board, and main control board. 3. Replace the high voltage supply board (T2). 4. Replace the I/O control board. 5. Replace the main control board. [Signal Check] • Feedback signal: CN221-A1, TP172, or CN211-A3 on I/O control board / CN302-A7 or TP105 on the main control board • PWM: CN221-A2 or TP138 on I/O control board	D
SC451	Paper transfer belt motor lock	- Timing & Condition - • The feedback signal from the motor is still out of range 1 second after the trigger signal is sent. • The feedback signal becomes out of range for 2 seconds while the trigger signal is ON.	• Defective motor • Defective motor dive board • Mechanical problem (drive transmission problem)		1. Check if the connectors on the paper transfer belt drive board and I/O control board (CN221) are properly connected. 2. Check if there is any mechanical problem by rotating the motor manually. 3. Replace the paper transfer belt motor. 4. Replace the paper transfer belt motor drive board. 5. Replace the I/O control board. 6. Replace the main control board. [Signal Check] • Feedback signal: CN221-B7 or TP154 on I/O control board	D

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Troubleshooting Procedure	Type
SC452	Belt mark detection error	- Timing & Condition- The main control board does not receive the belt mark detection signal from the belt mark detection sensor for a certain period.	• Dirty or damaged belt mark • Belt mark out of position • Defective sensor • Defective I/O control board • Defective main control board		1. Check if the image transfer release lever is properly set. 2. Clean the belt mark if it is dirty. 3. Replace the transfer belt if the belt mark peels off or damaged. 4. Clean the belt mark sensor if it is dirty. 5. Replace the belt mark detection sensor. 6. Replace the I/O control board. 7. Replace the main control board. [Signal Check] • Belt mark: CN220-A12, TP106, or CN212-B11 on I/O control board / CN303-B1 or TP108 on the main control board.	D
SC455	Paper transfer belt discharge corona current leak	- Timing & Condition - When the current leak is detected for 2 seconds, leak detection starts 1 second after the discharge corona turns on. The leak signal is monitored twice at every 1 second. When the leak condition is detected twice continuously, this SC is displayed.	• Discharge unit not properly set • Corona wire broken • Defective high voltage supply board (Q2) • Defective I/O control board • Defective main control board		1. Check if the discharge corona unit is properly set. 2. Replace the discharge if it is broken. 3. Check if the connectors on the terminal and high voltage supply board (Q2) are properly connected and if the harnesses are damaged. 4. Clean the receptacle. 5. Replace the high voltage supply board (Q2). 6. Replace the I/O control board. 7. Replace the main control board. [Signal Check] • Leak detection: CN221-A5 or TP149 on I/O control board	D

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Troubleshooting Procedure	Type
SC456	Paper transfer unit position error	- Timing & Condition • When the paper transfer belt touches the image transfer belt, the paper transfer belt unit H.P. sensor signal stays HIGH. • When the paper transfer belt releases from the image transfer belt. The paper transfer belt unit H.P sensor stays LOW.	• Broken joint parts • Defective paper transfer belt shift clutch • Defective drum peripheral component motor • Defective I/O control board		1. Pull out and re-insert the paper transport unit. 2. Check if the joint parts are broken or not. 3. Replace the paper transfer belt unit H.P. sensor. (Input Check: SP 5-803-011) 4. Replace the paper transfer belt shift clutch. (Output Check: SP 5-804-023) 5. Replace the drum peripheral component motor. 6. Replace the I/O control board. [Signal Check] • H.P.: CNCN221-B2or TP148 on I/O control Board	D
SC457	Image transfer belt cleaning unit position error	- Timing & Condition • When the belt cleaning section touches the image transfer belt, the belt cleaning sensor signal stays LOW. • When the belt cleaning section releases from the image transfer belt. The belt cleaning sensor stays HIGH.	• Dirty Sensor • Defective sensor • Defective belt cleaning shift clutch • Defective drum peripheral component motor • Defective I/O control board • Defective main control board		1. Pull out and re-insert the image transfer belt unit. 2. Clean the image transfer belt cleaning H.P. sensor if it is dirty. 3. Replace the sensor. (Input Check: 5-803-012) 4. Replace the belt cleaning shift clutch. (Output Check: SP 5-804-036) 5. Replace the drum peripheral component motor. 6. Replace the I/O control board. 7. Replace the main control board. [Signal Check] • H.P.: CN219-B2 or TP108 on I/O control board	D

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Troubleshooting Procedure	Type
SC495	Humidity sensor - temperature detection error	- Timing & Condition - The humidity sensor output for temperature is higher than 2.75V or less than 0.25V.	• Poor connection of connector • Defective humidity sensor • Defective I/O control board • Defective main control board		1. Check the connectors (CN210, 211 & CN302) are properly connected on the I/O control board and main control board. 2. Replace the humidity sensor. 3. Replace the I/O control board. 4. Replace the main control board. [Signal Check] • Temperature: CN210-1, TP247, or CN211-A9 on I/O control board / CN302-A1 or TP112 on main control board	C
SC496	Humidity sensor - humidity detection error	- Timing & Condition - The humidity sensor output for humidity is higher than 2V or less than 0.125V.	• Poor connection of connector • Defective humidity sensor • Defective I/O control board • Defective main control board		1. Check the connectors (CN210, 211 & CN302) are properly connected on the I/O control board and main control board. 2. Replace the humidity sensor. 3. Replace the I/O control board. 4. Replace the main control board. [Signal Check] • Humidity: CN201-4, TP236, or CN211-A8 on I/O control board / CN302-A2 or TP113 on main control board	C
SC500	Fusing motor error	- Timing & Condition - • The feedback signal from the motor is still out of range 1 second after the trigger signal is sent. • The feedback signal becomes out of range for 2 seconds while the trigger signal is ON.	• Poor connection of connector • Defective fusing motor • Defective I/O control board • Defective main control board		1. Check if the connector (CN218) is properly connected on the I/O control board. 2. Replace the fusing motor. (Output check: SP 5-804-005) 3. Replace the I/O control board. 4. Replace the main control board. 5. Check if anything causes overload for the fusing unit drive. [Signal Check] • Motor OK: CN218-7 or TP104 on I/O control board	D

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Troubleshooting Procedure	Type
SC501	1st paper tray error	- Timing & Condition - • The upper limit sensor stays HIGH when the pick-up solenoid turns off. • The upper limit sensor stays LOW 1.5 seconds after the tray bottom plate goes down. • The upper limit sensor stays HIGH 10 seconds after the tray bottom plate goes up. • The upper limit sensor stays HIGH 3 seconds after the tray bottom plate goes up again.	• Pick-up solenoid spring come off • Defective upper limit sensor • Defective tray bottom plate • Defective tray lift motor • Defective I/O control board • Defective main control board	SC502 SC503 SC504	1. Check if the spring of pick-up solenoid comes off. 2. Check if the sensor harness is properly connected. 3. Clean or replace the sensor and replace it if necessary (Input Check: SP 5-803-014 to 017). 4. Replace the tray bottom lever if it is broken. 5. Pull out the paper tray and check if the tray lift motor works properly (Output Check: SP 5-804-75 to 82) 6. Replace the I/O control board. 7. Replace the main control board. [Signal Check] • Limit sensor H.P.: CN224-A8 or TP215 on I/O control board	B
SC502	2nd paper tray error	Not used			Not used	B
SC503	3rd paper tray error	Same as SC501		SC501 SC502 SC504	Same as SC501 [Signal Check] • Limit sensor H.P.: CN226-A8 or TP282 on I/O control board	B
SC504	4th paper tray error	Same as SC501		SC501 SC502 SC503	Same as SC501 [Signal Check] • Limit sensor H.P.: CN226-B8 or TP280 on I/O control board	B

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Troubleshooting Procedure	Type
SC505	LCT: Upper limit detection error	- Timing & Condition - • While the paper tray is being lifted, the upper limit sensor does not activate within 2.5 seconds after the paper end sensor activates.	• Poor connection of the connectors • Defective paper end sensor • Paper is not properly loaded in the LCT or curled.		1. Open the LCT cover and reload paper properly. 2. Check if the paper end sensor is properly connected. 3. Replace the paper end sensor.	B
SC510	Paper feed motor error	- Timing & Condition - • The feedback signal from the motor is still out of range 1 second after the trigger signal is sent. • The feedback signal becomes out of range for 2 seconds while the trigger signal is ON.	• Poor connection of connector • Defective paper feed motor • Defective I/O control board • Defective main control board • Mechanical overload		1. Check if the connector is properly connected on the I/O control board (CN230). 2. Replace the paper feed motor. (Output check: SP 5-804-008 to 009) 3. Replace the I/O control board. 4. Replace the main control board. 5. Check the feed unit drive section and if anything causes overload. [Signal Check] • Motor OK: CN230-A1 or TP269 on I/O control board	D
SC522	Duplex - Side fence jogger H.P. error	- Timing & Condition - • The home position is still detected a few seconds after the side fence leaves from the home position. • The home position is not detected 12 seconds after the side fence moves back to the home position.	• Duplex unit not set properly • Excessive load • Poor connection of connector • Defective side fence motor • Defective I/O control board	SC524	1. Pull out and re-insert the duplex unit. 2. Check the connector (CN488) is properly connected on the duplex control board. 3. Check if anything causes overload to the motor. 4. Replace the side fence motor (Output Check: SP 5-804 093 and 094). 5. Replace the I/O control board. [Signal Check] Duplex Side Fence H.P.: CN207-B6 or TP293 on I/O control board	B

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Troubleshooting Procedure	Type
SC524	Duplex - End fence jogger H.P. error	- Timing & Condition - • The home position is still detected a few seconds after the end fence leaves from the home position. • The home position is not detected 24 seconds after the end fence moves back to the home position.	• Duplex unit not set properly • Excessive load • Poor connection of connector • Defective end fence motor • Defective I/O control board	SC522	1. Pull out and re-insert the duplex unit. 2. Check the connector (CN484) is properly connected on the duplex control board. 3. Check if anything causes overload to the motor. 4. Replace the end fence motor (Output Check: SP 5-804 095 and 096). 5. Replace the I/O control board. [Signal Check] Duplex End Fence H.P.: CN207-B7 or TP288 on I/O control board	B
SC541	Hot roller thermistor open	- Timing - at every 1 second when the fusing unit is set - Condition - The hot roller thermistor output is almost close to 5V, which is correspond to 0°C, for 6 seconds continuously.	• Fusing unit not set properly • Poor connection of connector • Defective thermistor • Defective I/O control board • Defective main control board		1. Check if the fusing unit is properly set. 2. Check if the thermistor connector is properly connected. 3. Replace the thermistor if it is deformed. 4. Replace the thermistor if it is opened by measuring the resistance. (Refer to the attached Temperature/ Resistance Conversion Reference Table.) 5. Replace the I/O control board. 6. Replace the main control board. [Signal Check] • Thermistor: CN214-A4, TP234, or CN211-B1 on I/O control board / CN302-B9 or TP117 on main control board.	A

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Troubleshooting Procedure	Type
SC542	Hot roller warm-up error	- Timing & Condition - The hot roller thermistor does not output an analog value corresponding to the ready temperature within 12 minutes after the main switch is turned on.	• Poor connection of connectors • Hot roller fusing lamp brown • Hot roller thermofuse opened • Power fluctuation • Defective main control board • Defective I/O control board • Defective AC drive board		1. Check if the following connectors are properly connected; • Hot roller fusing lamp connectors • CN303 on the main control board • CN212 and CN229 on the I/O control board • CN7 on the AC drive board 2. Replace the hot roller fusing lamp if it is opened. 3. Replace the hot roller thermofuse if it is opened. 4. Check if the power supplied from the outlet fluctuates. 5. Replace the main control board, I/O control board, or AC drive board by checking the trigger signal at each pin. [Signal Check] • Hot roller fusing trigger: CN303-B6 on main control board / CN212-B6, TP248, or CN229-5 on I/O control board / CN7-6 on AC drive board.	A

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Troubleshooting Procedure	Type
SC543	Hot roller fusing lamp overheat	- Timing - at every 1 second when the fusing unit is set - Condition - The hot roller thermistor output is lower than about 0.3V, which is correspond to 220°C, for 3 seconds continuously.	• Fusing unit not set properly • Poor connection of connector • Defective thermistor • Defective I/O control board • Defective main control board • Defective AC drive board		1. Check if the fusing unit is properly set. 2. Check if the thermistor connector is properly connected. 3. Replace the thermistor if it is deformed. 4. Replace the thermistor if it is opened by measuring the resistance. (Refer to the attached Temperature/ Resistance Conversion Reference Table.) 5. Replace the main control board, I/O control board, or AC drive board by checking output from the thermistor and the trigger signal at each pin. [Signal Check] • Thermistor: CN214-A4, TP234, or CN211-B1 on I/O control board / CN302-B9 or TP117 on main control board. • Hot roller fusing trigger: CN303-B6 on main control board / CN212-B6, TP248, or CN229-5 on I/O control board / CN7-6 on AC drive board.	A
SC544	Hot roller fusing lamp lower temperature	- Timing - at every 1 second after the warm-up is completed - Condition - The hot roller thermistor output is higher than about 3V, which is correspond to 87°C, for 8 seconds continuously after the warm-up is completed.	Same as SC543		Same as SC543	A

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Troubleshooting Procedure	Type
SC545	Hot roller ready temperature abnormal	- Timing - at every 1 second after the temperature reaches to the ready condition - Condition - The hot roller thermistor output does not reach to the ready temperature within 7 minutes continuously.	Same as SC543		Same as SC543	A
SC547	Hot roller temperature does not increase	- Timing - at every 1 second, 2minutes after the main switch turned on and before the hot roller temperature does not reach to the ready condition - Condition - The fusing roller temperature does not increase by no more than 3°C for a minutes during warm-up.	• Poor connection of connectors • Hot roller fusing lamp brown • Hot roller thermofuse opened • Defective main control board • Defective I/O control board • Defective AC drive board		1. Check if the following connectors are properly connected; • Hot roller fusing lamp connectors • CN303 on the main control board • CN212 and CN229 on the I/O control board • CN7 on the AC drive board 2. Replace the hot roller fusing lamp if it is opened. 3. Replace the hot roller thermofuse if it is opened. 4. Replace the main control board, I/O control board, or AC drive board by checking the trigger signal at each pin. [Signal Check] • Hot roller fusing trigger: CN303-B6 on main control board / CN212-B6, TP248, or CN229-5 on I/O control board / CN7-6 on AC drive board.	A

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Troubleshooting Procedure	Type
SC551	Pressure roller thermistor open	- Timing - at every 1 second after the fusing unit is set - Condition - The pressure roller thermistor output is almost close to 5V, which is correspond to 0°C, for 6 seconds continuously.	• Fusing unit not set properly • Poor connection of connector • Defective thermistor • Defective I/O control board • Defective main control board		1. Check if the fusing unit is properly set. 2. Check if the thermistor connector is properly connected. 3. Replace the thermistor if it is deformed. 4. Replace the thermistor if it is opened by measuring the resistance. (Refer to the attached Temperature/ Resistance Conversion Reference Table.) 5. Replace the I/O control board. 6. Replace the main control board. [Signal Check] • Thermistor: CN214-A9, TP232, or CN211-B2 on I/O control board / CN302-B8 or TP118 on main control board.	A
SC552	Pressure roller warm-up error	- Timing & Condition - The pressure roller thermistor does not output an analog value corresponding to the ready temperature within 12 minutes after the main switch is turned on.	• Poor connection of connectors • Pressure roller fusing lamp brown • Pressure roller thermofuse opened • Brown fuse • Power fluctuation • Defective main control board • Defective I/O control board • Defective AC drive board		1. Check if the following connectors are properly connected; • Pressure roller fusing lamp connectors • CN303 on the main control board • CN212 and CN229 on the I/O control board • CN7 on the AC drive board 2. Replace the hot roller fusing lamp if it is opened. 3. Replace the hot roller thermofuse if it is opened. 4. Check if the power supplied from the outlet fluctuates. 5. Replace the main control board, I/O control board, or AC drive board by checking the trigger signal at each pin. [Signal Check] • Pressure roller fusing trigger: CN303-B7 on main control board / CN212-B5, TP240, or CN229-4 on I/O control board / CN7-7 on AC drive board.	A

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

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Troubleshooting Procedure	Type
SC555	Pressure roller ready temperature abnormal	- Timing - at every 1 second after the temperature reaches to the ready condition - Condition - The pressure roller thermistor output does not reach to the ready temperature within 7 minutes continuously.	Same as SC553		Same as SC553	A
SC557	Pressure roller temperature does not increase	- Timing - at every 1 second, 2minutes after the main switch turned on and before the hot roller temperature does not reach to the ready condition - Condition - The pressure roller temperature does not increase by no more than 3°C for a minutes during warm-up.	• Poor connection of connectors • Pressure roller fusing lamp brown • Pressure roller thermofuse opened • Defective main control board • Defective I/O control board • Defective AC drive board		1. Check if the following connectors are properly connected; • Hot roller fusing lamp connectors • CN303 on the main control board • CN212 and CN229 on the I/O control board • CN7 on the AC drive board 2. Replace the hot roller fusing lamp if it is opened. 3. Replace the hot roller thermofuse if it is opened. 4. Replace the main control board, I/O control board, or AC drive board by checking the trigger signal at each pin. [Signal Check] • Pressure roller fusing trigger: CN303-B7 on main control board / CN212-B5, TP240, or CNCN229-4 on I/O control board / CN7-7 on AC drive board.	A

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

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Troubleshooting Procedure	Type
SC620	ADF communication error	- Timing & Condition - After the main control board communicate successfully with the ARDF once, communication error is detected.	• Poor connection of optical-fiber cable or damaged • Defective ARDF main board • Defective main control board		1. Check the connector of the optical-fiber cable is properly set on the ADF main board and main control board or check if it is damaged. 2. Replace the ARDF main board. 3. Replace the main control board.	D
SC621	Sorter communication error	- Timing - When the main switch is turned on or while Sorter is running - Condition - The main control board detected a communication error with the Sorter main board.	• Poor connection of optical-fiber cable or damaged • Defective Sorter main board • Defective main control board		1. Check the connector of the optical-fiber cable is properly set on the Sorter main board and main control board or check if it is damaged. 2. Replace the sorter main board. 3. Replace the main control board.	D
SC625	FPU communication error	- Timing & Condition - The scanner IPU board detected a communication error with FPU during the FPU is operating or after the FPU completes the operation.	• Poor connection of optical-fiber cable or damaged • Defective FPU main board • Defective scanner IPU board		1. Check the connector of the optical-fiber cable is properly set on the FPU main board and main control board or check if it is damaged. 2. Replace the FPU main board. 3. Replace the scanner IPU board.	B
SC626	LCT communication error	- Timing - When the main switch is turned on or while LCT is running - Condition - The main control board detected a communication error with the LCT main board.	• Poor connection of harnesses or damaged • Defective I/F board RDS/LCT • Defective LCT main board • Defective main control board		1. Check the connectors of harnesses are properly set on the main control board, I/F board RDS/LCT, and LCT main board or check if it is damaged. 2. Replace I/F board RDS/LCT board. 3. Replace the LCT main board. 4. Replace the main control board.	B

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Troubleshooting Procedure	Type
SC630	RDS communication error	- Timing & Condition - The main control board receives no response from RDS when accessing it. Even when this error is detected, the copier does not show the SC code and this SC code is not logged. (Copier function is still working.)	• Poor connection of harness, optical-fiber cable, or damaged • Defective line adapter • Defective I/F board RDS/LCT • Defective main control board		1. Check the connector of the harness and optical-fiber cable is properly set on the I/F board RDS/LCT and main control board or check if they are damaged. 2. Check and/or change the setting of the line adapter or replace it. 3. Replace the I/F board RDS/LCT. 4. Replace the scanner IPU board.	
SC690	Application selection error	- Timing & Condition - When the main CPU communicates with CPUs on other PCBs, main CPU does not receive response from others.	• Scanner IPU firmware upgrade • Poor connection of connectors • Defective main scanner IPU board • Defective main control board • Defective TD sensor I/F board 1 • Main board(s) of options		• This SC code will be displayed when the scanner IPU firmware is changed. Turn off the main switch and disconnect the IC card; then, turn on the main switch. 1. Check if the connectors on the main control board, sub scanner IPU board, TD sensor I/F board 1, and the main board on each option equipped are properly connected. 2. Replace the defective board(s).	B
SC721	Sorter: Bin motor error	- Timing & Condition - The signal from the wheel sensor does not change at certain timing. When this error detected twice, this SC code is displayed.	• Poor connection of connector • Defective sensor • Defective motor • Bin position error • Defective main board		1. Check if the connectors of the wheel H.P. sensor and bin motor are properly connected. 2. Replace the wheel sensor (Input check: SP 5-803-124/125). 3. Check if the bins are properly positioned. 4. Replace the bin motor (Output check: SP 5-804-124). 5. Replace the main board.	D

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Troubleshooting Procedure	Type
SC722	Sorter: Jogger motor error	- Timing & Condition - The jogger H.P. sensor does not activate within the timing programmed. When this error detected twice, this SC code is displayed.	• Poor connection of connector • Defective jogger H.P. sensor • Defective jogger motor • Defective main board		1. Check if the connectors of the jogger H.P. sensor and jogger motor are properly connected. 2. Replace the jogger H.P. sensor. (Input check: SP 5-803-128) 3. Replace the jogger motor. (Output check: SP 5-804-131) 4. Replace the main board.	D
SC724	Sorter: Grip motor error	- Timing & Condition - The grip H.P. sensor does not activate within the timing programmed. When this error detected twice, this SC code is displayed.	• Poor connection of connectors. • Defective grip H.P. sensor / grip unit H.P. sensor • Defective grip motor • Defective main board		1. Check if the connectors of the grip H.P. sensor, grip unit H.P. sensor, and grip motor are properly connected. 2. Replace the sensor(s). (Input check: SP 5-803-129/137) 3. Replace the grip motor. (Output check: SP 5-804-127) 4. Replace the main board.	D
SC725	Sorter: Stapler motor error	- Timing & Condition - The stapler H.P. sensor does not activates within the timing programmed. When this error detected twice, this SC code is displayed.	• Staple jam • Excessive sheets of paper stapled • Poor connection of connectors • Defective stapler H.P. sensor • Defective staple motor • Defective main board		1. Remove the staple(s) jammed if it causes SC. 2. Instruct user how many sheets can be stapled as maximum. 3. Check if the connectors of the staple H.P. sensor and/or staple unit motor are properly connected. 4. Replace the stapler H.P. sensor. (Input check: SP 5-803-131) 5. Replace the stapler motor. (Output check: SP 5-804-129) 6. Replace the main board.	D

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Troubleshooting Procedure	Type
SC726	Sorter: End release motor error	- Timing & Condition - The bin end open or close sensor does not activates within the timing programmed. When this error detected twice, this SC code is displayed.	• Poor connection of connectors. • Defective bin end open or close sensor • Defective end release motor • Defective main board		1. Check if the connectors of the bin end open and close sensors and end release motor are properly connected. 2. Replace the bin end open or close sensor. (Input check: SP 5-803-126/127) 3. Replace the end release motor. (Output check: SP 5-804-125) 4. Replace the main board.	D
SC727	Grip shift motor error	- Timing & Condition - The grip H.P. sensor does not activates within the timing programmed. When this error detected twice, this SC code is displayed.	• Poor connection of connectors. • Defective grip H.P. sensor • Defective grip shift motor • Defective main board		1. Check if the connectors of the grip H.P. sensor and grip shift motor are properly connected. 2. Replace the grip H.P. sensor. (Input check: SP 5-803-129) 3. Replace the grip shift motor. (Output check: SP 5-804-126) 4. Replace the main board.	D
SC731	Sorter: Staple unit motor error	- Timing & Condition - The staple unit H.P. sensor does not activates within the timing programmed. When this error detected twice, this SC code is displayed.	• Poor connection of connectors. • Defective staple unit H.P. sensor • Defective grip shift motor • Defective main board		1. Check if the connectors of the staple unit H.P. sensor and/or staple unit motor are properly connected. 2. Replace the staple unit motor H.P. sensor. (Input check: SP 5-803-130) 3. Replace the staple unit motor. (Output check: SP 5-804-128) 4. Replace the main board.	D
SC741	LCT: Main motor error	- Timing & Condition - • LCT main motor speed is out of range for more than 0.5 seconds during rotation.	• Poor connection of connectors • Defective LCT main motor • Defective LCT main board		1. Check if the connector is properly connected. 2. Replace the LCT main motor.	D

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Troubleshooting Procedure	Type
SC742	LCT: Tray lift error	- Timing & Condition - • The upper limit sensor does not activate within 18 seconds after the lift motor turns on (in UP direction) when the main switch is turned on or close the LCT cover. • The lower limit sensor does not activate within 18 seconds after the lift motor turns on (in DOWN direction) when paper runs out (paper end) or the Down key is pressed.	• Poor connection of connectors • Defective lift motor • Defective upper limit sensor • Defective pick-up solenoid • Defective LCT main board		1. Check if the connectors of the lift motor, upper limit sensor, and pick-up solenoid are properly connected. 2. Replace the lift motor. 3. Replace the upper limit sensor. 4. Replace the pick-up solenoid. 5. Replace the LCT main board.	D
SC790	FPU: Projector lamp on error	- Timing & Condition - The projector lamp does not turns on 100msec after 5V is applied to it.	• Poor connection of connector • Blown projector lamp • Defective projector main board		1. Check if the connector is properly connected. 2. Replace the projector lamp if it is blown. 3. Replace the projector main board.	B
SC791	FPU: Projector lamp off error	- Timing & Condition - The projector lamp does not turns off 100msec after it is turned off.	• Defective projector main board • Defective sub/main scanner IPU board • Defective main control board		1. Replace the projector main board. 2. Replace the sub and/or main scanner IPU board. 3. Replace the main control board.	B

SC No.	Item	Detection Conditions	Possible Causes	Related SC	Troubleshooting Procedure	Type
SC792	FPU: Projector lamp overheated	- Timing & Condition - The projector lamp overheats during projector operation.	• Poor connection of connector • Defective thermistor • Defective projector main board		1. Check if the connector of the fan is properly connected. 2. Replace the fan if it is defective. 3. Replace the thermistor if it is defective. 4. Replace projector main board.	B
SC901	Upper total counter error (Black)	- Timing & Condition - • Feedback signal stays LOW when the main switch is turned on. • Feedback signal stays LOW just before the trigger signal goes ON. • Feedback signal stays HIGH just before the trigger signal goes OFF.	• Poor connection of the connectors • Defective counter		Check if the connectors are properly set. Replace the total counter. [Signal Check] Trigger line: CN230-B8 on I/O control board Counter OK signal: TP227 on I/O control Board	D
SC902	Lower total counter error (Color)	Same as SC901			Same as SC901 [Signal Check] Trigger line: CN230-B10 on I/O control board Counter OK signal: TP228 on I/O control board	D

Temperature/Resistance Conversion Reference Table

Relationship between the fusing thermistor resistances and temperatures

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

APPENDIX-2

SP MODE

SP Mode No.	Item	Default Value	Value Range	Step	SP7	Description	Remarks	Description displayed on the screen
1. PAPER FEED/TRANSPORT/FUSING								
1-001: Leading edge registration adjustment								Lead Edge Regist
1-001-001	Normal paper	0 mm (FA)	-5.0 to 5.0 mm	0.1	903	Adjusts the leading edge registration by changing the registration clutch ON timing.	**Screen - A**	Normal Paper
1-001-002	OHP	0 mm (FA)	-5.0 to 5.0 mm	0.1	903			OHP
1-001-003	Thick paper 1	0 mm (FA)	-5.0 to 5.0 mm	0.1	903			Thick paper
1-001-004	Thick paper 2	0 mm (FA)	-5.0 to 5.0 mm	0.1	903			SP CARD
1-002: Side-to-side registration adjustment								Side to Side Reg
1-002-001	By-pass	0 mm (FA)	-5.0 to 5.0 mm	0.1	903	Adjusts the side-to-side registration by changing the laser main scan start position.	**Screen - A**	By-pass
1-002-002	1st tray	0 mm (FA)	-5.0 to 5.0 mm	0.1	903			Tray1
1-002-003	Duplex (1st side)	0 mm (FA)	-5.0 to 5.0 mm	0.1	903			Tray2
1-002-004	2nd tray	0 mm (FA)	-5.0 to 5.0 mm	0.1	903			Tray3
1-002-005	3rd tray	0 mm (FA)	-5.0 to 5.0 mm	0.1	903			Tray4
1-002-006	Duplex (2nd side)	0 mm (FA)	-5.0 to 5.0 mm	0.1	903			duplex
1-002-007	LCT	0 mm (FA)	-5.0 to 5.0 mm	0.1	903			Lct
1-003: Paper feed timing adjustment								P.Feed Tmg
1-003-001	Normal paper, by-pass	0 mm (FA)	-5.0 to 5.0 mm	0.1	903	Adjusts the amount of paper buckle at the registration roller by changing the time from when the registration sensor is activated until the relay clutch is turned off.	**Screen - A**	Normal Paper/By-ps
1-003-002	Tray paper feed	0 mm (FA)	-5.0 to 5.0 mm	0.1	903			Tray Feed
1-003-003	By-pass OHP	0 mm (FA)	-5.0 to 5.0 mm	0.1	903			OHP/By-ps
1-003-004	By-pass: Thick paper	2 mm (FA)	-5.0 to 7.0 mm	0.1	903			Thick Paper/By-ps
1-003-005	2nd side (Duplex)	0 mm (FA)	-5.0 to 5.0 mm	0.1	903			Dplx Feed
1-101-000	Oil End Sensor Detection	1	0 or 1	1	903	Specifies whether the oil end sensor is set ON or OFF. 0 = OFF 1 = ON		Oil End Sensor Fuser oil End Check
1-104-000	Fusing control method selection	1	0 or 1	1		Selects the fusing temperature control mode. 0 = Phase control (for improving flicker of the fluorescent lamp) 1 = ON/OFF control (for minimizing radio wave noise)	Phase control should only be selected if a user has a problem with flicker of the fluorescent lamp. The main switch needs to be turned off and on when the data is changed.	Fusing Control

SP Mode No.	Item	Default Value	Value Range	Step	SP7	Description	Remarks	Description displayed on the screen
1-105: Hot/pressure roller temperature setting								Roller. Tmp Set
1-105-001	Hot: 1st side: Idling	183 °C	100 to 200 °C	1		Adjusts the temperature at when the idling starts. The idling starts for 2 minutes when the temperature becomes over than Target - 15 ºC. If the temperature is higher than 50 ºC when the power relay is ON, the idling is not executed.	**Screen - B**	1
1-105-002	Hot: 1st side: Standby mode	193 °C	100 to 200 °C	1		Adjusts the temperature of the hot and pressure rollers in various modes.		2
1-105-003	Hot: 1st side: Normal paper: FC	178 °C	100 to 200 °C	1				3
1-105-004	Hot: 1st side: Normal paper : 1C	168 °C	100 to 200 °C	1				4
1-105-005	Hot: 1st side:OHP/Thick paper:	178 °C	100 to 200 °C	1				5
1-105-006	Hot: 1st side: OHP/Thick paper:	178 °C	100 to 200 °C	1				6
1-105-007	Pressure: 1st side: Standby	160 °C	100 to 200 °C	1				7
1-105-008	Pressure: 1st side: Normal paper: FC	155 °C	100 to 200 °C	1				8
1-105-009	Pressure: 1st side: Copy mode: Normal paper: 1C	145 °C	100 to 200 °C	1				9
1-105-010	Pressure: 1st side: Copy mode: OHP/Thick paper: FC	155 °C	100 to 200 °C	1				10
1-105-011	Pressure: 1st side: Copy mode: OHP/Thick paper: 1C	155 °C	100 to 200 °C	1				11
1-105-012	Hot: 2nd side: Standby mode	193 °C	100 to 200 °C	1				12
1-105-013	Hot: 2nd side: Copy mode: Normal paper: FC	178 °C	100 to 200 °C	1				13
1-105-014	Hot: 2nd side: Copy mode: Normal paper: 1C	168 °C	100 to 200 °C	1				14
1-105-015	Hot: 2nd side: Copy mode: OHP/Thick paper: FC	178 °C	100 to 200 °C	1				15
1-105-016	Hot: 2nd side: Copy mode: OHP/Thick paper: 1C	178 °C	100 to 200 °C	1				16
1-105-017	Pressure: 2nd side: Standby	160 °C	100 to 200 °C	1				17

SP Mode No.	Item	Default Value	Value Range	Step	SP7	Description	Remarks	Description displayed on the screen
1-105-018	Pressure: 2nd side: Copy mode: Normal paper: FC	155 °C	100 to 200 °C	1				18
1-105-019	Pressure: 2nd side: Copy mode: Normal paper: 1C	145 °C	100 to 200 °C	1				19
1-105-020	Pressure: 2nd side: Copy mode: OHP/Thick paper: FC	155 °C	100 to 200 °C	1				20
1-105-021	Pressure: 2nd side: Copy mode: OHP/Thick paper: 1C	155 °C	100 to 200 °C	1				21
1-106: Fusing temperature display								Roller Temp. Display
1-106-001	Pressure roller	°C	°C	1		Displays the temperature of the pressure roller.		Pressure Roller Temp
1-106-002	Hot roller	°C	°C	1		Displays the temperature the hot roller.		Hot Roller Temp
1-108-000	Fusing unit set	0	0 or 1	1		Disables fusing unit set detection. 0 = Detect 1 = Not detect - Procedure - (1) Make sure that the main switch is turned off. (2) Pull out and remove the fusing unit. (3) Keep the front door open and turn on the main switch. (4) Access the SP mode and set the data to "1". (5) Close the front door.	Keep this at 0 for normal operation. This mode is valid only for the fusing unit.	Fusing Unit Set
1-109-000	Fusing nip width measurement					Feeds OHP sheet and it stops 3 times for 2 seconds in between the hot rollers. This operation makes 3 NIP bands on the OHP sheet. Press the ON key to start.		Fusing Nip Band Wdth

SP Mode No.	Item	Default Value	Value Range	Step	SP7	Description	Remarks	Description displayed on the screen
1-112: Fusing temperature correction by environmental temperature								Fusing Temp. shifting value
1-112-001	at high temperature	0 °C	-20 to 0 °C	1		Sets the threshold which activates this correction. Hot and pressure roller temperature is corrected when it is detected as high or low temperature environment.	**Do not touch in the field.**	1
1-112-002	at low temperature	5°C	0 to 20 °C	1				2
1-801: Motor speed adjustment								Motor Speed Adjustment
1-801-002	Paper feed motor speed adjustment: Standard speed	0.0%	-1.0 to 1.0%	0.1		Adjusts the paper feed motor (standard) speed by 0.1% step.	**Do not touch in the field.**	P Feed Mt: Normal Spd
1-801-005	Paper feed motor speed adjustment: Half speed	0.0%	-1.0 to 1.0%	0.1		Adjusts the paper feed motor (half) speed in 0.1% step.		P Feed Mt: Half Spd
1-801-010	Registration motor speed: Standard speed	0.0%	-1.0 to 1.0%	0.1		Adjusts the registration motor (standard) speed by 0.1% step.		Regist Mt: Normal Spd
1-901: Duplex unit - Side/End fence position adjustment								Fence Position
1-901-001	Side fence	0 mm	-5.0 to 5.0 mm	0.1		Adjusts the side fence stop position of the duplex unit.		Dplx Side Fence Adjust
1-901-002	End fence	0 mm	-5.0 to 5.0 mm	0.1				Dplx End Fence Adjust
2. DRUM UNIT								
2-101: Sub-scan/Main-scan blank margin adjustment								Blnk Mrgn
2-101-001	Sub-scan: Leading edge:	0 mm (FA)	-4.0 to 4.0 mm	0.1	903	Adjusts the blank margin at the leading or trailing edge in sub-scan (paper feed) direction.	**Screen- C**	Lead Edge: Normal
2-101-002	Sub-scan: Leading edge: Thick	0 mm (FA)	-4.0 to 4.0 mm	0.1	903			Lead Edge: Thick
2-101-003	Sub-scan: Leading edge: Thick	0 mm (FA)	-4.0 to 4.0 mm	0.1	903			FsyncHeadErase V_Thick
2-101-004	Sub-scan: Leading edge: OHP	0 mm (FA)	-4.0 to 4.0 mm	0.1	903			Lead Edge: OHP
2-101-005	Sub-scan: Trailing edge: Normal	0 mm (FA)	-3.0 to 10.0 mm	0.1	903			Trail Edge: Normal
2-101-006	Sub-scan: Trailing edge: Thick	0 mm (FA)	-3.0 to 10.0 mm	0.1	903			Trail Edge: Thick
2-101-007	Sub-scan: Trailing edge : Thick	0 mm (FA)	-3.0 to 10.0 mm	0.1	903			FsyncRearErase V_Thick
2-101-008	Sub-scan: Trailing edge: OHP	0 mm (FA)	-3.0 to 10.0 mm	0.1	903			Trail Edge: OHP
2-101-009	Main-scan: Leading edge	0 mm (FA)	-2.0 to 5.0 mm	0.1	903	Adjusts the blank margin at the leading or trailing edge in main-scan direction.		Main Scan Head Side
2-101-010	Main-scan: Trailing edge	0 mm (FA)	-2.0 to 5.0 mm	0.1	903			Main Scan Rear Side
2-101-011	Sub-scan: Auto duplex: Trailing edge of 1st sided	0 mm (FA)	-3.0 to 10.0 mm	0.1	903	Adjusts the blank margin at the trailing edge in sub-scan (paper feed) direction on the 1-sided copy in the duplex mode.		Trail Edge: Auto Dplx 1 side
2-112: Main-scan magnification adjustment								Main Scn Mag
2-112-001	Copy mode	0.0%	-1.0 to 1.0%	0.1	903	Adjusts the magnification in Main-scan direction of Copy mode.	**Screen - D** **Do not touch in the field.**	LsyncMagAdj COPY

SP Mode No.	Item	Default Value	Value Range	Step	SP7	Description	Remarks	Description displayed on the screen
2-112-002	Print mode	0.0%	-1.0 to 1.0%	0.1	903	Adjusts the magnification in Main-scan direction of Printer mode.	**Screen - D**	LsyncMagAdj PRINTER
2-113: Sub-scan magnification adjustment								Sub Scan Mag
2-113-002	Printer mode	0.0%	-1.0 to 1.0%	0.1	903	Adjusts the magnification in Sub-scan direction of Printer mode.	**Screen - D**	FsyncMagAdj PRINTER
2-207: Forced toner supply								Forced Toner Splly
2-207-001	K					Moves the selected development unit to the development position and forces toner to be supplied in according to the setting in SP2-208. Press ON key to start after selecting the color.		K
2-207-002	C							C
2-207-003	M							M
2-207-004	Y							Y
2-208: Forced Toner supply clutch ON times / Toner supply ratio								Toner Supply
2-208-001	Clutch ON times: K	10	1 to 50	1		Sets the number of forced toner supply operations. Toner supply clutch turns on and off for 1 second each and this operation is repeated in according to the times selected. (Approximately 0.5g of toner is supplied while toner supply clutch is ON for 1 second. It means that about 5g of toner is supplied by this operation in the default setting. It increases toner density by about 0.7wt%.)		Forced: Times: K
2-208-002	Clutch ON times: C	10	1 to 50	1				Forced: Times: C
2-208-003	Clutch ON times: M	10	1 to 50	1				Forced: Times: M
2-208-004	Clutch ON times: Y	10	1 to 50	1				Forced: Times: Y
2-208-005	Toner supply ratio: Fixed mode:	5%	0 to 100%	1		Sets the toner supply ratio for each color in Fixed mode.		Fixed: Ratio: K
2-208-006	Toner supply ratio: Fixed mode:	5%	0 to 100%	1				Fixed: Ratio: C
2-208-007	Toner supply ratio: Fixed mode:	5%	0 to 100%	1				Fixed: Ratio: M
2-208-008	Toner supply ratio: Fixed mode:	5%	0 to 100%	1				Fixed: Ratio: Y
2-208-009	Toner supply method	2	0 to 2	1		Selects the toner supply method. 0 = Fixed supply mode 1 = Proportional control supply mode (with TD sensor output) 2 = Fuzzy control supply mode	Normally "2" should be selected. Only when the ID sensor and/or TD sensor is defective, the data needs to be changed as temporary.	Mode: 0:FIX, 1:PRP, 2:FZY

SP Mode No.	Item	Default Value	Value Range	Step	SP7	Description	Remarks	Description displayed on the screen
2-225: Developer Initialization								Dev. Agitation
2-225-001	K					Performs developer initialization and forced self-check for color(s) selected and displays the operation result. Press Execution key to start. 0 = failure 1 = success The followings are executed. Aging - Initial Vref check - Forced process control self check	**Screen - E**	K
2-225-002	C							C
2-225-003	M							M
2-225-004	Y							Y
2-225-005	All color							All Color
2-225-006	CMY							CMY
2-301: ITB bias adjustment								Belt transfer bias
2-301-001	4C : 1st color	1500V	300 to 4500V	1	903	Adjusts the image transfer belt bias in standard speed mode at each transfer process (1C - 4C) and for color mode selected.	Basically, do not change the data since the suitable value is prefixed for some kinds of paper.	1st 4C-mode
2-301-002	4C : 2nd color	1700V	300 to 4500V	1	903			2nd 4C-mode
2-301-003	4C : 3rd color	1900V	300 to 4500V	1	903			3rd 4C-mode
2-301-004	4C : 4th color	2100V	300 to 4500V	1	903			4th 4C-mode
2-301-005	2C : 1st color	1500V	300 to 4500V	1	903			1st 2C-mode
2-301-006	2C : 2nd color	1700V	300 to 4500V	1	903			2nd 2C-mode
2-301-007	3C : 1st color	1500V	300 to 4500V	1	903			1st 3C-mode
2-301-008	3C : 2nd color	1700V	300 to 4500V	1	903			2nd 3C-mode
2-301-009	3C : 3rd color	1900V	300 to 4500V	1	903			3rd 3C-mode
2-301-010	1C : 1st color	2100V	300 to 4500V	1	903			1st 1C-mode
2-301-011	Non-image area	500V	300 to 4500V	1	903	Adjusts the image transfer belt bias for non-image area.		Between image Areas
2-301-012	Half-speed	500V	300 to 4500V	1	903	Adjusts the image transfer belt bias for half-speed in OHP/Thick paper modes. Before paper transfer in these mode, the developed image on the transfer belt passes the drum to synchronize the registration.		Half Spd:Image Area
2-301-024	Bias correction ON/OFF	0	0 to 1	1	903	Sets the correction mode ON or OFF. If ON, the transfer belt bias for image area is corrected by Vd (process control potential table). 0 = ON 1 = OFF		Vd Correction: 0:ON, 1:OFF
2-301-025	4C : 2nd side : 1st color	1500V	300 to 4500V	1	903	Adjusts the image transfer belt bias for 2 sided copy in duplex mode at each transfer process (1C - 4C) and for color mode selected.		1st 4C-mode NrmlBack
2-301-026	4C : 2nd side : 2nd color	1700V	300 to 4500V	1	903			2nd 4C-mode NrmlBack
2-301-027	4C : 2nd side : 3rd color	1900V	300 to 4500V	1	903			3rd 4C-mode NrmlBack
2-301-028	4C : 2nd side : 4th color	2100V	300 to 4500V	1	903			4th 4C-mode NrmlBack
2-301-029	2C : 2nd side : 1st color	1500V	300 to 4500V	1	903			1st 2C-mode NrmlBack

SP Mode No.	Item	Default Value	Value Range	Step	SP7	Description	Remarks	Description displayed on the screen
2-301-030	2C : 2nd side : 2nd color	1700V	300 to 4500V	1	903			2nd 2C-mode NrmlBack
2-301-031	3C : 2nd side : 1st color	1500V	300 to 4500V	1	903			1st 3C-mode NrmlBack
2-301-032	3C : 2nd side : 2nd color	1700V	300 to 4500V	1	903			2nd 3C-mode NrmlBack
2-301-033	3C : 2nd side : 3rd color	1900V	300 to 4500V	1	903			3rd 3C-mode NrmlBack
2-301-034	1C : 2nd side : 1st color	2100V	300 to 4500V	1	903			1st 1C-mode NrmlBack
2-301-035	Lubricant brush 1	500V	300 to 4500V	1		Adjusts the image transfer belt bias during the lubricant brush cleaning mode.		Q1_Brush CLN1
2-301-036	Lubricant brush 2	500V	300 to 4500V	1				Q1_Brush CLN2
2-302: PTB bias - Humidity range threshold								Forced Trans. Condition Shift
2-302-001	Threshold 1	4.3 g/m3	0.6 to 50 g/m3	0.1		Changes the threshold of absolute humidity. TH1 TH2 TH3 TH4 | | | | Environment: LL L Normal H HH LL: Very low humidity L : Low humidity H : High humidity HH: Very high humidity	**Do not touch in the field.**	EnvLmt[0]
2-302-002	Threshold 2	11.3 g/m3	0.6 to 50 g/m3	0.1				EnvLmt[1]
2-302-003	Threshold 3	18.0 g/m3	0.6 to 50 g/m3	0.1				EnvLmt[2]
2-302-004	Threshold 4	24.0 g/m3	0.6 to 50 g/m3	0.1				EnvLmt[3]
02-310: PTB bias adjustment								Paper transfer bias
2-310-001	Humidity range set-up	1	0 to 5	1		Specifies which humidity range is used for paper transfer bias. 0 = fixed humidity range (normal condition) 1 = condition changes by humidity sensor 2 = fixed humidity range (LL) 3 = fixed humidity range (L) 4 = fixed humidity range (H) 5 = fixed humidity range (HH)	Change the data only when the humidity sensor fails if necessary for a while.	EnvChoise

SP Mode No.	Item	Default Value	Value Range	Step	SP7	Description	Remarks	Description displayed on the screen
2-310-002	Image area: Normal: 1C	25 µA	5 to 100 µA	1	903	Adjusts the paper transfer belt bias for the type of paper and copy mode.	**Screen - F** Basically, do not change the data since the suitable value is prefixed for some kinds of paper.	NRML 1C
2-310-003	Image area: Normal: 2C	35 µA	5 to 100 µA	1	903			NRML 2C
2-310-004	Image area: Normal: 3C	35 µA	5 to 100 µA	1	903			NRML 3C
2-310-005	Image area: Normal: 4C	35 µA	5 to 100 µA	1	903			NRML 4C
2-310-006	Image area: Thick 1: 1C	14 µA	5 to 100 µA	1	903			THICK 1C
2-310-007	Image area: Thick 1: 2C	18 µA	5 to 100 µA	1	903			THICK 2C
2-310-008	Image area: Thick 1: 3C	18 µA	5 to 100 µA	1	903			THICK 3C
2-310-009	Image area: Thick 1: 4C	18 µA	5 to 100 µA	1	903			THICK 4C
2-310-010	Image area: OHP:1C	16 µA	5 to 100 µA	1	903			OHP 1C
2-310-011	Image area: OHP:2C	18 µA	5 to 100 µA	1	903			OHP 2C
2-310-012	Image area: OHP:3C	18 µA	5 to 100 µA	1	903			OHP 3C
2-310-013	Image area: OHP:4C	18 µA	5 to 100 µA	1	903			OHP 4C
2-310-014	Image area: Thick 2: 1C	16 µA	5 to 100 µA	1	903			VERY-THICK 1C
2-310-015	Image area: Thick 2: 2C	20 µA	5 to 100 µA	1	903			VERY-THICK 2C
2-310-016	Image area: Thick 2: 3C	20 µA	5 to 100 µA	1	903			VERY-THICK 3C
2-310-017	Image area: Thick 2: 4C	20 µA	5 to 100 µA	1	903			VERY-THICK 4C
2-310-018	Image area: Normal: 2nd side:	30 µA	5 to 100 µA	1	903			NRML Back 1C
2-310-019	Image area: Normal: 2nd side:	35 µA	5 to 100 µA	1	903			NRML Back 2C
2-310-020	Image area: Normal: 2nd side:	35 µA	5 to 100 µA	1	903			NRML Back 3C
2-310-021	Image area: Normal: 2nd side:	35 µA	5 to 100 µA	1	903			NRML Back 4C
2-310-022	Image area: Thick 1: 2nd side:	14 µA	5 to 100 µA	1	903			THICK Back 1C
2-310-023	Image area: Thick 1: 2nd side:	20 µA	5 to 100 µA	1	903			THICK Back 2C
2-310-024	Image area: Thick 1: 2nd side:	20 µA	5 to 100 µA	1	903			THICK Back 3C
2-310-025	Image area: Thick 1: 2nd side:	20 µA	5 to 100 µA	1	903			THICK Back 4C
2-310-026	Image area: Thick 2: 2nd side:	16 µA	5 to 100 µA	1	903			VERY-THICK Back 1C
2-310-027	Image area: Thick 2: 2nd side:	20 µA	5 to 100 µA	1	903			VERY-THICK Back 2C
2-310-028	Image area: Thick 2: 2nd side:	20 µA	5 to 100 µA	1	903			VERY-THICK Back 3C
2-310-029	Image area: Thick 2: 2nd side:	20 µA	5 to 100 µA	1	903			VERY-THICK Back 4C
2-310-030	ID pattern: Normal: 1C	20 µA	5 to 100 µA	1	903	Adjusts the paper transfer belt bias of ID sensor pattern for normal paper or others, and copy mode.		P-Ptn NRML 1C
2-310-031	ID pattern: Normal: 2C	30 µA	5 to 100 µA	1	903			P-Ptn NRML 2C
2-310-032	ID pattern: Normal: 3C	30 µA	5 to 100 µA	1	903			P-Ptn NRML 3C
2-310-033	ID pattern: Normal: 4C	30 µA	5 to 100 µA	1	903			P-Ptn NRML 4C
2-310-034	ID pattern: Except for normal:	12 µA	5 to 100 µA	1	903			P-Ptn NOT-NRML 1C
2-310-035	ID pattern: Except for normal:	14 µA	5 to 100 µA	1	903			P-Ptn NOT-NRML 2C
2-310-036	ID pattern: Except for normal:	14 µA	5 to 100 µA	1	903			P-Ptn NOT-NRML 3C
2-310-037	ID pattern: Except for normal:	14 µA	5 to 100 µA	1	903			P-Ptn NOT-NRML 4C
2-310-038	Lubricant brush (Belt cleaning mode)	35 µA	5 to 100 µA	1		Adjusts the paper transfer belt bias during the lubricant brush cleaning mode.		Q1_Brush CLN

SP Mode No.	Item	Default Value	Value Range	Step	SP7	Description	Remarks	Description displayed on the screen
2-311-001	Forced belt cleaning					Lubricates the image transfer belt. Press the On key to start.	This mode may effects for partial blanking or insufficient belt cleaning.	Cleaning
2-313: PTB bias : Paper size correction								P.T.B.: Paper:Size Correct
2-313-001	Normal: LT (S) or larger	100%	50 to 200%	1		Corrects the paper transfer belt bias for the type of paper and paper size selected. The paper transfer belt bias times by the percentage selected in this SP mode is applied to the bias roller. (S): Sideways (L): Lengthwise	Basically, do not change the data since the suitable value is prefixed for some kinds of paper.	NRML over LT Sideways
2-313-002	Normal: B4 or larger	100%	50 to 200%	1				NRML over B4
2-313-003	Normal: A4 (L) or larger	100%	50 to 200%	1				NRML over A5 Lengthwise
2-313-004	Normal: Less than A4 (L)	100%	50 to 200%	1				NRML under A5 Lengthwise
2-313-005	Thick 1: LT (S) or larger	100%	50 to 200%	1				THICK over LT Sideways
2-313-006	Thick 1: B4 or larger	100%	50 to 200%	1				THICK over B4
2-313-007	Thick 1: A4 (L) or larger	100%	50 to 200%	1				THICK over A5 Lengthwise
2-313-008	Thick 1: Less than A4 (L)	100%	50 to 200%	1				THICK under A5 Lengthwise
2-313-009	OHP:LT (S) or larger	100%	50 to 200%	1				OHP over LT Sideways
2-313-010	OHP:B4 or larger	100%	50 to 200%	1				OHP over B4
2-313-011	OHP:A4 (L) or larger	100%	50 to 200%	1				OHP over A5 Lengthwise
2-313-012	OHP: Less than A4 (L)	100%	50 to 200%	1				OHP under A5 Lengthwise
2-313-013	Thick 2: LT (S) or larger	100%	50 to 200%	1				VERY-THICK over LT Sideways
2-313-014	Thick 2: B4 or larger	100%	50 to 200%	1				VERY-THICK over B4
2-313-015	Thick 2: A4 (L) or larger	100%	50 to 200%	1				VERY-THICK over A5 Lengthwis
2-313-016	Thick 2: Less than A4 (L)	100%	50 to 200%	1				VERY-THICK under A5 Lengthw
2-314: PTB bias : Leading edge correction								Paper Trans Bias: Lead Edge
2-314-001	Normal: 1C	110%	50 to 200%	1	903	Corrects the paper transfer belt bias for the paper leading edge area for the type of paper and copy mode. The paper transfer belt bias times by the percentage selected in this SP mode is applied to the bias roller.	Basically, do not change the data since the suitable value is prefixed for some kinds of paper.	NRML 1C
2-314-002	Normal: 2C	110%	50 to 200%	1	903			NRML 2C
2-314-003	Normal: 3C	110%	50 to 200%	1	903			NRML 3C
2-314-004	Normal: 4C	110%	50 to 200%	1	903			NRML 4C
2-314-005	Thick 1: 1C	100%	50 to 200%	1	903			THICK 1C
2-314-006	Thick 1: 2C	100%	50 to 200%	1	903			THICK 2C
2-314-007	Thick 1: 3C	100%	50 to 200%	1	903			THICK 3C
2-314-008	Thick 1: 4C	100%	50 to 200%	1	903			THICK 4C
2-314-009	OHP: 1C	100%	50 to 200%	1	903			OHP 1C
2-314-010	OHP: 2C	100%	50 to 200%	1	903			OHP 2C
2-314-011	OHP: 3C	100%	50 to 200%	1	903			OHP 3C
2-314-012	OHP: 4C	100%	50 to 200%	1	903			OHP 4C

SP Mode No.	Item	Default Value	Value Range	Step	SP7	Description	Remarks	Description displayed on the screen
2-314-013	Thick 2: 1C	100%	50 to 200%	1	903			VERY-THICK 1C
2-314-014	Thick 2: 2C	100%	50 to 200%	1	903			VERY-THICK 2C
2-314-015	Thick 2: 3C	100%	50 to 200%	1	903			VERY-THICK 3C
2-314-016	Thick 2: 4C	100%	50 to 200%	1	903			VERY-THICK 4C
2-314-017	Normal: 2nd side: 1C	110%	50 to 200%	1	903			NRML Back 1C
2-314-018	Normal: 2nd side: 2C	110%	50 to 200%	1	903			NRML Back 2C
2-314-019	Normal: 2nd side: 3C	110%	50 to 200%	1	903			NRML Back 3C
2-314-020	Normal: 2nd side: 4C	110%	50 to 200%	1	903			NRML Back 4C
2-314-021	Thick 1: 2nd side: 1C	100%	50 to 200%	1	903			THICK Back 1C
2-314-022	Thick 1: 2nd side: 2C	100%	50 to 200%	1	903			THICK Back 2C
2-314-023	Thick 1: 2nd side: 3C	100%	50 to 200%	1	903			THICK Back 3C
2-314-024	Thick 1: 2nd side: 4C	100%	50 to 200%	1	903			THICK Back 4C
2-314-025	Thick 2: 2nd side: 1C	100%	50 to 200%	1	903			VERY-THICK Back 1C
2-314-026	Thick 2: 2nd side: 2C	100%	50 to 200%	1	903			VERY-THICK Back 2C
2-314-027	Thick 2: 2nd side: 3C	100%	50 to 200%	1	903			VERY-THICK Back 3C
2-314-028	Thick 2: 2nd side: 4C	100%	50 to 200%	1	903			VERY-THICK Back 4C
2-315: PTB bias : Trailing edge correction								Paper Trans Bias: Trail Edge
2-315-001	Normal: 1C	90%	50 to 200%	1	903	Corrects the paper transfer belt bias for the paper trailing edge area for the type of paper and copy mode. The paper transfer belt bias times by the percentage selected in this SP mode is applied to the bias roller.	Basically, do not change the data since the suitable value is prefixed for some kinds of paper.	NRML 1C
2-315-002	Normal: 2C	90%	50 to 200%	1	903			NRML 2C
2-315-003	Normal: 3C	90%	50 to 200%	1	903			NRML 3C
2-315-004	Normal: 4C	90%	50 to 200%	1	903			NRML 4C
2-315-005	Thick 1: 1C	100%	50 to 200%	1	903			THICK 1C
2-315-006	Thick 1: 2C	100%	50 to 200%	1	903			THICK 2C
2-315-007	Thick 1: 3C	100%	50 to 200%	1	903			THICK 3C
2-315-008	Thick 1: 4C	100%	50 to 200%	1	903			THICK 4C
2-315-009	OHP: 1C	100%	50 to 200%	1	903			OHP 1C
2-315-010	OHP: 2C	100%	50 to 200%	1	903			OHP 2C
2-315-011	OHP: 3C	100%	50 to 200%	1	903			OHP 3C
2-315-012	OHP: 4C	100%	50 to 200%	1	903			OHP 4C
2-315-013	Thick 2: 1C	100%	50 to 200%	1	903			VERY-THICK 1C
2-315-014	Thick 2: 2C	100%	50 to 200%	1	903			VERY-THICK 2C
2-315-015	Thick 2: 3C	100%	50 to 200%	1	903			VERY-THICK 3C
2-315-016	Thick 2: 4C	100%	50 to 200%	1	903			VERY-THICK 4C
2-315-017	Normal: 2nd side: 1C	90%	50 to 200%	1	903			NRML Back 1C
2-315-018	Normal: 2nd side: 2C	90%	50 to 200%	1	903			NRML Back 2C
2-315-019	Normal: 2nd side: 3C	90%	50 to 200%	1	903			NRML Back 3C
2-315-020	Normal: 2nd side: 4C	90%	50 to 200%	1	903			NRML Back 4C
2-315-021	Thick 1: 2nd side: 1C	100%	50 to 200%	1	903			THICK Back 1C
2-315-022	Thick 1: 2nd side: 2C	100%	50 to 200%	1	903			THICK Back 2C
2-315-023	Thick 1: 2nd side: 3C	100%	50 to 200%	1	903			THICK Back 3C
2-315-024	Thick 1: 2nd side: 4C	100%	50 to 200%	1	903			THICK Back 4C
2-315-025	Thick 2: 2nd side: 1C	100%	50 to 200%	1	903			VERY-THICK Back 1C
2-315-026	Thick 2: 2nd side: 2C	100%	50 to 200%	1	903			VERY-THICK Back 2C
2-315-027	Thick 2: 2nd side: 3C	100%	50 to 200%	1	903			VERY-THICK Back 3C
2-315-028	Thick 2: 2nd side: 4C	100%	50 to 200%	1	903			VERY-THICK Back 4C

SP Mode No.	Item	Default Value	Value Range	Step	SP7	Description	Remarks	Description displayed on the screen
2-316: PTB bias: Humidity correction								P.T.B. Correction:Humidity
2-316-001	LL: Normal : 1C	125%	50 to 200%	1		Corrects the paper transfer belt bias for the type of paper and copy mode depending on the humidity condition. The paper transfer belt bias times by the percentage selected in this SP mode is applied to the bias roller. LL: Very low humidity L : Low humidity H : High humidity HH: Very high humidity	Basically, do not change the data since the suitable value is prefixed for some kinds of paper.	Very-Low-Hum NRML 1C
2-316-002	LL: Normal: 4C	100%	50 to 200%	1				Very-Low-Hum NRML 4C
2-316-003	L: Normal: 1C	125%	50 to 200%	1				Low-Hum NRML 1C
2-316-004	L: Normal: 4C	100%	50 to 200%	1				Low-Hum NRML 4C
2-316-005	H: Normal: 1C	100%	50 to 200%	1				High-Hum NRML 1C
2-316-006	H: Normal: 4C	100%	50 to 200%	1				High-Hum NRML 4C
2-316-007	HH: Normal: 1C	100%	50 to 200%	1				Very-High-Hum NRML 1C
2-316-008	HH: Normal: 4C	100%	50 to 200%	1				Very-High-Hum NRML 4C
2-316-009	LL: Thick 1: 1C	100%	50 to 200%	1				Very-Low-Hum THICK 1C
2-316-010	LL: Thick 1: 4C	100%	50 to 200%	1				Very-Low-Hum THICK 4C
2-316-011	L: Thick 1: 1C	100%	50 to 200%	1				Low-Hum THICK 1C
2-316-012	L: Thick 1: 4C	100%	50 to 200%	1				Low-Hum THICK 4C
2-316-013	H: Thick 1: 1C	117%	50 to 200%	1				High-Hum THICK 1C
2-316-014	H: Thick 1: 4C	114%	50 to 200%	1				High-Hum THICK 4C
2-316-015	HH: Thick 1: 1C	114%	50 to 200%	1				Very-High-Hum THICK 1C
2-316-016	HH: Thick 1: 4C	114%	50 to 200%	1				Very-High-Hum THICK 4C
2-316-017	LL: OHP: 1C	114%	50 to 200%	1				Very-Low-Hum OHP 1C
2-316-018	LL: OHP: 4C	100%	50 to 200%	1				Very-Low-Hum OHP 4C
2-316-019	L: OHP: 1C	114%	50 to 200%	1				Low-Hum OHP 1C
2-316-020	L: OHP: 4C	100%	50 to 200%	1				Low-Hum OHP 4C
2-316-021	H: OHP: 1C	114%	50 to 200%	1				High-Hum OHP 1C
2-316-022	H: OHP: 4C	111%	50 to 200%	1				High-Hum OHP 4C
2-316-023	HH: OHP: 1C	114%	50 to 200%	1				Very-High-Hum OHP 1C
2-316-024	HH: OHP: 4C	111%	50 to 200%	1				Very-High-Hum OHP 4C
2-316-025	LL: Thick 2: 1C	100%	50 to 200%	1				Very-Low-Hum VERY-THICK 1C
2-316-026	LL: Thick 2: 4C	100%	50 to 200%	1				Very-Low-Hum VERY-THICK 4C
2-316-027	L: Thick 2: 1C	100%	50 to 200%	1				Low-Hum VERY-THICK 1C
2-316-028	L: Thick 2: 4C	100%	50 to 200%	1				Low-Hum VERY-THICK 4C
2-316-029	H: Thick 2: 1C	117%	50 to 200%	1				High-Hum VERY-THICK 1C
2-316-030	H: Thick 2: 4C	114%	50 to 200%	1				High-Hum VERY-THICK 4C
2-316-031	HH: Thick 2: 1C	117%	50 to 200%	1				Very-High-Hum VERY-THICK 1C
2-316-032	HH: Thick 2: 4C	114%	50 to 200%	1				Very-High-Hum VERY-THICK 4C
2-316-033	LL: Normal: 2nd side:1C	100%	50 to 200%	1				Very-Low-Hum NRML Back 1C
2-316-034	LL: Normal: 2nd side: 4C	110%	50 to 200%	1				Very-Low-Hum NRML Back 4C
2-316-035	L: Normal: 2nd side:1C	100%	50 to 200%	1				Low-Hum NRML Back 1C
2-316-036	L: Normal: 4C	110%	50 to 200%	1				Low-Hum NRML Back 4C
2-316-037	H: Normal: 2nd side:1C	100%	50 to 200%	1				High-Hum NRML Back 1C
2-316-038	H: Normal: 2nd side:4C	117%	50 to 200%	1				High-Hum NRML Back 4C
2-316-039	HH: Normal: 2nd side:: 1C	100%	50 to 200%	1				Very-High-Hum NRML Back 1C
2-316-040	HH: Normal : 2nd side: 4C	117%	50 to 200%	1				Very-High-Hum NRML Back 4C
2-316-041	LL: Thick 1: 2nd side: 1C	100%	50 to 200%	1				Very-Low-Hum THICK Back 1C
2-316-042	LL: Thick 1: 2nd side: 4C	88%	50 to 200%	1				Very-Low-Hum THICK Back 4C
2-316-043	L: Thick 1: 2nd side: 1C	100%	50 to 200%	1				Low-Hum THICK Back 1C
2-316-044	L: Thick 1: 2nd side: 4C	88%	50 to 200%	1				Low-Hum THICK Back 4C
2-316-045	H: Thick 1: 2nd side: 1C	117%	50 to 200%	1				High-Hum THICK Back 1C

SP Mode No.	Item	Default Value	Value Range	Step	SP7	Description	Remarks	Description displayed on the screen
2-316-046	H: Thick 1: 2nd side: 4C	100%	50 to 200%	1				High-Hum THICK Back 4C
2-316-047	HH: Thick 1: 2nd side: 1C	117%	50 to 200%	1				Very-High-Hum THICK Back 1C
2-316-048	HH: Thick 1: 2nd side: 4C	100%	50 to 200%	1				Very-High-Hum THICK Back 4C
2-316-049	LL: Thick 2: 2nd-side: 1C	100%	50 to 200%	1				V-Low-Hum V_THICK Back 1C
2-316-050	LL: Thick 2: 2nd-side: 4C	88%	50 to 200%	1				V-Low-Hum V_THICK Back 4C
2-316-051	L: Thick 2: 2nd-side: 1C	100%	50 to 200%	1				Low-Hum VERY THICK Back 1C
2-316-052	L: Thick 2: 2nd-side: 4C	88%	50 to 200%	1				Low-Hum VERY THICK Back 4C
2-316-053	H: Thick 2: 2nd-side: 1C	117%	50 to 200%	1				High-Hum VERY THICK Back 1C
2-316-054	H: Thick 2: 2nd-side: 4C	100%	50 to 200%	1				High-Hum VERY THICK Back 4C
2-316-055	HH: Thick 2: 2nd-side: 1C	117%	50 to 200%	1				V-High-Hum V_THICK Back 1C
2-316-056	HH: Thick 2: 2nd-side: 4C	100%	50 to 200%	1				V-High-Hum V_THICK Back 4C
2-402: Paper separation corona voltage adjustment : Image area								Paper separation charge
2-402-001	Normal: 1C	3000V	500 to 3000V	1		Adjusts the paper separation corona voltage for the different copy mode.	Basically, do not change the data since the suitable value is prefixed for some kinds of paper.	NRML 1C
2-402-002	Normal: 2C/3C/4C	3000V	500 to 3000V	1				NRML 4C
2-402-003	Thick 1: 1C	1000V	500 to 3000V	1				THICK 1C
2-402-004	Thick 1: 2C/3C/4C	1000V	500 to 3000V	1				THICK 4C
2-402-005	OHP: 1C	1000V	500 to 3000V	1				OHP 1C
2-402-006	OHP: 2C/3C/4C	1000V	500 to 3000V	1				OHP 4C
2-402-007	Thick 2: 1C	1000V	500 to 3000V	1				VERY-THICK 1C
2-402-008	Thick 2: 2C/3C/4C	1000V	500 to 3000V	1				VERY-THICK 4C
2-402-009	Normal: 2nd side: 1C	3000V	500 to 3000V	1				NRML Back 1C
2-402-010	Normal: 2nd side: 2C/3C/4C	3000V	500 to 3000V	1				NRML Back 4C
2-402-011	Thick 1: 2nd side: 1C	1000V	500 to 3000V	1				THICK Back 1C
2-402-012	Thick 1: 2nd side: 2C/3C/4C	1000V	500 to 3000V	1				THICK Back 4C
2-402-013	Thick 2: 2nd side: 1C	1000V	500 to 3000V	1				VERY-THICK Back 1C
2-402-014	Thick 2: 2nd side: 2C/3C/4C	1000V	500 to 3000V	1				VERY-THICK Back 4C
2-403: Paper separation corona voltage adjustment: Leading edge								Paper Sep. CH Current: Leading
2-403-001	Normal	100%	50 to 200%	1		Adjusts the paper separation corona voltage for the paper leading edge. The voltage of the image area times by the percentage selected in this mode is applied.	Basically, do not change the data since the suitable value is prefixed for some kinds of paper.	NRML
2-403-002	Thick 1	100%	50 to 200%	1				THICK
2-403-003	OHP	100%	50 to 200%	1				OHP
2-403-004	Thick 2	100%	50 to 200%	1				VERY-THICK
2-403-005	2nd side: Normal	100%	50 to 200%	1				NRML Back
2-403-006	2nd side: Thick 1	100%	50 to 200%	1				THICK Back
2-403-007	2nd side: Thick 2	100%	50 to 200%	1				VERY-THICK Back
2-404: Paper Separation Corona Voltage: Humidity correction								Paper Sep. CH Current: Humidit
2-404-001	LL: Normal: 1C	100%	50 to 200%	1		Corrects the paper separation corona voltage for each humidity condition and copy mode. LL: Very low humidity L : Low humidity H : High humidity HH: Very high humidity	Basically, do not change the data since the suitable value is prefixed for some kinds of paper.	Very-Low-Hum NRML 1C
2-404-002	LL: Normal: 4C	100%	50 to 200%	1				Very-Low-Hum NRML 4C
2-404-003	L: Normal: 1C	100%	50 to 200%	1				Low-Hum NRML 1C
2-404-004	L: Normal: 4C	100%	50 to 200%	1				Low-Hum NRML 4C
2-404-005	H: Normal: 1C	100%	50 to 200%	1				High-Hum NRML 1C
2-404-006	H: Normal: 4C	100%	50 to 200%	1				High-Hum NRML 4C
2-404-007	HH: Normal: 1C	100%	50 to 200%	1				Very-High-Hum NRML 1C
2-404-008	HH: Normal: 4C	100%	50 to 200%	1				Very-High-Hum NRML 4C

SP Mode No.	Item	Default Value	Value Range	Step	SP7	Description	Remarks	Description displayed on the screen
2-404-009	LL: Thick 1: 1C	100%	50 to 200%	1				Very-Low-Hum THICK 1C
2-404-010	LL: Thick 1: 4C	100%	50 to 200%	1				Very-Low-Hum THICK 4C
2-404-011	L: Thick 1: 1C	100%	50 to 200%	1				Low-Hum THICK 1C
2-404-012	L: Thick 1: 4C	100%	50 to 200%	1				Low-Hum THICK 4C
2-404-013	H: Thick 1: 1C	100%	50 to 200%	1				High-Hum THICK 1C
2-404-014	H: Thick 1: 4C	100%	50 to 200%	1				High-Hum THICK 4C
2-404-015	HH: Thick 1: 1C	100%	50 to 200%	1				Very-High-Hum THICK 1C
2-404-016	HH: Thick 1: 4C	100%	50 to 200%	1				Very-High-Hum THICK 4C
2-404-017	LL: OHP: 1C	100%	50 to 200%	1				Very-Low-Hum OHP 1C
2-404-018	LL: OHP: 4C	100%	50 to 200%	1				Very-Low-Hum OHP 4C
2-404-019	L: OHP: 1C	100%	50 to 200%	1				Low-Hum OHP 1C
2-404-020	L: OHP: 4C	100%	50 to 200%	1				Low-Hum OHP 4C
2-404-021	H: OHP: 1C	100%	50 to 200%	1				High-Hum OHP 1C
2-404-022	H: OHP: 4C	100%	50 to 200%	1				High-Hum OHP 4C
2-404-023	HH: OHP: 1C	100%	50 to 200%	1				Very-High-Hum OHP 1C
2-404-024	HH: OHP: 4C	100%	50 to 200%	1				Very-High-Hum OHP 4C
2-404-025	LL: Thick 2: 1C	100%	50 to 200%	1				Very-Low-Hum VERY-THICK 1C
2-404-026	LL: Thick 2: 4C	100%	50 to 200%	1				Very-Low-Hum VERY-THICK 4C
2-404-027	L: Thick 2: 1C	100%	50 to 200%	1				Low-Hum VERY-THICK 1C
2-404-028	L: Thick 2: 4C	100%	50 to 200%	1				Low-Hum VERY-THICK 4C
2-404-029	H: Thick 2: 1C	100%	50 to 200%	1				High-Hum VERY-THICK 1C
2-404-030	H: Thick 2: 4C	100%	50 to 200%	1				High-Hum VERY-THICK 4C
2-404-031	HH: Thick 2: 1C	100%	50 to 200%	1				Very-High-Hum VERY-THICK 1C
2-404-032	HH: Thick 2: 4C	100%	50 to 200%	1				Very-High-Hum VERY-THICK 4C
2-404-033	LL: Normal: 2nd side: 1C	100%	50 to 200%	1				Very-Low-Hum NRML Back 1C
2-404-034	LL: Normal: 2nd side: 4C	100%	50 to 200%	1				Very-Low-Hum NRML Back 4C
2-404-035	L: Normal: 2nd side: 1C	100%	50 to 200%	1				Low-Hum NRML Back 1C
2-404-036	L: Normal: 2nd side: 4C	100%	50 to 200%	1				Low-Hum NRML Back 4C
2-404-037	H: Normal: 2nd side: 1C	100%	50 to 200%	1				High-Hum NRML Back 1C
2-404-038	H: Normal: 2nd side: 4C	100%	50 to 200%	1				High-Hum NRML Back 4C
2-404-039	HH: Normal: 2nd side: 1C	100%	50 to 200%	1				Very-High-Hum NRML Back 1C
2-404-040	HH: Normal: 2nd side: 4C	100%	50 to 200%	1				Very-High-Hum NRML Back 4C
2-404-041	LL: Thick 1: 2nd side: 1C	100%	50 to 200%	1				Very-Low-Hum THICK Back 1C
2-404-042	LL: Thick 1 : 2nd side: 4C	100%	50 to 200%	1				Very-Low-Hum THICK Back 4C
2-404-043	L: Thick 1: 2nd side: 1C	100%	50 to 200%	1				Low-Hum THICK Back 1C
2-404-044	L: Thick 1: 2nd side: 4C	100%	50 to 200%	1				Low-Hum THICK Back 4C
2-404-045	H: Thick 1: 2nd side: 1C	100%	50 to 200%	1				High-Hum THICK Back 1C
2-404-046	H: Thick 1: 2nd side: 4C	100%	50 to 200%	1				High-Hum THICK Back 4C
2-404-047	HH: Thick 1: 2nd side: 1C	100%	50 to 200%	1				Very-High-Hum THICK Back 1C
2-404-048	HH: Thick 1: 2nd side: 4C	100%	50 to 200%	1				Very-High-Hum THICK Back 4C
2-404-049	LL: Thick 2: 2nd side: 1C	100%	50 to 200%	1				V-Low-Hum V-THICK Back 1C
2-404-050	LL: Thick 2: 2nd side: 4C	100%	50 to 200%	1				V-Low-Hum V-THICK Back 4C
2-404-051	L: Thick 2: 2nd side: 1C	100%	50 to 200%	1				Low-Hum VERY-THICK Back 1C
2-404-052	L: Thick 2: 2nd side: 4C	100%	50 to 200%	1				Low-Hum VERY-THICK Back 4C
2-404-053	H: Thick 2: 2nd side: 1C	100%	50 to 200%	1				High-Hum VERY-THICK Back 1C
2-404-054	H: Thick 2: 2nd side: 4C	100%	50 to 200%	1				High-Hum VERY-THICK Back 4C

SP Mode No.	Item	Default Value	Value Range	Step	SP7	Description	Remarks	Description displayed on the screen
2-404-055	HH: Thick 2: 2nd side: 1C	100%	50 to 200%	1				V-High-Hum V-THICK Back 1C
2-404-056	HH: Thick 2: 2nd side: 4C	100%	50 to 200%	1				V-High-Hum V-THICK Back 4C
2-405: Paper separation corona voltage: AC Component ON/OFF								Paper Separation CH correction
2-405-001	Normal-Normal: 1C	1	0 or 1	1		Switches the paper separation corona ON or OFF for each mode. 0 = OFF 1 = ON	Basically, do not change the data since the suitable value is prefixed for some kinds of paper.	NRML NRML 1C
2-405-002	Normal-Normal: 4C	1	0 or 1	1				NRML NRML 4C
2-405-003	Normal-Thick 1: 1C	1	0 or 1	1				NRML THICK 1C
2-405-004	Normal -Thick 1: 4C	1	0 or 1	1				NRML THICK4C
2-405-005	Normal-OHP: 1C	1	0 or 1	1				NRML OHP 1C
2-405-006	Normal-OHP: 4C	1	0 or 1	1				NRML OHP 4C
2-405-007	Normal-Thick 2: 1C	1	0 or 1	1				NRML V_THCIK 1C
2-405-008	Normal-Thick2: 4C	1	0 or 1	1				NRML V_THCIK 4C
2-405-009	Normal-Normal: 2nd side: 1C	1	0 or 1	1				NRML B_NRML 1C
2-405-010	Normal-Normal: 2nd side: 4C	1	0 or 1	1				NRML B_NRML 4C
2-405-011	Normal-Thick 1: 2nd side: 1C	1	0 or 1	1				NRML B_THICK 1C
2-405-012	Normal-Thick 1: 2nd side: 4C	1	0 or 1	1				NRML B_THICK 4C
2-405-013	Normal-Thick 2: 2nd side: 1C	1	0 or 1	1				NRML B_V_THICK 1C
2-405-014	Normal-Thick 2: 2nd side: 4C	1	0 or 1	1				NRML B_V_THICK 4C
2-405-015	L-L: Normal: 1C	1	0 or 1	1				LL NRML 1C
2-405-016	L-L: Normal: 4C	1	0 or 1	1				LL NRML 4C
2-405-017	L-L: Thick 1: 1C	1	0 or 1	1				LL THICK 1C
2-405-018	L-L: Thick 1: 4C	1	0 or 1	1				LL THICK4C
2-405-019	L-L: OHP: 1C	1	0 or 1	1				LL OHP 1C
2-405-020	L-L: OHP: 4C	1	0 or 1	1				LL OHP 4C
2-405-021	L-L: Thick 2: 1C	1	0 or 1	1				LL V_THCIK 1C
2-405-022	L-L: Thick 2: 4C	1	0 or 1	1				LL V_THCIK 4C
2-405-023	L-L: Normal: 2nd side: 1C	1	0 or 1	1				LL B_NRML 1C
2-405-024	L-L: Normal: 2nd side: 4C	1	0 or 1	1				LL B_NRML 4C
2-405-025	L-L: Thick 1: 2nd side: 1C	1	0 or 1	1				LL B_THICK 1C
2-405-026	L-L: Thick 1: 2nd side: 4C	1	0 or 1	1				LL B_THICK 4C
2-405-027	L-L: Thick 2: 2nd side: 1C	1	0 or 1	1				LL B_V_THICK 1C
2-405-028	L-L: Thick 2: 2nd side: 4C	1	0 or 1	1				LL B_V_THICK 4C
2-405-029	L: Normal: 1C	1	0 or 1	1				L NRML 1C
2-405-030	L: Normal: 4C	1	0 or 1	1				L NRML 4C
2-405-031	L: Thick 1: 1C	1	0 or 1	1				L THICK 1C
2-405-032	L: Thick 1: 4C	1	0 or 1	1				L THICK4C
2-405-033	L: OHP: 1C	1	0 or 1	1				L OHP 1C
2-405-034	L: OHP: 4C	1	0 or 1	1				L OHP 4C
2-405-035	L: Thick 2: 1C	1	0 or 1	1				L V_THCIK 1C
2-405-036	L: Thick 2: 4C	1	0 or 1	1				L V_THCIK 4C
2-405-037	L: Normal: 2nd side: 1C	1	0 or 1	1				L B_NRML 1C
2-405-038	L: Normal: 2nd side: 4C	1	0 or 1	1				L B_NRML 4C
2-405-039	L: Thick 1: 2nd side: 1C	1	0 or 1	1				L B_THICK 1C
2-405-040	L: Thick 1: 2nd side: 4C	1	0 or 1	1				L B_THICK 4C
2-405-041	L: Thick 2: 2nd side: 1C	1	0 or 1	1				L B_V_THICK 1C
2-405-042	L: Thick 2: 2nd side: 4C	1	0 or 1	1				L B_V_THICK 4C

SP Mode No.	Item	Default Value	Value Range	Step	SP7	Description	Remarks	Description displayed on the screen
2-405-043	H: Normal: 1C	0	0 or 1	1				H NRML 1C
2-405-044	H: Normal: 4C	0	0 or 1	1				H NRML 4C
2-405-045	H: Thick 1: 1C	0	0 or 1	1				H THICK 1C
2-405-046	H: Thick 1: 4C	0	0 or 1	1				H THICK 4C
2-405-047	H: OHP: 1C	0	0 or 1	1				H OHP 1C
2-405-048	H: OHP: 4C	0	0 or 1	1				H OHP 4C
2-405-049	H: Thick 2: 1C	0	0 or 1	1				H V_THCIK 1C
2-405-050	H: Thick 2: 4C	0	0 or 1	1				H V_THCIK 4C
2-405-051	H: Normal: 2nd side: 1C	0	0 or 1	1				H B_NRML 1C
2-405-052	H: Normal: 2nd side: 4C	0	0 or 1	1				H B_NRML 4C
2-405-053	H: Thick 1: 2nd side: 1C	0	0 or 1	1				H B_THICK 1C
2-405-054	H: Thick 1: 2nd side: 4C	0	0 or 1	1				H B_THICK 4C
2-405-055	H: Thick 2: 2nd side: 1C	0	0 or 1	1				H B_V_THICK 1C
2-405-056	H: Thick 2: 2nd side: 4C	0	0 or 1	1				H B_V_THICK 4C
2-405-057	H-H: Normal: 1C	0	0 or 1	1				HH NRML 1C
2-405-058	H-H: Normal: 4C	0	0 or 1	1				HH NRML 4C
2-405-059	H-H: Thick 1: 1C	0	0 or 1	1				HH THICK 1C
2-405-060	H-H: Thick 1: 4C	0	0 or 1	1				HH THICK 4C
2-405-061	H-H: OHP: 1C	0	0 or 1	1				HH OHP 1C
2-405-062	H-H: OHP: 4C	0	0 or 1	1				HH OHP 4C
2-405-063	H-H: Thick 2: 1C	0	0 or 1	1				HH V_THCIK 1C
2-405-064	H-H: Thick 2: 4C	0	0 or 1	1				HH V_THCIK 4C
2-405-065	H-H: Normal: 2nd side: 1C	0	0 or 1	1				HH B_NRML 1C
2-405-066	H-H: Normal: 2nd side: 4C	0	0 or 1	1				HH B_NRML 4C
2-405-067	H-H: Thick 1: 2nd side: 1C	0	0 or 1	1				HH B_THICK 1C
2-405-068	H-H: Thick 1: 2nd side: 4C	0	0 or 1	1				HH B_THICK 4C
2-405-069	H-H: Thick 2: 2nd side: 1C	0	0 or 1	1				HH B_V_THICK 1C
2-405-070	H-H: Thick 2: 2nd side: 4C	0	0 or 1	1				HH B_V_THICK 4C
2-601: ITB lubricant brush bias adjustment: After image development								Transfer Belt Discharge: DC
2-601-001	Normal speed: 1C	50V	0 to 1000V	1		Adjusts the image transfer belt lubricant brush bias after the image development is completed, for each speed in 1C, 2C, or 4C mode.	Basically, do not change the data since the suitable value is prefixed for some kinds of paper.	SPEED_STD 1C
2-601-002	Normal speed: 2C	50V	0 to 1000V	1				SPEED_STD 2C
2-601-003	Normal speed: 4C	50V	0 to 1000V	1				SPEED_STD 4C
2-601-004	Half speed: 1C	50V	0 to 1000V	1				SPEED_HALF 1C
2-601-005	Half speed: 2C	50V	0 to 1000V	1				SPEED_HALF 2C
2-601-006	Half speed: 4C	50V	0 to 1000V	1				SPEED_HALF 4C
2-601-007	Normal speed: Others	100V	0 to 1000V	1				SPEED_STD other
2-601-008	Half speed: Others	100V	0 to 1000V	1				SPEED_HALF other
2-601-009	Normal speed: LL: 1C	0V	-500 to 500V	1		Shifts the image transfer belt lubricant brush bias set at SP 2-601-001 to 008 in each environment condition. LL = Low temperature and low humidity condition HH = High temperature and high humidity condition		ENV_LL_SPEED_STD 1C
2-601-010	Normal speed: LL: 2C	0V	-500 to 500V	1				ENV_LL_SPEED_STD 2C
2-601-011	Normal speed: LL: 4C	250V	-500 to 500V	1				ENV_LL_SPEED_STD 4C
2-601-012	Half speed: LL: 1C	0V	-500 to 500V	1				EBV_LL_SPEED_HALF 1C
2-601-013	Half speed: LL: 2C	0V	-500 to 500V	1				EBV_LL_SPEED_HALF 2C
2-601-014	Half speed: LL: 4C	250V	-500 to 500V	1				EBV_LL_SPEED_HALF 4C
2-601-015	Normal speed: LL: Others	50V	-500 to 500V	1				ENV_LL_SPEED_STD other
2-601-016	Half speed: LL: Others	50V	-500 to 500V	1				ENV_LL_SPEED_HALF other

SP Mode No.	Item	Default Value	Value Range	Step	SP7	Description	Remarks	Description displayed on the screen
2-601-017	Normal speed: HH: 1C	0V	-500 to 500V	1				ENV_HH_SPEED_STD 1C
2-601-018	Normal speed: HH: 2C	0V	-500 to 500V	1				ENV_HH_SPEED_STD 2C
2-601-019	Normal speed: HH: 4C	0V	-500 to 500V	1				ENV_HH_SPEED_STD 4C
2-601-020	Half speed: HH: 1C	0V	-500 to 500V	1				ENV_HH_SPEED_HALF 1C
2-601-021	Half speed: HH: 2C	0V	-500 to 500V	1				ENV_HH_SPEED_HALF 2C
2-601-022	Half speed: HH: 4C	0V	-500 to 500V	1				ENV_HH_SPEED_HALF 4C
2-601-023	Normal speed: HH: Others	0V	-500 to 500V	1				ENV_HH_SPEED_STD other
2-601-024	Half speed: HH: Others	0V	-500 to 500V	1				ENV_HH_SPEED_HALF other
2-601-025	Lubricant brush (Belt cleaning	100V	0 to 1000V	1				Q1_Brush CLN
2-603: PTB discharge corona voltage adjustment								Belt Discharge Bias
2-603-001	Normal: 1C	900V	100 to 1500V	1		Adjusts the paper separation belt discharge corona voltage for the type of paper and copy mode. Non transfer area: The different voltage is applied to the discharge corona after the trailing edge of paper passes it until next sheet of paper comes.	Basically, do not change the data since the suitable value is prefixed for some kinds of paper.	NRML 1C
2-603-002	Normal: 2C	1100V	100 to 1500V	1				NRML 2C
2-603-003	Normal: 3C	1100V	100 to 1500V	1				NRML 3C
2-603-004	Normal: 4C	1100V	100 to 1500V	1				NRML 4C
2-603-005	Normal: Non transfer area	800V	100 to 1500V	1				NRML Not-Trns
2-603-006	Thick 1: 1C	900V	100 to 1500V	1				THICK 1C
2-603-007	Thick 1: 2C	1100V	100 to 1500V	1				THICK 2C
2-603-008	Thick 1: 3C	1100V	100 to 1500V	1				THICK 3C
2-603-009	Thick 1: 4C	1100V	100 to 1500V	1				THICK 4C
2-603-010	Thick 1: Non transfer area	800V	100 to 1500V	1				THICK Not-Trns
2-603-011	OHP: 1C	900V	100 to 1500V	1				OHP 1C
2-603-012	OHP: 2C	1100V	100 to 1500V	1				OHP 2C
2-603-013	OHP: 3C	1100V	100 to 1500V	1				OHP 3C
2-603-014	OHP: 4C	1100V	100 to 1500V	1				OHP 4C
2-603-015	OHP: Non transfer area	800V	100 to 1500V	1				OHP Not-Trns
2-603-016	Thick 2: 1C	900V	100 to 1500V	1				VERY-THICK 1C
2-603-017	Thick 2: 2C	1100V	100 to 1500V	1				VERY-THICK 2C
2-603-018	Thick 2: 3C	1100V	100 to 1500V	1				VERY-THICK 3C
2-603-019	Thick 2: 4C	1100V	100 to 1500V	1				VERY-THICK 4C
2-603-020	Thick 2: Non transfer area	800V	100 to 1500V	1				VERY-THICK Not-Trns
2-603-021	Lubricant brush (Belt cleaning	1100V	100 to 1500V	1				Q1_Brush CLN
2-604: PTB discharge corona voltage: Humidity correction								Belt Discharge Bias Correction
2-604-001	LL: Normal: 1C	100%	50 to 200%	1		Adjusts the paper transfer belt discharge corona voltage for each humidity condition and copy mode. LL: Very low humidity L : Low humidity H : High humidity HH: Very high humidity	Basically, do not change the data since the suitable value is prefixed for some kinds of paper.	Very-Low-Hum NRML 1C
2-604-002	LL: Normal: 4C	100%	50 to 200%	1				Very-Low-Hum NRML 4C
2-604-003	L: Normal: 1C	100%	50 to 200%	1				Low-Hum NRML 1C
2-604-004	L: Normal: 4C	100%	50 to 200%	1				Low-Hum NRML 4C
2-604-005	H: Normal: 1C	100%	50 to 200%	1				High-Hum NRML 1C
2-604-006	H: Normal: 4C	100%	50 to 200%	1				High-Hum NRML 4C
2-604-007	HH: Normal: 1C	100%	50 to 200%	1				Very-High-Hum NRML 1C
2-604-008	HH: Normal: 4C	100%	50 to 200%	1				Very-High-Hum NRML 4C
2-604-009	LL: Thick 1: 1C	100%	50 to 200%	1				Very-Low-Hum THICK 1C
2-604-010	LL: Thick 1: 4C	100%	50 to 200%	1				Very-Low-Hum THICK 4C
2-604-011	L: Thick 1: 1C	100%	50 to 200%	1				Low-Hum THICK 1C
2-604-012	L: Thick 1: 4C	100%	50 to 200%	1				Low-Hum THICK 4C

SP Mode No.	Item	Default Value	Value Range	Step	SP7	Description	Remarks	Description displayed on the screen
2-604-013	H: Thick 1: 1C	100%	50 to 200%	1				High-Hum THICK 1C
2-604-014	H: Thick 1: 4C	100%	50 to 200%	1				High-Hum THICK 4C
2-604-015	HH: Thick 1: 1C	100%	50 to 200%	1				Very-High-Hum THICK 1C
2-604-016	HH: Thick 1: 4C	100%	50 to 200%	1				Very-High-Hum THICK 4C
2-604-017	LL: OHP: 1C	100%	50 to 200%	1				Very-Low-Hum OHP 1C
2-604-018	LL: OHP: 4C	100%	50 to 200%	1				Very-Low-Hum OHP 4C
2-604-019	L: OHP: 1C	100%	50 to 200%	1				Low-Hum OHP 1C
2-604-020	L: OHP: 4C	100%	50 to 200%	1				Low-Hum OHP 4C
2-604-021	H: OHP: 1C	100%	50 to 200%	1				High-Hum OHP 1C
2-604-022	H: OHP: 4C	100%	50 to 200%	1				High-Hum OHP 4C
2-604-023	HH: OHP: 1C	100%	50 to 200%	1				Very-High-Hum OHP 1C
2-604-024	HH: OHP: 4C	100%	50 to 200%	1				Very-High-Hum OHP 4C
2-604-025	LL: Thick 2: 1C	100%	50 to 200%	1				Very-Low-Hum VERY-THICK 1C
2-604-026	LL: Thick 2: 4C	100%	50 to 200%	1				Very-Low-Hum VERY-THICK 4C
2-604-027	L: Thick 2: 1C	100%	50 to 200%	1				Low-Hum VERY-THICK 1C
2-604-028	L: Thick 2: 4C	100%	50 to 200%	1				Low-Hum VERY-THICK 4C
2-604-029	H: Thick 2: 1C	100%	50 to 200%	1				High-Hum VERY-THICK 1C
2-604-030	H: Thick 2: 4C	100%	50 to 200%	1				High-Hum VERY-THICK 4C
2-604-031	HH: Thick 2: 1C	100%	50 to 200%	1				Very-High-Hum VERY-THICK 1C
2-604-032	HH: Thick 2: 4C	100%	50 to 200%	1				Very-High-Hum VERY-THICK 4C
2-802-000	Charge wire/grid cleaner					Starts charge wire/grid cleaning. Press the ON key to perform the wire cleaning.		Forced Charge cleaning
2-803: Charge wire/grid cleaner								Auto Charge cleaner setting
2-803-001	Start timing	1	0 or 1	1		Starts charge wire/grid cleaning after the main switch or operation switch is turned on and if the hot roller temperature is less than 100 ºC. 0 = OFF 1 = ON		CHClnMode 0:OFF, 1:ON
2-803-002	Counter setting	0	0 - 80K	1K		Sets the counter to start charge wire/grid cleaning after a copy job is finished when it reaches to the number of development cycles set in this SP. 0 = Disable the function		ClntvCHCln
2-803-003	Time setting	0	0 to 999	1H		Sets the time to start charge wire/grid cleaning. When the time set in this SP mode passes after the main switch is turned on, the charge wire cleaning starts after a copy job is finished. 0 = Disable the function		tIntvCHCln
2-912: Environment display								Temperature Display
2-912-001	Temperature		°C		903	Displays temperature detected.	V = 0.050 x [oC]	temperature

SP Mode No.	Item	Default Value	Value Range	Step	SP7	Description	Remarks	Description displayed on the screen
2-912-002	Relative humidity		%		903	Displays relative humidify detected.	V = 0.025 x [RH%]	humidity
2-913-000	Toner overflow detection setting	1	0 or 1	1	903	Sets the toner overflow sensor to be functioning or not. 0 = OFF 1 = ON		Toner Overflow Sensor 1: Sensor On, 0: Sensor Off
2-951-000	Toner end detection setting	0	0 or 1	1		Sets the toner end sensors of all color to be functioning. 0 = ON 1 = OFF **NOTE:** Make sure that the data is set back to the default when it is set OFF temporary at servicing.		Toner End Detection 0: Detection, 1: No detection
2-953: Maximum toner supply ratio adjustment								Max Toner Recovery Ratio
2-953-001	K	100%	0 to 100%	1	903	Adjusts the maximum toner supply ratio (upper limit) in the continuous supply mode.		MaxRtoBkTnAdd
2-953-002	CMY	100%	0 to 100%	1	903			MaxRtoClTnAdd
								Toner End Detection Count
2-955-000	Toner end: Counting method	0	0 or 1	1		Selects the method to count the number of copies which can be made between toner near-end and toner end. 0 = both the counting methods by monitoring image coverage ratio (number of pixel) and number of copies. 1 = number of copies	0 = 10 copies can be made at least. Toner end timing depends on image coverage. 1 = 10 copies	0: pixel and sheet, 1: Sheet

3. PROCESS CONTROL

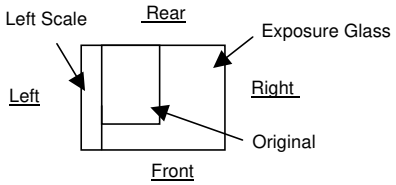
3-005: TD sensor initialization								TD Sensor Initialization
3-005-001	K					Does Vref adjustment. **NOTE:** Do not make a copy with new developer before the initial setting. This mode is required when the developer or TD sensor is replaced. Press the ON key to start.	**Screen - E**	K
3-005-002	C							C
3-005-003	M							M
3-005-004	Y							Y
3-005-005	All color							All Color

SP Mode No.	Item	Default Value	Value Range	Step	SP7	Description	Remarks	Description displayed on the screen
3-005-006	Toner density initial setting result		0 to 999	1		Displays the result of toner density initial setting. 1 = success others = error (Refer to the troubleshooting)		Result
3-006:TD sensor: Vcnt (gain) setting								Toner density sensor Gain
3-006-001	K	128	0 to 255	1	903	Adjusts the TD sensor gain data.	**Do not touch in the field.**	VcontRef[TN_K]
3-006-002	C	128	0 to 255	1	903			VcontRef[TN_C]
3-006-003	M	128	0 to 255	1	903			VcontRef[TN_M]
3-006-004	Y	128	0 to 255	1	903			VcontRef[TN_Y]
3-007: TD sensor output display								Toner density sensor output
3-007-001	K		V	0.01		Displays the output from the TD sensor.		Vt[TN_K]
3-007-002	C		V	0.01				Vt[TN_C]
3-007-003	M		V	0.01				Vt[TN_M]
3-007-004	Y		V	0.01				Vt[TN_Y]
3-103: VSP display								VSP Display
3-103-001	K		V	0.01	903	Displays VSP of the ID sensor pattern developed.		K
3-103-002	C		V	0.01	903			C
3-103-003	M		V	0.01	903			M
3-103-004	Y		V	0.01	903			Y
3-107: ID sensor output display: Bare drum								VSG Display
3-107-001	VSG: K		V	0.01	903	Displays VSG measured on the bare drum.		K
3-107-002	VSP: Color		V	0.01	903			Color
3-111-000	Residual voltage display		V	1	903	Displays the residual voltage. The drum is charged at certain potential and exposed by full power of laser. The remained voltage (residual voltage) on the drum is used for process control.		Residual Voltage Vr
3-121: Development Gamma								Development Gamma
3-121-001	K			1	903	Displays the development gamma.		DevGam [TN_K]
3-121-002	C			1	903			DevGam [TN_C]
3-121-003	M			1	903			DevGam [TN_M]
3-121-004	Y			1	903			DevGam [TN_Y]

SP Mode No.	Item	Default Value	Value Range	Step	SP7	Description	Remarks	Description displayed on the screen
3-122: VK								Vk
3-122-001	K		V	1	903	Displays the Vk.		K
3-122-002	C		V	1	903			C
3-122-003	M		V	1	903			M
3-122-004	Y		V	1	903			Y
								Potential Control
3-125-000	Process control method	0	0 or 1	1	903	Sets the process control ON or OFF. 0 = ON 1 = OFF	**Do not touch in the field.**	Potenticl Control 0: AUTO, 1: FIX
3-126-000	Forced Self-check		0 to 1	1		Performs the forced self-check. Press the ON key to start.	**Screen - E**	Forced P-Ctrl Self Chk
3-127: Process control gamma: Toner Max. M/A adjustment								P-control gamma target
3-127-001	K	0.7mg/cm2	0.5 to 1.5mg/cm2	0.001		Adjusts the target of the maximum toner M/A used for the process control self check.	**Do not touch in the field.**	Max M/A: K
3-127-002	Color	0.7mg/cm2	0.5 to 1.5mg/cm2	0.001				Max: M/A: Color
3-128-00	Toner density automatic adjustment	0	0 or 1	1		Sets the toner density automatic adjustment ON or OFF. If it is ON, the toner density is automatically adjusted during the forced or initial automatic process control. 0 = ON 1 = OFF	**Do not touch in the field.**	Toner Density Auto Control 0: ON, 1: OFF
3-129: ID sensor pattern: Toner M/A adjustment								ID sensor Pattern Target
3-129-001	Target: K	0.3mg/cm2	0.1 to 1.5 mg/cm2	0.001		Adjusts the target toner M/A for the ID sensor pattern.	**Do not touch in the field.**	M/Aref: K
3-129-002	Target: Color	0.7mg/cm2	0.1 to 1.5 mg/cm2	0.001				M/Aref: Color
3-129-003	Correction: K	0.000	-0.100 to 0.100	0.001		Sets the correction value for the target set in 3-129-001 or 002.		M/Aref correction: K
3-129-004	Correction: Color	0.000	-0.100 to 0.100	0.001				M/Aref correction: Color
3-902: Selected pointer table display								Pointer Table No
3-902-001	K		1 to 20	1	903	Displays the pointer table of VD, VB, VL selected during the self-check.		K
3-902-002	C		1 to 20	1	903			C
3-902-003	M		1 to 20	1	903			M
3-902-004	Y		1 to 20	1	903			Y

SP Mode No.	Item	Default Value	Value Range	Step	SP7	Description	Remarks	Description displayed on the screen
3-907: ID sensor pattern: Toner M/A Actual (current) data display								ID Sensor Pattern M/A Display
3-907-01	K		mg/cm2	0.001	903	Displays the actual (current) toner M/A.		K
3-907-02	C		mg/cm2	0.001	903			C
3-907-03	M		mg/cm2	0.001	903			M
3-907-04	Y		mg/cm2	0.001	903			Y
3-940: Vcnt: Correction steps								TS Gain
3-940-001	K	0	0 to 255	1		Adjusts the correction steps for the Vcnt (gain).	**Do not touch in the field.**	VcontShift[TN_K]
3-940-002	C	0	0 to 255	1				VcontShift[TN_C]
3-940-003	M	0	0 to 255	1				VcontShift[TN_M]
3-940-004	Y	0	0 to 255	1				VcontShift[TN_Y]
3-941: Vcnt: Lower limit								TS Gain
3-941-001	K	-20	-128 to 0	1		Sets the lower limit of the shift range of Vcnt (gain).	**Do not touch in the field.**	VcontMin[TN_K]
3-941-002	C	-20	-128 to 0	1				VcontMin[TN_C]
3-941-003	M	-20	-128 to 0	1				VcontMin[TN_M]
3-941-004	Y	-20	-128 to 0	1				VcontMin[TN_Y]
3-942: Vcnt: Upper limit								TS Gain
3-942-001	K	20	0 to 128	1		Sets the upper limit of the shift range of Vcnt (gain).	**Do not touch in the field.**	VcontMax[TN_K]
3-942-002	C	20	0 to 128	1				VcontMax[TN_C]
3-942-003	M	20	0 to 128	1				VcontMax[TN_M]
3-942-004	Y	20	0 to 128	1				VcontMax[TN_Y]
3-944: Vcnt: Display								TS Gain
3-944-001	K		0 to 255	1	903	Displays the Vcnt (gain) data.		Vcont[TN_K]
3-944-002	C		0 to 255	1	903			Vcont[TN_C]
3-944-003	M		0 to 255	1	903			Vcont[TN_M]
3-944-004	Y		0 to 255	1	903			Vcont[TN_Y]
3-946: Vref: Correction steps (V)								TS Control
3-946-001	K	0.05	0.00 to 5.00	0.01	903	Adjusts the correction steps of Vref.	**Do not touch in the field.**	VtRefShift[TN_K]
3-946-002	C	0.05	0.00 to 5.00	0.01	903			VtRefShift[TN_C]
3-946-003	M	0.05	0.00 to 5.00	0.01	903			VtRefShift[TN_M]
3-946-004	Y	0.05	0.00 to 5.00	0.01	903			VtRefShift[TN_Y]
3-947: Vref: Lower limit								TS Control
3-947-001	K	1.00	0.00 to 5.00	0.01		Sets the lower limit of the shift range of Vref.	**Do not touch in the field.**	VtRefMin[TN_K]
3-947-002	C	1.00	0.00 to 5.00	0.01				VtRefMin[TN_C]
3-947-003	M	1.00	0.00 to 5.00	0.01				VtRefMin[TN_M]
3-947-004	Y	1.00	0.00 to 5.00	0.01				VtRefMin[TN_Y]

SP Mode No.	Item	Default Value	Value Range	Step	SP7	Description	Remarks	Description displayed on the screen
3-948: Vref: Upper limit								TS Control
3-948-001	K	3.50	0.00 to 5.00	0.01		Sets the upper limit of the shift range of Vref.	**Do not touch in the field.**	VtRefMax[TN_K]
3-948-002	C	3.50	0.00 to 5.00	0.01				VtRefMax[TN_C]
3-948-003	M	3.50	0.00 to 5.00	0.01				VtRefMax[TN_M]
3-948-004	Y	3.50	0.00 to 5.00	0.01				VtRefMax[TN_Y]
3-949: Vref: Initial data display								TS Control
3-949-001	K		0.00 to 5.00	0.01	903	Displays the Vref value detected during the TD sensor initialization.		VtRefInit[TN_K]
3-949-002	C		0.00 to 5.00	0.01	903			VtRefInit[TN_C]
3-949-003	M		0.00 to 5.00	0.01	903			VtRefInit[TN_M]
3-949-004	Y		0.00 to 5.00	0.01	903			VtRefInit[TN_Y]
3-950: Vref: Actual (current) data display								TS Control
3-950-001	K		0.00 to 5.00	0.01	903	Displays the actual (current) Vref value.		VtRef[TN_K]
3-950-002	C		0.00 to 5.00	0.01	903			VtRef[TN_C]
3-950-003	M		0.00 to 5.00	0.01	903			VtRef[TN_M]
3-950-004	Y		0.00 to 5.00	0.01	903			VtRef[TN_Y]
								Dev. Agitation Result
3-964-000	Developer initialization result		0 to 999	1	903	Displays the result of the developer initialization.	**Screen - E**	bResAging
3-972-000	Timed process control self-check: Interval adjustment	6H	0 to 240H	1	903	Adjusts the interval of process control self-check by time. 0 = Disable the function		Timer
3-973-000	Interval process control self-check: Interval adjustment	150 sheets	0 to 500 sheets	1	903	Adjusts the interval of process control self-check by the number of copies/prints. 0 = Disable the function		P-Cntl Self Chk Interval Sheets
3-974: Toner Max. M/A target adjustment								Toner Max M/A Target
3-974-001	K	0.7mg/cm2	0.5 to 1.5mg/cm2	0.001		Adjusts the target of the maximum toner M/A used for the potential control (normal copy process).	**Do not touch in the field**	Max M/A: K
3-974-002	Color	0.7mg/cm2	0.5 to 1.5mg/cm2	0.001				Max M/A: Color
3-975-000	Self-check result		0 to 999	1	903	Displays the result of the self-check. 1 = success others = failure (Follow the troubleshooting.)	**Screen - E**	P-Ctrl Self Chk Result bResSlfChk

SP Mode No.	Item	Default Value	Value Range	Step	SP7	Description	Remarks	Description displayed on the screen
3-977-000	Process Control Gamma: Interval setting (copies/prints)	0	0 to 999	1	903	Adjusts the interval of self-check by copies/prints. 0 = Disable the function	**Do not touch in the field**	Procon Gamma ClntvProcGam
4. SCANNER UNIT								
4-008-000	Scanner sub-scan magnification adjustment	0%	-0.9 to 0.9%	0.1	903	Adjusts the sub-scan magnification by changing the scanner motor speed.	**Do not touch in the field.**	Subscan Magnification
4-010-000	Scanner leading edge registration adjustment	0 mm	-3.0 to 3.0 mm	0.1	903	Adjusts the leading edge registration by changing the laser exposure start timing in sub-scan direction.		Lead Edge Regist: Scanning
4-011-000	Scanner side to side registration adjustment	0 mm	-6.0 to 6.0 mm	0.1	903	Adjusts the side to side registration by changing the laser exposure start timing in main-scan direction.		Side to Side Reg: Scanning
4-012: Scanning blank margin adjustment								Scanning Blnk Mrgn
4-012-001	Rear	0 mm	0 to 3.0 mm	0.1		Sets the blank margin at each side for erasing the original shadow caused by the gap between the original and scale.  When adjusting the blank margin in each direction, please refer to the above figure.	**Screen - A**	Rear
4-012-002	Front	0 mm	0 to 3.0 mm	0.1				Front
4-012-003	Left	0 mm	0 to 3.0 mm	0.1				Left
4-012-004	Right	0 mm	0 to 3.0 mm	0.1				Right
4-013: Scanner free run								Scan Free Run
4-013-001	Lamp ON					Performs the scanner free run with the exposure lamp ON or OFF. Press the ON or OFF key to start or stop.		Lamp ON
4-013-002	Lamp OFF							Lamp OFF
4-301-000	APS operation check: Size display					Displays the original size detected by the original sensors.	Refer to S/M page 4-3 for the details.	APS Data Confirmation

SP Mode No.	Item	Default Value	Value Range	Step	SP7	Description	Remarks	Description displayed on the screen
4-417-000	IPU test pattern selection	0	0 to 14	1		0 = No pattern (normal copy operation mode) 1 = Grid pattern 2 = Slanted Grid Pattern 3 = 256 gradation (Horizontal) 4 = 256 gradation (Vertical) 5 = Color patch 6 = RGB gray scale (16 gradation steps) 7 = YMCK-RGB 16 gradation 8 = YMCK 16 gradation 9 = YMCK 128 gradation 10 = Same as 1 11 = Same as 8 12 = Same as 9 13 = YMCK 16 gradation 14 = YMCK 128 gradation	The data has to be set back to 0 when going out from SP mode. (The data is not reset to the default automatically.)	IPU Test Ptrn Selection
4-426: RGB gain display								RGB_GAIN
4-426-001	R: ODD		0 to 255	1	903	Displays the gain value of the amplifiers on the scanner IPU for each RGB color.	**Do not touch in the field.**	R_GAIN ODD
4-426-002	R: EVEN		0 to 255	1	903			R_GAIN_EVEN
4-426-003	G: ODD		0 to 255	1	903			G_GAIN ODD
4-426-004	G: EVEN		0 to 255	1	903			G_GAIN_EVEN
4-426-005	B: ODD		0 to 255	1	903			B_GAIN_ODD
4-426-006	B: EVEN		0 to 255	1	903			B_GAIN_EVEN
4-427: RGB reference setup								RGB REF
4-427-001	R: 0	133	0 to 255	1	903	Sets or displays the reference voltage for the A/D converters on the scanner IPU for each RGB color.	**Do not touch in the field.**	R_REF 0
4-427-002	G: 0	133	0 to 255	1	903			G_REF 0
4-427-003	B: 0	133	0 to 255	1	903			B_REF 0
4-427-004	R: 1	160 (FA)	0 to 255	1	903			R_REF 1
4-427-005	G: 1	160 (FA)	0 to 255	1	903			G_REF 1
4-427-006	B: 1	160 (FA)	0 to 255	1	903			B_REF 1
4-435-000	White level adjustment			1		Performs the white level adjustment. Press the ON key to perform the adjustment.		White Level Adj.

SP Mode No.	Item	Default Value	Value Range	Step	SP7	Description	Remarks	Description displayed on the screen
4-501: ACC target density level adjustment: Copy mode								ACC Target Adj: Copier
4-501-001	Letter: K	5	0 to 50	1	904	Adjusts the target density level of ACC for each mode and color in the copy mode. (The adjustable range is 0 to 50; but, effective range is 0 to 10. Even when it is set to 50, it is the same level of 10.) The middle of printer gamma is shifted in this mode.	**Do not touch in the field.**	Copier: Text: K
4-501-002	Letter: C	5	0 to 50	1	904			Copier: Text: C
4-501-003	Letter: M	5	0 to 50	1	904			Copier: Text: M
4-501-004	Letter: Y	5	0 to 50	1	904			Copier: Text: Y
4-501-005	Photo: K	5	0 to 50	1	904			Copier: Photo: K
4-501-006	Photo: C	5	0 to 50	1	904			Copier: Photo: C
4-501-007	Photo: M	5	0 to 50	1	904			Copier: Photo: M
4-501-008	Photo: Y	5	0 to 50	1	904			Copier: Photo: Y
4-502: ACC target density level adjustment: Print mode								ACC Target Adj: Printer 1
4-502-001	Letter: K	5	0 to 50	1	904	Adjusts the target density level of ACC for each mode and color in the print mode 1. (The adjustable range is 0 to 50; but, effective range is 0 to 10. Even when it is set to 50, it is the same level of 10.) The middle of printer gamma is shifted in this mode.	**Do not touch in the field.**	Printer: Text: K
4-502-002	Letter: C	5	0 to 50	1	904			Printer: Text: C
4-502-003	Letter: M	5	0 to 50	1	904			Printer: Text: M
4-502-004	Letter: Y	5	0 to 50	1	904			Printer: Text: Y
4-502-005	Photo: K	5	0 to 50	1	904			Printer: Photo: K
4-502-006	Photo: C	5	0 to 50	1	904			Printer: Photo: C
4-502-007	Photo: M	5	0 to 50	1	904			Printer: Photo: M
4-502-008	Photo: Y	5	0 to 50	1	904			Printer: Photo: Y
4-503: Not used								ACC Target Adjustment: printer
4-502-001	Letter: K	5	0 to 50	1		Not used. (This mode will be deleted from the software.)	**Do not touch in the field.**	Printer 2: Text: K
4-502-002	Letter: C	5	0 to 50	1				Printer 2: Text: C
4-502-003	Letter: M	5	0 to 50	1				Printer 2: Text: M
4-502-004	Letter: Y	5	0 to 50	1				Printer 2: Text: Y
4-502-005	Photo: K	5	0 to 50	1				Printer2: Photo: K
4-502-006	Photo: C	5	0 to 50	1				Printer2: Photo: C
4-502-007	Photo: M	5	0 to 50	1				Printer2: Photo: M
4-502-008	Photo: Y	5	0 to 50	1				Printer2: Photo: Y
4-505: ACC target level adjustment: High light area								ACC Device Correct: HL
4-505-001	K	0 (FA)	-128 to 127	1	904	Adjusts the scanner gamma for high light area.	**Screen - G** **Do not touch in the field.**	High Light: K
4-505-002	C	0 (FA)	-128 to 127	1	904			High Light: C
4-505-003	M	0 (FA)	-128 to 127	1	904			High Light: M
4-505-004	Y	0 (FA)	-128 to 127	1	904			High Light: Y
4-506: ACC target level adjustment: Shadow area								ACC Device Correct: Shadow
4-506-001	K	0 (FA)	-128 to 127	1	904	Adjusts the scanner gamma for shadow area.	**Screen - G** **Do not touch in the field.**	Shadow: K
4-506-002	C	0 (FA)	-128 to 127	1	904			Shadow: C
4-506-003	M	0 (FA)	-128 to 127	1	904			Shadow: M
4-506-004	Y	0 (FA)	-128 to 127	1	904			Shadow: Y

SP Mode No.	Item	Default Value	Value Range	Step	SP7	Description	Remarks	Description displayed on the screen
4-507-000	ACC Process Control ON/OFF	3	0 to 3			Specifies whether the copy interval process control works at ACC or not. 0 = OFF 1 = ON (Printer ACC only) 2 = ON (Copy ACC only) 3 = ON (Both Copy/Printer ACC)	Change the data only when a user does not want to wait for a few minutes at ACC.	ACC:Procon
4-904: Scanner IPU board test								IPU Board Test
4-904-001	Scanner IPU board test 1		0 or 17 to 25	1		Performs the IPU board test 1. The test 1 program diagnoses problems with register Write/Read of the ASICs on the IPU board. Press the ON key to start. 0 = OK 17 to 25 = NG 25: Error due to sub scanner IPU board Others: Error due to main scanner IPU board	It takes about 5 minutes to complete the test. The screen switches from "Job Acting" to "End" and displays the test result.	Test1
4-904-002	Scanner IPU board test 2		0 or 33 to 44	1		Performs the IPU board test 2. The test 2 program diagnoses problems with patterns generated from ASICs on the IPU board. Press the ON key to start. 0 = OK 33 to 44 = NG 35: Error due to sub scanner IPU board Others: Error due to main scanner IPU board	It takes a few minutes to complete the test. The screen switches from "Job Acting" to "End" and displays the test result.	Test2
4-907-000	LD control board: Test pattern selection	0	0 to 5	1		Selects the a test pattern. The analog video ASIC makes test patterns without image data sent from CCD. 0 = No pattern 1 = Black pattern 2 = White pattern 3 = 16 gradation pattern 4 = 4 dot grid pattern 5 = 2 dot grid pattern	The data has to be set back to 0 when going out from SP mode. (The data is not reset to the default automatically.)	VPU Test Ptrn Selection

SP Mode No.	Item	Default Value	Value Range	Step	SP7	Description	Remarks	Description displayed on the screen
4-910: Gamma adjustment: Copy: Letter: K								Manual Gamma Adj: Copier: K
4-910-001	Offset - High light	15	0 to 30	1	904	Adjusts the offset data of the printer gamma for Black in the Letter mode (Copy Mode).	**Screen - H**	Low ID (Offset) : Text
4-910-02	Offset - Middle	15	0 to 30	1	904			Middle ID (Offset) : Text
4-910-003	Offset - Shadow	15	0 to 30	1	904			High ID (Offset) : Text
4-910-004	Offset - IDmax	15	0 to 30	1	904			IDmax (Offset) : Text
4-910-005	Option - High light	0	0 to 255	1	904		**Do not touch in the field.**	Low ID (Option) : Text
4-910-006	Option - Middle	0	0 to 255	1	904			Middle ID (Option) : Text
4-910-007	Option - Shadow	0	0 to 255	1	904			High ID (Option) : Text
4-910-008	Option - IDmax	0	0 to 255	1	904			IDmax (Option) : Text
4-911: Gamma adjustment: Copy: Letter: C								Manual Gamma Adj: Copier: C
4-911-001	Offset - High light	15	0 to 30	1	904	Adjusts the offset data of the printer gamma for Cyan in the Letter mode (Copy Mode).	**Screen - H**	Low ID (Offset) : Text
4-911-002	Offset - Middle	15	0 to 30	1	904			Middle ID (Offset) : Text
4-911-003	Offset - Shadow	15	0 to 30	1	904			High ID (Offset) : Text
4-911-004	Offset - IDmax	15	0 to 30	1	904			IDmax (Offset) : Text
4-911-005	Option - High light	0	0 to 255	1	904		**Do not touch in the field.**	Low ID (Option) : Text
4-911-006	Option - Middle	0	0 to 255	1	904			Middle ID (Option) : Text
4-911-007	Option - Shadow	0	0 to 255	1	904			High ID (Option) : Text
4-911-008	Option - IDmax	0	0 to 255	1	904			IDmax (Option) : Text
4-912: Gamma adjustment: Copy: Letter: M								Manual Gamma Adj: Copier: M
4-912-001	Offset - High light	15	0 to 30	1	904	Adjusts the offset data of the printer gamma for Magenta in the Letter mode (Copy Mode).	**Screen - H**	Low ID (Offset) : Text
4-912-002	Offset - Middle	15	0 to 30	1	904			Middle ID (Offset) : Text
4-912-003	Offset - Shadow	15	0 to 30	1	904			High ID (Offset) : Text
4-912-004	Offset - IDmax	15	0 to 30	1	904			IDmax (Offset) : Text
4-912-005	Option - High light	0	0 to 255	1	904		**Do not touch in the field.**	Low ID (Option) : Text
4-912-006	Option - Middle	0	0 to 255	1	904			Middle ID (Option) : Text
4-912-007	Option - Shadow	0	0 to 255	1	904			High ID (Option) : Text
4-912-008	Option - IDmax	0	0 to 255	1	904			IDmax (Option) : Text
4-913: Gamma adjustment: Copy: Letter: Y								Manual Gamma Adj: Copier: Y
4-913-001	Offset - High light	15	0 to 30	1	904	Adjusts the offset data of the printer gamma for Yellow in the Letter mode (Copy Mode).	**Screen - H**	Low ID (Offset) : Text
4-913-002	Offset - Middle	15	0 to 30	1	904			Middle ID (Offset) : Text
4-913-003	Offset - Shadow	15	0 to 30	1	904			High ID (Offset) : Text
4-913-004	Offset - IDmax	15	0 to 30	1	904			IDmax (Offset) : Text
4-913-005	Option - High light	0	0 to 255	1	904		**Do not touch in the field.**	Low ID (Option) : Text
4-913-006	Option - Middle	0	0 to 255	1	904			Middle ID (Option) : Text
4-913-007	Option - Shadow	0	0 to 255	1	904			High ID (Option) : Text
4-913-008	Option - IDmax	0	0 to 255	1	904			IDmax (Option) : Text
4-914: Gamma adjustment: Copy: Letter, single color: K								Manual Gamma Adj: Copier: SC
4-914-001	Offset - High light	15	0 to 30	1	904	Adjusts the offset data of the printer gamma for Black in the Letter/Single color mode (Copy Mode).	**Screen - H**	Low ID (Offset) : Text
4-914-002	Offset - Middle	15	0 to 30	1	904			Middle ID (Offset) : Text
4-914-003	Offset - Shadow	15	0 to 30	1	904			High ID (Offset) : Text

SP Mode No.	Item	Default Value	Value Range	Step	SP7	Description	Remarks	Description displayed on the screen
4-914-004	Offset - IDmax	15	0 to 30	1	904			IDmax (Offset) : Text
4-914-005	Option - High light	0	0 to 255	1	904		**Do not touch in the field.**	Low ID (Option) : Text
4-914-006	Option - Middle	0	0 to 255	1	904			Middle ID (Option) : Text
4-914-007	Option - Shadow	0	0 to 255	1	904			High ID (Option) : Text
4-914-008	Option - IDmax	0	0 to 255	1	904			IDmax (Option) : Text
4-915: Gamma adjustment: Copy: Photo: K								Manual Gamma Adj: Copier: K
4-915-001	Offset - High light	15	0 to 30	1	904	Adjusts the offset data of the printer gamma for Black in the Photo mode (Copy Mode).	**Screen - H**	Low ID (Offset) : Photo
4-915-002	Offset - Middle	15	0 to 30	1	904			Middle ID (Offset) : Photo
4-915-003	Offset - Shadow	15	0 to 30	1	904			High ID (Offset) : Photo
4-915-004	Offset - IDmax	15	0 to 30	1	904			IDmax (Offset) : Photo
4-915-005	Option - High light	0	0 to 255	1	904		**Do not touch in the field.**	Low ID (Option) : Photo
4-915-006	Option - Middle	0	0 to 255	1	904			Middle ID (Option) : Photo
4-915-007	Option - Shadow	0	0 to 255	1	904			High ID (Option) : Photo
4-915-008	Option - IDmax	0	0 to 255	1	904			IDmax (Option) : Photo
4-916: Gamma adjustment: Copy: Photo: C								Manual Gamma Adj: Copier: C
4-916-001	Offset - High light	15	0 to 30	1	904	Adjusts the offset data of the printer gamma for Cyan in the Photo mode (Copy Mode).	**Screen - H**	Low ID (Offset) : Photo
4-916-002	Offset - Middle	15	0 to 30	1	904			Middle ID (Offset) : Photo
4-916-003	Offset - Shadow	15	0 to 30	1	904			High ID (Offset) : Photo
4-916-004	Offset - IDmax	15	0 to 30	1	904			IDmax (Offset) : Photo
4-916-005	Option - High light	0	0 to 255	1	904		**Do not touch in the field.**	Low ID (Option) : Photo
4-916-006	Option - Middle	0	0 to 255	1	904			Middle ID (Option) : Photo
4-916-007	Option - Shadow	0	0 to 255	1	904			High ID (Option) : Photo
4-916-008	Option - IDmax	0	0 to 255	1	904			IDmax (Option) : Photo
4-917: Gamma adjustment: Copy: Photo: M								Manual Gamma Adj: Copier: M
4-917-001	Offset - High light	15	0 to 30	1	904	Adjusts the offset data of the printer gamma for Magenta in the Photo mode (Copy Mode).	**Screen - H**	Low ID (Offset) : Photo
4-917-002	Offset - Middle	15	0 to 30	1	904			Middle ID (Offset) : Photo
4-917-003	Offset - Shadow	15	0 to 30	1	904			High ID (Offset) : Photo
4-917-004	Offset - IDmax	15	0 to 30	1	904			IDmax (Offset) : Photo
4-917-005	Option - High light	0	0 to 255	1	904		**Do not touch in the field.**	Low ID (Option) : Photo
4-917-006	Option - Middle	0	0 to 255	1	904			Middle ID (Option) : Photo
4-917-007	Option - Shadow	0	0 to 255	1	904			High ID (Option) : Photo
4-917-008	Option - IDmax	0	0 to 255	1	904			IDmax (Option) : Photo
4-918: Gamma adjustment: Copy: Photo Y								Manual Gamma Adj: Copier: Y
4-918-001	Offset - High light	15	0 to 30	1	904	Adjusts the offset data of the printer gamma for Yellow in the Photo mode (Copy Mode).	**Screen - H**	Low ID (Offset) : Photo
4-918-002	Offset - Middle	15	0 to 30	1	904			Middle ID (Offset) : Photo
4-918-003	Offset - Shadow	15	0 to 30	1	904			High ID (Offset) : Photo
4-918-004	Offset - IDmax	15	0 to 30	1	904			IDmax (Offset) : Photo
4-918-005	Option - High light	0	0 to 255	1	904		**Do not touch in the field.**	Low ID (Option) : Photo
4-918-006	Option - Middle	0	0 to 255	1	904			Middle ID (Option) : Photo

SP Mode No.	Item	Default Value	Value Range	Step	SP7	Description	Remarks	Description displayed on the screen
4-918-007	Option - Shadow	0	0 to 255	1	904			High ID (Option) : Photo
4-918-008	Option - IDmax	0	0 to 255	1	904			IDmax (Option) : Photo
4-919: Gamma adjustment: Printer: K								Manual Gamma Adj: Printer : K
4-919-001	Offset - High light	15	0 to 30	1	904	Adjusts the offset data of the printer gamma for Black in the Letter mode (Printer Mode).	**Screen - H**	Low ID (Offset) : Text
4-919-002	Offset - Middle	15	0 to 30	1	904			Middle ID (Offset) : Text
4-919-003	Offset - Shadow	15	0 to 30	1	904			High ID (Offset) : Text
4-919-004	Offset - IDmax	15	0 to 30	1	904			IDmax (Offset) : Text
4-919-005	Option - High light	0	0 to 255	1	904		**Do not touch in the field.**	Low ID (Option) : Text
4-919-006	Option - Middle	0	0 to 255	1	904			Middle ID (Option) : Text
4-919-007	Option - Shadow	0	0 to 255	1	904			High ID (Option) : Text
4-919-008	Option - IDmax	0	0 to 255	1	904			IDmax (Option) : Text
4-920: Gamma adjustment: Printer: C								Manual Gamma Adj: Printer : C
4-920-001	Offset - High light	15	0 to 30	1	904	Adjusts the offset data of the printer gamma for Cyan in the Letter mode (Printer Mode).	**Screen - H**	Low ID (Offset) : Text
4-920-002	Offset - Middle	15	0 to 30	1	904			Middle ID (Offset) : Text
4-920-003	Offset - Shadow	15	0 to 30	1	904			High ID (Offset) : Text
4-920-004	Offset - IDmax	15	0 to 30	1	904			IDmax (Offset) : Text
4-920-005	Option - High light	0	0 to 255	1	904		**Do not touch in the field.**	Low ID (Option) : Text
4-920-006	Option - Middle	0	0 to 255	1	904			Middle ID (Option) : Text
4-920-007	Option - Shadow	0	0 to 255	1	904			High ID (Option) : Text
4-920-008	Option - IDmax	0	0 to 255	1	904			IDmax (Option) : Text
4-921: Gamma adjustment: Printer: M								Manual Gamma Adj: Printer : M
4-921-001	Offset - High light	15	0 to 30	1	904	Adjusts the offset data of the printer gamma for Magenta in the Letter mode (Printer Mode).	**Screen - H**	Low ID (Offset) : Text
4-921-002	Offset - Middle	15	0 to 30	1	904			Middle ID (Offset) : Text
4-921-003	Offset - Shadow	15	0 to 30	1	904			High ID (Offset) : Text
4-921-004	Offset - IDmax	15	0 to 30	1	904			IDmax (Offset) : Text
4-921-005	Option - High light	0	0 to 255	1	904		**Do not touch in the field.**	Low ID (Option) : Text
4-921-006	Option - Middle	0	0 to 255	1	904			Middle ID (Option) : Text
4-921-007	Option - Shadow	0	0 to 255	1	904			High ID (Option) : Text
4-921-008	Option - IDmax	0	0 to 255	1	904			IDmax (Option) : Text
4-922: Gamma adjustment: Printer: Y								Manual Gamma Adj: Printer : Y
4-922-001	Offset - High light	15	0 to 30	1	904	Adjusts the offset data of the printer gamma for Yellow in the Letter mode (Printer Mode).	**Screen - H**	Low ID (Offset) : Text
4-922-002	Offset - Middle	15	0 to 30	1	904			Middle ID (Offset) : Text
4-922-003	Offset - Shadow	15	0 to 30	1	904			High ID (Offset) : Text
4-922-004	Offset - IDmax	15	0 to 30	1	904			IDmax (Offset) : Text
4-922-005	Option - High light	0	0 to 255	1	904		**Do not touch in the field.**	Low ID (Option) : Text
4-922-006	Option - Middle	0	0 to 255	1	904			Middle ID (Option) : Text
4-922-007	Option - Shadow	0	0 to 255	1	904			High ID (Option) : Text
4-922-008	Option - IDmax	0	0 to 255	1	904			IDmax (Option) : Text

SP Mode No.	Item	Default Value	Value Range	Step	SP7	Description	Remarks	Description displayed on the screen
4-932: Main scan dot position correction								Picture Element Correction
4-932-001	R left	5	0 to 9	1		Corrects the left or right side alignment of the red or blue filter line on the CCD.	**Screen - I**	Red: Left
4-932-002	R right	5	0 to 9	1				Red: Right
4-932-003	B left	5	0 to 9	1				Blue: Left
4-932-004	B right	5	0 to 9	1				Blue: Left
4-980: FPU: Reference value adjustment								FPU Reference Setting
4-980-001	R: Positive	133	0 to 255	1		Adjusts or displays the reference value used at A/D converter of RGB signal for FPU.	**Do not touch in the field.**	Red: Positive
4-980-002	G: Positive	133	0 to 255	1				Green: Positive
4-980-003	B: Positive	133	0 to 255	1				Blue: Positive
4-980-004	R: Negative	133	0 to 255	1				Red: negative
4-980-005	G: Negative	133	0 to 255	1				Green: Negative
4-980-006	B: Negative	133	0 to 255	1				Blue: Negative
4-981: FPU: White level adjustment								FPU White level Target
4-981-001	Positive	568	0 to 1023	1		Adjusts or displays the target value of white level for the type of film for FPU.		Positive
4-981-002	Negative	568	0 to 1023	1				Negative

5. OPERATION MODE/SYSTEM

5-001-000	Operation panel all on					Turns on all the indicators on the operation panel Press the ON or OFF key to turn on the indicators or not.		ALL Indication On
5-005: Copy mode selection (default setting)								Priority Selection
5-005-001	Standard mode	0	0 to 4	1		Selects the default setting of the standard mode. 0 = Text/Photo 1 = Text 2 = Photo 3 = Special Original	These setting can be done in the User Tool.	1
5-005-002	Inside area	1	1 to 3	1		Selects the default setting of the Inside Area mode. 0 = Text 1 = Photo		2

SP Mode No.	Item	Default Value	Value Range	Step	SP7	Description	Remarks	Description displayed on the screen
5-005-003	Outside area	0	0 to 3	1		Selects the default setting of the Outside Area mode. 0 = Text/Photo 1 = Text 2 = Photo 3 = Special Original		3
5-005-005	Photo type (Auto text/photo)	0	0 to 2	1		Selects the default setting of the Photo Type (Auto Text/Photo) mode. 0 = Press Print 1 = Glossy Photo 2 = 2nd Generation		5
5-005-006	Photo type (Photo)	0	0 to 2	1		Selects the default setting of the Photo Type (Photo) mode. 0 = Press Print 1 = Glossy Photo 2 = 2nd Generation		6
5-005-007	Special original priority	0	0 to 2	1		Selects the default setting of the Special Original priority. 0 = Highlight Pen 1 = Inkjet output 2 = Map		7

SP Mode No.	Item	Default Value	Value Range	Step	SP7	Description	Remarks	Description displayed on the screen
5-005-008	Copy mode selection in B & W	0	0 to 1	1		Selects the default setting of the B&W copy mode. 0 = Default setting in the User Tool 1 = Text mode		8
5-009: Operation panel display								Language/Unit Setting
5-009-001	Language selection	1	0 to 15	1		Selects a language for the LCD. 0 = Japanese 1 = English 2 = French 3 = German 4 = Spanish 5 = Italian 6 = Portuguese 7 = Dutch 8 = Danish 9 = Swedish 10 = Norwegian 11 = Czech 12 = Polish 13 = Russian 14 = Brazilian 15 = Taiwan After a language is selected by changing the data, turn off and on the main switch.	Selects the desired language in this SP mode when the main software is updated for the additional languages. When selecting the number which is not available in the version of firmware, English is automatically selected.	Disp Language
5-009-002	Metric/inch selection	0 (others) 1 (USA)	0 or 1	1		Selects metric or inch. 0 = metric 1 = inch Turn off and on the main switch after the data is changed.	Display related to the sizes is changed.	mm or inch

SP Mode No.	Item	Default Value	Value Range	Step	SP7	Description	Remarks	Description displayed on the screen
5-104-000	A3/DLT double count	0	0 or 1	1		Specifies whether the counter is doubled for A3/DLT size paper. 0 = Normal count 1 = Double count		A3/DLT Double Count
5-113-000	Key counter (User code) / Key card / Coin Lock Set	0	0 to 3	1		Specifies whether the key counter, key card, or coin lock is installed or not. 0 = None (default) 1 = Key card **(used in Japan market only)** 2 = Key counter (User code) 3 = Coin lock **(used in Japan market only)**		Key card / coin lock
5-114-000	Key card mode	15	1 to 15	1		Select the mode for the key card.	**Used in Japan market only**	ColorModeSelection: KeyCard
5-120-000	Key counter (User code): Mode clear ON/OFF	1	0 or 1	1		Specified whether the current mode is cleared or not when the key counter is removed. 0 = Mode not cleared 1 = Mode cleared		Clear Md on/off: Key Counter
5-121-000	Key card count timing setup	1	0 or 1	1		Selects the update timing for the key card. 0 = Paper feed-in 1 = Paper feed-out	**Used in Japan market only**	Cntr Up Timing: Key Card
5-126-000	F size original setting	0	0 to 2	1		Specifies which original size the machine selects when the APS sensors detect F size. 0 = F4 (8 1/2" x 13") 1 = F (8" x 13") 2 = Folio (8 1/4" x 13")		F*size Paper 0*F4, 1:F, 2:Folio
5-127: Coin lock: Mode On/OFF								Coin Lock Prohibition
5-127-001	APS	0	0 or 1	1		Specifies whether APS is ON or not when the machine is equipped with a coin lock. 0 = ON 1 = OFF	**Used in Japan market only**	APS function

SP Mode No.	Item	Default Value	Value Range	Step	SP7	Description	Remarks	Description displayed on the screen
5-127-002	ACS	0	0 or 1	1		Specifies whether ACS is ON or not when the machine is equipped with a coin lock. 0 = ON 1 = OFF	**Used in Japan market only**	ACS function
5-128-000	User code + Coin lock	0	0 or 1	1		Selects whether both User Code and Coin Lock can be used. 0 = one of them 1 = both	**Used in Japan market only**	User Code + Coin Lock
5-410-000	Reset password					Resets the key operator access code to 000000. Press the ON key to clear.		User Code Password Clear
5-501-000	PM counter Set	80000	0 to 999999	1		Sets the PM interval. 0 = PM counter is not used.	**Screen - J**	Set PM Counter
5-504-000	Jam alarm level	3	0 to 3	1		Sets the jam alarm level. 0 = Not function 1 = 250 sheets 2 = 500 sheets 3 = 1,000 sheets	**Used in Japan market only**	Jam Alarm Level
5-505-000	SC alarm level	15	0 to 30	1		Sets the SC alarm level.	**Used in Japan market only**	SC Alarm Level
5-507: Supply alarm level								Supply Alarm Level
5-507-001	Toner End	0	0 or 1	1		Specifies whether supply alarm is ON or not.	**Used in Japan market only**	Toner End
5-507-002	Copy count by paper size	0	0 or 1	1		0 = OFF		Count of copy
5-507-003	Staple end	0	0 or 1	1		1 = ON		Staple
5-507-131	A2	1000	250 to 10000	1				A2
5-507-132	A3	1000	250 to 10000	1		SP 5-507-002 enables SP 5-507-131 to 166 to be ON.		A3
5-507-133	A4	1000	250 to 10000	1				A4
5-507-134	A5	1000	250 to 10000	1				A5
5-507-140	B3	1000	250 to 10000	1				B3
5-507-141	B4	1000	250 to 10000	1				B4
5-507-142	B5	1000	250 to 10000	1				B5
5-507-143	B6	1000	250 to 10000	1				B6
5-507-160	DLT	1000	250 to 10000	1				DLT
5-507-164	LG	1000	250 to 10000	1				LG
5-507-166	LT	1000	250 to 10000	1				LT

SP Mode No.	Item	Default Value	Value Range	Step	SP7	Description	Remarks	Description displayed on the screen
5-508-000	CC auto call	1	0 or 1	1		Specifies whether CC auto call is On or not. 0 = OFF 1 = ON	**Used in Japan market only**	EM Auto Call on/off
5-610: ACC Factory setting								ACC
5-610-004	Recall					Recalls the default gamma values (factory setting) to the current memory of ACC data. Press the ON key to recall it.		Load: Factory Setting
5-610-005	Overwrite					Overwrites the current ACC data onto the default gamma values (factory setting). Press the ON key to overwrite it.	If this is done, the factory data is gone. To recall the factory setting, RAM clear needs to be done.	Save as Factory Setting
5-611: Color ratio adjustment in single color mode								Toner Amount Ratio in 2C
5-611-001	C ratio in Blue	90	0 to 100	1	903	Sets the toner amount of a color in a single color.		Cyan in Blue
5-611-002	M ratio in Blue	80	0 to 100	1	903			Magenta in Blue
5-611-003	C ratio in Green	90	0 to 100	1	903			Cyan in Green
5-611-004	Y ratio in Green	80	0 to 100	1	903			Yellow in Green
5-611-005	M ratio in Red	100	0 to 100	1	903			Magenta in Red
5-611-006	Y ratio in red	80	0 to 100	1	903			Yellow in Red
5-612-000	Scanner gamma Copy quality selection with scanner gamma	0	0 to 2	1		Changes the color correction coefficient for the text/photo, text, and photo modes. 0 = OFF 1 = Not fixed 2 = Not fixed	**Do not touch in the field.**	Scanner gamma selection
5-801-001	RAM clear					Resets the NV-RAM to the factory settings except for the machine serial No., the main counter value, counting method. Press the ON key to clear. (See the service manual for the details.)		NV RAM Clear
5-802: Free Run								Free Run
5-802-001	Printer					Press the ON or OFF key to start or stop the mode.		Printer

SP Mode No.	Item	Default Value	Value Range	Step	SP7	Description	Remarks	Description displayed on the screen
5-802-002	System							System
5-803	Input check					Refer to Section4.1.6 SP5-803 INPUT CHECK for the details.		Input check
5-804	Output check					Refer to Section4.1.7 SP5-804 OUTPUT CHECK for the details.		Output check
5-810-000	Fusing SC reset					Resets a type 1 service call condition which is caused by the fusing section. Press the ON key to reset. After resetting SC code, the main switch has to be turned off and on.		SC Reset
5-811-000	Serial number display				903	Displays the serial number.		Set Serial No.
5-812-000	Service Tel. No.					Inputs the telephone number of the service representative. (This number is displayed when a service call condition occurs or PM counter reaches the counter set.)		Service Tel. No.
5-816-000	RDS ON/OFF	0	0 or 1			Activates the RDS function. 0 = not activate 1 = activate		RDS ON/OFF
5-817-000	Service start/finish time					Informs the time of starting and finishing the service to the RDS center. Press the ON or OFF key to activate.		Repair time Tx
5-824-000	NV-RAM upload					Uploads the data of the NV-RAM to the flash ROM on the main board. Press the ON key to upload.	IC card needs to be set in the machine to execute these SP modes.	NVRAM Up Load

SP Mode No.	Item	Default Value	Value Range	Step	SP7	Description	Remarks	Description displayed on the screen
5-825-000	NV-RAM download					Downloads the data uploaded from NV-RAM in SP 5-824 from the flash ROM to the NV-RAM. Press the ON key to download.	IC card needs to be set in the machine to execute these SP modes.	NVRAM Down Load
5-827-000	Program download: Main					Downloads the main program from IC card to the flash ROM. Press the ON key to download.	IC card needs to be set in the machine to execute these SP modes.	Program Down Load
5-955: Printer internal pattern								DotLinedPwm
5-955-001	Dot line: LD PM setup	128	0 to 255	1	903	Selects the test pattern.	**Screen - J**	LD-PWM Value: dot, line
5-955-002	Print margin pattern	17	0 to 255	1	903			LD-PWM Value: 1/16 Gradation
5-955-003	Print out all fonts	34	0 to 255	1	903	5-955-018	The test pattern mode is automatically reset when you go out the SP mode.	LD-PWM Value: 2/16 Gradation
5-955-004	1 dot/line grid pattern	51	0 to 255	1	903	0: No pattern		LD-PWM Value: 3/16 Gradation
5-955-005	Belt pattern	68	0 to 255	1	903	1: Print margin pattern		LD-PWM Value: 4/16 Gradation
5-955-006	16-gradation with blank	85	0 to 255	1	903	2: Print out all fonts		LD-PWM Value: 5/16 Gradation
5-955-007	solid	102	0 to 255	1	903	3: 1 dot/line grid pattern		LD-PWM Value: 6/16 Gradation
5-955-08	1 dot patter (2x2)	119	0 to 255	1	903	4: Belt pattern		LD-PWM Value: 7/16 Gradation
5-955-009	1 dot pattern (4x4)	136	0 to 255	1	903	5: 16-gradation with blank		LD-PWM Value: 8/16 Gradation
5-955-010	2 dot subscan line	153	0 to 255	1	903	6: Solid		LD-PWM Value: 9/16 Gradation
5-955-011	1 dot main scan line	170	0 to 255	1	903	7: 1 dot pattern (2x2)		LD-PWM Value: 10/16 Gradatio
5-955-012	2 dot main scan line	187	0 to 255	1	903	8: 1 dot pattern (4x4)		LD-PWM Value: 1116 Gradation
5-955-013	Color patch	204	0 to 255	1	903	9: 1 dot sub scan line		LD-PWM Value: 12/16 Gradatio
5-955-014	Grid : scanning image	221	0 to 255	1	903	10: 2 dot sub scan line		LD-PWM Value: 13/16 Gradatio
5-955-015	2 beams pitch pattern	238	0 to 255	1	903	11: 1 dot main scan line		LD-PWM Value: 14/16 Gradatio
5-955-016	2 beams density pattern	255	0 to 255	1	903	12: 2 dot main scan line		LD-PWM Value: 15/16 Gradatio
5-955-017	16 grayscales-16: LD_PWM	128	0 to 255	1	903	13: Color patch		LD-PWM Value: Trailing Patch
5-955-018	Printer internal pattern type selection	0	0 to 21	1	903	14: Grid: scanner image 18: 2 beams pitch pattern 19: 2 beams density pattern No. 15 to 17, 20, and 21 are not used.		Pattern Selection

SP Mode No.	Item	Default Value	Value Range	Step	SP7	Description	Remarks	Description displayed on the screen
5-979-002	SC detection OFF mode	0	0 or 1			Disables the self-diagnostic function. It functions only for the following SCs. SC3XX SC4XX SC5XX except for SCs related to fusing section		Printer SC No Check Mode
6. PERIPHERALS								
6-006: ADF registration adjustment								
6-006-001	Scanning direction	0 mm	-3.0 to 3.0 mm	0.1		Adjusts the original scanning position.		Horizontal
6-006-002	Not switch-back : Front side	0 step	-15 to 15 steps	1				Thin paper
6-006-003	Switch-back: Front side	0 step	-15 to 15 steps	1				Thick Paper
6-006-004	Switch-back: Back side	0 step	-15 to 15 steps	1				2 sided
6-102-000	Sorter bin: maximum stack amount	1	0 to 1	1		Enables or disables the definition of the number of sheets that can be stacked in the sorter. 0 = Disable 1 = Enable		Sort/Stack Limit 0: No Limitation, 1: Limitation
6-104-000	Stabled sheet count limit	1	0 to 1	1		Enables or disables the number of sheets that can be stapled. 0 = Disabled 1 = Enabled		Staple Sheet Limit
6-107-000	Sorter free run					Sorter free run Press the ON or OFF key to start or stop.	OFF key does not function. The sorter front door needs to be opened and closed to stop it.	Sorter Free Run

SP Mode No.	Item	Default Value	Value Range	Step	SP7	Description	Remarks	Description displayed on the screen
6-910-000	Touch panel screen setting	0	0 to 1	1		Switches the touch panel display from Standard (copy screen to Scanning screen. 0 = Standard (copy) screen 1 = Scanning screen If "1" is selected, the touch panel screen displays a message and copy is prohibited until the scanning is finished when the Print/Scan key on the controller LCD panel is pressed.		Printer/scanner key setting
7. LOGGING DATA								
7-008-000	Counter display setting	1	1 or 2	1		Selects which counters to be displayed. 1 = counter based on developments 2 = counter based on copies/prints Development counter: Color XXXXX Black XXXXX Copies/Prints counter: Copy Printer Total Color XXXXX XXXXX XXXXX Black XXXXX XXXXX XXXXX	The data can be changed only once. (The data cannot be changed any more in SP mode after it has been changed.) If the data is changed in mistake, please contact your key Pearson. This data is not cleared at NVRAM clear functioned.	Set Counter Display
7-202: Developer counter								Development Counter
7-202-001	Total		0 to 9999999	1		Shows the number of development unit operation for total and each color.	**Screen - K**	Development Total Counter
7-202-002	K		0 to 9999999	1				Development K Counter
7-202-003	C		0 to 9999999	1				Development C Counter
7-202-004	M		0 to 9999999	1				Development M Counter
7-202-005	Y		0 to 9999999	1				Development Y Counter
7-203: PM parts counter (Image development)								Development counter
7-203-001	Drum		0 to 9999999	1		Shows the number of image developments on each component related to image production.	**Screen - K**	Drum counter
7-203-002	Image Transfer Belt		0 to 9999999	1				Transfer Belt Counter
7-203-003	Not used							Scanner Dust Filter Counter
7-203-004	Charge Corona Dust Filter		0 to 9999999	1				Main CH. Filter Counter
7-203-006	PCC Charge Wire		0 to 9999999	1				Pcc Wire Counter
7-203-007	Charge Corona Wire		0 to 9999999	1				Main Charge Wire Counter
7-203-008	Charge Corona Grid		0 to 9999999	1				Main Grid Counter

SP Mode No.	Item	Default Value	Value Range	Step	SP7	Description	Remarks	Description displayed on the screen
7-203-009	Charge Wire/Grid Cleaner		0 to 9999999	1				Charge Wire/Grid Cleaner
7-203-010	Development Dust Filter		0 to 9999999	1				Exhaust Dust Counter
7-203-011	Exhaust Dust Filter		0 to 9999999	1				Main Filter Counter
7-203-012	Fusing Unit Filter		0 to 9999999	1				Fusing Unit Filter
7-207: PM parts counter (Cleaning section)								Cleaning Counter
7-207-001	Drum Cleaning Blade		0 to 9999999	1		Shows the number of usage of each unit related to cleaning depending on the sheets of paper or developments.	**Screen - K**	Drum Cleaning Blade
7-207-002	Drum Cleaning Brush		0 to 9999999	1				Drum Cleaning Brush
7-207-003	Drum Lubricant Bar		0 to 9999999	1				Drum Lubricant Bar
7-207-004	ITB: Lubricant Brush		0 to 9999999	1				Transfer Belt Cleaning Brush
7-207-005	ITB: Lubricant Bar		0 to 9999999	1				Transfer Belt Lubricant Bar
7-207-006	PTB: Cleaning Blade: Paper		0 to 9999999	1				Paper Trns. Roller Blade [Print]
7-207-007	PTB: Cleaning Blade: Dev..		0 to 9999999	1				Paper Trns. Roller Blade [Dev]
7-207-010	Bias Roller Blade		0 to 9999999	1				Bias Roller Blade
7-207-011	Used Toner Bottle		0 to 9999999	1				Used toner tank
7-207-012	ITB: Cleaning Blade		0 to 9999999	1				Belt Cleaning Blade
7-210: PM parts counter (Fusing section)								Roller Counter
7-210-001	Hot Roller: Paper		0 to 9999999	1		Shows the number of usage on each component of the fusing unit depending on the sheets of paper or developments.	**Screen - K**	Hot Roller [Print]
7-210-002	Hot Roller: Dev.		0 to 9999999	1				Hot Roller [Dev]
7-210-003	Pressure Roller: Paper		0 to 9999999	1				Pressure Roller [Print]
7-210-004	Pressure Roller: Dev.		0 to 9999999	1				Pressure Roller [Dev]
7-210-005	Oil Supply Pad: Paper		0 to 9999999	1				Oil Supply Pad [Print]
7-210-006	Oil Supply Pad: Dev.		0 to 9999999	1				Oil Supply Pad [Dev]
7-210-007	Hot Roller Blade: Paper		0 to 9999999	1				Hot Roller Blade [Print]
7-210-008	Hot Roller Blade: Dev.		0 to 9999999	1				Hot Roller Blade [Dev]
7-210-009	Pressure Roller Blade: Paper		0 to 9999999	1				Pressure Roller Blade [Print]
7-210-010	Pressure Roller Blade: Dev.		0 to 9999999	1				Pressure Roller Blade [Dev]
7-210-011	Hot Roller Bearing: Paper		0 to 9999999	1				Hot Roller Joint [Print]
7-210-012	Hot Roller Bearing: Dev.		0 to 9999999	1				Hot Roller Joint [Dev]
7-210-013	Pressure Roller Bearing: Paper		0 to 9999999	1				Pressure Roller Joint [Print]
7-210-014	Pressure Roller Bearing: Dev.		0 to 9999999	1				Pressure Roller Joint [Dev]
7-401-000	Total SC counter					Shows the total number of SCs detected.		Total SC
7-402: 10 SC history counter								SC History
7-402-001	latest					Shows the SC code most recently detected in order. SCXXX - AAAA -BBBB XXX = SC code number AAAA = Counter of CMY BBBB = Counter of K	Last 4 digits of the electrical counters are displayed.	latest
7-402-002	lates-1							lates-1
7-402-003	lates-2							lates-2
7-402-004	lates-3							lates-3
7-402-005	lates-4							lates-4
7-402-006	lates-5							lates-5
7-402-007	lates-6							lates-6
7-402-008	lates-7							lates-7
7-402-009	lates-8							lates-8
7-402-010	lates-9							lates-9

SP Mode No.	Item	Default Value	Value Range	Step	SP7	Description	Remarks	Description displayed on the screen
7-502-001	Paper jam total counter					Shows the total number of paper jams.		Total Paper Jam
7-503-001	Original jam total counter					Shows the total number of original jams.		Total Original Jam
7-504: Paper jam counter at each location								Jam Counter: Point
7-504-001	By-pass					Shows the number of paper jam at each location.		Init
7-504-002	1st paper tray							Tray 1
7-504-003	2nd paper tray							Tray 2
7-504-004	3rd paper tray							Tray 3
7-504-005	4th paper tray							Tray 4
7-504-006	Duplex: Entrance							DplxEnter
7-504-007	Duplex: Paper feed							FeedDplx
7-504-008	Paper transport							Relay Roller
7-504-009	Registration							Regist
7-504-010	Paper transfer							Transfer
7-504-011	Fusing unit							Fusing Unit
7-504-012	Paper feed							ExitMain
7-504-013	Duplex: Turn guide							ExitDplx
7-504-014	Sorter							Sorter
7-504-015	Staple jam							Staple
7-504-016	Proof							Proof Tray
7-505: Original Jam counter at each location								Original Jam Counter: Point
7-505-001	Original feed					Shows the number of original jam at each location.		Feed
7-505-002	Original exit							Exit
7-801: ROM version display								ROM version
7-801-001	Main					Shows the ROM versions.		Main
7-801-002	Scanner IPU							Scanner
7-801-003	IDU							IDU
7-801-004	ADF							ADF
7-801-005	Sorter							Sorter
7-801-006	LCT							Bank
7-801-007	FPU							FPU
7-803-001	PM counter		0 to 9999999	1		Shows the number of developments on the PM parts.	**Screen - K**	Total No. of Dev. Cycles
7-804: PM counter clear								PM Counter Clear
7-804-003	All					Clears all or each PM counter.	**Screen - K**	PM Counter Clear
7-804-004	80K PM					Press the ON key to clear the counter.		80KDPM
7-804-005	160K PM							160KDPM
7-804-006	200K PM							200KDPM
7-804-007	400K PM							400KDPM
7-804-008	Others							Others

SP Mode No.	Item	Default Value	Value Range	Step	SP7	Description	Remarks	Description displayed on the screen
7-807-000	SC/Jam counter clear					Clears the SC and Jam counters. Press the ON key to clear the counter.		SC/Jam Counter Clear
7-808-000	Counter all clear					Clears all the counters except for PM, SC, and Jam counters. Press the ON key to clear the counter.		All Counter Clear
7-809: Print logging data								Print Logging Data
7-809-001	Logging data					Prints out each logging data Press the ON key to clear the counter. When selecting "004" (All logging data), "001" to "003" are automatically executed.		Logging Counter
7-809-002	SC/Jam counter							Jam SC History
7-809-003	Copy counter							Counter
7-809-004	All logging data							All Page
7-810-000	Copy counter clear: All					Clears the copy counter. Press the ON key to clear the counter.		All Copy Counter Clear
7-816-000	Copy counter clear: Paper trays					Clears the copy counter of each paper tray. Press the ON key to clear the counter.		Tray Copy Counter Clear
7-818: Developer counter clear								Dev. Counter Clear
7-818-001	All color					Clears the development unit counter for all or each color. Press the ON key to clear the counter.	**Screen - K**	
7-818-002	K							K
7-818-003	C							C
7-818-004	M							M
7-818-005	Y							Y
7-819-000	Copy counter clear: Paper size					Clears the copy counter counted for each paper size. Press the ON key to clear the counter.		Paper Size Counter Clear
7-825-000	Total counter clear					Clears the total counter to 0. This mode is available only when the number of the counter is below 0.		Total Counter 0 Reset

SP Mode No.	Item	Default Value	Value Range	Step	SP7	Description	Remarks	Description displayed on the screen
7-902-000	Data print: Non-default					Prints non default value (data changed from the default value). Press the ON key to print.		Print Non-Default Data
7-903-000	Data print: All					Prints out all SP data. Press the ON key to print.		Print All Data
7-904: Printer gamma data print								
7-904-001	Copy mode					Prints out the gamma data in the Copy or Print mode.		Copier Mode
7-904-002	Print mode							Printer Mode
7-905-000	PM counter print					Prints out the PM counter data. Press the ON key to print.	**Screen - K**	Print PM Data
7-910: PM parts counter (PTB section)								Transfer Belt Counter
7-910-001	Paper Separation Wire: Paper		0 to 9999999	1		Shows the number of usage on each component of the paper transfer belt unit depending on the sheets of paper or developments.	**Screen - K**	Paper Separate Wire [Print]
7-910-002	Paper Separation Wire: Dev.		0 to 9999999	1				Paper Separate Wire [Dev]
7-910-003	PTB: Discharge Wire: Paper		0 to 9999999	1				Trns Belt Sep. Wire [Print]
7-910-004	PTB: Discharge Wire: Dev.		0 to 9999999	1				Trns Belt Sep. Wire [Dev]
7-910-005	PTB: Cleaning Brush: Paper		0 to 9999999	1				Paper Trns Brush [Print]
7-910-006	PTB: Cleaning Brush: Dev.		0 to 9999999	1				Paper Trns Brush [Dev]
7-910-007	Paper Transfer Belt: Paper		0 to 9999999	1				Paper Trans Belt [Print]
7-910-008	Paper Transfer Belt: Dev.		0 to 9999999	1				Paper Trans Belt [Dev]
7-910-009	PTB: Back Brush: Paper		0 to 9999999	1				Trns Brush Back Side [Print]
7-910-010	PTB: Back Brush: Dev.		0 to 9999999	1				Trns Brush Back Side [Dev]
7-911: PM parts counter (Duplex unit)								Counter: Paper transfer
7-911-001	Reverse roller: Paper		0 to 9999999	1		Shows the number of usage on the reverse and feed rollers of the duplex unit depending on the sheets of paper or developments.	**Screen - K**	Duplex Sep. Roller [Print]
7-911-002	Reverse roller: Dev.		0 to 9999999	1				Duplex Sep. Roller [Dev]
7-911-003	Feed roller: Paper		0 to 9999999	1				Duplex Feed Roller [Print]
7-911-004	Feed roller: Dev.		0 to 9999999	1				Duplex Feed Roller [Dev]
7-911-005	Bottom plate pad: Paper		0 to 9999999	1				Duplex Pad [Print]
7-911-006	Bottom plate pad: Dev.		0 to 9999999	1				Duplex Pad [Dev]

8. SPECIAL MODE

T.B.A.

APPENDIX-3

POP-UP DISPLAYS

POP-UP SCREEN

SCREEN-A

Lead Edge Regist		P. Feed Tmg	
Nrml Paper	0.0	Nrml/By-ps	0.0
OHP	0.0	Tray	0.0
Thk	0.0	By-ps/OHP	0.0
Super Thk	0.0	By-ps/Thk	0.0
Side to Side Reg		**Scanning Blnk Mrgn**	
By-ps	0.0	Rear	0.0
Tray 1	0.0	Front	0.0
Tray 2	0.0	Left	0.0
Tray 3	0.0	Right	0.0
Tray 4	0.0		
Dplx	0.0		
LCT	0.0		

Back

A269X50A.WMF

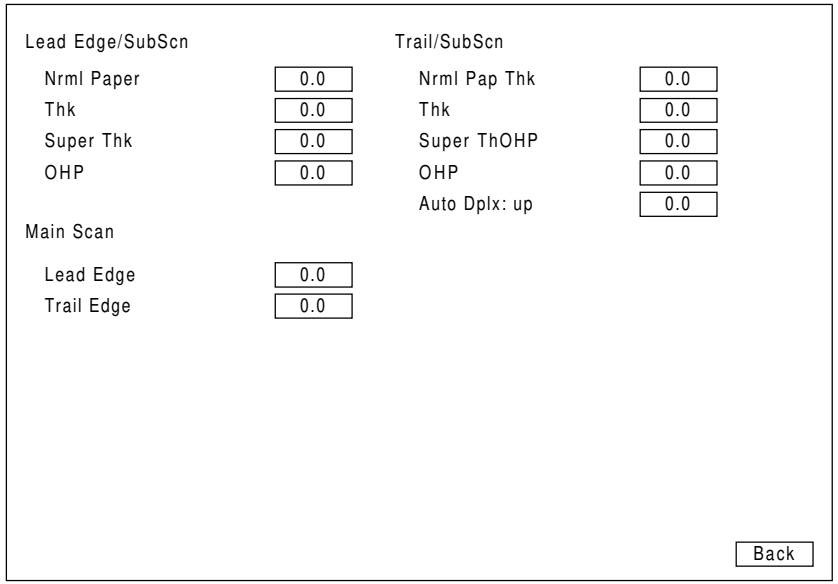
SCREEN-B

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

Back

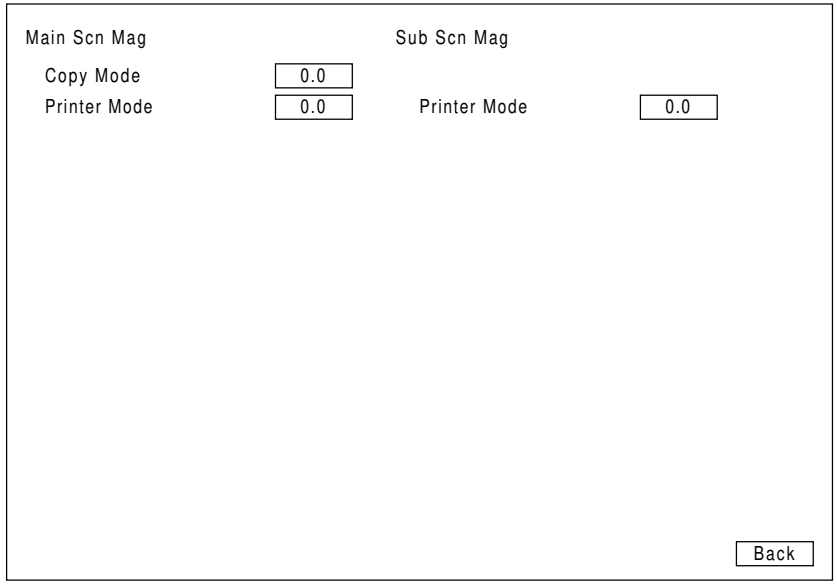
A269X50B.WMF

SCREEN-C



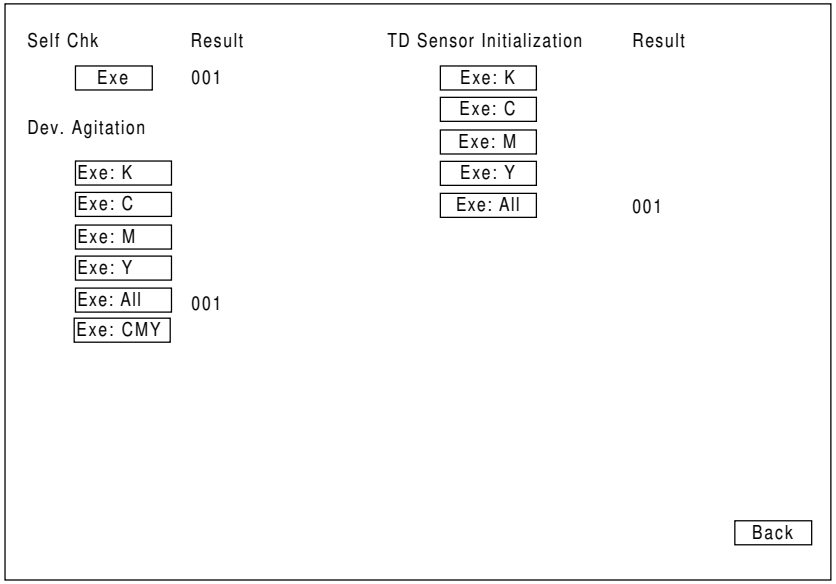
A269X50C.WMF

SCREEN-D



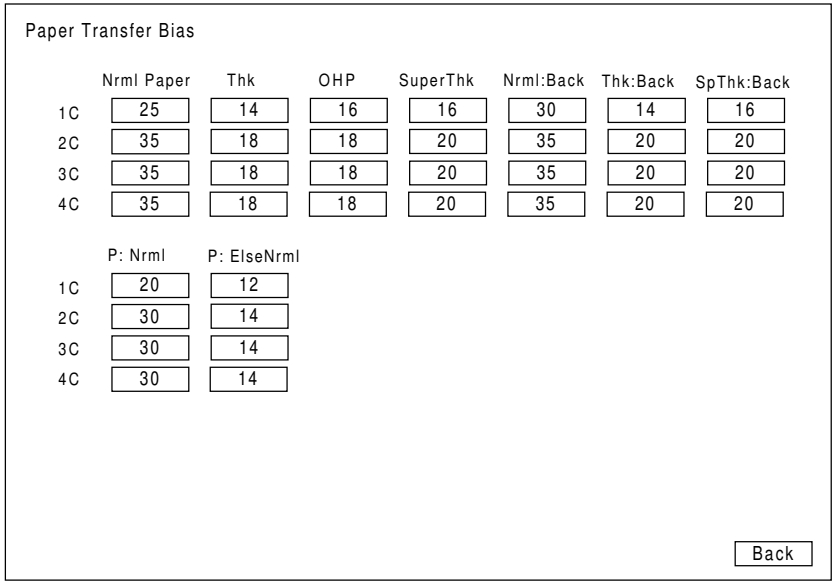
A269X50D.WMF

SCREEN-E



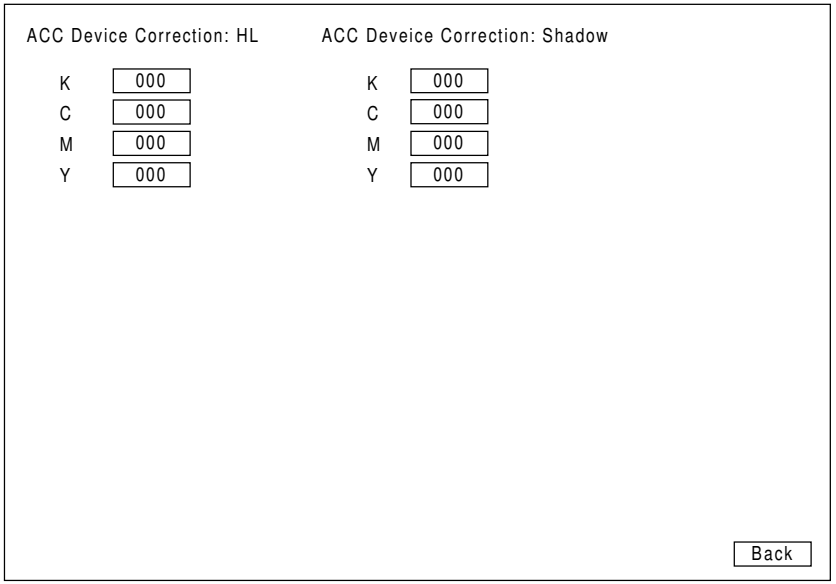
A269X50E.WMF

SCREEN-F



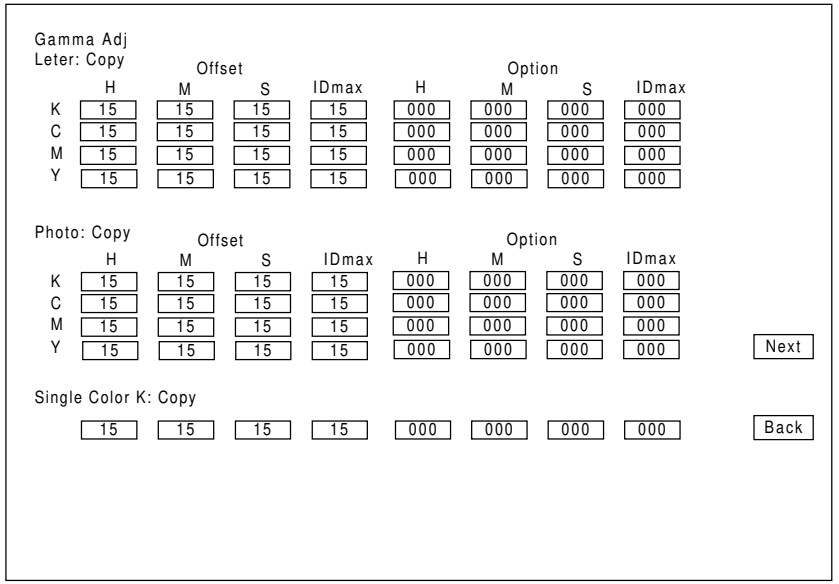
A269X50F.WMF

SCREEN-G



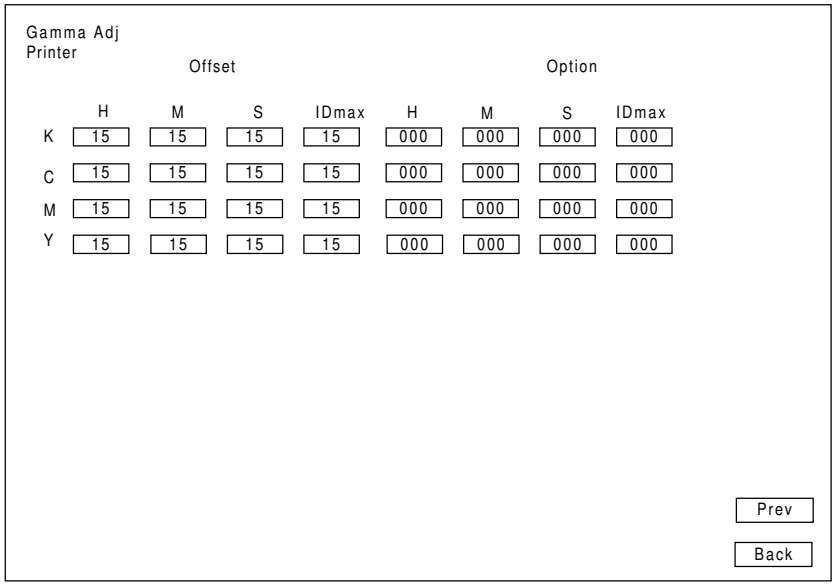
A269X50G.WMF

SCREEN-H



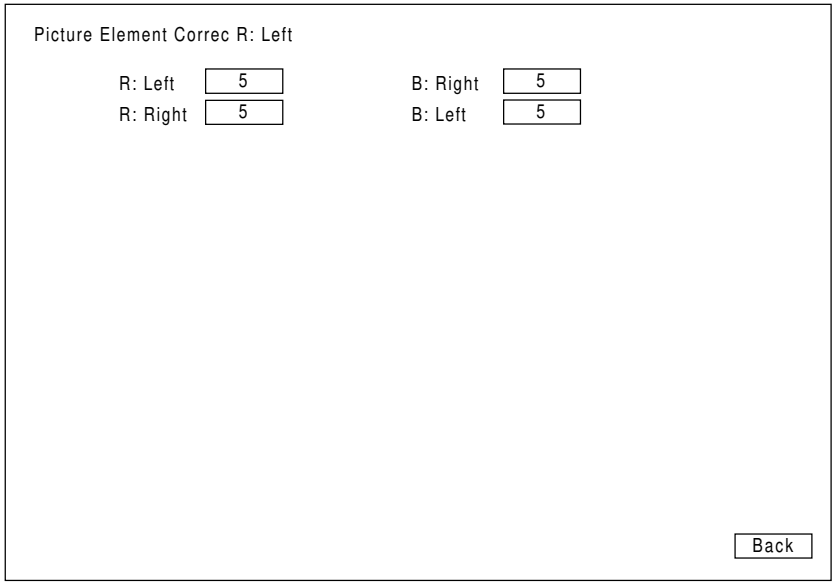
A269X5H1.WMF

SCREEN-H



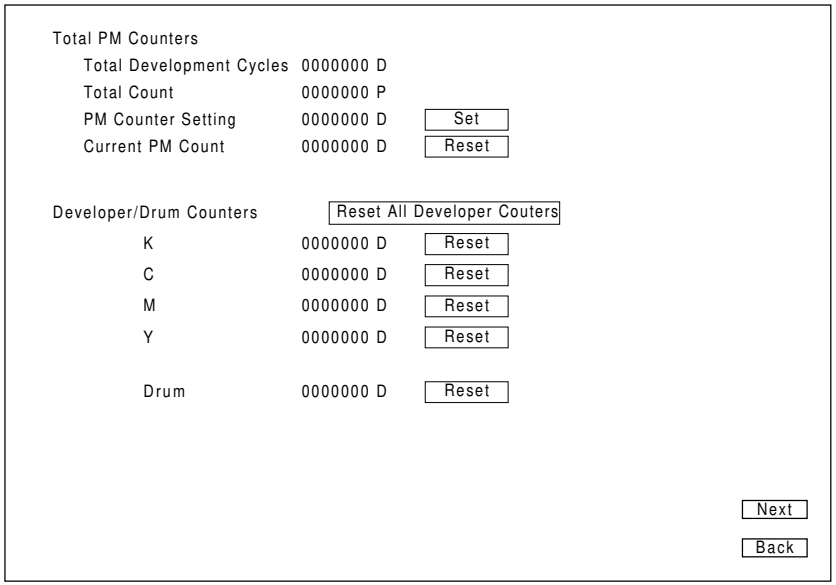
A269X5H2.WMF

SCREEN-I



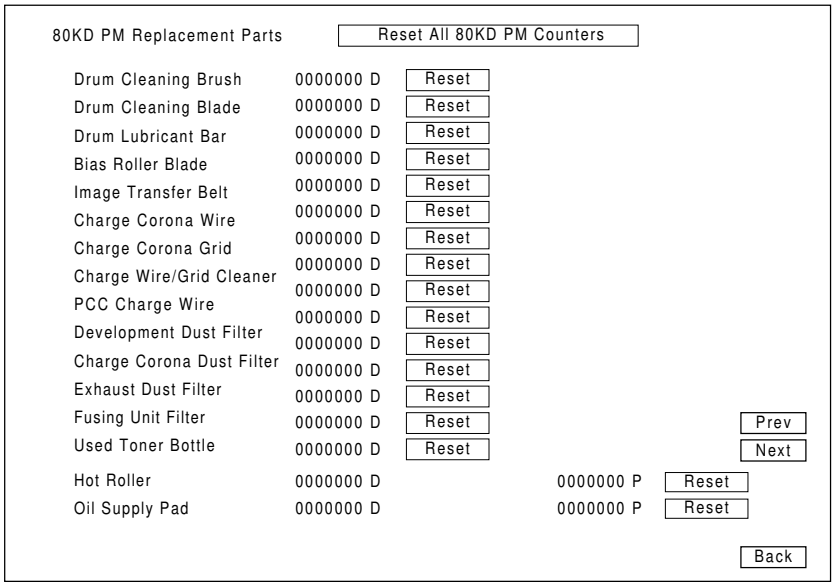
A269X50I.WMF

SCREEN-J



A269X5J1.WMF

SCREEN-J



A269X5J2.WMF

SCREEN-J

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

Pressure Roller	0000000 D	0000000 P	Reset
Hot Roller Bearing	0000000 D	0000000 P	Reset
Pressure Roller Bearing	0000000 D	0000000 P	Reset
Hot Roller Blade	0000000 D	0000000 P	Reset
Pressure Roller Blade	0000000 D	0000000 P	Reset
Pressure Roller Cleaning Pad	0000000 D	0000000 P	Reset

Prev
Next
Back

A269X5J3.WMF

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

ITB: Lubricant Brush	0000000 D	Reset	
ITB: Cleaning Blade	0000000 D	Reset	
ITB: Lubricant Bar	0000000 D	Reset	
Separation Corona Wire	0000000 D	0000000 P	Reset
PTB: Discharge Wire	0000000 D	0000000 P	Reset
PTB: Cleaning Brush	0000000 D	0000000 P	Reset
PTB: Cleaning Blade	0000000 D	0000000 P	Reset
Paper Transfer Belt	0000000 D	0000000 P	Reset
PTB: Back Brush	0000000 D	0000000 P	Reset

Prev
Next
Back

A269X5J4.WMF

SCREEN-J

400KD PM Replacement Parts [Reset All 400KD PM Counters]

1st Tray Pick-up Roller	0000000 D	0000000 P	Reset
1st Tray Feed Roller	0000000 D	0000000 P	Reset
1st Tray Reverse Roller	0000000 D	0000000 P	Reset
2nd Tray Pick-up Roller	0000000 D	0000000 P	Reset
2nd Tray Feed Roller	0000000 D	0000000 P	Reset
2nd Tray Reverse Roller	0000000 D	0000000 P	Reset
3rd Tray Pick-up Roller	0000000 D	0000000 P	Reset
3rd Tray Feed Roller	0000000 D	0000000 P	Reset
3rd Tray Reverse Roller	0000000 D	0000000 P	Reset
Duplex Unit Feed Roller	0000000 D	0000000 P	Reset
Duplex Unit Reverse Roller	0000000 D	0000000 P	Reset
Duplex Unit Bottom Plate Pad	0000000 D	0000000 P	Reset

[Prev] [Next] [Back]

A269X5J5.WMF

SCREEN-J

Others [Reset All Counters]

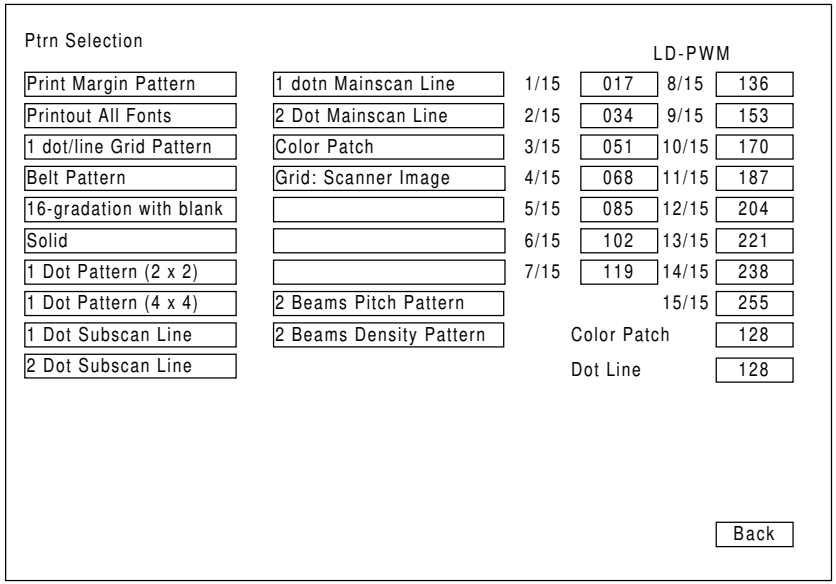
By-pass Table Pick-up Roller	0000000 D	0000000 P	Reset
By-pass Table Feed Roller	0000000 D	0000000 P	Reset
By-pass Table Reverse Roller	0000000 D	0000000 P	Reset
LCT Pick-up Roller	0000000 D	0000000 P	Reset
LCT Feed Roller	0000000 D	0000000 P	Reset
LCT Reverse Roller	0000000 D	0000000 P	Reset
ADF Transport Belt	0000000 D		Reset
ADF Separation Belt	0000000 D		Reset
ADF Separation Roller	0000000 D		Reset

Print PM Counters [Print]

[Prev] [Back]

A269X5J6.WMF

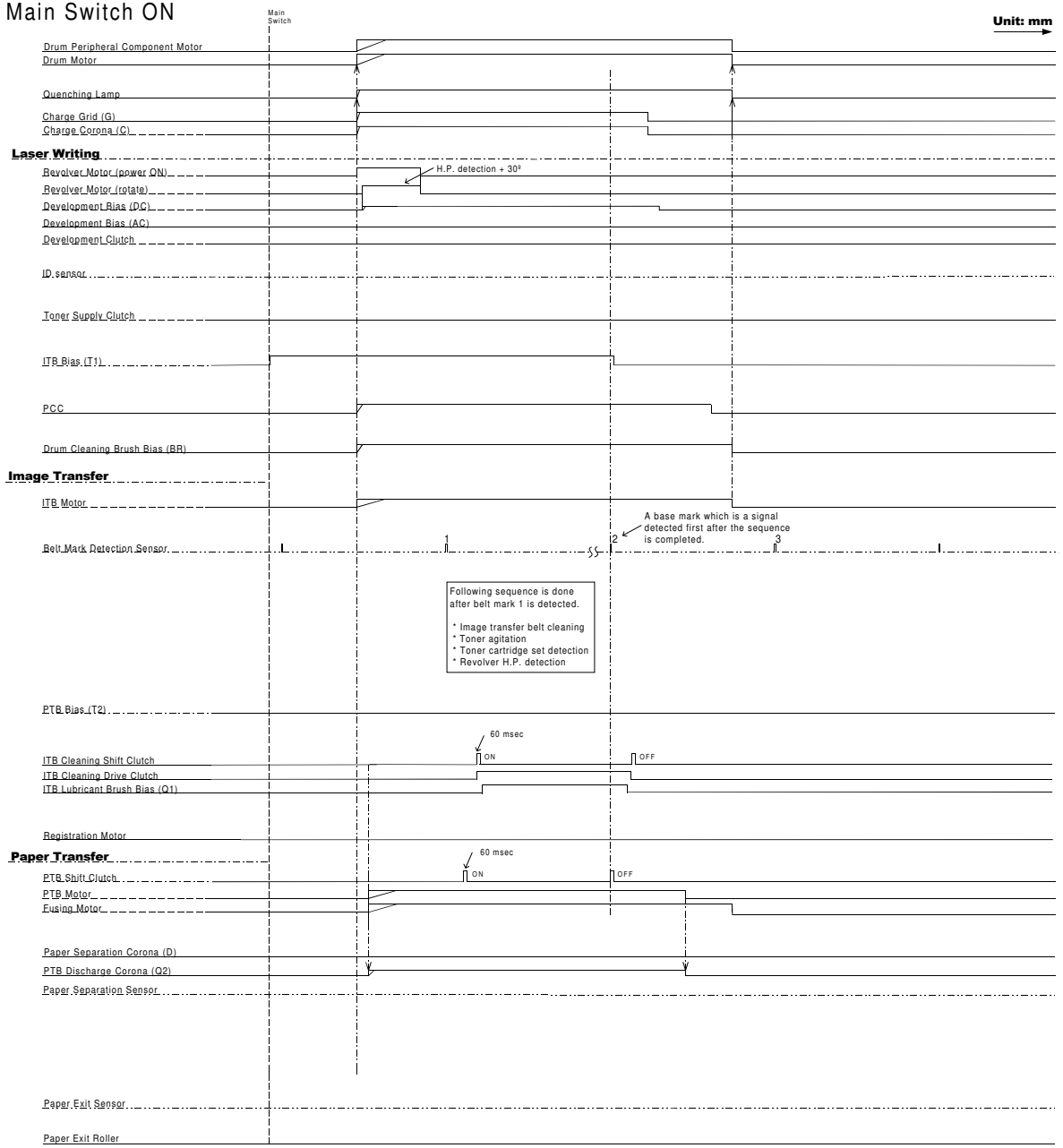
SCREEN-K



A269X50K.WMF

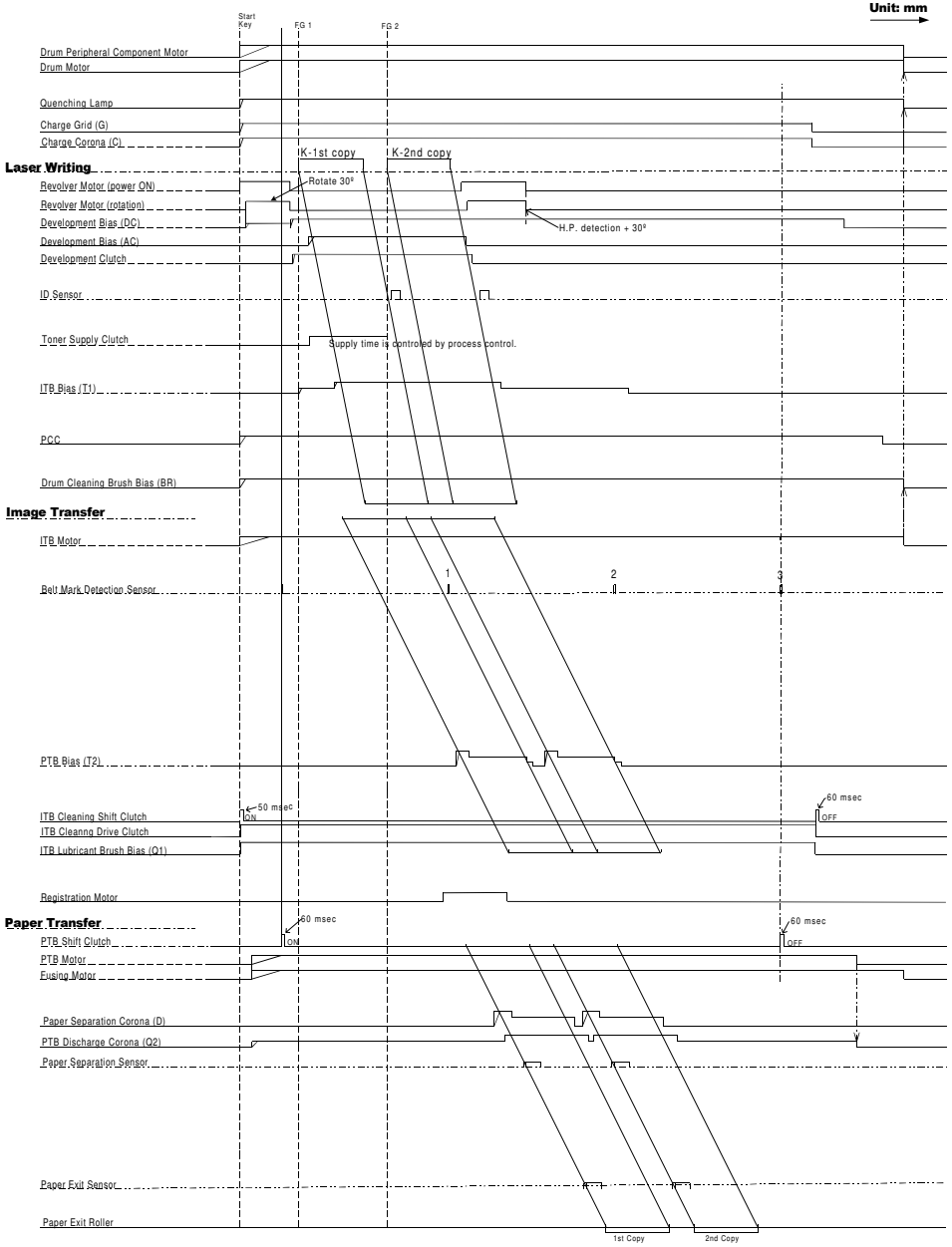
APPENDIX-4
TIMING CHARTS

Main Switch ON



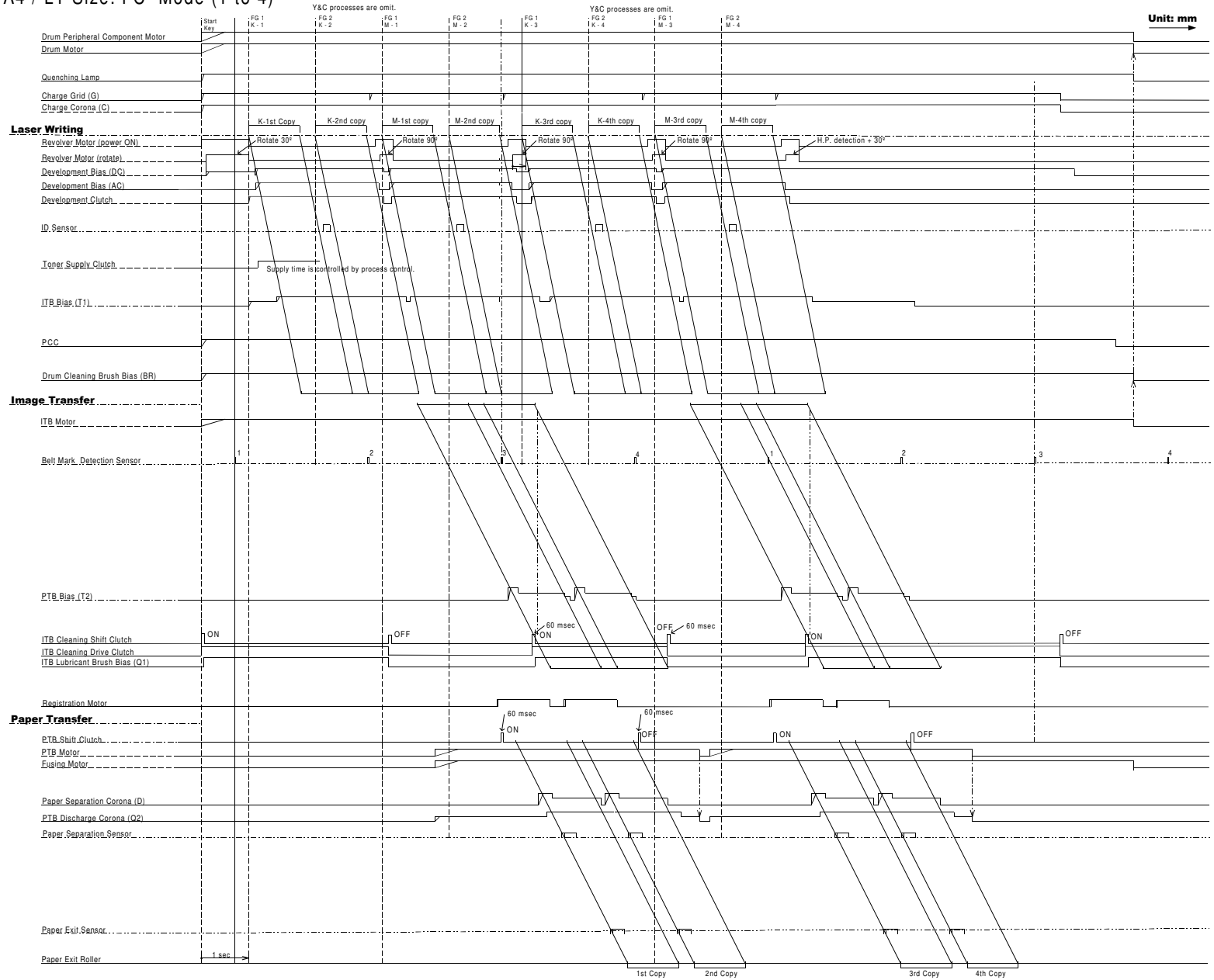
A269X500.WMF

A4 / LT Size : 1C Mode (1 to 2)



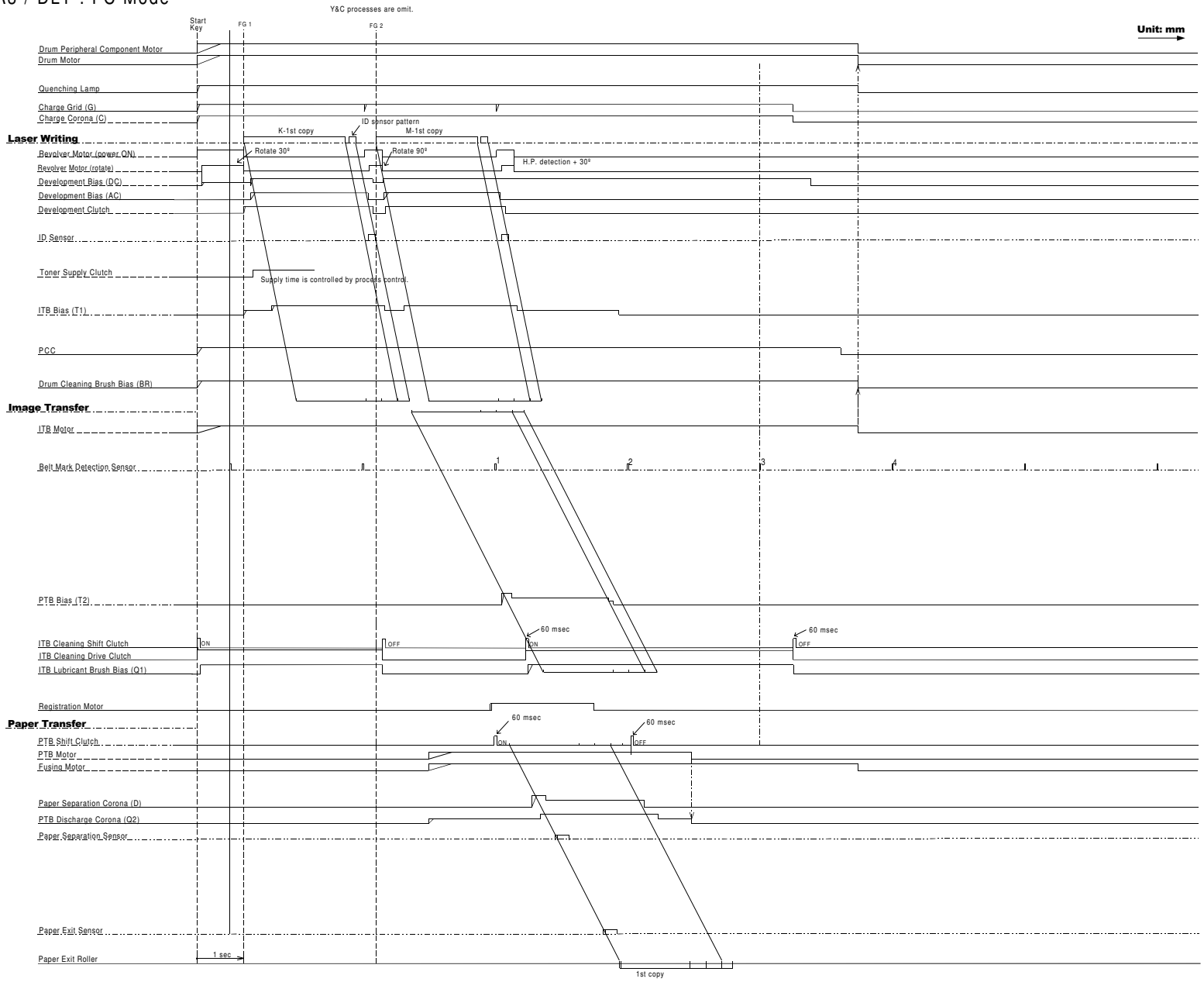
A269X501.WMF

A4 / LT Size: FC Mode (1 to 4)



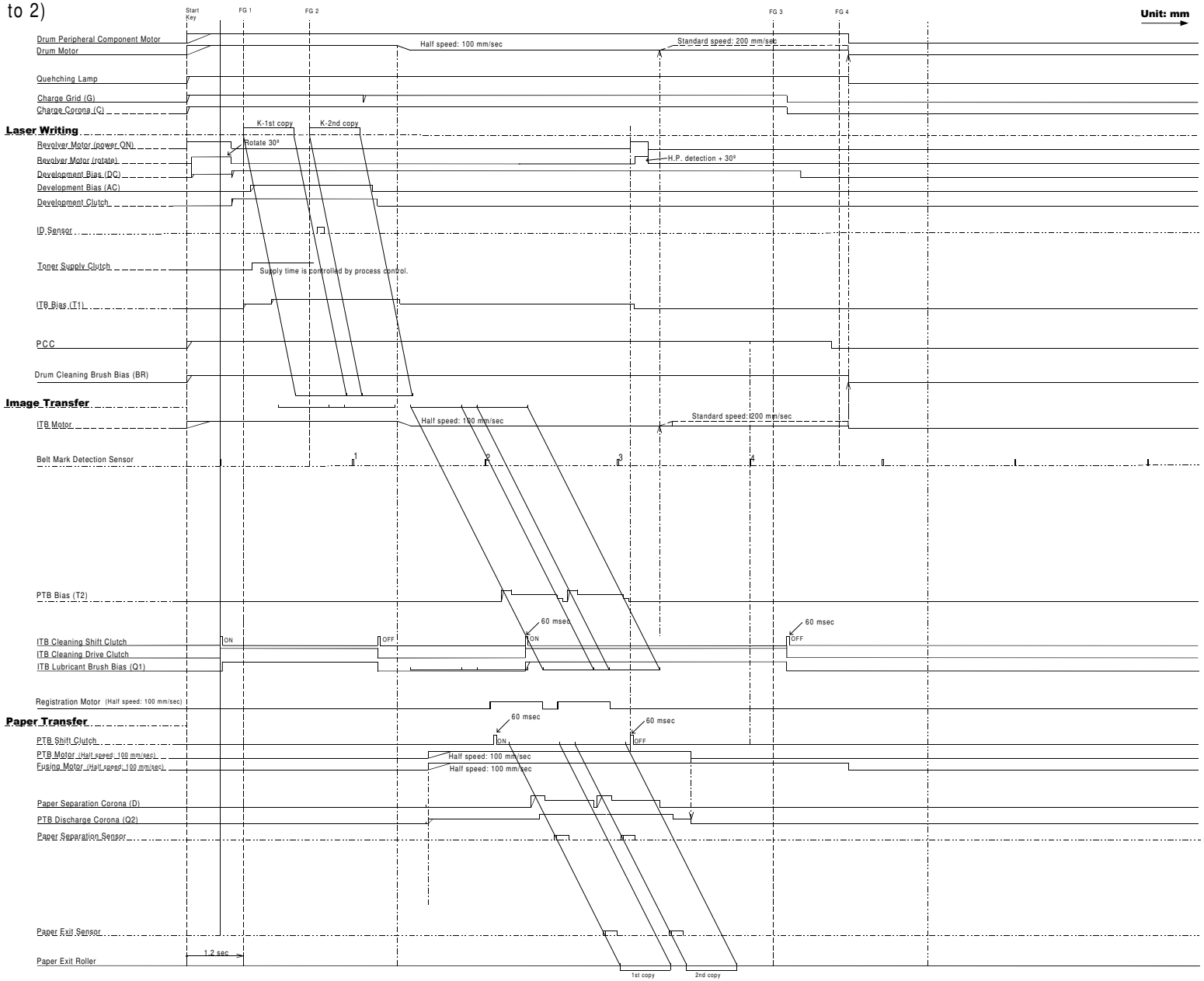
A269X502.WMF

A3 / DLT : FC Mode



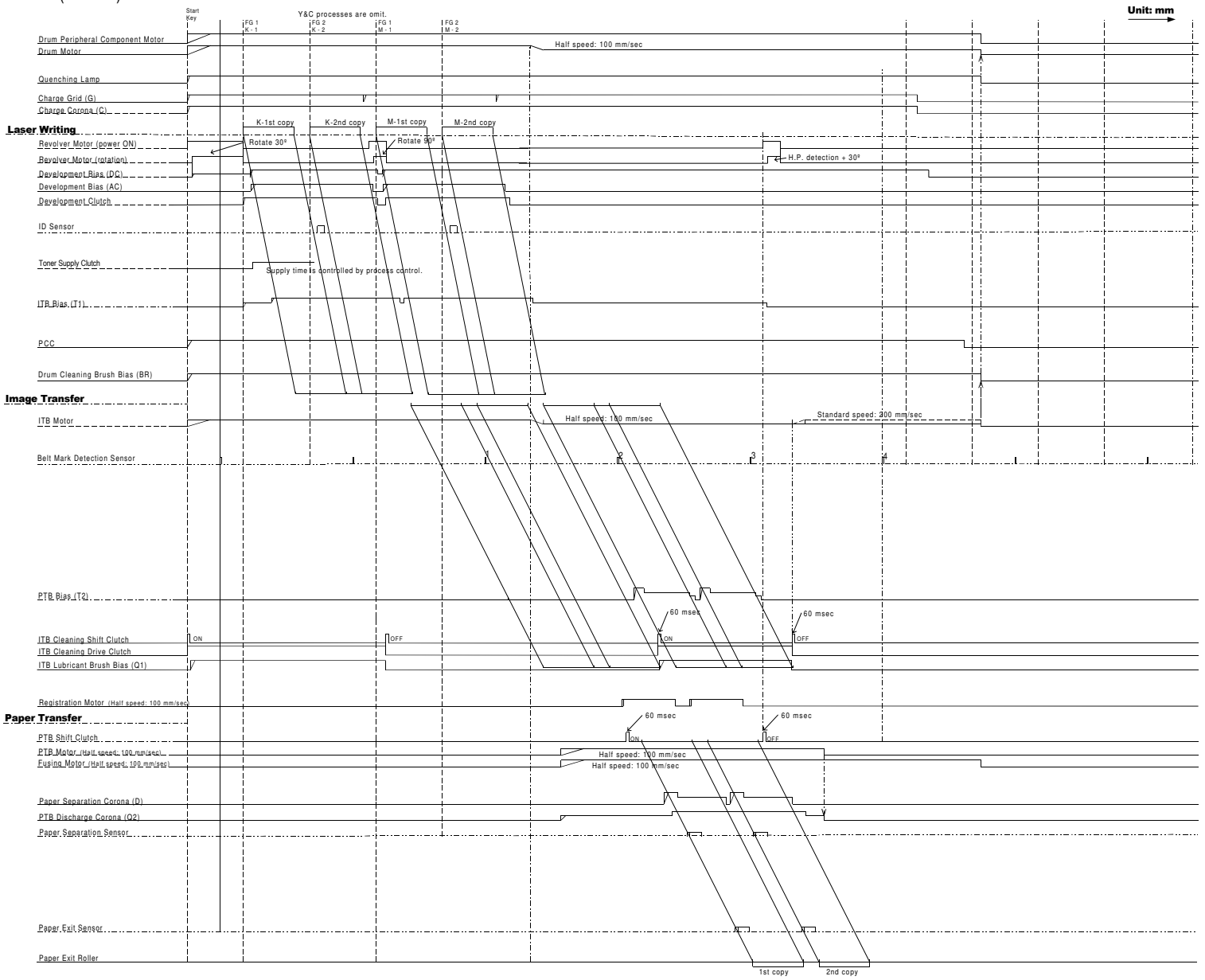
A269X503.WMF

A4 / LT : 1C, Half Speed Mode
(1 to 2)



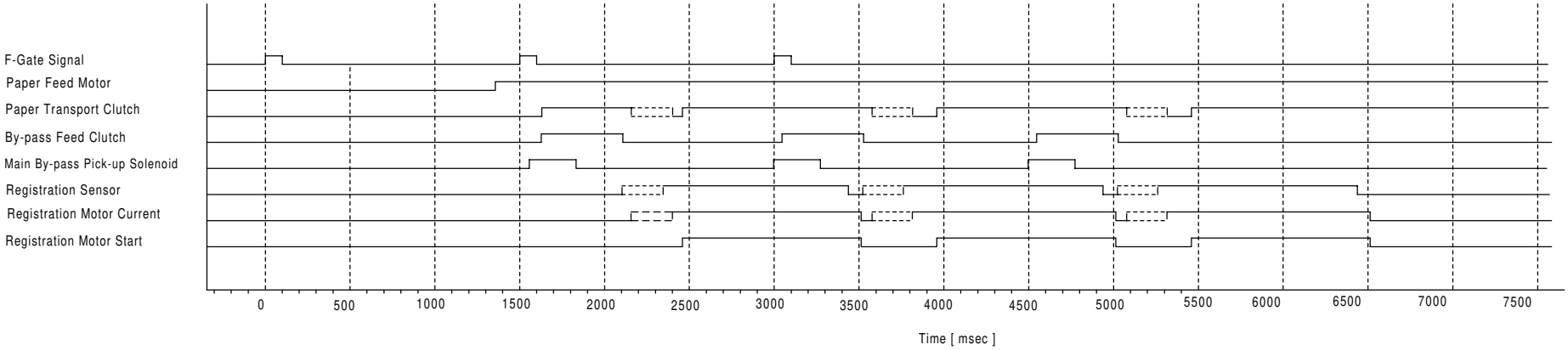
A269X508.WMF

A4 / LT Size : FC, Half Speed Mode (1 to 2)

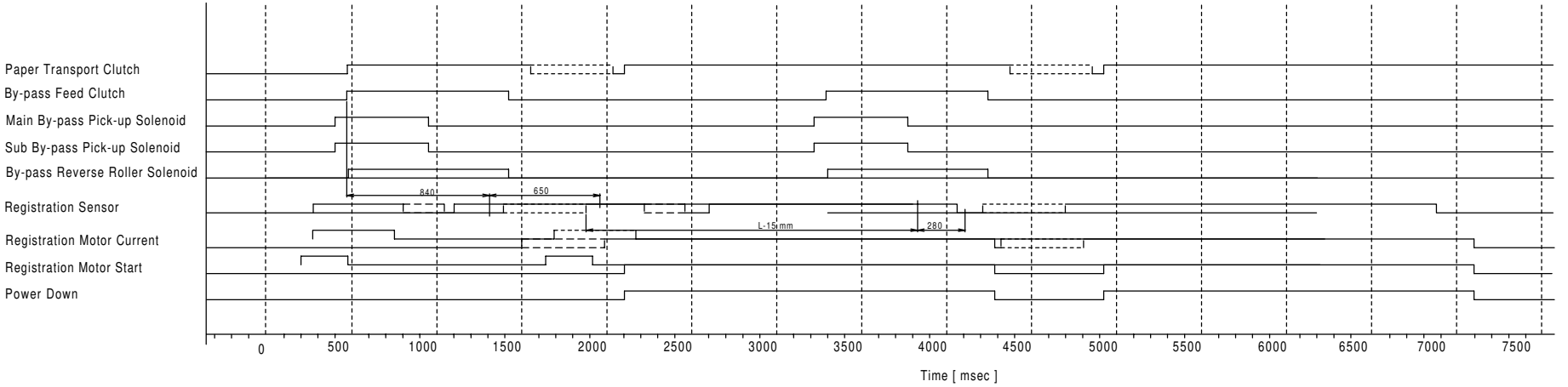


A269X505.WMF

BY-pass Feed : Normal Paper

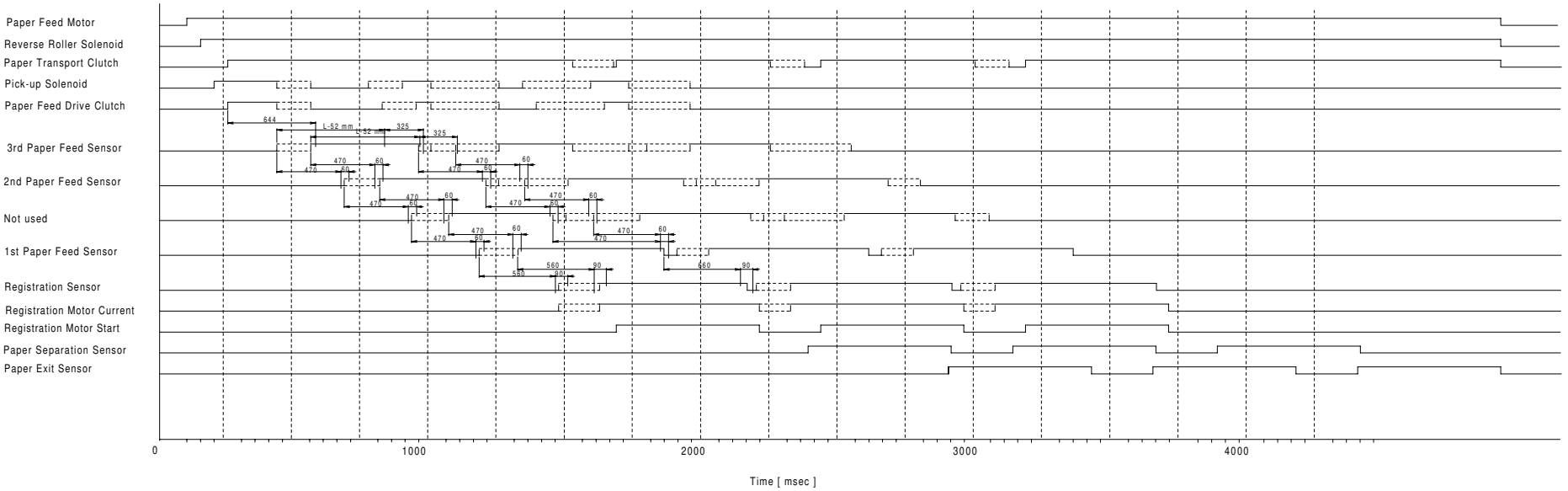


By-pass Feed : OHP (Half Speed)



A269X506.WMF

Paper Tray Feed : Normal Paper



A269X507.WMF

SYMBOL TABLE

AC Line
DC Line
Pulse Signal
Signal Direction
Active High
Active Low
Voltage

I/O Control Board (PCB9)

Paper Exit Sensor (S40)
Hot Roller Thermistor (TH1)
Oil End Sensor (S47)
Pressure Roller Thermistor (TH2)
Hot Roller Thermofuse (TF1)
Hot Roller Fusing Lamp (L3)
Pressure Roller Thermofuse (TF2)
Pressure Roller Fusing Lamp (L4)
Pressure Roller Fusing Lamp N
Pressure Roller Fusing Lamp L
Hot Roller Fusing Lamp N
Hot Roller Fusing Lamp L

FUSE	NA	EU, AA	USE
FU101	250V 15A	Not Used	ACL Fusing Lamp
FU102	125V 10A	250V 6.3A	ACL PSU
FU103	Not Used	250V 4A	ACL PSU
FU104	125V 5A	250V 4A	ACL Lamp Regulator

Paper Tray Heater 1 (H3)
Paper Tray Heater 2 (H4)
Pepar Transfer Heater (H2)
Optics Anti-Condensation Heater (H1)
<To Lamp Regulator> <H4(1/2)>

AC Drive Board (PCB2)

FUSE	NA	EU, AA	USE		
FU1	125V 6.3A	250V 6.3A	24V_MOT	VAA3	
FU2	125V 6.3A	250V 6.3A	24V_P,R	VAA2	
FU3	125V 6.3A	250V 6.3A	24V_PRN	VAA1	
FU4	125V 6.3A	250V 6.3A	24V_OPR	VAA4	
FU5	125V 6.3A	250V 6.3A	24V_SCN	VAA5	
FU6	125V 6.3A	250V 6.3A	24V_MOT	VMM1	
FU7	125V 2A	250V 2A	17V_SCN	VDD	
FUB1	125V 3.15A	250V 3.15A	17V, 12V	VDD, VCA	
FUF1	250V 2A	250V 2A	-12V_OPR	VCB	
FUS1	250V 3.15A	250V 2A	5V, 5VE	VCC1, VCC2	

(CB1) Power Cord, Circuit Breaker, Main Switch (SW1)
ACL-IN, ACN-IN, ACL-OUT, ACN-OUT
<To Controller> <H5(2/2)>
PSU (PCB1)
PSU Fan x2
Scanner Motor
<To LD Control Board> <F10(1/2)>

(PCB4) Scanner Motor Drive Board
BLACK, RED, ORANGE, YELLOW, BLUE
STM1

Optics Cooling Fan(Rear) FAN3
Optics Cooling Fan(Front) FAN2
IPU Cooling Fan FAN1
Scanner H.P. Sensor (S2)
Platen Cover Position Sensor (S1)
(L1) Exposure Lamp
(TS1) Thermostat
(CC1) Choke Coil
<To PSU> <D1(1/2)>
(PCB3) Lamp Regulator

(PCB8) Main Control Board

S/S (Option)
ARDF (Option)

Main Control Board(CN311) ↔ Operation Panel Board(CN2)

PinNo	Signal	PinNo	Signal	PinNo	Signal	PinNo	Signal
A1	X-	A18	XCK	B1	GND	B18	GND
A2	Y-	A19	LD(0)	B2	GND	B19	GND
A3	X+	A20	NC	B3	GND	B20	GND
A4	Y+	A21	LD(1)	B4	GND	B21	GND
A5	GND	A22	LCD5V	B5	GND	B22	GND
A6	GND	A23	LCD5V	B6	GND	B23	GND
A7	GND	A24	LD(2)	B7	GND	B24	GND
A8	GND	A25	DISP	B8	GND	B25	GND
A9	GND	A26	LD(3)	B9	GND	B26	GND
A10	GND	A27	UD(3)	B10	GND	B27	GND
A11	GND	A28	UD(4)	B11	GND	B28	GND
A12	LD(4)	A29	UD(2)	B12	GND	B29	GND
A13	LD(5)	A30	UD(5)	B13	GND	B30	GND
A14	YD	A31	UD(1)	B14	GND	B31	GND
A15	LD(6)	A32	UD(0)	B15	GND	B32	GND
A16	LP	A33	UD(6)	B16	GND	B33	GND
A17	LD(7)	A34	UD(7)	B17	GND	B34	GND

Main Control Board(CN305) ↔ I/F Board(for Controller)(CN102)

CN305 PinNo	Signal	CN102 PinNo	CN305 PinNo	Signal	CN102 PinNo
A1	P3CLK	A12	B1	RXD8	B12
A2	/P3ST	A11	B2	GND	B11
A3	P3AD7	A10	B3	RXD7	B10
A4	P3AD5	A9	B4	GND	B9
A5	P3AD3	A8	B5	GND	B8
A6	P3AD1	A7	B6	/RESET	B7
A7	GND	A6	B7	P3AD0	B6
A8	/RTRG	A5	B8	P3AD2	B5
A9	WKUP	A4	B9	P3AD4	B4
A10	TXD7	A3	B10	P3AD6	B3
A11	GND	A2	B11	GND	B2
A12	TXD8	A1	B12	GND	B1

(PCB27) I/F Board RDS/LCT
CN CSS, CN756, CN750, CN752, CN595A, CN595A-1, CN595B-8, CN595C-9
LCT (Option)

Main Scanner IPU Board(CN404) ↔ CCD(CN501)

CN404 PinNo	Signal	CN501 PinNo	CN404 PinNo	Signal	CN501 PinNo
30	CCD_1	1	15	12V	16
29	GND	2	14	12V	17
28	CCD_2	3	13	AGND	18
27	GND	4	12	AGND	19
26	CCD_1L	5	11	BO	20
25	GND	6	10	AGND	21
24	CCD_RB	7	9	BE	22
23	GND	8	8	AGND	23
22	CCD_CLB	9	7	GO	24
21	GND	10	6	AGND	25
20	CCD_TG	11	5	GE	26
19	5V	12	4	AGND	27
18	5V	13	3	RO	28
17	GND	14	2	AGND	29
16	GND	15	1	RE	30

(PCB5) CCD, CN501, CN404 30P
(PCB6) Main Scanner IPU Board

Main Scanner IPU Board(CN406) ↔ LD Control Board(CN605)

CN406 PinNo	Signal	CN605 PinNo	CN406 PinNo	Signal	CN605 PinNo	CN406 PinNo	Signal	CN605 PinNo	CN406 PinNo	Signal	CN605 PinNo
A 1	GND	A 1	B 7	GND	B 7	A14	XSDATA6	A14	B20	GND	B20
B 1	GND	B 1	A 8	XSDATA0	A 8	B14	GND	B14	A21	XSDATA12	A21
A 2	XSFGATE	A 2	B 8	GND	B 8	A15	XSDATA7	A15	B21	GND	B21
B 2	GND	B 2	A 9	XSDATA1	A 9	B15	GND	B15	A22	XSDATA13	A22
A 3	XSLSYNC	A 3	B 9	GND	B 9	A16	GND	A16	B22	GND	B22
B 3	GND	B 3	A10	XSDATA2	A10	B16	GND	B16	A23	XSDATA14	A23
A 4	SCLOCK	A 4	B10	GND	B10	A17	XSDATA8	A17	B23	GND	B23
B 4	GND	B 4	A11	XSDATA3	A11	B17	GND	B17	A24	XSDATA15	A24
A 5	GND	A 5	B11	GND	B11	A18	XSDATA9	A18	B24	GND	B24
B 5	GND	B 5	A12	XSDATA4	A12	B18	GND	B18	A25	GND	A25
A 6	XMFGATE	A 6	B12	GND	B12	A19	XSDATA10	A19	B25	GND	B25
B 6	GND	B 6	A13	XSDATA5	A13	B19	GND	B19			
A 7	XPMSYNC	A 7	B13	GND	B13	A20	XSDATA11	A20			

CN430 CN440 CN431 CN441

(PCB7) Sub Scanner IPU Board
24V, FAN1, FAN2, FAN3, GND, 5V, HP, Platen Cover, ACDET, PGND, LAMPTRIG, LAMPDET, 24V

APS4(▼5), APS6(▼5), APS5(▼5), APS1(▼5), APS2(▼5), APS3(▼5)
(S4) Original Length Sensor2
(S5) Original Width Sensor
(S3) Original Length Sensor1
CN405-1, FPU (Option)

Sub Scanner IPU Board(CN409) ↔ IDU

PinNo	Signal	PinNo	Signal	PinNo	Signal	PinNo	Signal	PinNo	Signal	PinNo	Signal
A1	GND	A18	BLUE(6)	A35	GND	B1	GND	B18	BLUE(7)	B35	GND
A2	5V	A19	GND	A36	NC	B2	5V	B19	GND	B36	NC
A3	5V	A20	GREEN(0)	A37	NC	B3	5V	B20	GREEN(1)	B37	NC
A4	5V	A21	GND	A38	NC	B4	5V	B21	GND	B38	NC
A5	GND	A22	GREEN(2)	A39	NC	B5	GND	B22	GREEN(3)	B39	NC
A6	/RESET	A23	GND	A40	NC	B6	NC	B23	GND	B40	NC
A7	GND	A24	GREEN(4)	A41	GND	B7	GND	B24	GREEN(5)	B41	GND
A8	ICLK	A25	GND	A42	NC	B8	LGATE	B25	GND	B42	NC
A9	GND	A26	GREEN(6)	A43	GND	B9	GND	B26	GREEN(7)	B43	GND
A10	FGATE	A27	GND	A44	NC	B10	NC	B27	GND	B44	NC
A11	GND	A28	RED(0)	A45	NC	B11	GND	B28	RED(1)	B45	NC
A12	BLUE(0)	A29	GND	A46	NC	B12	BLUE(1)	B29	GND	B46	NC
A13	GND	A30	RED(2)	A47	NC	B13	GND	B30	RED(3)	B47	NC
A14	BLUE(2)	A31	GND	A48	GND	B14	BLUE(3)	B31	GND	B48	GND
A15	GND	A32	RED(4)	A49	RXD	B15	GND	B32	RED(5)	B49	TXD
A16	BLUE(4)	A33	GND	A50	GND	B16	BLUE(5)	B33	GND	B50	GND
A17	GND	A34	RED(6)			B17	GND	B34	RED(7)		

(PCB8) Main Control Board
CN305 24P
<To Controller> <F4(2/2)>

(PCB11) LD Drive Board
CN650, CN603 50P

LD Control Board (PCB10)
LD Control Board(CN603) ↔ LD Drive Board(CN650)

CN603 PinNo	Signal	CN1 PinNo	CN603 PinNo	Signal	CN1 PinNo	CN603 PinNo	Signal	CN1 PinNo	CN603 PinNo	Signal	CN1 PinNo
1	GND	50	14	GND	37	27	VCC	24	40	LR1	11
2	XVD20	49	15	XLDON2	36	28	GND	23	41	XLDERROR1	10
3	XVD21	48	16	GND	35	29	GND	22	42	GND	9
4	XVD22	47	17	RESET2	34	30	XVD10	21	43	XLDON1	8
5	XVD23	46	18	GND	33	31	XVD11	20	44	GND	7
6	XVD24	45	19	VCONT2	32	32	XVD12	19	45	RESET1	6
7	XVD25	44	20	GND	31	33	XVD13	18	46	GND	5
8	XVD26	43	21	MODE2	30	34	XVD14	17	47	VCONT1	4
9	XVD27	42	22	GND	29	35	XVD15	16	48	GND	3
10	CLK2	41	23	VCC	28	36	XVD16	15	49	MODE1	2
11	GND	40	24	VCC	27	37	XVD17	14	50	GND	1
12	LR2	39	25	VCC	26	38	CLK1	13			
13	XLDERROR2	38	26	VCC	25	39	GND	12			

CN606 100P
<To Controller> <H4(2/2)>
<To PSU> <F4(1/2)>

(PCB16) TD Sensor I/F Board 1
(PCB17) TD Sensor I/F Board 2
Toner Density Sensor-Y (S9), Toner Density Sensor-K (S10), Toner Density Sensor-M (S11), Toner Density Sensor-C (S12)

(PCB26) Operation Panel (for Scanner/Printer)
(PCB26) Operation Panel Board
CN2, CN311 68P

(PCB13) Laser Synchronizing Detector Board
(PCB12) Polygon Motor Drive Board
Polygon Motor (M1)
Front Door Switch4 (SW5), Front Door Switch5 (SW6)

(PCB14) IDU
CN409

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SYMBOL TABLE

———	AC Line
———	DC Line
- - - -	Pulse Signal
> <	Signal Direction
▲	Active High
▼	Active Low
( )	Voltage

(PCB20) High Voltage Supply Board T1/PCC/BR

(PCB15) High Voltage Supply Board C/G/B

(PCB9) I/O Control Board

(PCB8) Main Control Board

(PCB10) LD Control Board

(PCB18) Revolver Motor Drive Board

PTB Drive Board (PCB21)

(PCB29) Duplex Control Board

I/F Board(for Controller)

LD Control Board(CN606) ↔ I/F Board(for Controller)(CN103)

PinNo	Signal	PinNo	Signal	PinNo	Signal	PinNo	Signal	PinNo	Signal	PinNo	Signal
A1	GND	A18	GND	A35	XPDATA9	B1	GND	B18	GND	B35	XSDATA0
A2	GND	A19	XPDATA2	A36	GND	B2	GND	B19	GND	B36	GND
A3	XPIFGATE	A20	GND	A37	XPDATA10	B3	XSDATA15	B20	GND	B37	XIPMSYNC
A4	GND	A21	XPDATA3	A38	GND	B4	GND	B21	XSDATA7	B38	GND
A5	XPILSYNC	A22	GND	A39	XPDATA11	B5	XSDATA14	B22	GND	B39	XIMFGATE
A6	GND	A23	XPDATA4	A40	GND	B6	GND	B23	XSDATA6	B40	GND
A7	PICLOCK	A24	GND	A41	XPDATA12	B7	XSDATA13	B24	GND	B41	GND
A8	GND	A25	XPDATA5	A42	GND	B8	GND	B25	XSDATA5	B42	GND
A9	GND	A26	GND	A43	XPDATA13	B9	XSDATA12	B26	GND	B43	SOCLOCK
A10	GND	A27	XPDATA6	A44	GND	B10	GND	B27	XSDATA4	B44	GND
A11	XOMFGATE	A28	GND	A45	XPDATA14	B11	XSDATA11	B28	GND	B45	XSOLSYNC
A12	GND	A29	XPDATA7	A46	GND	B12	GND	B29	XSDATA3	B46	GND
A13	XOPMSYNC	A30	GND	A47	XPDATA15	B13	XSDATA10	B30	GND	B47	XSOFGATE
A14	GND	A31	GND	A48	GND	B14	GND	B31	XSDATA2	B48	GND
A15	XPDATA0	A32	GND	A49	TCONT	B15	XSDATA9	B32	GND	B49	GND
A16	GND	A33	XPDATA8	A50	GND	B16	GND	B33	XSDATA1	B50	GND
A17	XPDATA1	A34	GND			B17	XSDATA8	B34	GND		

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I/O CONTROL BOARD LOCATION MAP (A257/A269 COPIER)