Model M-C1/C2
(Machine Code: A292/A293, B098)
SERVICE MANUAL

30 August, 2002
Subject to change

⚠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.

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

LASER SAFETY

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

⚠WARNING

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

⚠WARNING

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

CAUTION MARKING:

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OPTIONS

3,000-SHEET FINISHER (B302)

3,000-SHEET FINISHER (B312/B586)

COPIER CONNECTION KIT (B322)

LCT (A698/B587)

BOOKLET FINISHER (A763)

1. OVERALL MACHINE INFORMATION

1.1 SPECIFICATIONS

1.1.1 COPIER ENGINE

Configuration:	Console
Copy Process:	Dry electrostatic transfer system
Originals:	Sheet/Book
Original Size:	Maximum A3/11" x 17"
	Minimum B6, 5 1/2"x 8 1/2" (using ADF)
Original Alignment:	Rear left corner
Copy Paper Size:	Maximum A3/11" x 17" (2nd/3rd Tray, By-pass) Minimum A5/5 1/2" x 8 1/2" (2nd/3rd Tray) A6/5 1/2" x 8 1/2" lengthwise (By-pass)
	Tandem LCT (1st Tray) A4/8 1/2" x 11" sideways only
Duplex Copying:	Maximum A3/11" x 17" Minimum A5/5 1/2" x 8 1/2" lengthwise
Copy Paper Weight:	Paper tray: 52.3 ~ 127.9 g/m^2, 14 ~ 34 lb Bypass feed table: 52.3 ~ 157 g/m^2, 14 ~ 41.7 lb Duplex copying: 64 ~ 104.7 g/m^2, 17 ~ 28 lb
Reproduction Ratios:	6 reduction and 5 enlargement

	Metric Version	Inch Version
Enlargement	400% 200% 141% 122% 115%	400% 200% 155% 129% 121%
Full Size	100%	100%
Reduction	93% 82% 75% 71% 65% 50%	93% 85% 78% 73% 65% 50%

Zoom: 25 ~ 400%

Copy Speed:
A292: Max. 55 cpm (A4 / 8 1/2" x 11" sideways)
A293: Max. 70 cpm (A4 / 8 1/2" x 11" sideways)
B098: Max. 55 cpm (A4 / 8 1/2" x 11" sideways)

Resolution:

	Scanning	**Printing**
A292/A293	600 dpi	400/600 dpi
B098	600dpi	600 dpi

Gradation: 256 levels

Warm-up Time:
Less than 330 s (from Off-mode)
Less than 30 s (from Low Power Mode)

First Copy Time:
(1st Tray)
Less than 3.5 s (A4/LT, Face up mode)
Less than 5.3 s (A4/LT, Face down mode)

Copy Number Input: Ten-key pad, 1 to 999

Copy Paper Capacity:
Tray 1: 3100 sheets (when used as a tandem tray)
Tray 2: 550 sheets
Tray 3 : 550 sheets
By-pass Tray: 50 sheets

Copy Tray Capacity:
(Output Tray)
A4/8 1/2" x 11" : 500 sheets (100 μm thickness paper)
A3/11" x 17" : 250 sheets

Memory Capacity:
RAM: 48 MB
HDD: 4.3 GB

Toner Replenishment: Cartridge exchange (1220g/ cartridge)

Toner Yield:
A292/A293: 43k copies/cartridge
B098: 46k copies/cartridge
46k copies/cartridge
(A4 sideways, 6% full black, 1 to 5 copying, including toner recycling ratio 20%)

Power Source:
North America:
120V, 60Hz, 20A
Europe/Asia:
220 ~ 240 V, 50Hz/60Hz, 10A

Power Consumption: A292/A293 copier (120 V Model)

	Copier only	Full system*
Warm-up	About 1.290 kW	About 1.300 kW
Stand-by	About 0.255 kW	About 0.270 kW
Copying	About 1.630 kW	About 1.650 kW
Maximum	Less than 1.75 kW	Less than 1.75 kW
Energy Saver	About 0.230 kW	About 0.240 kW
Low Power	About 0.225 kW	About 0.235 kW
Off Mode	About 0.009 kW	About 0.009 kW

A292/A293 copier (220 to 240 V Model)

	Copier only	Full system*
Warm-up	About 1.255 kW	About 1.300 kW
Stand-by	About 0.270 kW	About 0.285 kW
Copying	About 1.610 kW	About 1.590 kW
Maximum	Less than 1.75 kW	Less than 1.75 kW
Energy Saver	About 0.245 kW	About 0.255 kW
Low Power	About 0.240 kW	About 0.250 kW
Off Model	About 0.012 kW	About 0.012 kW

B098 copier (120 V Model)

	Copier only	Full system*
Warm-up	About 1.200 kW	About 1.200 kW
Stand-by	About 0.271 kW	About 0.292 kW
Copying	About 1.400 kW	About 1.500 kW
Maximum	Less than 1.75 kW	Less than 1.85 kW
Energy Saver	About 0.260 kW	About 0.290 kW
Low Power	About 0.207 kW	About 0.230 kW
Off Mode	About 0.009 kW	About 0.023 kW

B098 copier (220 to 240 V Model)

	Copier only	Full system*
Warm-up	About 1.200 kW	About 1.200 kW
Stand-by	About 0.281 kW	About 0.303 kW
Copying	About 1.400 kW	About 1.400 kW
Maximum	Less than 1.75 kW	Less than 1.75 kW
Energy Saver	About 0.256 kW	About 0.278 kW
Low Power	About 0.212 kW	About 0.240 kW
Off Model	About 0.012 kW	About 0.025 kW

*Full System: A292/A293: Mainframe with LCT (A698) and Finisher (B302)
B098: Mainframe with LCT (B587), Finisher (B586) and Printer Controller (B590)

Noise Emission:

Sound Power Level: The measurements were made in accordance with ISO 7779 at the operator position.

	Copier only		Full system	
	A292/A293	B098	A292/A293	B098
Stand-by	Less than 49 dB(A)	Less than 49 dB(A)	Less than 49 dB(A)	Less than 49 dB(A)
Copying (ADF 1 to 1)	Less than 75 dB(A)	Less than 74 dB(A)	Less than 75 dB(A)	Less than 74 dB(A)
Copying (From Memory)	Less than 71 dB(A)	Less than 71 dB(A)	Less than 71 dB(A)	Less than 71 dB(A)

Sound Pressure Level: The measurements were made in accordance with ISO 7779 at the operator position.

	Copier only		Full system	
	A292/A293	B098	A292/A293	B098
Stand-by	Less than 35 dB(A)	Less than 37 dB(A)	Less than 35 dB(A)	Less than 38 dB(A)
Copying (ADF 1 to 1)	Less than 65 dB(A)	Less than 64 dB(A)	Less than 65 dB(A)	Less than 64 dB(A)
Copying (From Memory)	Less than 58 dB(A)	Less than 58 dB(A)	Less than 58 dB(A)	Less than 56 dB(A)

Dimensions: (W x D x H) 690 x 750 x 1138 mm (27.2" x 29.5" x 44.8") (without ADF right exit tray, and options)

Weight: 188 kg (without options)

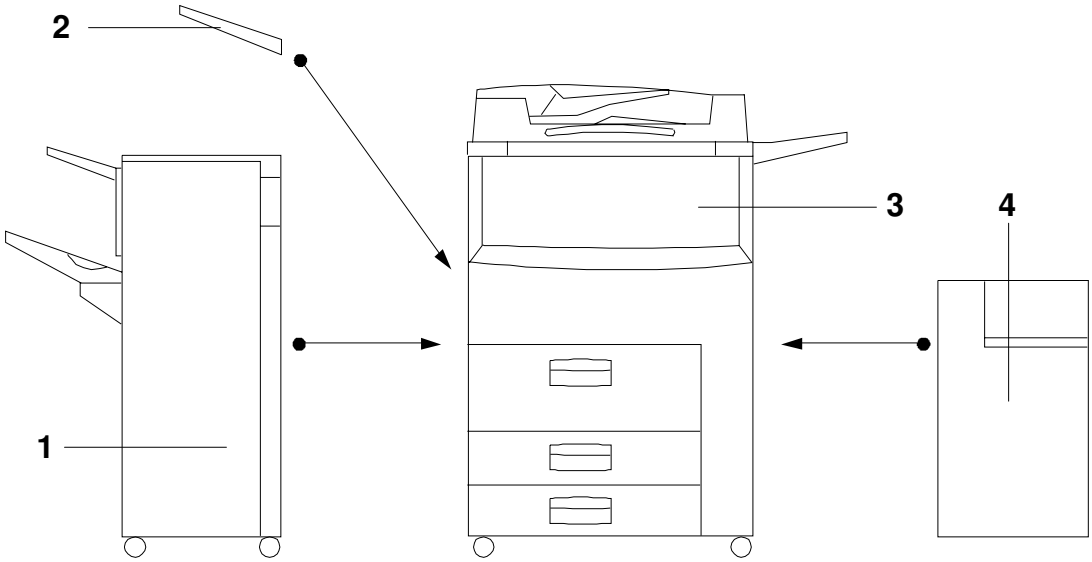
Optional Equipment:

A292/A293	B098
• Output tray (B333-17) • Finisher (A763) • Finisher (B302) • Finisher (B312) • Punch unit (A812-30, -31, -32, -57, 67) • Large capacity tray (A698) • Copy connector kit (B322) • LG kit (A375) • Tab sheet holder (B373)	• Output tray (B476-17) • Finisher (B586) • Punch unit (A812-30, -31, -32, -57, 67) • Large capacity tray (B587) • Copy connector kit (B322) • LG kit (B588) • Tab sheet holder (B373)

1.1.2 ADF

Original Size:	Normal Original Mode: A3 to B6, DLT to HLT Thin Original Mode: A3 to B6 sideways, DLT to HLT Duplex Original Mode: A3 to B5, DLT to HLT
Original Weight:	Normal Original Mode: 52 ~ 156 g/m^2, 14 ~ 42 lb Thin Original Mode: 40 ~ 156 g/m^2, 11 ~ 42 lb Duplex Original Mode: 52 ~ 128 g/m^2, 14 ~ 34 lb
Table Capacity:	100 sheets (80 g/m^2, 20 lb)
Original Standard Position:	Rear left corner
Separation:	FRR
Original Transport:	One flat belt
Original Feed Order:	From the top original
Power Source:	DC 24 V and DC 38 V from the copier
Power Consumption:	130 W
Dimensions (W x D x H):	680 x 560 x 150 mm

1.2 MACHINE CONFIGURATION



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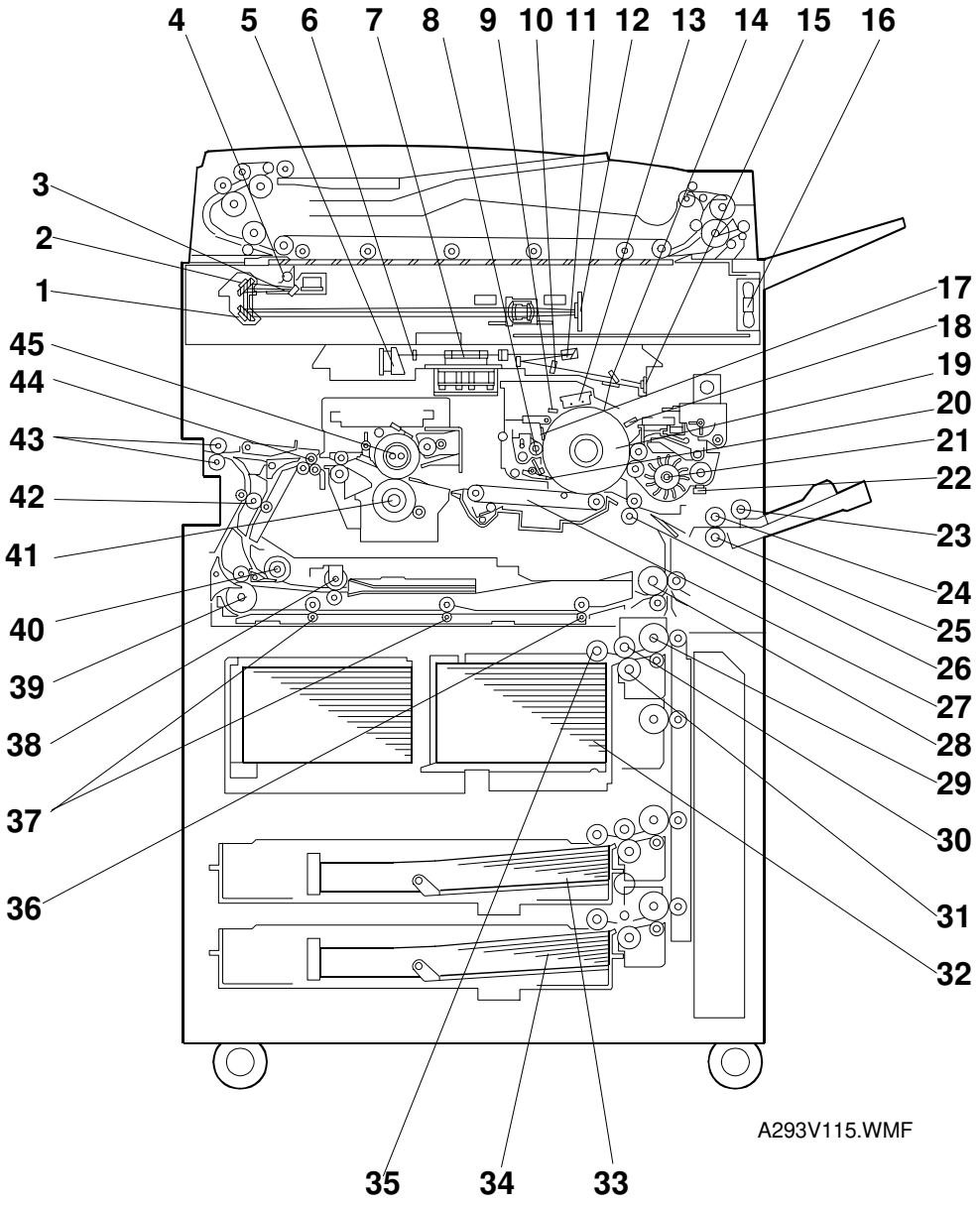
Item	Machine Code		No.
Mainframe	A292/A293	B098	3
Output Tray	B333	B476	2
Finisher	A763, B302, B312	B586	1
Large Capacity Tray	A698	B587	4
Punch Unit (Option for Finisher)	A812-30 (4 holes) A812-31 (4 holes) A812-32 (2 holes) A812-57 (3 holes) A812-67 (2 holes)		Inside the Finisher
Copy Connector Kit (for the tandem copy feature)	B322		
LG Kit (Option for large capacity tray)	B375	B588	
Tab Sheet Holder	B373		

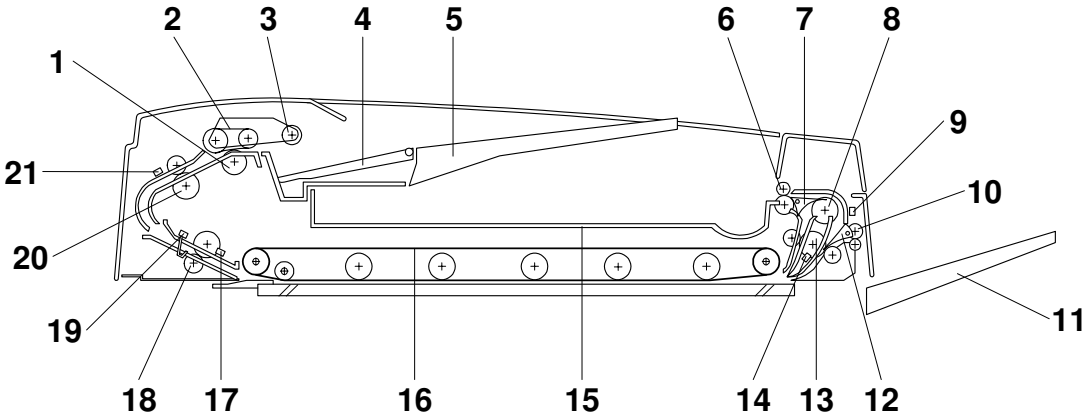
1.3 MECHANICAL COMPONENT LAYOUT

1.3.1 COPIER ENGINE



1. 3rd Mirror
2. 2nd Mirror
3. 1st Mirror
4. Exposure Lamps
5. LD Unit
6. Cylindrical Lens
7. Polygonal Mirror
8. Cleaning Brush
9. Quenching Lamp
10. Barrel Toroidal Lends (BTL)
11. F-theta Mirror
12. SBU
13. Charge Corona Unit
14. Shield Glass
15. Laser Synchronization Detector
16. Optics Cooling Fan Motor
17. Drum Cleaning Blade
18. Drum Potential Sensor
19. Drum
20. Pick-off Pawl
21. Development Unit
22. TD Sensor
23. Pick-up Roller
24. Feed Roller (By-pass Tray)
25. Separation Roller
26. Registration Rollers
27. Transfer Belt Unit
28. Relay Roller
29. Vertical Transport Rollers
30. Feed Roller
31. Separation Roller
32. Tray 1 (Tandem LCT)
33. Tray 2 (550-sheet Tray)
34. Tray 3 (550-sheet Tray)
35. Pick-up Roller
36. Duplex Feed Roller
37. Duplex Transport Rollers
38. Reverse Trigger Roller
39. Inverter Unit Paper Exit Roller
40. Inverter Feed Roller
41. Pressure Roller
42. Transport Rollers
43. Paper Exit Rollers
44. Curl Correction Roller
45. Hot Roller

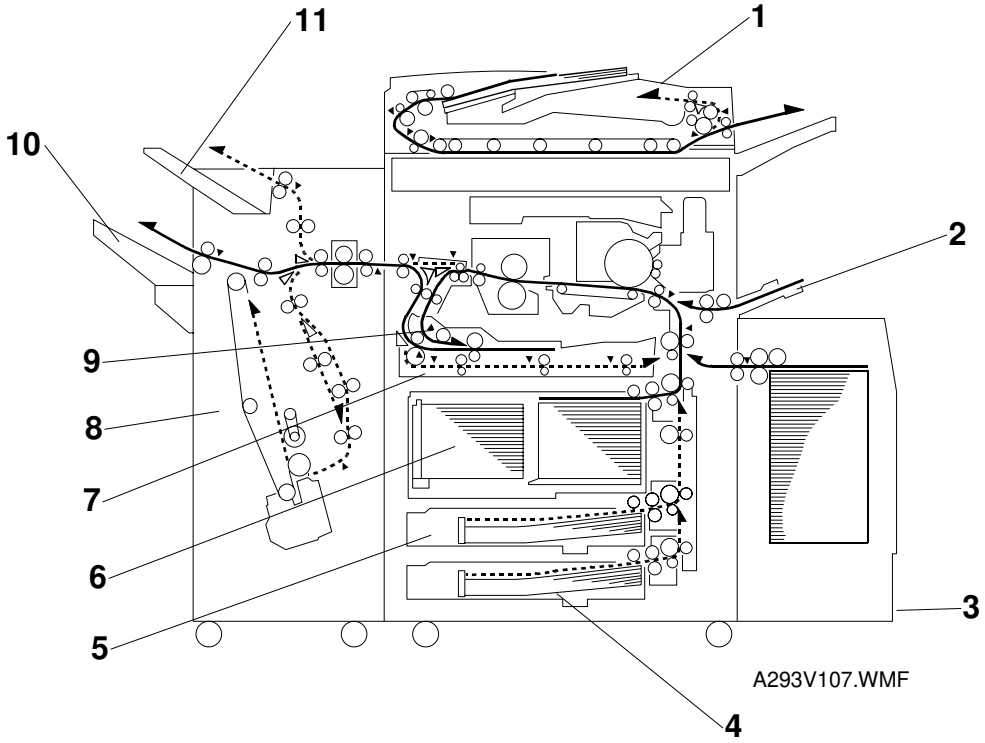
1.3.2 ADF



A293V554.WMF

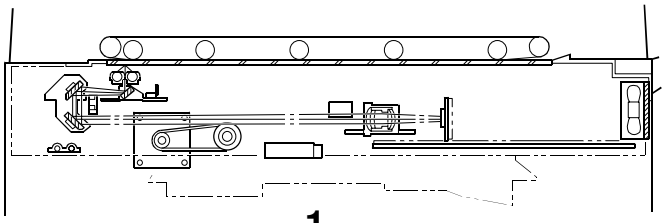
1. Separation Roller
2. Feed Belt
3. Pick-up Roller
4. Bottom Plate
5. Original Tray
6. Upper Tray Exit Roller
7. Inverter Gate
8. Inverter Guide Roller
9. Inverter Sensor
10. Right Tray Exit Roller
11. Right Exit Tray
12. Exit Gate
13. Inverter Roller
14. Exit Sensor
15. Upper Exit Tray
16. Transport Belt
17. Registration Sensor
18. Lower Transport Roller
19. Width Sensor
20. Upper Transport Roller
21. Entrance Sensor

1.4 PAPER PATH



1. ADF
2. By-pass Tray
3. Optional LCT
4. Tray 3 (550-sheet Tray)
5. Tray 2 (550-sheet Tray)
6. Tray 1 (Tandem LCT)
7. Duplex Unit
8. Finisher
9. Inverter Unit
10. Shift Tray
11. Upper Tray

1.5 COPY PROCESS



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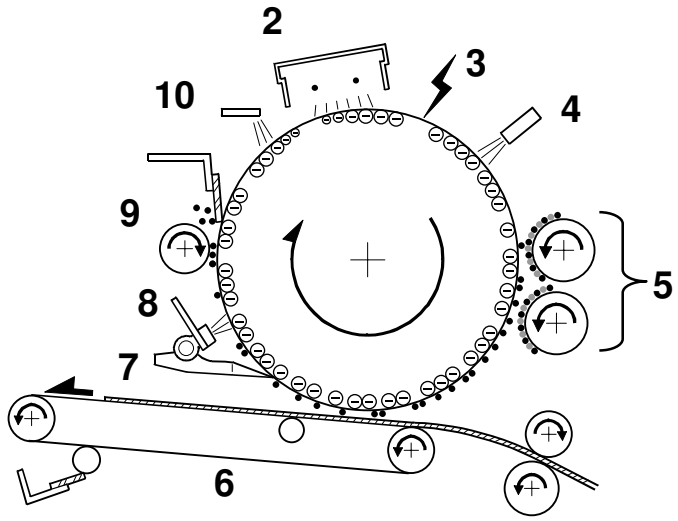

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1. EXPOSURE

A xenon lamp exposes the original. Light reflected from the original passes to the CCD, where it is converted into an analog data signal. This data is converted to a digital signal, processed, and stored in the memory. At the time of printing ,the data is retrieved and sent to the laser diode. For multi-copy runs, the original is scanned once only and stored to the hard disk.

2. DRUM CHARGE

An OPC (organic photoconductor) drum is used in this machine. In the dark, the charge corona unit gives a negative charge to the drum. The grid plate ensures that corona charge is applied uniformly. The charge remains on the surface of the drum because the OPC layer has a high electrical resistance in the dark.

3. LASER EXPOSURE

The processed data from the scanned original is retrieved from the hard disk and transferred to the drum by two laser beams, which form an electrostatic latent image on the drum surface. The amount of charge remaining as a latent image on the drum depends on the laser beam intensity, which is controlled by the BICU board.

4. DRUM POTENTIAL SENSOR

The drum potential sensor detects the electric potential on the drum to correct various process control elements.

5. DEVELOPMENT

The magnetic developer brush on the development rollers comes in contact with the latent image on the drum surface. Toner particles are electrostatically attracted to the areas of the drum surface where the laser reduced the negative charge on the drum.

6. IMAGE TRANSFER

Paper is fed to the area between the drum surface and the transfer belt at the proper time to align the copy paper and the developed image on the drum. Then, the transfer bias roller applies a high positive charge to the reverse side of the paper through the transfer belt. This positive charge pulls the toner particles from the drum to the paper. At the same time, the paper is electrically attracted to the transfer belt.

7. PAPER SEPARATION

Paper separates from the drum as a result of the electrical attraction between the paper and the transfer belt. The pick-off pawls also help separate the paper from the drum.

8. ID SENSOR

The laser forms a sensor pattern on the drum surface. The ID sensor measures the reflectivity of the pattern. The output signal is one of the factors used for toner supply control.

9. CLEANING

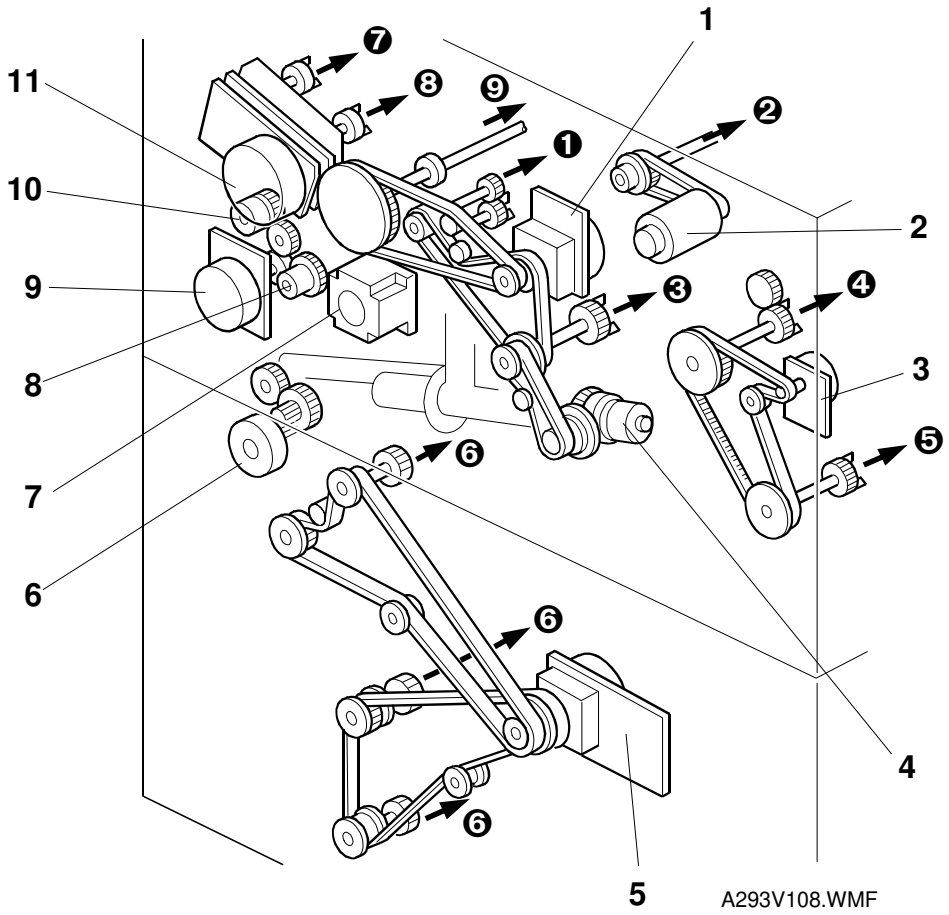
The cleaning brush removes toner remaining on the drum after image transfer and the cleaning blade scrapes off all remaining toner.

10. QUENCHING

The light from the quenching lamp electrically neutralizes the charge on the drum surface.

1.6 DRIVE LAYOUT

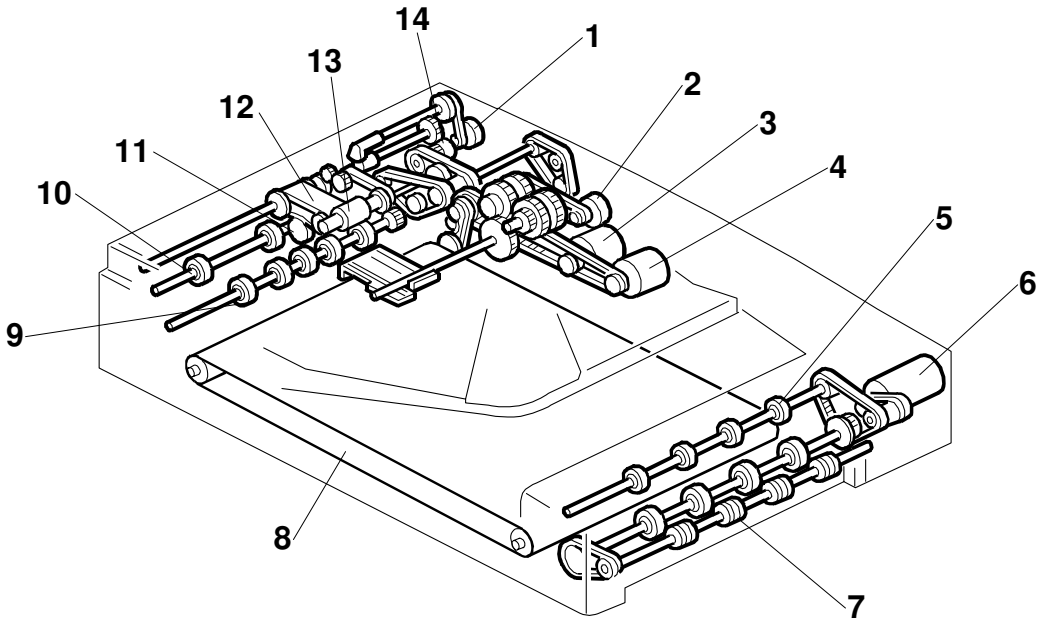
1.6.1 COPIER ENGINE



1. Drum Motor
2. Scanner Motor
3. Fusing/Duplex Motor
4. Toner Recycling Clutch
5. Paper Feed Motor
6. Toner Collection Motor
7. Registration Motor
8. Relay Clutch
9. By-pass Feed Motor
10. By-pass Feed Clutch
11. Development Motor

❶ Cleaning Unit
❷ Scanner Unit
❸ Transfer Belt Unit
❹ Fusing Unit
❺ Duplex Unit
❻ Paper Feed Units
❼ Toner Hopper
❽ Development Unit
❾ Drum

1.6.2 ADF



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1. Pick-up Motor
2. Bottom Plate Motor
3. Feed-in Motor
4. Transport Motor
5. Upper Exit Roller
6. Feed-out Motor
7. Right Exit Roller
8. Transport Belt
9. Lower Transport Roller
10. Upper Transport Roller
11. Separation Roller
12. Feed Belt
13. Pick-up Roller
14. Feed-in Clutch

1.7 ELECTRICAL COMPONENT DESCRIPTION

Refer to the electrical component layout on the reverse side of the point-to-point diagram for the location of the components using the symbols and index numbers.

1.7.1 COPIER ENGINE

Symbol	Name	Function	Index No.
Motors			
M1	Scanner	Drives the 1st and 2nd scanners.	15
M2	Polygonal Mirror	Turns the polygonal mirror.	22
M3	LD Positioning ***(for A292/A293 only)***	Rotates the LD unit to adjust the LD beam pitch when a different resolution is selected.	25
M4	Drum	Drives the drum and cleaning unit.	36
M5	Development	Drives the development unit.	37
M6	Toner Supply	Rotates the toner bottle to supply toner to the development unit.	43
M7	Charge Corona Wire Cleaner	Drives the charge corona wire cleaner.	68
M8	Fusing/Duplex	Drives the fusing unit, duplex unit, inverter unit, and paper exit rollers.	44
M9	Toner Collection	Transports the collected toner to the toner collection bottle.	3
M10	Toner Recycling	Drives the air pump to send recycled toner to the development unit.	6
M11	Paper Feed	Drives all feed and transport rollers in the paper tray unit.	124
M12	1st Tray Lift	Raises and lowers the bottom plate in the 1st paper tray.	125
M13	2nd Tray Lift	Raises the bottom plate in the 2nd paper tray.	127
M14	3rd Tray Lift	Raises the bottom plate in the 3rd paper tray.	128
M15	By-pass Feed	Drives the by-pass feed rollers.	41
M16	Registration	Drives the registration rollers.	40
M17	Rear Fence	Moves the paper stack in the left tandem tray to the right tandem tray.	136
M18	Jogger	Drives the jogger fences to square the paper stack in the duplex unit.	94
M19	Optics Cooling Fan	Removes heat from the optics unit.	21
M20	Drum Cooling Fan	Sends the air to the drum inside.	38
M21	Exhaust Fan	Removes heat from around the fusing unit.	35
M22	Fusing Fan	Removes heat from around the fusing unit.	34
M23	Duplex Cooling Fan	Removes heat from around the duplex unit.	42

Symbol	Name	Function	Index No.
M24	Exit Cooling Fan ***(for A292/A293 only)***	Removes heat from the exit unit.	45
M25	PSU Cooling Fan	Removes heat from around the PSU.	54
M26	SBU Cooling	Removes the heat from around CCD.	19
M27	Exit Cooling Fan 1 ***(for B098 only)***	Removes heat from around the PSU	145
M28	Exit Cooling Fan 2 ***(for B098 only)***	Removes heat from around the PSU	146
Magnetic Clutches			
MC1	Toner Supply	Turns the toner supply roller to supply toner to the development unit.	39
MC2	Toner Recycling	Drives the toner recycling unit.	1
MC3	1st Paper Feed	Starts paper feed from tray 1.	100
MC4	2nd Paper Feed	Starts paper feed from tray 2.	104
MC5	3rd Paper Feed	Starts paper feed from tray 3.	109
MC6	By-pass Feed	Starts paper feed from the by-pass table.	78
MC7	Inverter Exit Clutch	Drives the inverter exit roller.	88
MC8	Duplex Transport	Drives the duplex transport rollers to transport the paper to the duplex feed rollers.	89
MC9	Duplex Feed	Starts paper feed out of the duplex tray back into the machine via to the relay rollers.	91
MC10	1st Vertical Relay	Drives the 1st vertical transport rollers.	101
MC11	2nd Vertical Relay	Drives the 2nd vertical transport rollers.	105
MC12	3rd Vertical Relay	Drives the 3rd vertical transport rollers.	108
MC13	Bank Relay	Drives the bank relay roller.	103
MC14	Relay	Drives the relay rollers.	81
Switches			
SW1	Main Power	Provides power to the machine. If this is off, there is no power supplied to the machine.	9
SW2	Operation	Provides power for machine operation. The machine still has power if this switch is off.	27
SW3	Front Door Safety Switch 1	Cuts the +5 V LD dc power line.	10
SW4	Front Door Safety Switch 2	Detects if the front door is open or not, and cuts the +24 V dc power line.	11
SW5	Front Door Safety Switch 3	Cuts the +5 V LD dc power line.	12
SW6	Lower Front Door Safety	Cuts the +24 V dc power line.	8
SW7	Toner Collection Bottle Set	Detects if the toner collection bottle is set or not.	5

Symbol	Name	Function	Index No.
SW8	Toner Overflow	Detects when the toner collection bottle is full.	4
SW9	Paper Size	Determines the size of paper in tray 2.	129
Solenoids			
SOL1	Transfer Belt Lift	Controls the up-down movement of the transfer belt unit.	70
SOL2	1st Pick-up	Controls the up-down movement of the pick-up roller in tray 1.	99
SOL3	2nd Pick-up	Controls the up-down movement of the pick-up roller in tray 2.	106
SOL4	3rd Pick-up	Controls the up-down movement of the pick-up roller in tray 3.	110
SOL5	By-pass Pick-up	Controls the up-down movement of the pick-up roller for by-pass feed.	76
SOL6	1st Separation Roller	Controls the up-down movement of the separation roller in tray 1.	102
SOL7	2nd Separation Roller	Controls the up-down movement of the separation roller in tray 2.	107
SOL8	3rd Separation Roller	Controls the up-down movement of the separation roller in tray 3.	111
SOL9	Right Tray Lock	Locks the right tandem tray during paper feed from tandem tray.	126
SOL10	Left Tray Lock	Locks the left tandem tray during more the paper from left tray to right tray.	123
SOL11	Front Side Fence	Opens the front side fence of right tandem tray.	134
SOL12	Rear Side Fence	Opens the rear side fence of right tandem tray.	130
SOL13	Duplex Inverter Gate	Moves the junction gate to direct copies to the duplex tray or to the paper exit.	96
SOL14	Reverse Roller	Controls the up-down movement of the reverse trigger roller.	95
SOL15	Guide Plate	Opens the guide plate when a paper misfeed occurs around this area.	80
SOL16	Inverter Gate	Opens the inverter gate during a duplex job.	74
Sensors			
S1	Scanner HP	Informs the CPU when the 1st and 2nd scanners are at home position.	32
S2	Original Width	Detects original width. This is one of APS (Auto Page Select) sensors.	33
S3	Original Length 1	Detects original length. This is one of APS (Auto Page Select) sensors.	16
S4	Original Length 2	Detects original length. This is one of APS (Auto Page Select) sensors.	18
S5	LD Unit Home Position ***(for A292/A293 only***	Informs the CPU when the LD unit is at home position.	24
S6	Drum Potential	Detects the drum surface potential.	66

Symbol	Name	Function	Index No.
S7	Toner Density (TD)	Detects the amount of toner in the developer.	73
S8	Image Density (ID)	Detects the density of the ID sensor pattern on the drum.	69
S9	Toner End	Detects toner end.	72
S10	Toner Collection Motor	Monitors the toner collection motor.	7
S11	Toner Recycling	Monitors the toner recycling and collection unit operation.	2
S12	1st Paper Feed	Controls the 1st paper feed clutch off/on timing and the 1st pick-up solenoid off timing.	120
S13	2nd Paper Feed	Controls the 2nd paper feed clutch off/on timing and the 2nd pick-up solenoid off timing.	116
S14	3rd Paper Feed	Controls the 3rd paper feed clutch off/on timing and the 3rd pick-up solenoid off timing.	114
S15	1st Tray Lift	Detects when the paper in tray 1 is at the correct height for paper feed.	122
S16	2nd Tray Lift	Detects when the paper in tray 2 is at the correct height for paper feed.	118
S17	3rd Tray Lift	Detects when the paper in tray 3 is at the correct height for paper feed.	112
S18	1st Paper End	Informs the CPU when tray 1 runs out of paper.	121
S19	2nd Paper End	Informs the CPU when tray 2 runs out of paper.	117
S20	3rd Paper End	Informs the CPU when tray 3 runs out of paper.	113
S21	By-pass Paper End	Informs the CPU that there is no paper in the by-pass feed table.	77
S22	1st Paper Near End	Informs the CPU when the paper in tray 1 is almost finished.	140
S23	2nd Paper Near End	Informs the CPU when the paper in tray 2 is almost finished.	119
S24	3rd Paper Near End	Informs the CPU when the paper in tray 3 is almost finished.	115
S25	Rear Fence HP	Informs the CPU when the tandem tray rear fence is in the home position.	139
S26	Rear Fence Return	Informs the CPU when the tandem tray rear fence is in the return position.	132
S27	Front Side Fence Open	Defects that the front side fence of tandem tray is opened.	135
S28	Front Side Fence Close	Defects that the front side fence of tandem tray is closed.	138
S29	Rear Side Fence Open	Defects that the rear side fence of tandem tray is opened.	142
S30	Rear Side Fence Close	Defects that the rear side fence of tandem tray is closed.	141

Symbol	Name	Function	Index No.
S31	Right Tray Down	Detects when the bottom plate of the right tandem tray is completely lowered to stop the 1st tray lift motor.	133
S32	Right Tray Paper	Detects whether there is paper or not in the right tray of tandem tray.	131
S33	Left Tandem Tray Paper	Detects whether there is paper or not in the left tray of tandem tray.	137
S34	Duplex Entrance Sensor	Detects the leading and trailing edges of the paper to determine the reverse roller solenoid on or off timing.	98
S35	Duplex Inverter	Defects the leading edge and tray edges of the paper to determine the inverter exit clutch on or off timing.	97
S36	Duplex Transport Sensor 1	Detects the position of paper in the duplex unit.	87
S37	Duplex Transport Sensor 2	Detects the position of paper in the duplex unit.	93
S38	Duplex Transport Sensor 3	Detects the position of paper in the duplex unit.	92
S39	Duplex Jogger HP	Detects if the duplex jogger fences are at the home position or not.	90
S40	Relay	Detects misfeeds.	82
S41	Registration	Detects misfeeds and controls registration clutch off-on timing.	83
S42	Guide Plate Position	Detects whether the registration guide plate is closed or not.	75
S43	Fusing Exit	Defects misfeeds	62
S44	1st Exit	Detects misfeeds.	84
S45	2nd Exit	Detects misfeeds.	85
S46	Tray Paper Limit (option)	Detects paper overflow on the output tray.	86
PCBs			
PCB1	BICU	Controls all base engine functions both directly and through other control boards.	20
PCB2	PSU	Provides dc power to the system and ac power to the fusing lamp and heaters.	53
PCB3	IOB	Controls the mechanical parts of the machine (excluding the scanner unit section), and the fusing lamp.	47
PCB4	SBU	Contains the CCD, and outputs a video signal to the SBICU board.	17
PCB5	MCU	Controls the components in the scanner unit.	46
PCB6	Lamp Regulator	Provides dc power to the exposure lamp.	14
PCB7	CNB	Passes signals and dc supplies from the PSU and IOB to motors and other components.	59

Symbol	Name	Function	Index No.
PCB8	DRB	Drives the registration, by-pass feed and development motor.	50
PCB9	Paper Feed Control Board (PFB)	Controls the mechanical parts of all paper feed sections.	52
PCB10	Operation Panel 1	Controls the components on the right-hand side of the operation panel.	28
PCB11	Operation Panel 2	Controls the components on the left-hand side of the operation panel.	31
PCB12	LCD Control	Controls the LCD.	30
PCB13	By-pass Paper Size	Detects the paper width on the by-pass tray.	79
PCB14	Mother (Option)	Connects the printer control board.	–
PCB15	Printer Control (Option)	Receives print data from a PC.	–
PCB16	Copy Connect	Receives and sends data to other copier.	–
PCB17	RSS Board	Passes signal for RDS function	51
Lamps			
L1	Exposure Lamp	Apply high intensity light to the original for exposure.	13
L2	Fusing Lamp 1	Provides heat to the hot roller.	64
L3	Fusing Lamp 2	Provides heat to the hot roller.	63
L4	Quenching	Neutralizes any charge remaining on the drum surface after cleaning.	67
Power Packs			
PP1	Charge	Provides high voltage for the charge corona wires and the grid plate.	65
PP2	Development	Provides high voltage for the development unit.	49
PP3	Transfer	Provides high voltage for the transfer belt.	71
Others			
TF1	Fusing Thermofuse ***(for A292/A293 only)***	Opens the fusing lamp circuit if the fusing unit overheats.	61
TH1	Fusing Thermistor	Detects the temperature of the hot roller.	60
H1	Drum	Turns on when the main switch is off to prevent moisture from forming around the drum.	58
H2	Tray Heater 1	Turns on when the main switch is off to keep paper dry in the paper tray.	57
H3	Tray Heater 2	Turns on when the main switch is off to keep paper dry in the paper tray.	55
CB1	Circuit Breaker	Provides back-up high current protection for the electrical components.	56
HDD 1	HDD	Scanned image data is compressed and held here temporarily.	48

Symbol	Name	Function	Index No.
LCD 1	LCD	Displays the operation menus and messages.	29
LSD 1	Laser Synchronization Detector	Detects the laser beam at the start of the main scan.	23
LDU1	Laser Diode Unit	Controls the laser diode.	26
TP1	Touch Panel	Monitors the key matrix.	(29)
TS 1	Thermostat 1 ***(for B098 only)***	Opens the fusing lamp circuit if the fusing unit overheats.	143
TS 2	Thermostat 2 ***(for B098 only)***	Opens the fusing lamp circuit if the fusing unit overheats.	144

1.7.2 ADF

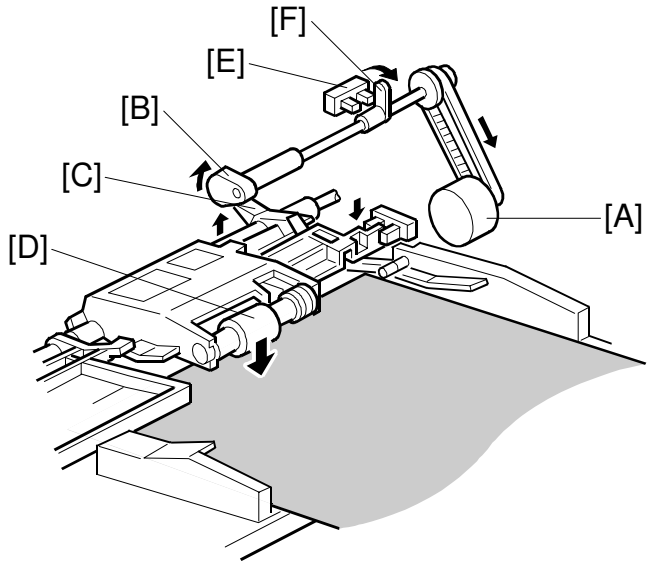
Symbol	Name	Function	Index No.
Motors			
M1	Pick-up	Moves the pick-up roller up and down.	3
M2	Feed-in	Drives the feed belt, and the separation, pick-up, and transport rollers.	8
M3	Transport Belt	Drives the transport belt.	9
M4	Feed-out	Drives the exit and inverter rollers.	14
M5	Bottom Plate	Moves the bottom plate up and down.	7
Sensors			
S1	APS Start	Informs the CPU when the DF is opened and closed (for platen mode) so that the original size sensors in the copier can check the original size.	12
S2	DF Position	Detects whether the DF is lifted or not.	13
S3	Original Set	Detects whether an original is on the table.	19
S4	Bottom Plate HP	Detects whether the bottom plate is in the down position or not.	20
S5	Bottom Plate Position	Detects when the original is at the correct position for feeding.	4
S6	Pick-up Roller HP	Detects whether the pick-up roller is up or not.	2
S7	Entrance	Detects when to restart the pick-up motor to lift up the pick-up roller, detects when to change the feed motor direction, detects the trailing edge of the original to finish checking the original length, and checks for misfeeds.	26
S8	Registration	Detects the leading edge of the original to check the original length, detects when to stop the original on the exposure glass, and checks for misfeeds.	21
S9	Original Width 1	Detects the original width.	22

Symbol	Name	Function	Index No.
S10	Original Width 2	Detects the original width.	23
S11	Original Width 3	Detects the original width.	24
S12	Original Length	Detects the original length.	25
S13	Exit	Detects when to stop the transport belt motor and checks for misfeeds.	18
S14	Inverter	Detects when to turn the inverter gate and exit gate solenoids off and checks for misfeeds.	17
S15	Feed Cover	Detects whether the feed cover is open or not.	5
S16	Exit Cover	Detects whether the exit cover is open or not.	15
Solenoids			
SOL1	Exit Gate	Opens and closes the exit gate.	16
SOL2	Inverter Gate	Opens and closes the inverter gate.	11
Magnetic Clutches			
MC1	Feed-in	Drives the feed belt, separation roller, and pick-up roller.	1
PCBs			
PCB1	DF Main	Controls the DF and communicates with the main copier boards.	10
PCB2	DF Indicator	Indicates whether an original has been placed in the feeder, and indicates whether SADF mode has been selected.	6

2. DETAILED DESCRIPTIONS

2.1 DOCUMENT FEEDER

2.1.1 PICK-UP ROLLER RELEASE



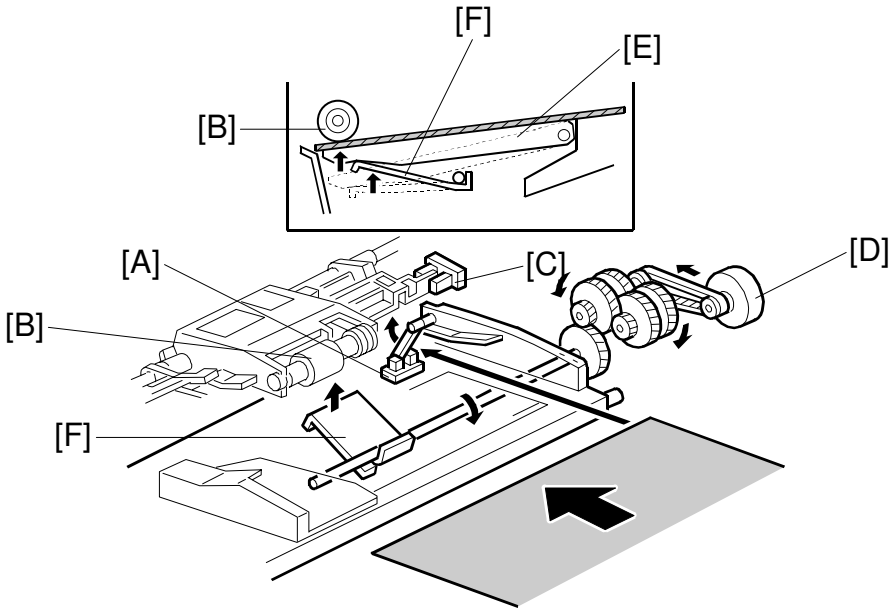
B301D103.WMF

When the original set sensor is off (no original on the original tray), the pick-up roller remains in the up position.

When the original set sensor turns on (or when the trailing edge of a page passes the entrance sensor while pages remain on the original tray), the pick-up motor [A] turns on. The cam [B] rotates away from the pick-up roller release lever [C]. The lever then rises and the pick-up roller [D] drops onto the original.

When the original reaches the entrance sensor, the pick-up motor turns on again. The cam pushes the lever down, and the pick-up roller rises until the pick-up roller HP sensor [E] detects the actuator [F].

2.1.2 BOTTOM PLATE LIFT

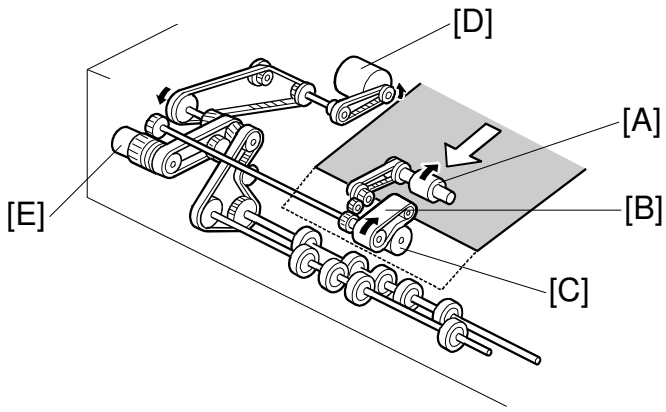


B301D105.WMF

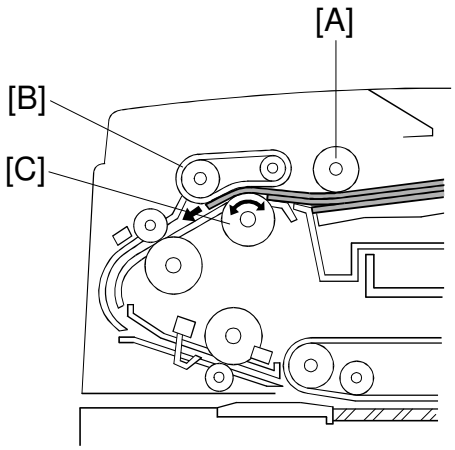
When an original is placed on the original tray, the original set sensor [A] turns on. The pick-up roller [B] drops on to the original, and the bottom plate position sensor [C] turns off. Then the bottom plate motor [D] turns on, and lifts the bottom plate [E] by raising the lift lever [F] until the bottom plate position sensor turns on.

The level of the pick-up roller drops as the stack of originals becomes smaller, and eventually the bottom plate position sensor [C] turns off. Then, the bottom plate motor turns on, and lifts the bottom plate until the bottom plate position sensor turns on. This keeps the original at the correct height for feeding.

2.1.3 PICK-UP AND SEPARATION



B301D102.WMF



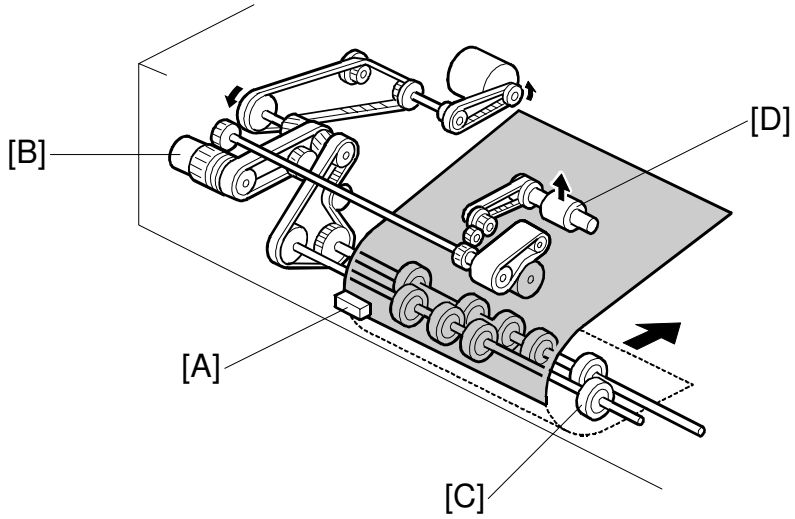
B301D506.WMF

The original separation system is a Feed and Reverse Roller (FRR) system. The pick-up roller [A] feeds belt [B], and separation roller [C] are driven by the feed-in motor [D].

To drive this mechanism, the feed-in motor [D] and feed-in clutch [E] turn on.

When two sheets of originals are fed from the pick-up roller, the separation roller turns in the opposite direction to the feed belt, and the 2nd sheet is pushed back to the original tray. When there is only one sheet between the feed belt and separation roller, the separation roller rotates in the same direction as the feed belt. This is because the separation roller contains a torque limiter.

2.1.4 ORIGINAL FEED

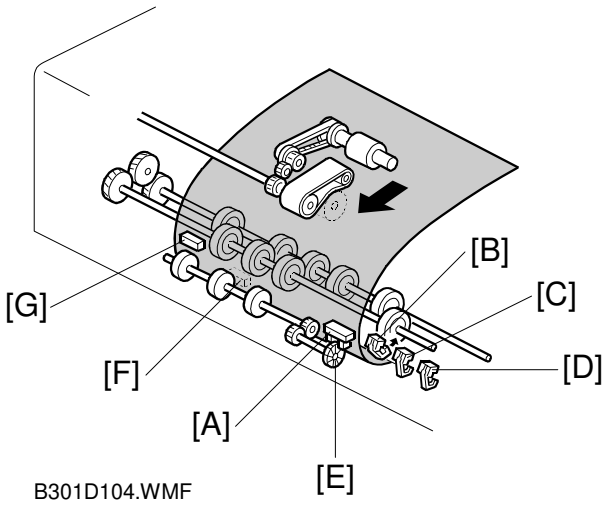


B301D109.WMF

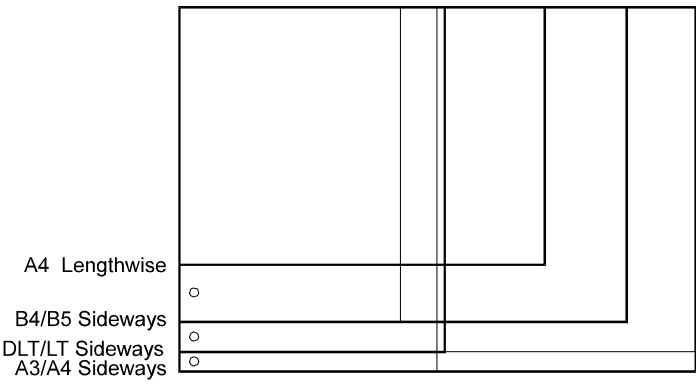
When the leading edge of the original turns the entrance sensor [A] on, the feed-in clutch [B] turns off, and the drive for the feed belt is released. The original is fed from the transport rollers [C].

At the same time, the pick-up motor starts again and the pick-up roller [D] is lifted up. When the pick-up roller HP sensor turns on, the pick-up motor stops (see Pick-up Roller Release).

2.1.5 ORIGINAL SIZE DETECTION



B301D104.WMF



B301D503.WMF

The DF detects the original size by combining the readings of original length sensor [A], and original width sensors-1 [B], -2 [C], and -3 [D].

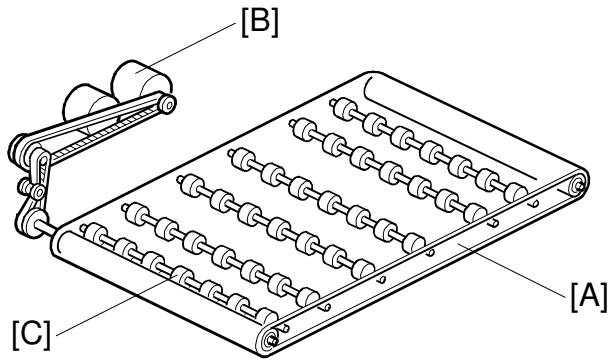
Original Length

The original length sensor and the disk [E] (connected to the transport roller) generate a pulse signal. The CPU counts pulses, starting when the leading edge of the original turns on the registration sensor [F], until the trailing edge of the original turns off the entrance sensor [G].

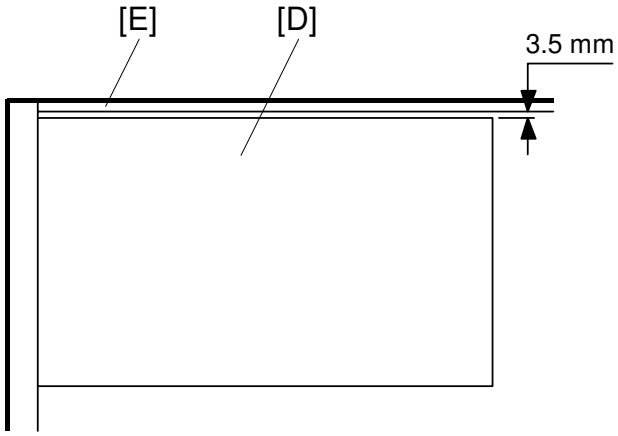
Original Width

The CPU detects original width using three original width sensors -1, -2, -3 as shown above. Three small circles on the diagram indicate the positions of the sensors.

2.1.6 ORIGINAL TRANSPORT



B301D106.WMF



B301D509.WMF

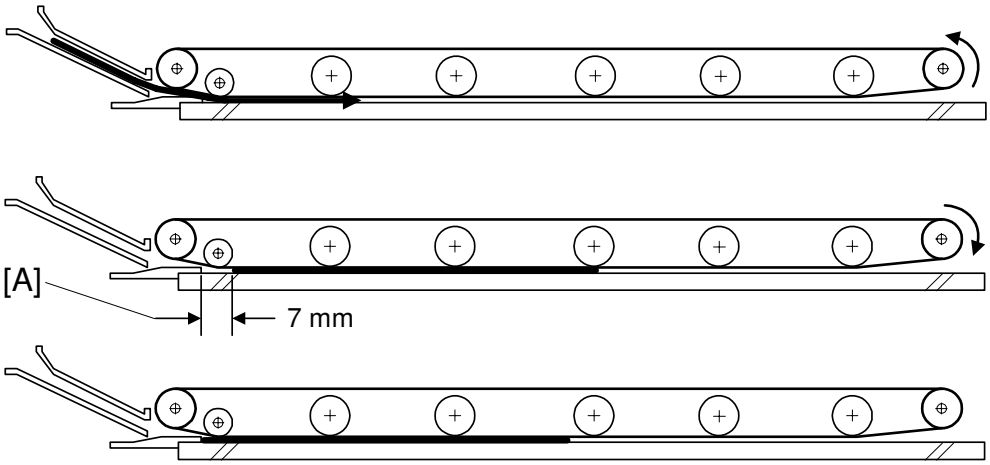
The transport belt [A] is driven by the transport belt motor [B]. The transport belt motor starts when the copier sends an original feed-in signal.

Inside the transport belt are six pressure rollers. These rollers maintain the correct pressure between the belt and original. The pressure roller [C] closest to the left original scale is made of rubber as stronger pressure needed for thick originals. The other rollers are sponge rollers.

Normally, originals are manually placed at the left rear corner, so an original [D] fed from the DF must also be at this position. However, if the original is fed along the rear scale [E], original skew, jam, or wrinkling may occur.

To prevent such problems, the original transfer position is set to 3.5 mm away from the rear scale as shown. The 3.5 mm gap is compensated for, by changing the starting position of the main scan.

2.1.7 ORIGINAL SKEW CORRECTION



B301D500.WMF

The transport belt motor remains energized to carry the original about 7 mm past the left scale [A] (see the middle drawing). Then the motor stops and reverses, feeding the original back against the left scale (see the bottom drawing). This forces the original to hit the left scale, which aligns the trailing edge to minimize original skew on the exposure glass.

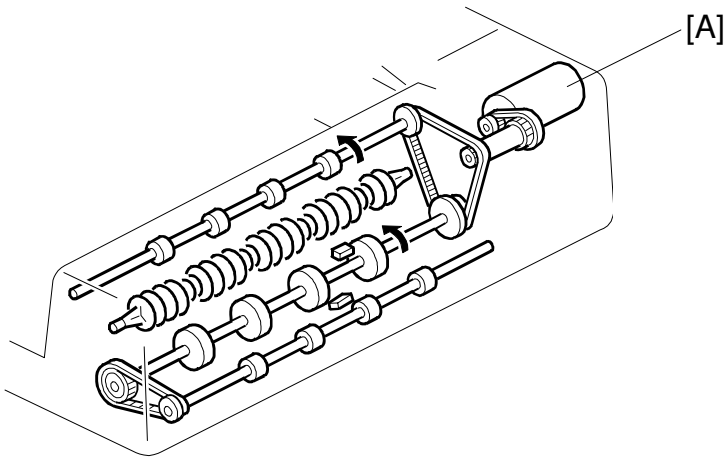
If thin original mode is selected, the original is not forced back against the left scale. This is to prevent damage to the original.

After a two-sided original has been inverted to copy the 2nd side, it is fed in from the inverter against the left scale (see the bottom drawing; the top two drawings do not apply in this mode).

The amount of reverse feed against the left scale can be adjusted with SP modes.

2.1.8 ORIGINAL INVERSION AND FEED-OUT

General Operation



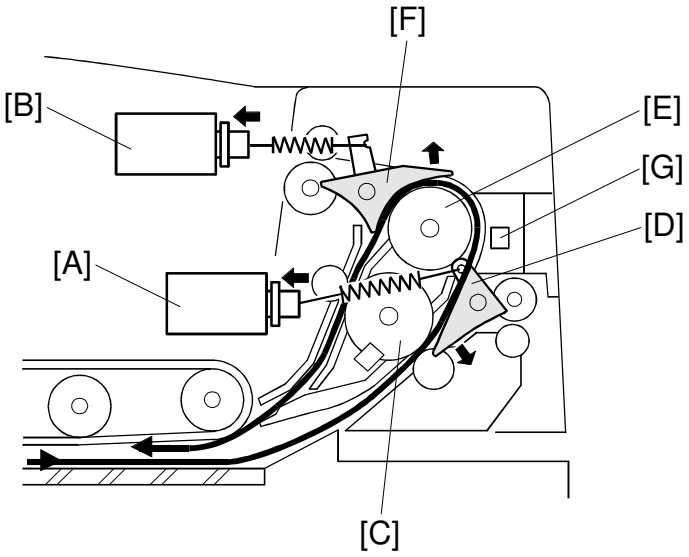
B301D107.WMF

When the scanner reaches the return position, the copier's CPU sends the feed-out signal to the DF. After the DF receives the feed-out signal, the transport belt motor and feed-out motor [A] turn on. The original is then fed out to the exit tray, or fed back to the exposure glass after reversing in the inverter section.

This DF has two exit trays. For single-sided original mode, the original is fed out to the right exit tray. For double-sided original mode, the original is fed out to the upper exit tray.

This causes the originals to be fed out in the correct order on the exit trays, and allows the maximum one-to-one copy speed for each mode. The user can change the exit tray to the upper exit tray for single-sided mode (for example, if there is not enough space in the room for the right exit tray to be installed). However, one-to-one copy speed for this mode is reduced.

Original Inversion

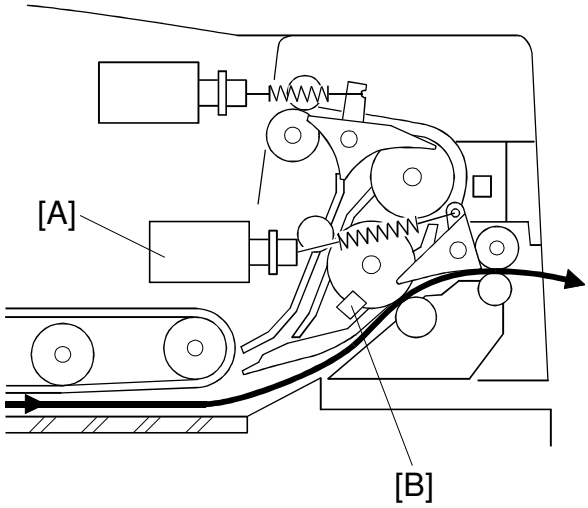


B301D113.WMF

When the DF receives the original invert signal from the copier, the transport belt motor, feed-out motor, exit gate solenoid [A], and inverter gate solenoid [B] turn on. The original is fed back to the exposure glass through the inverter roller [C], exit gate [D], inverter guide roller [E], inverter gate [F], and inverter roller.

The transport belt motor turns in reverse shortly after the leading edge of the original turns on the inverter sensor [G], and feeds the original to the left scale.

Original Exit (Single-Sided Original Mode)

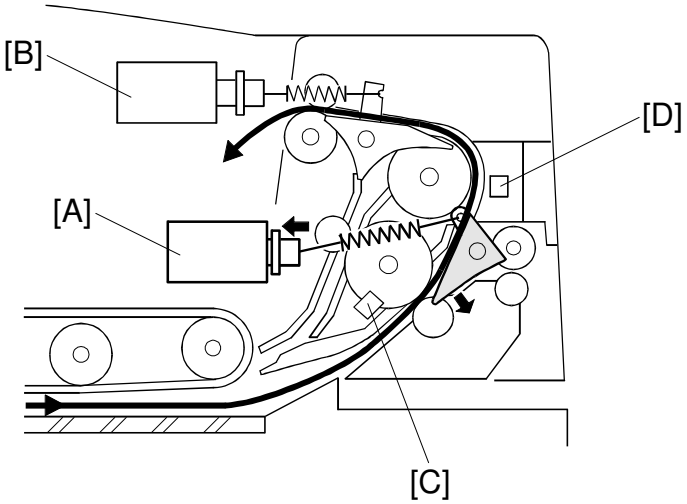


B301D111.WMF

The exit gate solenoid [A] remains off, and the original is fed out to the right exit tray. The transport belt motor turns off after the exit sensor [B] turns off.

To stack the originals neatly on the exit tray, the feed-out motor speed is reduced about 30 mm before the trailing edge of the original turns off the exit sensor.

Original Exit (Double-Sided Original Mode)

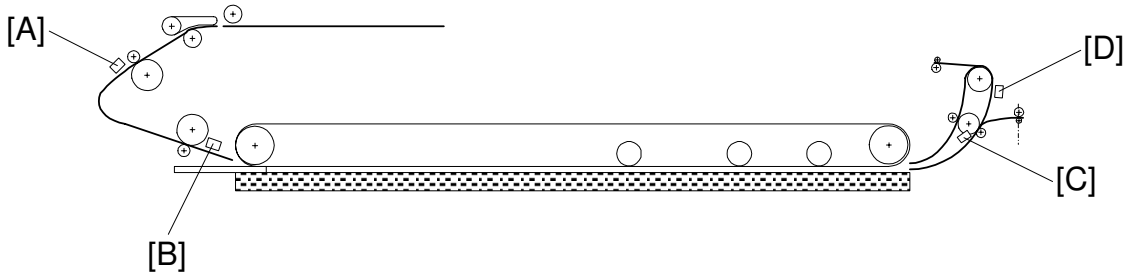


B301D112.WMF

The exit gate solenoid [A] turns on, while the inverter gate solenoid [B] remains off. The original is fed out to the upper tray. The transport belt motor turns off when the trailing edge of the original passes through the exit sensor [C].

To stack the originals neatly on the upper tray, the feed-out motor speed is reduced shortly after the trailing edge of the original turns off the inverter sensor [D].

2.1.9 JAM CONDITIONS



B301D501.WMF

Feed-in

1. The entrance sensor [A] is still off 500 ms after the feed-in motor turned on.
2. The registration sensor [B] is still not off 300 ms after the feed-in motor speed increased.
3. The entrance sensor is still on when the feed-in and transport motors have fed the original 442 mm after the registration sensor turned on.

Feed-out

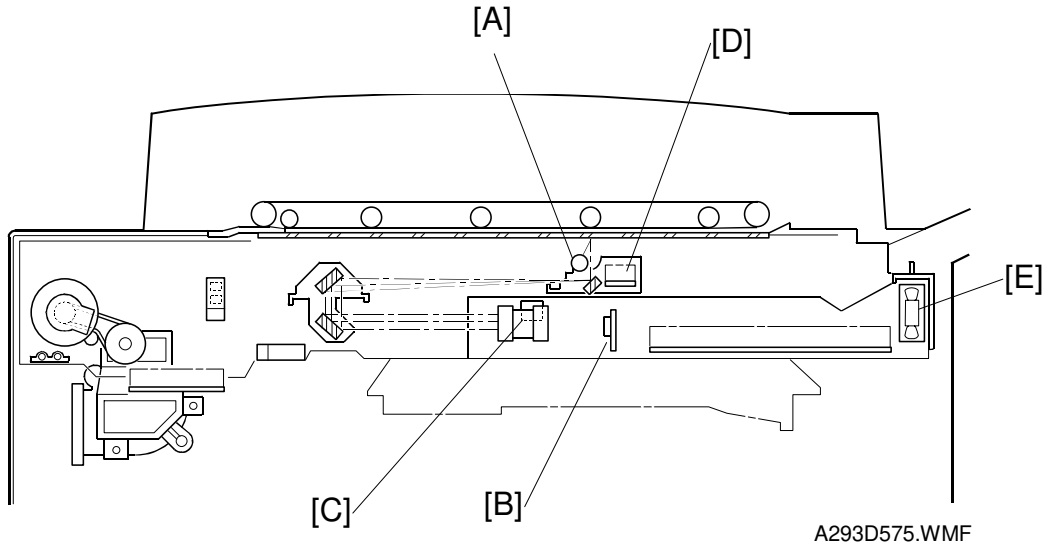
4. The registration sensor is still on when the feed-in and transport motors have fed the original 751 mm after the registration sensor turned on.
5. The exit sensor [C] is still off when the transport and feed-out motors have fed the original 129 mm after the feed-out motor turned on.
6. The exit sensor is still on when feed-out motor has fed the original X mm (X = original length x 1.3) after the exit sensor turned on.

Inversion

7. The exit sensor is still off when the transport and exit motors have fed the original 198 mm after the transport motor turned on to feed the original to the inverter section.
8. The exit sensor is still on when the feed-out motor has fed the original X mm (X = original length x 1.3) after the exit sensor turned on.
9. The inverter sensor [D] is still off when the transport and feed-out motors have fed the original 96 mm after the exit sensor turned on.
10. The inverter sensor is still off when the transport and feed-out motors have fed the original 96 mm to the exposure glass after the exit sensor turned off.

2.2 SCANNING

2.2.1 OVERVIEW



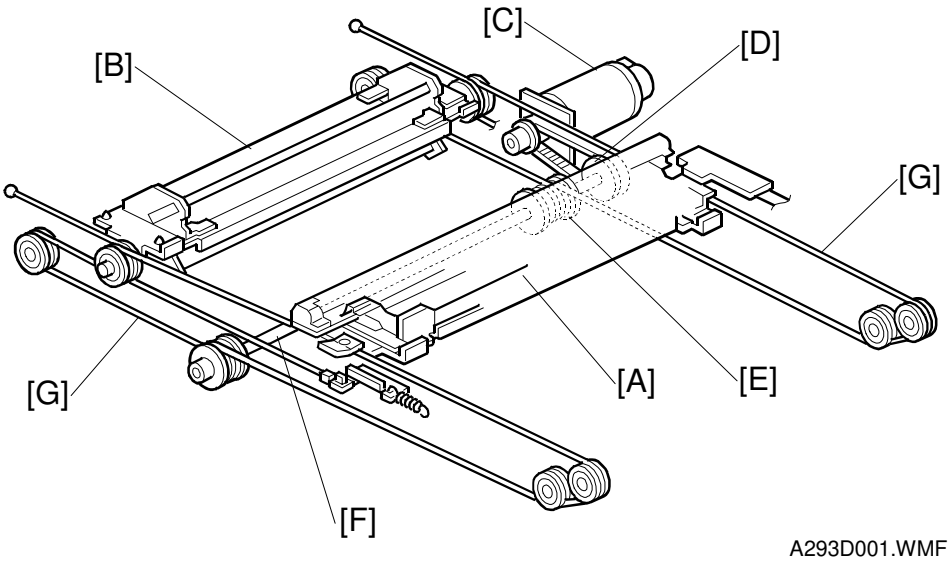
The original is illuminated by the exposure lamp (a xenon lamp in this model) [A]. The image is reflected onto a CCD (charge coupled device) [B] via the 1st, 2nd, and 3rd mirrors, and through the lens [C].

The 1st scanner consists of the exposure lamp, the 1st mirror and the lamp regulator [D].

The exposure lamp is energized by a dc supply (24 V) to avoid uneven light intensity while the 1st scanner moves in the sub scan direction (down the page). The entire exposure lamp surface is frosted to ensure even exposure in the main scan direction (across the page).

There is an optics cooling fan [E] on the right side of the optics cavity to draw cool air inside. The hot air exits through the vents in the upper cover. The fan operates whenever the operation switch is turned on.

2.2.2 SCANNER DRIVE



A293D001.WMF

The scanner drive motor is a dc servo motor. The 1st and 2nd scanners [A, B] are driven by the scanner drive motor [C] through the timing belt [D], scanner drive pulley [E], scanner drive shaft [F], and two scanner wires [G].

The MCU board controls the scanner drive motor. In full size mode, the 1st scanner speed is 425 mm/s during scanning. The 2nd scanner speed is half that of the 1st scanner.

In reduction or enlargement mode, the scanning speed depends on the magnification ratio. The returning speed is always the same, whether in full size or magnification mode. The image length is changed in the sub scan direction by changing the scanner drive motor speed, and in the main scan direction it is changed by image processing on the BICU board.

Magnification in the sub-scan direction can be adjusted by changing the scanner drive motor speed using SP4008.

2.2.3 ORIGINAL SIZE DETECTION IN BOOK MODE

Original Size		Length Sensor		Width Sensor			SP4301 Display
A4/A3 Version	LT/DLT Version	2	1	3	4	5	
A3	11" x 17"	O	O	O	O	O	10011111
B4	10" x 14"	O	O	O	O	X	10011110
F4	8 1/2" x 14" (8" x 13")	O	O	O	X	X	10011100
A4-L	8 1/2" x 11"	X	O	O	X	X	10001100
B5-L	–	X	O	X	X	X	10001000
A5-L	5 1/2" x 8 1/2"	X	X	X	X	X	10000000
A4-S	11" x 8 1/2"	X	X	O	O	O	10000111
B5-S	–	X	X	O	O	X	10000110
A5-S	8 1/2" x 5 1/2"	X	X	O	X	X	10000100

-L: Lengthwise, -S: Sideways, O: High (Paper Present), X: Low

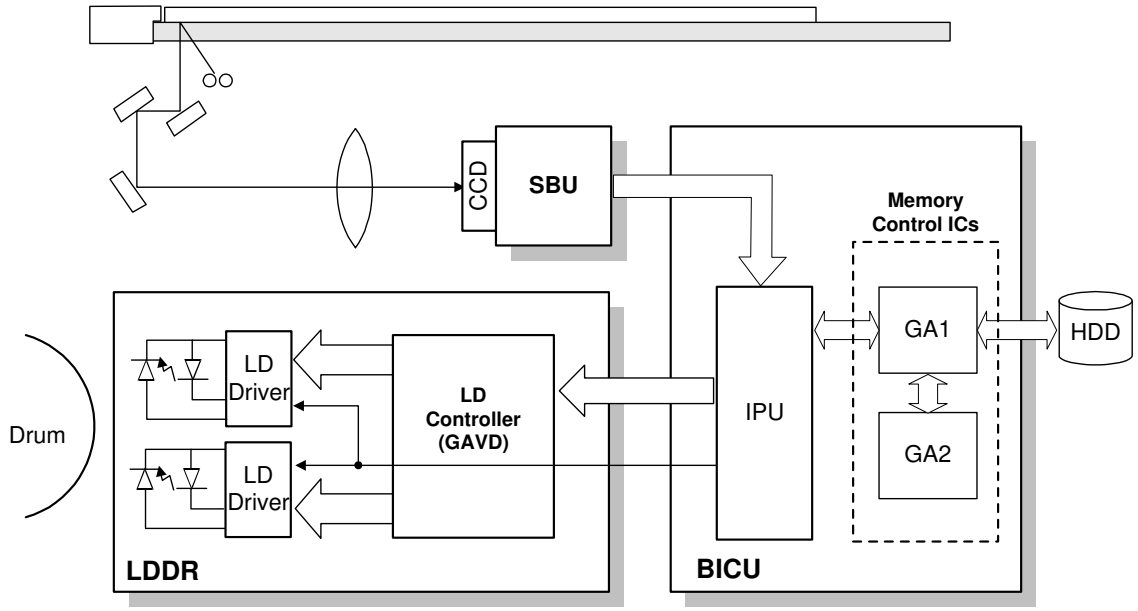
The original size data is taken by the main CPU when the DF position sensor is activated. This is when the DF is positioned about 15 cm above the exposure glass. At this time, only the sensor(s) located underneath the original receive the reflected light and switch on. The other sensor(s) are off. The main CPU can recognize the original size from the on/off signals from the five sensors.

If the copy is made with the platen open, the main CPU decides the original size from the sensor outputs when the Start key is pressed.

The above table shows the outputs of the sensors for each original size. This original size detection method eliminates the necessity for a pre-scan and increases the machine's productivity. However, if the by-pass feeder is used, note that the machine assumes that the copy paper is lengthwise. For example, if A4 sideways paper is placed on the by-pass tray, the machine thinks it is A3 paper and scans the full A3 area, disregarding the original size sensors. However, for each page, the data signal to the laser diode is stopped to match the copy paper length detected by the registration sensor. This means that copy time for the first page may be slower (because of the longer time required for scanning), but it will be normal for the rest of the job.

2.3 IMAGE PROCESSING

2.3.1 OVERVIEW



A293D579.WMF

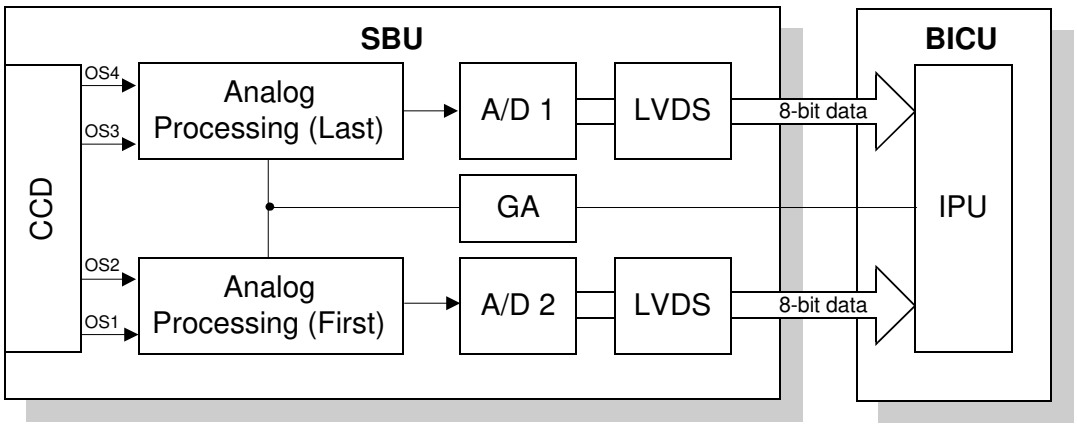
The CCD generates an analog video signal. The SBU (Sensor Board Unit) converts the analog signal to an 8-bit digital signal, then it sends the digital signal to the BICU (Base-engine, and Image Processing Control Unit) board.

The BICU board can be divided into two image processing blocks; the IPU (Image Processing Unit) and the memory control IC. These two ICs mainly do the following:

- **IPU:** Auto shading, filtering, magnification, γ correction, gradation processing, and video path control
- **Memory Controller:** Image compression, image rotation, interface with HDD controller, image repeat, and combine originals

Finally, the BICU board sends the video data to the LD drive board.

2.3.2 SBU



B098D502.WMF

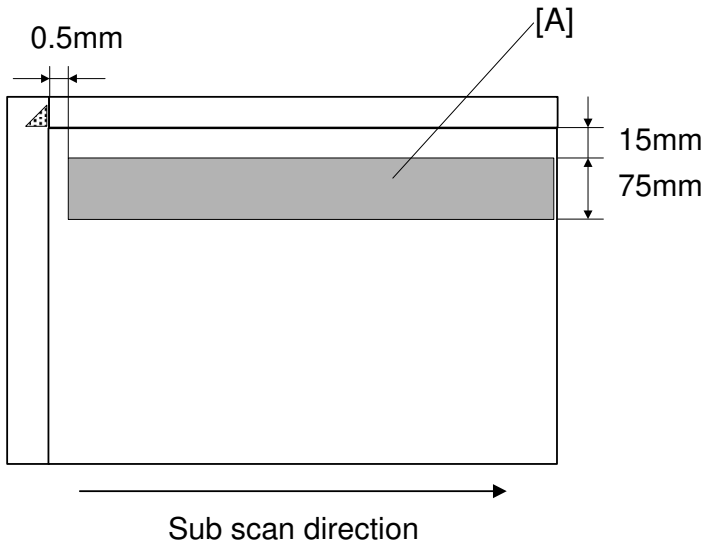
The CCD converts the light reflected from the original into an analog signal. The CCD line has 7,500 pixels and the resolution is 600 dpi (23.6 lines/mm).

The CCD has four output lines: OS1, OS2, OS3, and OS4. OS1 and OS2 are for the first half of the scan line (Non-operation side), and OS3 and OS4 are for the last half of the scan line (Operation side). There are two analog processing ICs; one handles the first half line (OS 1 and OS2) and the other handles the last half line (OS3 and OS4). The analog processing IC performs the following operations:

1) Combines the odd and even signals into one line signal.
2) Adjust the black reference level of each CCD output channel.
3) Amplifies the analog signal from the CCD.

After the above processing, the analog signals are converted to 8-bit signals by the A/D converter. This gives a value for each pixel on scale of 256 grades. Then, the two 8-bit signals are sent to the BICU board through the LVDS (Low Voltage Differential Signaling). The LVDS is a noise-resistant interface.

2.3.3 AUTO IMAGE DENSITY (ADS)



A293D676.WMF

This mode prevents the background of an original from appearing on copies.

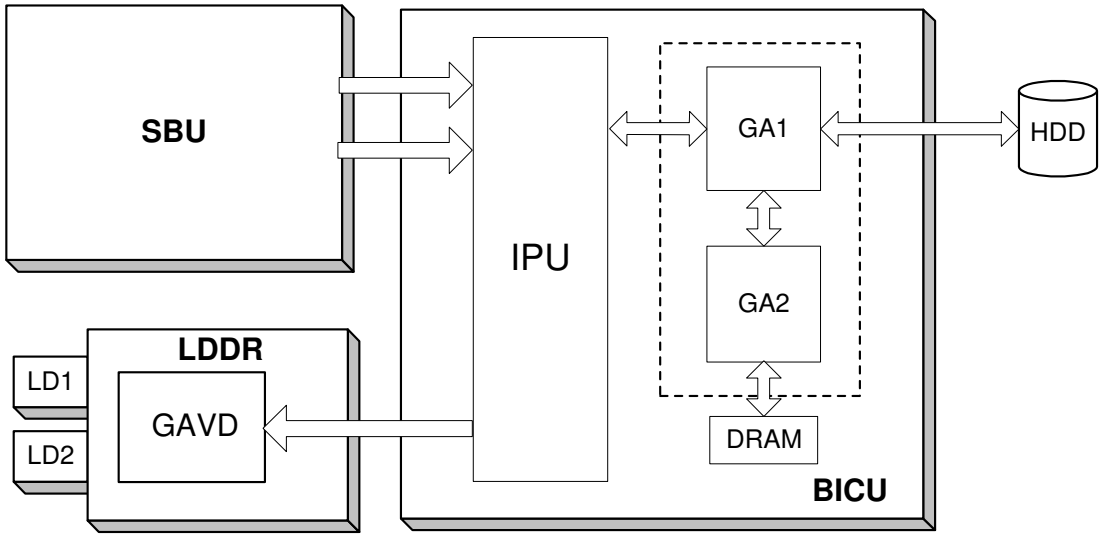
The copier scans the auto image density detection area [A]. This corresponds to a narrow strip at one end of the main scan line, as shown in the diagram. As the scanner scans down the page, the IPU on the BICU detects the peak white level for each scan line, within this narrow strip only. From this peak white level, the IPU determines the reference value for A/D conversion for the scan line. Then, the IPU sends the reference value to the A/D controller on the SBU.

When an original with a gray background is scanned, the density of the gray area is the peak white level density. Therefore, the original background will not appear on copies. Because peak level data is taken for each scan line, ADS corrects for any changes in background density down the page.

As with previous digital copiers, the user can select manual image density when selecting auto image density mode and the machine will use both settings when processing the original.

2.3.4 IPU (IMAGE PROCESSING UNIT)

Overview



A293D581.WMF

The image data from the SBU goes to the IPU (Image Processing Unit) IC on the BICU board, which carries out the following processes on the image data.

1. Auto shading
2. Text/Photo separation
3. Background/Independent dot erase
4. Filtering (MTF and smoothing)
5. Magnification
6. γ correction
7. Grayscale processing
8. Error diffusion
9. Dithering
10. Video path control
11. Test pattern generation

2.3.5 IMAGE PROCESSING STEPS AND RELATED SP MODES

Text Mode

MTF filtering is used in text mode. The MTF filtering coefficient and strength can be adjusted individually for both main and sub scan. Low density originals are produced better when a stronger MTF filter is selected, but in this case, moiré tends to appear.

With UP Mode (Copy Features – General Features – Original Mode Quality Level), the user can select 'Soft', 'Normal', 'Sharp', and 'SP Mode Changed'. The settings of the SP modes indicated with an asterisk (*) are not used unless the user selects 'SP Mode Changed'.

	Image Processing Steps	Related SP Modes
Input Correction 1	Auto Shading	
Input Correction 2	Background Erase	• SP4903-065 * (Scanner Gamma Threshold Level) • SP4903-070 * (Background Erase Level)
	Independent Dot Erase	• SP4903-060 (Independent Dot Erase Level)
Filtering	MTF	• SP4903-010 to 011 * (Pre-Filter Coefficient) • SP4903-020 to 035 * (MTF Filter Strength)
Magnification	Main Scan Magnification	• SP2909-001 (Main Scan Magnification)
ID Control	γ Correction	• SP4903-84 * (Scanner gamma setting)
Gradation	Error Diffusion/ Line Width Correction	• SP4903-78 to 80 *, 4904-20 (Line Width Correction Type)

Photo Mode

Normally, the smoothing filter is used in photo mode but MTF filtering can also be selected with SP mode.

With UP Mode (Copy Features – General Features – Original Mode Quality Level), the user can select 'Screen Printed', 'Normal', 'Continuous Tone', and 'SP Mode Changed'. The settings of the SP modes indicated with an asterisk (*) are not used unless the user selects 'SP Mode Changed'.

When the user selects "Normal Paper" and "Continuous Tone", error diffusion is used for the gradation process. However, if the user selects "Screen Printed", dither processing is used.

	Image Processing Path	Related SP Modes
Input Correction 1	Auto Shading	
Input Correction 2	Background Erase	• SP4903-66 * (Scanner Gamma Thresh Level) • SP4903-071 * (Background Erase Level)
Filtering	Smoothing/MTF	• SP4903-012 * (Pre Filter Coefficient) • SP4903-009 * (Filter Type Selection) • SP4903-036 to 038 * (Smoothing/MTF Filter Coefficient Level in Photo Mode) • SP4904-006 (Smoothing Filter Level)
Magnification	Main Scan Magnification	• SP2909-001 (Main Scan Magnification)
ID Control	γ Correction	
Gradation	Error Diffusion/ Dither Matrix	• SP4904-002 * (Grayscale Process Selection: Dither or Error Diffusion)

Text/Photo Mode

MTF filtering is used for text/photo mode.

With UP Mode (Copy Features – General Features – Original Mode Quality Level), the user can select 'Photo Mode', 'Normal', 'Text Mode', and 'SP Mode Changed'. The settings of the SP modes indicated with an asterisk (*) are not used unless the user selects 'SP Mode Changed'.

	Image Processing Path	Related SP Modes
Input Correction 1	Auto Shading	
Input Correction 2	Background Erase	• SP4930-67 * (Scanner Gamma Thresh Level) • SP4903-072 * (Background Erase Level) • SP4906 * (On/Off in Text/Photo Mode)
	Independent Dot Erase	• SP4903-062 (Independent Dot Erase Level)
Filtering	MTF	• SP4903-013 to 014 * (Pre Filter Coefficient) • SP4903-039 to 054 * (Filter Level and Strength) • SP4904-007 (Texture Erase Filter Level)
Magnification	Main Scan Magnification	• SP2909-001 (Main Scan Magnification)
ID Control	γ Correction	• SP4903-85 * (Scanner gamma setting)
Gradation	Error Diffusion/ Line Width Correction	• SP4904-003, 005 * (Error Diffusion) • SP4903-81 to 83 *, SP4904-22 (Line Width Correction Type)

Pale Mode

The image processing for pale mode is basically the same as in text mode. However, the contrast of the original is low. So, to preserve details, a stronger MTF filter is used. Also, the independent dot erase level is set at a lower level, so that only the faintest of dots are deleted; this ensures that dotted lines and periods are not deleted.

With UP Mode (Copy Features – General Features – Original Mode Quality Level), the user can select 'Soft', 'Normal', 'Sharp', and 'SP Mode Changed'. The settings of the SP modes indicated with an asterisk (*) are not used unless the user selects 'SP Mode Changed'.

	Image Processing Path	Related SP Modes
Input Correction 1	Auto Shading	
Input Correction 2	Background Erase	• SP4903-068 * (Scanner Gamma Thresh Level) • SP4903-73 * (Background Erase Level)
	Independent Dot Erase	• SP4903-063 (Independent Dot Erase Level)
Filtering	MTF	• SP4903-015 * (Pre Filter) • SP4903-055 to 056 * (MTF Filter Coefficient – Pale Originals)
Magnification	Main Scan Magnification	• SP2909-001 (Main Scan Magnification)
ID Control	γ Correction	
Gradation	Grayscale Processing/ Line Width Correction	• SP4904-23 (Line Width Correction Type)

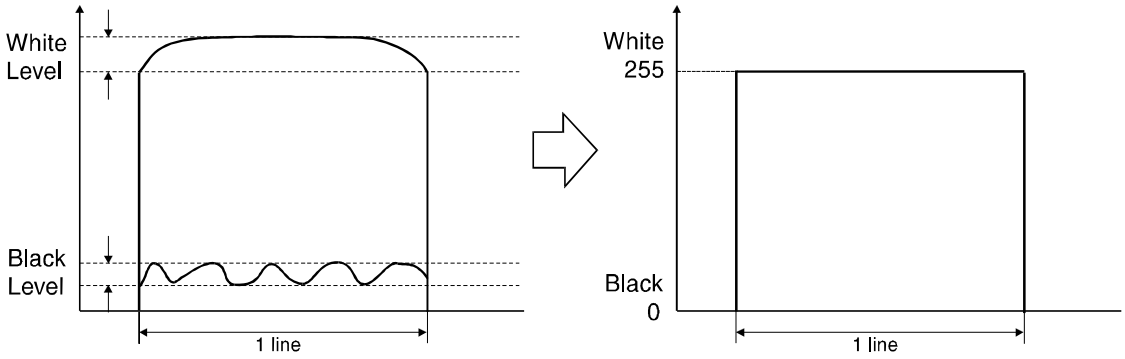
Generation Copy Mode

The image processing for generation mode is basically the same as in text mode, except that in order to prevent lines in the main scan direction from being reproduced too thickly, line width correction is applied for the final gradation treatment. Also, to reduce unwanted black dots, a weaker MTF filter is used; this ensures that isolated dots do not get bigger, and are spread out. These dots will then be deleted by the independent dot erase feature. This feature, however, is kept at a low setting to ensure that important details such as dotted lines and periods are not deleted.

With UP Mode (Copy Features – General Features – Original Mode Quality Level), the user can select 'Soft', 'Normal', 'Sharp', and 'SP Mode Changed'. The settings of the SP modes indicated with an asterisk (*) are not used unless the user selects 'SP Mode Changed'.

	Image Processing Path	Related SP Modes
Input Correction 1	Auto Shading	
Input Correction 2	Background Erase	• SP4903-069 * (Scanner Gamma Thresh Level) • SP4903-074 * (Background Erase Level)
	Independent Dot Erase	• SP4903-064 (Independent Dot Erase Level)
Filtering	MTF	• SP4903-016 * (Pre Filter Coefficient) • SP4903-057 to 058 * (MTF Filter Coefficient – Generation Copy)
Magnification	Main Scan Magnification	• SP2909-001 (Main Scan Magnification)
ID Control	γ Correction	
Gradation	Grayscale Processing/ Line Width Correction	• SP4903-75 to 77*, SP4904-24 (Line Width Correction Type)

2.3.6 AUTO SHADING



A293D582.WMF

Two things happen during auto shading.

Black Level Correction

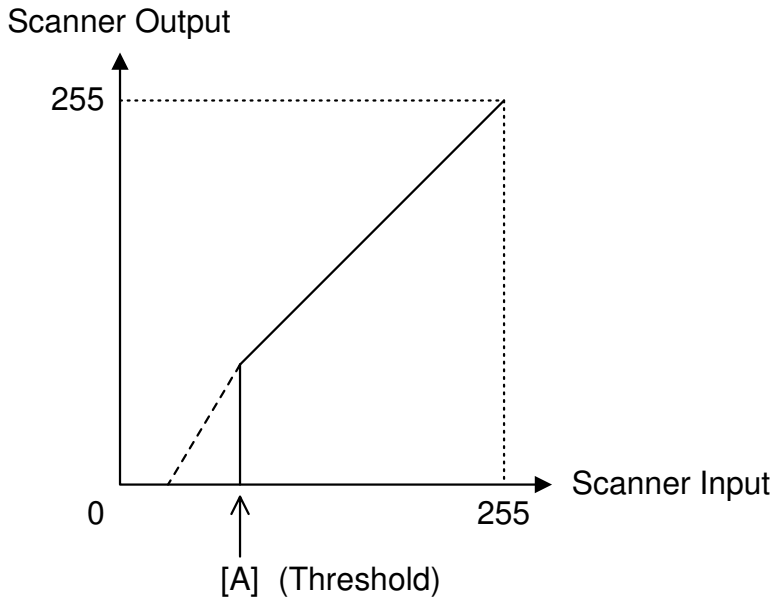
The black level is zeroed for each scan line of data by reading the dummy elements at the end of the CCD signal for each scan line, which should be black.

White Level Correction

The data is corrected for variations in white level across the main scan. To do this, a white reference plate is scanned before each original (book mode) or every 30 s (ADF mode). This corrects for the following effects on each pixel:

- Loss of brightness at the ends of the exposure lamp and the edges of the lens
- Variations in sensitivity among the CCD elements
- Distortions in the light path

2.3.7 BACKGROUND ERASE



A293D583.WMF

Background Erase

The background erase process is used only when setting of SP 4-903-70 to 75 is changed from the default setting (the default is 'disabled').

Usually, dirty background is erased using Auto Image Density (ADS). Background Erase should be used when ADS cannot fully erase the dirty background.

There are two Background Erase modes. The one that is being used depends on the SP mode setting. Setting 2 has a stronger effect than setting 1, but setting 2 may cause sudden changes in the data around the threshold level.

Setting 1: MTF correction is not applied to any low image density data that remains after auto shading if the data is lower than a threshold level [A]. The overall effect is to reduce the background in a similar way to that shown by the dotted line in the diagram. This process can be applied for each image mode (except for photo mode) by changing the setting of SP4-903-70, 72, 73 or 74.

Setting 2: Any low image density data that remains after auto shading will be treated as "0" if the data is lower than a threshold level [A]. The background is cut off as shown by the solid vertical line in the diagram at [A]. This process can be applied for each image mode by changing the setting of SP4-903-70, 71, 72, 73 or 74.

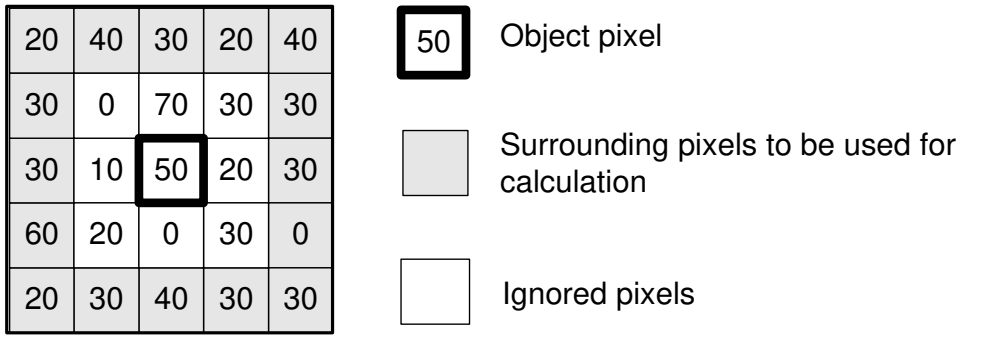
The thresholds can be changed with SP4-903-65 to 69.

2.3.8 INDEPENDENT DOT ERASE

By default, this process is used in all image processing modes except for photo mode. This function allows independent black dots appearing on copies to be erased.

As shown in the drawing below, the software compares each pixel with the pixels in the surrounding 5 x 5 area (except for the immediately adjacent pixels).

If all of the surrounding pixels are white, and the difference between the value of the object pixels and the average of the surrounding pixel is larger than the threshold level, the object pixel is either changed to 0 (white) or reduced in density. The combination of the threshold value and the pixel data reduction ratio depends on the setting of SP4-903-60, 62, 63 or 64. If a larger number is selected, the effect of independent dot erase will be stronger. If 0 is selected, independent dot erase is disabled.



A293D584.WMF

2.3.9 FILTERING, MAIN SCAN MAGNIFICATION/REDUCTION

Overview

After auto shading, the image data is processed by both filtering and main scan magnification. However, to reduce the occurrence of moiré in the image, the processing order depends on the reproduction ratio, as follows.

1. 64% reduction or less
   Main Scan Reduction → Filtering
2. 65% reduction or higher
   Filtering → Main Scan Magnification

Filtering

By default, an individual MTF filter is used for each image processing mode, to enhance the desired image qualities. (For Photo mode, smoothing filter is selected as the default setting.)

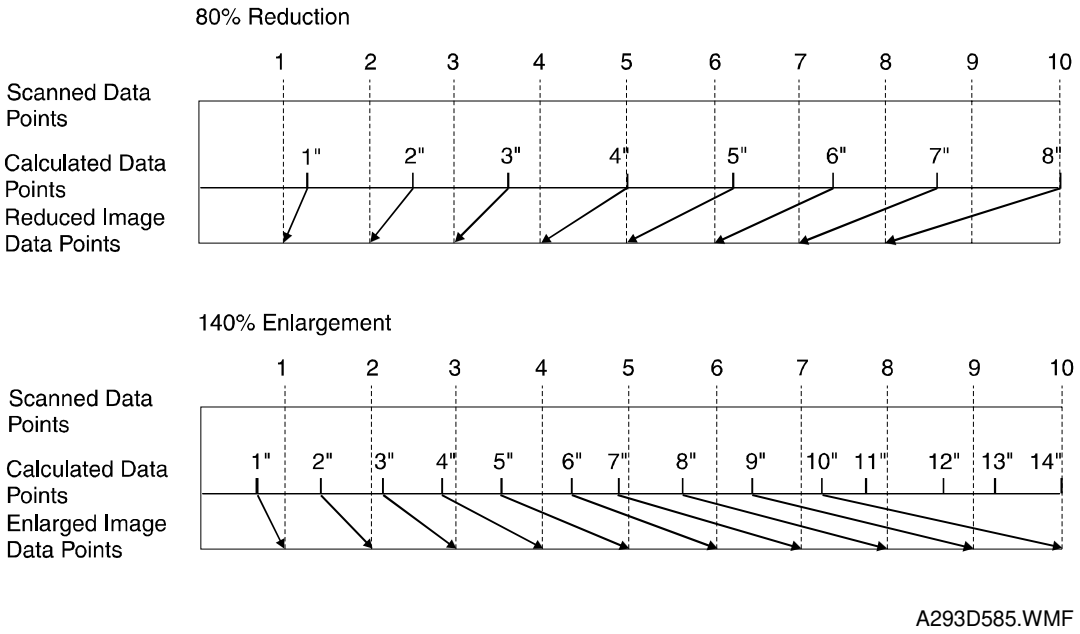
A stronger MTF filter emphasizes sharpness and leads to better reproduction of low image density areas, but may leads to the occurrence of moiré in the image.

The MTF filter strength can be changed by changing the coefficient (MTF Filter Level) and strength of the MTF filter in combination using SP mode. Refer to the combination chart in 'Image Quality Setting by UP Mode' in section 4. The filter coefficient and strength can be adjusted in the main scan and sub scan directions individually. This allows the copy quality to be adjusted more precisely, to match the originals normally scanned by a particular customer.

Example: In a case when vertical lines (sub scan) are reproduced clearly, but horizontal lines (main scan) are not reproduced clearly, the technician can adjust the main scan filter only.

For photo mode, the smoothing filter is the default filter, but the MTF filter may be selected by SP mode 4-903-9. This is effective when putting more weight on improving the resolution when copying from "continuous tone" originals.

Main Scan Magnification/Reduction



A293D585.WMF

However, reduction and enlargement in the main scan direction are handled by the IPU chip on the BICU board.

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 of the nearest four true points. The calculated image data then becomes the new (reduced or enlarged) image data.

Main scan magnification can be disabled with SP4-903-5 to test the IPU chip.

Sub Scan Magnification

When the selected magnification is 50% or larger, the image magnification in the sub scan direction is changed by changing the scanner speed. (As the magnification ratio increases, the scanner speed is reduced.)

However, when a magnification ratio smaller than 50% is selected, the required scanner speed exceeds the limit of the scanner motor. So, the scanner speed is reduced to half of the required speed for that reduction ratio. As a result, there are twice as many scan lines as needed. So alternate lines are removed.

Foe example, if a 49% magnification ratio is selected, the scanner speed is the same as the speed of 98% magnification, but the number of sub scan lines used for the image is half of that for 98% magnification.

2.3.10 GAMMA (γ) CORRECTION

Gamma correction ensures accurate generation of the various shades in the gray scale from black to white, accounting for the characteristics of the scanner and printer.

Scanner gamma correction corrects the data output to the IPU to account for the characteristics of the scanner (e.g., CCD response, scanner optics).

Printer gamma correction corrects the data output from the IPU to the laser diode to account for the characteristics of the printer (e.g., the characteristics of the drum, laser diode, and lenses).

The scanner and printer gamma settings can be changed for the 'Service Mode' original type of text and text/photo modes, using SP4-903-84 and 85.

2.3.11 GRADATION PROCESSING

Various processes are available to try to reproduce various types of original as faithfully as possible.

The following processes are used in combination depending on the image mode settings.

1) Three-graduation processing
2) Four-graduation processing
3) Error diffusion
4) Dithering

These three processes are used as follows:

Text Mode:	Error diffusion + line width correction and four-graduation processing
Text/Photo Mode:	Error diffusion + line width correction and four-graduation processing
Photo Mode:	Error diffusion or dithering, and three-graduation processing
Generation Copy Mode:	Error diffusion + line width correction, and three-graduation processing
Pale Mode:	Error diffusion and four-graduation processing

Three-graduation Processing

This mode is used in Photo mode.

The image density data after gamma correction is changed into three-graduation data (full dot, half dot, or blank) using two thresholds. With this processing, halftone images are reproduced smoother than with four-graduation processing because of stable dot image reproduction due to only one intermediate density level.

Four-graduation Processing

This process is used in Text mode and Text/Photo mode.

The image density data after gamma correction is changed into 2-bit data using 3 thresholds. The four graduations are reproduced by laser power control. This process is suitable for reproducing fine originals which do not include halftone areas.

Error Diffusion and Dithering

Error diffusion reduces the difference in contrast between light and dark areas of a halftone image. Each pixel is corrected using the difference between it and the surrounding pixels. The corrected pixels are then corrected using an error diffusion matrix.

With dithering, each pixel is compared with a pixel in a dither matrix. Several matrixes are available, to increase or decrease the detail on the copy.

Comparing with dithering, error diffusion gives a better resolution, and is more suitable for “continuous toned” originals. On the other hand, dithering is more suitable for “screen printed” originals.

In Photo mode, when the user selects “Normal Paper” or “Continuous Tone”, error diffusion is used. However, if the user selects “Screen Printed”, dither processing is used. If the user selects “SP Mode Changed”, then error diffusion or one of three types dither matrix can be selected with SP4-904-002. There are three types of dither matrix, 8" x 8", 6" x 6", and 4" x 4". A larger dither matrix causes halftone areas to become coarser.

2.3.12 LINE WIDTH CORRECTION

This function is effective for Text, Text/Photo and Generation modes.

The software compares each pixel with adjacent pixels. If the differences between the object pixel and adjacent pixels are more than a threshold, the software judges that the pixel is on a line edge, and line width correction is applied.

The line width correction setting can be changed separately for Text, Text/Photo and Generation modes. The widths of vertical and horizontal lines can be corrected separately.

- Thinner 1: If the pixel is on the edge of a line, its density is multiplied by 0.75
- Thinner 2: If the pixel is on the edge of a line its density is multiplied by 0.5
- Thicker: If the pixel is on the edge of a line, 48 is added to its density

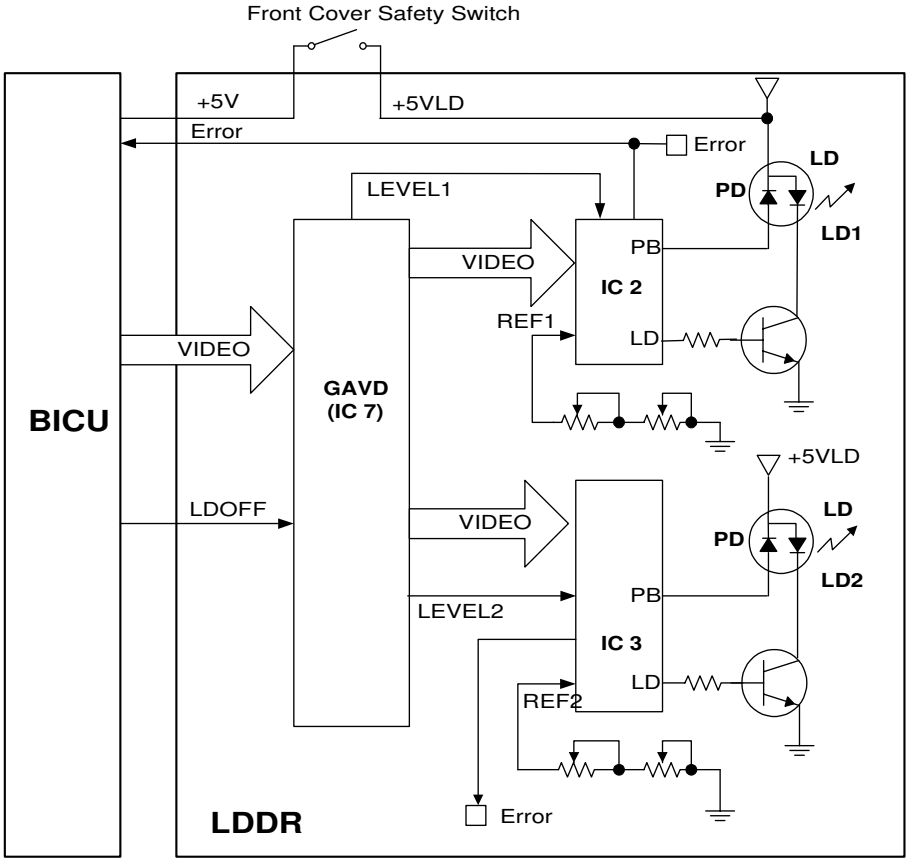
The threshold for detecting edges of lines can also be changed separately for vertical lines and horizontal lines.

Use SP4-903-75 to 83 to adjust the line width correction settings.

Line width can also be corrected by adjusting the laser output (SP4904-20 to 24).

2.4 LASER EXPOSURE

2.4.1 AUTO POWER CONTROL



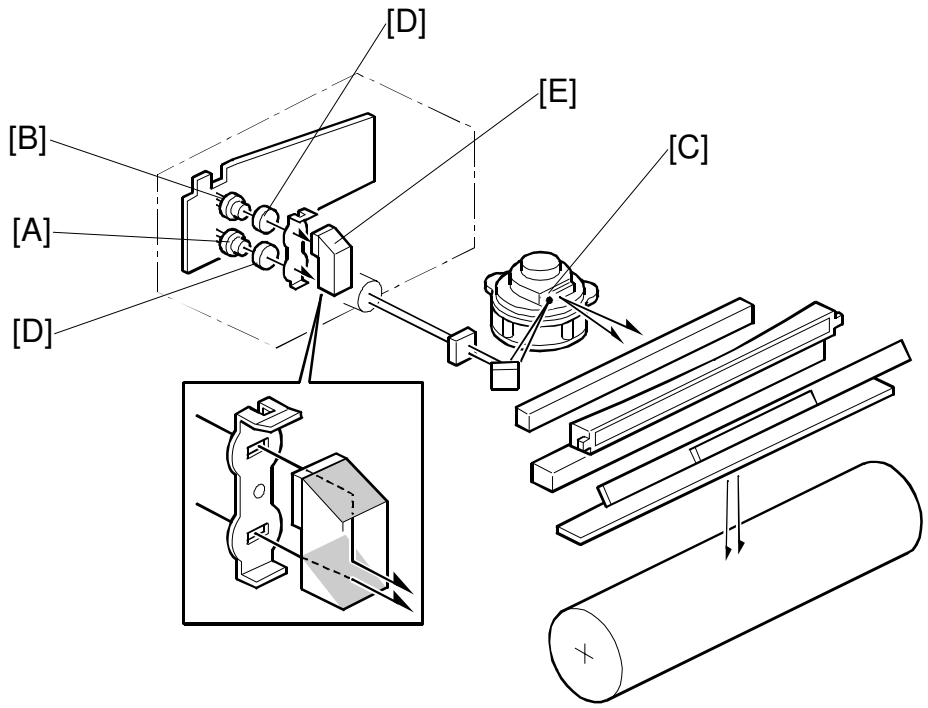
A293R577.WMF

IC2 and IC3 on the LDDR drive the laser diodes. 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, IC2 and IC3 monitor the current passing through the photodiode (PD). Then they increase or decrease the current to the laser diode as necessary, comparing it with the reference levels (REF1 and REF2). This auto power control is done just after the machine is turned on and during printing while the laser diode is active.

The reference levels are adjusted on the production line. Do not touch the variable resistors on the LDDR in the field.

2.4.2 DUAL BEAM WRITING



A293D598.WMF

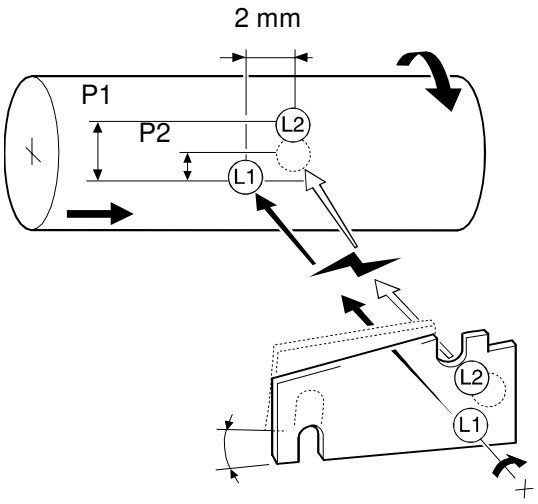
This LD unit has two laser diodes; LD1 [A] and LD2 [B] for writing the image. This means that each face of the polygon mirror writes two main scan lines, and twelve main scans are produced when the polygon mirror rotates once. The reasons for this mechanism are as follows.

1) To reduce the polygon motor rotation speed
2) To reduce the noise generated by the polygon motor
3) To reduce the frequency of the image data clock

Two laser beams are transferred to the polygon mirror [C] through collimating lens [D] and prism [E]. The two laser beams arrive on the drum surface about 2 mm away from each other in the main scan direction and about 0.04 mm (at 600 dpi) in the sub scan direction (see the next page).

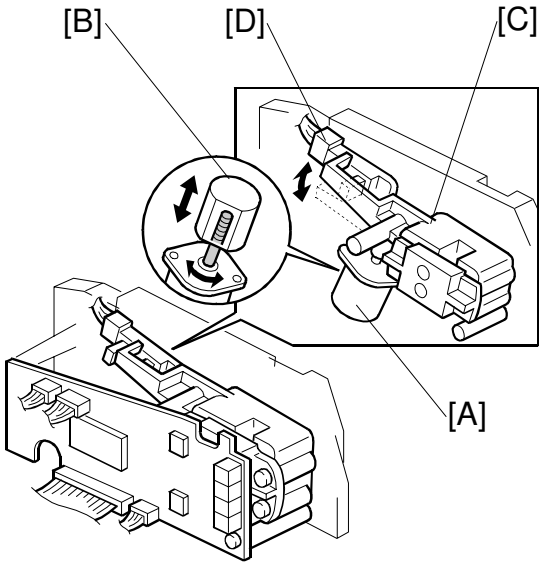
The reason for the two-mm difference in the main scan direction is so that the machine can detect a laser synchronization signal for each beam.

2.4.3 LASER BEAM PITCH CHANGE MECHANISM (FOR A292/A293 ONLY)



P1: 400 dpi
P2: 600 dpi

A293D599.WMF



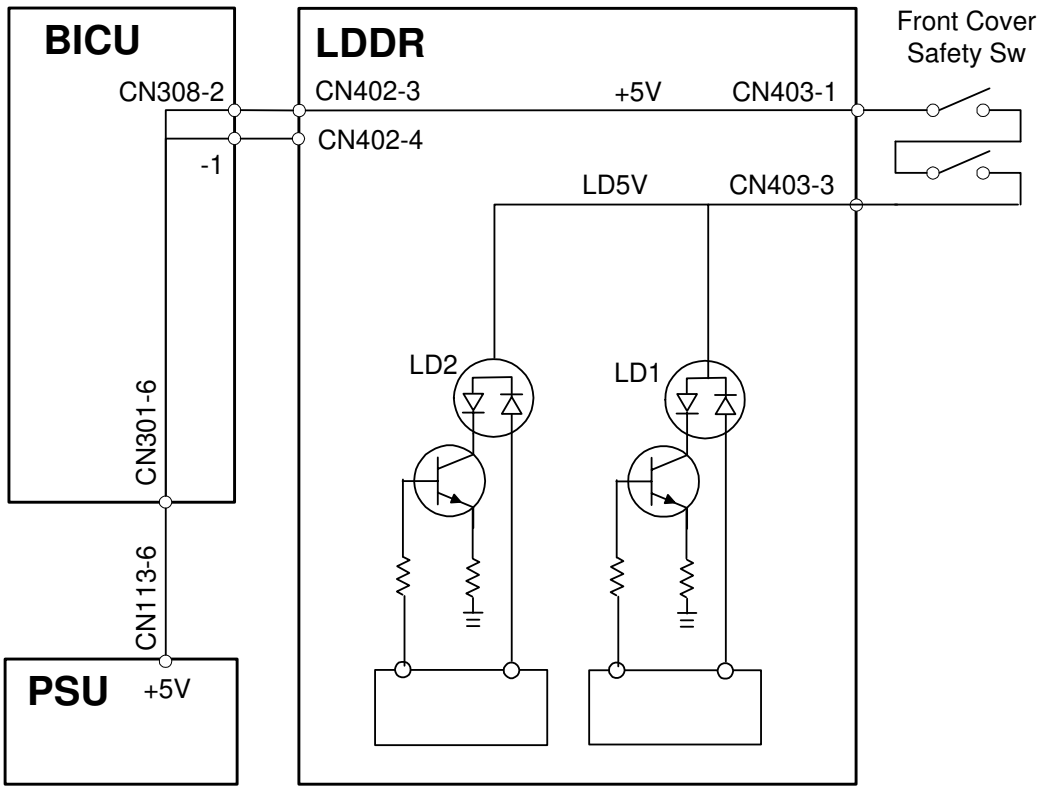
A293D650.WMF

A printer option is available for this machine and the resolution of the printer is 400 dpi or 600 dpi. The machine changes the resolution between 400 and 600 dpi by rotating the LD unit.

When the LD positioning motor [A] turns, the metal block [B] (which contacts the LD unit housing [C]) moves up and down. This changes the position of the L2 laser beam (L1 does not move).

Both LD unit positions are at fixed distances from the LD home position sensor [D] (measured by motor pulses). Usually, the LD unit moves directly to the proper position. However, when the number of times that the resolution has changed reaches the value of SP2-109-5, the LD unit moves to the home position (the home position sensor activates), then it moves to the proper position. This recalibrates the LD unit positioning mechanism.

2.4.4 LD SAFETY SWITCHES



A293D578.WMF

To ensure technician and user safety and to prevent the laser beam from inadvertently switching on during servicing, there are two safety switches located at the front cover. These two switches are installed in series on the LD5 V line coming from the power supply unit (PSU) through the BICU board.

When the front cover or the upper right cover is opened, the power supply to the laser diode is interrupted.

2.5 DRUM UNIT

2.5.1 PROCESS CONTROL

Overview

The drum potential will gradually change because of the following factors.

- Dirty optics or exposure glass
- Dirty charge corona casing and grid plate
- Changes in drum sensitivity

To maintain good copy quality, the machine does the following just after the main switch has been turned on (if the fusing temperature is less than 100 °C and SP3-901 is on).

1) Potential Sensor Calibration

2) V_{SG} Adjustment

3) V_G(Grid Voltage) Adjustment

4) LD Power Adjustment

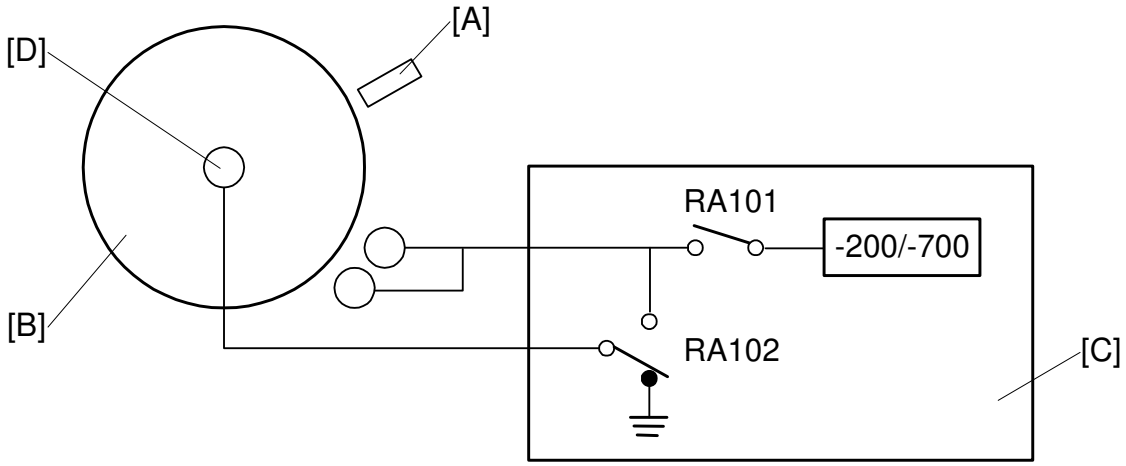
5) V_{REF} Update

6) Density Adjustment

This process is known as 'Process Control Initial Setting'. The rest of this section will describe these steps in more detail.

Processes 1, 3, and 4 in the above list compensate for changes in drum potential. Processes 2 and 5 are for toner density control; see the "Development and Toner Supply" section for more details.

Drum potential sensor calibration



A293D556.WMF

The drum potential sensor [A] detects the electric potential of the drum surface [B].

Since the output of the sensor is affected by environmental conditions, such as temperature and humidity, the sensor needs recalibration at times. This is done during process control initial setting.

The development power pack [C] has two relay contacts. Usually RA102 grounds the drum. However, to calibrate the sensor, the BICU switches RA102 and RA101 over, which applies the power pack output voltage to the drum shaft [D].

The machine automatically calibrates the drum potential sensor by measuring the output of the sensor when –200V and –700V are applied to the drum. From these two readings, the machine can determine the actual drum potential from the potential sensor output that is measured during operation.

During calibration, if the rate of change in drum potential sensor response to applied voltage is out of the target range, SC310 or 311 is logged and auto process control turns off. The V_G and LD power adjustments are skipped; V_G is set to the value stored in SP2-001-01, and LD power is set to the values stored in SP2-103.

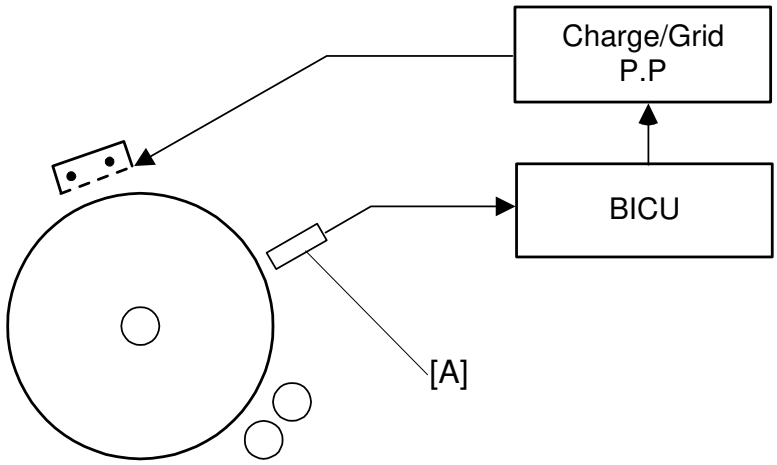
V_{SG} adjustment

This calibrates the ID sensor output for a bare drum to 4.0 ± 0.2V. It does this by changing the intensity of the light shining on the drum from the sensor. This is done automatically during process control initial setting, and it can also be done manually with SP3-001-002.

If the ID sensor output cannot be adjusted to within the standard, SC353 or 354 is logged and toner density control is done using the TD sensor only.

For details of how the machine determines an abnormal sensor detection, see section 7 (Troubleshooting).

VG Adjustment



A293D551.WMF

The potential on unexposed areas of the drum (VD) gradually changes during drum life. To keep VD constant, the grid voltage (VG) is adjusted during process control initial setting.

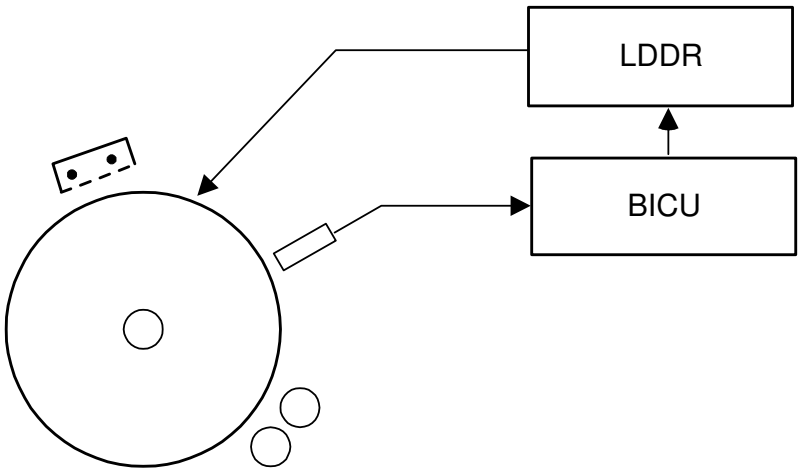
The BICU checks VD using the drum potential sensor [A]. If it is not within the target range (-900V ± 10V), the BICU adjusts VG (Grid Voltage) through the Charge/Grid power pack to get the correct target voltage.

The most recently detected values can be displayed with SP3-902-2 (VD) and 3-902-4 (VG).

If the CPU cannot get VD within the target range by changing VG, VG is set to the value in SP2001-001 and SC312 is logged.

For details of how the machine determines an abnormal sensor detection, see section 7 (Troubleshooting).

LD power adjustment



A293D552.WMF

This adjustment uses the drum potential sensor to keep the ID sensor pattern at the same density, so that V_{REF} will be updated correctly (see the next page).

The V_H pattern is developed using the current LD power. The drum potential sensor detects the potential on this pattern. The LD power is adjusted until V_H becomes –300V ±20V.

This is done only during process control initial setting.

The latest V_H can be displayed using SP3-902-3. The corrected LD power can be displayed using SP3-902-5 (the default is stored in SP2-103-1-4). See “Laser exposure” for more details about laser power.

If V_H cannot be adjusted to within the standard within 25 attempts, LD power is set to the latest value (the one used for the 25th attempt) and SC314 is logged.

For details of how the machine determines an abnormal sensor detection, see section 7 (Troubleshooting).

Toner Density Adjustment

This adjustment uses the ID sensor to maintain the toner density in the development unit to around the target range as follows.

Vsp/Vsg ≥ Target range: Supply Toner
Vsp/Vsg ≤ Target range: Consume Toner

VREF Update

The TD sensor reference voltage (VREF) is updated to stabilize the concentration of toner in the development unit as follows;

New VREF = Current VREF + ΔVREF

ΔVREF is determined using the following Vsp/Vsg and VREF– VT table

	Vsp/Vsg (B)				
VREF– VT (A)		B < 0.055	0.055 < B =< 0.07	. . . . .	0.15 < B
	A =< –0.2	0.25	0.22	:	–0.03
	–0.2< A =<–0.1	0.25	0.22	:	–0.05
	: :	: :	: :	: :	: :
	0.2 < A	0	0.05	:	–0.25

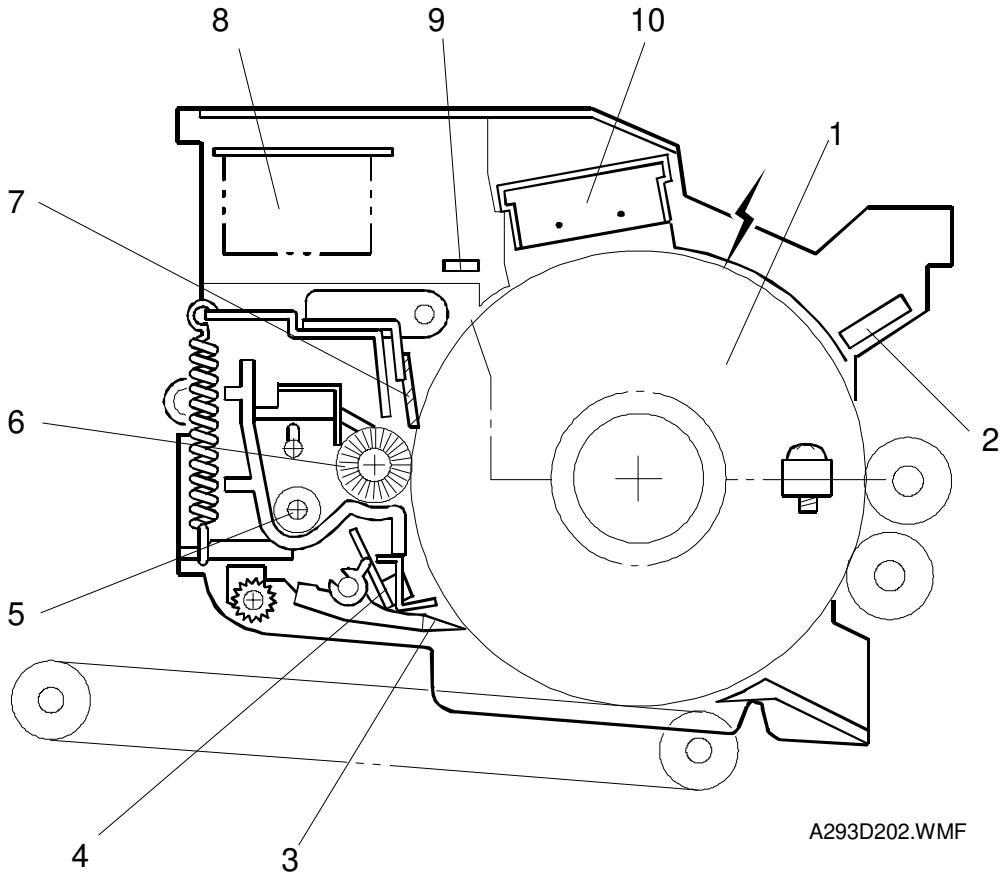
VT : TD Sensor Output

When SC350, 351 or 352 (ID Sensor Abnormal) is generated, VREF is not updated. The machine uses the current value.

VREF is updated during process control initial setting. It is also updated if both of the following conditions exist:

- 10 or more copies have been made since the last VREF update
- The copy job is finished

2.5.2 DRUM UNIT COMPONENTS

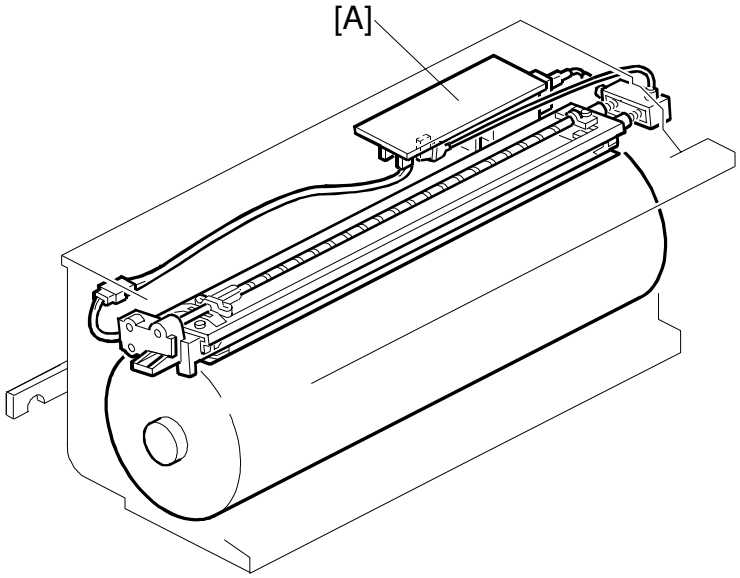


The drum unit consists of the components shown in the above illustration. An organic photoconductor drum (diameter: 100 mm) is used for this model.

1. OPC Drum
2. Drum Potential Sensor
3. Pick-off Pawl
4. Image Density Sensor
5. Toner Collection Coil
6. Cleaning Brush
7. Cleaning Blade
8. Charge Power Pack
9. Quenching Lamp
10. Charge Corona Unit

2.5.3 DRUM CHARGE

Overview



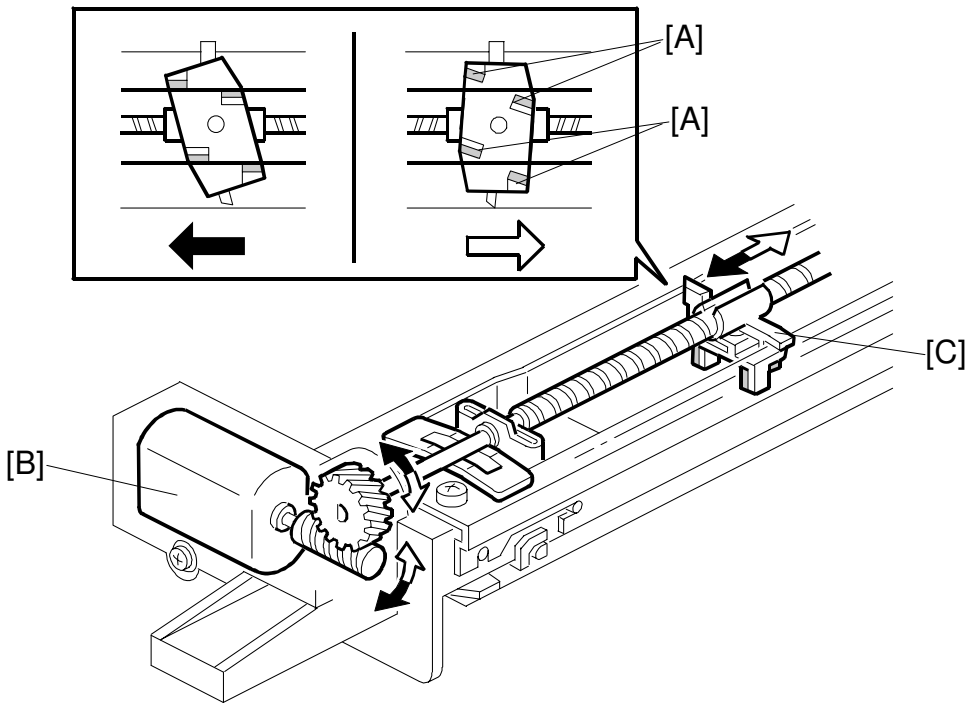
A293D594.WMF

This copier uses a double corona wire scorotron system to charge the drum. Two corona wires are needed to give a sufficient negative charge to the drum surface. The stainless steel grid plate makes the corona charge uniform and controls the amount of negative charge on the drum surface by applying a negative grid bias voltage.

The charge power pack [A] gives a constant corona current to the corona wires (-1300 μA).

The bias voltage to the grid plate is automatically controlled to maintain the correct image density in response to changes in drum potential caused by dirt on the grid plate and charge corona casing. This is described in the Process Control section in more detail.

Charge Corona Wire Cleaning Mechanism



A293D595.WMF

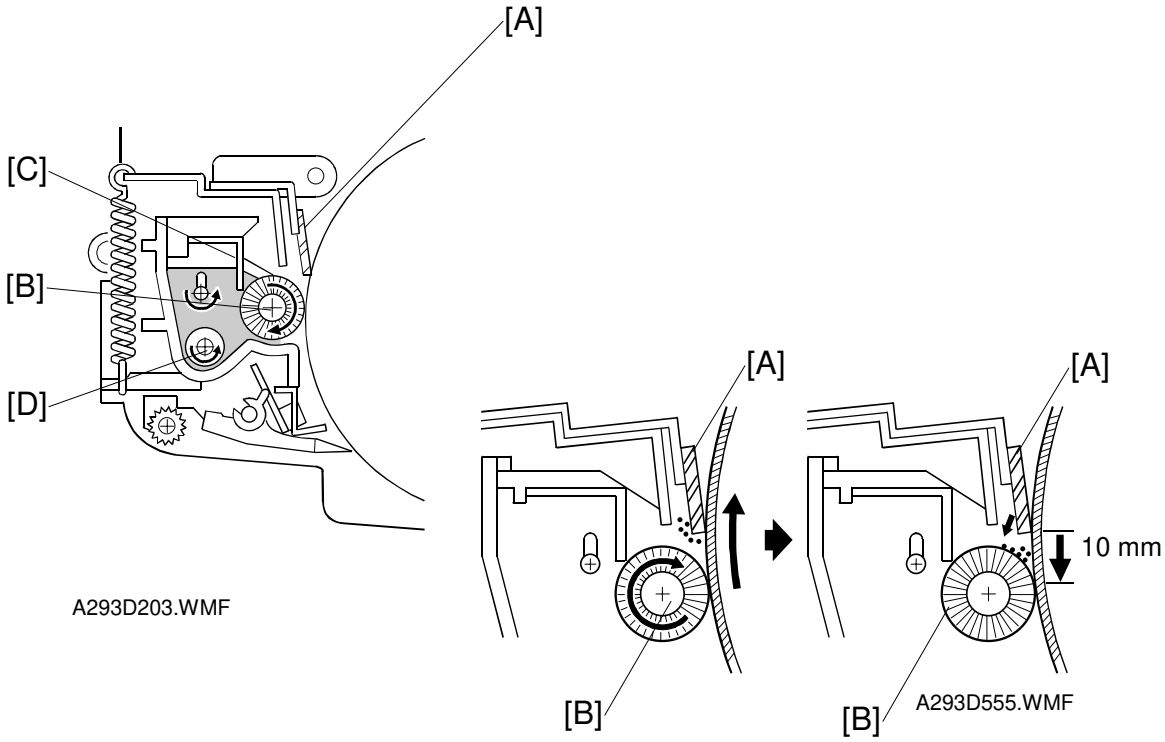
Air flowing around the charge corona wire may deposit toner particles on the corona wires. These particles may interfere with charging and cause low density bands on copies.

The wire cleaner pads [A] automatically clean the wires to prevent such a problem.

The wire cleaner is driven by a dc motor [B]. Normally the wire cleaner [C] is located at the front end (this is the home position). Just after the main switch is turned on, the wire cleaner motor turns on to bring the wire cleaner to the rear and then back to the home position. When the wire cleaner moves from the rear to the home position (black arrow in the illustration), the wire cleaner pads clean the wires. This is only done when 5000 or more copies have been made since the wires were cleaned last.

2.5.4 DRUM CLEANING AND TONER RECYCLING

Overview



This copier uses a counter blade system to clean the drum. In a counter blade system, the drum cleaning blade [A] is angled against drum rotation. The counter blade system has the following advantages:

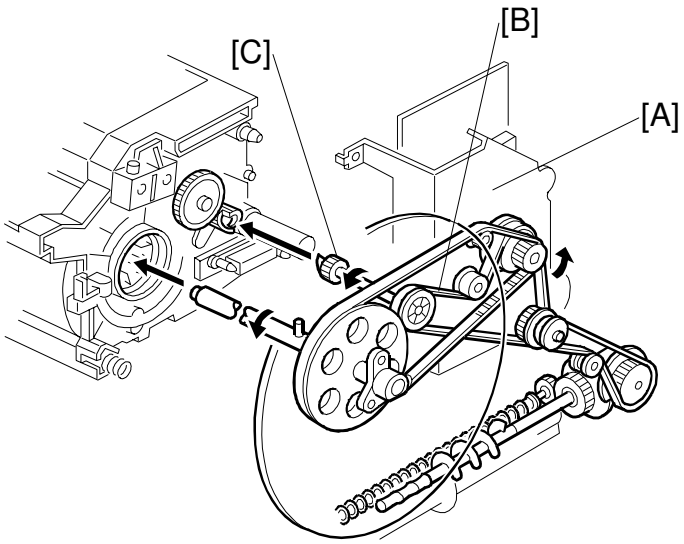
- Less wearing of the cleaning blade edge
- High cleaning efficiency

Due to the high efficiency of this cleaning system, the pre-cleaning corona and cleaning bias are not used for this copier.

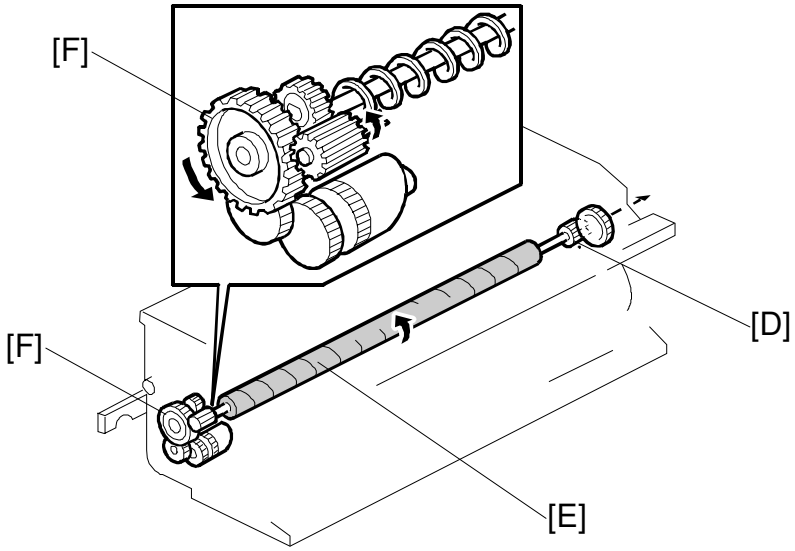
The cleaning brush [B] supports the cleaning blade. The brush removes toner from the drum surface and any remaining toner is scraped off by the cleaning blade. Toner on the cleaning brush is scraped off by the mylar [C] and falls onto the toner collection coil [D]. The coil transports the toner to the toner collector bottle.

To remove any accumulated toner at the edge of the cleaning blade, the drum turns in reverse for about 10 mm at the end of every copy job. The accumulated toner is deposited on the drum and is removed by the cleaning brush.

Drive Mechanism



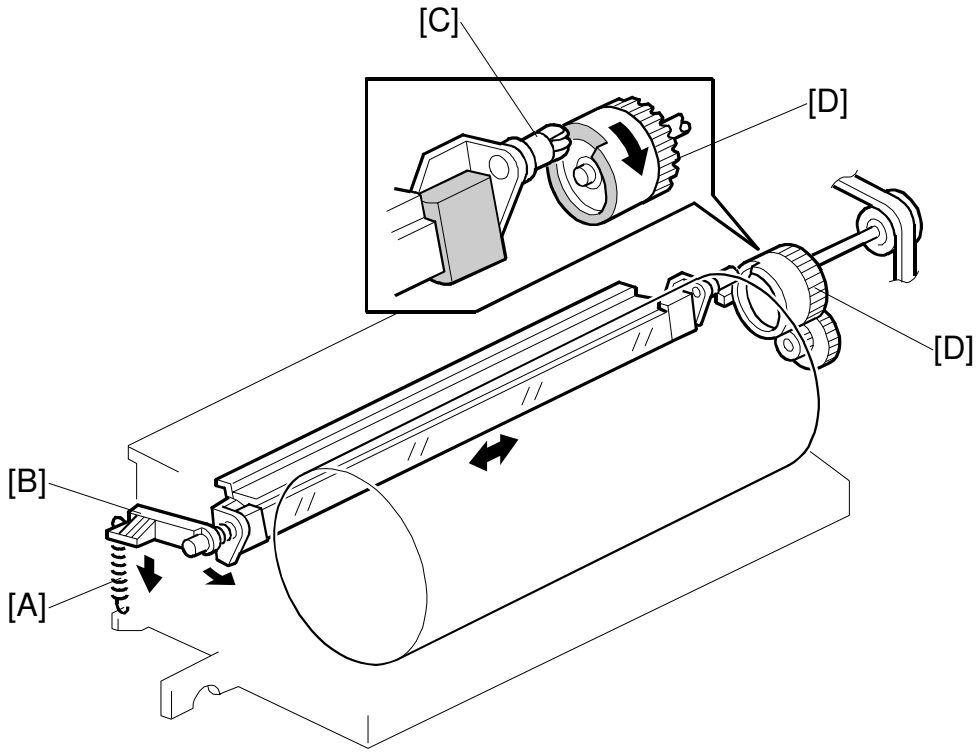
A293D597.WMF



A293D596.WMF

Drive from the drum motor [A] is transmitted to the cleaning unit drive gear via the timing belt [B] and the cleaning unit coupling [C]. The cleaning unit drive gear [D] then transmits the drive to the front through the cleaning brush [E]. The gear at the front drives the toner collection coil gear [F].

Cleaning Blade Pressure Mechanism and Side-to-Side Movement



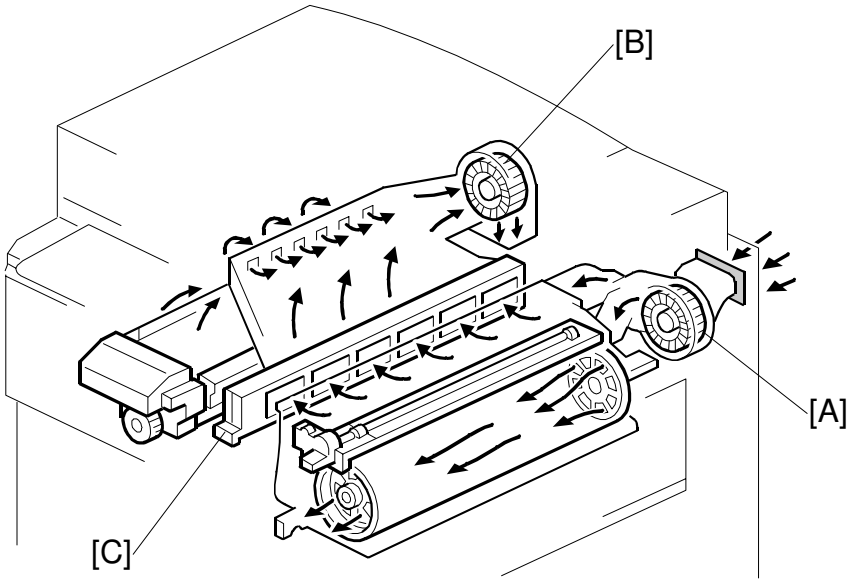
A293D204.WMF

The spring [A] always pushes the cleaning blade against the drum. The cleaning blade pressure can be manually released by pushing up the release lever [B]. To prevent cleaning blade deformation during transportation, the release lever must be locked in the pressure release (upper) position.

The pin [C] at the rear end of the cleaning blade holder touches the cam gear [D], which moves the blade from side to side. This movement helps to disperse accumulated toner to prevent early blade edge wear.

2.5.5 OTHERS

Air Flow Around the Drum



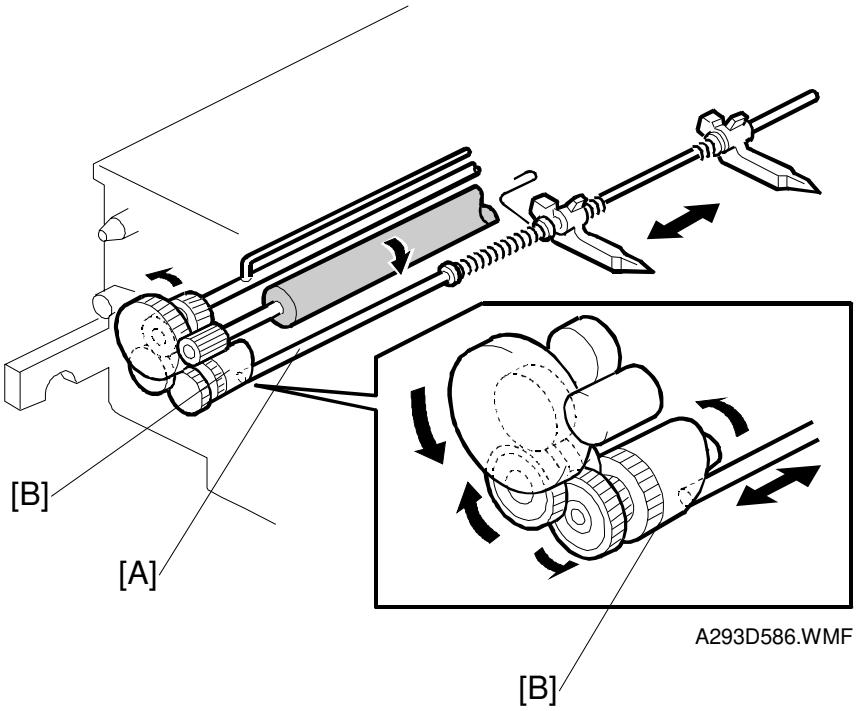
A293D201.WMF

The drum cooling fan [A] provides air flow into the drum to cool the drum and the charge corona unit to prevent uneven build-up of negative ions that can cause uneven drum surface charge. The exhaust fan [B] located above the fusing unit causes air to flow out of the machine.

An ozone filter [C] absorbs the ozone around the drum.

To keep the temperature inside the machine constant, the drum cooling fan and the exhaust fan turn slowly during stand-by, and turn quickly during copying.

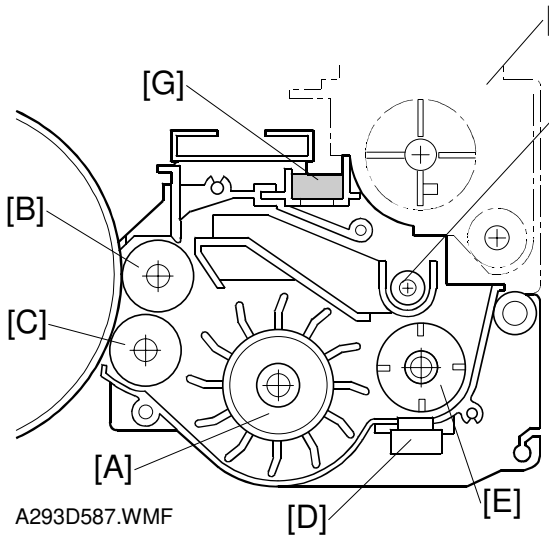
Pick-off Mechanism

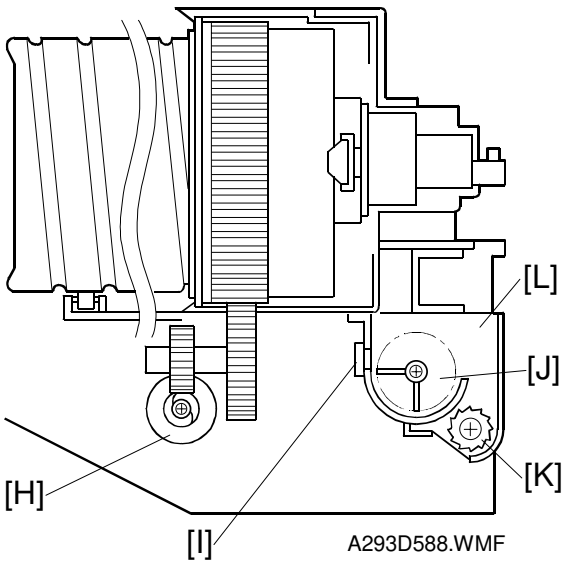


The pick-off pawls are always in contact with the drum surface as a result of weak spring pressure. They move from side to side during the copy cycle to prevent drum wear at any particular location. This movement is made via a shaft [A] and an a cam [B].

2.6 DEVELOPMENT AND TONER SUPPLY

2.6.1 OVERVIEW





- Paddle Roller [A]
- Upper Development Roller [B]
- Lower Development Roller [C]
- Toner Density Sensor [D]
- Developer Agitator [E]
- Toner Auger [F]
- Development Filter [G]
- Toner Supply Motor [H]
- Toner End Sensor [I]
- Toner Agitator [J]
- Toner Supply Roller [K]
- Toner Hopper [L]

This copier uses a double roller development (DRD) system. Each roller has a diameter of 20 mm.

This system differs from single roller development systems in that:

(1) It develops the image in a narrower area

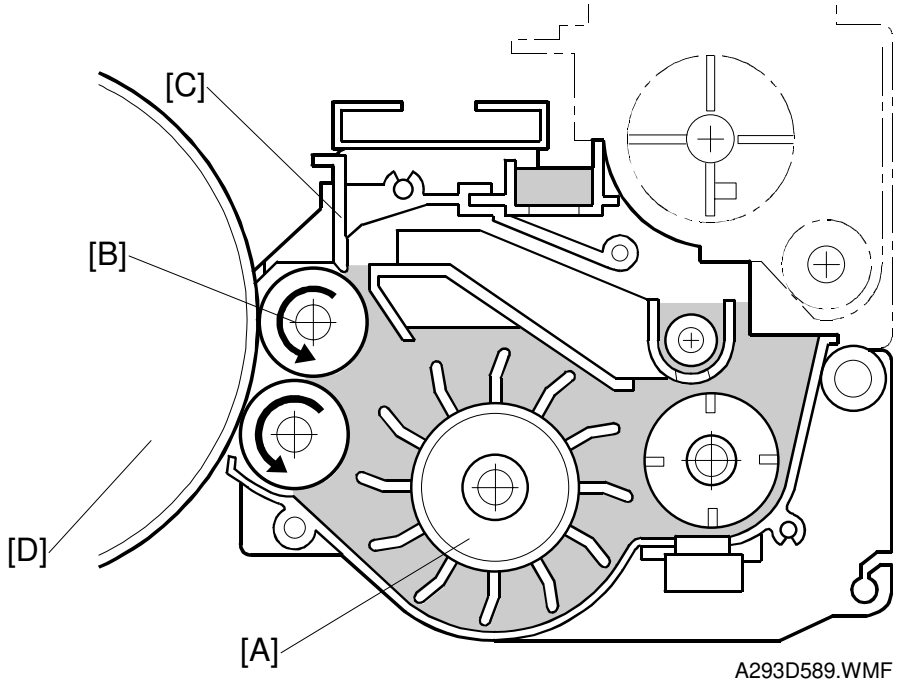
(2) It develops the image twice

(3) The relative speed of each development roller against the drum is reduced.

Also, this machine uses fine toner (about 9.5 μm) and developer (about 80 μm). Both the DRD system and new consumables improve the image quality, especially of thin horizontal lines, the trailing edges of the half-tone areas, and black cross points.

The machine contains a toner recycling system. The recycled toner is carried to the toner hopper [L] by the toner recycling motor and mixed with new toner by the toner agitator [J]. (The toner recycling system is described in the “Drum Cleaning And Toner Recycling section”.)

2.6.2 DEVELOPMENT MECHANISM



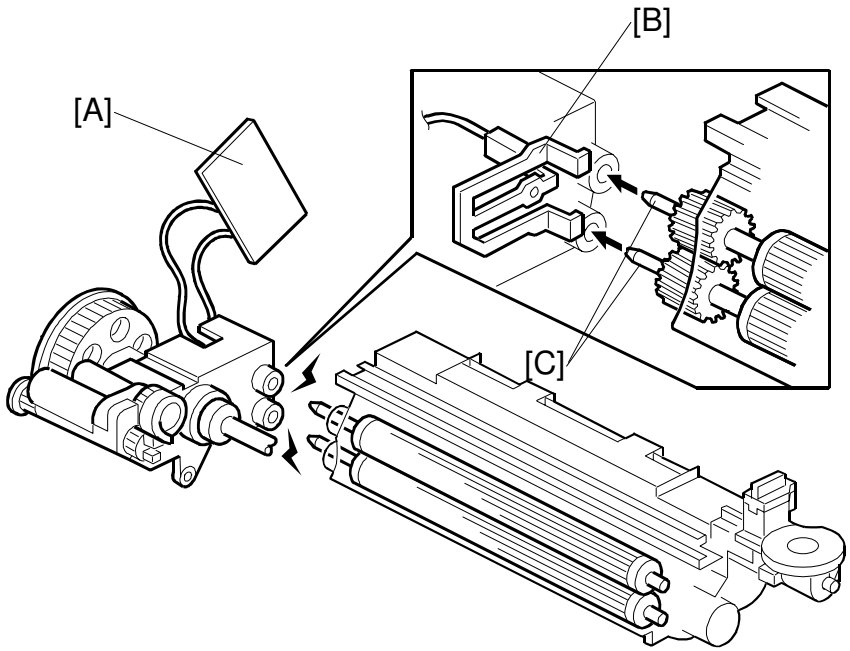
The paddle roller [A] picks up developer and transports it to the upper development roller [B]. Internal permanent magnets in the development rollers attract the developer to the development roller sleeve. The upper development roller carries the developer past the doctor blade [C]. The doctor blade trims the developer to the desired thickness and creates backspill to the cross mixing mechanism.

In this machine, black areas of the latent image are at a low negative charge (about –120 V) and white areas are at a high negative charge (about –900 V).

The development roller is given a negative bias to attract negatively charged toner to the black areas of the latent image on the drum.

The development rollers continue to turn, carrying the developer to the drum [D]. When the developer brush contacts the drum surface, the low-negatively charged areas of the drum surface attract and hold the negatively charged toner. In this way, the latent image is developed.

2.6.3 DEVELOPMENT BIAS



A293D301.WMF

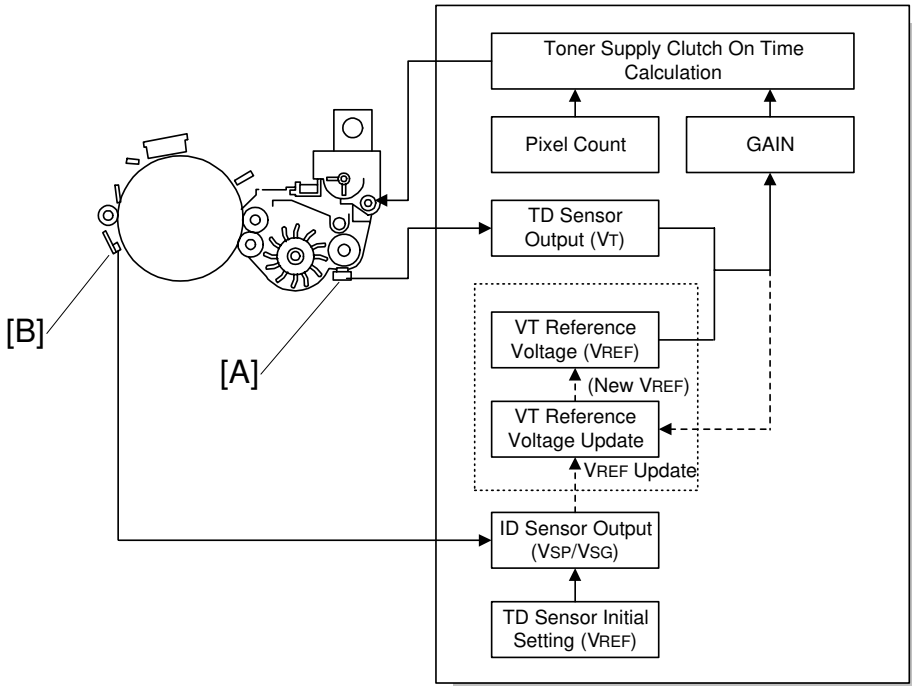
To attract negatively charged toner to the black areas of the latent image on the drum, the development power pack [A] applies the negative development bias to the upper and lower sleeve roller through the terminal [B] and roller shafts [C].

Also, the bias is applied to the lower casing through the spring which is mounted on the front lower development shaft. The bias applied to the lower casing prevents toner from being attracted back from the drum.

2.6.4 TONER DENSITY CONTROL

Overview

There are two modes for controlling toner supply: sensor control mode and image pixel count control mode. The mode can be changed with SP2-208. The factory setting is sensor control mode. Image pixel count mode should only be used if the TD and ID sensor are defective.



A293D554.WMF

Sensor control mode

In sensor control mode, the machine varies toner supply for each copy to maintain the correct proportion of toner in the developer and to account for changes in drum reflectivity over time. The adjustment depends on two factors.

- The amount of toner required to print the page (based on the black pixel amount for the page)
- Readings from the TD sensor [A] and ID sensor [B].

Toner density sensor initial setting

When the new developer is installed, TD sensor initial setting must be done using SP2-801. This sets the sensor output to 3.0V. This value will be used as the TD sensor reference voltage (VREF).

If Vt cannot be adjusted to within standard, SC341 or 342 is generated and the machine cannot make copies.

VSP and VSG detection

The ID sensor detects the following voltages.

- VSG: The ID sensor output when checking the drum surface
- VSP: The ID sensor output when checking the ID sensor pattern

In this way, the reflectivity of both the drum and the pattern on the drum are checked.

The ID sensor pattern is made on the drum with the charge corona and laser diode.

VSP/VSG is detected at the end of a copy job of more than 10 pages to update the TD sensor reference voltage (VREF). This interval can be changed using SP2-210. This compensates for any variations in the reflectivity of the pattern on the drum or the reflectivity of the drum surface.

VREF Update

VREF is updated using VSP/VSG and VT. This is done (or at the end of a copy job of more than 10 pages, and during process control initial setting. See "VREF Update" in the Process Control section for details.

VT detection

The toner density in the developer is detected once every copy cycle after the trailing edge of the image passes through the development roller.

Image pixel count

For each copy, the CPU adds up the image data value of each pixel and converts the sum to a value between 0 and 255. (The value would be 255 if the page was completely black.)

Gain Determination

GAIN is another factor in the toner supply clutch on time calculation. Its value can be 0, 1, 2, 3, or 4. It is calculated every copy using "VREF – VT".

Toner Supply Clutch On Time Calculation

The toner supply clutch on time for each copy is decided using the following formula: (GAIN × Image pixel count × 0.7mg/cm^2 /Toner Supply Rate) + 50ms

The toner supply rate can be changed using SP2-209.

Image pixel count control

This mode should only be use as a temporary countermeasure while waiting for replacement parts, such as a TD sensor. This mode controls the toner supply using the same formula for the toner supply clutch on time. However, the GAIN value is fixed at 0.7.

2.6.5 TONER END DETECTION

Toner near end and toner end are detected every copy using the toner end sensor and toner supply motor as follows.

Toner Near End

When the toner end sensor is on for two consecutive pages, the toner supply motor turns on for 1.1s. If the toner supply motor has turned on more than 30 times during the last 100 prints, “Toner Near End” is displayed.

The “Toner Near End” condition is cleared if the toner end sensor turns off.

Toner End

If the toner end sensor has been continuously on for 200 copies (toner end sensor copy counter), “Toner End” is displayed.

If the toner end sensor is off twice consecutively, the toner end sensor copy counter is reset to 0.

2.6.6 TONER END RECOVERY

If the front door is opened and closed while a toner near end or toner end condition exists, the machine will attempt to recover using measurements from the toner end sensor and TD sensor.

At this time, the drum and development motor, charge and development bias turn on.

The toner supply motor turns on for 1.1s, then the toner supply clutch turns on for 1s. Then the CPU checks the toner end sensor output.

If the toner end sensor is off (meaning that there is toner in the toner hopper), the CPU compares VT and V_{REF}.

If VT is less than or equal to V_{REF} (meaning that there is enough toner in the development unit), the CPU waits for 20s to mix the toner in the developer evenly. Then the above components turn off, and the toner end or toner near end is cleared.

If VT is more than V_{REF}, the CPU turns on the toner supply clutch for 1s again until VT becomes less than or equal to V_{REF}.

If the toner end sensor output remains on even after trying the above procedure 7 times, the components turn off and “Toner End” remains on.

2.6.7 ABNORMAL TD AND ID SENSOR CONDITIONS

If the TD sensor and/or ID sensor is/are defective, the toner supply mode is changed as follows.

TD Sensor Defective

The toner supply amount is controlled by the ID sensor. ID sensor output is used to decide the GAIN factor for the toner supply clutch on time calculation.
SC340 is logged.

ID Sensor Defective

The toner supply amount is controlled by the TD sensor. However, TD sensor reference output VREF is not updated.
SC350, 351, 352, 353 or 354 is logged.

TD and ID sensor defective

Toner supply mode is changed to image pixel count mode.

2.7 IMAGE TRANSFER AND PAPER SEPARATION

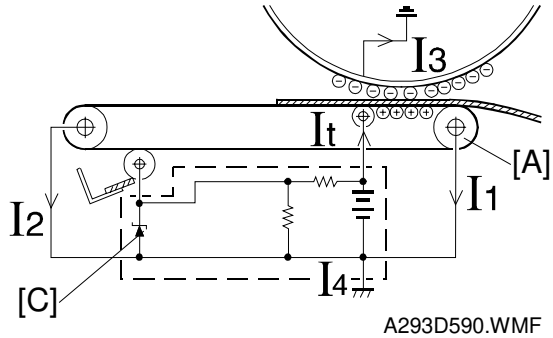
2.7.1 IMAGE TRANSFER AND PAPER SEPARATION MECHANISM

After the image transfer is completed, the charge on the transfer belt holds the paper to the transfer belt. After separating the paper from the transfer belt, the transfer belt is discharged by the transfer belt drive roller [A].

The transfer power pack [B] inside the transfer belt unit monitors the current (I_1 and I_2) fed back from the drive rollers at each end of the transfer belt.

Then, the power pack adjusts I_t to keep the current (I_4) constant, even if the paper, environmental conditions, or transfer belt surface resistance change.

The varistor [C] keeps the voltage at the cleaning bias roller [D] constant if there are fluctuations.



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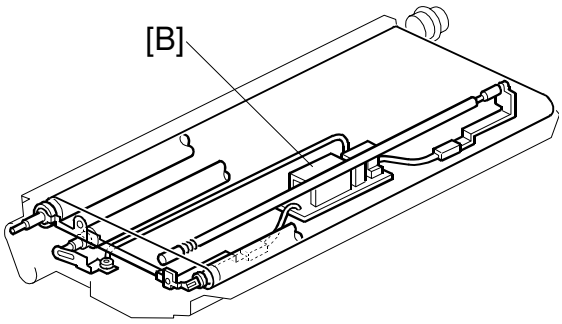

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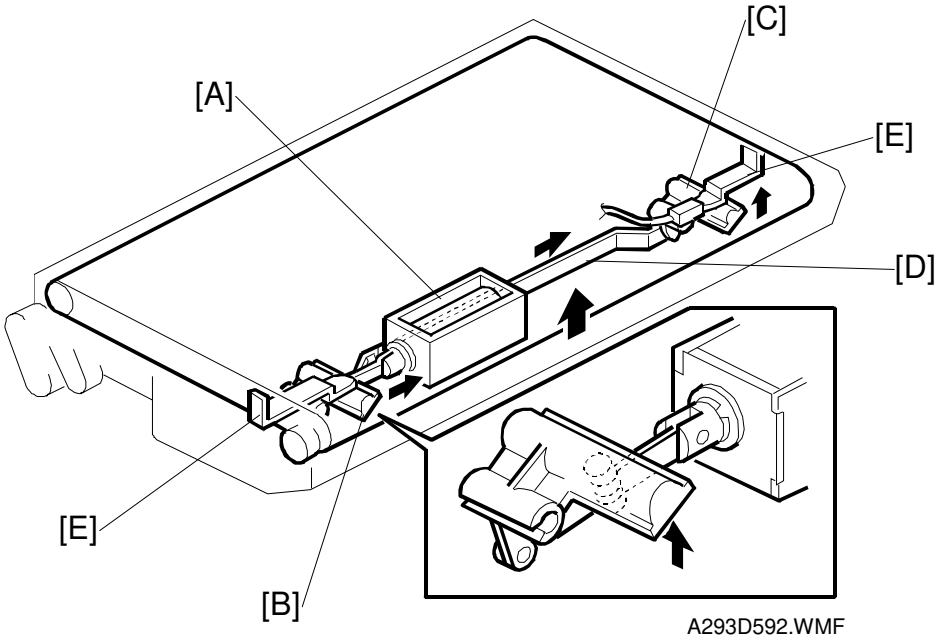
2.7.2 TRANSFER BELT UNIT LIFT MECHANISM

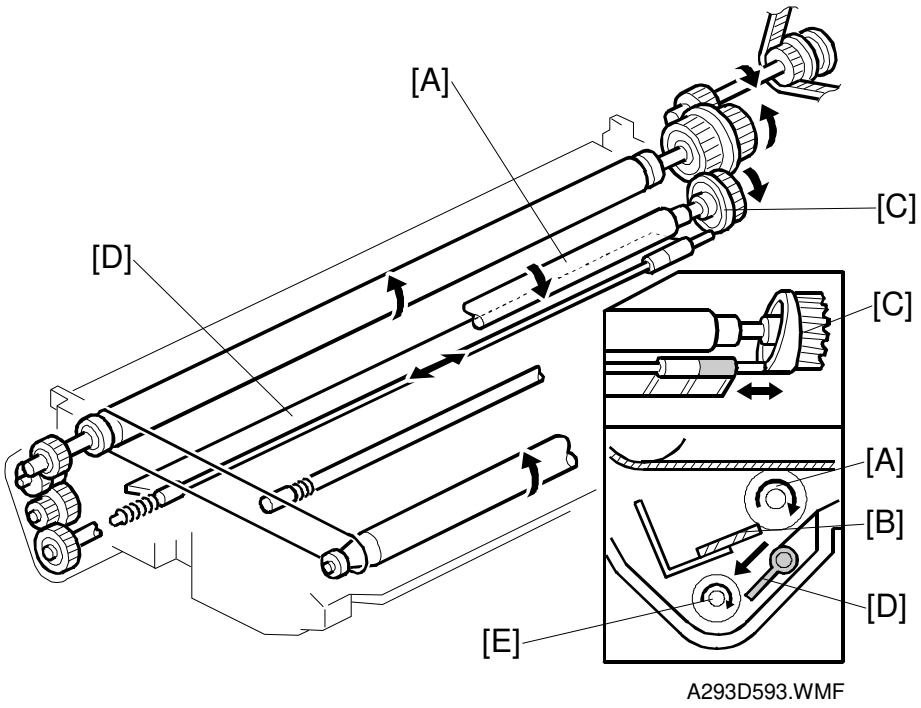


The transfer belt lift solenoid [A] inside the transfer belt unit turns on to raise the transfer belt into contact with the drum. The front lever [B] and the rear lever [C] are connected to the solenoid by links [D], and they push up the stays [E] when the solenoid turns on.

The solenoid turns off after the copy job is finished. The transfer belt must be released from the drum for the following reasons:

1. To prevent the ID sensor pattern on the drum from being rubbed off by the transfer belt, because the transfer belt is located between the development unit and the ID sensor.
2. To decrease the load on the bias roller cleaning blade, it is better to prevent toner on non-image areas (for example V_D, V_H, ID sensor patterns developed during process control data initial setting) from being transferred onto the transfer belt.
3. To prevent drum characteristics from being changed by coming into contact with material of the rubber belt.

2.7.3 TRANSFER BELT CLEANING MECHANISM



A293D593.WMF

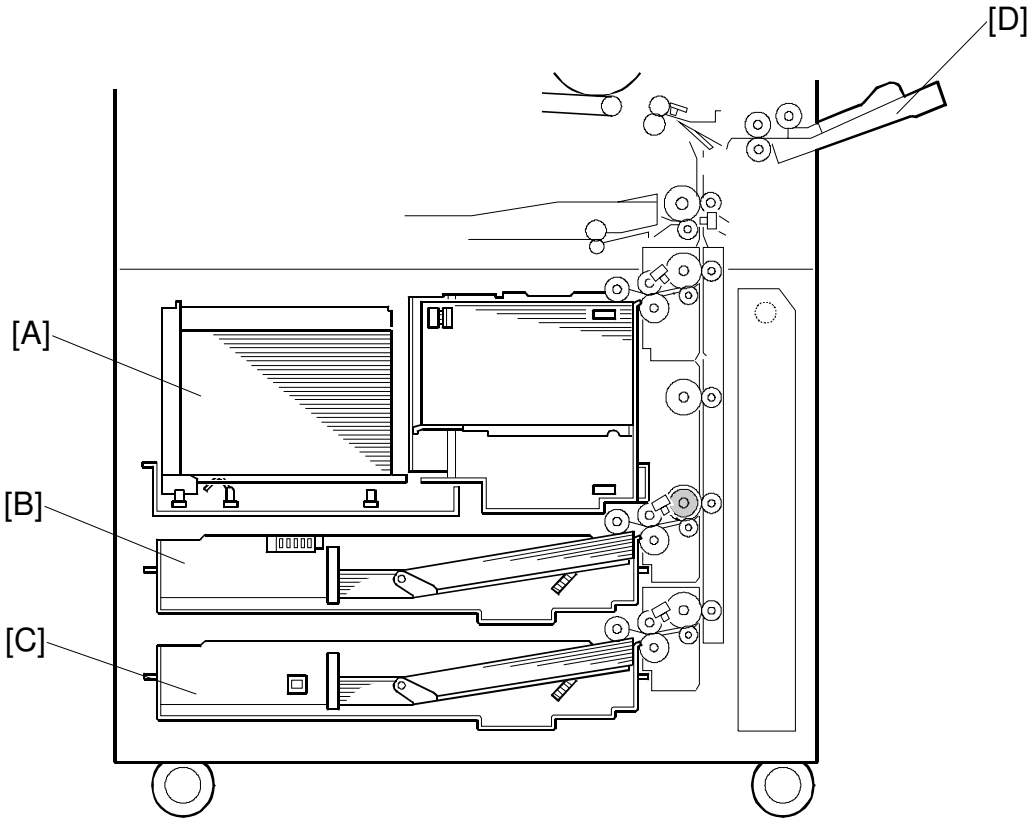
Some toner may adhere to the transfer belt when paper jams occur, or when the by-pass feed table side fences are set in the wrong position. The adhered toner must be removed to prevent the rear side of the copy paper from getting dirty.

The cleaning roller [A] is always in contact with the transfer belt. It collects toner and paper dust adhering to the surface of the transfer belt. This is because a positive bias is applied to the cleaning roller and this attracts the negatively charged toner on the transfer belt.

A counter blade system cleans the cleaning roller. The cleaning blade [B] scrapes off toner collecting on the cleaning roller [A]. The gear [C] moves the agitator plate [D] from side to side to transport toner to the toner collection coil [E]. Toner cleaned off the transfer belt is transported to the waste toner collection bottle by the coil.

2.8 PAPER FEED

2.8.1 OVERVIEW



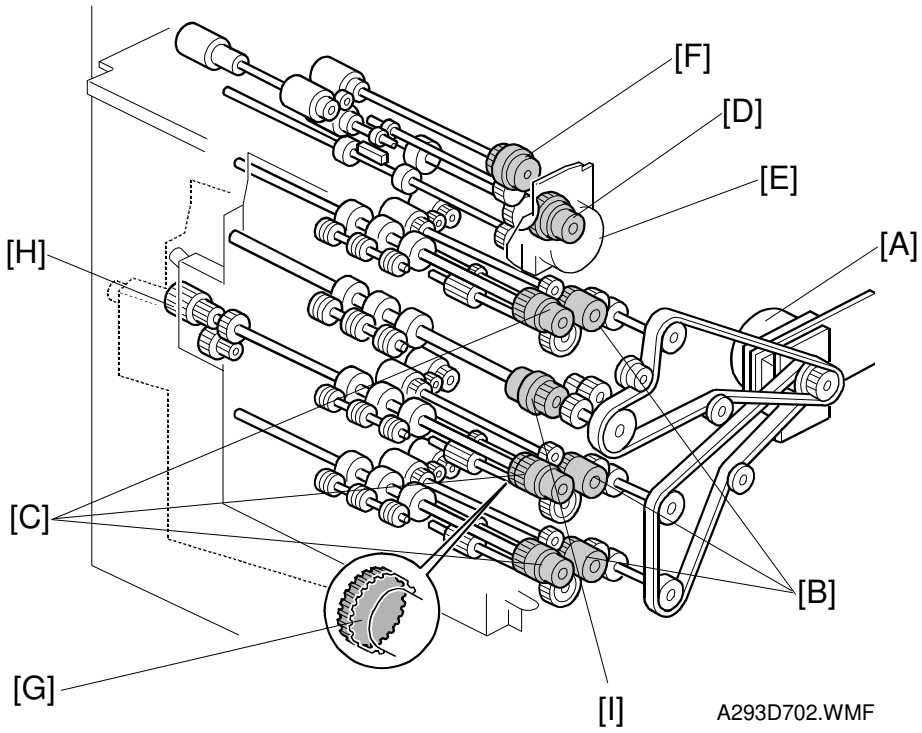
A293D558.WMF

This model has three built-in paper feed trays: tandem LCT (1st tray) [A] (1550 + 1550 sheets), universal tray (2nd tray) [B] (550 sheets), and single-size tray (3rd tray) [C] (550 sheets).

Paper can also be fed using the by-pass feed table [D] which has an independent feed mechanism. The by-pass feed table can hold 50 sheets of paper.

All feed stations use an FRR feed system.

2.8.2 DRIVE MECHANISM



[A] Paper Feed Motor
[B] Paper Feed Clutches
[C] Vertical Relay Clutches
[D] Relay Clutch
[E] By-pass Feed Motor
[F] By-pass Feed Clutch
[I] Bank Relay Clutch

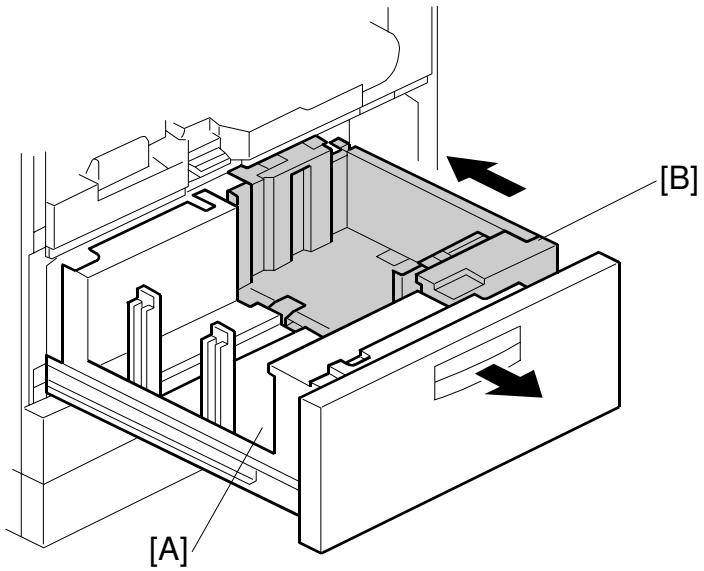
The paper feed motor [A] drives feed, pick-up, and separation rollers in the trays via timing belts, clutches [B], and gears. The paper feed motor also drives the vertical transport rollers and the relay roller. Drive is transferred to each of the four vertical transport rollers by a vertical relay clutch [C], and to the relay roller by the relay clutch [D].

The by-pass feed motor [E] drives all the rollers in the by-pass tray via gears and a clutch [F].

The second vertical relay clutch has a one-way-gear [G]. This prevents the clutch from slipping when the knob [H] is turned to remove jammed paper in the paper feed tray and vertical transport area.

2.8.3 TANDEM LCT – TRAY 1

Overview

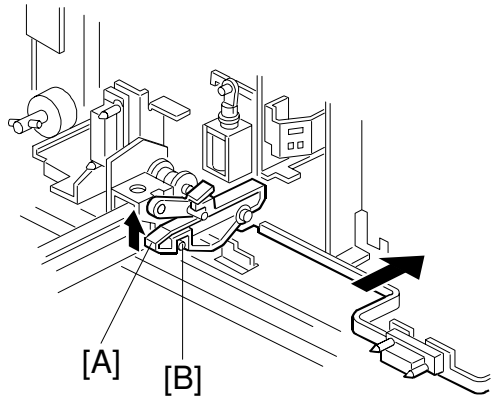


A293D559.WMF

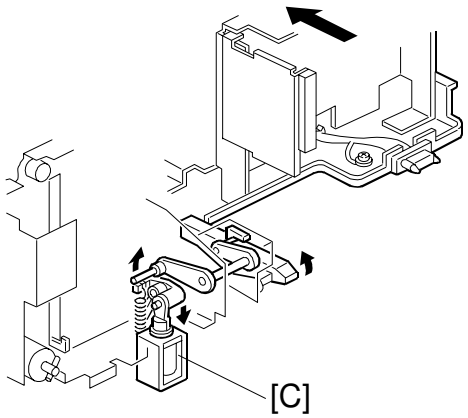
1,550 sheets of paper can be set in each of the left [A] and right trays [B]. Paper is fed from the right tray. When the paper in the right tray runs out, the paper in the left tray automatically transfers to the right tray. After the paper transfer to the right tray, paper feeding resumes.

Normally both the right and the left trays are joined together. However, during copying, if there is no paper in the left tray, the left tray can be pulled out to load paper. During that time, the right tray stays in the machine and paper feed continues.

Connecting the Left and Right Sides of the Tray



A293D673.WMF



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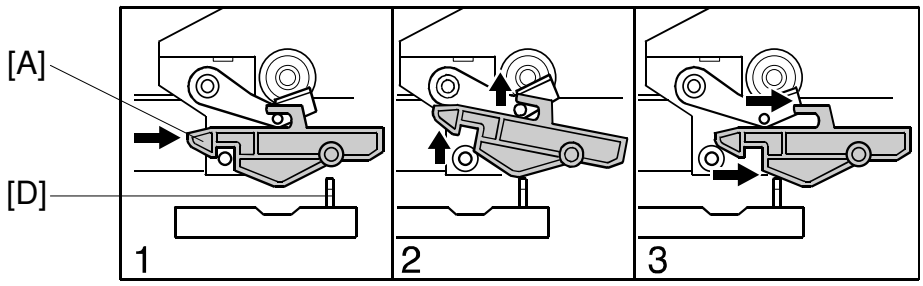


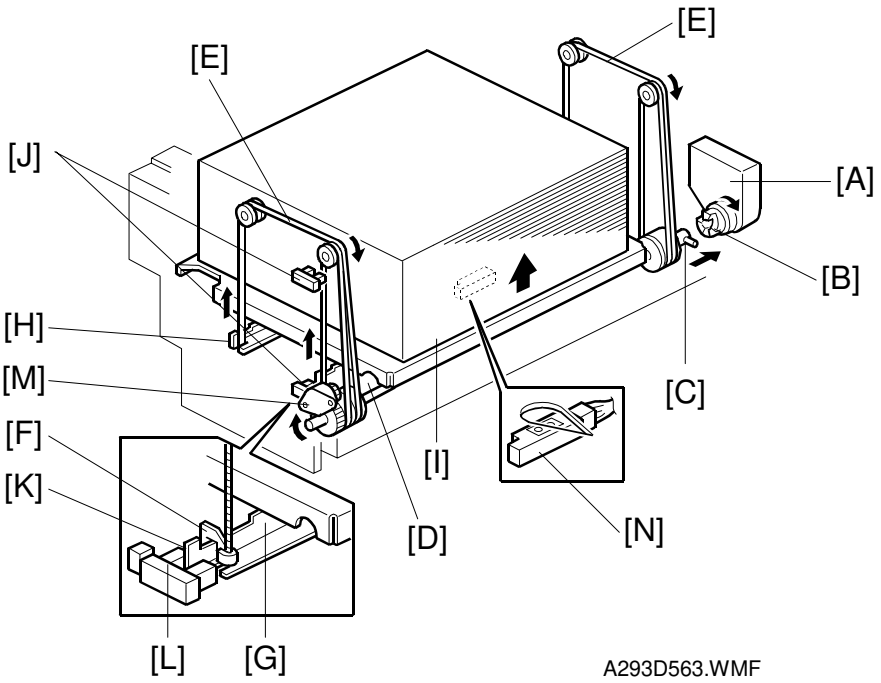
A293D562.WMF

Normally the left tray lock lever [A] in the left tray catches the pin [B] in the right tandem tray. During copying, if there is no paper in the left tray, the tandem tray connect solenoid [C] turns on to release the tray lock lever so that the left tray separates from the right tray. Therefore, the left tray can be pulled out to load paper while paper is still being fed into the machine from the right tray.

When the tandem tray is drawn out fully, the projection [D] pushes up the left tray lock lever [A] so that both trays separate for easier paper loading.

Paper Lift/Remaining Paper Detection

The machine detects when the 1st tray has been placed in the machine by monitoring the tray set signal through the connector.



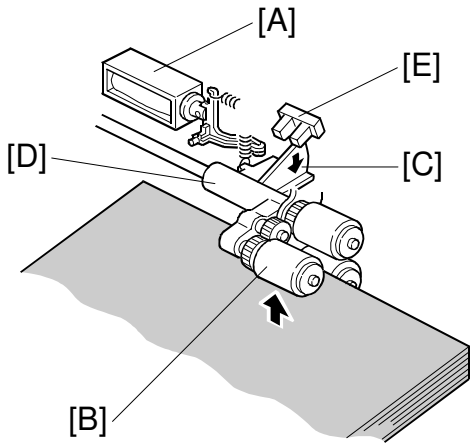
When the machine detects that the 1st paper tray is set in the machine, the right 1st tray paper sensor [N] (under the tray) checks whether there is paper in the right tandem tray.

NOTE: The right half of the tray holds up to 1,550 sheets. So, if the right 1st tray paper sensor was not present and the tray was empty, the bottom plate would have to lift up fully until the paper end sensor at the top of the tray detected that there was no paper, and this would waste several seconds.

If paper is detected, the lift motor [A] rotates and the coupling gear [B] on the tray lift motor engages the pin [C] of the lift shaft [D]. The tray wires [E] are fixed in the slots [F] at the ends of the tray support rods [G, H]. When the lift motor rotates clockwise, the tray support rods and the tray bottom plate [I] move upward. The tray goes up until the top paper pushes up the pick-up roller and the lift sensor in the 1st feed unit is activated, and the paper end sensor at the top of the tray is deactivated.

When the actuator [K] on the front end of the right support rod [G] activates the paper near end sensor [J], the paper near end condition is detected.

When removing the tray, the coupling gear [B] separates from the pin [C], so that the tray bottom plate moves downward. The tray lowers until the actuator activates the tray down sensor [L]. The damper [M] lets the tray bottom plate drop down slowly.



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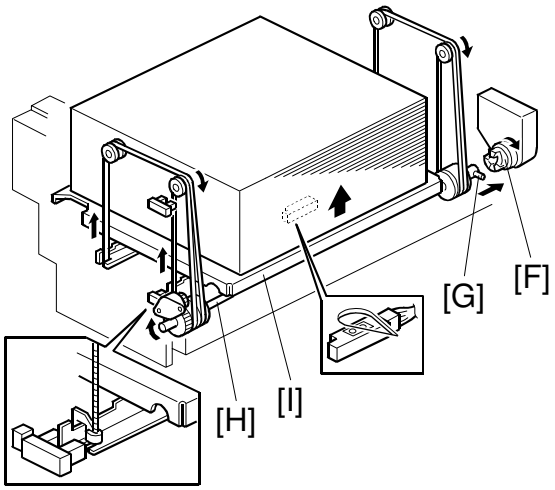


A293D565.WMF

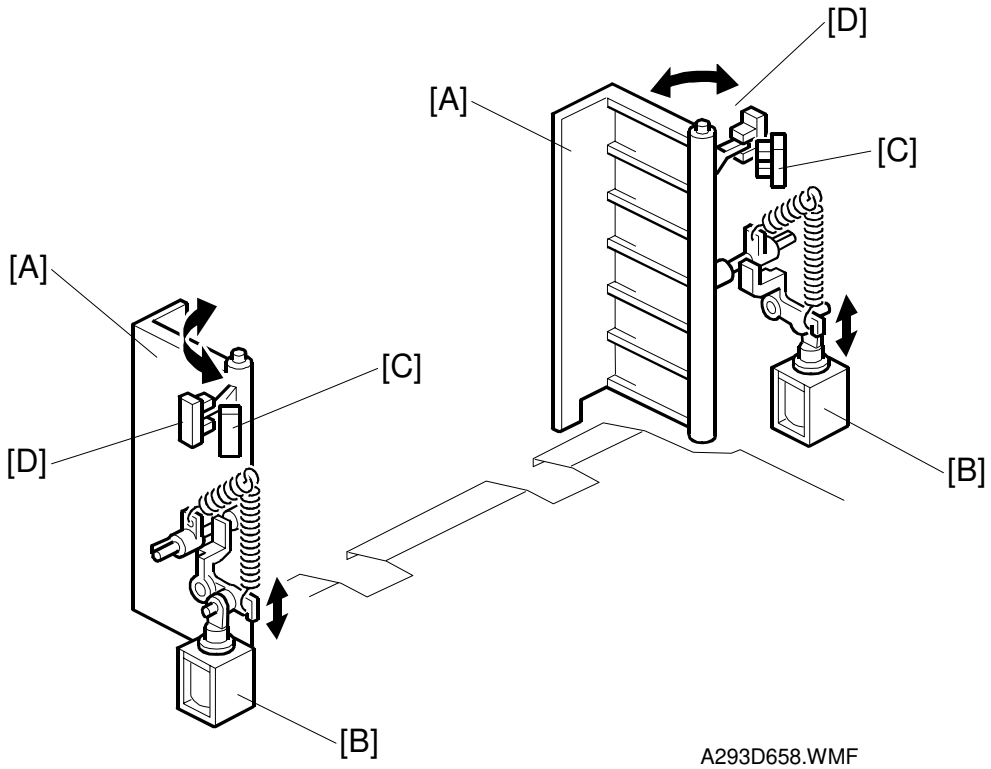
When the lift motor turns on, the pick-up solenoid [A] activates to lower the pick-up roller [B]. When the top sheet of paper reaches the correct height for paper feed, the paper pushes up the pick-up roller and the actuator [C] on the pick-up roller supporter [D] activates the lift sensor [E] to stop the lift motor.

After several paper feeds, the paper level gradually lowers then the lift sensor is de-activated and the lift motor turns on again until the lift sensor is activated again.

When the tray is drawn out of the feed unit, the lift motor coupling gear [F] disengages the pin [G] of the lift shaft [H], then the tray bottom plate [I] drops (the damper slows the fall, as explained on the previous page).

There is also a paper end sensor for the 1st tray, which works in the same way as the sensor in the 2nd and 3rd trays.

Fence Drive

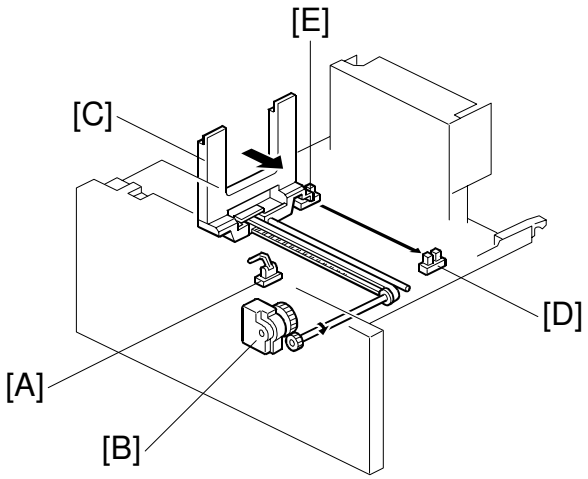


The side fences [A] of the right tray are normally closed. They open only when paper in the left tray goes to the right tray.

The side fence solenoids [B] drive the side fences. When the paper loaded in the left tray transfers to the right tray, the side fence solenoids turn on to open the side fences until the side fence positioning sensor [C] activates.

When the rear fence in the left tray has pushed the paper stack into the right tray, the side fence solenoids turn off to close the side fences. Then, when the side fence close sensor [D] actuates after pushing the tandem tray in, the LCD displays a message advising the user to set some paper in the left side of the tandem tray.

Rear Fence Drive



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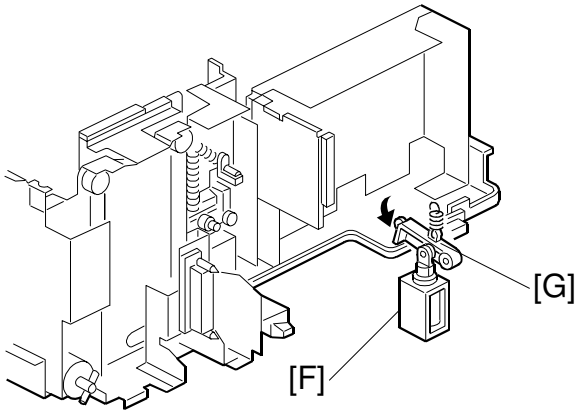

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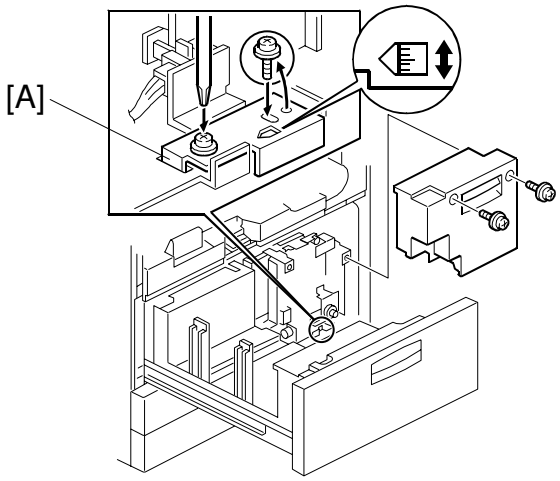
When the left 1st tray paper sensor [A] detects paper but the right 1st tray paper sensor does not, the rear fence drive motor [B] (a DC motor) in the left tray turns counter-clockwise causing the rear fence [C] to push the paper stack into the right tray.

When the actuator on the rear fence activates the rear fence return position sensor [D], the rear fence drive motor turns clockwise until the actuator activates the rear fence HP sensor [E].

While the rear fence is moving, the left 1st tray lock solenoid [F] turns on and the lock lever [G] locks the left tray.

Tray Positioning



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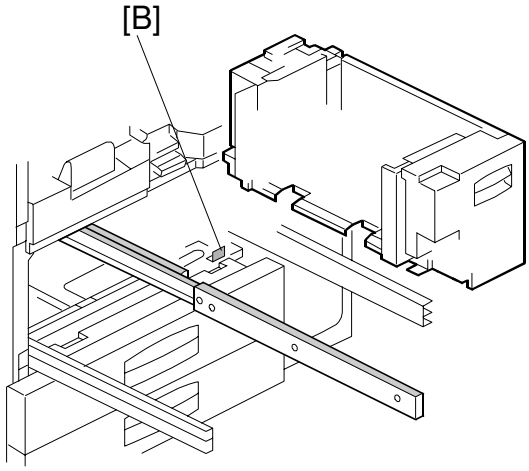
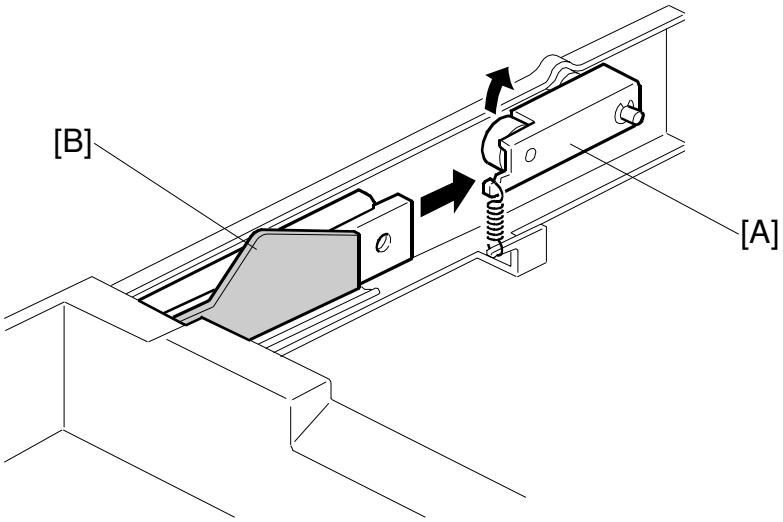


A293D571.WMF

Side-to-side Positioning

When the feed tray is set in the paper feed unit, the side-to-side positioning plate [A] presses the feed tray against the stopper [B]. By moving the positioning plate, the tray position can be changed to adjust the side-to-side registration.

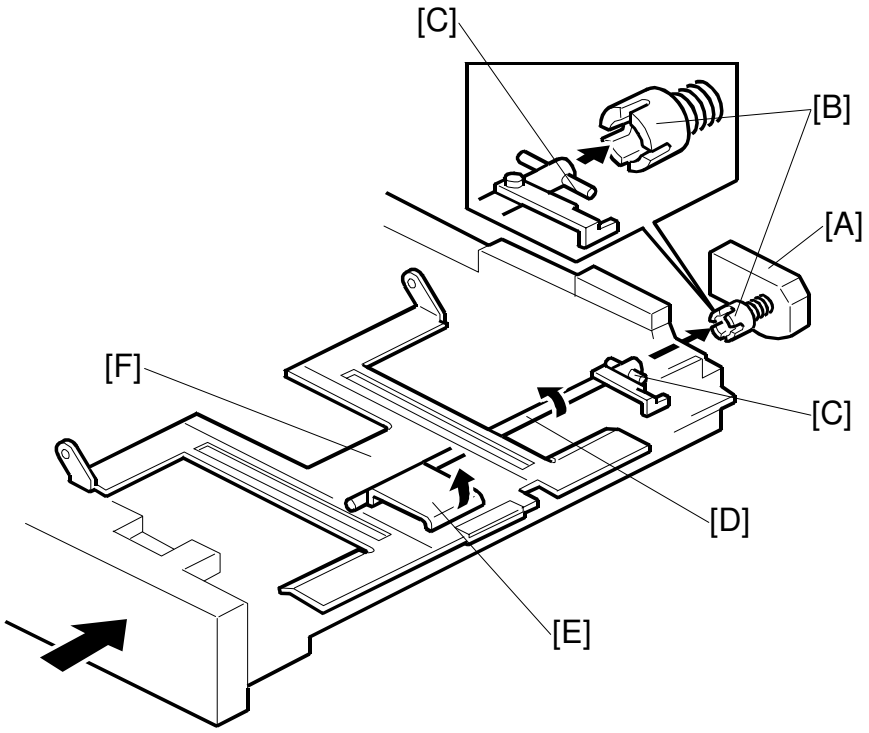
2.8.4 TRAY POSITIONING MECHANISM – TRAYS 1 TO 3



A293D569.WMF

When the tray is placed in the paper feed unit, the lock lever [A] drops behind the lock plate [B] on the support bracket to lock the tray in the proper position.

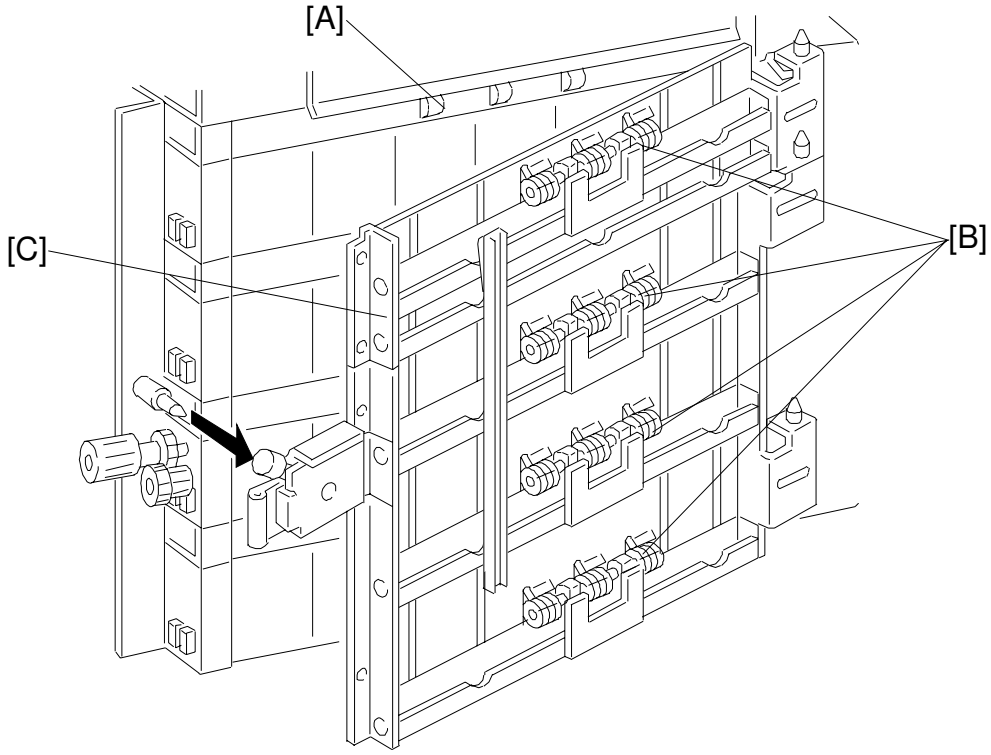
2.8.5 PAPER LIFT MECHANISM - TRAYS 2 AND 3



A293D572.WMF

When the machine detects that the paper tray has been placed in the machine, the lift motor [A] turns on. The coupling gear [B] on the tray lift motor engages the pin [C] on the lift arm shaft [D], then it turns the tray lift arm [E] to lift the tray bottom plate [F].

2.8.6 VERTICAL TRANSPORT MECHANISM



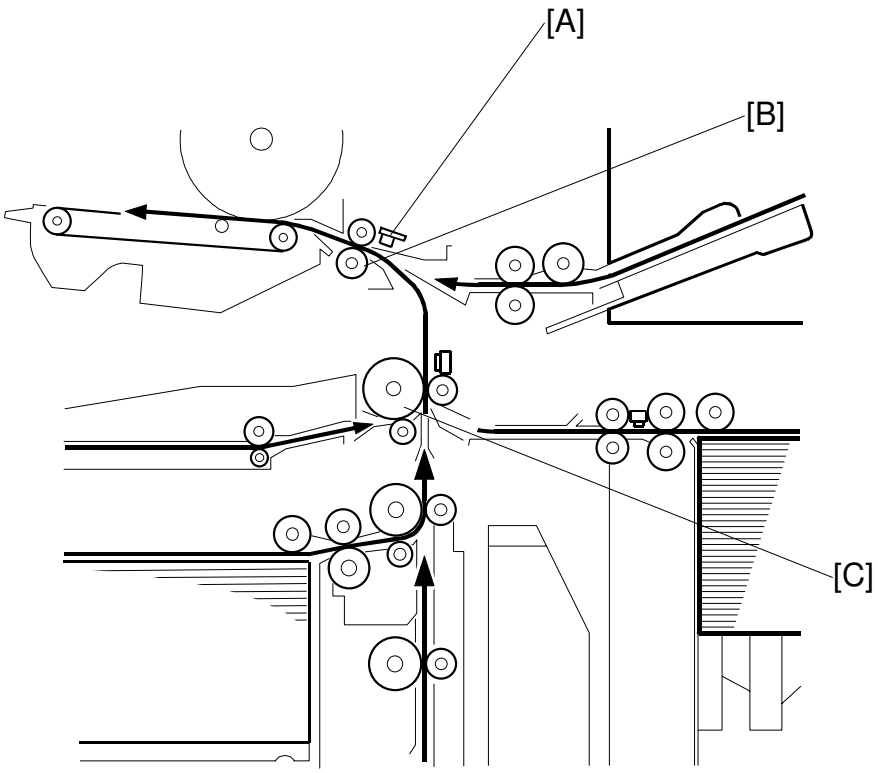
A293D573.WMF

The vertical transport rollers [A] in each feed unit are all driven by the paper feed motor. The vertical transport rollers and the idle vertical transport rollers [B], on the inner and outer vertical guide plates, transport the paper up from each feed unit towards the relay and registration rollers.

The vertical transport guides [C] can be opened to remove jammed paper in the vertical transport area.

2.8.7 PAPER REGISTRATION

Overview



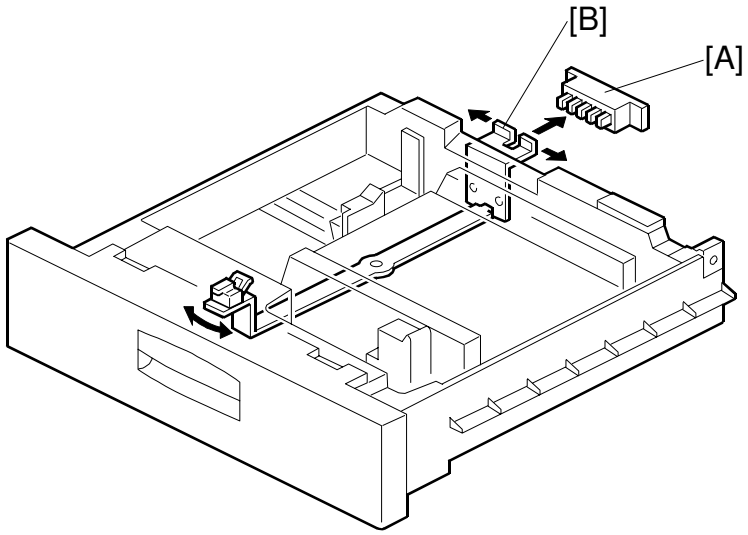
A293D704.WMF

The registration sensor [A] is positioned just before the registration rollers [B].

When the paper leading edge activates the registration sensor, the registration motor is off and the registration rollers are not turning. However, the relay clutch [C] stays on for a bit longer. This delay allows time for the paper to press against the registration rollers and buckle slightly to correct skew. Then, the registration motor energizes and the relay clutch re-energizes at the proper time to align the paper with the image on the drum. The registration and relay rollers feed the paper to the image transfer section.

The registration sensor is also used for paper misfeed detection.

2.8.8 PAPER SIZE DETECTION – TRAY 2



A293D574.WMF

SW Actuated – 0 De-actuated – 1	Paper size	L: Lengthwise S: Sideways
	A4/A3 Version	LT/DLT Version
01111	A3-L	11" x 17"-L
00111	8 1/4" x 13"	8 1/2" x 14"-L
10011	A4-L	8 1/2" x 11"-L
01001	A4-S	8 1/2" x 11"-S
00100	8 1/2" x 13"	5 1/2" x 8 1/2"-L
00010	A5-L	5 1/2" x 8 1/2"-S
00001	A5-S	8" x 10 1/2"-L
10000	–	8" x 10"-L
11000	–	8" x 13"-L
11100	–	10" x 14"-L
11110	*	*

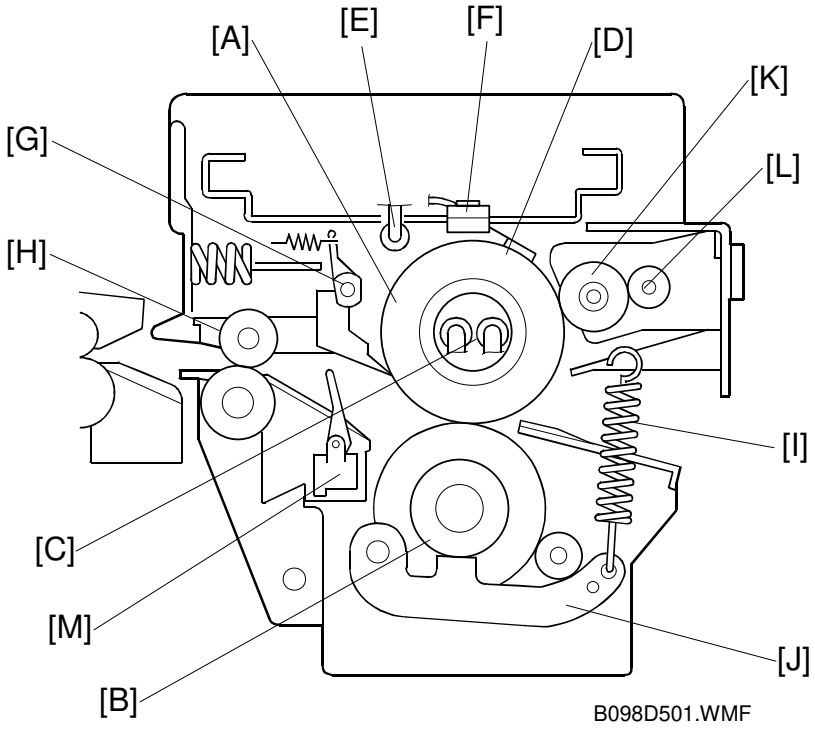
For the first and the third feed trays, the paper size has to be stored with a UP mode.

For the second feed tray (universal tray), the paper size switch [A] detects the paper size. The paper size switch contains five microswitches. The paper size switch is actuated by an actuator plate [B] at the rear of the tray. Each paper size has its own unique combination as shown in the table and the CPU determines the paper size by the combination.

Using the asterisk setting (*), a wider range of paper sizes can be used, but the size has to be entered with a UP mode.

2.9 IMAGE FUSING

2.9.1 OVERVIEW



After the developed latent image is transferred from the drum to the paper, the copy paper enters the fusing unit. Then the image is fused to the copy paper by a heat and pressure process through the use of a hot roller [A] and a pressure roller [B].

There are two fusing lamps [C] in the hot roller. Both lamps are 550 W lamps. They switch on and off at the same time.

The fusing lamps turn on and off to keep the operating temperature at 185°C. The CPU monitors the hot roller surface temperature through a thermistor [D] which is in contact with the hot roller surface. A thermofuse (A292/A293) [E] /thermostats (B098) [F] protects the fusing unit from overheating.

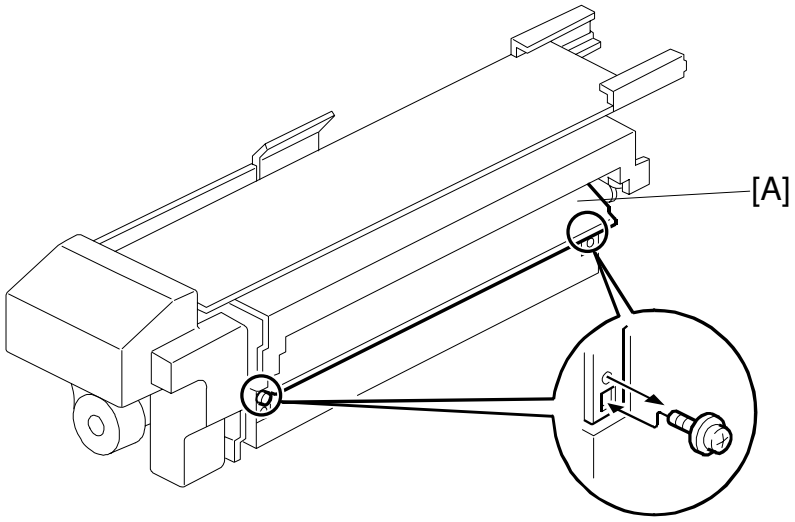
The hot roller strippers [G] separate the copy paper from the hot roller and direct it to the fusing exit rollers [H]. The exit sensor in the inverter and paper exit unit monitors the progress of the copy paper through the fusing unit and acts as a misfeed detector while the exit rollers feed the copy paper to the inverter section.

The hooking position of the tension springs [I] on the pressure lever [J] adjusts the roller pressure.

The oil supply roller [K] applies a light coat of silicone oil to the hot roller. The oil supply cleaning roller [L] removes the paper dust attached to the cleaning roller.

The fusing sensor [M] detects concertina jams at the fusing unit exit. This sensor is needed because the user may not see this type of jam inside the machine when removing jams at the exit.

2.9.2 FUSING ENTRANCE GUIDE



A293D505.WMF

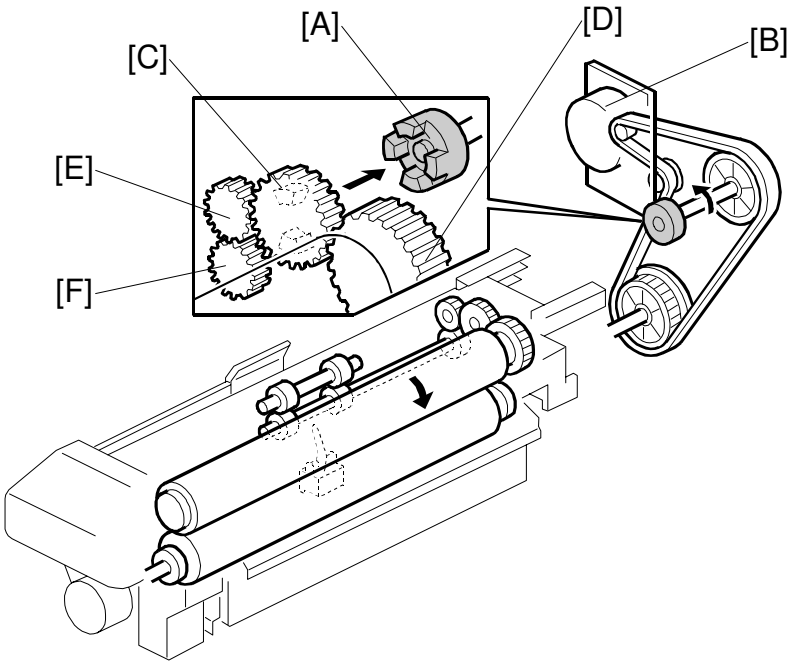
The entrance guide [A] for this machine is adjustable for thick or thin paper.

For thin paper, the entrance guide should be in the upper position (this is the standard position). This slightly lengthens the paper path which prevents the paper from creasing in the fusing unit.

For thick paper, move the entrance guide to the lower position. This is because thick paper does not bend as easily, and is therefore less prone to creasing. Also, the lower setting allows more direct access to the gap between the hot and pressure rollers. This prevents thick paper from buckling against the hot roller, which can cause blurring at the leading edge of the copy.

In this model, the transfer belt improves paper transport and the paper path to the fusing entrance is stabilized. This reduces the chance of paper creasing due to paper skew in the fusing unit.

2.9.3 FUSING DRIVE MECHANISM



A293D507.WMF

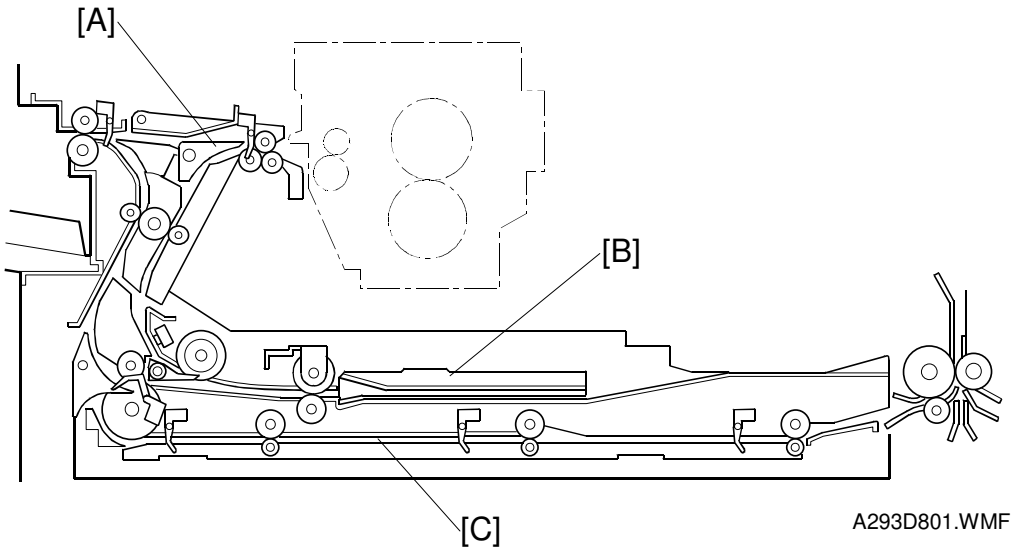
The fusing drive gear [A] transmits drive from the fusing/duplex drive motor [B] to the gear [C], which drives the hot roller gear [D].

Rotation passes from the gear [C] through the idle gear [E] to the exit roller drive gear [F].

The pressure roller is driven by the friction between the hot and pressure rollers.

2.10 PAPER EXIT/DUPLEX

2.10.1 OVERVIEW



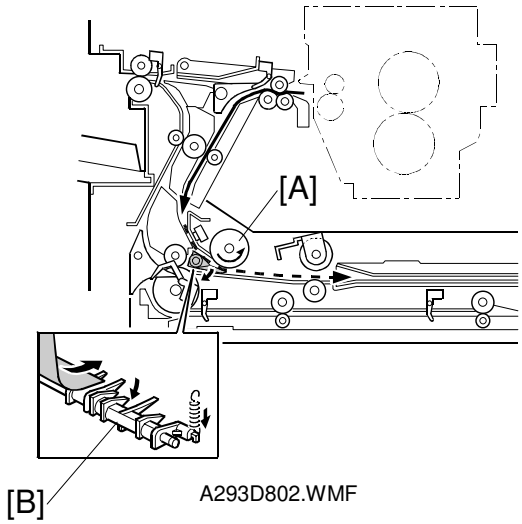
The printed page from the fusing unit goes either straight through to the output tray or finisher, or downward through to the inverter or duplex unit, depending on the position of the junction gate [A].

If the page is fed out directly, it arrives on the tray face-up. If the user selected face-down output, the page goes to the inverter [B] before being fed out.

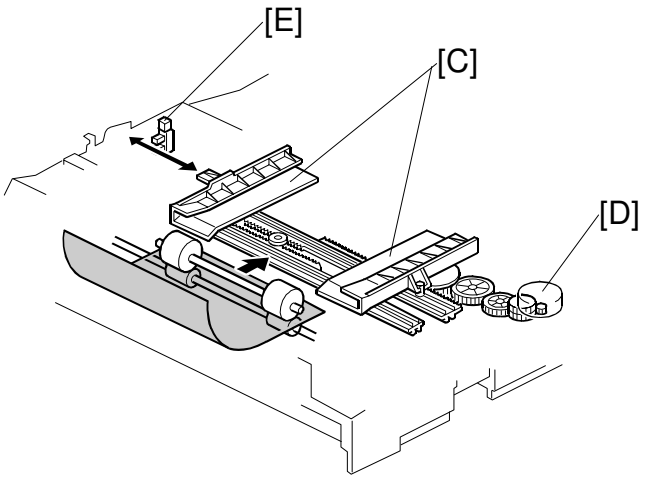
If the user selects duplex mode, the page is directed to the duplex tray [C] after inverting, and back to the machine for printing the second side.

2.10.2 INVERTER

Feed-in and Jogging



A293D802.WMF



A293D557.WMF

When the paper is fed to the jogger section by the inverter feed roller [A], it pushes down the gate [B]. After the paper passes through the gate [B], the jogger fences [C] move to square the paper. This happens every page.

NOTE: The gate has no solenoid. A spring pushes the gate back up again after the paper has gone.

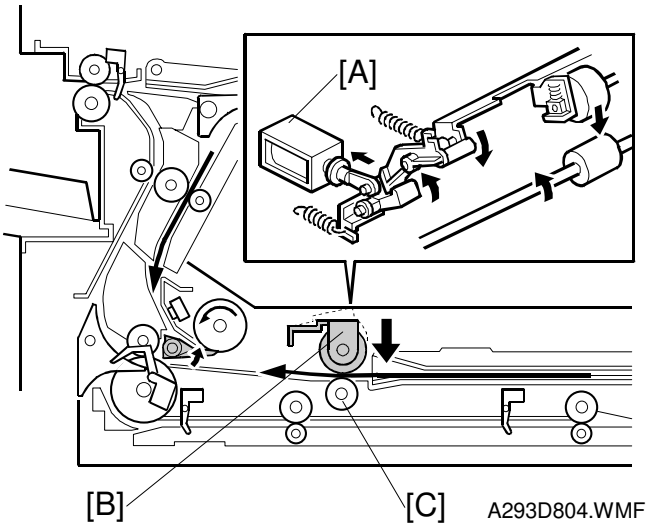
The jogger motor (a stepper motor) [D] moves the jogger fences [C] inward or outward.

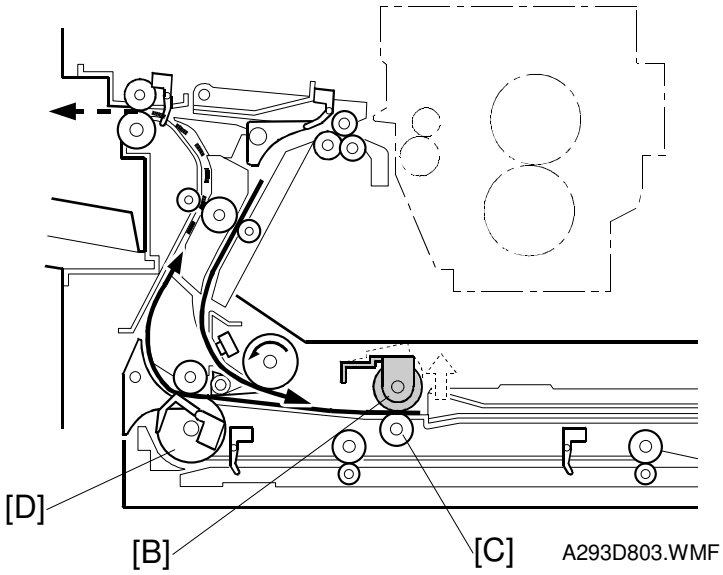
When the main switch is turned on, the jogger motor places the jogger fences at the home position, which is determined by monitoring the signal from the jogger home position sensor [E].

When the start key is pressed, the jogger motor positions the jogger fences 10 mm away from the selected paper size to wait for the paper.

When the paper is delivered to the jogger fences, the jogger fences move inward to square the paper. After this, the jogger fences move back to the previous position (10 mm away from the paper).

Feed-out

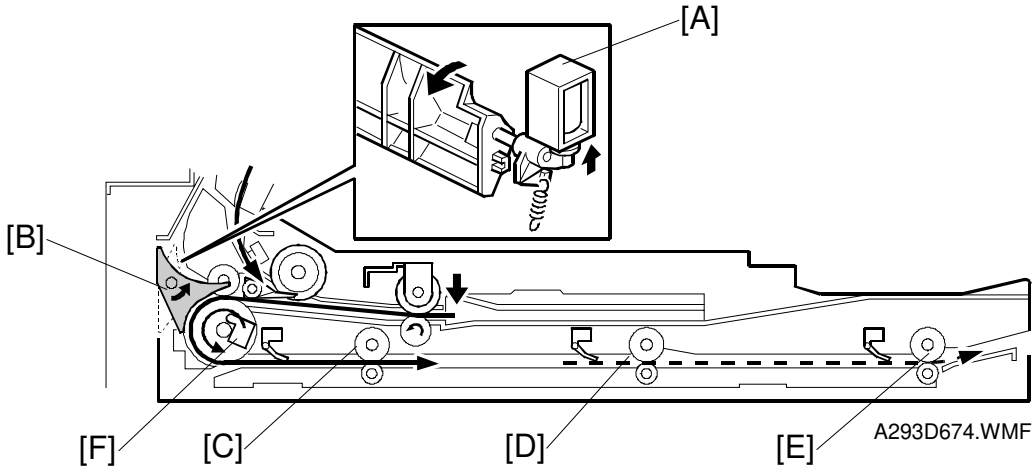




After jogging, the reverse roller solenoid [A] energizes to push down the reverse trigger roller [B]. The reverse roller [C] turns counterclockwise continuously, so the paper starts to reverse when the reverse trigger roller is down and catches the paper between the rollers.

The paper is fed from the reverse roller to the inverter exit roller [D]. After the paper starts to be fed by the inverter exit roller, the reverse trigger roller moves back up.

2.10.3 DUPLEX TRAY FEED MECHANISM



In duplex mode, after the paper leaves the inverter, the duplex inverter solenoid [A] switches the junction gate [B] to direct the paper to the duplex tray. The paper is fed through the duplex tray by duplex transport rollers 1 [C] and 2 [D], and the duplex feed roller [E].

If duplex mode is not selected, the solenoid does not switch the junction gate, and the paper goes to the output tray or finisher face down.

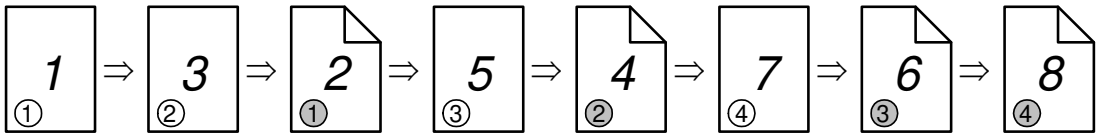
The inverter exit sensor [F] controls the on/off timing of the inverter exit clutch which stops paper coming into the duplex unit for a while. If image processing for the page coming out of the duplex unit is taking a long time, this mechanism prevents the paper entering the duplex unit from slipping over the paper at the duplex unit exit and accidentally being fed out of the unit first. The mechanism maintains the maximum productivity of printing while preventing this type of duplex feed error. When the clutch is on, paper stops.

2.10.4 BASIC DUPLEX FEED OPERATION

Longer than A4 / Letter lengthwise

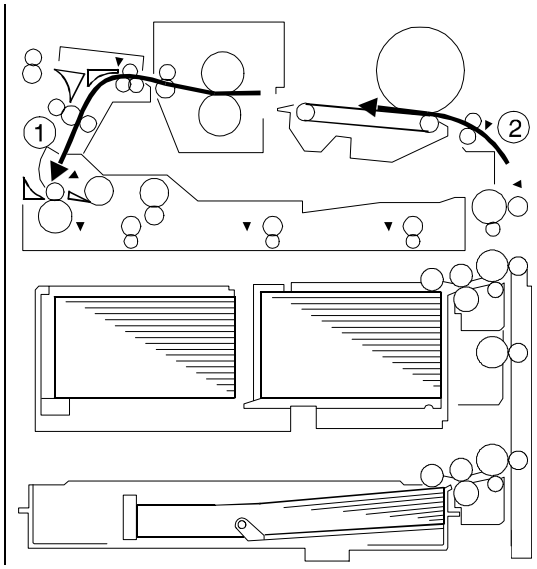
The duplex unit can process two sheets of copy paper

Example: 8 pages. The number [A] in the illustration shows the order of pages. The number [B] in the illustration shows the order of sheets of copy paper (if shaded, this indicates the second side).



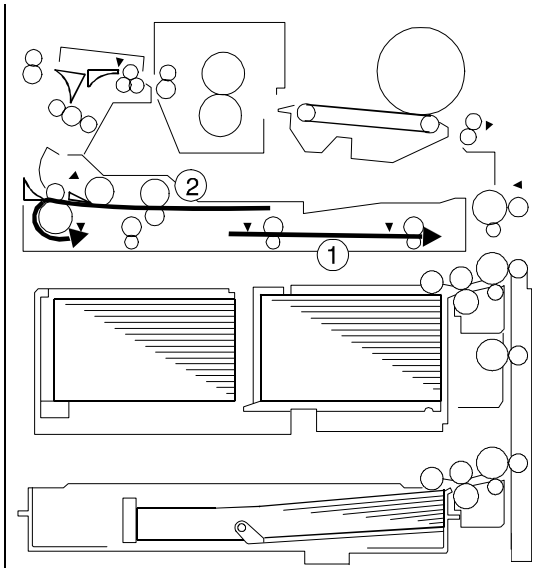
A293D657.WMF

1. The first 2 sheets are fed and printed.
   1) 1st sheet printed (1st page)
   2) 2nd sheet printed (3rd page)



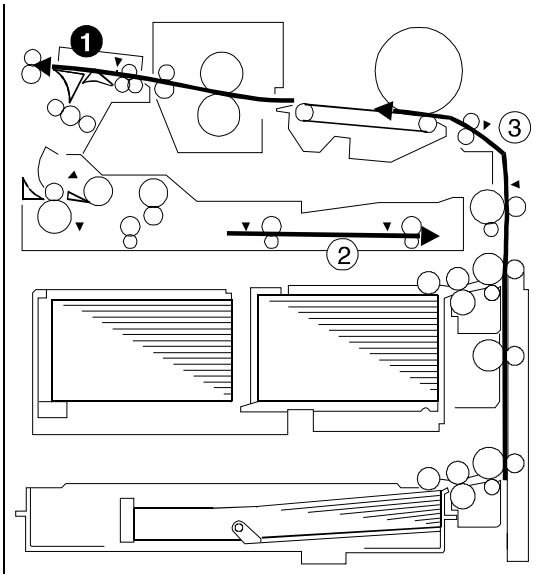
A293D651.WMF

2. The first 2 sheets go into the duplex unit



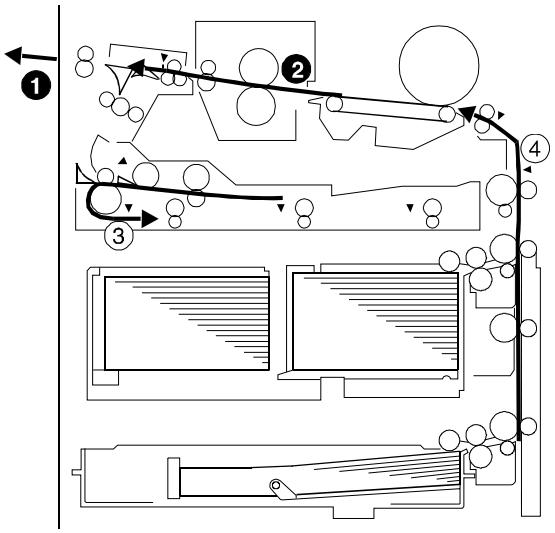
A293D652.WMF

3. The back of the 1st sheet (2nd page) is printed.
4. The 3rd sheet (5th page) is fed and printed.



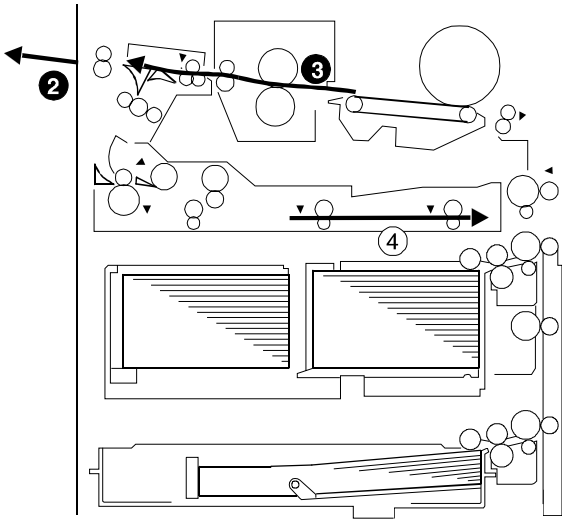
A293D653.WMF

5. The 1st sheet (1st and 2nd pages) is fed out.
6. The back of the 2nd sheet (4th page) is printed.
7. The 4th sheet (7th page) is fed and printed.



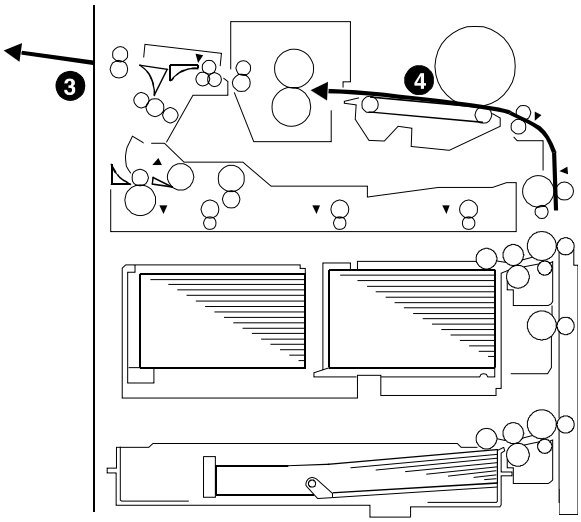
A293D654.WMF

8. The 2nd sheet (3rd and 4th pages) is fed out
9. The back of the 3rd sheet (6th page) is printed.



A293D655.WMF

10. The 3rd sheet (5th and 6th pages printed) is fed out.
11. The back of the 4th sheet (8th page) is printed.
12. The 4th sheet (7th and 8th pages) is fed out.



A293D656.WMF

2.11 ENERGY SAVER MODES

2.11.1 LOW POWER MODE

Entering low power mode

The low power shift timer runs out after the end of a job.

What happens in low power mode

The fusing lamp drops to a certain temperature, that depends on the setting of SP5-920. The other conditions are the same as for energy saver mode.

Return to stand-by mode

The machine returns to standby mode in exactly the same way as from energy saver mode.

The recovery time from low power mode depends on the setting of SP5-920.

Model	Recovery Time	Operation Switch	Energy Saver LED	Fusing Temp. (SP5-920)	System +5V	Main Power LED
A292/	About 20 seconds	On	On	170 °C (NA) 160 °C (EU)	On	On
A293	About 20 seconds	On	On	177°C	On	On
B098	Less than 30 seconds	On	On	160°C (NA) 155°C (EU)	On	On

3. INSTALLATION PROCEDURE

3.1 INSTALLATION REQUIREMENTS

3.1.1 ENVIRONMENT

1. Temperature Range: 10°C to 32°C (50°F to 89.6°F)
2. Humidity Range: 15% to 80% RH (27°C 80%, 32°C 54%)
3. Ambient Illumination: Less than 1,500 lux (do not expose to direct sunlight or strong light.)
4. Ventilation: Room air should turn over at least 3 times per hour
5. Ambient Dust: Less than 0.10 mg/m^3 (2.7 x 10^{-6} oz/yd^3)
6. If the place of installation is air-conditioned or heated, do not place the machine where it will be:
   1) Subjected to sudden temperature changes
   2) Directly exposed to cool air from an air-conditioner
   3) Directly exposed to heat from a heater
7. Do not place the machine where it will be exposed to corrosive gases.
8. Do not install the machine at any location over 2,000 m (6,500 feet) above sea level.
9. Place the copier on a strong and level base.
10. Do not place the machine where it may be subjected to strong vibrations.

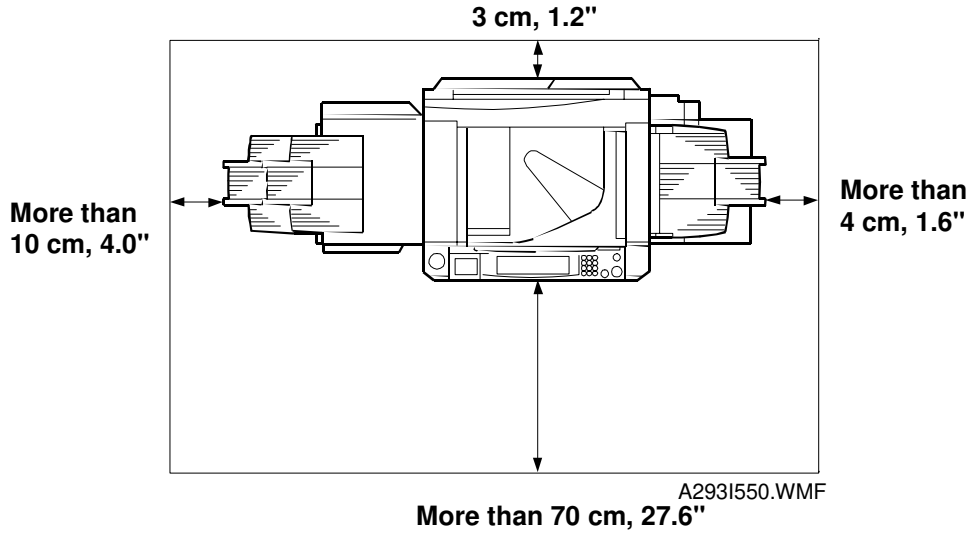
3.1.2 MACHINE LEVEL

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

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

3.1.3 MINIMUM SPACE REQUIREMENTS

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



3.1.4 POWER REQUIREMENTS

⚠CAUTION
1. Make sure the plug is firmly inserted in the outlet.
2. Avoid multi-wiring.
3. Do not set anything on the power cord.

1. Input voltage level: 120 V/60 Hz: More than 20 A
   220~240 V/50-60 Hz: More than 10 A
2. Permissible voltage fluctuation: 10%

3.2 COPIER (A292/A293/B098)

3.2.1 ACCESSORY CHECK

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

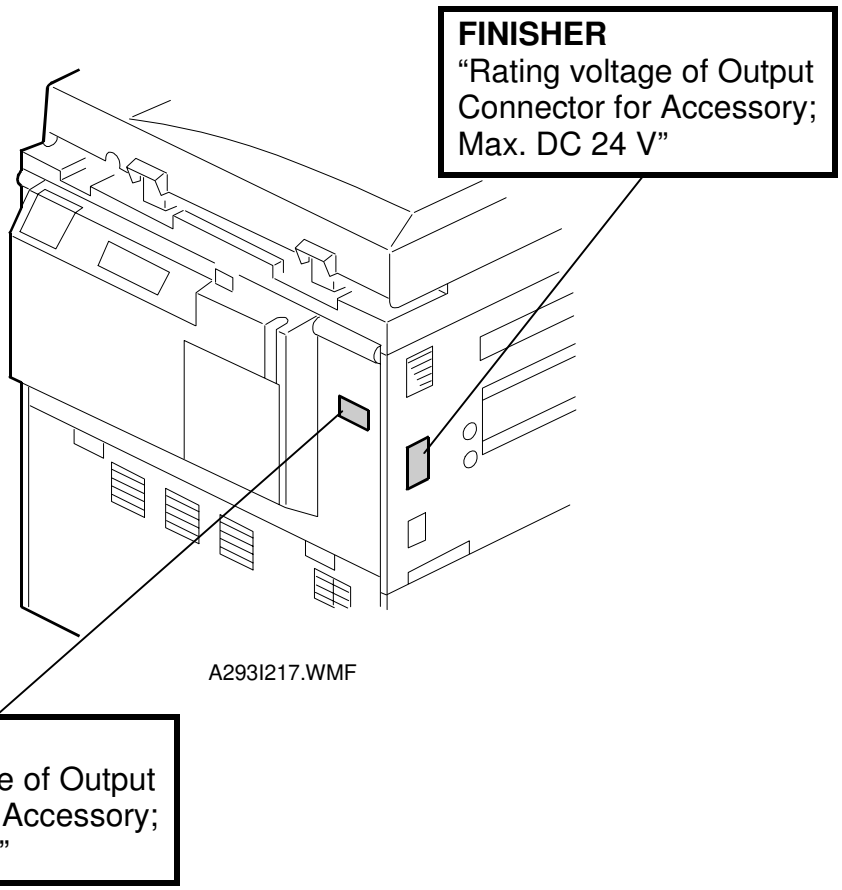
Description	Q'ty
1. Model Name Decal	1
A292/**A293**: -15, -22 machines	
B098: -22 machines	
2. Operation Instructions – English	1
A292/**A293**: -15, -15, -17, -22, -26, -29 machines	
B098: -17, -26, -29 machines	
3. Operation Instructions – Chinese (-19, -69 machines)	1
4. Operation Instructions – Korean (-28 machines)	1
5. NECR – English (-17 machines)	1
6. NECR – Multi-language (-19, -27, -29, -69 machines)	1
7. Operation Panel Brand Decal (-22 machines)	1
8. Paper Size Decal	1
9. Decal – Face Up	1
10. Original Exit Tray	1
11. Tapping Screw – M4 x 8	3
12. Plastic Mylar – Large	2
13. Plastic Mylar – Small	1
14. Leveling Shoes	2
15. Operation Instruction Holder	1

3.2.2 INSTALLATION PROCEDURE

⚠CAUTION

Rating Voltage for Peripherals

Make sure to plug the cables into the correct sockets.



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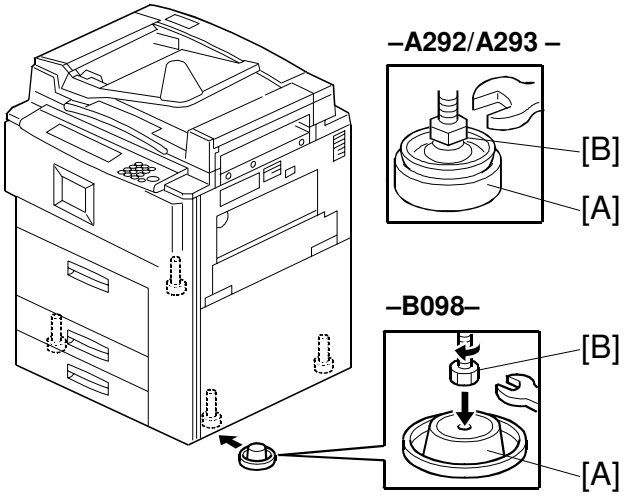
NOTE: Since the installation procedure is not packed with the copier as an accessory, always bring this manual with you.



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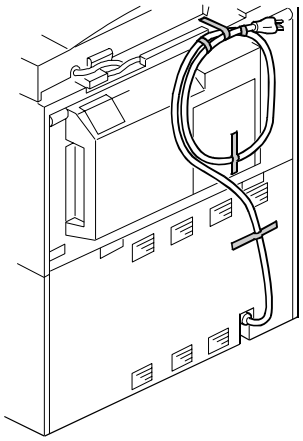
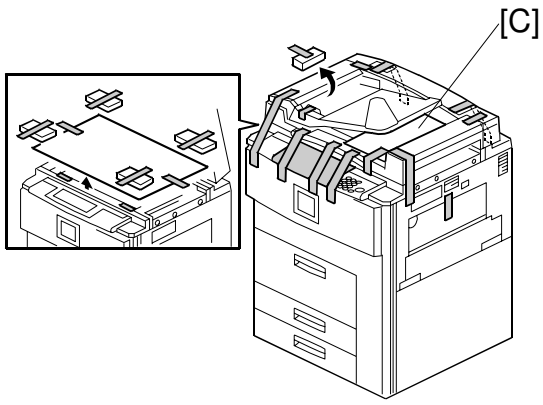


B098I214.WMF



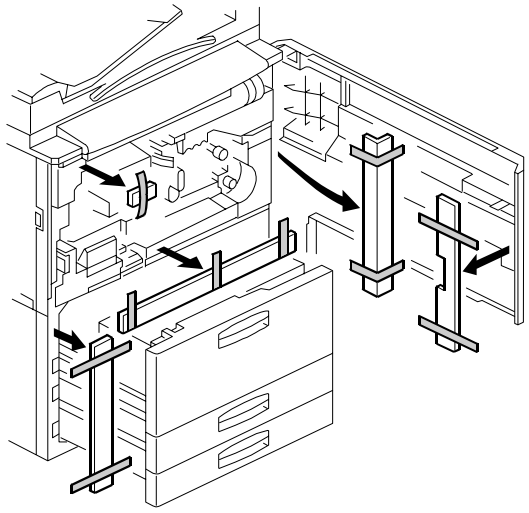
B098I215.WMF

⚠CAUTION

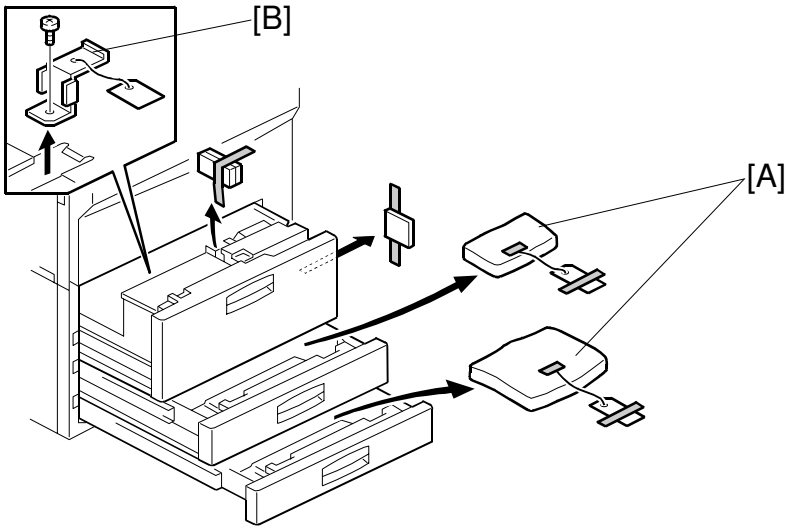
Keep the power cord unplugged when starting the following procedure.

NOTE: 1) Keep the shipping retainers after installing the machine. They will be reused if the machine is moved to another location in the future.
2) Insert the levelling shoes [A] under the levelling feet [B] at the front, and level the machine before starting the installation. (The levelling feet [B] can be screwed up or down.) Extra levelling shoes and levelling feet are available as spare parts.

1. Remove the strips of tape from the outside as shown above.
2. Keep the factory setting data sheet [C] for future usage.

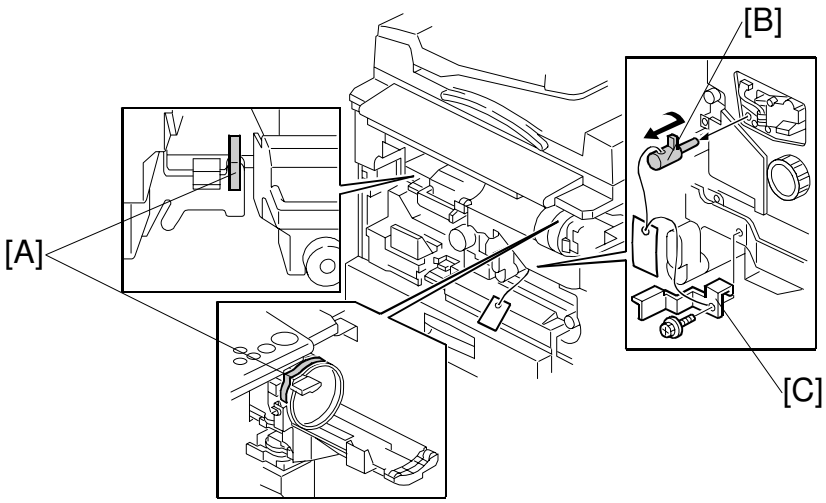


A293I213.WMF



A293I216.WMF

3. Draw out trays 1 and 2, and take out the accessory items [A] placed inside.
4. Remove the strips of tape from the inside and spring retainer [B] as shown above.



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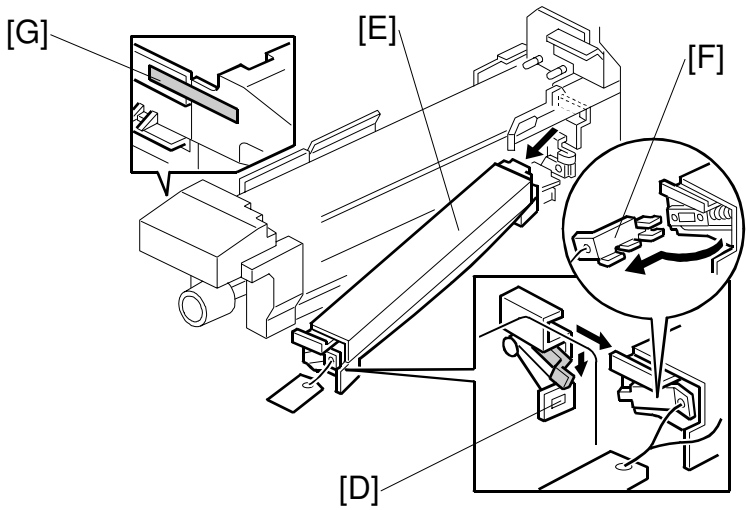

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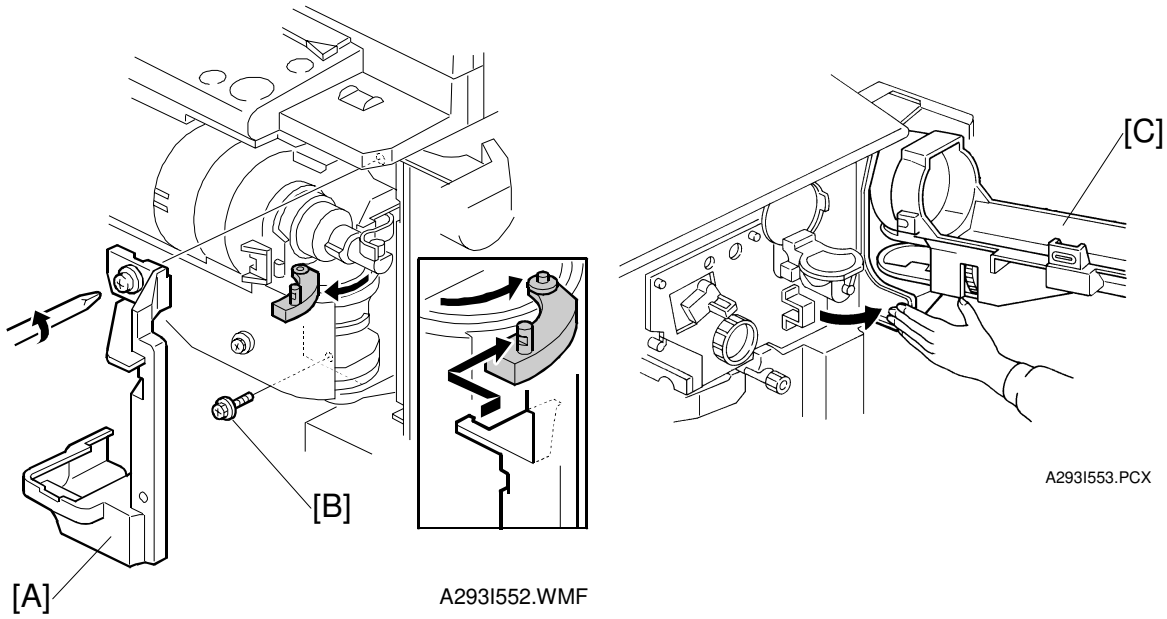
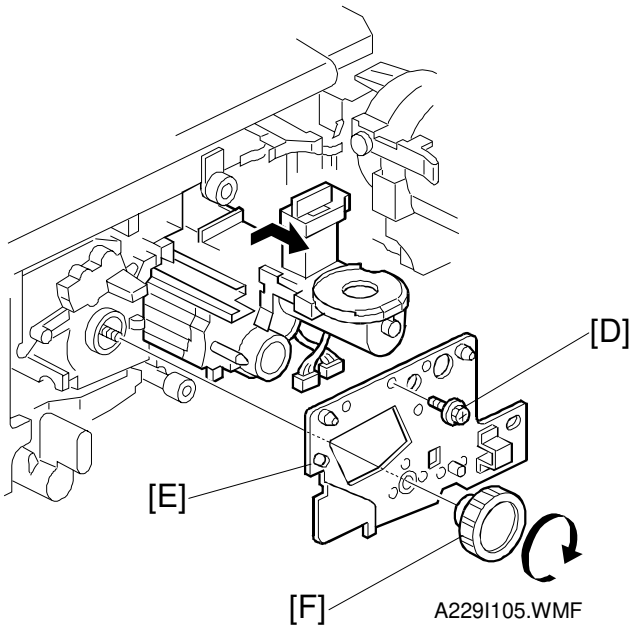
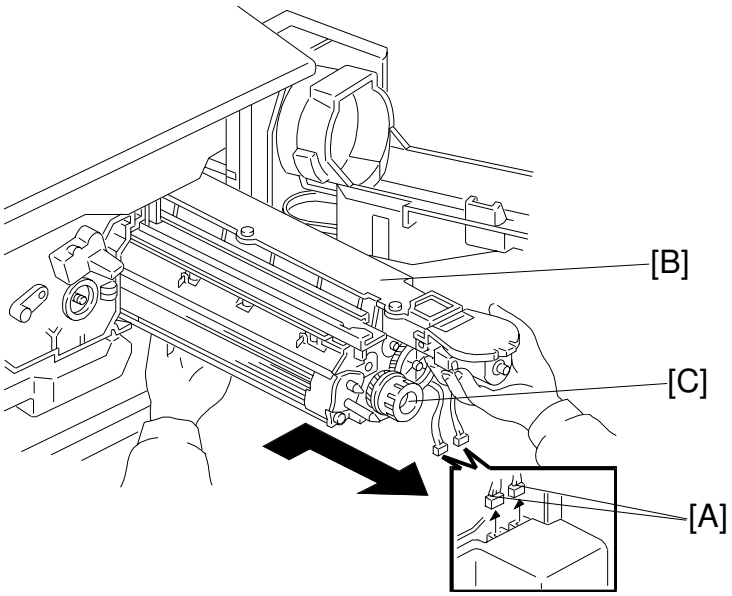
5. Open the front cover and remove the strips of tape [A].
6. Remove the blade release pin [B] together with the transfer belt lock plate [C] (1 screw).
7. Pull out the fusing unit. Lower the lever [D], remove the oil supply unit [E], and remove the front and rear clamps [F]. Reinstall the oil supply unit and push in the fusing unit. Remove the strip of filament tape [G] from the fusing unit.





8. Remove the shutter inner cover [A] (1 screw).
9. Remove the screw [B] securing the toner bottle holder.
10. Swing out the toner bottle holder [C].
11. Remove the screw [D] that holds the drum stay [E].
12. Remove the drum stay knob [F] and the drum stay (turn the knob clockwise to remove it).



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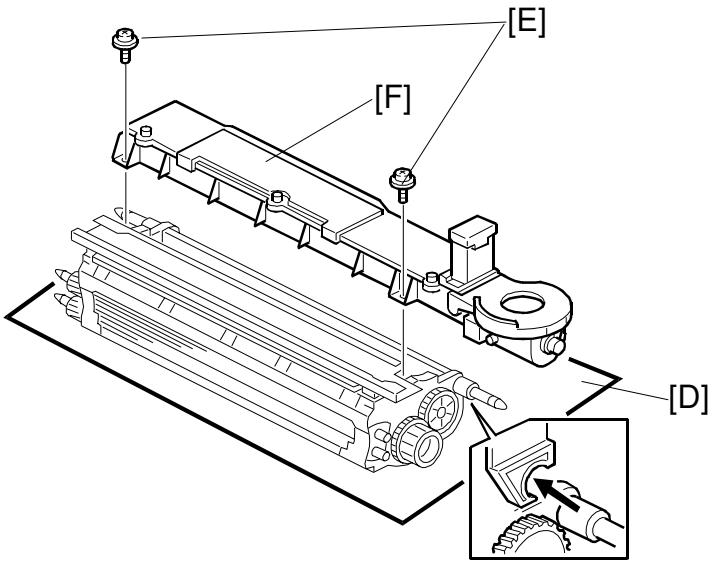
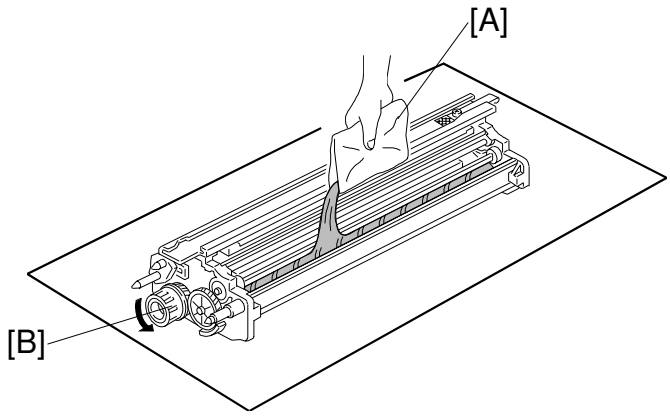


A293I556.WMF

13. Disconnect two connectors [A].
14. Pull out the development unit [B] as shown.
    NOTE: 1) To prevent scratches on the drum, push the development unit to the right while pulling it out.
    2) When pulling out the development unit, do not pull the knob [C].
    3) Place the development unit on a clean sheet of paper [D], to prevent foreign matter from being attracted to the sleeve rollers.
15. Remove the two screws [E] that hold the toner hopper [F].
16. Remove the toner hopper by lifting it out.



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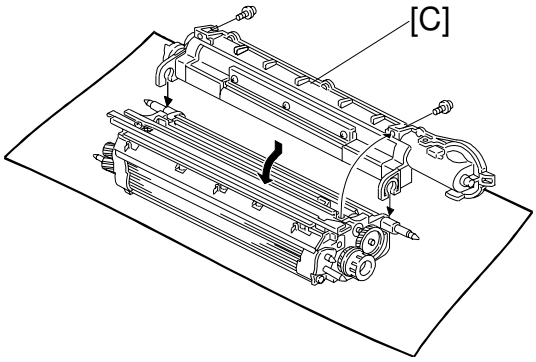

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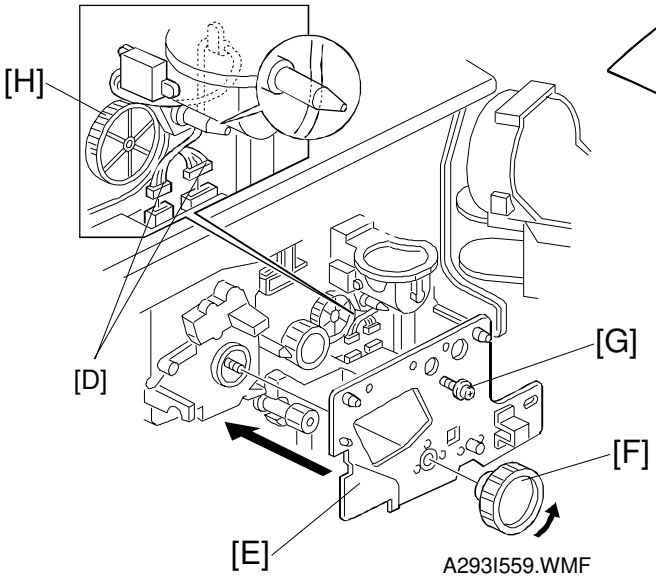
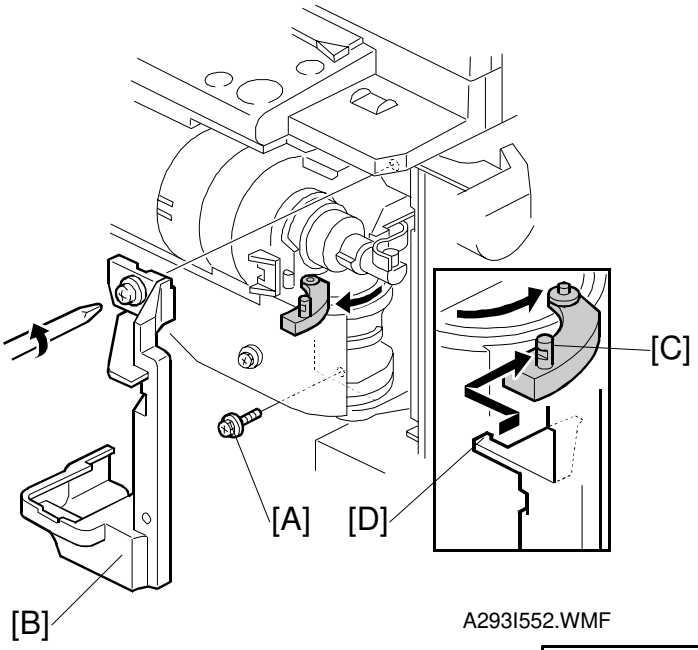


A293I559.WMF

17. Pour in one pack of developer [A] while turning the knob [B]. Distribute the developer evenly along the development unit.
18. Attach the toner hopper [C] to the development unit (2 screws).
19. Install the development unit in the machine.
20. Connect two connectors [D].
21. Attach the drum stay [E] and attach the drum stay knob [F] and one screw [G].
    NOTE: When installing the drum stay, be careful not to pinch the cables, and keep the cables away from the gear [H].



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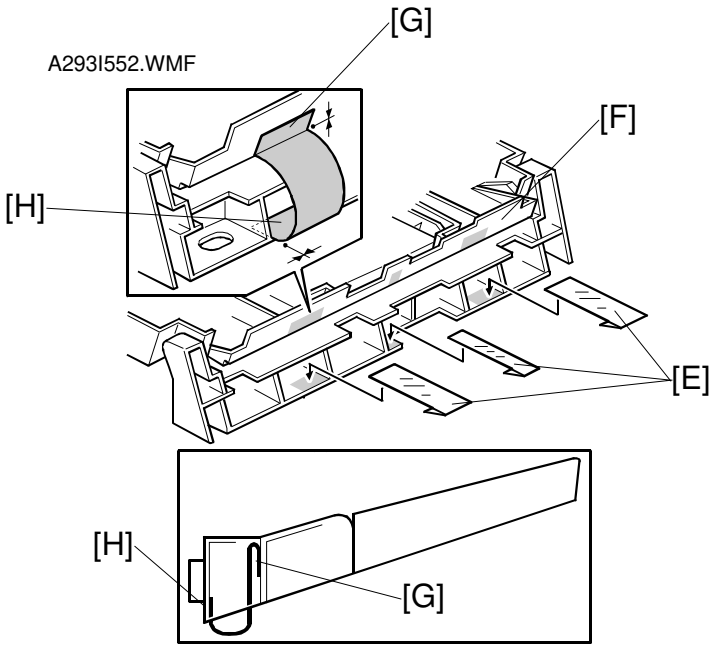
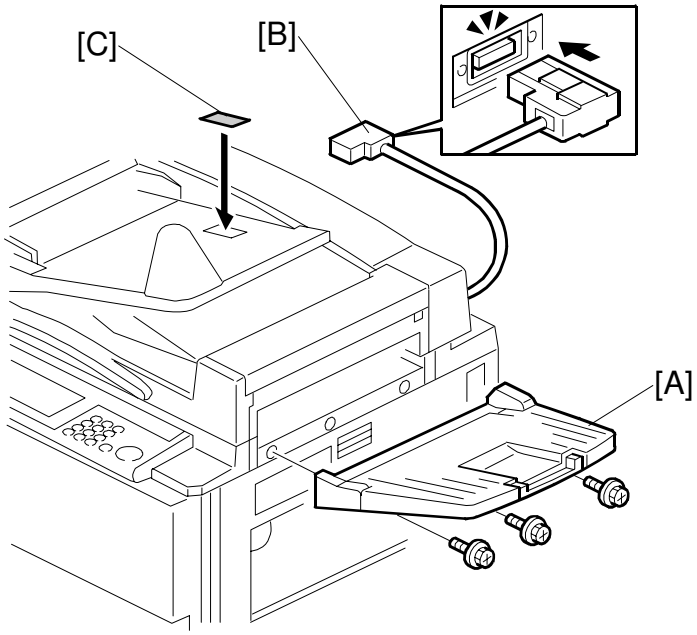


A293I561.WMF

22. Set the toner bottle holder in position (1 screw [A]) and attach the shutter inner cover [B] (1 screw).
    NOTE: When attaching the shutter cover, make sure that the pin [C] in the shutter engages the stopper [D].
23. Install a toner bottle by following the instructions on the decal.
24. Attach the three plastic mylar strips [E] to the back of the original exit tray [F].
    NOTE: 1) The small mylar strip should be in the middle.
    2) The mylar strips must be attached to the tray side [G] first, then to the base copier side [H].



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25. Install the original exit tray [A] (3 screws).
26. Connect the ARDF connector [B] to the socket at the rear of the copier.
27. Attach the face up decal [C] to the feed tray as shown.
28. Plug in the power cord, then turn on the main power switch and the operation switch.
    NOTE: Do not make any copies until after SP2963 has finished in step 30.

29. Before the machine automatically starts the Auto Process Control (within approximately 2 minutes after the main switch is turned on), enter SP mode as follows:
    1) Press the clear modes key.
    2) Enter “107”
    3) Hold down the clear/stop key for more than 3 seconds.

    → 1 → 0 → 7 →

NOTE: If you cannot enter the SP mode before the machine automatically starts Auto Process Control, do not turn off the main switch until step 30 finishes.

30. Select “Copy SP” on the LCD, and perform the initial setting as follows:
    1) Enter “2963” using the numeric keys.
    2) Press the “Enter” key.
    3) Press the “Start” key on the LCD.
    NOTE: This SP mode performs the TD initial setting and the forced toner supply. It will stop automatically when both procedures have finished.
31. **For B098 only:** Exit SP mode.
32. **For B098 only:** Set the date and time for the copier’s internal clock inside “User Tools”:
    1) Press “User Tools/Counter” key.
    2) Select “System setting”, then “Set Time” on the LCD.
    3) Select “Set Day” and enter the current date.
    4) Select “Set Time” and enter the current time.
    NOTE: Make sure to set the date and time before Initializing the electrical copy counter (Step 34 below).
33. **For B098 only:** Exit “User Tools” and enter SP mode.
34. Initialize the electrical copy counter using SP7-825.
35. If necessary, select the correct display language (SP5-009).
36. Press the “Exit” key on the LCD to exit SP mode.
37. Change the paper size for all paper trays to suit the customer’s requests. (See section 3.3 “Paper Size Change” for details.)
38. Attach the appropriate paper size decals, which are included as accessories, to each paper feed tray.
39. Check copy quality and machine operation.

3.3 LCT (A698/B587)

The LCT: A698 is for the A292/A293 copiers.

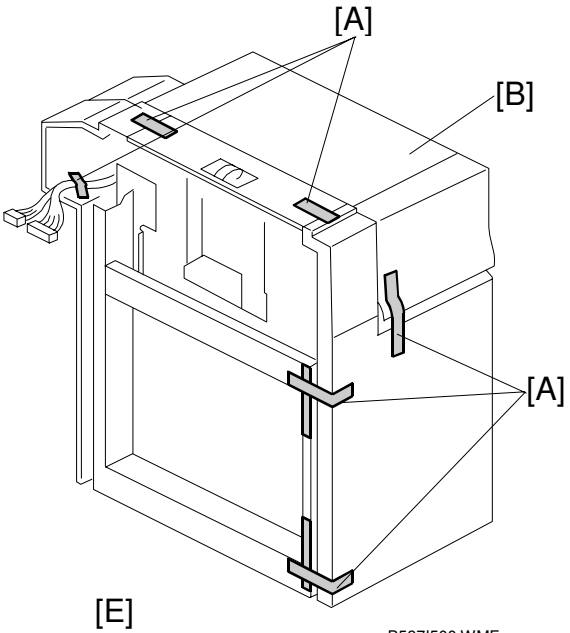
The LCT: B587 is for B098 copier only.

3.3.1 ACCESSORY CHECK

Check the accessories in the box according to the following list:

Description	Q'ty
1. LCT Feed Unit	1
2. Small Cap - Left Cover	1
3. Tapping Screw - M4 x 8	3
4. Philips Pan Head Screw - M4 x 16	3
5. Philips Pan Head Screw - M4 x 6	1
6. Installation Procedure (English)	1
7. New Equipment Condition Report (A698 only)	1

3.3.2 INSTALLATION PROCEDURE



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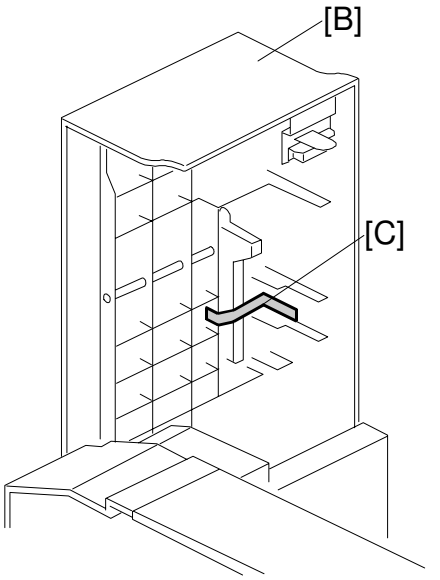

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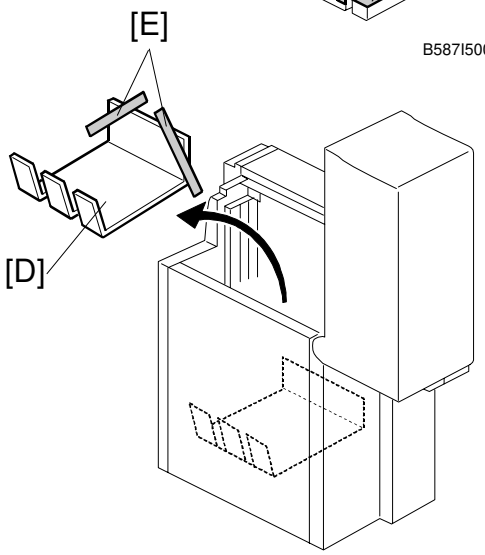

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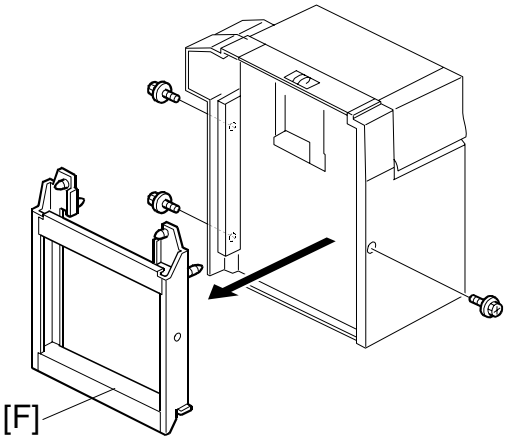
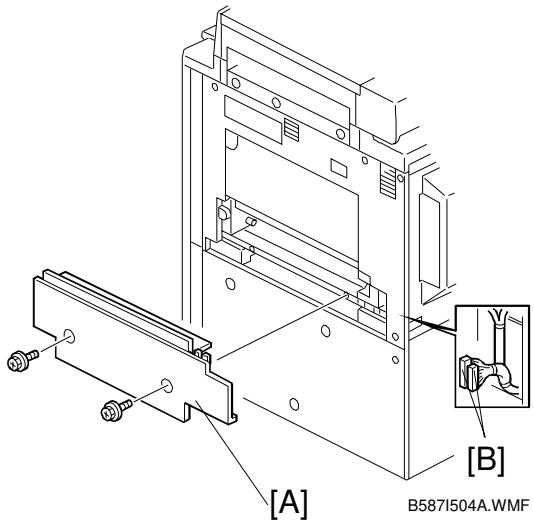


B587I504.WMF

⚠CAUTION

Unplug the copier power cord before starting the following procedure.

1. Remove the four strips of tape [A].
2. Open the LCT cover [B] and remove the tape [C] fixing the paper trailing edge stopper.
3. Remove the tray cushion [D] secured with strips of tape [E].
4. Remove the LCT connector [F] (3 screws).



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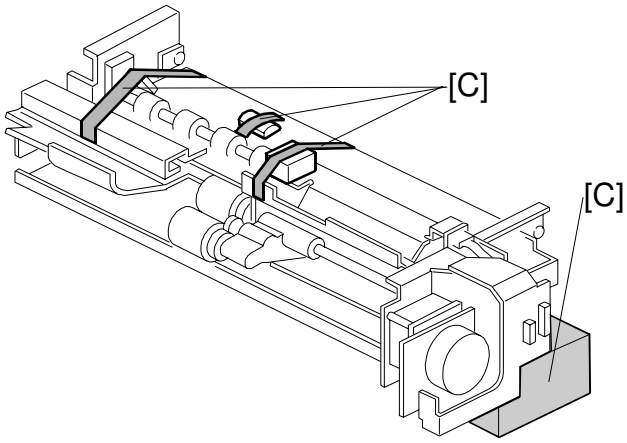

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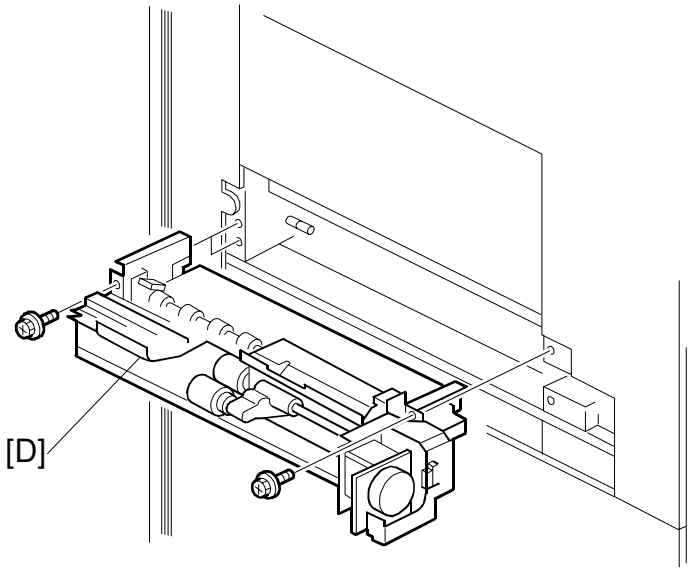

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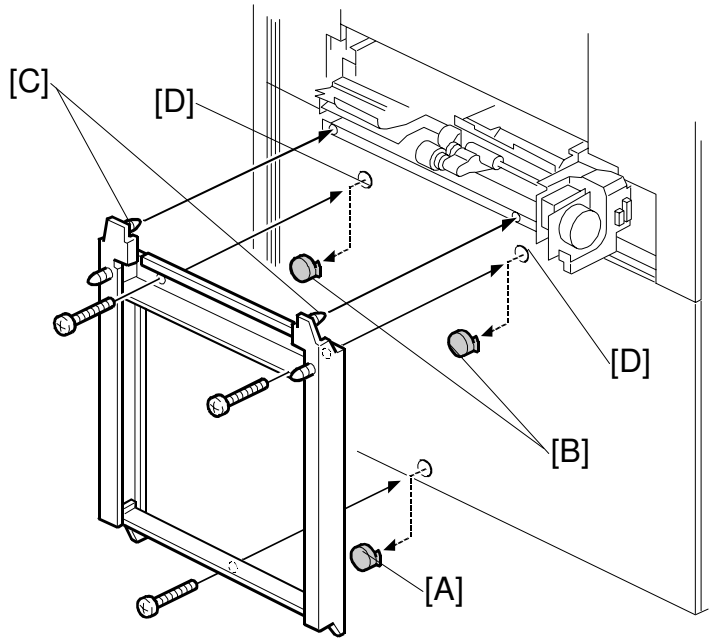
5. Remove the feed unit cover [A] (2 screws) and free the LCT connectors [B].
6. Remove the shipping retainers [C].
7. Install the LCT feed unit [D] to the copier (3 screws - M 4 x 8).



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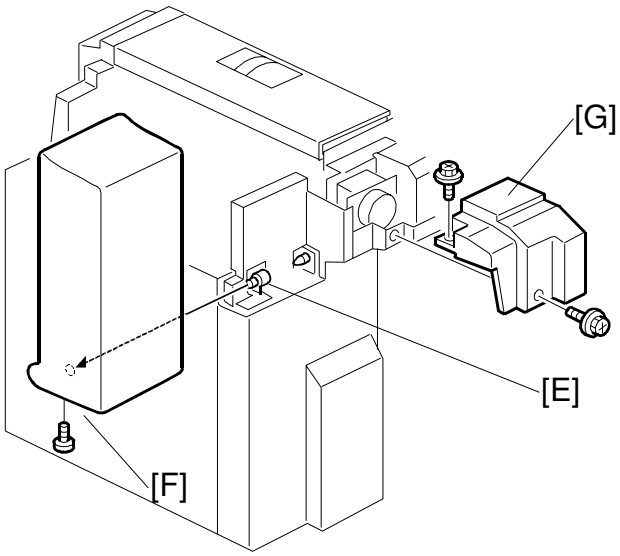

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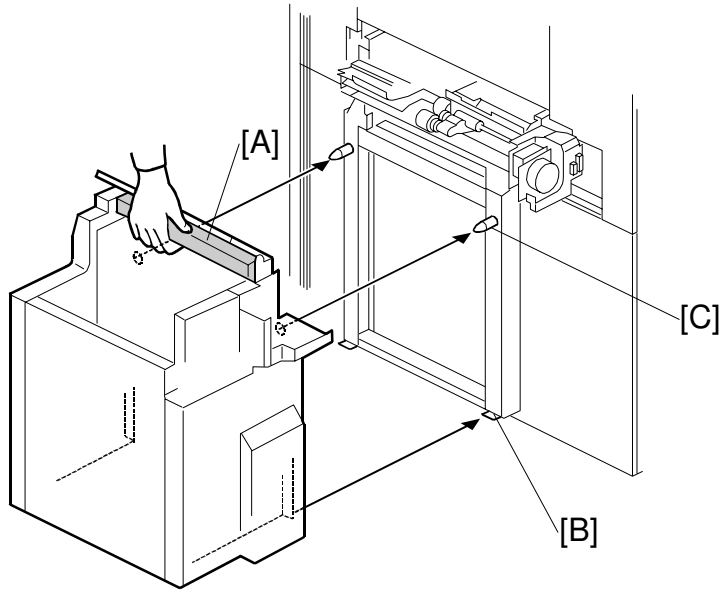
8. Install the LCT connector [A] to the copier.
   1) Remove the three caps [B].
   2) Set the two pins [C] of the LCT connector into the two holes [D] on the copier.
   3) Install the LCT connector to the copier (3 screws - M4 x 16).
9. Remove the screw fixing the upper cover hinge [E] then slide and remove the LCT cover [F] (1 screw).
10. Remove the rear upper cover [G] (2 screws).



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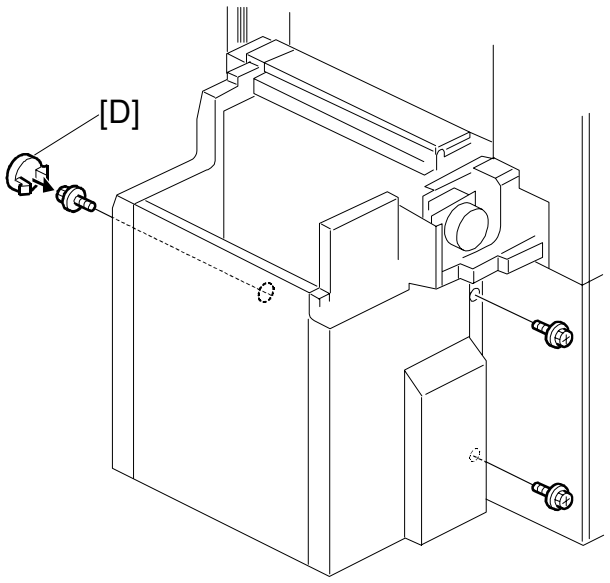

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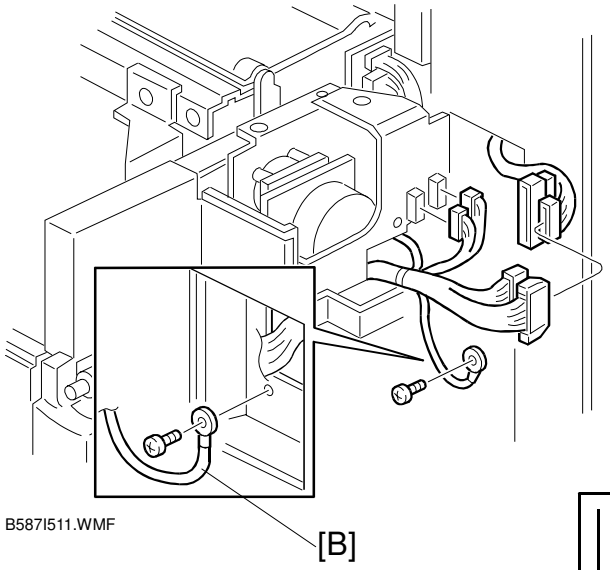
11. Hold the upper stay [A] of the LCT and place the LCT on the plates [B] of the LCT connector.

⚠CAUTION
Properly place the LCT on the plate [B] of the LCT connector.

12. Insert the two pins [C] on the LCT connector into the two holes on the LCT.
13. Secure the LCT to the LCT connector (3 screws).
14. Set the cap [D] in the front screw access hole.



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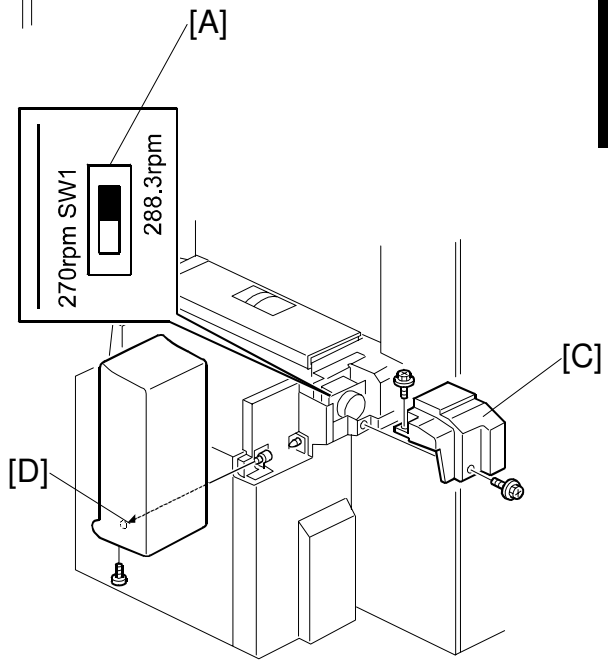

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15. Connect the connectors.
    - Between the copier and the LCT (2 connectors).
    - Between the LCT and the LCT feed unit (2 connectors).

    NOTE: Confirm that DIPSW1 [A] is set to 288.3rpm. If it is not, change the switch to this setting.
    Factory setting of the DIPSW1: A698 ---270 rpm
    B587 ---288.3 rpm
16. Secure the protective grounding wire [B] on the copier (1 screw – M4 x 6).
17. Install the rear upper cover [C] (2 screws).
18. Install the LCT cover [D] (1 screw).
19. Plug in the copier and check machine operation.
    NOTE: The copier automatically recognizes that the LCT has been installed.

3.4 3,000-SHEET FINISHER (B312/B586)

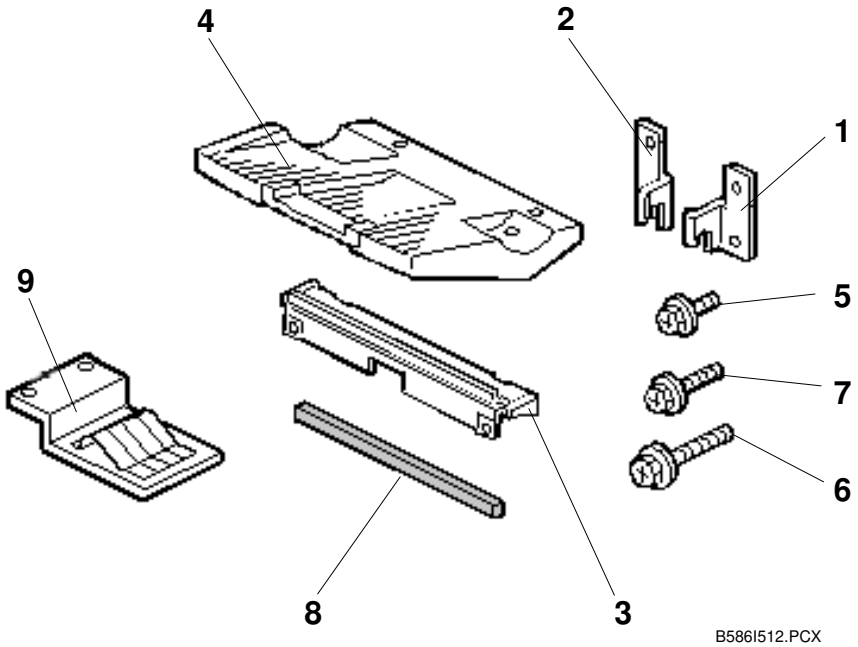
The 3.000-sheet finisher: B312 is for the A292/A293 copiers.

The 3.000-sheet finisher: B586 is for the B098 copier only.

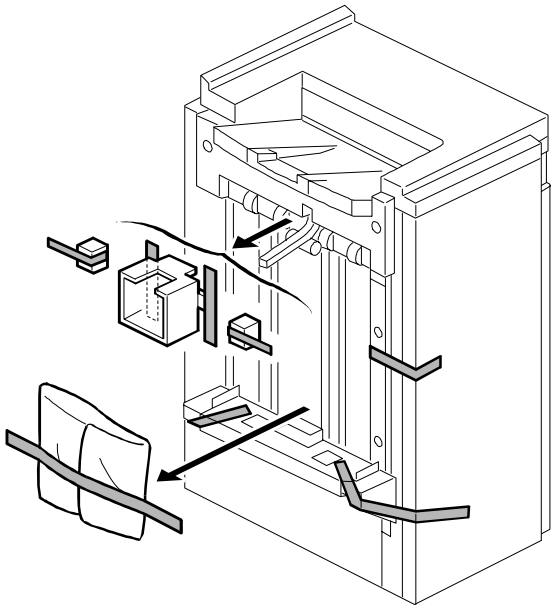
3.4.1 ACCESSORY CHECK

Check the accessories in the box according to the following list:

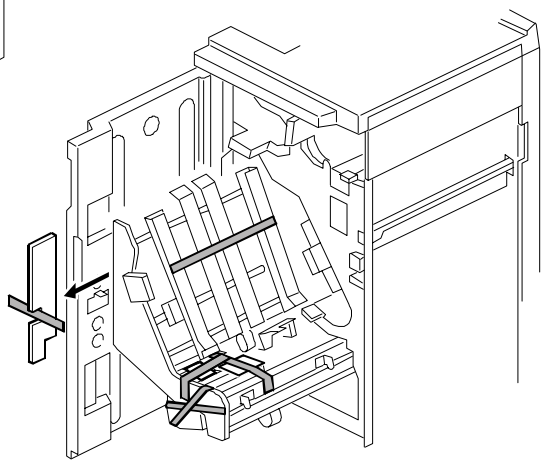
No.	Description	Q'ty
1	Front Joint Bracket	1
2	Rear Joint Bracket	1
3	Entrance Guide Plate	1
4	Shift Tray	1
5	Tapping Screw - M3 x 6	4
6	Tapping Screw - M4 x 14	4
7	Tapping Screw - M3 x 8	4
8	Cushion	1
9	Lower Grounding Plate	1
10	Installation Procedure (English)	1
11	Exit Guide Mylar (B312 only)	1
12	Staple Position Decal (B312 only)	1
13	New Equipment Condition Report (B312 only)	1



3.4.2 INSTALLATION PROCEDURE



B586I506.WMF

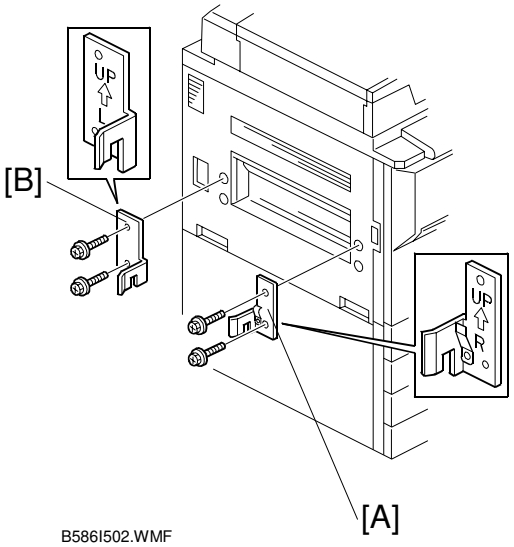


B586I507.WMF

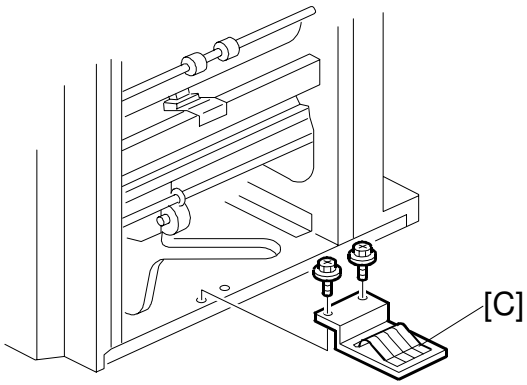
⚠CAUTION

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

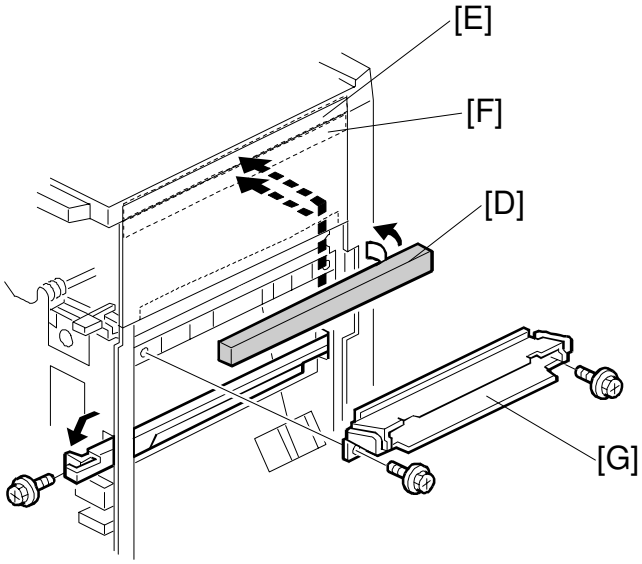
1. Unpack the finisher and remove the tapes.



B586I502.WMF

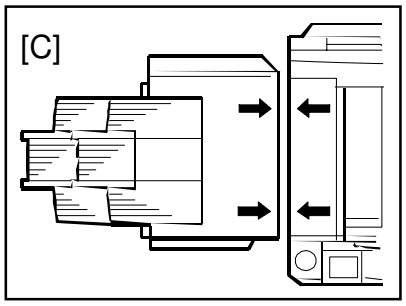


B586I102.WMF

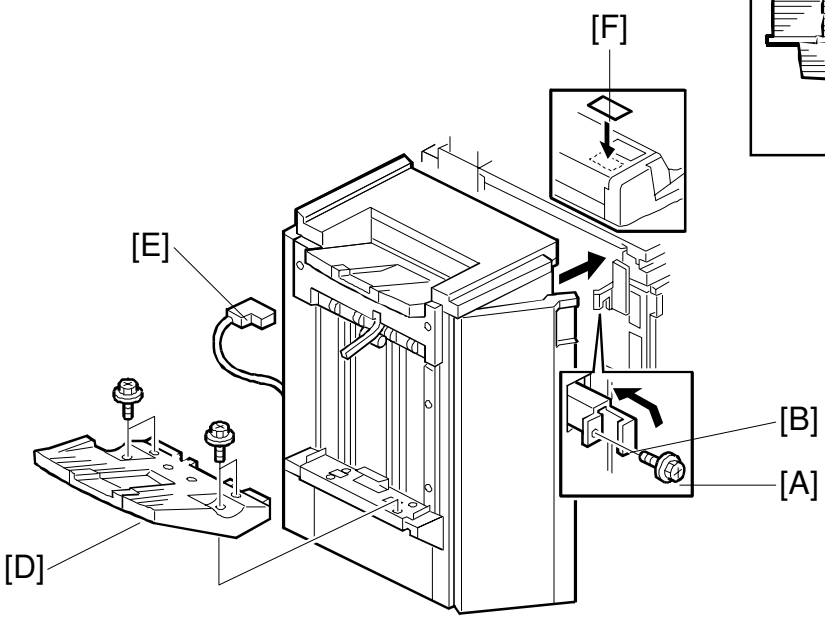


B312I512.WMF

2. Install the front joint bracket [A] and rear joint bracket [B] (2 screws - M4 x 14 each).
3. Install the lower grounding plate [C].
4. The position of the cushion [D] varies depending on which base copier or peripherals that are installed. Attach the cushion on the plate as follows:
   - Position [E] for A292/A293 and B098 copiers.
   - Position [F] for when the optional mailbox (G909 for A292/A293) in installed.
5. Install the entrance guide plate [G] (2 screws).



B586I534.WMF



B312I510.WMF

6. Open the front door of the finisher, and remove the screw [A] which secures the locking lever [B]. Then pull the locking lever.
7. Align the finisher on the joint brackets, and lock it in place by pushing the locking lever.
   NOTE: Before securing the locking lever, make sure that the top edges of the finisher and the copier are parallel from front to rear as shown [C].
8. Secure the locking lever (1 screw) and close the front door.
9. Install the shift tray [D] (4 screws).
10. Connect the finisher cable [E] to the main machine.
11. **For B312 only:** Attach the staple position decal [F] to the ARDF as shown.
12. Turn on the main power switch and check the finisher operation.

3.5 PUNCH UNIT INSTALLATION (A812) FOR B312/B586 FINISHER

The 3.000-sheet finisher: B312 is for the A292/A293 copiers.

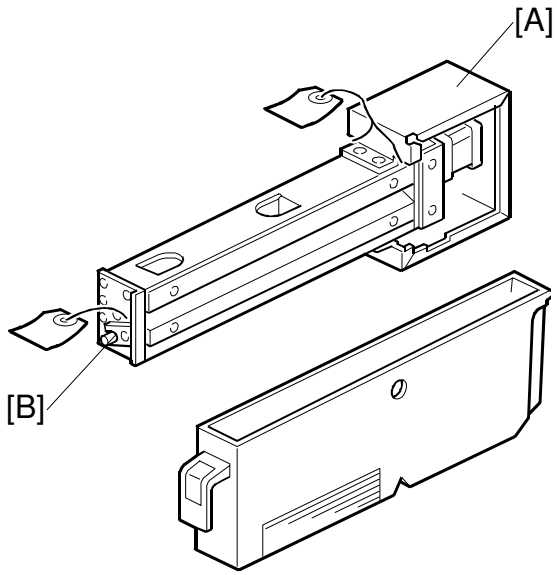
The 3.000-sheet finisher: B586 is for the B098 copier only.

3.5.1 ACCESSORY CHECK

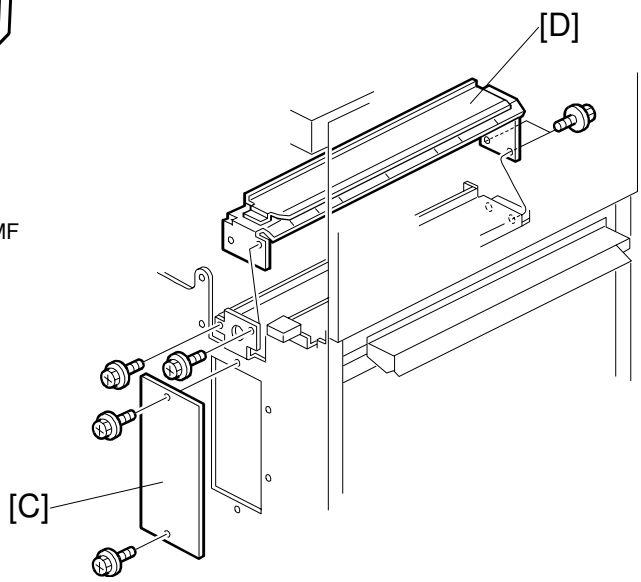
Check the accessories in the box against the following list.

Description	Q'ty
1. Spacer –2 mm	1
2. Spacer – 1 mm	2
3. Stepped Screw – Short	1
4. Stepped Screw – Long	1
5. Punch Unit Knob	1
6. Spring	1
7. Harness – Long	1
8. Harness – Short	1
9. Hopper	1
10. Punch Position Decal	1
11. Tapping Screw – M4 x 10	2
12. Screw with Flat Washer – M4 x 6	1

3.5.2 PUNCH UNIT INSTALLATION



A812I500.WMF

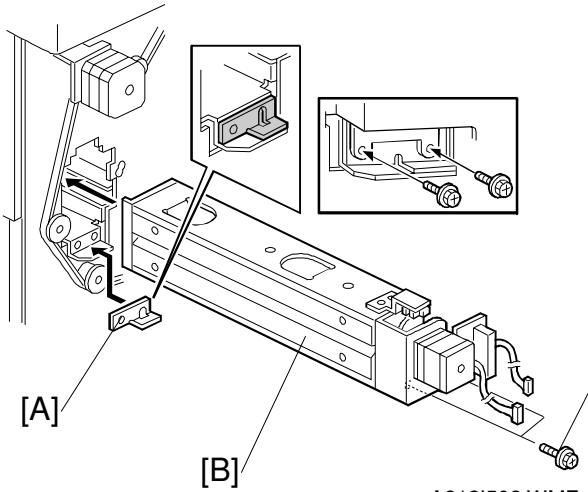


A812I501.WMF

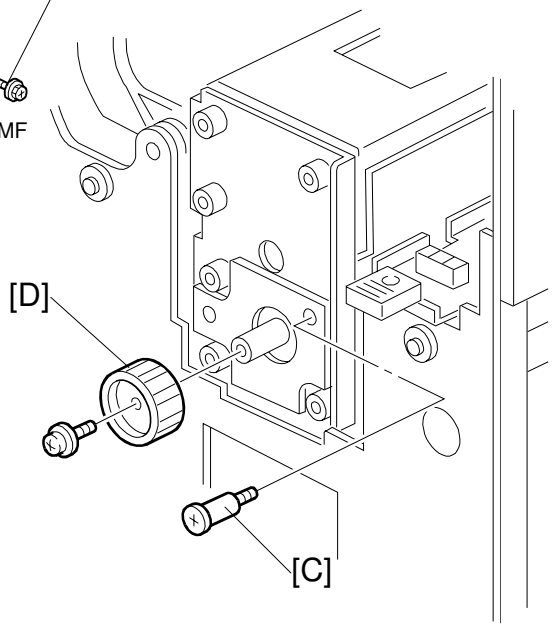
⚠CAUTION

Unplug the copier power cord and remove the 3,000-sheet finisher from the copier before starting the following procedure.

1. Unpack the punch unit and remove the shipping retainers [A] (4 screws) and [B] (1 screw).
2. Open the front door and remove the hopper cover [C] (2 screws).
3. Remove the rear cover (2 screws) and remove the transport guide plate [D] (4 screws).

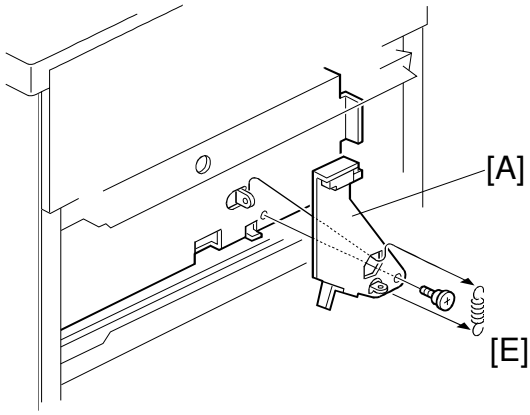


A812I502.WMF

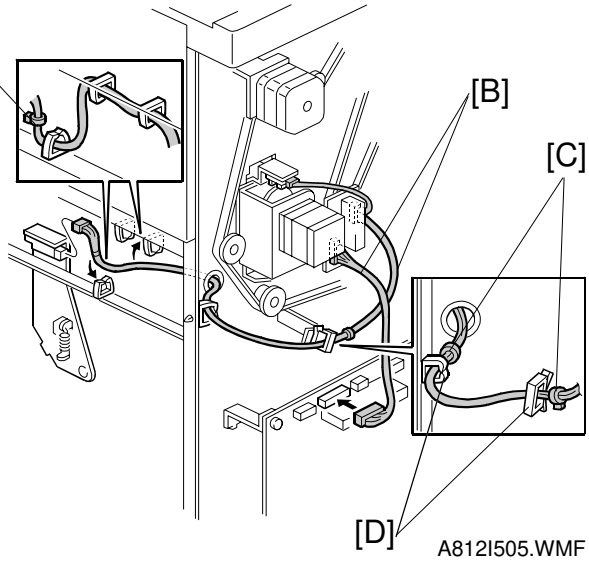


A812I503.WMF

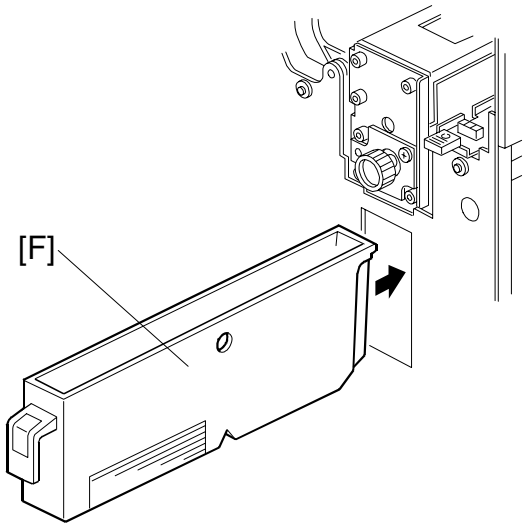
4. Install the spacer [A] (thickness = 2 mm).
   NOTE: There are three spacers in the accessory box. Do not lose the other two spacers (1 mm), because they are used for adjusting the punch hole position.
5. Install the punch unit [B] and secure it with a long stepped screw [C].
6. Install the punch unit knob [D] (1 screw).
7. Secure the rear of the punch unit (2 screws [E]).



A812I504.WMF



A812I505.WMF



A812I506.WMF

8. Install the sensor bracket [A] (1 short stepped screw, 1 spring).
9. Connect the cables [B].

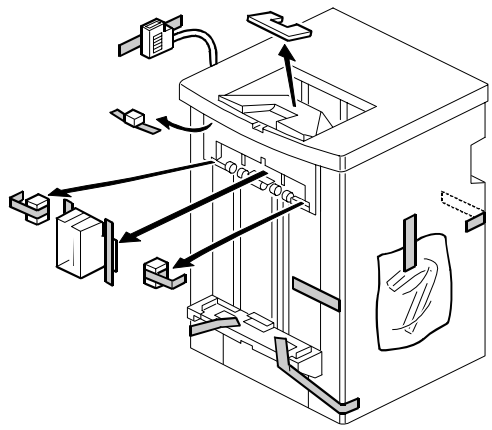
NOTE: 1) The cable binders [C] must not be between the cable clamps [D].
2) The cable binder [E] must be positioned to the left of the cable clamp.

10. **When a three-punch-hole-unit is installed:** Change switch 1 of DIP SW 100 on the punch drive board has been set to ON.
11. Slide the hopper [F] into the finisher.
12. Reassemble the finisher and attach it to the copier. Then check the punch unit operation.

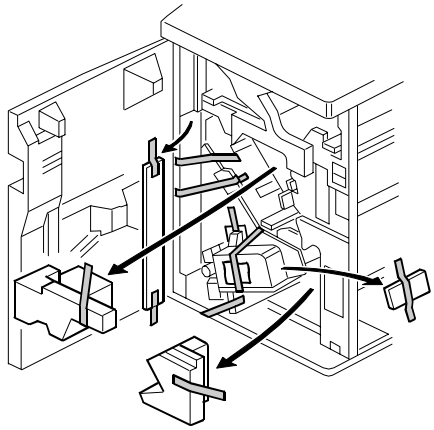
3.6 FINISHER (B302)

The finisher: B302 is for the A292/A293 copiers.

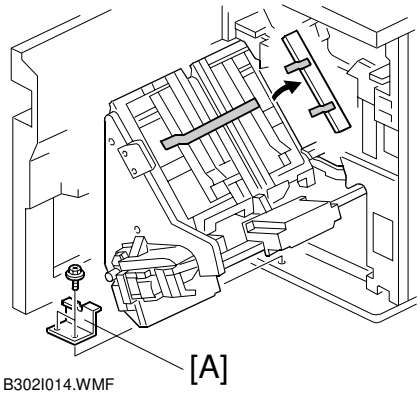
3.6.1 INSTALLATION PROCEDURE



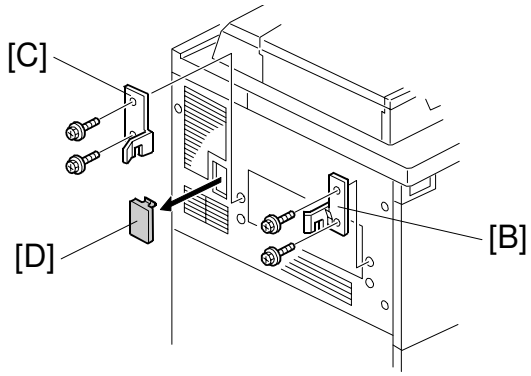
B302I002.WMF



B302I003.WMF



B302I014.WMF

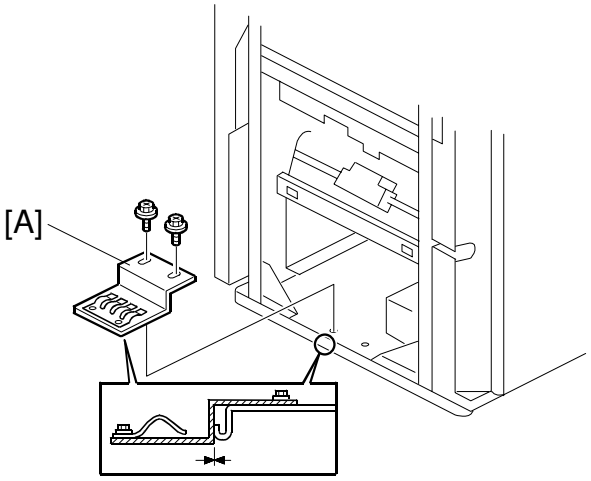


B302I019.WMF

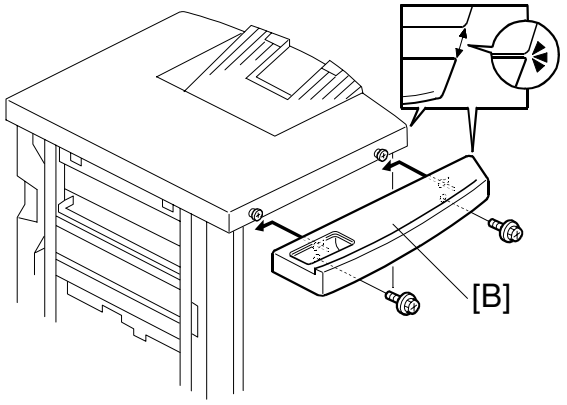
⚠CAUTION

Unplug the machine power cord before starting the following procedure.

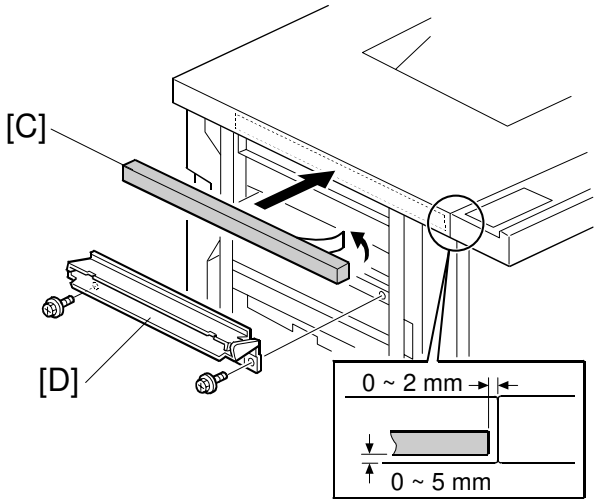
1. Unpack the finisher and remove the tapes and shipping retainers as shown above.
2. Open the front door and remove the shipping retainers. Remove the bracket [A] (2 screws) securing the stapler unit.
3. Install the front joint bracket [B] and rear joint bracket [C] (two M4 x 14 screws each) on the left side of the copier.
4. Remove the connection plate [D].



B302I004.WMF

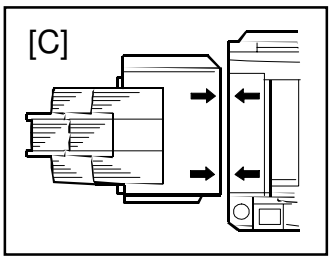


B302I005.WMF

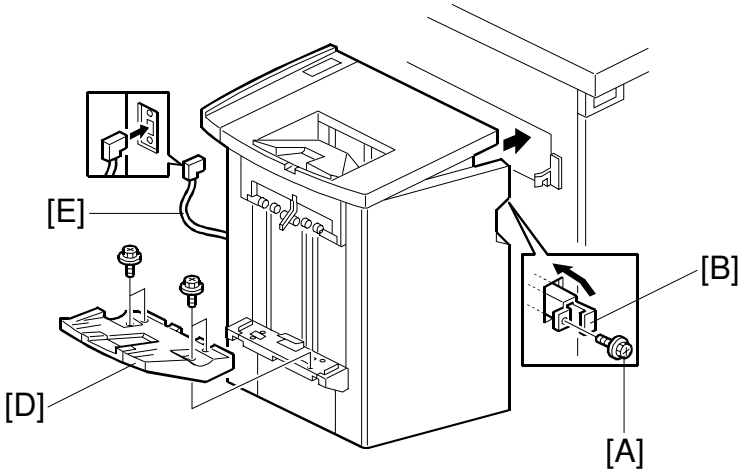


B302I107.WMF

5. Install the grounding plate [A] (two M3 x 6 screws).
   NOTE: Set the grounding plate so that there is no gap between the grounding plate and the bottom frame of the finisher (as shown).
6. **A294/A295 copiers only:**
   Install the rear tray as shown [B] (two M4 x 8 screws).
   NOTE: The edge of the rear tray should be aligned with the edge of the finisher (as shown).
7. Attach the cushion [C] to the right side of the upper cover.
8. Install the entrance guide plate [D] (two M3 x 6 screws).



B302I534.WMF



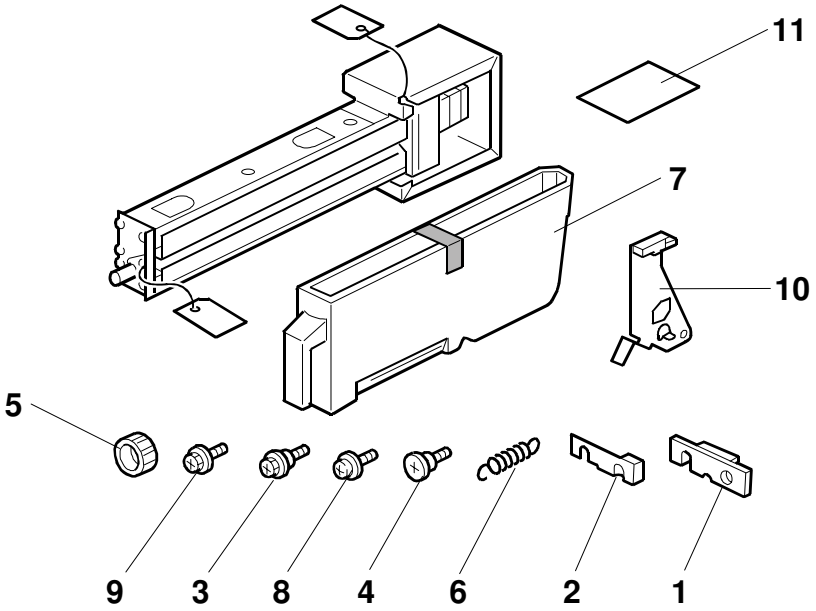
B302I006.WMF

9. Open the front door of the finisher, and remove the screw [A] which secures the locking lever. Then pull the locking lever [B].
10. Align the finisher on the joint brackets, and lock it in place by pushing the locking lever [B].
    NOTE: Before securing the locking lever, make sure that the top edges of the finisher and the copier are parallel from front to rear as shown [C].
11. Secure the locking lever (1 screw) and close the front door.
12. Install the shift tray [D] (four M3 x 8 screws).
13. Connect the finisher cable [E] to the copier.

3.7 PUNCH UNIT INSTALLATION (A812) FOR B302 FINISHER

The finisher: B302 is for the A292/A293 copiers.

3.7.1 ACCESSORY CHECK

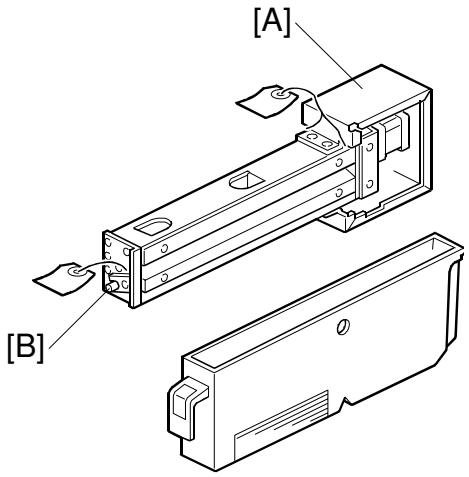


A812I101.WMF

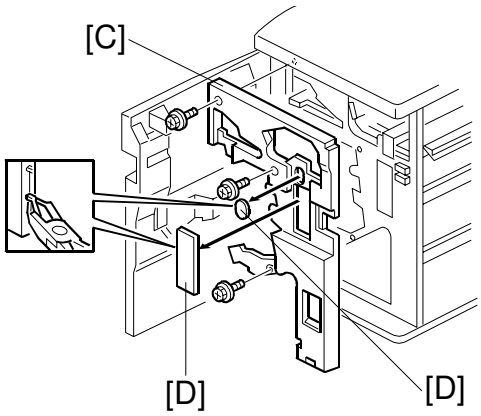
Check the quantity and condition of the accessories in the box against the following list:

Description	Quantity
1. Spacer - 2 mm	1
2. Spacer - 1 mm	2
3. Stepped Screw - Short	1
4. Stepped Screw - Long	1
5. Punch Unit Knob	1
6. Spring	1
7. Hopper	1
8. Tapping Screw - M4 x 10	2
9. Screw with Flat Washer - M4 x 6	1
10. Sensor Bracket	1
11. Punch Position Decal	1

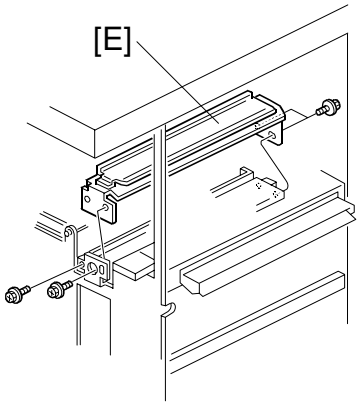
3.7.2 PUNCH UNIT INSTALLATION



A812I500.WMF



A812I007.WMF



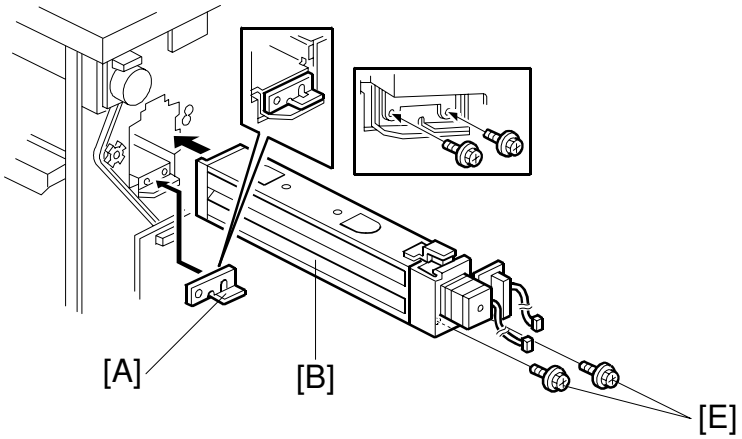
A812I008.WMF

⚠CAUTION

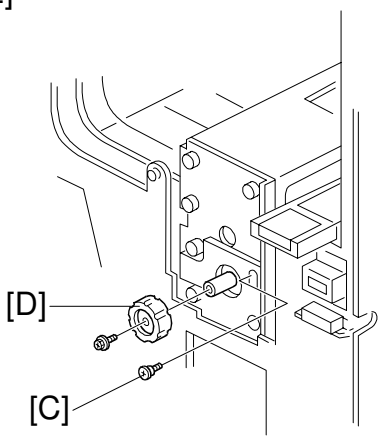
Unplug the copier power cord and remove the finisher from the copier before starting the following procedure.

Unpack the punch unit and remove the shipping retainers [A] (4 screws) and [B] (1 screw)

1. Remove the inner cover [C] of the finisher and remove the caps [D].
2. Remove the rear cover of the finisher (2 screws) and remove the transport guide plate [E] (4 screws).

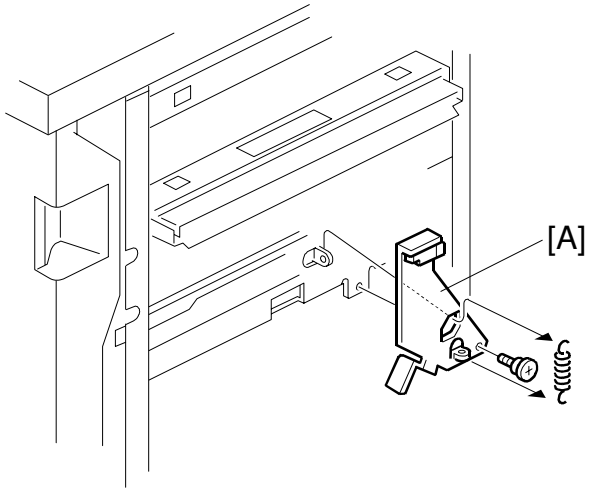


A812I010.WMF

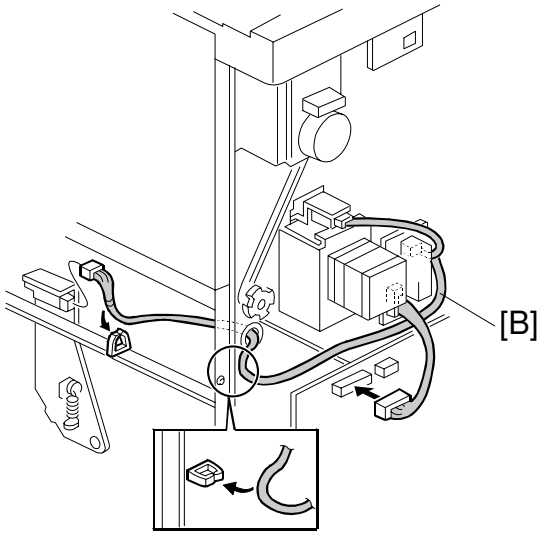


A812I011.WMF

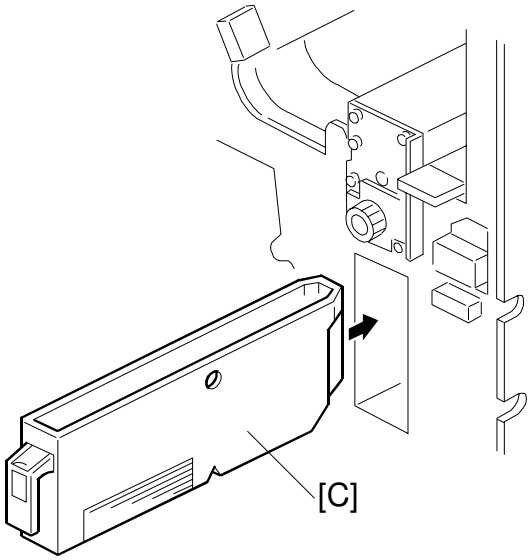
3. Install the spacer [A] (thickness = 2 mm).
   NOTE: There are three spacers in the accessory box. Do not lose the other two spacers (1 mm), because they are used for adjusting the punch hole position.
4. Reinstall the inner cover.
5. Install the punch unit [B] and secure it with a long stepped screw [C].
6. Install the punch unit knob [D] (1 screw).
7. Secure the rear of the punch unit (2 screws [E]).



A812I009.WMF



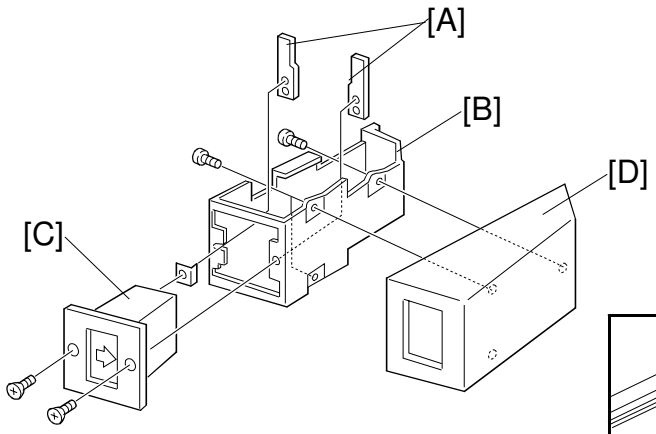
A812I012.WMF



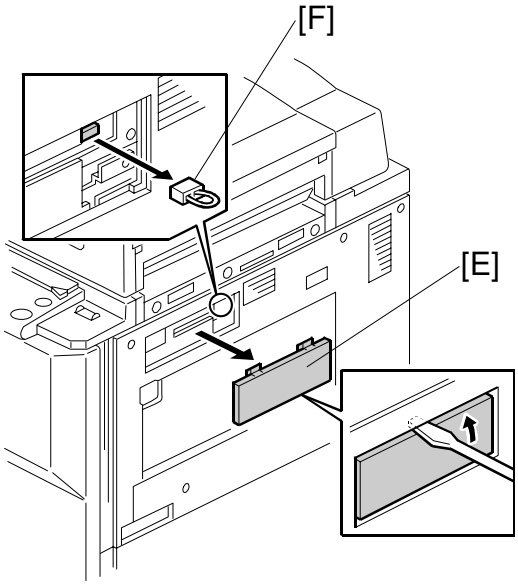
A812I013.WMF

8. Install the sensor bracket [A] (1 short stepped screw, 1 spring).
9. Connect the cables [B] as shown.
10. Slide the hopper [C] into the finisher.
11. Reassemble the finisher and attach it to the copier. Then check the punch unit operation.

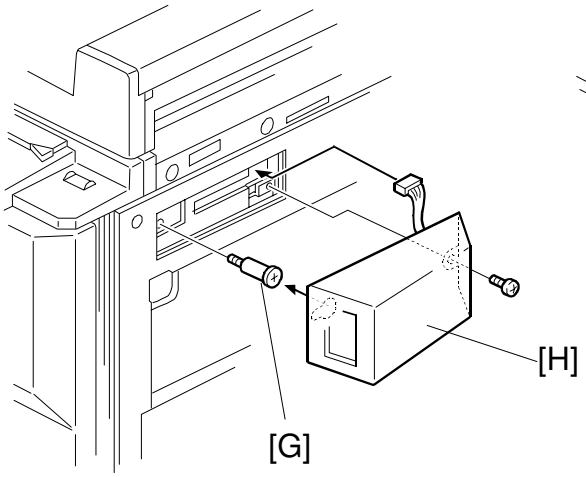
3.8 KEY COUNTER INSTALLATION



A293I569.WMF



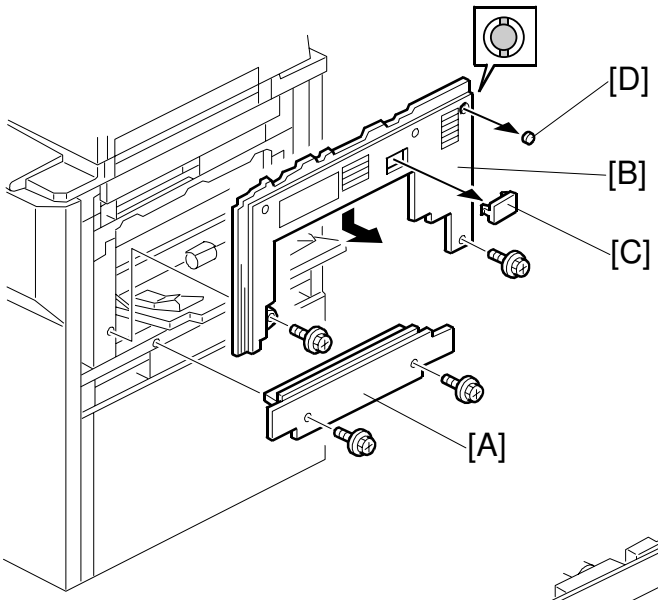
A293I568.WMF



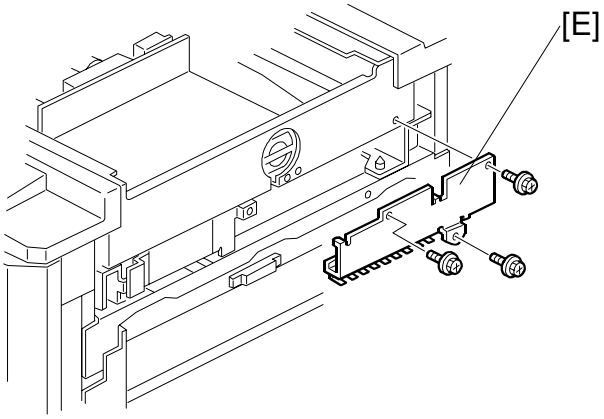
A293I567.WMF

1. Hold the key counter plates [A] on the inside of the key counter bracket [B] and insert the key counter holder [C].
2. Secure the key counter holder to the bracket (2 screws).
3. Attach the key counter cover [D] (2 screws).
4. Remove the small cover [E] on the right side of the copier as shown.
5. Remove the jumper connector [F].
6. Install the stepped screw [G].
7. Install the key counter assembly [H] (1 screw).
8. Instruct the user's key operator to enable the key counter with the User Tools (User Tools – System Settings – Count Manager – Key Counter).

3.9 COPY CONNECTOR KIT INSTALLATION (B322)

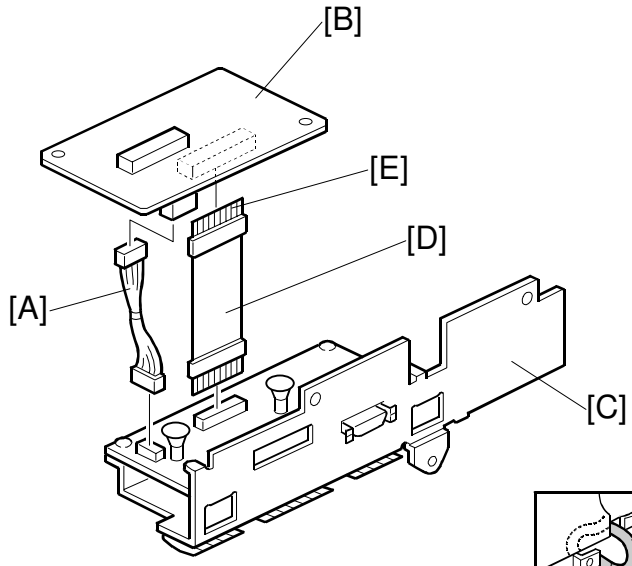


B322I502.WMF

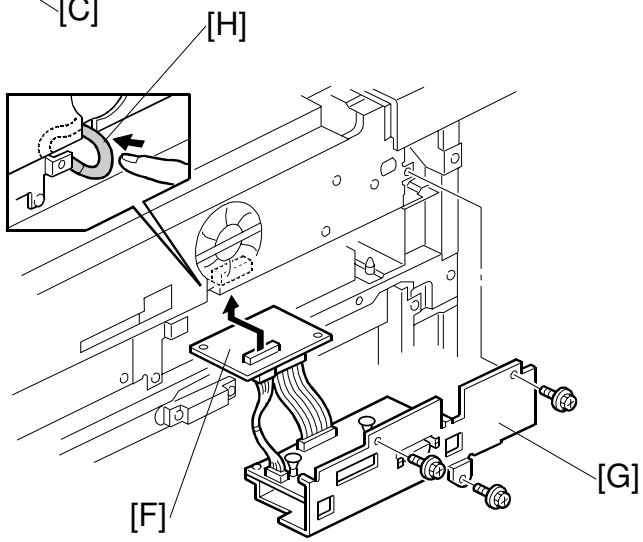


B322I504.WMF

1. If the optional LCT is installed, remove it from the copier.
2. Remove the original exit tray.
3. Remove the paper feed cover [A] (2 screws).
4. Remove the upper right cover [B] (2 screws).
5. Remove the connector cover [C] and the clamp cover [D] from the upper right cover.
6. Remove the connecting plate [E] (3 screws).

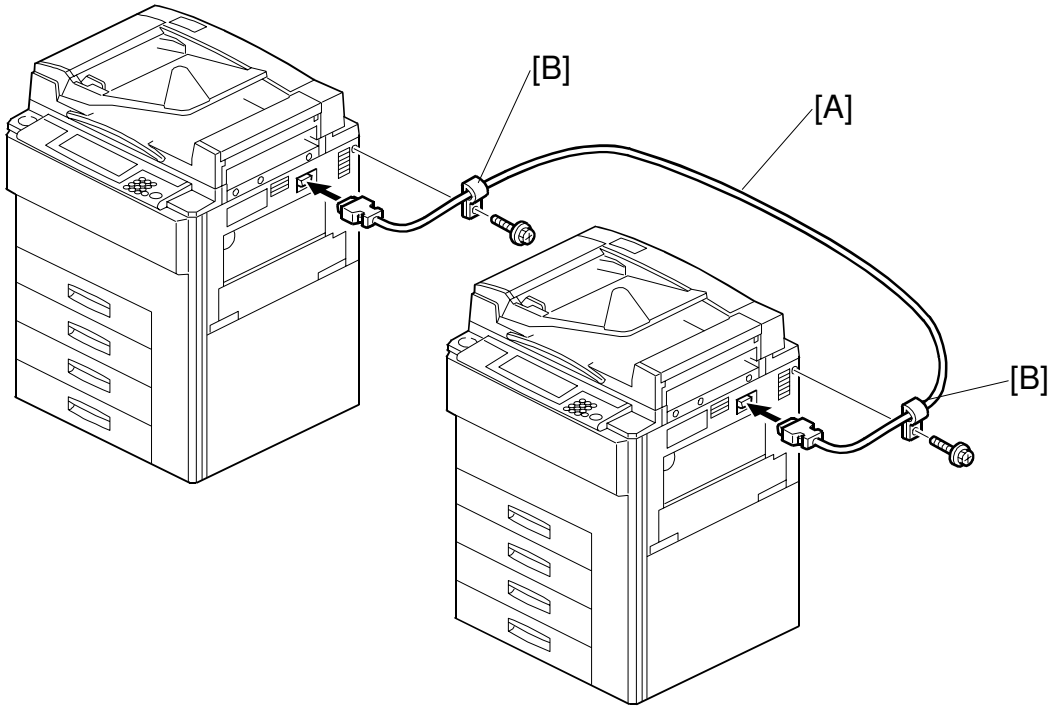


B322I101.WMF



B322I102.WMF

7. Connect the harness [A] between the interface board [B] and the connectotr board [C].
8. Connect the cable [D] to the boards.
   NOTE: The terminals [E] must face the right hand side of the machine.
9. Install the interface board [F] (1 connector).
10. Install the connector board [G] (3 screws).
    NOTE: Push the HDD cable [H] into the inside of the machine.
11. Reassemble the machine.



B322I505.WMF

12. Install the other copy connector kit in the other machine.
13. Connect the two machines with the cable [A] and secure it with clamps [B] (1 screw each).
14. Check the operation.

3.10 LG KIT (B375/B588)

The LG Kit: B375 is for the A292/A293 copiers.

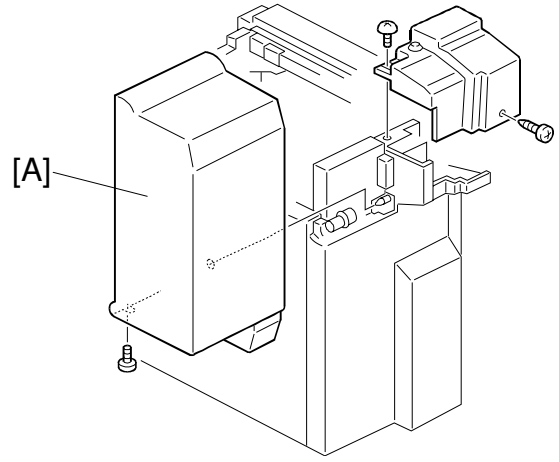
The LG Kit: B588 is for the B098 copier only.

3.10.1 ACCESSORY CHECK

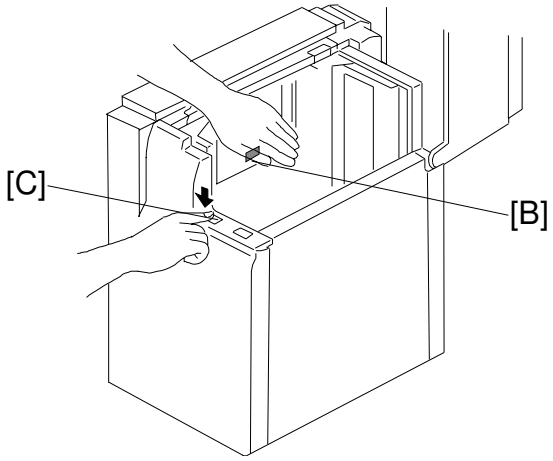
Check the quantity and condition of the accessories in the box against the following list:

Description	Q'ty
1. LG Tray Frame	1
2. LG Tray Cover	1
3. LG Bottom Plate	1
4. Securing Plate	2
5. Philips Pan Head Screw – M4 x 6……	6
6. Tapping Bind Screw – M4 x 6	4

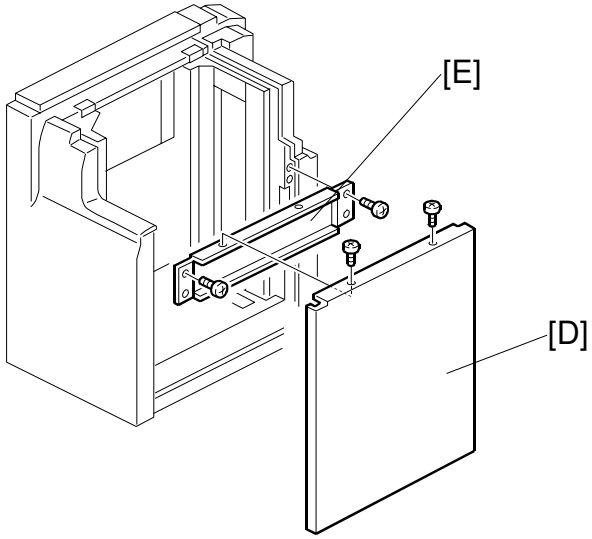
3.10.2 INSTALLATION PROSEDURE



B588I504.WMF

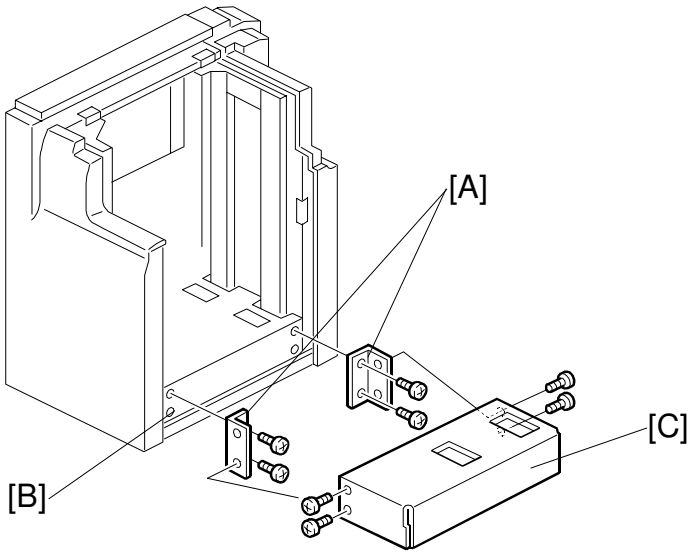


B588I507.WMF

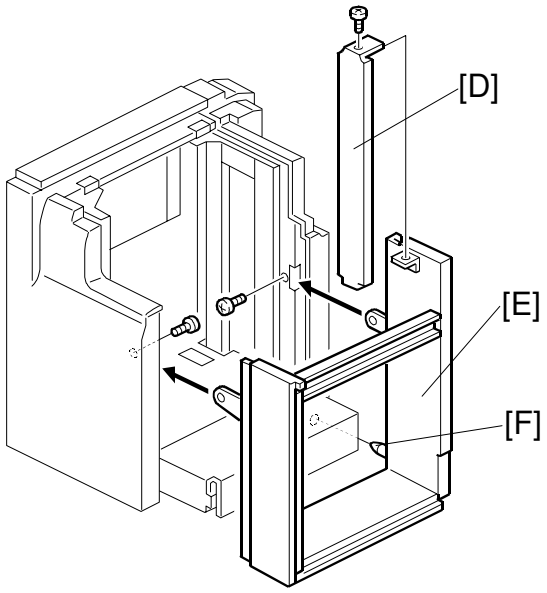


B588I501.WMF

1. Open the LCT cover [A] and while covering the paper position sensor [B] with your hand, press the tray down switch [C] to lower the tray bottom plate to its lowest position.
2. Turn off the copier main switch.
3. Remove the LCT cover (1 screw).
4. Remove the LCT right cover [D] (2 screws).
5. Remove the LCT right stay [E] (2 screws).

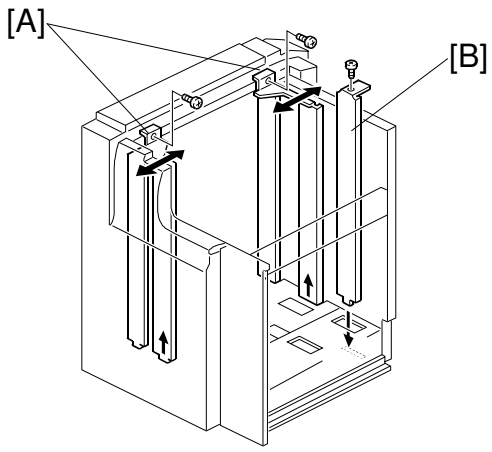


B588I502.WMF

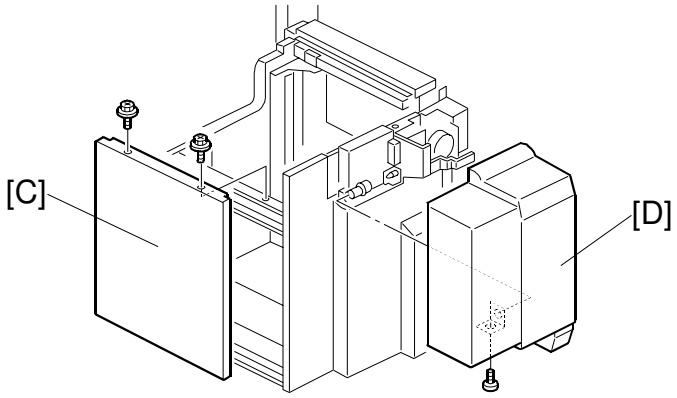


B588I503.WMF

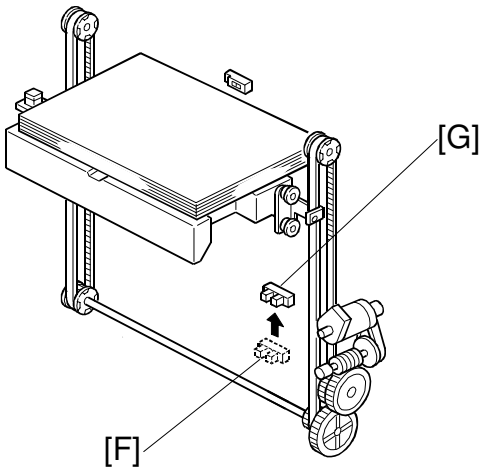
6. Attach the securing plates [A] to the LCT paper tray [B] (2 screws each).
7. Mount the LG paper tray to the securing plates [C] (2 screws each).
8. Remove the side fence [D] of the LG tray frame [E] (1 screw).
9. Insert the positioning pin [F] to the LCT and secure the LG tray frame (2 screws).



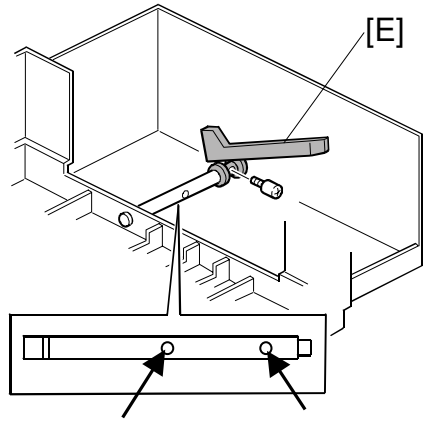
B588I505.WMF



B588I506.WMF



B588I508.WMF



B588I901.WMF

10. Remove the front and rear side fences [A] from the LCT] (1 screw each).
11. Position the LCT and LG tray side fences [A,B] to LG paper size and secure them (1 screw each).
12. Install the LCT right cover [C] and LG tray cover [D] (3 screws).
    NOTE: For B588 only:
    If the customer requests to use the LTR (lengthwise) size paper, reposition the end fence [E] from original position to LTR size paper position (1 screw).
13. Turn on the copier main switch and input the paper size with SP5-019.
    For B375: LG
    For B588: LG or LTR (lengthwise)
14. Turn off the copier main switch. After perform the LCT initialization, turn off the copier main switch and remove the LCT right cover.
15. Reposition the down sensor [F] from original position to LG/LTR size paper position [G] which is 82cm higher than original position (1 screw).
    NOTE: The down sensor repositioning procedure should be done after reposition the side fences.

4. SERVICE TABLES

4.1 GENERAL CAUTIONS

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

4.1.1 DRUM

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

1. Never expose the drum to direct sunlight.
2. Never expose the drum to direct light of more than 1,000 Lux for more than a minute.
3. Never touch the drum surface with bare hands. When the drum surface is touched with a finger or becomes dirty, wipe it with a dry cloth or clean it with wet cotton. Wipe with a dry cloth after cleaning with wet cotton.
4. Never use alcohol to clean the drum; alcohol dissolves the drum surface.
5. Store the drum in a cool, dry place away from heat.
6. Take care not to scratch the drum as the drum layer is thin and is easily damaged.
7. Never expose the drum to corrosive gases such as ammonia gas.
8. Always keep the drum in the protective sheet when keeping the drum unit, or the drum itself, out of the copier. Doing so avoids exposing it to bright light or direct sunlight, and will protect it from light fatigue.
9. Dispose of used drums in accordance with local regulations.
10. When installing a new drum, do the Auto Process Control Data Adjustment (SP 2-962).

4.1.2 DRUM UNIT

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

4.1.3 TRANSFER BELT UNIT

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

4.1.4 SCANNER UNIT

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

4.1.5 LASER UNIT

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

4.1.6 CHARGE CORONA

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

4.1.7 DEVELOPMENT

1. Be careful not to nick or scratch the development roller.
2. Place the development unit on a sheet of paper after removing it from the copier.
3. Never disassemble the development roller assembly. The position of the doctor plate is set with special tools and instruments at the factory to ensure the proper gap between the doctor blade and the development roller.
4. Clean the drive gears after removing used developer.
5. Dispose of used developer in accordance with local regulations.
6. Never load types of developer and toner into the development unit other than specified for this model. Doing so will cause poor copy quality and toner scattering.
7. Immediately after installing new developer, the TD sensor initial setting procedure should be performed to avoid damage to the copier. Do not perform the TD sensor initial setting with used developer. Do not make any copies before doing the TD sensor initial setting.
8. When using a vacuum cleaner to clean the development unit casing, always ground the casing with your fingers to avoid damaging the toner density sensor with static electricity.
9. When replacing the TD sensor, the developer should be replaced and then the TD sensor initial setting procedure (SP 2-801) should be done.

4.1.8 CLEANING

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

4.1.9 FUSING UNIT

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

4.1.10 PAPER FEED

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

4.1.11 USED TONER

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

4.2 SERVICE PROGRAM MODE

4.2.1 SERVICE PROGRAM MODE OPERATION

The service program (SP) mode is used to check electrical data, change modes, and adjust values.

Service Program Access Procedure

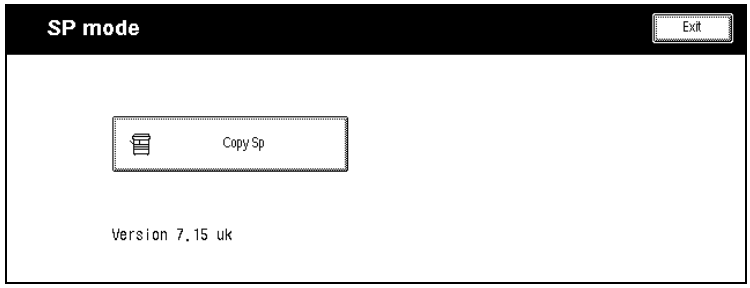
Entering SP mode

1) Press the following keys in sequence.

[#/P] → [1] → [0] → [7] → [C/⊘]

NOTE: Hold the [C/⊘] key for more than 3 seconds.

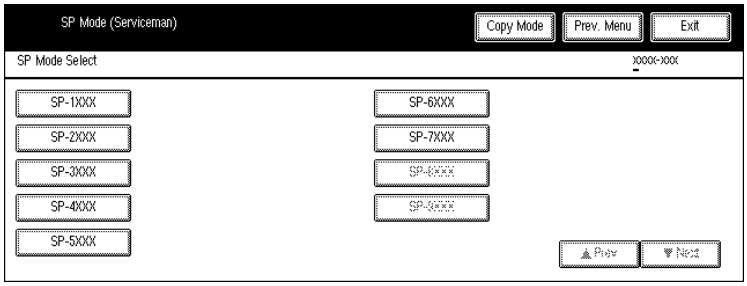
2) A menu of SP modes is displayed on the LCD.



A293M500.TIF

NOTE: 1) The installed applications appear as Copy SP and Printer SP. If the printer application is not installed, its name does not appear.
2) The meaning of the bottom line is as follows.
- "Ver 7.15 uk" is the BICU board software version.

3) Touch the application which you need. Then, the application's SP mode display will appear, as shown.



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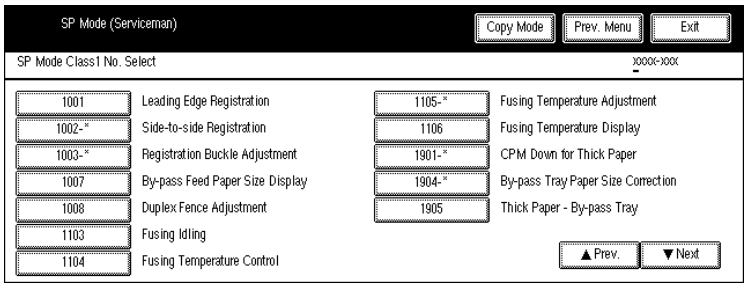
Exiting SP mode

1) Touch the "Exit" keys to return to the standby mode display.

Accessing Copy Mode from within an SP Mode

1) Touch the “Copy Mode” key.



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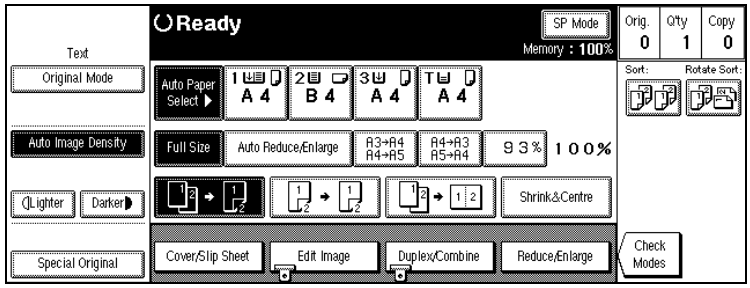
2) Select the appropriate copy mode and make trial copies.
3) To return to the SP mode, touch the “SP mode” key.



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Selecting the Program Number

Program numbers are composed of two or three levels.

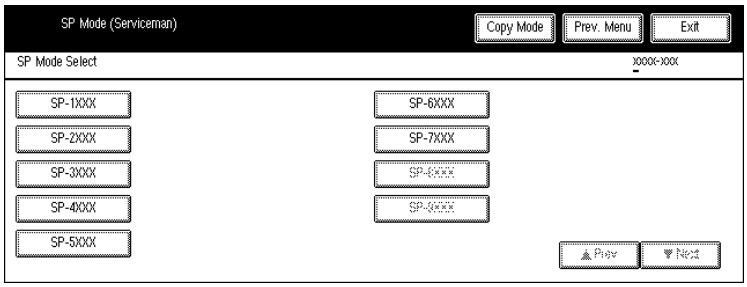
There are two ways to select the program number.

Ten-key Pad

Input the required program number.

Touch Panel

1. Touch the 1st level program.



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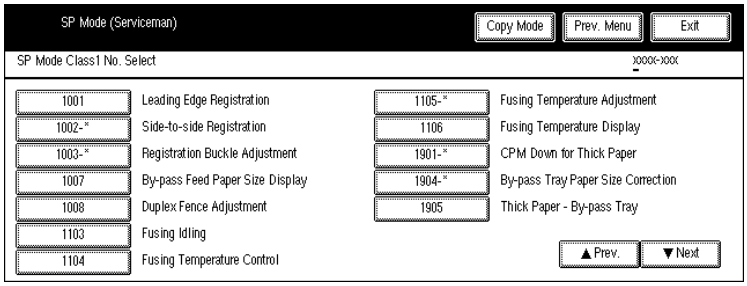
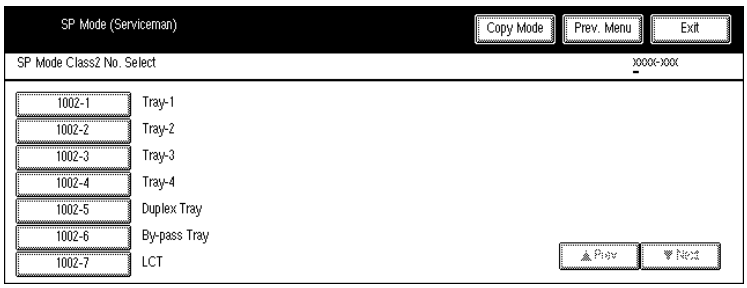
2. Touch the 2nd level program.



A293M502.TIF

NOTE: A "*" mark indicates that there are 3rd level programs.

3. Touch the 3rd level program.



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Inputting a Value or Setting for an SP Mode

1. Select the required program mode as explained on the previous page.
2. Enter the required setting using the ten-key pad, then touch the “Start” key or OK key or # key.

   NOTE: 1) If you forget to touch the “Start” key or OK key, the previous value remains.
   2) Change between “+” and “-“ using the “•” key before entering the required value.
3. Exit SP mode.

4.2.2 SERVICE PROGRAM MODE TABLES

NOTE: 1) In the Function column, comments are in italics.
2) In the Settings column, the default value is in bold letters.
3) An asterisk (*) in the right hand side of the mode number column means that this mode is stored in the NVRAM. If you do a RAM reset, all these SP modes will be reset to their factory settings.

Mode No. (Class 1 , 2 & 3)				Function	Settings
1-001	Leading Edge Registration				
			*	Adjusts the printing leading edge registration using the trimming area pattern (SP2-902-3, No.10). *The specification is 3 ±2 mm. See "Replacement and Adjustment - Copy Image Adjustments" for details.*	+9 ~ -9 0.1 mm/step **+ 3.0 mm**
1-002	Side-to-Side Registration				
	1	Tray - 1	*	Adjusts the printing side-to-side registration from the feed stations using the trimming area pattern (SP2-902-3, No.10). *The specification is 0 ±2.0 mm in platen mode and 0 ± 4.0 mm in ADF mode.* **Tray 4 is only for the Japanese version.**	+9 ~ -9 0.1 mm/step **+ 0.0 mm**
	2	Tray - 2			
	3	Tray - 3			
	4	Tray - 4			
	5	Duplex Tray			
	6	By-pass Tray			
	7	LCT			
1-003	Paper Feed Timing				
	1	Tray and Duplex Tray	*	Adjusts the relay clutch timing at registration. The relay clutch timing determines the amount of paper buckle at registration. (A +ve setting leads to more buckling.)	+9 ~ -9 1 mm/step **+ 0 mm**
	2	By-pass Tray	*	Adjusts the by-pass feed clutch timing at registration. The by-pass feed clutch timing determines the amount of paper buckle at registration. (A +ve setting leads to more buckling.)	
1-007	By-pass Feed Paper Size Display				
				Displays the paper width sensor data for the by-pass feed table. 132: A3 160: DLT 133: A4 Lengthwise 164: LG 134: A5 Lengthwise 166: LT Lengthwise 141: B4 Lengthwise 172: HLT Lengthwise 142: B5 Lengthwise	

Mode No. (Class 1 , 2 & 3)				Function	Settings
1-008	Duplex Fence Adjustment				
			*	Adjusts the position of the fence (side-to-side position with reference to paper feed).	0 ~ -2 0.5 mm/step **-1.0 mm**
1-103	Fusing Idling				
			*	Selects whether fusing idling is done or not. *If fusing is incomplete on the 1st and 2nd copies, change the setting to a longer time. This may occur if the room is cold.* *Refer to "Detailed Section Descriptions - Fusing Temperature Control" for more details.*	**0: 330 sec.** 1: 10 min. 2: 15 min. 3: No idling
1-104	Fusing Temperature Control				
			*	Selects the fusing temperature control mode. After changing the setting, turn the main switch off and on.	**On/Off control** Phase control
1-105	Fusing Temperature Adjustment				
	1	Normal	*	Adjusts the fusing temperature for plain paper.	170 ~ 200 1°C/step **185°C**
	2	OHP	*	Adjusts the fusing temperature for OHP sheets fed from the by-pass feed unit.	+10 ~ -10°C 1°C/step **0 (165°C)**
	3	Thick Paper 1	*	Adjusts the fusing temperature for thick paper fed from the by-pass feed unit.	+5 ~ -10°C 1°C/step **0 (195°C)**
	4	Thick Paper2	*	Adjusts the fusing temperature for thick paper (105 g/m², 28 lb Bond or heaver) fed from the by-pass feed unit. *(B098 only)* *This SP mode is useful when the Low Temp. Environment is selected in the user tools.* *When copying onto thick paper, the first copy time may be longer.*	185 ~ 200°C 1°C/step **195°C**
1-106	Fusing Temperature Display				
				Displays the fusing temperature.	
1-107	1st Copy Temperature Setting (*B098 only*)				
	1	Thick Paper 1	*	Adjusts the 1st copy temperature for thick paper 1 mode.	185 ~ 200°C 1°C/step **195°C**
	2	Thick Paper 2	*	Adjusts the 1st copy temperature for thick paper 2 mode.	

Mode No. (Class 1 , 2 & 3)				Function	Settings
1-108	Fusing Idling - Thick Paper 2 (*B098 only*)				
			*	Selects whether fusing idling is done or not in thick paper –2 mode..	**0: OFF** 1: ON
				The first copy time is longer when ON.	
1-901	CPM Change for Special Paper (NA: North America, EU: Europe)				
	1	***for A292/A293*** Thick Paper 1	*	Selects the copy speed when the paper setting for the by-pass table is thick paper.	0: 25 cpm 1: 35 cpm 2: 45 cpm 3: 55 cpm
		for B098 Thick Paper 1		Select the copy speed when Thick Paper 1 is selected from user tools.	***for 292/A293*** **NA: 3** **EU: 2** ***For B098*** **NA: 3** **EU: 3**
	2	***for A292/A293*** Tab Stack	*	Selects the copy speed when the paper setting for the 2nd tray is tab stack.	0: 25 cpm 1: 35 cpm 2: 45 cpm 3: 55 cpm
		for B098 Thick Paper 2		Selects the copy speed when Thick paper 2 is selected from user tools.	***for 292/A293*** **NA: 2** **EU: 0** ***for B098*** **NA: 1** **EU: 1**
1-904	By-pass Tray Paper Size Correction				
	1	Minimum Size		Calibrates the minimum paper width position of the sensor (100 mm).	Start
	2	Maximum Size		Calibrates the maximum paper width position of the sensor (A3).	Start
1-905	Thick Paper Mode - By-pass Table				
			*	Selects the by-pass feed clutch on mode for thick paper mode.	**ON: Twice** OFF: Once
2-001	Charge Corona Bias Adjustment				
	1	Image Area	*	Adjusts the voltage applied to the grid plate during copying when auto process control is **off**.	-600 ~ -1300 10 V/step **-1000 V**
				Normally, there is no need to adjust this. If there is an ID or TD sensor problem, the machine goes into fixed toner supply mode. *After replacing the drum or charge corona wire, change this value to the default.*	

Mode No. (Class 1 , 2 & 3)				Function	Settings
2-001	Charge Corona Bias Adjustment				
	2	ID Sensor Pattern	*	Adjusts the voltage applied to the grid plate when making the ID sensor pattern. *Normally, there is no need to adjust this. If the user wants high density copies, the sensor pattern must be lighter, so this voltage must be a higher negative voltage.*	-600 ~ -1300 10 V/step **-650 V**
	3	Total Corona Current	*	Adjusts the current applied to the charge corona wire. Factory use only.	-900 ~ -1500 10 µA/step **–1300 µA**
	4	Image Area	*	Adjusts the voltage applied to the grid plate during copying when auto process control is **on**. This voltage changes every time auto process control starts up (every time the machine is switched on)	-600 ~ -1300 10 V/step **-1000 V**
	5	OHP Sheet	*	Adjusts the voltage applied to the grid plate when OHP mode is selected. Use this if there is a copy quality problem when making OHPs. Normally there is no need to adjust this. See 2-001-1.	-600 ~ -1300 10 V/step **–700 V**
	6	Thick Paper 1	*	Adjusts the voltage applied to the grid plate when thick paper 1 mode is selected. (***B098 only***)	-600 ~ -1300 10 V/step **–1000 V**
	7	Thick Paper 2	*	Adjusts the voltage applied to the grid plate when thick paper 2 mode is selected. (***B098 only***)	-600 ~ -1300 10 V/step **–900 V**
2-101	Printing Erase Margin				
	1	Leading Edge	*	Adjusts the leading edge erase margin. *The specification is 3 ±2 mm. See "Replacement and Adjustment - Copy Image Adjustments" for more on SP2-101.*	0.0 ~ 9.0 0.1 mm/step **3.0 mm**
	2	Trailing Edge	*	Adjusts the trailing edge erase margin. *The specification is 3 ±2 mm.*	0.0 ~ 9.0 0.1 mm/step **3.0 mm**
	3	Left	*	Adjusts the left side erase margin. *The specification is 2 ±1.5 mm.*	0.0 ~ 9.0 0.1 mm/step **2.0 mm**
	4	Right	*	Adjusts the right side erase margin. *The specification is 2 +2.5/-1.5 mm.*	0.0~ 9.0 0.1 mm/step **2.0 mm**

Service Tables

Mode No. (Class 1 , 2 & 3)				Function	Settings
2-103	LD Power Adjustment				
	1	LD1 - 400dpi	*	Adjusts the power of LD1 for 400 dpi resolution. ***(A292/A293 only)***	-127 ~ +127 1/step 1=1.1 μW **+0**
				Do not change the value.	
	2	LD1 - 600dpi	*	Adjusts the power of LD1 for 600 dpi resolution.	
				Do not change the value.	
	3	LD2 - 400dpi	*	Adjusts the power of LD2 for 400 dpi resolution. ***(A292/A293 only)***	
				Do not change the value.	
	4	LD2 - 600dpi	*	Adjusts the power of LD2 for 600 dpi resolution.	
				Do not change the value.	
	5	LD1 Power Adjustment (Start/End)	*	**Factory use only. Do not use this SP mode.**	Start Stop
	6	LD2 Power Adjustment (Start/End)	*	**Factory use only. Do not use this SP mode.**	Start Stop
2-109	Laser Beam Pitch Adjustment ***(A292/A293 only)***				
	1	400 dpi	*	Adjusts the laser beam pitch value for 400 dpi resolution.	0 ~ 262 4 pulses/step **144**
				After replacing the LD unit or replacing or clearing the NVRAM, use this SP mode and SP2-109-3 to adjust the laser beam pitch. Refer to "Replacement and Adjustment - Laser Beam Pitch Adjustment" for details.	
2-109	Laser Beam Pitch Adjustment ***(A292/A293 only)***				
	2	600 dpi	*	Adjusts the laser beam pitch value for 600 dpi resolution.	0 ~ 284 4 pulses/step **168**
				After replacing the LD unit , replacing or clearing the NVRAM, use this SP mode and SP2-109-4 to adjust the laser beam pitch. Refer to "Replacement and Adjustment - Laser Beam Pitch Adjustment" for details.	
	3	400 dpi Initial Setting	*	Initializes the laser beam pitch for 400 dpi to the SP2-109-1 value.	Start
				After inputting a value for SP2-109-1, this SP must be used.	
	4	600 dpi Initial Setting	*	Initializes the laser beam pitch for 600 dpi to the SP2-109-2 value.	Start
				After inputting a value for SP2-109-2, this SP must be used.	
	5	Auto Pitch Adjustment Interval	*	Inputs the interval for the automatic laser beam pitch adjustment	0 ~ 65535 1/step **1000 times**
				When the number of times that the resolution been changed reaches this value, the laser unit position is automatically corrected.	

Mode No. (Class 1 , 2 & 3)				Function	Settings
2-109	Laser Beam Pitch Adjustment ***(A292/A293 only)***				
	6	Current LD Unit Position	*	Displays the current LD unit position (number of pulses from home position). If this is different from the value of 2-109-1 or 2-109-2, LD unit positioning has failed.	
	7	Beam Pitch Change Counter	*	Displays how many times the LD unit position has been changed (how many times the resolution has changed.) *When the laser beam pitch adjustment is done, this counter is reset to "0"*	
	8	Beam Pitch Data Reset	*	Resets the values of SP2-109-6 and SP2-109-7. *After replacing the LD unit, this SP mode must be done.*	
2-110	Test Mode dpi ***(A292/A293 only)***				
				Designer use only. Do not change this value.	**0: 400 dpi** 1: 600 dpi 2: 15.4 x 16 3: 16 x 15.4
2114	Printer Dot Edge parameter Setting				
	1	Leading Dot Level (600dpi)	*	Change the LD power level for the leading edge pixel in printer mode, if FCI is off.	0 ~ 15 1/step **10**
	2	Trailing Dot Level (600dpi)	*	Change the LD power level for the trailing edge pixel in printer mode, if FCI is off.	0 ~ 15 1/step **10**
	3	Multiple Dot Level (600dpi)	*	Change the LD power level for continuous pixels in printer mode, if FCI is off.	0 ~ 15 1/step **15**
	4	Independent Dot Level (600dpi)	*	Change the LD power level for independent dots in printer mode, if FCI is off.	0 ~ 15 1/step **10**
	5	Leading Dot Level (400dpi)	*	Change the LD power level for the leading edge pixel in printer mode, if FCI is off.	0 ~ 15 1/step **8**
	6	Trailing Dot Level (400dpi)	*	Change the LD power level for the trailing edge pixel in printer mode, if FCI is off.	0 ~ 15 1/step **8**
	7	Multiple Dot Level (400dpi)	*	Change the LD power level for continuous pixels in printer mode, if FCI is off.	0 ~ 15 1/step **9**
	8	Independent Dot Level (400dpi)	*	Change the LD power level for independent dots in printer mode, if FCI is off.	0 ~ 15 1/step **6**
2-201	Development Bias Adjustment				
	1	Image Area	*	Adjusts the development bias for copying. *This can be adjusted as a temporary measure if faint copies appear due to an aging drum.*	-200 ~ -700 10 V/step **-550 V**

Mode No. (Class 1 , 2 & 3)				Function	Settings
2-201	Development Bias Adjustment				
	2	ID Sensor Pattern	*	Adjusts the development bias for making the ID sensor pattern for Vsp measurement. *This should not be used in the field, because it affects ID sensor pattern density, which affects toner supply.*	-200 ~ -700 10 V/step **-400 V**
	3	OHP Sheet	*	Adjusts the development bias for copying onto OHP sheets.	-200 ~ -700 10 V/step **-300 V**
	4	Development Performance	*	Adjusts the development potential for making the ID sensor pattern for Vsp measurement. Do not adjust.	-140 ~ -380 1 V/step **-280 V**
	5	Thick Paper 1	*	Adjusts the development bias for thick paper.1 mode. (***B098 only***)	-200 ~ -700 10 V/step **-550 V**
	6	Thick Paper 2	*	Adjusts the development bias for thick paper.2 mode. (***B098 only***)	-200 ~ -700 10 V/step **-450 V**
2-207	Forced Toner Supply				
				Forces the toner bottle to supply toner to the toner supply unit for 7 seconds. *This mode finishes automatically after the toner is supplied 7 times (1 s for each time). This process is not normally needed in the field for this model.*	Start
2-208	Toner Supply Mode				
			*	Selects the toner supply mode. *Use image pixel count mode only as a temporary countermeasure if the ID or TD sensor is defective.*	**Sensor Control** Image Pixel Count
2-209	Toner Supply Rate				
			*	Adjusts the toner supply rate. *Increasing this value reduces the toner supply clutch on time. Use a lower value if the user tends to make lots of copies that have a high proportion of black.*	50 ~ 2000 5 mg/s/ step **850 mg/s**
2-210	ID Sensor Interval				
			*	Changes the interval for making the ID sensor pattern (VSP/VSG detection). *If the user normally makes copies with a high proportion of black, reduce the interval.*	0 ~ 200 1 copy/step **10 copies**

Mode No. (Class 1 , 2 & 3)				Function	Settings
2-220	VREF Manual Setting				
			*	Adjusts the TD sensor reference voltage (VREF).	1.0 ~ 4.0 0.01V/step **3.0 V** (When perform SP2801, SP2963) **2.5 V** (When SP2967 is on)
				Change this value after replacing the development unit with another one that already contains toner. *For example, when using a development unit from another machine for test purposes, do the following:* *1. Check the value of SP2-220 in both the machine containing the test unit and the machine that you are going to move it to.* *2. Install the test development unit, then input the VREF for this unit into SP2-220.* *3. After the test, put back the old development unit, and change SP2-220 back to the original value.*	
2-223	VT Display				
			*	Displays the current TD sensor output voltage.	
2-301	Transfer Current Adjustment				
	1	1st copy	*	Adjusts the current applied to the transfer belt during copying on the 1st side of the paper.	15 ~ 200 1 μA/step **65 μA**
				If the user uses thicker paper, the current may have to be increased to ensure sufficient transfer of toner.	
	2	2nd Copy	*	Adjusts the current applied to the transfer belt during copying on the 2nd side of the paper.	15 ~ 200 1 μA/step **65 μA**
				See above.	
	3	By-pass Tray	*	Adjusts the current applied to the transfer belt during copying from the by-pass feed table.	15 ~ 200 1 μA/step **75 μA**
				See above. If the user normally feeds thicker paper from the bypass tray, use a higher setting.	
	4	Post Card	*	Adjusts the current applied to the transfer belt during copying on post cards from the by-pass feed table.	15 ~ 200 1 μA/step **165 μA**
				The post card mode is selected when the by-pass tray is selected and the width is detected as A6.	
	5	Between Papers	*	Adjusts the current applied to the transfer belt between the pages.	15 ~ 200 1 μA/step **15 μA**
	6	Tab Sheet	*	Adjusts the current applied to the transfer belt during copying on tab sheet.	15 ~ 200 1 μA/step **75 μA**

Mode No. (Class 1 , 2 & 3)				Function	Settings
2-506	Cleaning Interval – Multiple Copy				
	1	Operation (On/Off)	*	Selects whether multiple copy jobs are stopped at regular intervals for the following purposes. 1. Stop and turn the drum motor in reverse to clean the cleaning blade edge 2. Make an ID sensor pattern to correct the toner density control. The interval depends on SP2-506-2. Use if the drum gets dirty or images get too pale or too dark during a long job.	**1 : No** 2 : Yes
	2	Interval	*	Selects the interval at which multi copy jobs are stopped.	1 ~ 100 1 minute/step **15 minutes**
2-801	TD Sensor Initial Setting				
			*	Performs the TD sensor initial setting. This SP mode controls the voltage applied to the TD sensor to make the TD sensor output about 3.0 V. When SP2967 is on, TD sensor output is about 2.5 V. After finishing this, the TD sensor output voltage is displayed. *Use this mode only after changing the TD sensor or the developer.*	Start
2-803	Corona Wire Cleaner On				
				Turns on the corona wire cleaner manually. *When copy density across the paper is uneven at EM, clean the wire with this mode.*	Start
2-804	Corona Wire Cleaner Operation Setting				
	1	On/Off		Selects whether corona wire cleaner operation is done. *When 'Operate' is selected, the period is set with SP2-804-2.*	**1:Operate (yes)** 0:Not operate (No)
	2	Operation Interval		Selects the operation interval of the corona wire cleaner.	100 ~ 10 k 100w print/step **5 k**
2-813	γ-Table Printing Test Pattern				
				A γ-table is not used when printing the test pattern (SP2902-003) when "1" is selected. "1" is cleared when exiting from SP mode. Procedure for using this SP. 1. Select SP2902 -003 and pattern 2. Select this SP and "1". 3. Change to copy mode and press "Start".	0: Used (the γ-table for the selected image mode is used) **1: Not used (no γ-table is used)**

Mode No. (Class 1 , 2 & 3)				Function	Settings
2-902	Printing Test Pattern				
	2	IPU Test Pattern		Prints the test patterns for the IPU chip. See section 4.2.3. for how to print test patterns. *This SP mode is useful for finding whether the SBICU or the SBU is defective. If the printout is not OK, the BICU is defective.*	
	3	Printing Test Pattern		Prints the printer test patterns. See section 4.2.3. for how to print test patterns. Example: 10. Trimming Area *This SP mode is useful for finding whether the LDDR or the SBICU is defective. If the printout is not OK, the LDDR is defective.*	
	4	Application Test Pattern		Prints the test pattern from a PC application	**0: No** 1: Pattern 1 2: Pattern 2
	5	Pattern Density		Adjusts the image density of test patterns No. 12 and 13 of SP2902-002.	0 ~ 255 **255** 1/step
2-906	Vcont Manual Setting				
	1	Setting	*	**Factory use only.**	**9.7 V**
	2	Vctr	*	Store the VREF value at developer initialization.	
2-909	Main Scan Magnification				
	1	Copier	*	Adjusts the magnification in the main scan direction for copy mode. *See "Replacement and Adjustment – Copy Image Adjustments" for details.*	- 2.0 ~+ 2.0 0.1 %/step **+ 0.0 %**
	2	Printer	*	Adjusts the magnification in the main scan direction when printing from a personal computer. *See "Replacement and Adjustment - Copy Image Adjustments" for details.*	- 2.0 ~+ 2.0 0.1 %/step **+ 0.0 %**
2-911	Transfer Current On/Off Timing				
	1	La(ON)	*	Adjusts the transfer current on timing at the leading edge.	-30 ~ +30 1 mm/step **0 mm**
	3	Lc(OFF)	*	Adjusts the transfer current off timing (for example: –5 mm is 5 mm after the trailing edge).	-30 ~ +30 1 mm/step **0 mm**
2-912	Drum Reverse Rotation Interval				
			*	**This SP mode is for designer use only. Do not change the value..**	0 ~ 20 1/step **2**

Service Tables

Mode No. (Class 1 , 2 & 3)			Function	Settings
2-913	Test Pattern ID Adjustment			
			Adjusts the image density for printing test patterns (with SP2-902). Usually this SP mode is only used by designers. *The value is cleared when the main power switch is turned off and on.*	0 ~ 15 1/step **15**
2-920	LD Off Check			
			Checks whether the LD turns off or on when the front door is opened. ***Factory use only.***	**0 : On** 1: Off
2-921	Shading Correction			
		*	***Designer use only***	0 : No **1: Yes**
2-930	Transfer Pre Cleaning			
		*	When resolution changes from 400 to 600 dpi, the LD writes a pattern on the drum. Toner is applied, and this must be cleaned off the belt. This SP mode determines whether bias is applied to the transfer belt cleaning bias roller at this time.	**0 : No** 1 : Yes
2-961	Developer Initialization (Factory)			
			Factory use only.	
2-962	Auto Process Control			
		*	Automatically adjusts the following process control factors. 1. ID sensor 2. Drum potential sensor 3. Charge grid voltage (by changing V_D) 4. LD power (by changing V_H) 5. Image density adjustment Before using this SP, auto process control should be on (SP3-901) *After changing the drum, ID sensor, drum potential sensor, LD unit, or toner density sensor, this SP should be used.*	Start
2-963	Toner Supply From Toner Bottle			
			When installing a new machine, the following two process are done automatically. 1. Developer initialization 2. Forced toner supply (sends toner to the toner hopper) *Do not use this SP after replacing the developer. Use SP2-801 (developer initialization)*	Start

Mode No. (Class 1 , 2 & 3)				Function	Settings
2-964	Blade Protection				
	1	Pattern Interval	*	Selects the interval for applying a strip of toner across drum and transfer belt to prevent the drum cleaning blade and belt cleaning blade from peeling off.	0 ~ 50 1 /step **0 (not applied)**
	2	Pattern Density	*	Selects the LD power for making the toner strip on the drum and transfer belt to prevent the drum cleaning blade and belt cleaning blade from peeling off.	0 ~ 15 1 /step **1**
2-965	Toner Pump Adjustment				
	1	First Toner Waste Adjustment	*	**Factory use only**	0 ~ 100 1g /step **3 g**
	2	After First Toner Waste	*	**Factory use only**	0 ~ 100 1 g /step **3 g**
	3	Pump Clutch On Time	*	**Factory use only**	0 ~ 5 1 /step **2 s**
	4	Pump Motor On Time	*	**Factory use only**	0 ~ 20 1 s/step **6 s**
	5	Return to First Toner Waste	*	**Factory use only**	0 ~ 50 1 time/step **30 times**
	6	Aggregate of Toner Waste	*	**Factory use only**	
2-966	Periodical Auto Process Control				
			*	When both the following conditions exist, auto process control and charge corona wire cleaning will be done automatically. 1. The main switch was not turned off since 24 hours after the last auto process control was done. 2. A copy job has finished.	**OFF: No** ON: Yes
2-967	Auto Image Density Adjustment				
			*	During the auto process control after the main switch is turned on, the toner amount in the development unit is checked and adjusted using the ID sensor.	**OFF: No** ON: Yes
2-970	Transfer Belt Resistance Value Display				
				XX.XM Unit is Ω Very High → 190 ← High → 90 ← Standard → 25 ← Low → 15 ← Very Low	

Service Tables

Mode No. (Class 1 , 2 & 3)				Function	Settings
2-971	Output Value Measured Between Copies				
	1	Voltage		Displays the measurement condition of value in SP2-970.	
	2	Current			
3-001	ID Sensor PWM Setting				
	1	ID Sensor PWM Setting	*	This SP mode is added to recover the machine when an SC condition occurs because ID Sensor Initial Setting is not done after doing an NVRAM Clear or replacing the NVRAM. Reset this SP to the factory setting in this case. *The PWM data is stored when ID Sensor Initial Setting is done.*	0 ~ 255 1/step **90**
	2	Initialization	*	Performs the ID sensor initial setting. The ID sensor output for the bare drum (V_{SG}) is adjusted to 4.0 ± 0.2V. *This SP mode should be performed after:* *1. Replacing or cleaning the ID sensor* *2. Replacing the NVRAM or doing an NVRAM clear* *3. Replacing the BICU board*	Start
3-103	ID Sensor Output Display				
			*	Displays the current V_{SG} and V_{SP} output. V_{SP}= x.xx V V_{SG}= x.xx V *If the ID sensor does not detect the ID pattern, "V_{SP}=5.0V/V_{SG}=5.0V" is displayed and an SC code is generated.* *If the ID sensor does not detect the bare area of the drum, "V_{SP}=0.0V/V_{SG}=0.0V" is displayed and an SC code is generated.*	
3-901	Auto Process Control				
			*	Decides whether or not the machine checks and corrects the drum potential (V_D) and LD power when the fusing temperature is lower than 100°C at power-up.	**ON** OFF
3-902	Process Control Data Display				
	1	Auto Process Control	*	Displays whether auto process control is on or off. (O: OFF, 1: ON)	
	2	V_D	*	Displays the drum potential.	
	3	V_H (Half Tone)	*	Displays the drum potential in areas illuminated by the laser.	
	4	V_G	*	Displays the charge grid voltage which resulted from the latest V_D adjustment.	
	5	LD Power (Correction)	*	Displays the LD power correction value which resulted from the latest V_H adjustment.	

Mode No. (Class 1 , 2 & 3)				Function	Settings
3-902	Process Control Data Display				
	6	VID	*	Displays the latest drum surface voltage measured on the ID sensor pattern.	
	7	VQL	*	Displays the drum potential after quenching.	

Mode No. (Class 1 , 2 & 3)				Function	Settings
4-008	Scanner Sub Scan Magnification				
			*	Adjusts the magnification in the sub scan direction for scanning. If this value is changed, the scanner motor speed is changed. *See "Replacement and Adjustment - Copy Image Adjustments" for details.*	- 0.9 ~ + 0.9 0.1 %/step **+ 0.0 %**
4-010	Scanner Leading Edge Registration				
			*	Adjusts the leading edge registration for scanning. *(-): The image moves in the direction of the leading edge* *See "Replacement and Adjustment - Copy Image Adjustments" for details.*	- 9.0 ~ + 9.0 0.1 mm/step **+ 0.0 mm**
4-011	Scanner Side-to Side Registration				
			*	Adjusts the side-to-side registration for scanning. *(-): The image disappears at the left side.* *(+): The image appears at the left side.* *See "Replacement and Adjustment - Copy Image Adjustments" for details.*	- 6.0 ~ + 6.0 0.1 mm/step **+ 0.0 mm**
4-012	Scanner Erase Margin				
	1	Leading Edge	*	Adjusts the leading edge erase margin for scanning. *Do not adjust this unless the user wishes to have a scanner margin that is greater than the printer margin.*	0.0 ~ 0.9 0.1 mm/step **0.5 mm**
	2	Trailing Edge	*	Adjusts the trailing edge erase margin for scanning. *See the comment for SP 4-012-1.*	
	3	Left	*	Adjusts the left side erase margin for scanning. *See the comment for SP 4-012-1.*	
	4	Right	*	Adjusts the right side erase margin for scanning. *See the comment for SP 4-012-1.*	
4-013	Scanner Free Run				
				Performs a scanner free run with the exposure lamp on.	**0: Stop** 1: Start
4-015	Scanner Speed Adjustment				
			*	Adjusts the scanner speed variation. Do not adjust unless instructed by senior technical staff.	-20 ~ 20 1/step **0**

Mode No. (Class 1 , 2 & 3)				Function	Settings
4-301	APS Sensor Output Display				
				Displays the APS sensor output signals when an original is placed on the exposure glass. Bit 0: Width sensor 1 Bit 1: Width sensor 2 Bit 2: Width sensor 3 Bit 3: Length sensor 1 Bit 4: Length sensor 2 See “Detailed Section Descriptions – Original Size Detection in Platen Mode” for more details.	00000000 0: Not detected 1: Detected
4-303	APS A5/HLT Size Original Detection				
			*	Selects whether or not the copier determines that the original is A5/HLT size when the APS sensor does not detect the size. *If "A5 length/5 1/2" x 8 1/2" is selected, paper sizes that cannot be detected by the APS sensors are regarded as A5 lengthwise or 5 1/2" x 8 1/2".* *If "Not detected" is selected, "Cannot detect original size" will be displayed.* *If not using 8 k and 16 k paper, select “0” or “1”.* *If using 8 k and 16 k paper, select “2” or “3”.*	**0: Not detected** 1: A5 length / 5 1/2" x 8 1/2" 2: Not detected 3: A5 length/ 5 1/2” x 8 1/2”
4-428	Scanner Adjustment				
	1	Flag Display	*	Displays whether or not the standard white level adjustment has been done.	Adjusted Not adjusted
	2	Standard		Corrects the standard white level from the white plate. ***This SP mode is for factory use only. Do not use this SP mode.***	Start
4-902	SBU Setting				
	1	Image data Path Setting		Changes the image data path in the SBU. ***This SP mode is for factory use only. Do not use this SP mode.***	0 ~5 1/step **0**
	2	SBU ID		Displays the ASIC ID of the SBU. ***This SP mode is for factory use only.***	
	3	First-side E/O Adjustment		Checks the difference value of the black level for the first side after adjusting the black level at power-up. ***This SP mode is for designer use only. Do not use this SP mode.***	0 ~ 255 1/step **128**
	4	Last-side E/O Adjustment		Checks the difference value of the black level for the last side after adjusting the black level at power-up. ***This SP mode is for designer use only. Do not use this SP mode.***	0 ~ 255 1/step **128**

Mode No. (Class 1 , 2 & 3)				Function	Settings
4-902	SBU Setting				
	7	First-side Bk Adjustment		Checks the value of the black level for the first side after adjusting the black level at power-up. ***This SP mode is for designer use only. Do not use this SP mode.***	0 ~ 255 1/step **170**
	8	Last-side Bk Adjustment		Checks the value of the black level for the last side after adjusting the black level at power-up. ***This SP mode is for designer use only. Do not use this SP mode.***	0 ~ 255 1/step **170**
	15	First-side Gain Range Adjustment		Checks the AGC gain range of the white level for the first side after adjusting the white level at power-up. ***This SP mode is for designer use only. Do not use this SP mode.***	0 ~ 255 1/step **80**
	16	Last-side Gain Range Adjustment		Checks the AGC gain value of the white level for the last side after adjusting the white level at power-up. ***This SP mode is for designer use only. Do not use this SP mode.***	0 ~ 255 1/step **80**
	19	First-side Gain Adjustment E-ch		Checks the AGC gain value of the white level for the EVEN channel of the first side after adjusting the white level at power-up. ***This SP mode is for designer use only. Do not use this SP mode.***	0 ~ 255 1/step **0**
	20	First-side Gain Adjustment O-ch		Checks the AGC gain value of the white level for the ODD channel of the first side after adjusting the white level at power-up. ***This SP mode is for designer use only. Do not use this SP mode.***	0 ~ 255 1/step **0**
	21	Last-side Gain Adjustment E-ch		Checks the AGC gain value of the white level for the EVEN channel of the last side after adjusting the white level at power-up. ***This SP mode is for designer use only. Do not use this SP mode.***	0 ~ 255 1/step **0**
	22	Last-side Gain Adjustment O-ch		Checks the AGC gain value of the white level for the ODD channel of the last side after adjusting the white level at power-up. ***This SP mode is for designer use only. Do not use this SP mode.***	0 ~ 255 1/step **0**
	25	Standard White Level Adjustment		Checks the value of the standard white level after adjusting the white level. ***This SP mode is for factory use only. Do not use this SP mode.***	0 ~ 255 1/step **117**
	31	First-side E/O Adjustment (Memory)		Checks the difference value of the black level for the First side after adjusting the black level at power-up. ***This SP mode is for designer use only.***	0 ~255 1/step **128**

Mode No. (Class 1 , 2 & 3)				Function	Settings
4-902	SBU Setting				
	32	Last-side E/O Adjustment (Memory)	*	Checks the difference value of the black level for the last side after adjusting the black level at power-up. ***This SP mode is for designer use only.***	0 ~255 1/step **128**
	35	First-side Bk Adjustment (Memory)	*	Checks the value of the black level for the first side after adjusting the black level at power-up. ***This SP mode is for designer use only.***	0 ~ 255 1/step **170**
	36	Last-side Bk Adjustment (Memory)	*	Checks the value of the black level for the last side after adjusting the black level at power-up. ***This SP mode is for designer use only.***	0 ~ 255 1/step **170**
	43	First-side Gain Range Adjustment (Memory)	*	Checks the AGC gain value of the white level for the EVEN channel of the first side after adjusting the white level at power-up. ***This SP mode is for designer use only.***	0 ~ 255 1/step **0**
	44	Last-side Gain Range Adjustment (Memory)	*	Checks the AGC gain value of the white level for the ODD channel of the first side after adjusting the white level at power-up. ***This SP mode is for designer use only.***	0 ~ 255 1/step **0**
	47	First-side Gain Adjustment E-ch (Memory)	*	Checks the AGC gain value of the white level for the EVEN channel of the last side after adjusting the white level at power-up. ***This SP mode is for designer use only.***	0 ~ 255 1/step **0**
	48	First-side Gain Adjustment O-ch (Memory)	*	Checks the AGC gain value of the white level for the ODD channel of the last side after adjusting the white level at power-up. ***This SP mode is for designer use only.***	0 ~ 255 1/step **0**
	49	Last-side Gain Adjustment E-ch (Memory)	*	Checks the AGC gain value of the white level for the EVEN channel of the last side after adjusting the white level at power-up. ***This SP mode is for designer use only.***	0 ~ 255 1/step **0**
	50	Last-side Gain Adjustment O-ch (Memory)	*	Checks the AGC gain value of the white level for the ODD channel of the last side after adjusting the white level at power-up. ***This SP mode is for designer use only.***	0 ~ 255 1/step **0**
	53	Standard White Level Adjustment (Memory)	*	Checks the value of the standard white level after adjusting the white level. ***This SP mode is for factory use only.***	0 ~ 255 1/step **117**
	59	White Level Data		Checks either the maximum or minimum white shading data. ***This SP mode is for designer use only.***	0: Maximum 1: Minimum
	61	First-side Gain Range Adjustment at Factory	*	Checks the AGC gain value of the white level for the EVEN channel of the first side after adjusting the white level at power-up. ***This SP mode is for designer use only.***	0 ~ 255 1/step **80**

Mode No. (Class 1 , 2 & 3)				Function	Settings
4-902	SBU Setting				
	62	Last-side Gain Range Adjustment at Factory	*	Checks the AGC gain value of the white level for the ODD channel of the first side after adjusting the white level at power-up. ***This SP mode is for designer use only.***	0 ~ 255 1/step **80**
	65	First-side Gain Adjustment -E ch at Factory	*	Checks the AGC gain value of the white level for the EVEN channel of the last side after adjusting the white level at power-up. ***This SP mode is for designer use only.***	0 ~ 255 1/step **0**
	66	First-side Gain Adjustment-O ch at Factory	*	Checks the AGC gain value of the white level for the ODD channel of the last side after adjusting the white level at power-up. ***This SP mode is for designer use only.***	0 ~ 255 1/step **0**
	67	Last-side Gain Adjustment-E ch at Factory	*	Checks the AGC gain value of the white level for the EVEN channel of the last side after adjusting the white level at power-up. ***This SP mode is for designer use only.***	0 ~ 255 1/step **0**
	68	Last-side Gain Adjustment-O ch at Factory	*	Checks the AGC gain value of the white level for the ODD channel of the last side after adjusting the white level at power-up. ***This SP mode is for designer use only.***	0 ~ 255 1/step **0**
	71	Standard White Level Adjustment at Factory	*	Checks the value of the standard white level after adjusting the white level. ***This SP mode is for factory use only.***	0 ~ 255 1/step **117**
	75	Overflow Flag		Checks the overflow flag data during the automatic scanner adjustment. ***This SP mode is for designer use only.***	0 ~ 1023 1/step **0**
	76	Time-out Flag		Checks the time out flag data during the automatic scanner adjustment. ***This SP mode is for designer use only.***	0 ~ 1023 1/step **0**
	78	SBU Reset Error Flag		Checks the error flag data during the automatic scanner adjustment. ***This SP mode is for designer use only.***	0 ~ 15 1/step **0**
	79	Error Flag		Checks the error flag data during the automatic scanner adjustment. ***This SP mode is for designer use only.***	0 ~ 255 1/step **0**
	80	Gain Adjustment First/Last Error Times	*	Counts the errors during the automatic scanner adjustment. ***This SP mode is for designer use only.***	0 ~ 255 1/step **0**
	81	Offset Level Read Error Times	*	Counts the errors during the automatic scanner adjustment. ***This SP mode is for designer use only.***	0 ~ 255 1/step **0**

Mode No. (Class 1 , 2 & 3)				Function	Settings
4-902	SBU Setting				
	82	Gain Level Read Error Times	*	Counts the errors during the automatic scanner adjustment ***This SP mode is for designer use only.***	
	83	Offset Level Read Error Times	*	Counts the errors during the automatic scanner adjustment. ***This SP mode is for designer use only.***	
	84	Gain Level Read Error Times	*	Counts the errors during the automatic scanner adjustment. ***This SP mode is for designer use only.***	
	85	Retry to Adjust Error Fail Time	*	Counts the errors during the automatic scanner adjustment. ***This SP mode is for designer use only.***	
	86	Retry to Adjust Success Time	*	Counts the errors during the automatic scanner adjustment. ***This SP mode is for designer use only.***	
	87	White Peak Level – Front side (E ch)	*	Displays the white peak level when the main switch is turned on. ***This SP mode is for designer use only.***	
	88	White Peak Level – Front side (O ch)	*	Displays the white peak level when the main switch is turned on. ***This SP mode is for designer use only.***	
	89	White Peak Level – Last side (E ch)	*	Displays the white peak level when the main switch is turned on. ***This SP mode is for designer use only.***	
	90	White Peak Level – Front side (O ch)	*	Displays the white peak level when the main switch is turned on. ***This SP mode is for designer use only.***	
	91	BIPU ID Display	*	***This SP mode is for designer use only.***	
4-903	Filter Setting				
	5	Full Size Mode		Selects whether the copy is always in full size mode even if the magnification ratio has been changed. *Set to 1 when checking the magnification in the main scan direction. If the magnification is not 100%, something is wrong with the image processing circuits.*	**0: Normal operation** 1: Always full size mode
	7	Image Shift in Magnification		Adjusts the pixel shift amount in the main scan direction in magnification mode. ***This SP mode is for designer use only.***	0 ~ 8191 1/step **0**

Service Tables

Mode No. (Class 1 , 2 & 3)				Function	Settings
4-903	Filter Setting				
	9	Photo Mode Filter Selection	*	Selects the filter used in photo mode	0: MTF Filter **1: Smoothing Filter**
	10	Pre-filter Type (Text mode 25% ~ 49%)	*	Selects the pre-filter type. 0: None 1: Smoothing (Normal) 2: Smoothing (Weak) 3 ~ 5: Special smoothing filters which reduce moiré but do not weaken the edges of low contrast text. A suitable filter should be selected depending on the original type. 6: MTF (Weak) 7: MTF (Normal) 8 ~ 10: Special smoothing filters only for the main scan direction. These filters should be used if the edges of lines that are parallel to the sub scan line are weakened when a filter from 3 ~ 5 is selected. A suitable filter should be selected depending on the original type. This SP is ignored unless the user selects 'Service Mode' in UP mode.	0 ~ 10 1/step **1**
	11	Pre-filter Type (Text mode 50% ~ 154%)	*		0 ~ 10 1/step **0**
	12	Pre-filter Type (Photo mode)	*		0 ~ 10 1/step **1**
	13	Pre-filter Type (Text/Photo mode 25% ~ 49%)	*		0 ~ 10 1/step **1**
	14	Pre-filter Type (Text/Photo mode 50% ~ 154%)	*		0 ~ 10 1/step **0**
	15	Pre-filter Type (Pale mode)	*		0 ~ 10 1/step **1**
	16	Pre-filter Type (Generation mode)	*		0 ~ 10 1/step **1**
	20	Filter Level-25% ~ 49% (Main Scan Direction-Text)	*	Selects the MTF filter coefficient in the main scan direction for 25% ~ 49% reduction for text mode. Settings 0 to 6 are MTF filters, and settings 7 to 13 are moiré erase filters. 0: Weak 6: Strong 7: Weak 13: Strong *This SP is ignored unless the user selects 'Service Mode' in UP mode.*	0 ~ 13 1/step **13**
	21	Filter Level-25% ~ 49% (Sub Scan Direction-Text)	*	Selects the MTF filter coefficient in the sub scan direction for 25% ~ 49% reduction for text mode. 0: Weak 6: Strong *This SP is ignored unless the user selects 'Service Mode' in UP mode.*	0 ~ 6 1/step **6**
	22	Filter Strength-25% ~ 49% (Main Scan Direction-Text)	*	Selects the MTF strength in the main scan direction for 25% ~ 49% reduction for text mode. 0: Weak 6:Strong *This SP is ignored unless the user selects 'Service Mode' in UP mode.*	0 ~ 6 1/step **1**

Mode No. (Class 1 , 2 & 3)				Function	Settings
4-903	Filter Setting				
	23	Filter Strength-25% ~ 49% (Sub Scan Direction-Text)	*	Selects the MTF strength in the sub scan direction for 25% ~ 49% magnification for text mode. 0: Weak 6: Strong *This SP is ignored unless the user selects 'Service Mode' in UP mode.*	0 ~ 6 1/step **1**
	24	Filter Level-50% ~ 154% (Main Scan Direction-Text)	*	Selects the MTF filter coefficient in the main scan direction for 50% ~ 154% reduction for text mode. Settings 0 to 6 are MTF filters, and settings 7 to 13 are moiré erase filters. 0: Weak 6: Strong 7: Weak 13: Strong *This SP is ignored unless the user selects 'Service Mode' in UP mode.*	0 ~ 13 1/step **13**
	25	Filter Level-50% ~ 154% (Sub Scan Direction-Text)	*	Selects the MTF filter coefficient in the sub scan direction for 50% ~ 154% reduction for text mode. 0: Weak 6: Strong *This SP is ignored unless the user selects 'Service Mode' in UP mode.*	0 ~ 6 1/step **6**
	26	Filter Strength-50% ~ 154% (Main Scan Direction-Text)	*	Selects the MTF strength in the main scan direction for 50% ~ 154% reduction for text mode. 0: Weak 6: Strong *This SP is ignored unless the user selects 'Service Mode' in UP mode.*	0 ~ 6 1/step **1**
	27	Filter Strength-50% ~ 154% (Sub Scan Direction-Text)	*	Selects the MTF strength in the sub scan direction for 50% ~ 154% magnification for text mode. 0: Weak 6: Strong. *This SP is ignored unless the user selects 'Service Mode' in UP mode.*	0 ~ 6 1/step **1**
	28	Filter Level-155% ~ 256% (Main Scan Direction-Text)	*	Selects the MTF filter coefficient in the main scan direction for 155% ~ 256% reduction for text mode. Settings 0 to 6 are MTF filters, and settings 7 to 13 are moiré erase filters. 0: Weak 6: Strong 7: Weak 13: Strong *This SP is ignored unless the user selects 'Service Mode' in UP mode.*	0 ~ 13 1/step **13**
	29	Filter Level-155% ~ 256% (Sub Scan Direction-Text)	*	Selects the MTF filter coefficient in the sub scan direction for 155% ~ 256% reduction for text mode. 0: Weak 6: Strong *This SP is ignored unless the user selects 'Service Mode' in UP mode.*	0 ~ 6 1/step **2**

Mode No. (Class 1 , 2 & 3)				Function	Settings
4-903	Filter Setting				
	30	Filter Strength-155% ~ 256% (Main Scan Direction-Text)	*	Selects the MTF strength in the main scan direction for 155% ~ 256% reduction for text mode. 0: Weak 6: Strong *This SP is ignored unless the user selects 'Service Mode' in UP mode.*	0 ~ 6 1/step **0**
	31	Filter Strength-155% ~ 256% (Sub Scan Direction-Text)	*	Selects the MTF strength in the sub scan direction for 155% ~ 256% magnification for text mode. 0: Weak 6: Strong *This SP is ignored unless the user selects 'Service Mode' in UP mode.*	0 ~ 6 1/step **4**
	32	Filter Level-257% ~ 400% (Main Scan Direction-Text)	*	Selects the MTF filter coefficient in the main scan direction for 256% ~ 400% reduction for text mode. Settings 0 to 6 are MTF filters, and settings 7 to 13 are moiré erase filters. 0: Weak 6: Strong 7: Weak 13: Strong *This SP is ignored unless the user selects 'Service Mode' in UP mode.*	0 ~ 13 1/step **13**
	33	Filter Level-257% ~ 400% (Sub Scan Direction-Text)	*	Selects the MTF filter coefficient in the sub scan direction for 257% ~ 400% reduction for text mode. 0: Weak 6: Strong *This SP is ignored unless the user selects 'Service Mode' in UP mode.*	0 ~ 6 1/step **2**
	34	Filter Strength-257% ~ 400% (Main Scan Direction-Text)	*	Selects the MTF strength in the main scan direction for 257% ~ 400% reduction for text mode. 0: Weak 6: Strong *This SP is ignored unless the user selects 'Service Mode' in UP mode.*	0 ~ 6 1/step **0**
	35	Filter Strength-257% ~ 400% (Sub Scan Direction-Text)	*	Selects the MTF strength in the sub scan direction for 257% ~ 400% magnification for text mode. 0: Weak 6: Strong *This SP is ignored unless the user selects 'Service Mode' in UP mode.*	0 ~ 6 1/step **4**
	36	MTF Filter-Photo Mode	*	Selects the MTF filter coefficient for photo mode, if MTF is enabled for this mode with SP4-903-9. Settings 0 to 6 are MTF filters, and settings 7 to 13 are moiré erase filters. 0: Weak 6: Strong 7: Weak 13: Strong *This SP is ignored unless the user selects 'Service Mode' in UP mode.*	0 ~ 13 1/step **13**

Mode No. (Class 1 , 2 & 3)				Function	Settings
4-903	Filter Setting				
	37	Smoothing Filter-Photo mode	*	Selects the smoothing filter coefficient for photo mode, if smoothing is enabled for this mode with SP4-903-9. 0: Weak 7: Strong *This SP is ignored unless the user selects 'Service Mode' in UP mode.*	0 ~ 7 1/step **4**
	38	Filter Strength-Photo mode	*	Selects the smoothing filter coefficient for photo mode, if MTF is enabled for this mode with SP4-903-9. 0: Weak 6: Strong *This SP is ignored unless the user selects 'Service Mode' in UP mode.*	0 ~ 6 1/step **1**
	39	Filter Level-25% ~ 49% (Main Scan Direction-Text/Photo)	*	Selects the MTF filter coefficient in the main scan direction for 25% ~ 49% magnification for text areas in text/photo mode. Settings 0 to 6 are MTF filters, and settings 7 to 13 are moiré erase filters. 0: Weak 6: Strong 7: Weak 13: Strong *This SP is ignored unless the user selects 'Service Mode' in UP mode.*	0 ~ 13 1/step **13**
	40	Filter Level-25% ~ 49% (Sub Scan Direction-Text/Photo)	*	Selects the MTF filter coefficient in the sub scan direction for 25% ~ 49% magnification for text areas in text/photo mode. 0: Weak 6: Strong *This SP is ignored unless the user selects 'Service Mode' in UP mode.*	0 ~ 6 1/step **3**
	41	Filter Strength-25% ~ 49% (Main Scan Direction-Text/Photo)	*	Selects the MTF strength in the main scan direction for 25% ~ 49% magnification for text areas in text/photo mode. 0: Weak 6: Strong *This SP is ignored unless the user selects 'Service Mode' in UP mode.*	0 ~ 6 1/step **0**
	42	Filter Strength-25% ~ 49% (Sub Scan Direction-Text/Photo)	*	Selects the MTF strength in the sub scan direction for 25% ~ 49% magnification for text areas in text/photo mode. 0: Weak 6: Strong *This SP is ignored unless the user selects 'Service Mode' in UP mode.*	0 ~ 6 1/step **0**
	43	Filter Level-50% ~ 154% (Main Scan Direction Text/Photo)	*	Selects the MTF filter coefficient in the main scan direction for 50% ~ 154% magnification for text areas in text/photo mode. Settings 0 to 6 are MTF filters, and settings 7 to 13 are moiré erase filters. 0: Weak 6: Strong 7: Weak 13: Strong *This SP is ignored unless the user selects 'Service Mode' in UP mode.*	0 ~ 13 1/step **13**

Mode No. (Class 1 , 2 & 3)				Function	Settings
4-903	Filter Setting				
	44	Filter Level-50% ~ 154% (Sub Scan Direction-Text/Photo)	*	Selects the MTF filter coefficient in the sub scan direction for 50% ~ 154% magnification for text areas in text/photo mode. 0: Weak 6: Strong *This SP is ignored unless the user selects 'Service Mode' in UP mode.*	0 ~ 6 1/step **3**
	45	Filter Strength-50% ~ 154% (Main Scan Direction-Text/Photo)	*	Selects the MTF strength in the main scan direction for 50% ~ 154% magnification for text areas in text/photo mode. 0: Weak 6: Strong *This SP is ignored unless the user selects 'Service Mode' in UP mode.*	0 ~ 6 1/step **0**
	46	Filter Strength-50% ~ 154% (Sub Scan Direction-Text/Photo)	*	Selects the MTF strength in the sub scan direction for 50% ~ 154% magnification for text areas in text/photo mode. 0: Weak 6: Strong *This SP is ignored unless the user selects 'Service Mode' in UP mode.*	0 ~ 6 1/step **1**
	47	Filter Level-155% ~ 256% (Main Scan Direction-Text/Photo)	*	Selects the MTF filter coefficient in the main scan direction for 155% ~ 256% magnification for text areas in text/photo mode. Settings 0 to 6 are MTF filters, and settings 7 to 13 are moiré erase filters. 0: Weak 6: Strong 7: Weak 13: Strong *This SP is ignored unless the user selects 'Service Mode' in UP mode.*	0 ~ 13 1/step **13**
	48	Filter Level-155% ~ 256% (Sub Scan Direction-Text/Photo)	*	Selects the MTF filter coefficient in the sub scan direction for 155% ~ 256% magnification for text areas in text/photo mode. 0: Weak 6: Strong *This SP is ignored unless the user selects 'Service Mode' in UP mode.*	0 ~ 6 1/step **3**
	49	Filter Strength-155% ~ 256% (Main Scan Direction-Text/Photo)	*	Selects the MTF strength in the main scan direction for 155% ~ 256% magnification for text areas in text/photo mode. 0: Weak 6: Strong *This SP is ignored unless the user selects 'Service Mode' in UP mode.*	0 ~ 6 1/step **0**

Mode No. (Class 1 , 2 & 3)				Function	Settings
4-903	Filter Setting				
	50	Filter Strength-155% ~ 256% (Sub Scan Direction-Text/Photo)	*	Selects the MTF strength in the sub scan direction for 155% ~ 256% magnification for text areas in text/photo mode. 0: Weak 6: Strong *This SP is ignored unless the user selects 'Service Mode' in UP mode.*	0 ~ 6 1/step **3**
	51	Filter Level 257% ~ 400% (Main Scan Direction-Text/Photo)	*	Selects the MTF filter coefficient in the main scan direction for 257% ~ 400% magnification for text areas in text/photo mode. Settings 0 to 6 are MTF filters, and settings 7 to 13 are moiré erase filters. 0: Weak 6: Strong 7: Weak 13: Strong *This SP is ignored unless the user selects 'Service Mode' in UP mode.*	0 ~ 13 1/step **13**
	52	Filter Level-257% ~ 400% (Sub Scan Direction-Text/Photo)	*	Selects the MTF filter coefficient in the sub scan direction for 257% ~ 400% magnification for text areas in text/photo mode. 0: Weak 6: Strong *This SP is ignored unless the user selects 'Service Mode' in UP mode.*	0 ~ 6 1/step **3**
	53	Filter Strength-257% ~ 400% (Main Scan Direction-Text/Photo)	*	Selects the MTF strength in the main scan direction for 257% ~ 400% magnification for text areas in text/photo mode. 0: Weak 6: Strong *This SP is ignored unless the user selects 'Service Mode' in UP mode.*	0 ~ 6 1/step **0**
	54	Filter Strength-257% ~ 400% (Sub Scan Direction-Text/Photo)	*	Selects the MTF strength in the sub scan direction for 257% ~ 400% magnification for text areas in text/photo mode. 0: Weak 6: Strong *This SP is ignored unless the user selects 'Service Mode' in UP mode.*	0 ~ 6 1/step **3**
	55	Filter Level-Pale Mode	*	Selects the table of the MTF filter coefficient for pale original mode Settings 0 to 6 are MTF filters, and settings 7 to 13 are moiré erase filters. 0: Weak 6: Strong 7: Weak 13: Strong *This SP is ignored unless the user selects 'Service Mode' in UP mode.*	0 ~ 13 1/step **3**

Mode No. (Class 1 , 2 & 3)				Function	Settings
4-903	Filter Setting				
	56	Filter Strength-Pale Mode	*	Selects the table of the MTF filter strength for pale original mode. 0: Weak 6: Strong *This SP is ignored unless the user selects 'Service Mode' in UP mode.*	0 ~ 6 1/step **3**
	57	Filter Level-Generation Mode	*	Selects the table of the MTF filter coefficient for pale original mode. Settings 0 to 6 are MTF filters, and settings 7 to 13 are moiré erase filters. 0: Weak 6: Strong 7: Weak 13: Strong *This SP is ignored unless the user selects 'Service Mode' in UP mode.*	0 ~ 13 1/step **13**
	58	Filter Strength-Generation Mode	*	Selects the table of the MTF filter strength for generation original mode. 0: Weak 6: Strong *This SP is ignored unless the user selects 'Service Mode' in UP mode.*	0 ~ 6 1/step **1**
	60	Independent Dot Erase-Text Mode	*	Selects the independent dot erase level for text mode. *A larger number erases more dots. 0 means disabled. Refer to "Detailed Section Description – Independent Dot Erase" for details.*	0 ~ 14 1/step **3**
	62	Independent Dot Erase-Text/Photo Mode	*	Selects the independent dot erase level for text/photo mode. *A larger number erases more dots. 0 means disabled. Refer to "Detailed Sectional Description – Independent Dot Erase" for details.*	0 ~ 14 1/step **3**
	63	Independent Dot Erase-Pale Mode	*	Selects the independent dot erase level for pale mode. *A larger number erases more dots. 0 means disabled. Refer to "Detailed Section Description – Independent Dot Erase" for details.*	0 ~ 14 1/step **3**
	64	Independent Dot Erase - Generation Copy Mode	*	Selects the independent dot erase level for generation copy mode. *A larger number erases more dots. 0 means disabled. Refer to "Detailed Sectional Description – Independent Dot Erase" for details.*	0 ~ 14 1/step **3**

Mode No. (Class 1 , 2 & 3)				Function	Settings
4-903	Filter Setting				
	65	Scanner Gamma Thresh Level - Text	*	Adjust the threshold level for the background erase function in letter mode. *A larger value reduces dirty background. This SP is ignored unless 1 or 2 is selected with SP4-903-70.*	0 ~ 255 1/step **0**
	66	Scanner Gamma Thresh Level - Photo	*	Adjust the threshold level for the background erase function in photo mode. *A larger value reduces dirty background. This SP is ignored unless 1 or 2 is selected with SP4-903-71.*	
	67	Scanner Gamma Thresh Level - Text/Photo	*	Adjust the threshold level for the background erase function in text/photo mode. *A larger value reduces dirty background. This SP is ignored unless 1 or 2 is selected with SP4-903-72.*	
	68	Scanner Gamma Thresh Level - Pale	*	Adjust the threshold level for the background erase function in pale mode. *A larger value reduces dirty background. This SP is ignored unless 1 or 2 is selected with SP4-903-73.*	
	69	Scanner Gamma Thresh Level - Generation	*	Adjust the threshold level for background erase in generation copy mode. *A larger value reduces dirty background. This SP is ignored unless 1 or 2 is selected with SP4-903-74.*	
	70	Background Erase Mode - Text	*	Selects the background erase function setting in text mode. 0: Not done 1: Weak background erase (the MTF filter is not used if the pixel is below the threshold selected with SP4-903-65.) 2: Strong background erase (the pixel is changed to 0 if it is below the threshold level selected with SP4-903-65.) *This SP is ignored unless the user selects 'Service Mode' in UP mode.*	0 ~ 2 1/step **0**

Mode No. (Class 1 , 2 & 3)				Function	Settings
4-903	Filter Setting				
	71	Background Erase Mode - Photo	*	Selects the background erase function setting in photo mode. 0: Not done 1: Strong background erase (the pixel is changed to 0 if it is below the threshold level selected with SP4-903-66.) *This SP is ignored unless the user selects 'Service Mode' in UP mode.*	0 ~ 1 1/step **0**
	72	Background Erase Mode - Text/Photo	*	Selects the background erase function setting in text/photo mode. 0: Not done 1: Weak background erase (the MTF filter is not used if the pixel is below the threshold selected with SP4-903-67.) 2: Strong background erase (the pixel is changed to 0 if it is below the threshold level selected with SP4-903-67.) *This SP is ignored unless the user selects 'Service Mode' in UP mode.*	0 ~ 2 1/step **0**
	73	Background Erase Mode - Pale	S	Selects the background erase function setting in pale mode. 0: Not done 1: Weak background erase (the MTF filter is not used if the pixel is below the threshold selected with SP4-903-68.) 2: Strong background erase (the pixel is changed to 0 if it is below the threshold level selected with SP4-903-68.) *This SP is ignored unless the user selects 'Service Mode' in UP mode.*	0 ~ 2 1/step **0**
	74	Background Erase Mode- Generation	*	Selects the background erase function setting in generation mode. 0: Not done 1: Weak background erase (the MTF filter is not used if the pixel is below the threshold selected with SP4-903-69. 2: Strong background erase (the pixel is changed to 0 if it is below the threshold level selected with SP4-903-69. *This SP is ignored unless the user selects 'Service Mode' in UP mode.*	0 ~ 2 1/step **0**

Mode No. (Class 1 , 2 & 3)				Function	Settings
4-903	Filter Setting				
	75	Line Thickness Correction-Generation	*	Selects the line thickness setting in generation mode. 0: No Correction / No Correction 1: No Correction / Thinner 1 2: No Correction / Thinner 2 3: No Correction / Thicker 4: Thinner 1 / No Correction 5: Thinner 1 / Thinner 1 6: Thinner 1 / Thinner 2 7: Thinner 1 / Thicker 8: Thinner 2 / No Correction 9: Thinner 2 / Thinner 1 10: Thinner 2 / Thinner 2 11: Thinner 2 / Thicker 12: Thicker / No Correction 13: Thicker / Thinner 1 14: Thicker / Thinner 2 15: Thicker / Thicker (Main Scan / Sub Scan) Line Thickness: Thicker > No Correction > Thinner 1 > Thinner 2 *Refer 'Line Width Correction' in section 2.*	0 ~ 15 1/step **5**
	76	Line Thickness Correction - Threshold (Main Scan - Generation)	*	Selects the threshold to determine if line thickness correction is applied for a pixel. If a higher number is selected, the effectiveness of the line thickness correction selected with SP4-903-75 becomes stronger.	0 ~ 5 1/step **2**
	77	Line Thickness Correction - Generation (Sub Scan)	*	Selects the threshold to determine if line thickness correction is applied for a pixel. If a higher number is selected, the effectiveness of the line thickness correction selected with SP4-903-75 becomes stronger.	0 ~ 5 1/step **2**

Service Tables

Mode No. (Class 1 , 2 & 3)				Function			Settings
4-903	Filter Setting						
	78	Line Thickness Correction - Text	*	Selects the line thickness setting in generation mode.			0 ~ 15 1/step **5**
					Main Scan	**Sub Scan**	
				0:	No Correction	No Correction	
				1:	No Correction	Thinner 1	
				2:	No Correction	Thinner 2	
				3:	No Correction	Thicker	
				4:	Thinner 1	No Correction	
				5:	Thinner 1	Thinner 1	
				6:	Thinner 1	Thinner 2	
				7:	Thinner 1	Thicker	
				8:	Thinner 2	No Correction	
				9:	Thinner 2	Thinner 1	
				10:	Thinner 2	Thinner 2	
				11:	Thinner 2	Thicker	
				12:	Thicker	No Correction	
				13:	Thicker	Thinner 1	
				14:	Thicker	Thinner 2	
				15:	Thicker	Thicker	
				Line Thickness: Thicker > No Correction > Thinner 1 > Thinner 2			
				Refer 'Line Width Correction' in section 2.			
	79	Line Thickness Correction - Threshold (Main Scan-Text)	*	Selects the threshold to determine if line thickness correction is applied for a pixel. If a higher number is selected, the effectiveness of the line thickness correction selected with SP4-903-78 becomes stronger.			0 ~ 5 1/step **2**
	80	Line Thickness Correction - Threshold (Sub Scan-Text)	*	Selects the threshold to determine if line thickness correction is applied for a pixel. If a higher number is selected, the effectiveness of the line thickness correction selected with SP4-903-78 becomes stronger.			0 ~ 5 1/step **2**

Mode No. (Class 1 , 2 & 3)				Function	Settings
4-903	Filter Setting				
	81	Line Thickness Correction - Text/Photo Mode	*	Selects the line thickness setting in generation mode.	0 ~ 15 1/step **5**
				0: No Correction / No Correction 1: No Correction / Thinner 1 2: No Correction / Thinner 2 3: No Correction / Thicker 4: Thinner 1 / No Correction 5: Thinner 1 / Thinner 1 6: Thinner 1 / Thinner 2 7: Thinner 1 / Thicker 8: Thinner 2 / No Correction 9: Thinner 2 / Thinner 1 10: Thinner 2 / Thinner 2 11: Thinner 2 / Thicker 12: Thicker / No Correction 13: Thicker / Thinner 1 14: Thicker / Thinner 2 15: Thicker / Thicker (Main Scan / Sub Scan)	
				Line Thickness: Thicker > No Correction > Thinner 1 > Thinner 2	
				Refer 'Line Width Correction' in section 2.	
	82	Line Thickness Correction - Threshold (Main Scan-Text/Photo)	*	Selects the threshold to determine if line thickness correction is applied for a pixel. If higher number is selected, the effectiveness of the line thickness correction selected with SP4-903-81 becomes stronger.	0 ~ 5 1/step **2**
	83	Line Thickness Correction - Threshold (Sub Scan - Text/Photo)	*	Selects the threshold to determine if line thickness correction is applied for a pixel. If higher number is selected, the effectiveness of the line thickness correction selected with SP4-903-81 becomes stronger.	0 ~ 5 1/step **2**
	84	Scanner Gamma Selection - Text Mode	*	Selects the scanner and printer gamma settings used when 'Service Mode' for Text mode is selected. 0: Scanner gamma for 'Soft' is used. 1: Scanner gamma for 'Normal' is used. 2: Scanner gamma for 'Sharp' is used.	0 ~ 2 1/step **1**

Mode No. (Class 1 , 2 & 3)				Function	Settings
4-903	Filter Setting				
	85	Scanner Gamma Selection - Text/Photo Mode		Selects the scanner and printer gamma settings used when 'Service Mode' for Text/Photo mode is selected. 0: Scanner gamma for 'Photo Priority' is used. 1: Scanner gamma for 'Normal' is used. 2: Scanner gamma for 'Text Priority' is used.	0 ~ 2 1/step **1**
4-904	IPU Setting -1				
	2	Gradation Processing Selection - Photo	*	Selects the gradation processing procedure. 0: Three-gradation error diffusion 1: Four-gradation error diffusion 2: 8" x 8" dither matrix 3: 6" x 6" dither matrix 4: 4" x 4" dither matrix *A larger dither matrix gives coarser reproduction of halftones. This SP is ignored unless the user selects 'Service Mode' in UP mode.*	0 ~ 4 **1**
	4	Forced Binary Mode	*	1: Binary processing is done for all image modes.	**0: No** 1: Yes
	6	Smoothing Filter Level in Photo Mode	*	Selects the smoothing filter level in photo mode. 0: None 1: Weak 5: Strong	0 ~ 5 **2**
	7	Texture Erase Filter Level in Text Mode	*	Selects the strength of the filter for erasing texture from the image in text/photo mode. 0: None 1: Weak 2: Strong	0 ~ 2 **0**
	20	Thin Line Mode in Laser Writing - Text	*	Selects thin line mode level in laser writing for text mode. 0: None 1: Weak 2: Medium 3: Strong	0 ~ 3 **2**
	22	Thin Line Mode in Laser Writing - Text/Photo	*	Selects thin line mode level in laser writing for text/photo mode. 0: None 1: Weak 2: Medium 3: Strong	0 ~ 3 **2**

Mode No. (Class 1 , 2 & 3)				Function	Settings
4-904	IPU Setting -1				
	23	Thin Line Mode in Laser Writing - Pale	*	Selects thin line mode level in laser writing for pale mode. 0: None 1: Weak 2: Medium 3: Strong	0 ~ 3 **2**
	24	Thin Line Mode in Laser Writing - Generation	*	Selects thin line mode level in laser writing for generation mode. 0: None 1: Weak 2: Medium 2: Strong	0 ~ 3 **2**
4-905	Image Data Path				
	1	Image Data Path – Filtering/Magnification		Selects one of the following video data outputs, which will be used for printing. 0: Magnification → Filtering 1: Filtering → Magnification 2: Pre-filtering → Magnification → Filtering 3: Pre-filtering → Filtering → Magnification 4**: Normal operation**	
				Do not change the value.	
	4	Printout Type Selection		Selects one of the following video data outputs, which will be used for the printer controller. **0: Normal operation** 1: Black/white conversion 2: Not printed out 3: Direct printing of data from the application	
				Do not change the value.	
4-906	Image Processing Priority in Text/Photo Mode				
			*	Selects either text priority or photo priority for text/photo mode. Photo priority: Background erase is off Letter priority: Background erase is on. *This SP is ignored unless the user selects 'SP Mode Changed' in UP mode.*	1: Photo priority **0: Letter priority**
4-909	IPU Setting - 2				
	1	Data Through Setting in IPU (Image Processing)		***Do not change the value.***	0 ~255 1/step **0**
	2	Data Through Setting in IPU (I/F-1)		***Do not change the value.***	0 ~ 255 1 /step **0**
	3	Data Through Setting in IPU (I/F-2)		***Do not change the value.***	0 ~ 15 1 /step **13**

Mode No. (Class 1 , 2 & 3)				Function	Settings
4-909	IPU Setting - 2				
	15	Main Scan Data Conversion	*	***Do not change the value.***	0 ~ 1 **0**
	16	Image Data Path-Scanner Test		***Do not change the value.***	0 ~ 4 1 /step **0**
	17	Image Data Path-MSU		***Do not change the value.***	0 ~ 3 1 /step **3**
	18	Image Data Path-Application		***Do not change the value.***	0 ~ 4 1 /step **3**
	20	Image Data Path-Printer		***Do not change the value.***	0 ~ 4 1 /step **3**
4-910	Data Compression				
	3	ABS Core		***Do not change the value.***	**0: On** 1: Off
4-911	HDD				
	1	HDD Media Check		Checks for bad sectors on the hard disk that develop during machine use. This takes 4 minutes. *This SP mode should be done when an abnormal image is printed. There is no need to do this at installation as the hard disk firmware already contains bad sector information, and damage is not likely during transportation.* *Bad sectors detected with this SP mode will be stored in the NVRAM with the bad sector data copied across from the firmware.* *If the machine detects over 50 bad sectors, SC361 will be generated. At this time, use SP4-911-2.*	Start
	2	HDD Formatting		Formats the hard disk. This takes 4 minutes. **Do not turn off the main power switch during this process.**	
	6	HDD Bad Sector Information Reset		Resets the bad sector information which is stored in the NVRAM. *This SP should be used when the hard disk is replaced.*	Start
	7	HDD Bad Sector Display	*	Displays the number of bad sectors there are on the hard disk. *If the machine detects a total of over 50 bad sectors on the disk, SC361 will be generated. At this time, use SP4-911-2.*	Total: 0 Copy: 0 Printer: 0 Copy Server: 0

Mode No. (Class 1 , 2 & 3)				Function	Settings
4-911	HDD				
	8	HDD Model Name Display		Displays the model name of the HDD. *If the HDD is not installed or the HDD connector is not connected, SC360 will be displayed. However, the user can make single copies.*	
5-019	Tray Paper Size Selection				
	5	LCT	*	Selects the paper size in the optional LCT.	**A4** **LT** B5 LG LTR
5-024	mm/inch Display Selection				
			*	Selects what unit is used. *After selecting the unit, turn the main power switch off and on.*	**0: mm** 1: inch
5-104	A3/DLT Double Count				
			*	Specifies whether the counter is doubled for A3/11"x17" paper. *If "1" is selected, the total counter and the current user code counter count up twice when A3/11"x17" paper is used.*	**No** Yes
5-106	ID Shift Level				
	6	ADS Level Selection	*	Selects the image density level that is used in ADS mode.	1 ~ 7 1 notch /step **4**
5-112	Non-standard Paper Selection				
			*	Selects whether a non-standard paper size can be input for tray 2 (universal tray) or not. *If "1" is selected, the customer will be able to input a non-standard paper size using a UP mode.*	**No** Yes
5-113	Optional Counter Type				
			*	**Select the option counter type.** 0. None 1. Key card (Japan only) 2. Key card (Count down type) 3. Pre-paid card 4. Coin lock 5. Key card (Japan only)	0 ~ 5 1/step **0**
5-118	Disable Copying				
			*	Selects whether the copy function is disabled or not when printer controller is installed.	**0: No** 1: Yes

Mode No. (Class 1 , 2 & 3)				Function	Settings
5-120	M/C Option Counter Removal				
			*	**This SP is for Japan only. Do not change the value.**	0 ~ 2 1/step **0**
5-121	Counter Up Timing				
			*	Determines whether the optional key counter counts up at paper feed-in or at paper exit. *The total counter is not affected by this SP mode.*	**0: Feed-in** 1: Exit
5-127	APS Mode				
			*	Selects whether the APS function is enabled or not.	No **Yes**
5-131	Paper Size Type Selection				
			*	Selects the paper size type (for originals and copy paper). (Only needs to be adjusted if the optional printer controller is installed) • *After changing the value, turn the main power switch off and on.* • *If the paper size type of the archive files stored in the HDD is different, abnormal copies will be made. So, after changing this setting, perform SP5-822 and ask the user to restore the archive files.*	0: Japan **1: North America** **2: Europe** **3: China**
5-212	Page Numbering				
	3	Page Print Position – Side to Side	*	Adjust the position (sub scan direction9 of “Page Numbering” on 2nd side when making duplex copy.	-10 ~ 10 mm 1 mm/step **0**
	4	Page Print Position – Up and Down	*	Adjust the position (main scan direction9 of “Page Numbering” on 2nd side when making duplex copy.	-10 ~ 10 mm 1 mm/step **0**
5-501	PM Alarm Interval				
			*	Sets the PM interval, with an alarm. *When set to "0", the alarm is disabled.*	0 ~ 255 1k copies/step **0 k copies**
5-504	Jam Alarm Level(RSS function)				
	1	Jam Alarm Level	*	**Japanese version only.** **Do not change the values.**	0: No 1: L 2: M **3: H**
	2	Jam Auto Call (RSS function)	*	**Japanese version only.** **Do not change the values.**	0: Off **1: On**
5-505	Error Alarm Level				
			*	**Japanese version only.** **Do not change the values.**	0 ~ 255 copies/step **100**

Mode No. (Class 1 , 2 & 3)				Function	Settings
5-507	Paper Supply Call Level				
	128	Others	*	**Japanese version only.** **Do not change the values.**	250 ~ 10000 1 page/step **1000 pages**
	132	A3	*		
	133	A4	*		
	134	A5	*		
	141	B4	*		
	142	B5	*		
	160	DLT	*		
	164	LG	*		
	166	LT	*		
	172	HLT	*		
5-513	PM Alarm Interval Setting				
	1	Copy Paper Based	*	**Japanese version only.** **Do not change the values.**	0 ~ 9999 k 1 k/step **300 k**
	2	Original Based	*	**Japanese version only.** **Do not change the values.**	0 ~ 9999 k 1 k/step **300 k**
5-514	PM Alarm On/Off Setting				
	1	Copy Paper Based	*	**Japanese version only.** **Do not change the values.**	0: No **1: Yes**
	2	Original Based	*	**Japanese version only.** **Do not change the values.**	**0: No** 1: Yes
5-590	Auto Call Setting				
	2	Door Open	*	**Japanese version only.**	**0: Off** 1: On
	3	Paper Supply	*	**Do not change the values.**	
	4	Stapler Supply	*		
	5	Toner Supply	*		
5-801	Memory All Clear				
				Resets all correction data for process control and all software counters. Also, returns all modes and adjustments to the default settings. See the "Memory All Clear" section for how to use this SP mode correctly. Touch “Start” for over 3 seconds, then turn the main power switch off and on.	Start
				Normally, this SP mode should not be used. *It is used only after replacing the NVRAM, or when the copier malfunctions due to a damaged NVRAM.* The LCD coordinates are also cleared, see “LCD Touch Panel Calibration”.	

Service Tables

Mode No. (Class 1 , 2 & 3)				Function	Settings
5-802	Printer Free Run				
			*	Performs a free run. The scanner scans once and the printer prints for the number of copies requested. *To perform the free run, select "ON"* *1) Select "ON".* 2) *Select "Exit".* 3) *Select "Copy Mode".* 4) *Make the required settings (such as the number of copies.).* 5) *Press the Start key.* *After finishing the free run, return this SP to "OFF"*	**Off** On
5-803	Input Check				
	1 ~ 14			Displays the signals received from sensors and switches. See the "Input Check" section for details.	
5-804	Output Check				
	1 ~ 97			Turns on the electrical components individually for test purposes. See the "Output Check" section for details.	On Off
5-807	Option Connection Check				
	1	ADF		Checks the connectors to the optional peripherals.	0: Not connected 1: Connected
	2	Bank			
	4	Finisher			
5-811	Machine Serial Number				
			*	Use to input the machine serial number. (Normally done at the factory.) *This serial number will be printed on the system parameter list.* *Use the " •" key to input "A".*	
5-812	Service Tel. No. Setting				
	1	Service Telephone Number at SC Condition	*	Use this to input the telephone number of the service representative (this is displayed when a service call condition occurs.) *Press the " •" key to input a pause.* *Press the "Clear modes" key to delete the telephone number.*	
	2	Service Fax Number for Counter Printing	*	Use this to input the fax number of the service representative (this is printed on the Counter Report – UP mode, System No.19) *Press the " •" key to input a pause.* *Press the "Clear modes" key to delete the telephone number.*	
5-816	CSS Function				
	1	Function Setting	*	**Japanese version only.** **Do not change the values.**	**Off** On
	2	CE Call	*	**Japanese version only.** **Do not change the values.**	**Off** On

Mode No. (Class 1 , 2 & 3)				Function	Settings
5-821	CSS PI Device Code				
			*	**Japanese version only.** **Do not change the value.**	0 ~ 4 1/step **0**
5-823	Paper Supply Call Tray				
	1	1st Tray		***This SP is for Japan only. Do not change the value.***	**0: Call** 1: Not Call
	2	2nd Tray			
	3	3rd Tray			
	4	4th Tray			
	5	LCT			
	6	By-pass Tray			
5-824	Upload NVRAM Data				
				Uploads the NVRAM data to the flash memory card. *When uploading this SP mode data, the front door should be opened.*	Start
5-825	Download NVRAM Data				
	1	All Data		*Downloads the NVRAM data from flash memory card to NVRAM.*	Start
	2	Mode Data		*The following data are not downloaded when selecting 'All Data'.* *SP7-003-**** *SP7-006-**** *SP7-007-**** *When the serial number of NVRAM and flash memory card are not the same, you cannot download the data.*	
5-826	Program Upload				
				Uploads the machine program to the flash memory card.	Start
5-829	Stamp Data Download				
				Downloads the stamp data from the flash memory card.	Start
5-849	Counter Clear Data (***B098 only***)				
	1	Indication	*	Display the date when resets the electrical total counter (7-825).	
	2	Print out setting	*	Selects whether or not the counter date is printed on the counter print.	0: No Print 1: Print
5-907	Plug & Play (Brand Name and Production Name Setting)				
				Selects the brand name and the production name for Windows 95 Plug & Play. This information is stored in the NVRAM. If the NVRAM is defective, these names should be registered again. *After selecting, press the "Original Type" key and "#" key at the same time. When the setting is completed, the beeper sounds five times.*	

Mode No. (Class 1 , 2 & 3)				Function	Settings
5-914	Printer Counter Display				
			*	Selects whether or not the total printer counter is displayed in the UP mode.	**Off** On
5-915	Mechanical Counter Detection				
				Checks whether the mechanical counter inside the inner cover is connected or not.	0: Not detected 1: Detected 2: Unknown
5-920	Fusing Temperature in Low Power Mode				
			*	Adjusts the fusing temperature in low power mode. Default setting as follows: For A292 NA: 170°C EU: 160°C For A293 NA: 177°C For B098 NA: 160°C EU: 155°C **Do not change the value.**	170 ~ 182 1°C /step
5-921	Data Port Change				
			*	Changes the connector for sending the key card data.	**0: Key card connector** 1: Key counter connector
5-922	Counter Operation Setting				
			*	Selects the counter operation for the optional counter. **0: No Interleaf** (Productivity is slow in duplex mode.) 1: Interleaf (Productivity is high in duplex mode.) *When using a "count down type" key card and duplex mode, the last copy will sometimes be free if "1" is selected.*	
5-923	Edge Erase Standard				
			*	Selects the standard for edge erase. 0: The margin is erased from the original data. 1: The margin is erased from the data sent to the laser diode. Note that the output resulting from each of the settings will be different when reduction/enlargement is used.	**0: Original** 1: Paper
5-924	Margin per Original				
	1	Margin Per Original	*	Selects whether or not Margin per Original is enabled. **No**: Images are shifted with a binding margin during image writing. **Yes**: The margin is applied during scanning. *After Yes has been selected, the "per original" keys is displayed. This key must be pressed to activate the mode.*	**No** Yes

Mode No. (Class 1 , 2 & 3)				Function	Settings
5-924	Margin per Original				
	2	Per Original Priority	*	Selects whether or not Margin Per Original is enabled as default. This setting is given priority over 5924-1 *When this mode is enabled, the ADF feed interval is longer.*	**On** Off
5-954	Copy Server Password Display				
				Selects whether to display the password when a file with a password is selected on the copy server. *If you forget the password, select "1" to check it.*	**Normal** Display password
5-965	All Copy Server File Delete				
				Delete the all copy server files.	Start Cancel
5-970	Printer Installed **(A292/A293 only)**				
			*	Selects whether the information " Now loading…. Please wait" is displayed or not	**0: No** 1: Yes
5-971	Enhance Copy Setting				
	2	Effective Original Density	*	Selects the original image ratio at which the mode is activated (calc. from setting).	1 ~ 60% 1% step **4%**
	3	Effective Multiple Copy	*	Selects the sheet number at which the mode is activated with multi-copy jobs (calc. from setting).	1 ~ 50 sheets 1 sheet step **3 sheets**
5-972	Document Server Counter Selection				
			*	Selects the counter.	**0: Copy** 1: Copy or Printer
5-990	SMC Print				
	1	All		Prints all the system parameter lists. See the "System Parameter and Data Lists" section for how to print the lists.	Start
	2	SP		Prints the SP mode data list. See the "System Parameter and Data Lists" section for how to print the lists.	Start
	3	User Program		Prints the UP mode data list. See the "System Parameter and Data Lists" section for how to print the lists.	Start
	4	Logged Data		Prints the machine status history data list. See the "System Parameter and Data Lists" section for how to print the lists.	Start
6-006	DF Registration Adjustment				
	1	Side-to-Side	*	Adjusts the printing side-to-side registration in the ADF mode.	-3 ~ +3 0.1 mm/step **+ 0.0 mm**

Mode No. (Class 1 , 2 & 3)				Function	Settings
6-006	DF Registration Adjustment				
	2	Leading Edge (Thin Original)	*	Adjusts the original stop position.	-29 ~ +29 0.18 mm/step **+ 0.0 mm**
	3	Leading Edge (Duplex-front)	*	Adjusts the original stop position against the original left scale in one-sided original mode.	-29 ~ +29 0.18 mm/step **+ 0.0 mm**
	4	Reading Edge (Duplex-rear)	*	Adjusts the original stop position against the original left scale in two-sided original mode.	-29 ~ +29 0.1 mm/step **+ 0.0 mm**
6-007	ADF Input Check				
	1	Group 1		Displays the signals received from sensors and switches of the ADF. See the "Input Check" section for details.	
	2	Group 2		Displays the signals received from sensors and switches of the ADF. See the "Input Check" section for details.	
6-008	ADF Output Check				
				Turns on the electrical components of the ADF individually for test purposes. See the "Output Check" section for details.	
6-009	ADF Free Run (Two-sided original)				
	1			Performs an ADF free run in two-sided original mode. Press “1” to start.	**Off** On
				This is a general free run controlled from the copier. For more detailed free run modes, see the ‘Test Points/Dip Switches/LEDs’ section.	
6-016	ADF Motor Speed Auto Adjustment				
				Performs the ADF motor speed auto adjustment when replace the main board, feed-in motor, transport motor and feed-out motor.	Start
6-020	ADF Speed Adjustment				
				When the customer points out noise form the ADF, use this to adjust the ADF speed to low.	High speed: 70 cpm Low Speed: 55 cpm
6-105	Stapling Position Adjustment				
			*	Adjusts the stapling position in the main scan direction	- 3.5~ +3.5 0.5 mm/step **+0.0 mm**
				A larger value causes the stapling position to shift outward.	
6-113	Punch Hole Adjustment				
	1	2-Holes		Adjusts the punch hole position in the sub-scan direction for the punch unit with two punch holes.	- 7.5 ~ + 7.5 0.5 mm/step **0 mm**
				A larger value shifts the punch holes towards the edge of the paper.	

Mode No. (Class 1 , 2 & 3)				Function	Settings
6-113	Punch Hole Adjustment				
	2	3-Holes		Adjusts the punch hole position in the sub-scan direction for the punch unit with three punch holes. *A larger value shifts the punch holes towards the edge of the paper.*	- 7.5 ~ + 7.5 0.5 mm/step **0 mm**
6-116	Thick Paper Count				
			*	Multiply the normal limit by this number to determine the staple limit number for thick paper mode.	1 ~ 3 1 sheet/step 3 sheets
6-119	Punch Function Enabled (Thick Paper)				
			*	Selects whether the punch function is enabled or not in thick paper mode.	**No: Disable** Yes: Enable
6-120	Staple Jogger Adjustment				
	1	A3	*	Adjusts the jogger fence position of the staple tray.	0.0 ~ 1.5 0.5/step **0.0**
	2	B4			
	3	A4 Lengthwise			
	4	A4 Sideways			
	5	B5 Lengthwise			
	6	B5 Sideways			
	7	DLT			
	8	LG			
	9	LT Lengthwise			
	10	LT Sideways			
	11	Others			
6-801	Copy Connect I/F Test				
				Checks the copy connect kit connection.	
6-901	Original Exchange Time Adjustment				
	1	Normal Paper	*	Adjusts the original exchange time. This is based on the time that the machine estimates (from DF sensor outputs) that the paper has arrived on the exposure glass and stopped for scanning. If a higher value is set, 1-to-1 copying will be slower. If a lower value is set, scanning may start before the original has stopped on the glass.	500 ~ 700 ms 10 ms/step **620 ms**
	2	Thin Paper	*		500 ~ 700 ms 10 ms/step **520 ms**
6-902	Saddle Stitch Adjustment				
	1	A3/DLT	*	Adjusts the fold position.	–3.0 ~ +3.0 mm 0.5 mm/step **0.0 mm**
	2	B4	*		–2.0 ~ +2.0 mm 0.5 mm/step **0.0 mm**
	3	A4/LT	*		–1.5 ~ +1.5 mm 0.5 mm/step **0.0 mm**

Mode No. (Class 1 , 2 & 3)				Function	Settings
7-001	Main Motor (Drum Motor) Operation Time				
			*	Displays the total drum rotation time.	Min.
7-002	Original Counter				
	1	Total	*	Displays the total number of fed originals.	
	2	Copy	*	Displays the total number of fed originals in copy mode.	
	3	Document Server	*	Displays the total number of fed originals in document server mode.	
7-003	Copy Counter				
	1	Total Count	*	Displays the total number of prints in all modes.	
	2	Copy	*	Displays the total number of prints in copy mode.	
	4	Printer	*	Displays the total number of prints in printer mode.	
7-006	C/O, P/O Counter				
	1	C/O	*	Displays the number of sets of copies per original when making 10 or more sets of copies.	
				e.g.: When making 15 sets of copies of an original, this counter value will increase by “6”.	
	2	P/O	*	Displays the number of sets of prints per original data when making 10 or more sets of prints.	
				e.g.: When making 15 sets of prints of an original data, this counter value will increase by “6”.	
7-101	Copy Counter – Paper Size				
	5	A4 Sideways	*	Displays the total number of prints by paper size.	
	6	A5 Sideways	*		
	14	B5 Sideways	*		
	38	LT Sideways	*		
	44	HLT Sideways	*		
	128	Other Sizes	*		
	132	A3	*		
	133	A4 Lengthwise	*		
	134	A5 Lengthwise	*		
	141	B4	*		
	142	B5 Lengthwise	*		
	160	DLT	*		
	164	LG	*		
	166	LT Lengthwise	*		
	172	HLT Lengthwise	*		
7-201	Total Scan Count				
			*	Displays the total number of scanned originals.	

Mode No. (Class 1 , 2 & 3)				Function	Settings
7-202	Original Counter By Size				
	4	A3	*	Displays the total number of scanned originals by original size.	
	5	A4	*		
	6	A5	*		
	13	B4	*		
	14	B5	*		
	32	DLT	*		
	36	LG	*		
	38	LT	*		
	44	HLT	*		
	128	Other Sizes	*		
7-204	Copy Counter – Paper Tray				
	1	1st Paper Tray	*	Displays the total number of sheets fed from each paper feed tray. **4th tray - Japanese version only**	
	2	2nd Paper Tray	*		
	3	3rd Paper Tray	*		
	4	4th Paper Tray	*		
	5	LCT	*		
	6	By-pass Feed	*		
7-205	Total ADF Counter				
			*	Displays the total number of originals fed by the ADF.	
7-206	Staple Counter				
	1	Normal	*	Displays the total number of staples used.	
	2	Booklet	*		
7-207	Punch Counter				
			*	Displays the total number of hole punch operations.	
7-301	Total Copy By Reproduction Ratio				
	1	25% ~ 49%	*	Displays the total number of prints by reproduction ratio.	
	2	50% ~ 99%	*		
	3	100%	*		
	4	101% ~ 200%	*		
	5	201% ~ 400%	*		
	6	Direct Mag.	*		
	7	Direct Size Mag.	*		
	8	Size Mag.	*		
	9	Fixed Mag.	*		

Service Tables

Mode No. (Class 1 , 2 & 3)				Function	Settings
7-304	Total Copies By Copy Mode				
	1	Letter	*	Displays the total number of prints by copy mode.	
	2	Letter/Photo	*		
	3	Photo	*		
	4	Generation	*		
	5	Pale	*		
	6	Punch	*		
	7	Multiple Copy	*		
	8	Sort	*		
	9	Staple	*		
	10	Combine	*		
	11	Erase Copy	*		
	12	Duplex Copy	*		
	13	ADF	*		
	14	Double	*		
	15	2-sided Original	*		
	16	Interrupt	*		
	17	Combine Mode - 1 Side	*		
	18	Combine Mode - 2 Side	*		
	19	Mini Book Mode	*		
	20	Magazine Mode	*		
	21	Batch (SADF) Mode	*		
	22	Mixed Size Mode	*		
	23	Thin Original	*		
	24	Stamp	*		
	25	Index	*		
	26	Slip Sheet	*		
7-305	Total Copies in Multiple Copy Mode				
	1	1 to 1	*	Displays the total number of prints by multiple copy quantity.	
	2	1 to 2 ~ 5	*		
	3	1 to 6 ~ 10	*		
	4	1 to 11 ~ 20	*		
	5	1 to 21 ~ 50	*		
	6	1 to 51 ~ 100	*		
	7	1 to 100 ~ 300	*		
	8	1 to 301 ~	*		
7-306	Copy : Each Mode Job				
	1	Electrical Sort	*	Displays the total number of copy jobs that have been done for various modes.	
	2	Staple	*		
	3	Punch	*		
	4	Next Job	*		
	5	Sample Copy	*		

Mode No. (Class 1 , 2 & 3)				Function	Settings
7-320	Document Server : Scanned Storage				
	1	Total Number of Original Scan	*	Displays the total number of stored originals in the document server.	
7-321	Document Server : Each Size of Original				
	4	A3	*	Displays the total number of stored originals in the document server by size.	
	5	A4	*		
	6	A5	*		
	13	B4	*		
	14	B5	*		
	32	DLT	*		
	36	LG	*		
	38	LT	*		
	44	HLT	*		
	128	Other Size	*		
7-323	Document Server : Each Size of Copies				
	5	A4 Sideways	*	Displays the total number of prints made from the document server by paper size.	
	6	A5 Sideways	*		
	14	B5 Sideways	*		
	38	LT Sideways	*		
	44	HLT Sideways	*		
	128	Other Sizes	*		
	132	A3	*		
	133	A4 Lengthwise	*		
	134	A5 Lengthwise	*		
	141	B4	*		
	142	B5 Lengthwise	*		
	160	DLT	*		
	164	LG	*		
	166	LT Lengthwise	*		
	172	HLT Lengthwise	*		
7-324	Document Server : Print Job				
	1	Duplex	*	Displays the total number of copy jobs made from the document server.	
	2	Electrical Sort	*		
	3	Staple Print Job	*		
	4	Punch Print Job	*		
	5	Sample Copy	*		
	6	First Page Print	*		
7-325	Document Server : Print Job Page Distribution				
	1	1	*	Displays the number of jobs by number of pages, made from the document server.	
	2	2	*		
	3	3 - 5	*		
	4	6 - 10	*		
	5	11 -	*		

Service Tables

Mode No. (Class 1 , 2 & 3)				Function	Settings
7-326	Document Server : Print Job File Distribution				
	1	1	*	Displays the number of jobs by the number of consecutive files in the job, made from the document server.	
	2	2 - 5	*		
	3	6 - 10	*		
	4	11 -	*		
7-327	Document Server : Print Job Set Distribution				
	1	1 to 1	*	Displays the total number of prints by multiple document quantity, using the document server.	
	2	1 to 2 ~ 5	*		
	3	1 to 6 ~ 10	*		
	4	1 to 11 ~ 20	*		
	5	1 to 21 ~ 50	*		
	6	1 to 51 ~ 100	*		
	7	1 to 100 ~ 300	*		
	8	1 to 301 ~	*		
7-328	Document Server : Copy Number of Each Job				
	6	Punch	*	Displays the total number of prints for each type of job.	
	8	Sort	*		
	9	Staple	*		
	16	Interrupt Document Server	*		
	19	Booklet	*		
	20	Magazine	*		
	24	Stamp	*		
	25	Index	*		
	26	Slip Sheet	*		
7-330	Connect Copy Job				
		Connect Copy	*	Displays the total number of jobs as the master machine.	
7-331	Connect Copy: Copy				
	1	Copy Number of Master	*	Display the total number of copies as the master machine.	
	2	Copy Number of Slave	*	Display the total number of copies as the slave machine.	
7-332	Connect Copy : Copy Number by Copy Mode				
	1	Original Mode : Text	*	Display the total number of copies by copy mode as the master machine.	
	2	Original Mode : Text/Photo	*		
	3	Original Mode : Photo	*		
	4	Original Mode : Generation	*		
	5	Original Mode : Pale	*		
	6	Punch	*		
	7	Repeat	*		
	8	Sort	*		
	9	Staple	*		
	10	Series	*		
	11	Erase	*		

Mode No. (Class 1 , 2 & 3)				Function	Settings
7-332	12	Duplex Copy	*	Display the total number of copies by copy mode as the master machine.	
	13	ADF Mode	*		
	14	Double Copy	*		
	15	Duplex Original	*		
	17	Combine 1 Side	*		
	18	Combine 2 Side	*		
	19	Booklet	*		
	20	Magazine	*		
	21	Batch Mode	*		
	22	Mixed Sizes	*		
	23	Thin	*		
	24	Stamp	*		
	25	Index	*		
	26	Slip Sheet	*		
7-333	Connect Copy: Copy Number by Copy Mode				
	6	Punch	*	Displays the total number of copies by copy mode as the slave machine.	
	7	Repeat	*		
	8	Sort	*		
	9	Staple	*		
	10	Series	*		
	12	Duplex Copy	*		
	14	Double Copy	*		
	17	Combine 1 Side	*		
	18	Combine 2 Side	*		
	19	Booklet	*		
	20	Magazine	*		
	24	Stamp	*		
	25	Index	*		
	26	Slip Sheet	*		
7-401	Total SC Counter				
			*	Displays the total number of service calls that have occurred.	
7-403	SC History				
	1	Latest	*	Displays the latest 10 service call codes.	
	2	Latest 1st	*		
	3	Latest 2nd	*		
	4	Latest 3rd	*		
	5	Latest 4th	*		
	6	Latest 5th	*		
	7	Latest 6th	*		
	8	Latest 7th	*		
	9	Latest 8th	*		
	10	Latest 9th	*		

Mode No. (Class 1 , 2 & 3)				Function	Settings
7-501	Total Jam Counter				
			*	Displays the total number of copy jams and original jams.	
7-502	Total Copy Jam Counter				
			*	Displays the total number of copy jams.	
7-503	Total Original Jam Counter				
			*	Displays the total number of original jams.	
7-504	Copy Jam Counter by Jam Location				
	1	At Power On	*	Displays the total number of copy jams by location. These are jams when the paper does not activate the sensor.	
	3	1st Paper Tray	*	(1st Paper Feed Sensor)	
	4	2nd Paper Tray	*	(2nd Paper Feed Sensor)	
	5	3rd Paper Tray	*	(3rd Paper Feed Sensor)	
	6	4th Paper Tray	*	(Not Used)	
	7	LCT Relay Sensor	*		
	12	Relay Sensor	*		
	13	Registration Sensor	*		
	14	Fusing Exit Sensor	*		
	15	1st Exit Sensor	*		
	16	2nd Exit Sensor	*		
	19	Duplex Entrance Sensor	*		
	20	Duplex Relay Sensor 1	*	(Duplex Transport Sensor 1)	
	21	Duplex Relay Sensor 2	*	(Duplex Transport Sensor 2)	
	22	Duplex Relay Sensor 3	*	(Duplex Transport Sensor 3)	
	23	Duplex Exit Sensor	*	(Not Used)	
	25	Entrance Sensor – Fin.	*		
	26	Upper Tray Exit Sensor – Fin.	*		
	27	Shift Tray Exit Sensor – Fin.	*		

Mode No. (Class 1 , 2 & 3)				Function	Settings
7-504	Copy Jam Counter by Jam Location				
	28	Stapler Tray Entrance Sensor – Fin.	*		
	29	Stapler Tray Paper Sensor – Fin.	*		
	30	Entrance Sensor - PP	*		
	31	Proof Tray Exit Sensor - PP	*		
	32	Relay Sensor – PP	*		
	33	Exit Sensor - PP	*		
	34	By-pass Tray	*		
	35	Stapler Tray Entrance Sensor	*		
	37	Entrance Sensor (Booklet FIN)- Late	*		
	38	Transport Sensor (Booklet FIN)	*		
	39	Entrance Sensor (Booklet FIN)- Early	*		
	40	Staple -FIN (Booklet FIN)	*		
	41	Exit Sensor (Booklet FIN) - (ON check)	*		
	42	Exit Sensor (Booklet FIN) - (Off check)	*		
	43	Staple – Booklet (Booklet FIN)	*		
	53	1st Paper Tray	*	These are jams when the paper stays at the sensor. (1st Paper Feed Sensor)	
	54	2nd Paper Tray	*	(2nd Paper Feed Sensor)	
	55	3rd Paper Tray	*	(3rd Paper Feed Sensor)	
	56	4th Paper Tray	*	(Not Used)	

Service Tables

Mode No. (Class 1 , 2 & 3)				Function	Settings
7-504	Copy Jam Counter by Jam Location				
	57	LCT Relay Sensor	*		
	62	Relay Sensor	*	These are jams when the paper stays at the sensor.	
	63	Registration Sensor	*		
	66	2nd Exit Sensor	*		
	69	Duplex Entrance Sensor	*		
	71	Duplex Relay Sensor 2	*	(Duplex Transport Sensor 2)	
	72	Duplex Relay Sensor 3	*	(Duplex Transport Sensor 3)	
7-505	Original Jam Counter by Jam Location				
	1	At Power On	*	Displays the total number of original jams by location.	
	3	ADF Feed-in Sensor	*	(Entrance and Registration Sensor)	
	4	ADF Feed-out Sensor	*	(Exit and Inverter Sensor)	
7-506	Jam Counter by Copy Size				
	5	A4 Sideways	*	Displays the total number of copy jams by paper size.	
	6	A5 Sideways	*		
	14	B5 Sideways	*		
	38	LT Sideways	*		
	44	HLT Sideways	*		
	128	Other Size	*		
	132	A3	*		
	133	A4 Lengthwise	*		
	134	A5 Lengthwise	*		
	141	B4 Lengthwise	*		
	142	B5 Lengthwise	*		
	160	DLT	*		
	164	LG	*		
	166	LT Lengthwise	*		
	172	HLT Lengthwise	*		
7-507	Jam History				
	1	Copy : Latest	*	Displays the following items for the most recent 10 jams. 1. Last 5 digits of the total counter value 2. Paper size 3. Detected position 4. Stuck or not fed	
	2	Latest 1 st	*		
	3	Latest 2 nd	*		
	4	Latest 3 rd	*		
	5	Latest 4 th	*		
	6	Latest 5 tht	*		
	7	Latest 6 th	*		
	8	Latest 7 th	*		
	9	Latest 8 th	*		
	10	Latest 9 th	*		

Mode No. (Class 1 , 2 & 3)				Function	Settings
7-507	Jam History				
	11	Original : Latest	*	Displays the following items for the most recent 10 jams. 1. Last 5 digits of the total counter value 2. Paper size 3. Detected position 4. Stuck or not fed	
	12	Latest 1 st	*		
	13	Latest 2 nd	*		
	14	Latest 3 rd	*		
	15	Latest 4 th	*		
	16	Latest 5 tht	*		
	17	Latest 6 th	*		
	18	Latest 7 th	*		
	19	Latest 8 th	*		
	20	Latest 9 th	*		
7-617	PM Alarm Counter				
	1	Copy Paper Based	*	Displays the PM alarm counter	
	2	Original Based	*		
7-618	PM Alarm Counter Clear				
	1	Copy Paper Based		Reset the PM alarm counter.	Start
	2	Original Based			Start
7-801	ROM Version Display				
	1	MAIN		Displays the ROM versions. Main CSS (P1) LCDC Bank MCU Stamp HDC	
	2	Options		Displays the ROM versions. ADF Finisher Print Post Printer Finisher (Booklet)	
7-803	PM Counter Display				
			*	Displays the PM counter since the last PM.	
7-804	PM Counter Reset				
				Resets the PM counter.	Start
7-807	SC/Jam Counter Reset				
				Resets the SC and jam counters. Press “Start” to reset.	Start
7-808	Counters Reset				
				Resets the counter except following counters: Press “Start” to reset. • All counters of SP7-003 • All counters of SP7-006 • All counters of SP7-206 • All counters of SP7-101-132	Start

Service Tables

Mode No. (Class 1 , 2 & 3)			Function	Settings
7-810	Access Code Clear			
			Resets both the key operator code and the weekly timer code (Key operator code for off setting). Press “Start” to reset.	Start
7-816	Copy Counter Reset – Paper Tray			
	1	Paper Tray 1	Resets the total copy counter by paper tray. Use these SP modes when replacing the pick-up, feed, and separation rollers in the paper feed stations. (Tray 4 is not used)	Start
	2	Paper Tray 2		
	3	Paper Tray 3		
	4	Paper Tray 4		
	5	LCT		
	6	By-pass Tray		
7-817	ADF Counter Reset			
			Resets the counter of SP7-205.	
7-822	Copy Counter Reset - Magnification			
			Resets all counters of SP7-301.	Start
7-825	Total Counter Reset			
			Resets the electrical total counter. *Usually, this SP mode is done at installation.* *This SP mode works only once when the counter value is negative*	Start
7-828	Punch Counter Reset			
			Resets the counter of SP7-207.	
7-902	SC Details			
			Displays details about latest SCs. Not all SCs have these details.	
7-904	Copy Counter Reset – Copy Mode			
			Resets all counters of SP7-304.	Start
7-905	Copy Counter Reset – Multiple Copy Mode			
			Resets all counters of SP7-305.	Start
7-906	Clear Original Number of Each size			
			Resets all counters of SP7-202.	Start
7-907	Clear Job Number of Each size			
			Resets all counters of SP7-306.	Start
7-908	Document : Clear Original Number			
			Resets all counters of SP7-002-2.	Start
7-920	Document Server : Clear Scanned Storage			
			Resets the counter of SP7-320.	Start
7-921	Document Server : Clear Original Number of Each Size			
			Resets all counters of SP7-321.	Start
7-923	Document Server : Clear Print Number of Each Copy			
			Resets all counters of SP7-323	Start
7-924	Document Server : Clear Print Job Logging			
			Resets all counters of SP7-324	Start
7-925	Document Server : Clear Print Job Page Distribution			
			Resets all counters of SP7-325	Start
7-926	Document Server : Clear Print Job File Distribution			
			Resets all counters of SP7-326	Start

Mode No. (Class 1 , 2 & 3)				Function	Settings
7-927	Document Server : Clear Print Job Set Distribution				
				Resets all counters of SP7-327.	Start
7-990	SC990 Information				
	1	File Name	*	Displays the detail information for SC990.	
	2	Line Number	*		
	3	Value	*		

4.2.3 TEST PATTERN PRINTING (SP2-902)

NOTE: Do not operate the machine until the test pattern is printed out completely. Otherwise, an SC may occur.

1. Access the SP mode which contains the test pattern you need.
2. Touch the "Copy Mode" key on the operation panel to access the copy mode display.
3. Select the paper size.
4. Press the "Start" key to print the test pattern.
5. After checking the test pattern, exit copy mode by touching the "SP Mode" key.
6. Exit the SP mode.

Test Pattern Table (SP2-902-2: Test Pattern Printing – IPU)

No.	Test Pattern	No.	Test Pattern
0	None	7	Vertical Lines
1	Vertical Lines (1-dot)	8	Grayscale (Vertical)
2	Vertical Lines (2-dot)	9	Grayscale (Horizontal)
3	Horizontal lines (1-dot)	10	Cross Pattern
4	Horizontal lines (2-dot)	11	Argyle Pattern
5	Alternating dot Pattern	12	Frequency (Horizontal)
6	Grid Pattern 81-dot)	13	Frequency (Vertical)

Test Pattern Table (SP2-902-3: Test Pattern Printing – Printing)

No.	Test Pattern	No.	Teat Pattern
0	None	13	16 Grayscales (Vertical)
1	Vertical Line (1-dot)	14	16 Grayscales (Vertical/Horizontal)
2	Horizontal Line (1-dot)	15	16 Grayscales (Grid)
3	Vertical Line (2 dot)	16	Hound's Tooth Check (1-dot 600dpi)(Cross Stitch)
4	Horizontal Line (2-dot)	17	Hound's Tooth Check (1-dot 400dpi)(Cross Stitch)
5	Grid Pattern (1-dot)	18	Horizontal Line (1-dot)(Reverse Order LD1 and LD2)
6	Grid Pattern (1-dot pair)	19	Grid Pattern (1-dot) (Reverse Order LD1 and LD2)
7	Independent Pattern	20	Grid Pattern (1-dot pair) (Reverse Order LD1 and LD2)
8	Full Dot Pattern	21	Independent Pattern (1-dot) (Reverse Order LD1 and LD2)
9	Black Band	22	Blank Page
10	Trimming Area	23	Grid Pattern (1-dot) (Overlaying Outside Data)
11	Argyle Pattern	24	Trimming Area (Overlaying Outside Data)
12	16 Grayscales (Horizontal)		

4.2.4 INPUT CHECK

Main Machine Input Check (SP5-803)

1. Access SP mode.
2. Select the class 3 SP number which will access the switch or sensor you wish to check.
3. Check the status of the sensor or switch.
   NOTE: If you wish to change to another class 3 level, press the "Next" or "Prev." key.
4. The reading ("0" or "1") will be displayed. The meaning of the display is as follows.

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	0	0	0	0	0	0	0

Class 3 no.	Bit no.	Description	Reading	
			0	1
1 (Paper Feed 1)	7	Paper Size 1 Switch	On	Off
	6	Paper Size 2 Switch	On	Off
	5	Paper Size 3 Switch	On	Off
	4	Paper Size 4 Switch	On	Off
	3	Paper Size 5 Switch	On	Off
	2	2nd Near End Sensor	Not detected	Near end
	1	1st Tray Set Detection	Set	Not Set
	0	1st Near End Sensor	Not detected	Near end
2 (Paper Feed 2)	7	Not used		
	6	Not used		
	5	Tray Construction 1	4 : 0 , 5 : 1 Export 4 : 1 , 5 : 1 Japan	
	4	Tray Construction 2		
	3	Not Used		
	2	Not Used		
	1	3rd Tray Set Detection	Set	Not Set
	0	3rd Near End Sensor	Not Detected	Near end
3 (Paper Feed 3)	7	Left Tandem Tray Set Detection 2 (Connector)	Set	Not set
	6	Side Fence Positioning Sensor	Not Detected	Fence Detected
	5	Right Tray Down Sensor	Not Detected	Detected
	4	Rear Fence HP Sensor	Not Detected	At home Position
	3	Side Fence Close Sensor	Open	Closed
	2	Rear Fence Return Sensor	Not detected	Return position

Class 3 no.	Bit no.	Description	Reading	
			0	1
3 (Paper Feed 3)	1	2nd Paper End Sensor	Not paper end	Paper end
	0	Right Tandem Tray Set Detection 2 (Connector)	Set	Not set
4 (Paper Feed 4)	7	1st Paper Feed Sensor	Paper detected	No paper
	6	2nd Paper Feed Sensor	Paper detected	No paper
	5	3rd Paper Feed Sensor	Paper detected	No paper
	4	Not used		
	3	Not used		
	2	Not used		
	1	Not used		
	0	Not used		
5 (Paper Feed 5)	7	1st Lift Sensor	Lifted	No paper
	6	2nd Lift Sensor	Lifted	No paper
	5	3rd Lift Sensor	Lifted	No paper
	4	Not used		
	3	1st Paper End Sensor	Not paper end	Paper end
	2	2nd Paper End Sensor	Not paper end	Paper end
	1	3rd Paper End Sensor	Not paper end	Paper end
	0	Not used		
6 (3rd Paper Feed Tray)	7	Not used		
	6	Not used		
	5	Not used		
	4	Not used		
	3	3rd Tray Down Switch	On	Off
	2	3rd Tray Down Sensor	Not detected	Overload
	1	3rd Tray Motor Lock	Normal	Overload
	0	3rd Tray Paper Set	No Paper	Detected
7 (Toner Collection)	7	Not used		
	6	Not used		
	5	Not used		
	4	Not used		
	3	Paper Feed Motor Lock	Overload	Normal
	2	Toner Overflow Switch	Full	Not full
	1	Toner Collection Bottle Set Switch	Set	Not set
	0	Toner Collection Motor Sensor	Pulse	Pulse
8 (I/O Board Dip Switch 101)	7	Dip Switch – 8	On	Off
	6	Dip Switch – 7	On	Off
	5	Dip Switch – 6	On	Off
	4	Dip Switch – 5	On	Off
	3	Dip Switch – 4	On	Off
	2	Dip Switch – 3	On	Off
	1	Dip Switch – 2	On	Off
	0	Dip Switch – 1	On	Off

Class 3 no.	Bit no.	Description	Reading	
			0	1
9 (Motor Lock /Transport)	7	Drum Motor Lock	Overload	Normal
	6	By-pass Feed Motor Lock	Overload	Normal
	5	Development Motor Lock	Overload	Normal
	4	Fusing/Duplex Motor Lock	Overload	Normal
	3	LD Unit HP Sensor	Not detected	Detected
	2	1st Exit Sensor	Paper detected	No paper
	1	2nd Exit Sensor	Paper detected	No paper
	0	Tray Paper Limit Sensor	Not full	Full
10 (Duplex)	7	Duplex Entrance Sensor	Detected	Not detected
	6	Duplex Transport 3 Sensor	Detected	Not detected
	5	Duplex Transport 2 Sensor	Detected	Not detected
	4	Duplex Transport 1 Sensor	Detected	Not detected
	3	Duplex Jogger HP Sensor	Not detected	Detected
	2	Duplex Connection	Connected	Not Connected
	1	Toner Pump Connection	Connected	Not Connected
	0	Guide Plate Position Sensor	In position	Out of position
11 (LCT1)	7	LCT Motor Lock	Overload	Normal
	6	LCT Tray Down Switch	On	Off
	5	LCT Connection	Connected	Not connected
	4	LCT Cover Open Switch	Closed	Open
	3	LCT Paper End Sensor	Paper end	Not paper end
	2	LCT Down Sensor	Not detected	Detect
	1	LCT Lift Sensor	Layout	Not lifted
	0	LCT Paper Height 1 Sensor	Not detected	Detected
12 (LCT2)	7	Fusing Fan Motor Lock	Detected	Not detected
	6	Not Used		
	5	Front Door Safety Switch	Closed	Open
	4	Not Used		
	3	LCT Paper Height 2 Sensor	Not detected	Detected
	2	LCT Paper Height 3 Sensor	Not detected	Detected
	1	LCT Near End Sensor	Not detected	Near end
	0	LCT Paper Feed Sensor	Paper detected	Paper end
13 (By-pass)	7	LCT Paper Position Sensor	Detected	Not detected
	6	Toner End Sensor	Toner End	Not toner end
	5	Not Used		
	4	Relay Sensor	Paper detected	No paper

Class 3 no.	Bit no.	Description	Reading	
			0	1
13 (By-pass)	3	By-pass Paper End Sensor	Not paper end	Paper end
	2	Registration Sensor	Paper detected	No paper
	1	Not Used		
	0	Not Used		
14 (Unit Set)	7	Duplex Inverter Sensor	Not detected	Detected
	6	Fusing Exit Sensor	Not detected	Detected
	5	Key Counter Set	Set	Not set
	4	Total Counter Set	Set	Not set
	3	Exhaust Fan Lock	No lock	Lock
	2	Toner Recycling Sensor	Pulse	Pulse
	1	Drum Unit Set	Set	Not set
	0	Fusing Unit Set	Set	Not set

Table 1: 2nd Tray Paper Size Switch Combination

Class 3 no.	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Paper Width	
						A/B size version	Inch version
1	0	1	1	1	1	A3	DLT
	0	0	1	1	1	8 1/4" x 13"	8 1/2" x 14"
	1	0	0	1	1	A4 lengthwise	LT lengthwise
	0	1	0	0	1	A4 sideways	LT sideways
	0	0	1	0	0	8 1/2" x 13"	HLT sideways
	0	0	0	1	0	-	8" x 10 1/2"
	0	0	0	0	1	A5 sideways	8" x 10"
	1	0	0	0	0	8K lengthwise (Taiwan Version only)	8" x 13"
	1	1	0	0	0	16K lengthwise (Taiwan Version only)	10" x 14"
	1	1	1	0	0	16K sideways (Taiwan Version only)	11" x 15"
	1	1	1	1	0	*	*

ADF Input Check (SP6-007)

Class 3 No.	Bit No.	Description	Reading	
			0	1
1	0	Original Set Sensor	No Original	Original detected
	1	Original Width Sensor 1	No Original	Original detected
	2	Original Width Sensor 2	No Original	Original detected
	3	Original Width Sensor 3	No Original	Original detected
	4	Entrance Sensor	No Original	Original detected
	5	Registration Sensor	No original	Original detected
	6	Exit Sensor	No original	Original detected
	7	Inverter Sensor	No original	Original detected
2	0	DF Position Sensor	Down	Up
	1	APS Start Sensor	Start	Off
	2	Feed Cover Sensor	Close	Open
	3	Exit Cover Sensor	Close	Open
	4	Bottom Plate HP Sensor	At home position	Not home position
	5	Bottom Plate Position Sensor	Detected	Not detected
	6	Pick-up Roller HP Sensor	At home position	Not home position
	7	Not used		

4.2.5 OUTPUT CHECK

NOTE: Motors keep turning in this mode regardless of upper or lower limit sensor signals. To prevent mechanical or electrical damage, do not keep an electrical component on for a long time.

Main Machine Output Check (SP5-804)

1. Access SP mode 5-804.
2. Select the SP number that corresponds to the component you wish to check.
3. Press "1", then press # to check that component.
4. Press "0" to interrupt the test.
5. If you wish to check another component, press the "Next" or "Prev." Key.

No.	Description	No.	Description
1	1st Paper Feed Clutch	37	Not used
2	2nd Paper Feed Clutch	38	Relay Solenoid (LCT)
3	3rd Paper Feed Clutch	39	Registration Motor
4	Not Used	40	Guide Plate Release Solenoid
5	By-pass Feed Clutch	41	Inverter Gate Solenoid
6	Paper Feed Clutch (LCT)	42	Not used
7, 8	Not used	43	Duplex Transport Clutch
9	1st Pick-up Solenoid	44	Duplex Feed Clutch
10	2nd Pick-up Solenoid	45	Duplex Inverter Gate Solenoid
11	3rd Pick-up Solenoid	46	Reverse Roller Solenoid
12	Not Used	47	Inverter Exit Clutch
13	By-pass Pick-up Solenoid	48~ 51	Not used
14	Pick-up Solenoid (LCT)	52	Toner Supply Clutch
15, 16	Not used	53	Development Motor
17	1st Separation Roller Solenoid	54	Toner Recycling Motor
18	2nd Separation Roller Solenoid	55	Not used
19	3rd Separation Roller Solenoid	56	Toner Supply Motor
20 ~ 21	Not used	57	Transfer Belt Solenoid
22	Tandem Tray Connect Solenoid	58 ~ 60	Not used
23	Left tandem Tray Lock Solenoid	61	Not used
24	Rear Fence Motor	62	Quenching Lamp
25	LCT Motor (LCT)	63	Charge Corona
26	Paper Feed Motor	64	Charge Corona Grid
27	By-pass Feed Motor	65, 66	Not used
28	Main Motor	67	Development Bias
29 ~ 30	Not used	68	Not used
31	Fusing/Duplex Motor	69	Transfer Belt Voltage
32	1st Vertical Relay Clutch	70	ID Sensor
33	2nd Vertical Relay Clutch	71	SBU Cooling Fan
34	3rd Vertical Relay Clutch	72	Exposure Lamp
35	Not used	73	Optics Cooling Fan
36	Relay Clutch	74	Not used

No.	Description	No.	Description
75	Duplex Fan	87	Shift Tray Exit Motor (Finisher)
76	Exhaust Fan	88	Staple Hammer Motor (Finisher)
77	Drum Cooling Fan	89	Punch Motor (Punch Unit)
78	Fusing Fan	90	Laser Diode
79	Exit Cooling Fan	91	Not used
80	Tray Junction Gate Solenoid (Finisher)	92	Tray Lift Motor (Finisher)
81	Stapler Junction Gate Solenoid (Finisher)	93	Jogger Motor (Finisher)
82	Positioning Roller Solenoid (Finisher)	94	Stapler Motor (Finisher)
83	Not used	95	Stack Feed-out Belt Motor (Finisher)
84	Mechanical Counter	96	Shift Motor (Finisher)
85	Upper Transport Motor (Finisher)	97	Stapler Rotation Motor (Finisher)
86	Lower Transport Motor (Finisher)	98 ~ 99	Not used

ADF Output Check (SP6-008)

No.	Description
1	Feed-in Motor (Forward)
2	Feed-in Motor (Reverse)
3	Transport Motor (Forward)
4	Transport Motor (Reverse)
5	Feed-out Motor
6	Exit Gate Solenoid
7	Inverter Gate Solenoid
8	DF Indicators
9	Pick-up Motor (Forward)
10	Bottom Plate Motor
11	Feed-in Clutch

4.2.6 SYSTEM PARAMETER AND DATA LISTS (SMC LISTS)

1. Access the SP mode corresponding to the list that you wish to print.
   1) SP5-990-1 : All system parameter list
   2) SP5-990-2 : SP mode data list
   3) SP5-990-3 : UP mode data list
   4) SP5-990-4 : Machine status history data list
2. Touch the “Copy Mode” key to access the copy mode display.
3. Select the paper size and press the “Start” key to print the list.
4. After printing the list, exit the copy mode display by touching the “SP Mode” key.
5. Exit SP mode.

4.2.7 MEMORY ALL CLEAR (SP5-801)

NOTE: Memory All Clear mode resets all the settings stored in the NVRAM to their default settings except the following:

- Electrical total counter value (SP7-003-1)
- Machine serial number (SP5-811)
- Plug & Play Brand Name and Production Name Setting (SP5-907)

Among the settings that are reset are the correction data for process control and all the software counters.

Normally, this SP mode should not be used. This procedure is required only after replacing the NVRAM or when the copier malfunctions due to a damaged NVRAM.

1. Print out all SMC Data Lists (SP mode 5-990-1).
2. Access SP mode 5-801.
3. Hold down the "Start" key for over 3 seconds. At this time the beeper will sound.
4. Turn the main power switch off and back on.
5. Calibrate the LCD touch panel.
6. Do the laser beam pitch adjustment.
7. Do the printer and scanner registration and magnification adjustments (see Replacement and Adjustment – Copy Image Adjustments).
8. Referring to the SMC data lists, re-enter any values which had been changed from their factory settings.
9. Do SP 3-001-2 (ID Sensor Initial Setting) and SP4-911-1 (HDD media test).
10. Check the copy quality and the paper path, and do any necessary adjustments.

4.2.8 SOFTWARE RESET

The software can be reset when the machine hangs up. Use the following procedure.

Either

Turn the main power switch off and on.

Or

Hold down the “#” key and “**.**” key at the same time for over 10 seconds.

4.2.9 SYSTEM SETTING AND COPY SETTING (UP MODE) RESET

System Setting Reset

The system settings in the UP mode can be reset to their defaults using the following procedure.

1. Make sure that the machine is in the copier standby mode.
2. Press the User Tools key.
3. Hold down the “#” key and touch the “System Setting” key.
4. A confirmation message will be displayed, then press “Yes”.

Copy Features Reset

The copy settings in the UP mode can be reset to their defaults using the following procedure.

1. Make sure that the machine is in the copier standby mode.
2. Press the User Tools key.
3. Hold down the “#” key and touch “Copy Features” key.
4. A confirmation message will be displayed, then press “Yes”.

4.3 PROGRAM AND DATA DOWNLOAD

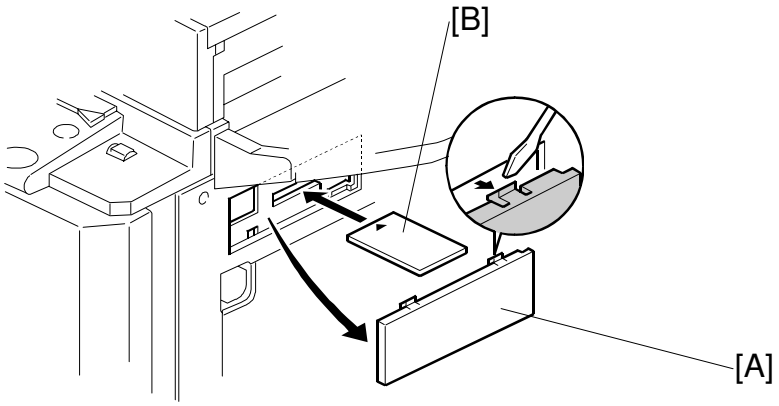
4.3.1 OVERVIEW

In this machine, the program, NVRAM data and stamp data are downloaded using flash memory card as shown in the table.

BICU Software	Flash Card → BICU
	BICU → Flash Card
NVRAM Data	BICU → Flash Card
	Flash Card → BICU
Stamp Data	Flash Card → BICU

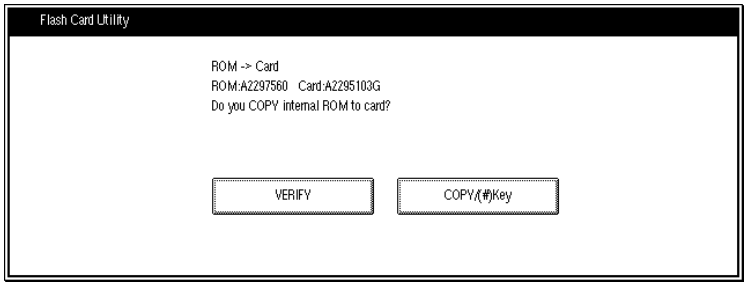
NOTE: The procedure for how to write the source software from a flash memory card writer to a flash memory card is described in the SwapBox FTL manual.

4.3.2 DOWNLOAD THE BICU SOFTWARE FROM BICU TO FLASH MEMORY CARD



A293M551.WMF

1. Turn off the main power switch.
2. Remove the flash memory card cover [A].
3. Plug the flash memory card [B] into the card slot.
   NOTE: Make sure that the surface printed “A” faces upwards.
4. Turn on the main power switch.

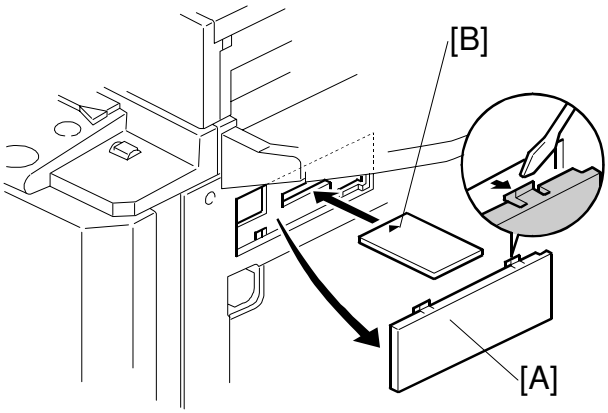


A293M504.TIF

5. Enter SP mode.
6. Select SP5-826.
7. Touch “START”. The machine erases the current software, then writes the new software to the flash memory card.
8. Exit SP Mode.
9. Turn off the main switch.
10. Pull out the flash memory card.

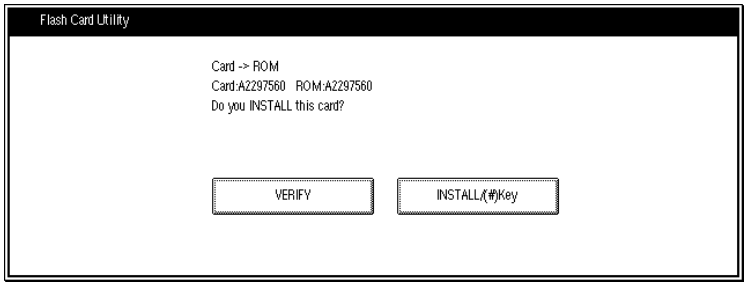
4.3.3 DOWNLOAD NVRAM DATA TO THE BICU

1. Turn off the main power switch.
2. Remove the flash memory card cover [A].
3. Plug the flash memory card [B] into the card slot.
   NOTE: Make sure that the surface printed “A” faces upwards.
4. Turn on the main power switch.
5. Enter SP Mode.
6. Select SP5-825-***.
   001: All data
   002: User tools (UP mode) data



A293M552.WMF

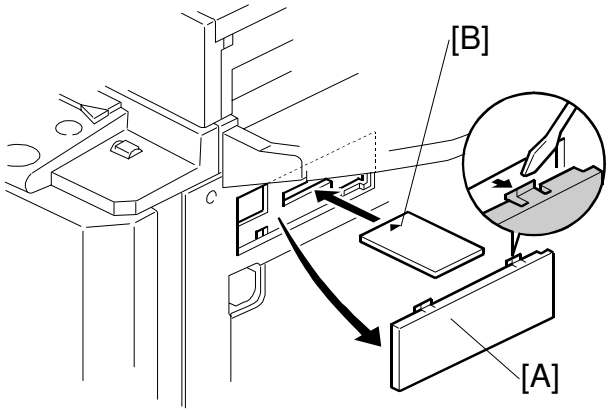
NOTE: 1) Data of SP7-003, SP7-006, and SP7-007 are not downloaded.
2) When you select “001”, no data are downloaded if the serial number on the BICU is not the same as the one on the flash card.



A293M507.TIF

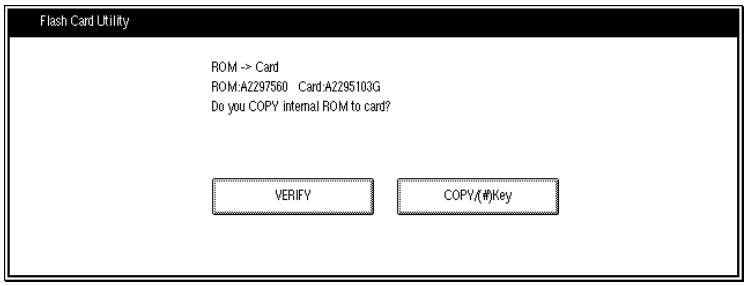
7. Open the front door.
   NOTE: Do not close the front door until the download finishes.
8. Press “Start”.
9. Exit SP Mode.
10. Turn off the main switch.
11. Pull out the flash memory card.

4.3.4 DOWNLOAD NVRAM DATA FROM BICU TO FLASH MEMORY CARD



A293M552.WMF

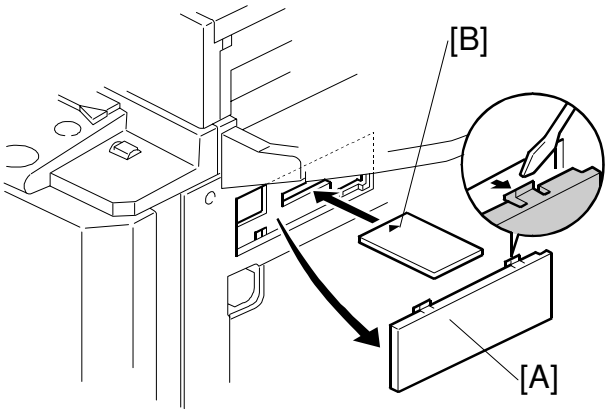
1. Turn off the main power switch.
2. Remove the flash memory card cover [A].
3. Plug the flash memory card [B] into the card slot.
   NOTE: Make sure that the surface printed “A” faces upwards.
4. Turn on the main power switch while holding down the operation switch.



A293M504.TIF

5. Enter SP Mode.
6. Select SP5-824.
7. Touch the “Start” key.

4.3.5 DOWNLOAD STAMP DATA TO THE BICU



A293M552.WMF

1. Turn off the main power switch.
2. Remove the flash memory card cover [A].
3. Plug the flash memory card [B] into the card slot.
   NOTE: Make sure that the surface printed “A” faces upwards.
4. Turn on the main power switch.
5. Enter SP Mode.
6. Select SP5-829.
7. Open the front door.
   NOTE: Do not close the front door until the download finishes.
8. Touch the “Start” key.
9. Exit SP Mode.
10. Turn off the main switch.
11. Pull out the flash memory card.

4.4 USER PROGRAM MODE

The user program (UP) mode is accessed by users, and by sales and service staff. UP mode is used to input the copier's default settings.

4.4.1 HOW TO ENTER AND EXIT UP MODE

Press the User Tools button, then select the UP mode program. After finishing the UP mode program, touch "Exit" key to exit UP mode.

4.4.2 UP MODE TABLE

NOTE: The function of each UP mode is explained in the System Setting and Copy Reference sections of the operating instructions.

System Setting Table

Basic 1	Operation Panel Beeper	
	Ready Operation Panel Beeper	
	Copy Count Display	
	Auto Response (Human) Sensor	
	Auto Tray Switching	
	Auto Off Timer	
	Low Power Shift Time	
	Low Power Timer	
	ADF Original Ejection	
	<F/F4> Size Setting	
Basic 2	System Reset	
	Function Priority	
	Copy Document Server Output Tray	
	Stapler Initialization	
Set Time	Set Date	
	Set Time	
	Weekly Timer : Monday	
	Weekly Timer : Tuesday	
	Weekly Timer : Wednesday	
	Weekly Timer : Thursday	
	Weekly Timer : Friday	
	Weekly Timer : Saturday	
	Weekly Timer : Sunday	
	Key Operator Code for Off Setting	
Paper Size Setting	Paper Tray Priority	
	Tray 1 Paper Size Setting	
	Tray 2 Paper Size Setting	
	Tray 3 Paper Size Setting	
Count Manager	Set User Code	
	Key Counter	
	Set Key Card	
	Key Operator Code	
	AOF (Keep it on)	
	Counter Print	Total Count
		Printer
		P/O
		A3/11 x 17 paper
		Staple
		Copy

Service Tables

Copy Features Table

Tab	Item	Detail
General Features 1/3	Auto Paper Select Priority	
	Auto Paper Select Tray Display	
	Auto Image Density Priority	
	Original Mode Priority	
	Original Mode Display	
	Original Mode Quality Level	Text
		Text/Photo
		Photo
		Pale
		Generation
	Original Image Density Level	Text
		Text/Photo
		Photo
		Pale
		Generation
	Auto Reset Timer	
General Features 2/3	Duplex Mode Priority	
	Copy Orientation in Duplex Mode	
	Original Orientation in Duplex Mode	
	Initial Mode	
	Maximum Copy Quantity	
	Original Beeper	
	Job End Call	
	Time for indicating job status	
General Features 3/3	Shortcut keys: F1	
	Shortcut keys: F2	
	Shortcut keys: F3	
	Shortcut keys: F4	
	Shortcut keys: F5	
Reproducti on Ratio 1/2	Shortcut R/E	
	R/E Priority	
	Enlarge 1	
	Enlarge 2	
	Enlarge 3	
	Enlarge 4	
	Enlarge 5	
	Priority Setting : Enlarge	
Short Cut R/E	RE Priority	

Tab	Item	Detail	
Reproducti on Ratio 2/2	Reduce 1		
	Reduce 2		
	Reduce 3		
	Reduce 4		
	Reduce 5		
	Reduce 6		
	Priority Setting : Reduce		
	Shrink & Center Ratio		
Page Format 1/2	Front Margin : Left/Right		
	Back Margin : Left Right		
	Front Margin : Top/Bottom		
	Back Margin : Top/Bottom		
	1→2 Duplex Auto Margin Adjust		
	Erase Border		
	Combine Original Shadow Erase		
	Erase Center		
	Repeat Separation Line		
Page Format 2/2	Double Copies Separation Line		
	Combine Separation Line		
	Copy Back Cover		
	Cover Page in Combine Mode		
	Designated Slip Sheet Copy in Combine		
	Booklet/Magazine Original Orientation		
	Copy Order in Combine Mode		
Stamp Setting	Background Numbering	Size	
		Density	
		Superimpose	
	Preset Stamp (1/4)	Stamp Priority	
		Stamp Language	
		Stamp Position: Copy	
		Stamp Position: URGENT	
		Stamp Position: PRIORITY	
		Stamp Position: For Your Info.	
		Stamp Position: PRELIMINARY	
	Preset Stamp (2/4)	Stamp Position :For Interval Use only	
		Stamp Position: CONFIDENTIAL	
		Stamp Position: DRAFT	
		Stamp Condition: Copy	Size
			Density
			Print Page

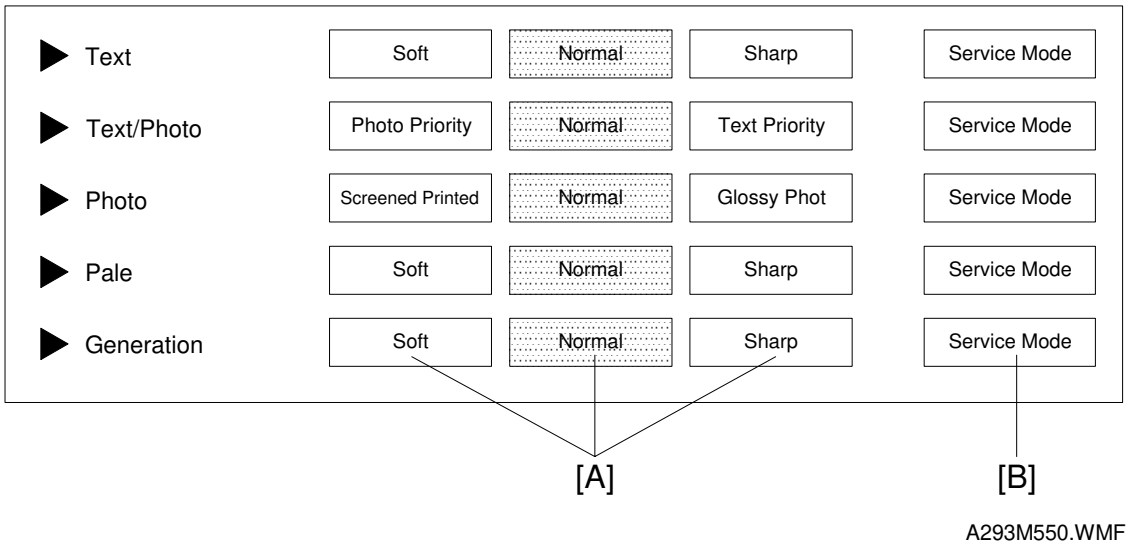
Service Tables

Tab	Item	Detail	
	Preset Stamp (3/4)	Stamp Condition: URGENT	Size
			Density
			Print Page
		Stamp Condition: PRIORITY	Size
			Density
			Print Page
		Stamp Condition: For Your Info.	Size
			Density
			Print Page
		Stamp Condition: PRELIMINARY	Size
			Density
			Print Page
	Preset Stamp (4/4)	Stamp Condition: For Internal Use	Size
			Density
			Print Page
		Stamp Condition: CONFIDENTIAL	Size
			Density
			Print Page
		Stamp Condition: DRAFT	Size
			Density
			Print Page
		Superimpose	
	User Stamp (1/2)	Program/Delete Stamp	Program
			Delete
		Stamp Position: 1	
		Stamp Position: 2	
		Stamp Position: 3	
		Stamp Position: 4	
		Stamp Condition: 1	
		Stamp Condition: 2	
	User Stamp (2/2)	Stamp Condition: 3	
		Stamp Condition: 4	
	Date Stamp	Format	
		Font	
		Position Priority	
		Size	
		Superimpose	
	Page Numbering (1/2)	Format Priority	
		Font	
		size	
		Duplex Back Page Number Position	
		Page Numbering in Combine Mode	
		Copy on Slip Sheet in Designate Mode	
		Position Priority: P1, P2, ...	

Tab	Item	Detail
	Page Numbering (2/2)	Position Priority: 1/5, 2/5, ...
		Position Priority: -1-, -2-, ...
		Position Priority: P.1, P.2, ...
		Position Priority: 1, 2, ...
		Position Priority: 1-1, 1-2, ...
		Position Priority: 1 page, 2 page, ...
		Position Priority: Superimpose
Input Output	Batch (SADF) Auto Reset Time	
	ADRF Original Table Rise Time	
	Face-up/Down Selection in Platen Mode	
	Rotate Sort Auto Paper Continue	
	Auto Sort Mode	
	Memory Full Auto Scan Restart	
	Select Stack or Rotate Sort	
	Staple Position	
	Paper Eject: Always Rotate 180	
Count Manager	Check/Reset/Print Copy Counter	Print
		Reset Counter
		Reset All
	User Code Register/Change/Delete	Register
		Change
		Delete User Code
		Delete All User Code
	Face-up/Down Selection in Bypass Mode	
	Connect Copy Master	
	Auto File Delete	
	Delete All the Saved Files	Yes
		No

4.4.3 IMAGE QUALITY SETTING BY UP MODE

'Original Mode Level' in the 'General Features' UP menu is related to the 'MTF Filter Settings' SP mode.



A293M550.WMF

If a setting from the above three columns [A] is selected, the MTF level (coefficient) and MTF strength (SP4-903-20 to 58) are fixed. Any changes to the SP mode settings are not reflected on the copy. To use the settings specified by SP mode, the user must select "Service Mode" [B].

The detailed relationship between the different original modes, the UP modes, and the SP modes are as follows.

Text Mode

Different gamma correction settings are used for "Sharp", "Normal" or "Soft" mode. So, when adjusting the "Service Mode" setting, first select a gamma correction setting for the basic image setting using SP4-903-84.

1. The following tables should be used when 1 (Normal) or 2 (Sharp) is selected in SP4-903-84.

Magnification Ratio: 25 ~ 49%

MTF Filter Strength	Strong				Weak
UP mode		Sharp	Normal		
Pre-filter Type – Text SP4-903-010	1	1	1	1	1
Filter Level – Text Main Scan Direction SP4-903-020	13	13	13	13	7
Filter Strength – Text Main Scan Direction SP4-903-022	3	2	1	0	0

Magnification Ratio: 50 ~ 154%

MTF Filter Strength	Strong				Weak
UP mode		Sharp	Normal		
Pre-filter Type – Text SP4-903-011	0	0	0	0	2
Filter Level – Text Main Scan Direction SP4-903-024	13	13	13	13	13
Filter Strength – Text Main Scan Direction SP4-903-026	3	2	1	0	0

Magnification Ratio: 155 ~ 256%

MTF Filter Strength	Strong				Weak
UP mode		Sharp	Normal		
Pre-filter Type – Text SP4-903-011	0	0	0	0	2
Filter Level – Text SP4-903-028	13	13	13	9	7
Filter Strength – Text Main Scan Direction SP4-903-030	2	1	0	0	0

Magnification Ratio: 257 ~ 400%

MTF Filter Strength	Strong				Weak
UP mode		Sharp	Normal		
Pre-filter Type – Text SP4-903-011	0	0	0	0	2
Filter Level – Text SP4-903-032	13	13	13	9	7
Filter Strength – Text Main Scan Direction SP4-903-034	2	1	0	0	0

2. The following tables should be used when 0 (Soft) is selected in SP4-903-84.

Magnification Ratio: 25 ~ 49%

MTF Filter Strength	Strong				Weak
UP mode			Soft		
Pre-filter Type – Text SP4-903-010	1	1	1	1	1
Filter Level – Text Main Scan Direction SP4-903-020	3	3	3	3	3
Filter Level – Text Sub Scan Direction SP4-903-021	6	6	6	6	6
Filter Strength – Text Main Scan Direction SP4-903-022	4	3	2	1	1
Filter Strength – Text Sub Scan Direction SP4-903-023	2	2	1	1	0

Magnification Ratio: 50 ~ 154%

MTF Filter Strength	Strong				Weak
UP mode			Soft		
Pre-filter Type – Text SP4-903-011	0	0	0	0	0
Filter Level – Text Main Scan Direction SP4-903-024	3	3	3	3	3
Filter Level – Text Sub Scan Direction SP4-903-025	6	6	6	6	6
Filter Strength – Text Main Scan Direction SP4-903-026	4	3	2	1	1
Filter Strength – Text Sub Scan Direction SP4-903-027	2	2	1	1	0

Magnification Ratio: 155 ~ 256%

MTF Filter Strength	Strong				Weak
UP mode			Soft		
Filter Level – Text Main Scan Direction SP4-903-028	0	0	0	0	0
Filter Level – Text Sub Scan Direction SP4-903-029	2	2	2	2	2
Filter Strength – Text Main Scan Direction SP4-903-030	5	4	2	2	1
Filter Strength – Text Sub Scan Direction SP4-903-031	5	4	4	2	1

Magnification Ratio: 257 ~ 400%

MTF Filter Strength	Strong				Weak
UP mode			Soft		
Filter Level – Text Main Scan Direction SP4-903-032	0	0	0	0	0
Filter Level – Text Sub Scan Direction SP4-903-033	2	2	2	2	2
Filter Strength – Text Main Scan Direction SP4-903-034	5	4	2	2	1
Filter Strength – Text Sub Scan Direction SP4-903-035	5	4	4	2	1

Text/Photo Mode

Initially, the same filter settings are used for Sharp, Normal, and Soft in Text/Photo mode. The difference of each image mode is due to the gamma correction setting. The following filter settings should be changed after selecting the gamma correction setting in SP4-903-85.

Magnification Ratio: 25 ~ 49%

MTF Filter Strength	Strong				Weak
UP mode			Photo Priority/ Normal/Text Priority		
Pre-filter Type – Text/Photo SP4-903-013	1	1	1	1	1
Filter Level – Text/Photo Main Scan Direction SP4-903-039	13	13	13	9	7
Filter Strength – Text/Photo Main Scan Direction SP4-903-041	2	1	0	0	0

Magnification Ratio: 50 ~ 154%

MTF Filter Strength	Strong				Weak
UP mode			Photo Priority/ Normal/Text Priority		
Pre-filter Type – Text/Photo SP4-903-014	0	0	0	2	1
Filter Level – Text/Photo Main Scan Direction SP4-903-43	13	13	13	13	13
Filter Strength – Text/Photo Main Scan Direction SP4-903-045	2	1	0	0	0

Magnification Ratio: 155 ~ 256%

MTF Filter Strength	Strong				Weak
UP mode			Normal/Text Priority		Photo Priority
Filter Level – Text/Photo Main Scan Direction SP4-903-047	13	13	13	9	7
Filter Strength – Text/Photo Main Scan Direction SP4-903-049	2	1	0	0	0

Magnification Ratio: 257 ~ 400%

MTF Filter Strength	Strong				Weak
UP mode			Normal Text Priority		Photo Priority
Filter Level – Text/Photo Main Scan Direction SP4-903-051	13	13	13	9	7
Filter Strength – Text/Photo Main Scan Direction SP4-903-053	2	1	0	0	0

Photo Mode

Normally the smoothing filter is used in this mode, whether the user selects “Glossy Photo”, “Normal”, or “Screen Printed”.

When a stronger setting is selected, the reproduction of graduations is improved. However, the image tends to go out of focus.

MTF Filter Strength	Strong								Weak
UP mode		Screened Printed			Normal			Glossy Photo	
Pre-filter Type – Photo Mode SP4-903-012		1	2	1	1	1	7	7	10
Smoothing Filter – Photo Mode SP4-903-037		4	4	2	1	0	1	0	0

If the user selects “Service Mode” to use another smoothing filter setting, SP4-903-009 (Filter Type Selection in Photo Mode) should be “1: Smoothing”.

If the user selects “Service Mode” to use an MTF filter setting for photo mode, SP4-903-009 (Filter Type Selection in Photo Mode) should be “0: MTF”.

The following table should be used to change the MTF filter strength for Photo mode.

MTF Filter Strength	Strong				Weak
UP mode					
Pre-filter Type – Photo Mode SP4-903-012	10	10	7	2	1
MTF Filter – Photo Mode SP4-903-36	13	13	13	13	13
MTF Filter Strength – Photo Mode SP4-903-38	2	1	1	1	0

Pale Mode

MTF Filter Strength	Strong						Weak
UP mode		Sharp		Normal		Soft	
Pre-filter Type – Pale Mode SP4-903-015	1	1	1	1	1	1	1
Filter Level – Pale Mode SP4-903-055	3	3	3	3	3	3	1
Filter Strength – Pale Mode SP4-903-056	6	5	4	3	2	1	0

Generation Mode

MTF Filter Strength	Strong						Weak
UP mode		Sharp		Normal		Soft	
Pre-filter Type – Generation Mode SP4-903-016	1	1	1	1	1	1	1
Filter Level – Generation Mode SP4-903-057	13	13	10	13	10	13	7
Filter Strength – Generation Mode SP4-903-058	3	2	2	1	1	0	0

4.5 TEST POINTS/DIP SWITCHES/LEDS

4.5.1 DIP SWITCHES

ADF Main Board

DPS100				Description
1	2	3	4	
0	0	0	0	Normal operating mode
0	0	0	1	Motor Test: Transport motor – Forward
0	0	1	0	Motor Test: Transport motor – Reverse
0	0	1	1	Motor Speed Adjustment (Automatic)
0	1	0	0	Original stop position adjustment – Single-sided original mode (No original skew correction)
0	1	0	1	Original stop position adjustment – Double sided original mode
1	0	0	0	Free Run: Single-sided original mode with skew correction
1	0	1	0	Free Run: Single-sided original mode without skew correction
0	1	1	0	Free Run: Double-sided original mode
Others				Do not select

"SADF" LED turns on when one of the DIP switches is on.

MCU: All the dip switches should be OFF. Do not change the settings.

4.5.2 TEST POINTS

BICU

Number	Monitored Signal
TP113	GDN
TP123	5 V_E
TP136	Not used
TP143	Not used

Paper Feed Board

Number	Monitored Signal
TP101	Ground
TP102	+24 V
TP103	Ground
TP104	+5 V

I/O Board

Number	Monitored Signal
TP104	+12 V
TP154	+5 V
TP155	Ground
TP162	+24 V
TP163	Ground
TP172	–12 V
TP173	+24 V_{INT}

ADF Main Board

No.	Label	Monitored Signal
TP100	TXD	TXD to the copier
TP101	RXD	RXD from the copier
TP102	GND	Ground
TP103	12 V	+12 V
TP104	5 V	+5 V

I/O BOARD (DIP SW101)

No.	Description	Function
1	Should be off.	–
2	Should be off.	–
3	SC codes display.	On: SC codes are not displayed.
4	Should be off.	–
5	Should be off.	–
6	Version 1	6: Off, 7: Off , 8: Off - Japanese version 6: On, 7: Off , 8: Off - 115 V version 6: Off, 7: On , 8: Off - 220/240 V version 6: On, 7: On , 8: Off – Chinese version 6: Off, 7: Off , 8: On – Taiwan version
7	Version 2	
8	Version 3	

NOTE: When replacing the I/O board in the field, change the setting of DIP SW6, 7 and 8 for your field.

4.5.3 FUSES

PSU

Number	Description
FU101	Protects the ac input line.
FU102	Protects +24V
FU103	Protects +24V
FU104	Protects +24V
FU105	Protects +24V
FU106	Protects +24V
FU107	Protects +24V

ADF Main Board

Number	Description
FU100	Protects the 38 V line
FU101	Protects the 24 V line

4.5.4 VARIABLE RESISTORS

ADF Main Board

Number	Function
VR100	Adjusts the original stop position for the single-sided original at no skew correction mode.
VR101	Adjusts the original stop position for the double-sided original.

4.5.5 LEDS

BICU

Number	Monitored Signal
LED101	Blinking : Normal Stays on or off : CPU defective
LED103	Turns on when the main power switch on.
LED104	Blinking : Normal Stays on or off : HDD abnormal

Paper Feed Board

Number	Monitored Signal
LED101	Turns on 500ms interval : Normal (software) Turns on 200ms interval : Software error Stays on of off : Paper feed board defective

4.6 SPECIAL TOOLS AND LUBRICANTS

4.6.1 SPECIAL TOOLS

Part Number	Description	Q'ty
A2309352	Flash Memory Card – 4MB	1
A2309351	Case – Flash Memory Card	1
A0069104	Scanner Positioning Pin (4 pcs/set)	1
54209516	Test Chart – OS-A3 (10 pcs/Set)	1
A0299387	Digital Multimeter – FLUKE 87	1

4.6.2 LUBRICANTS

Part Number	Description	Q'ty
A0289300	Grease Barrierta JFE 5 5/2	1
52039502	Silicone Grease G-501	1
G0049668	Grease: KS660: SHIN ETSU	1

5. PREVENTIVE MAINTENANCE SCHEDULE

5.1 PM TABLE

NOTE: The amounts mentioned as the PM interval indicate the number of prints, unless stated otherwise.

Symbol key: C: Clean, R: Replace, L: Lubricate, I: Inspect

	EM	150 K	300 K	450 K	Expected Life K	NOTE
SCANNER/OPTICS						
1st, 2nd, 3rd Mirror		C	C	C		Optics cloth
Reflectors		C	C	C		Optics cloth
White Reference Plate		I	I	I		Water
Scanner Guide Rails		C	C	C		Dry cloth
Exposure Glass	C	C	C	C		Dry cloth or alcohol
Toner Shield Glass		C	C	C		Optics cloth
Optics Dust Filter		I	R	I		Blower brush
AROUND THE DRUM						
Charge Corona Wire		C	C	C	300	Dry Cloth
Charge Corona Casing		C	C	C		Damp cloth
Corona Wire Cleaner		C	C	C	300	
Drum Potential Sensor		C	C	C		Blower brush
Charge Corona Grid		C	C	C	300	Blower brush
ID Sensor		C	C	C		Blower brush; initialize with SP3-001-2 after cleaning.
Quenching Lamp		C	C	C		Dry cloth
Pick-off Pawls		C	C	C		Dry cloth Replace if necessary.
Cleaning Blade					300	
Cleaning Brush					300	
Cleaning Brush Seal			C			Dry cloth
Cleaning Side Seals		I	I	I		Dry cloth
Cleaning Entrance Seal		C	C	C		Dry cloth Replace if necessary
DEVELOPMENT UNIT						
Developer			R			
Side Seals		I	I	I		Dry cloth or blower brush
Development Filter		R	R	R		
Entrance Seal		C	C	C		Dry cloth or blower brush
Air Filter – Large/ Small		R	R	R		
Drive Gears		C	C	C		Blower brush
Toner Bottle Holder		C	C	C		Dry cloth or vacuum cleaner
Toner Hopper Entrance		C	C	C		Dry cloth
Development Roller Shaft		C	C	C		Dry cloth or blower brush

	EM	150 K	300 K	450 K	Expected Life K	NOTE
PAPER FEED						
Registration Rollers		C	C	C		Water or alcohol
Relay Rollers		C	C	C		Water or alcohol
Paper Dust Remover		C	C	C		Dry cloth
Registration Sensor		C	C	C		Blower brush
Relay Sensor		C	C	C		Blower brush
Paper Feed Rollers		C	C	C	300	Replace pick-up, feed and separation roller as a set. Check the counter value for each paper tray station (SP7-204). If the value has reached 300K, replace the rollers. After replacing the rollers, reset the counter (SP7-816).
Paper Feed Guide Plate		C	C	C		Water or alcohol
Vertical Transport Rollers		C	C	C		Water or alcohol
Paper Feed Sensor		C	C	C		Blower brush
TRANSFER BELT UNIT						
Transfer Belt		C	C	C	450	Dry cloth
Cleaning Roller Cleaning Blade				C	450	
Transfer Entrance Guide Plate		C	C	C		Dry cloth
Belt Drive/Guide/ Bias Roller/Cleaning Roller		C	C	C		Alcohol
Transfer Exit Guide Plate		C	C	C		Dry cloth
FUSING/PAPER EXIT						
Hot Roller: A292/A293		I	I	I	200	
B098		I	I	I	150	
Hot Roller Bearings		I	I	I	600	
Pressure Roller		I	I	I	450	Replace as a set.
Pressure Roller Bearings		I	I	I	450	
Fusing Thermistor	I	I	I	I		Replace if necessary.
Hot Roller Strippers	C	C	C	C	300	Water or alcohol
Oil Supply Roller Bushings	I	I	I	I		Replace if necessary.
Pressure Roller Cleaning Roller and Bushings		R	R	R		Replace as a set.
Oil Supply Roller		R	R	R		
Oil Supply Cleaning Roller		R	R	R		
Fusing Entrance and Exit Guide Plates		C	C	C		Clean with water or alcohol
Transport/Exit Rollers			C			Water
Exit Anti-static Brush			I			

	EM	150 K	300 K	450 K	Expected Life K	NOTE
DUPLEX						
Entrance Sensor		C	C	C		Blower brush
Reverse Roller		C	C	C		Water or alcohol
Separation Rollers		C	C	C		
Duplex Roller		C	C	C		
Feed Rollers		C	C	C		
Entrance Anti-static Brush		I	I	I		
Reverse Junction Gate		C	C	C		Dry cloth
OTHERS						
Ozone Filter: PCU			R			
Ozone Filter: Duct			R			
Filter: Vacuum		R	R	R		Blower brush
Used Toner Tank	I	I	I	I		Replace if necessary (about 1,000k copies).

	EM	80K	160K	240K	NOTE
ADF (the PM interval is for the number of originals that have been fed)					
Transport Belt	C	R	R	R	Belt cleaner
Feed Belt	C	R	R	R	Belt cleaner
Separation Roller	C	R	R	R	Dry or damp cloth
Pick-up Roller	C	R	R	R	Dry or damp cloth
Sensors	C	C	C	C	Belt brush
Drive Gears		L	L	L	Grease G501

	EM	150 K	300 K	450 K	Expected Life K	NOTE
LCT (A698/B587)						
Paper Feed Roller		C	C	C	300	Check the counter value for the LCT (SP7-204-5). If the value has reached 300K, replace the rollers. After replacing the rollers, reset the counter (SP7-816-5).
Pick-up Roller		C	C	C	300	
Separation Roller		C	C	C	300	
Bottom Plate Pad		C	C	C		Dry or damp cloth
Paper Feed Clutch					1,200	
Relay Clutch					1,200	
Pick-up Solenoid					2,400	

	EM	150 K	300 K	450 K	Expected Life K	NOTE
3,000-SHEET FINISHER (50-SHEET STAPLER): (B312/B586)						
Rollers	C	C	C	C		Clean with water or alcohol.
Brush Roller	I	I	I	I	2,400	
Discharge Brush	C	C	C	C		Clean with a dry cloth.
Sensors	C	C	C	C		Blower brush
Jogger Fences	I	I	I	I		Replace if necessary.
Punch Waste Hopper	I	I	I	I		Empty the hopper.

	EM	150 K	300 K	450 K	Expected Life K	NOTE
3,000-SHEET FINISHER (100-SHEET STAPLER): (B302)						
Rollers	C	C	C	C		Clean with water or alcohol.
Brush Roller	I	I	I	I	2,000	Check the counter value for the total copies by copy mode for staple (SP7-304-6). If the value has reached 600K, replace the brush roller.
Discharge Brush	C	C	C	C		Clean with a dry cloth.
Sensors	C	C	C	C		Blower brush
Jogger Fences	I	I	I	I		Replace if necessary.
Punch Waste Hopper	I	I	I	I		Empty the hopper.

	EM	150 K	300 K	450 K	Expected Life K	NOTE
FINISHER: (A763)						
Rollers	C	C	C	C		Clean with water or alcohol.
Brush Roller	I	I	I	I		
Discharge Brush	C	C	C	C		Clean with a dry cloth.
Sensors	C	C	C	C		Blower brush
Jogger Fences	I	I	I	I		Replace if necessary.
Punch Waste Hopper	I	I	I	I		Empty the hopper.

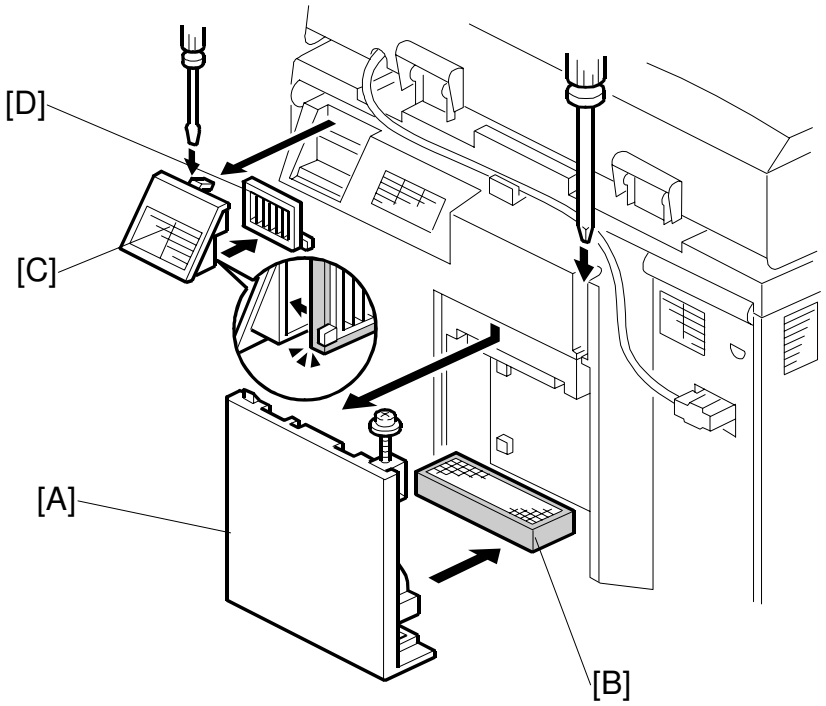
6. REPLACEMENT AND ADJUSTMENT

⚠CAUTION

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

6.1 EXTERIOR

6.1.1 FILTERS



A293R655.WMF

Ozone Filter: Duct

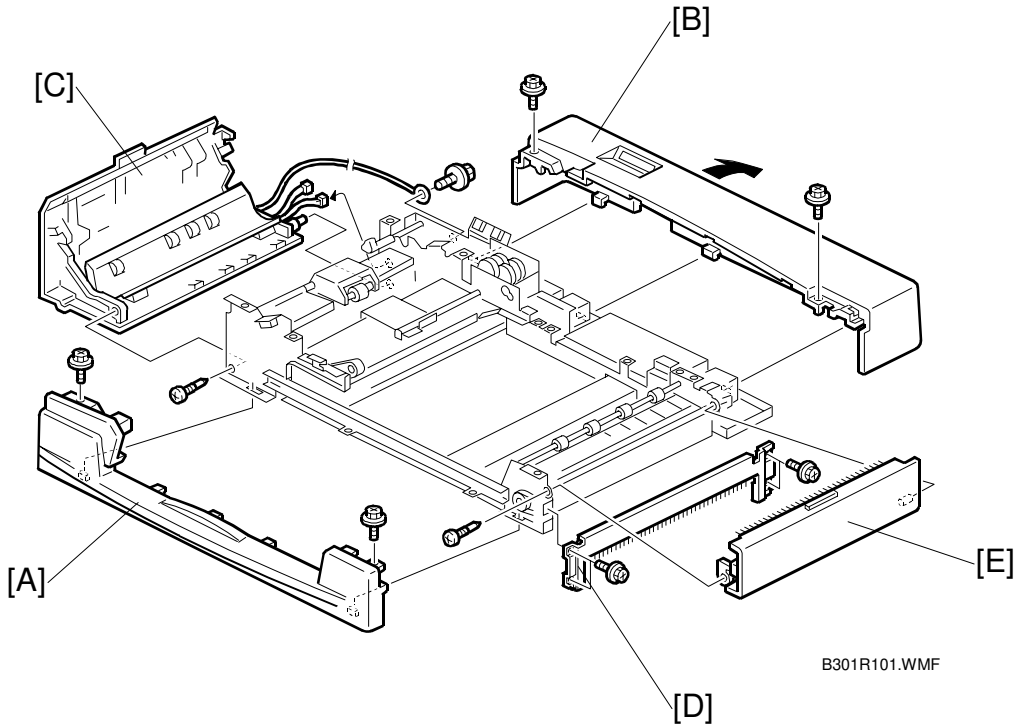
1. Remove the duct [A] (1screw).
2. Replace the ozone fuller [B].

Filter Vacuum

1. Remove the louver [C] (1 hook).
2. Replace the vacuum filter [D].

6.2 DOCUMENT FEEDER

6.2.1 COVER REMOVAL



Front Cover Removal

1. Remove the front cover [A] (2 screws).

Rear Cover Removal

1. Remove the rear cover [B] (2 screws).

Left Cover Removal

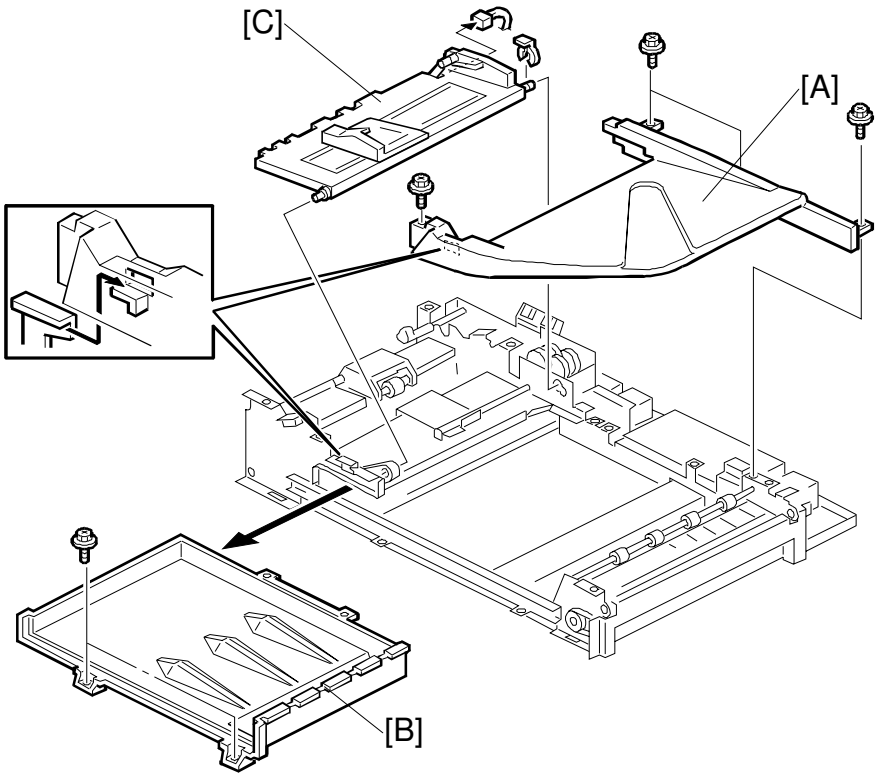
1. Remove the front and rear covers.
2. Remove the grounding wire (1 screw).
3. Remove the left cover [C] (1 connector 2 connectors).

Right Lower Cover Removal

1. Remove the right lower cove [D] (4 screws).

Upper Exit Cover Removal

1. Remove the front and right lower covers.
2. Remove the front cover.
3. Remove the upper exit cover [E] (1 screw).



A293R202.WMF

Original Tray Removal

1. Remove the front and rear covers.
2. Remove the original tray [A] (4 screws).

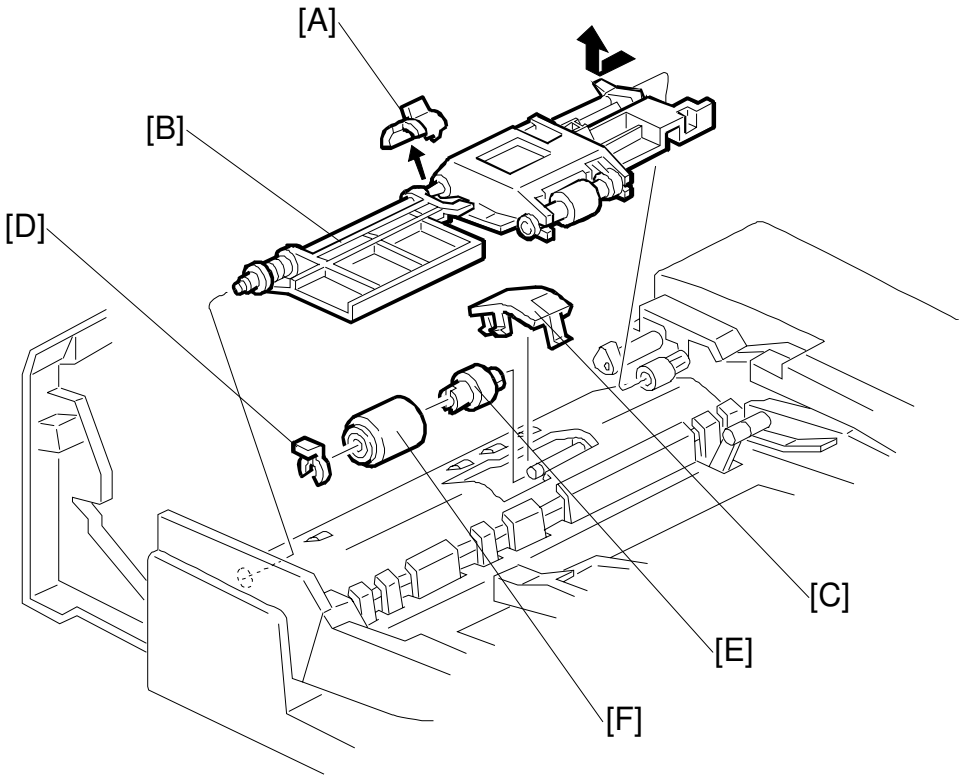
Upper Cover Removal

1. Remove the front and rear covers
2. Remove the original tray.
3. Remove the upper cover [B] (2 screws).

Bottom Plate Removal

1. Remove the front and rear covers.
2. Remove the original tray.
3. Remove the bottom plate [C] (1 snap ring, 1 connector).

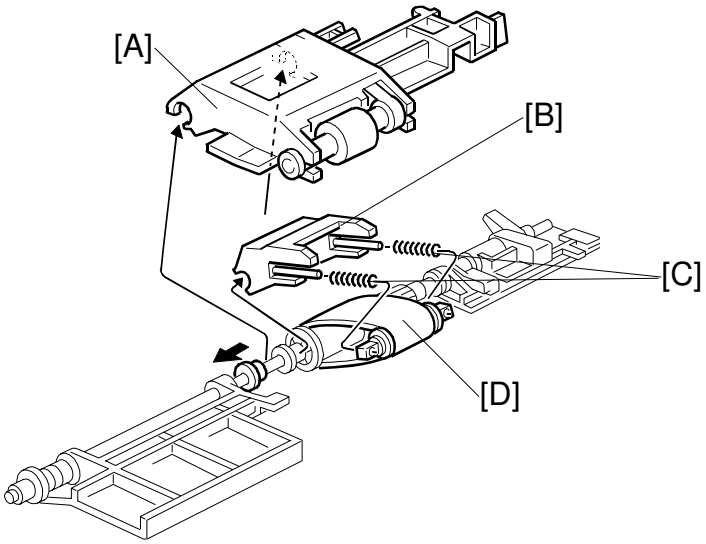
6.2.2 FEED UNIT REMOVAL AND SEPARATION ROLLER REPLACEMENT



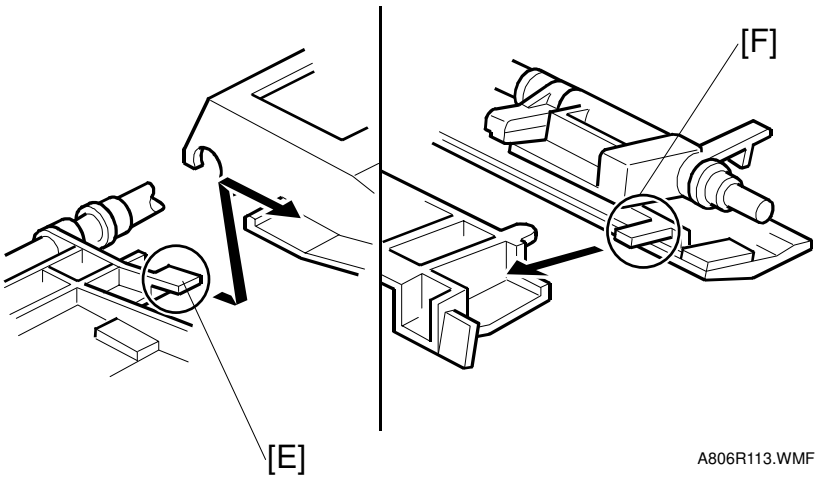
A806R103.WMF

1. Open the left cover.
2. Remove the clip [A].
3. Remove the feed unit [B].
   (Pull the feed unit to the front, release the shaft at the rear, and release the front bushing.)
4. Remove the separation roller cover [C].
5. Remove the snap ring [D].
6. Remove the torque limiter [E] and separation roller [F].

6.2.3 FEED BELT REPLACEMENT



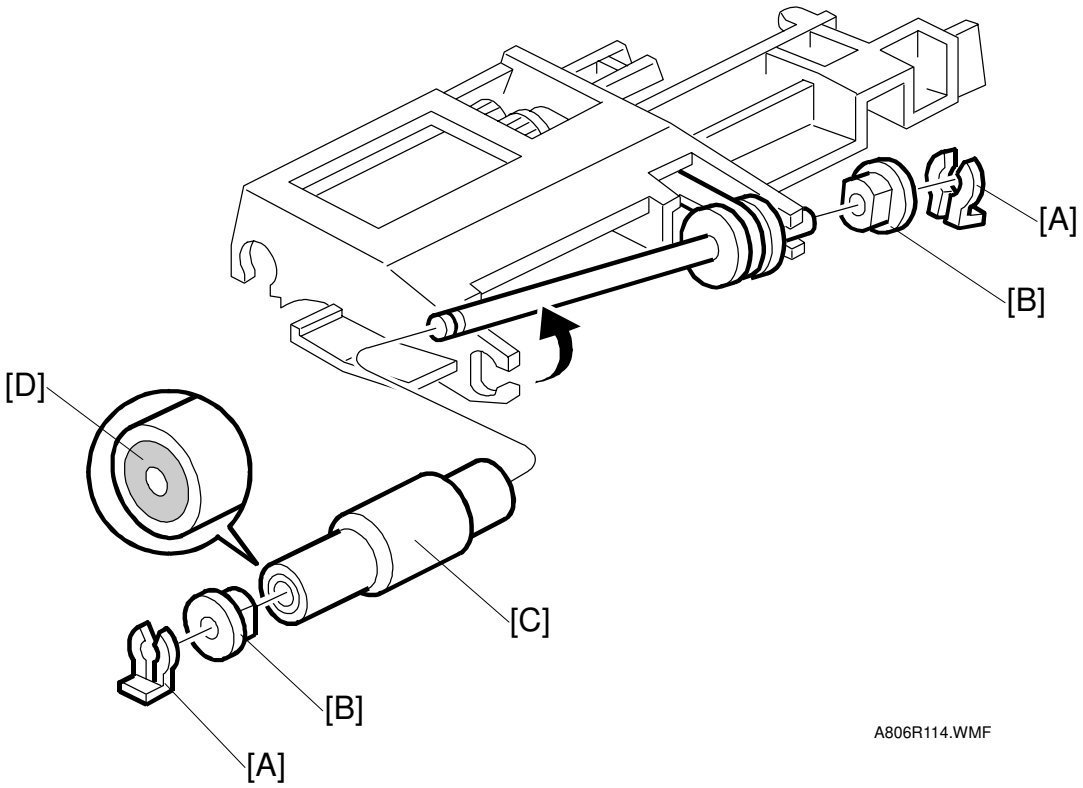
A806R104.WMF



A806R113.WMF

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

6.2.4 PICK-UP ROLLER REPLACEMENT

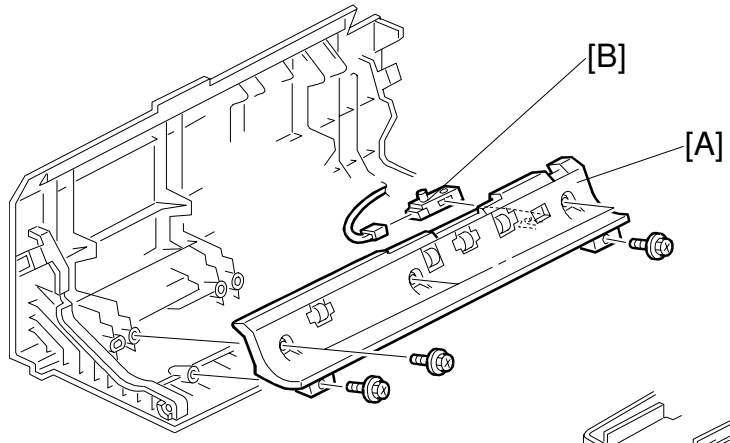


1. Open the left cover.
2. Remove the two snap rings [A].
3. Remove the two bushings [B].
4. Replace the pick-up roller [C].

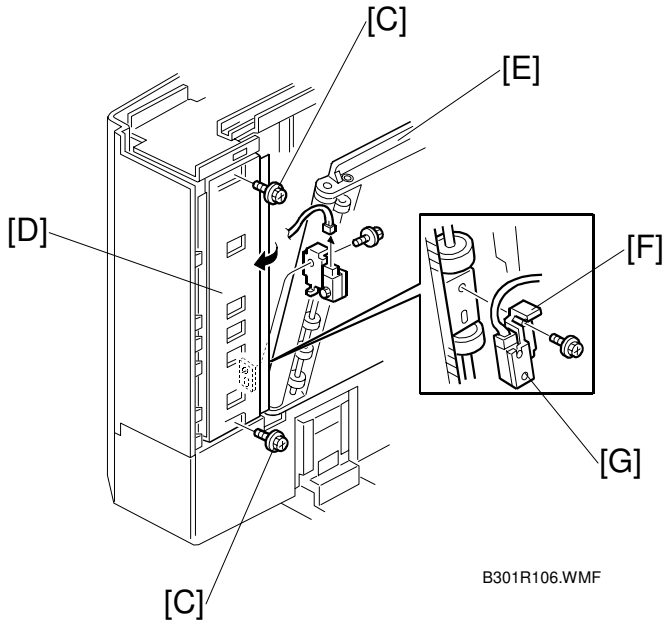
NOTE: When reinstalling the pick-up roller, make sure that the one-way clutch [D] is not at the gear side.

6.2.5 SENSOR REPLACEMENT

Entrance and Registration Sensors



A806R105.WMF



B301R106.WMF

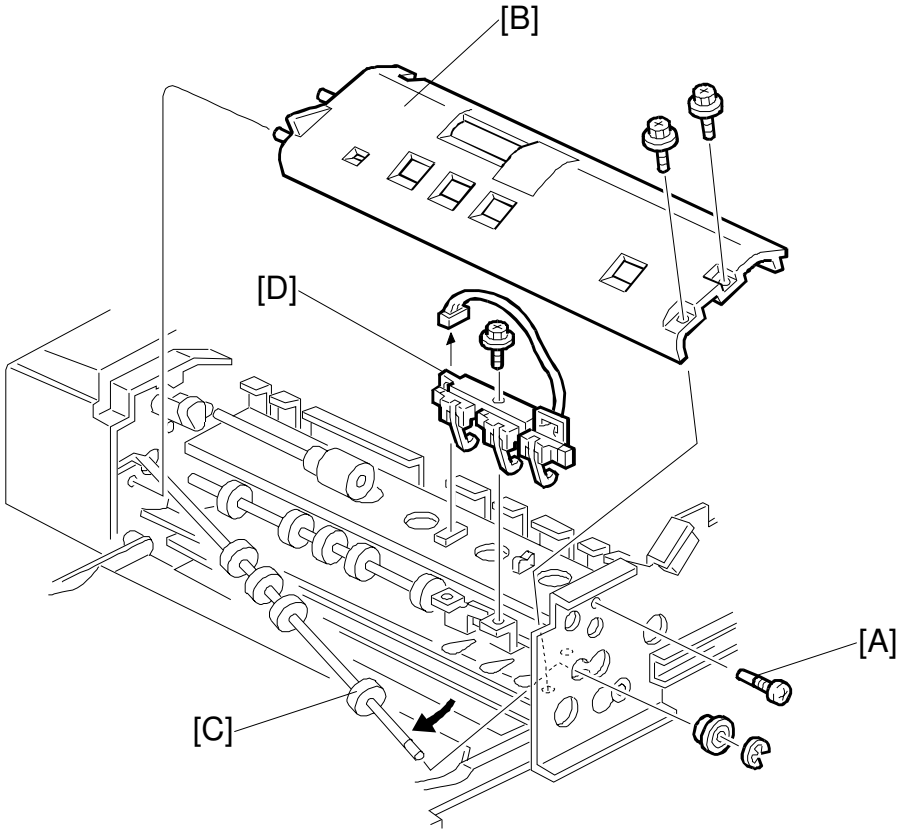
Entrance Sensor

1. Remove the left cover.
2. Remove the guide plate [A] (5 screws).
3. Replace the entrance sensor [B] (1 connector).

Registration Sensor

1. Remove the front cover.
2. **For B098 only:** Remove the two screws [C] securing the original feed base [D].
3. Release the transport belt unit [E] (**A229**/**A293:** 6 screws, **B098:** 3 screws).
4. Remove the sensor bracket [F] (1 screw).
5. Replace the registration sensor [E] (1 connector, 1 screw).

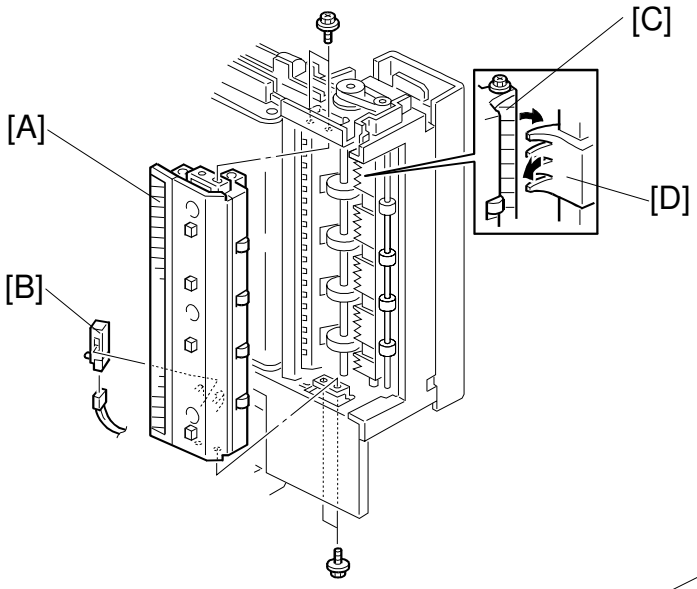
Width Sensor



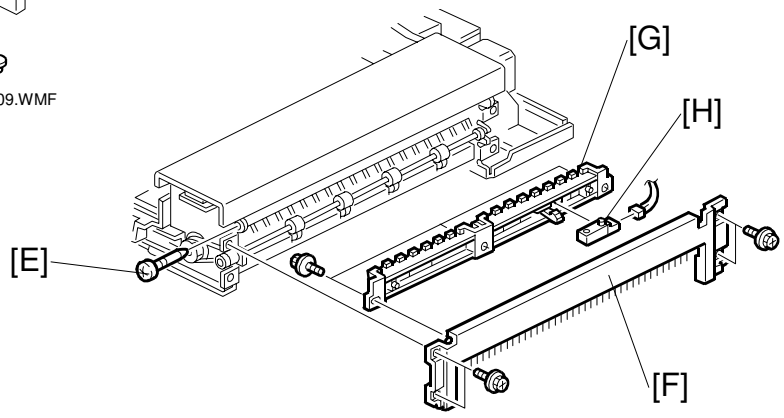
A806R107.WMF

1. Remove the feed unit.
2. Remove the front cover.
3. Remove the stopper screw [A].
4. Remove the guide plate [B] (2 screws).
5. Release the front end of the upper transport roller [C] (1 bushing, 1 E-ring).
6. Remove the sensor unit [D] (1 screw).
7. Replace the width sensor.

Exit Sensor and Inverter Sensor



A806R109.WMF



B301R108.WMF

Exit Sensor

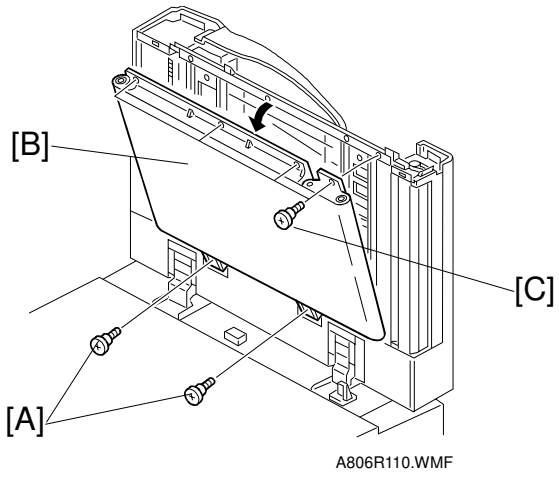
1. Remove the front and rear covers.
2. Remove the exit guide unit [A] (4 screws).
3. Replace the exit sensor [B] (1 connector).
   NOTE: When reinstalling the exit guide unit, make sure that the guide plate [C] on the exit unit is over the exit gate [D].

Inverter Sensor

1. Remove the front and rear covers.
2. **For B098 only:** Remove the screw [E].
3. Remove the right lower cover [F] (4 screws).
4. Remove the guide plate [G] (3 screws).
5. Replace the inverter sensor [H] (1 connector).

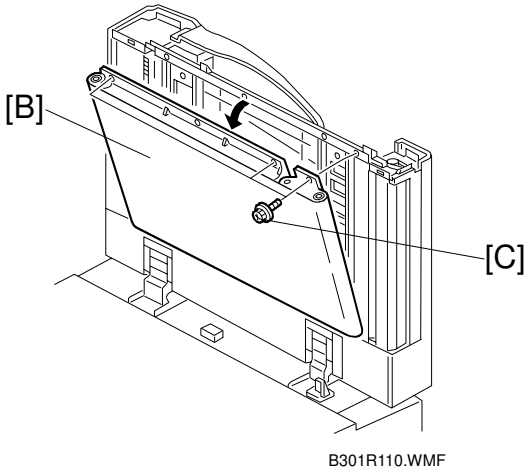
6.2.6 TRANSPORT BELT REPLACEMENT

– A229/A293 –

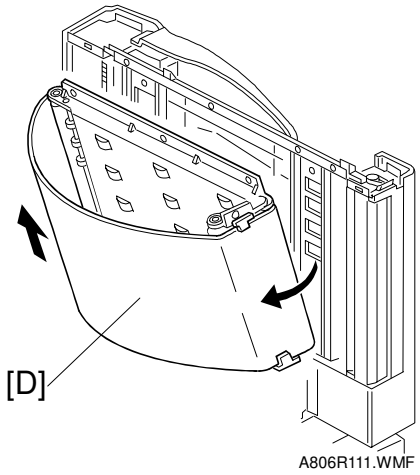


A806R110.WMF

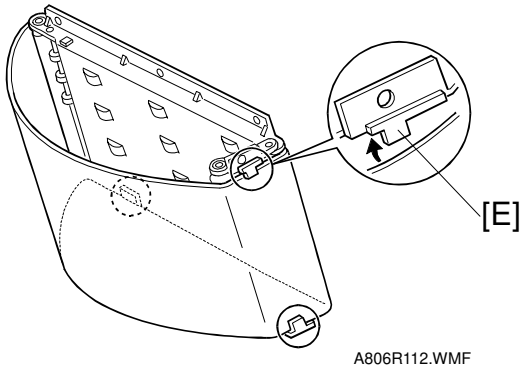
– B098 –



B301R110.WMF



A806R111.WMF



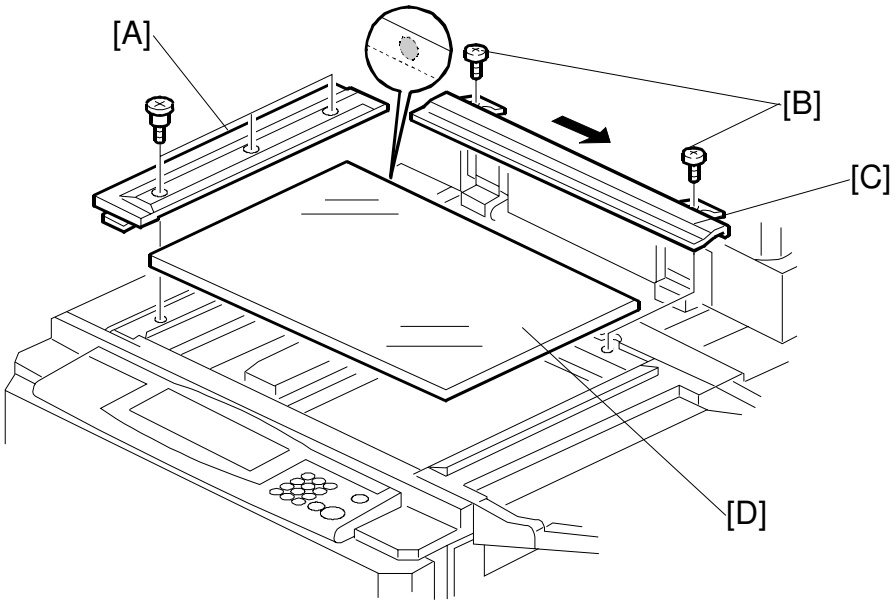
A806R112.WMF

1. Remove the front cover (see section 6-2-1).
2. **For A229/A293 only:** Remove the lower two screws [A] securing the transport belt assembly [B].
3. **For A229/A293:** Remove the upper four screws [C] securing the transport belt assembly.
   For B098: Remove the three screws [C] securing the transport belt assembly [B].
4. Bend up the transport belt assembly extension.
5. Pull off the transport belt [D] and replace it.

NOTE: 1) When releasing the transport belt assembly, make sure to remove the two lower screws first. **(A229/A293)**
2) When installing the transport belt, make sure that the belt runs under the belt guide spacers [E].
3) When securing the transport belt assembly with the six screws, make sure to secure the four upper screws first. **(A229/A293)**

6.3 SCANNER UNIT

6.3.1 EXPOSURE GLASS

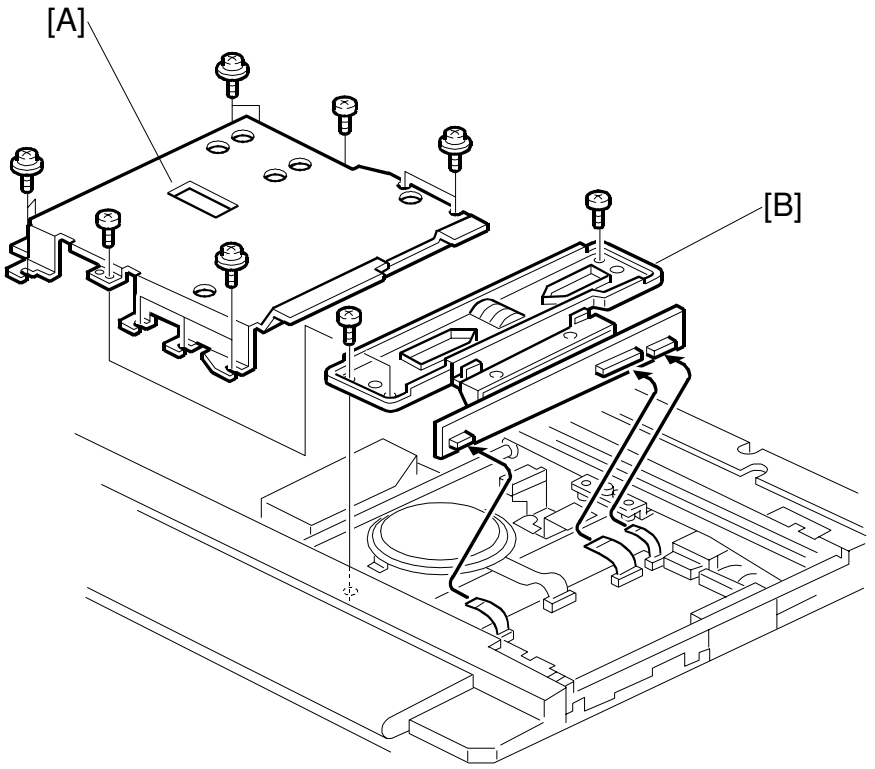


A293R008.WMF

1. Open the ADF.
2. Remove the left scale [A] (3 screws).
3. Remove the 2 screws [B] holding the rear scale.
4. Slide the rear scale [C] in the direction of the arrow, then remove it.
5. Remove the exposure glass [D].

NOTE: When reinstalling the exposure glass, make sure that the mark [D] is positioned at the rear left corner, as shown.

6.3.2 LENS BLOCK

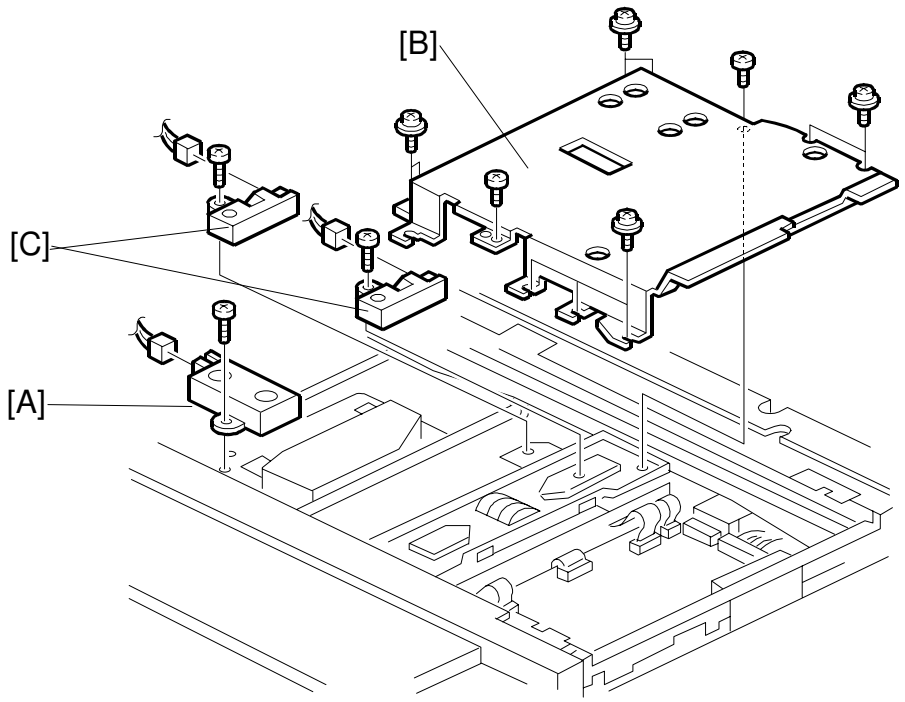


A293R004.WMF

1. Remove the exposure glass. (See Exposure Glass.)
2. Remove the lens cover [A] (11 screws).
3. Replace the lens block assembly [B] (2 screws, 3 connectors).
4. Do the scanner and printer copy adjustments. (See Replacement and Adjustment – Copy Image Adjustments.)

NOTE: When putting back the lens cover, take care not to pinch the operation panel cable.

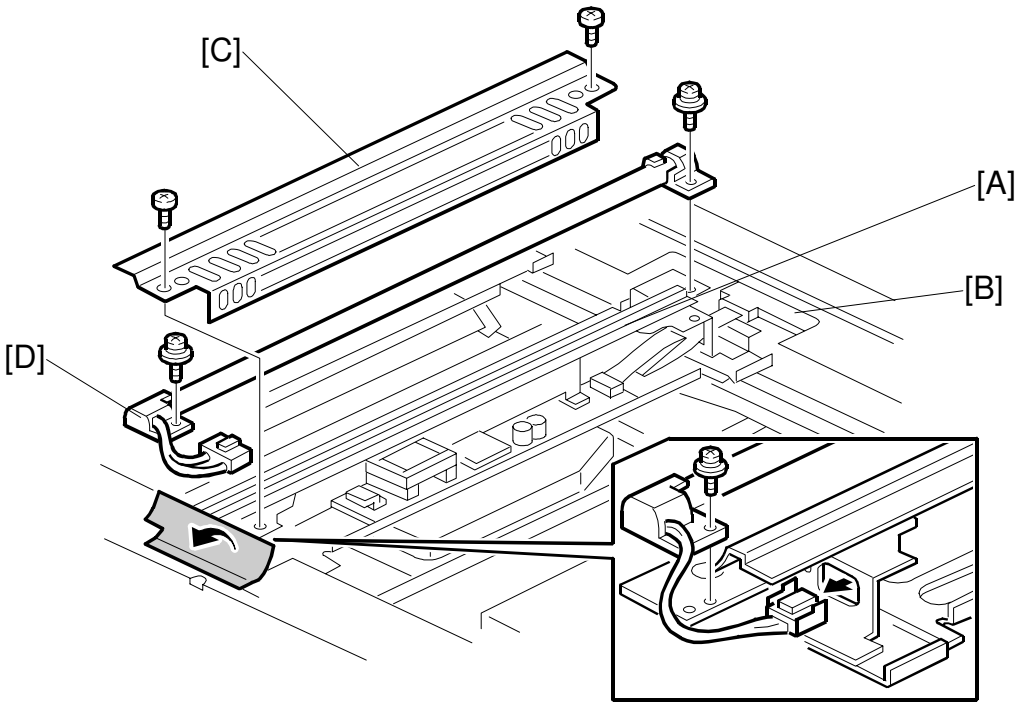
6.3.3 ORIGINAL SIZE SENSORS



A293R016.WMF

1. Remove the exposure glass. (See Exposure Glass.)
2. Remove the original width sensor [A] (1 screw, 1 connector).
3. Remove the lens cover [B] (11 screws).
4. Remove the original length sensors [C] (1 screw and 1 connector each).

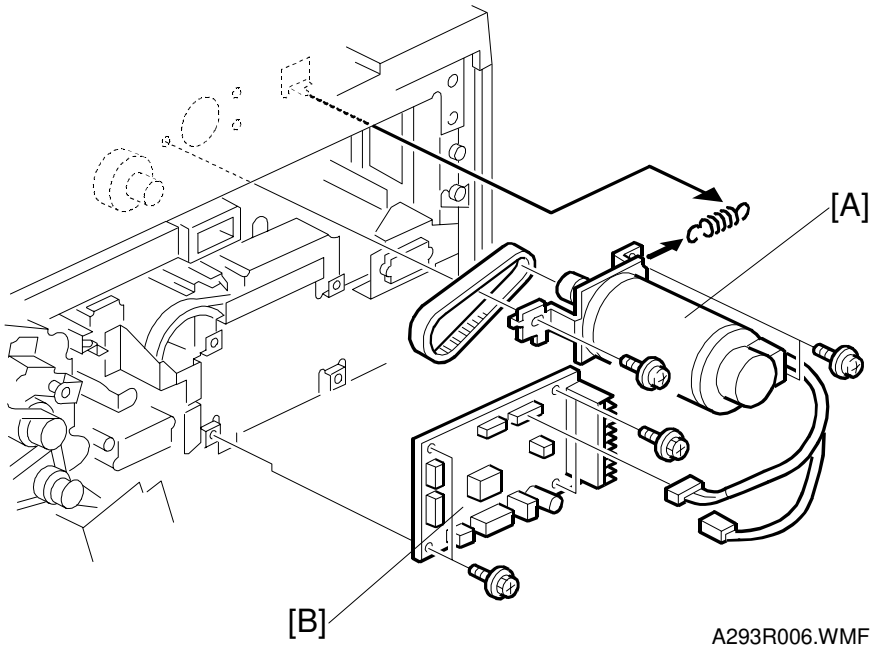
6.3.4 EXPOSURE LAMP



A293R002.WMF

1. Remove the exposure glass. (See Exposure Glass.)
2. Slide the 1st scanner [A] to the cutout [B] in the rear scanner frame.
3. Remove the lamp cover [C] (2 screws).
4. Remove the exposure lamp [D] (1 screw, 2 connectors).
   NOTE: Do not touch the glass surface of the exposure lamp with fingers.

6.3.5 SCANNER MOTOR / MCU



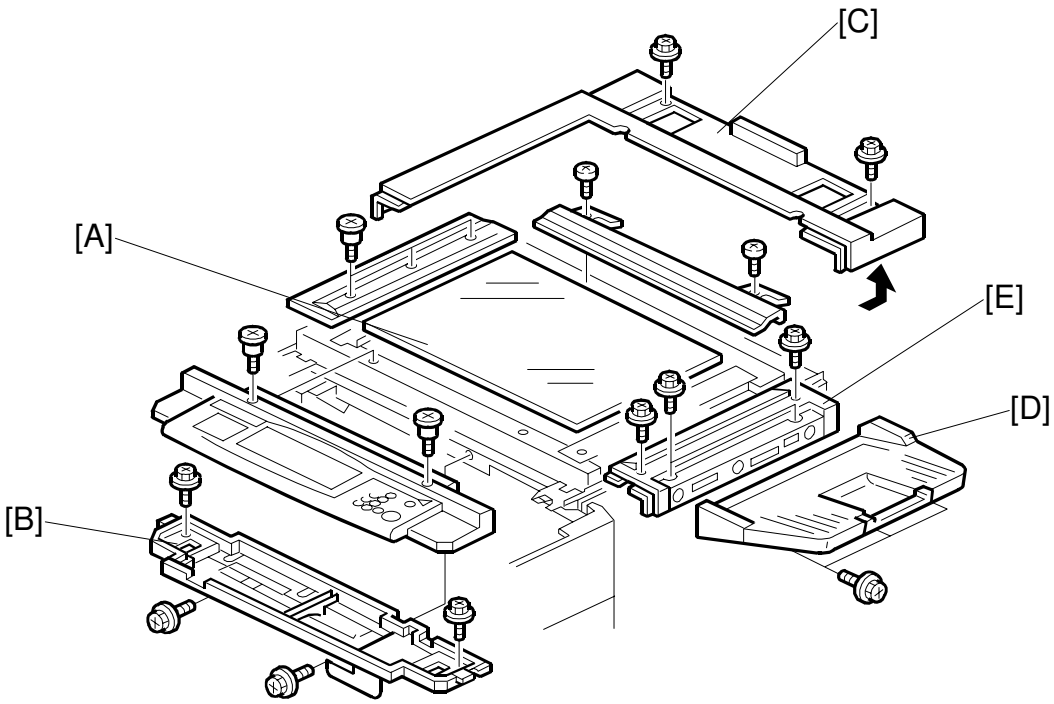
Scanner Motor

1. Remove the scanner rear cover. (See Covers - Rear.)
2. Remove the exhaust fan (2 screw, 1 connector and 1 snap fit).
3. Remove the scanner motor [A] with the bracket (3 screws, 2 connectors, 1 spring).
4. Do the scanner and printer copy adjustments. (See Replacement and Adjustment – Copy Image Adjustments.)

MCU

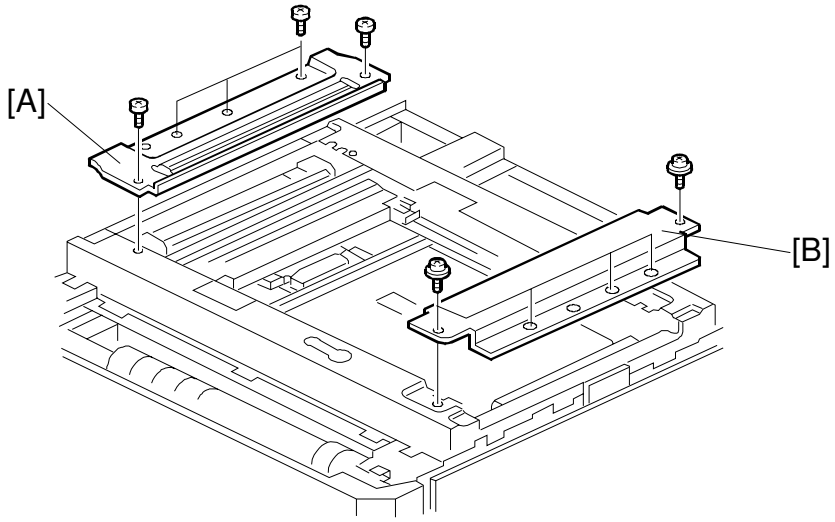
1. Do steps 1 and 2 of the scanner motor removal.
2. Replace the MCU [B] (4 screws and 3 connectors).

6.3.6 SCANNER WIRES

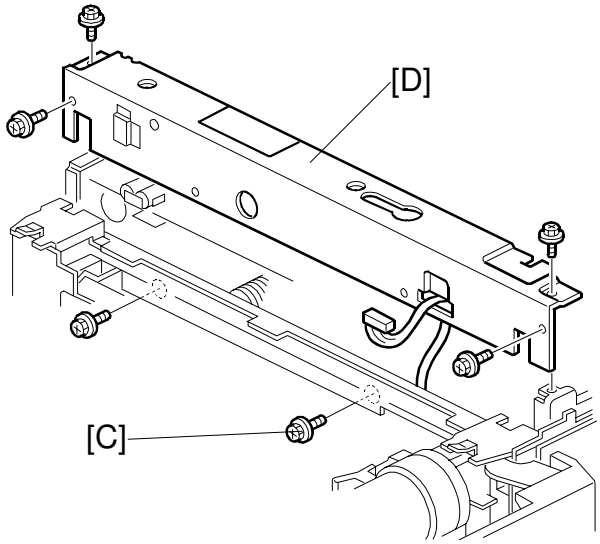


A293R007.WMF

1. Remove the ADF.
2. Remove the following parts:
   - Exposure glass [A] (See Exposure Glass.)
   - Operation panel under cover [B] (See Scanner H.P Sensor.)
   - Scanner rear cover [C] (2 screws)
   - Original exit tray [D] (3 screws)
   - Upper right cover [E] (4 screws).

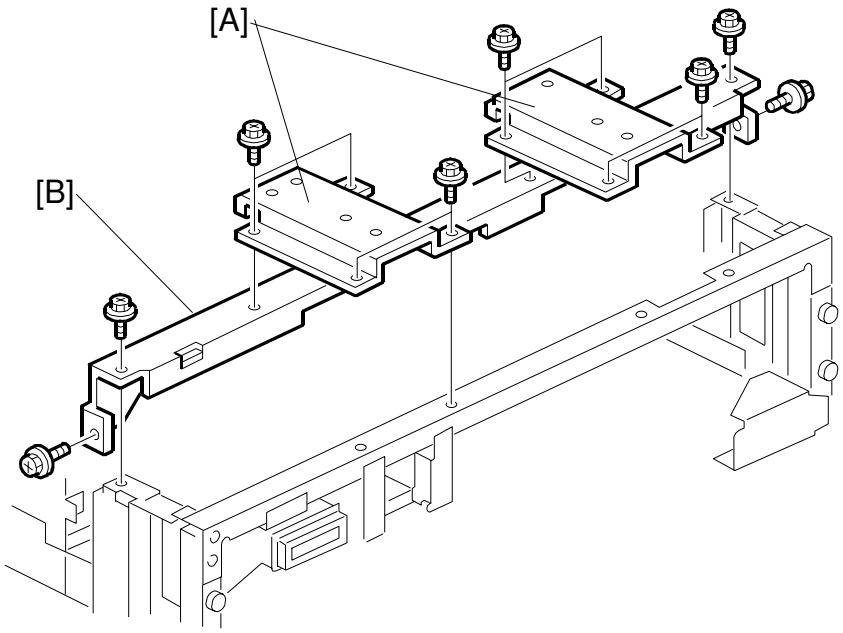


A293R009.WMF



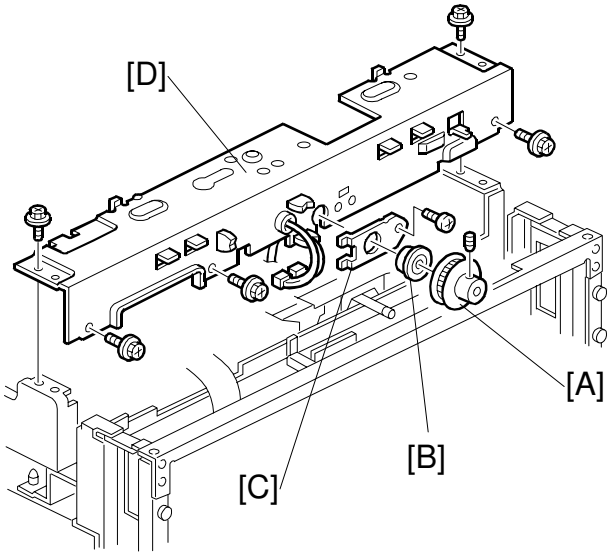
A293R657.WMF

3. Remove the left upper stay [A] (5 screws).
4. Remove the right upper stay [B] (5 screws).
5. Remove the shutter inner cover (see Development Unit) and swing out the toner bottle holder [C].
6. Remove the front frame [D] (6 screws).

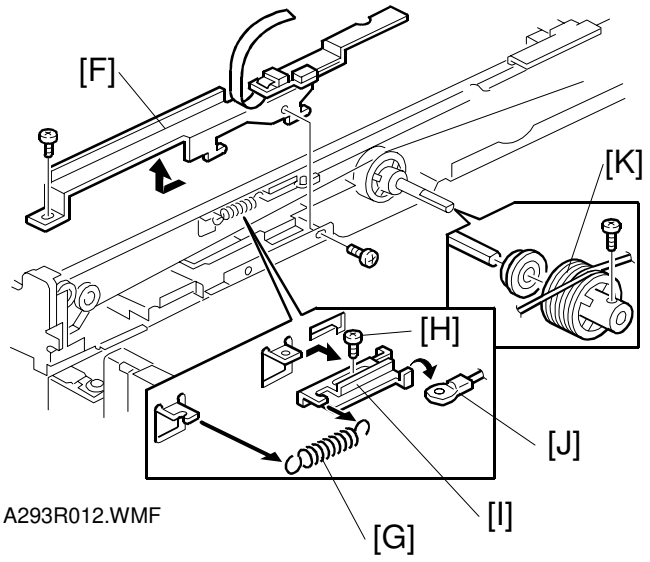


A293R010.WMF

7. Remove the ARDF support brackets [A] (4 screws each).
8. Remove the scanner upper frame [B] (4 screws).



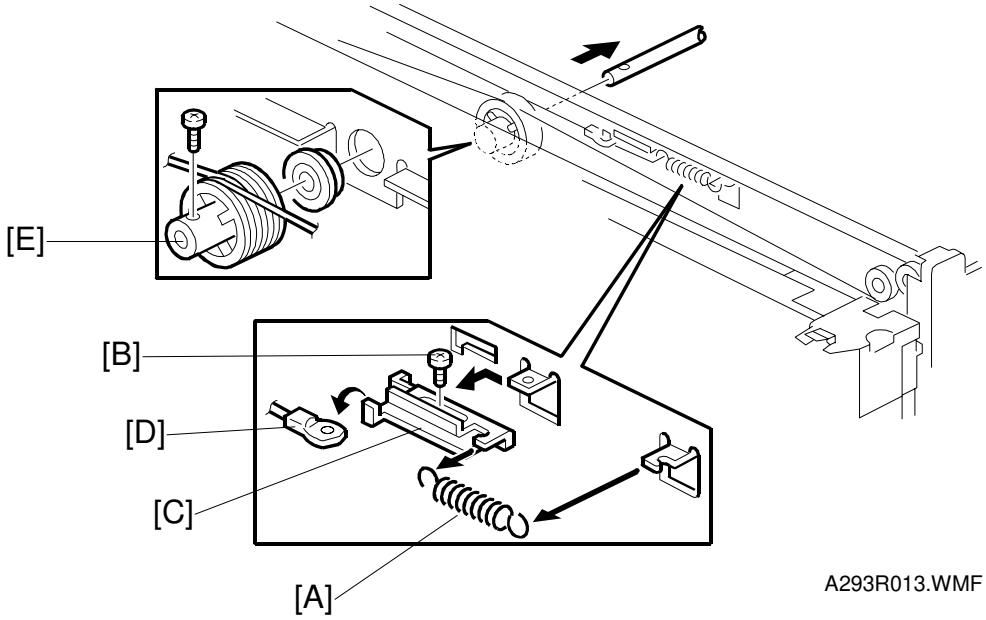
A293R656.WMF



A293R012.WMF

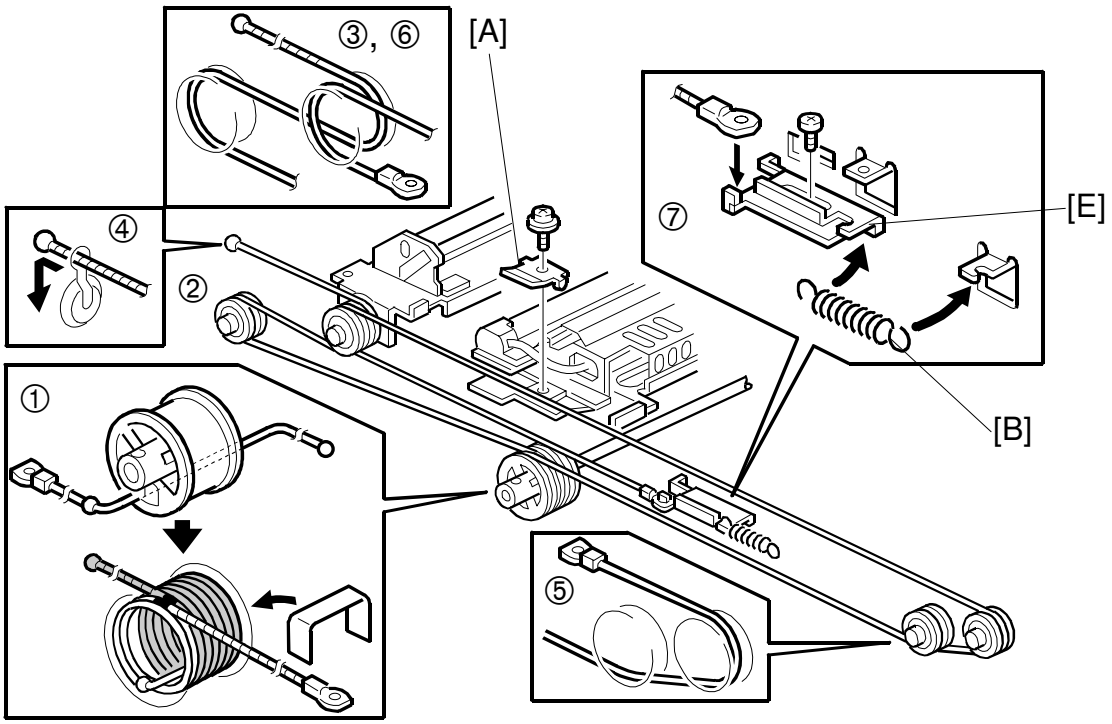
Rear Scanner Drive Wire

9. Remove the scanner motor and the scanner motor drive board. (See Scanner Motor and Scanner Motor Drive Board.)
10. Remove the drive pulley [A] (1 Allen screw), bearing [B], and the bearing holder bracket [C] (1 screw).
11. Remove the scanner rear frame [D] (5 screws).
12. Remove the rear scanner wire bracket [no illustration] (1 screw).
13. Remove the cable guide [F] (1 screw).
14. Remove the tension spring [G].
15. Loosen the screw [H] securing the wire tension bracket [I], and remove the rear scanner wire [J].
16. Remove the pulley [K].



Front Scanner Drive Wire

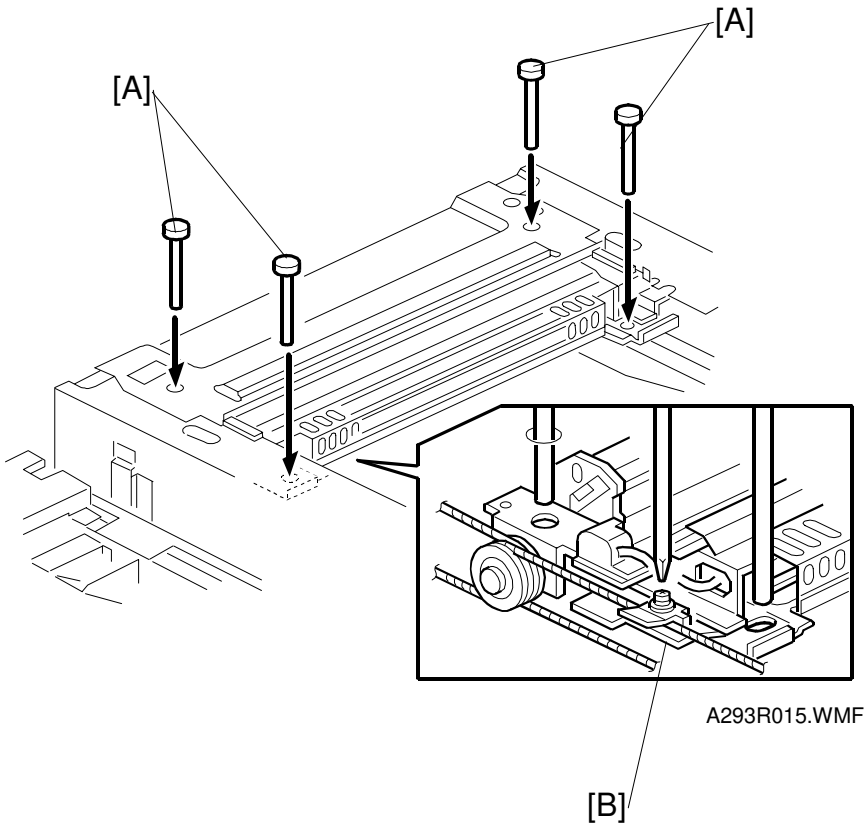
17. Remove the tension spring [A].
18. Loosen the screw [B] securing the wire tension bracket [C], and remove the front scanner wire [D].
19. Remove the pulley [E] (1 screw).



A293R014.WMF

Reinstallation

20. While making sure of the direction, place the bead on the middle of the wire in the pulley hole. Then wind the wire (ball side) [D] clockwise 6 times, and the other side (ring side) 2 times as shown (①). Secure the pulley with tape to keep this condition.
21. Place the pulley on the scanner drive shaft.
22. Secure the pulley with the Allen screw in the position where the Allen screw hole faces up.
23. Wind the end of the new wire with the ball as shown (②, ③, and ④).
24. Wind the end of the new wire with the ring as shown (⑤, ⑥, and ⑦).
25. Install the tension spring on the tension bracket [E], and slightly tighten the tension bracket.



26. Install the 1st scanner and adjust the position with the positioning tools (P/N A0069104) [A].
27. Secure the 1st scanner with the scanner wire bracket [B] (1 screw).
28. Fully tighten the tension bracket.
29. Remove the positioning tools. After sliding the scanner to the right and left several times, set the positioning tools to check the scanner wire bracket and tension bracket again.
30. Reassemble the scanner and do the scanner and printer copy adjustments (see Replacement and Adjustment – Copy Image Adjustments).

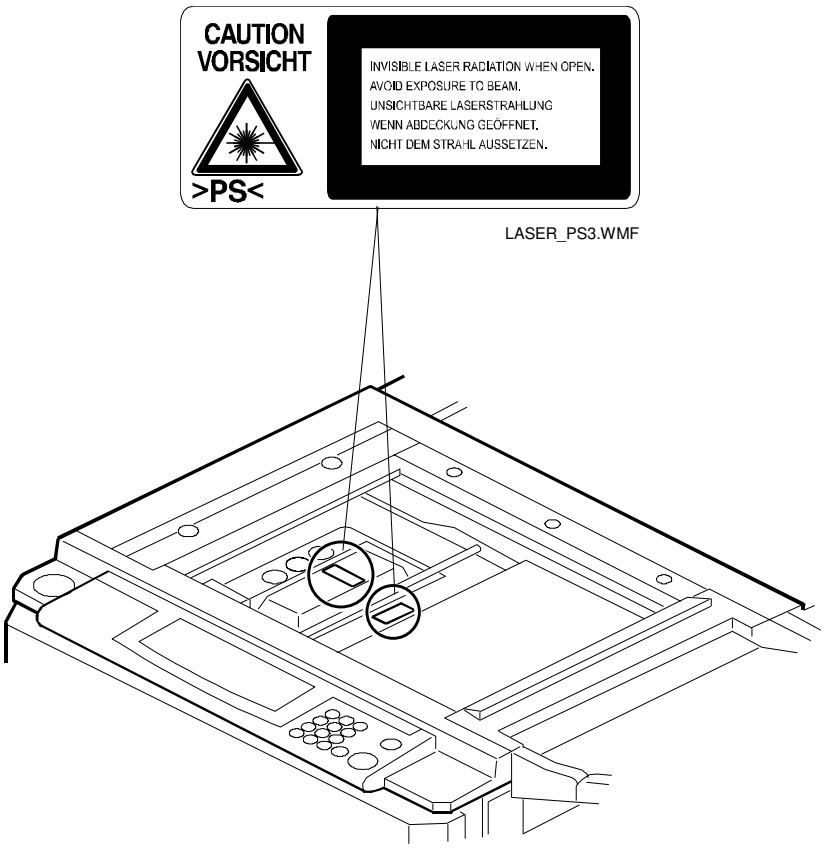
6.4 LASER UNIT

⚠WARNING

Turn off the main power switch and unplug the machine before attempting any of the procedures in this section. Laser beams can seriously damage your eyes.

6.4.1 CAUTION DECAL LOCATIONS

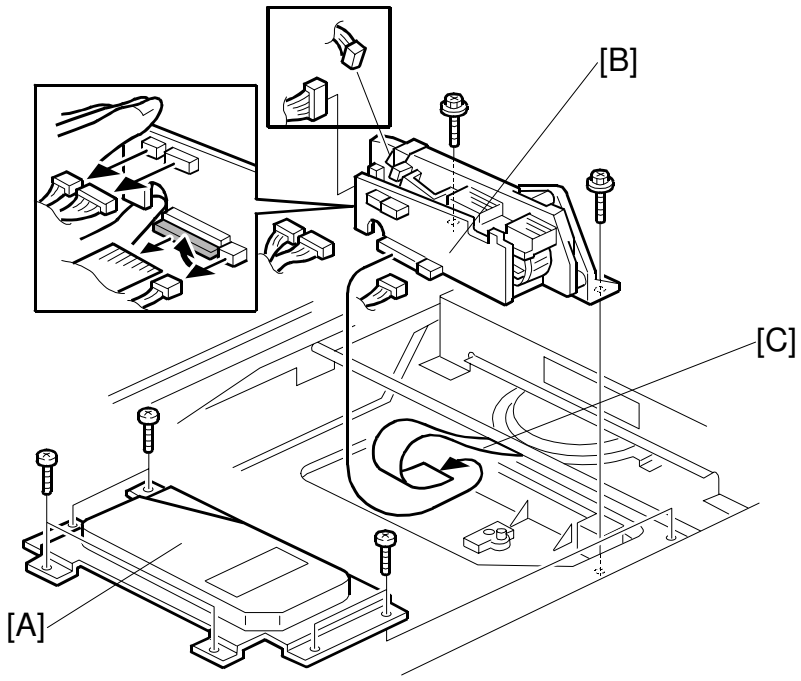
There are two caution decals in the laser section as shown below.



B098R661.WMF

6.4.2 LD UNIT REPLACEMENT

–A229/A293 Only–



B098R101.WMF

⚠WARNING

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

1. Remove the exposure glass. (See Exposure Glass Removal.)
2. Remove the LD cover [A] (6 screws).
3. Replace the LD unit [B] (**A229/A293:** 2 screws and 6 connectors, **B098:** 2 screws and 4 connectors).
   NOTE: When disconnecting the cables, hold the LD unit.
4. When reinstalling, make sure that the flat cable [C] is mounted above the LD unit, and that the rotation of the unit is not interrupted.
5. After replacing the LD unit, check the laser beam pitch adjustment and readjust it if necessary.

   A229/A293: See Laser Beam Pitch Adjustment

   B098: See Laser Beam Pitch Adjustment for B098
6. **For A229/A293 only:** Do SP 2-962 (process control initialization).
   NOTE: Be sure that the cable does not block LD unit rotation after replacing the LD unit. If the LD unit cannot rotate smoothly to change the resolution, SC329 (LD unit home position error) may occur.

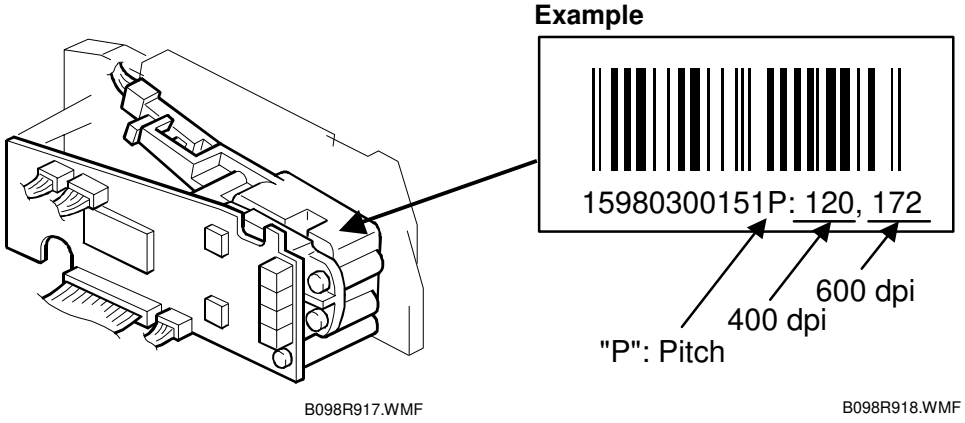
6.4.3 LASER BEAM PITCH ADJUSTMENT

– For A292A293 –

There are two laser beam pitch adjustment procedures: one for 400 dpi, and one for 600 dpi. These adjustments use the following SP modes.

- SP2-109-1: Laser Beam Pitch Adjustment – 400 dpi
- SP2-109-2: Laser Beam Pitch Adjustment – 600 dpi
- SP2-109-3: Laser Beam Pitch Initial Setting – 400 dpi
- SP2-109-4: Laser Beam Pitch Initial Setting – 600 dpi
- SP2-902-3, no.17: Printing Test Pattern – Hound's Tooth Check (1-dot 400 dpi) (Cross Stitch)
- SP2-902-3, no.16: Printing Test Pattern – Hound's Tooth Check (1-dot 600 dpi) (Cross Stitch)

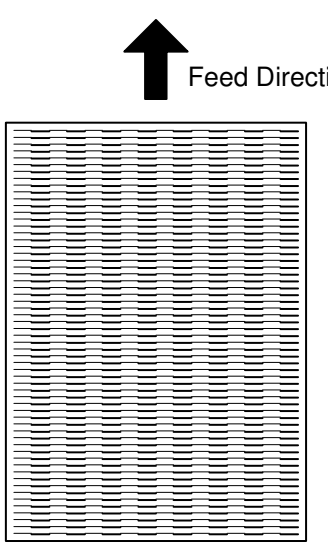
1. Perform SP2-109-8 (Beam Pitch Data Reset).
2. Input the value for 400 dpi that is printed on the LD unit into SP2-109-1. Use the value printed after “P” on the new LD unit as shown below.



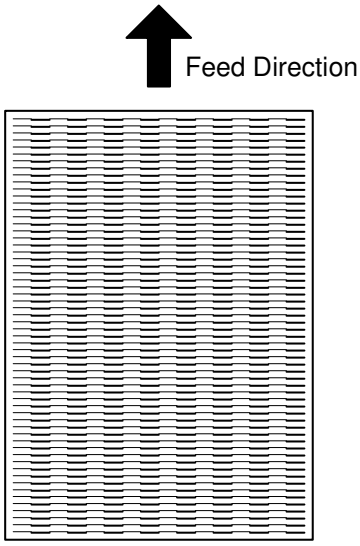
NOTE: Do not use values printed after a “V”.

3. Press the “Enter” key.
4. Perform SP2-109-3.
5. Print the 400-dpi test pattern onto A3 (11”x17”) paper using SP2-902-2 no.12 (cross stitch). (See Service Tables - Test Pattern Printing).
6. Write the value of SP2-109-1 on the test pattern which was input at step 2.
7. Change the value of SP2-109-1 and print another test pattern, repeating steps 2 to 5. Print about 5 patterns with different values for SP2-109-1 (e.g. “48”, “96”, “192”, “240”).

8. Check this test pattern. If the laser beam pitch is not correct, the image looks like a black vertical stripe pattern.
   NOTE: If the laser beam pitch is correct, the vertical stripe is not so noticeable. If the value is not correct, the vertical stripe pattern is darker.
9. Adjust the laser beam pitch position until the thin lines are of uniform thickness (no striping effect should appear on the printout), doing steps 2, 3, and 4. (In step 2, input a value which is estimated to be correct, then do steps 3 and 4, then if necessary go back to step 2 and try another value.)



B098R915.WMF

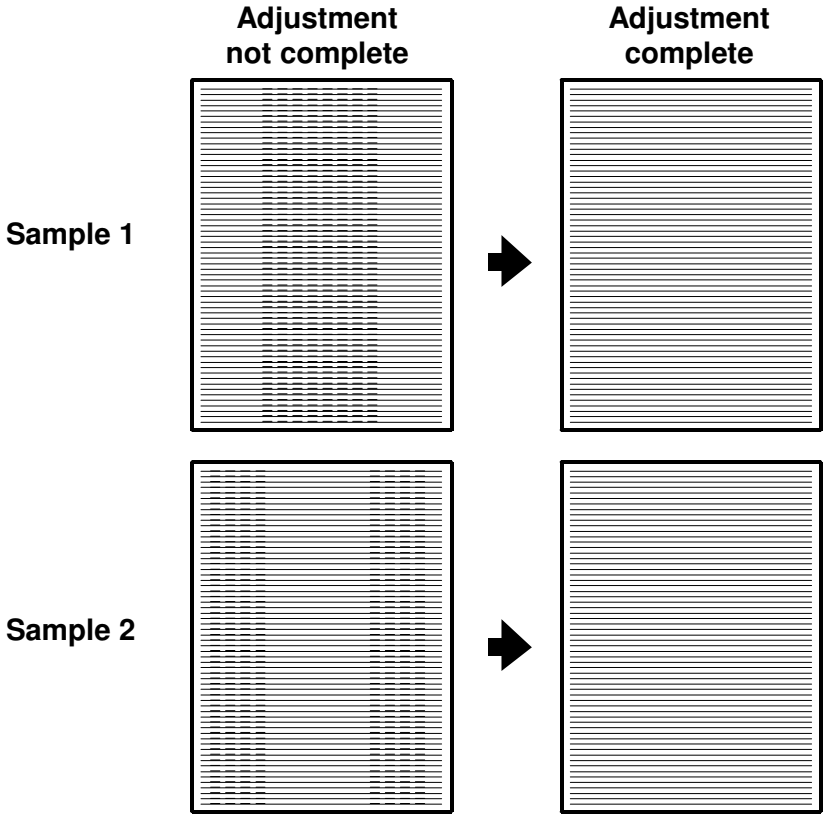


B098R915.WMF

10. After adjusting the laser beam pitch for 400 dpi, adjust the laser beam pitch for 600 dpi, using the same procedure as for 400 dpi (use the SP modes for 600 dpi).

Adjustment not complete **Adjustment complete**

– For B098 –



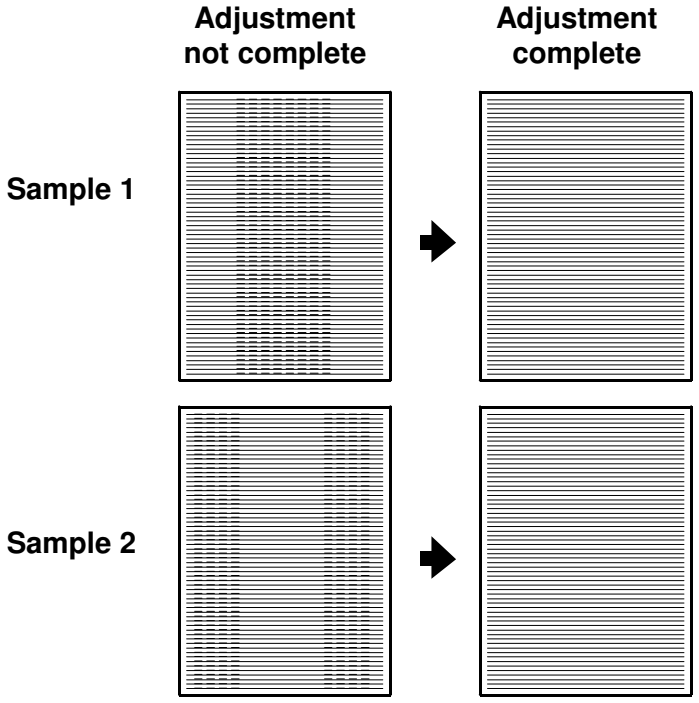
B098R913.WMF

⚠WARNING

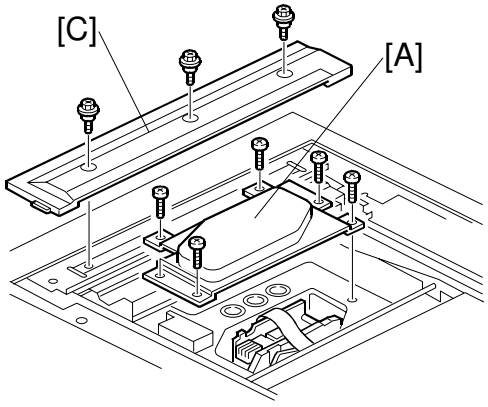
Turn off the main power switch and unplug the machine after performing Steps 1 and 2 below. Laser beams can seriously damage your eyes.

Use the following procedure to perform the pitch adjustment after replacing the LD unit:

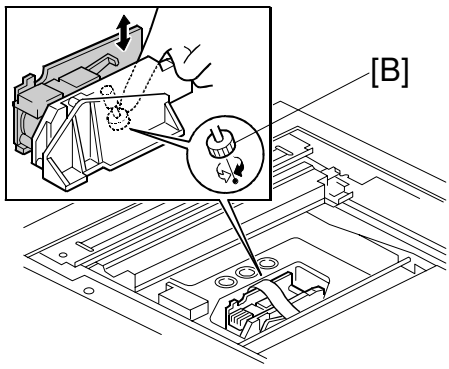
1. Print out the test pattern on to a sheet of A3/ 11" x 17" paper (SP2902-003: 16 – Cross-stitch).
2. Check the test pattern. If the vertical lines are visible, as shown in Sample 1 and 2 above, correct the beam pitch as described below.
   NOTE: The lines are thin, with uniform thickness.
3. Turn off the main switch and unplug the machine.
   NOTE: For safety reasons, make absolutely sure to perform this step before continuing.
4. Remove the exposure glass. (See Exposure Glass Removal.)



B098R913.WMF



B098R912.WMF



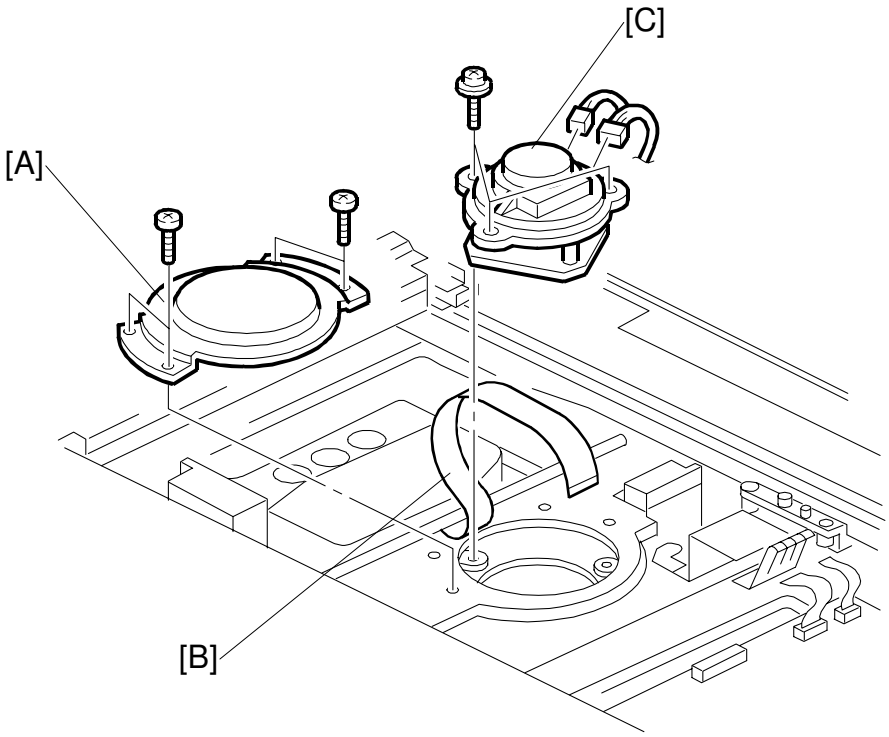
B098R914.WMF

5. Remove the LD cover [A] (6 screws).
6. Adjust the laser beam pitch by turning the adjustment screw [B]. Turn the clockwise or counter-clockwise, depending on what the test pattern looks like:

Test pattern:	Adjustment direction
Sample 1	Clockwise
Sample 2	Counter clockwise

7. Reattach the LD cover, exposure glass and left scale [C].
8. Print out the test pattern again. If necessary, repeat the adjustment from Step 3 until the lines do not appear.
   NOTE: If performing the adjustment again, make absolutely sure to turn off the main power and unplug the machine before beginning.

6.4.4 POLYGON MIRROR MOTOR REPLACEMENT



A293R102.WMF

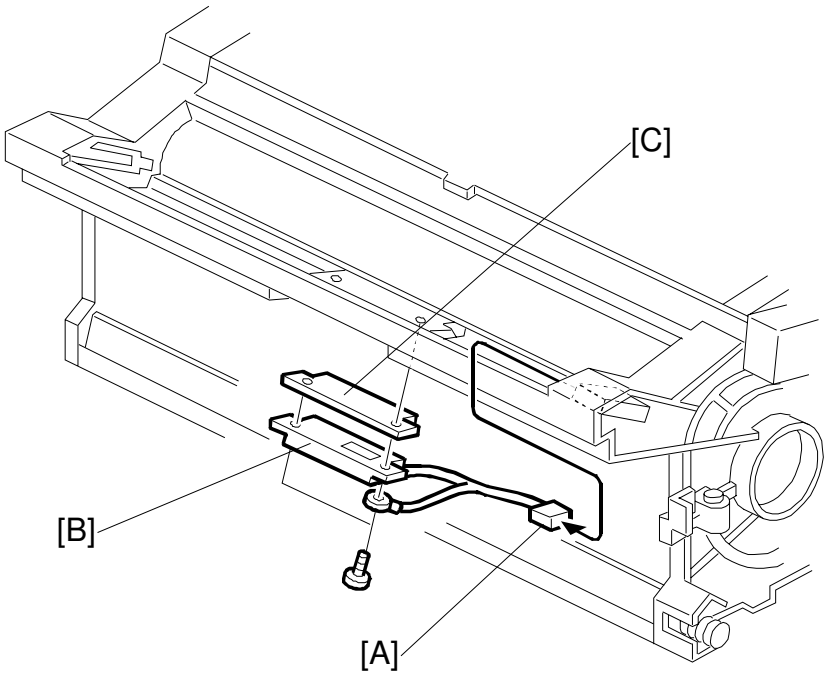
1. Turn off the main power switch and unplug the machine.
2. Remove the exposure glass. (See Exposure Glass Removal.)
3. Remove the lens cover. (See Lens Block Assembly Replacement.)
4. Remove the lens block assembly. (See Lens Block Assembly Replacement.)
5. Remove the polygon mirror motor cover [A] (2 screws).
6. Disconnect the LD unit flat cable [B].
7. Replace the polygon mirror motor [C] (3 screws and 2 connectors.)

NOTE: When reinstalling, make sure that the polygon mirror opening faces the right. Also, do not pull on the LD flat cable.

8. Do the scanner and printer copy adjustments. (See Replacement and Adjustment – Copy Image Adjustments.)

6.5 DRUM UNIT

6.5.1 DRUM POTENTIAL SENSOR REPLACEMENT

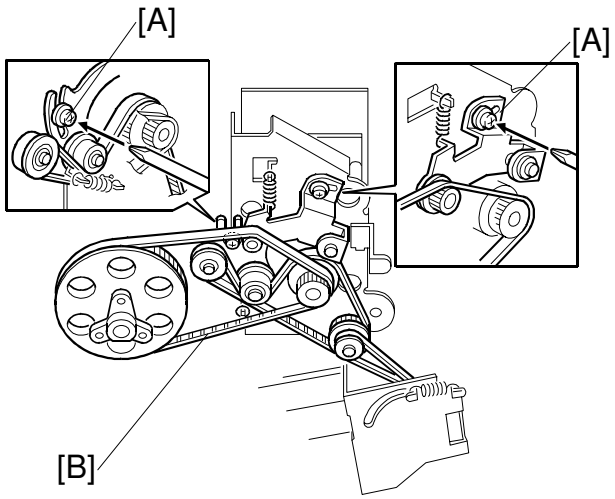


A293R662.WMF

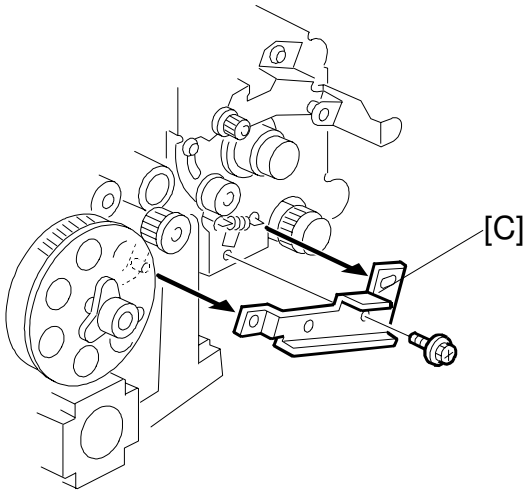
1. Take out the drum unit. (Refer to Drum Unit Removal.)
2. Disconnect the connector [A].
   NOTE: Before removing the drum potential sensor, put a few sheets of paper between the sensor and the drum to protect the drum surface.
3. Remove the drum potential sensor [B] and the grounding plate [C] (2 screws).
4. Replace the drum potential sensor [B].

⚠CAUTION
After replacing the drum potential sensor, perform the process control data initial setting (SP mode No. 2-962).

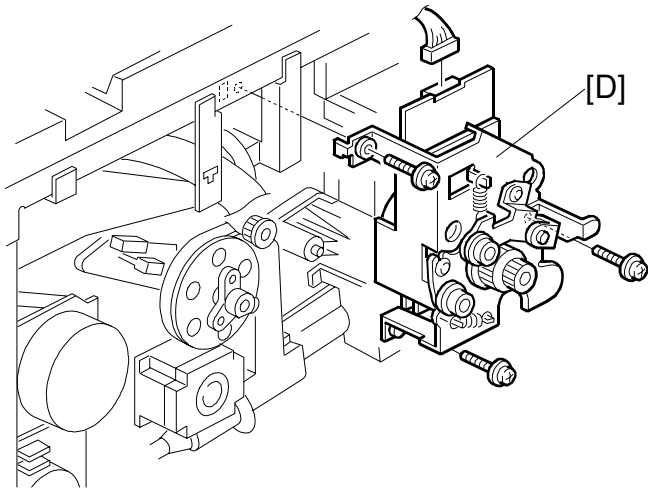
6.5.2 DRUM MOTOR REPLACEMENT



A293R573.WMF



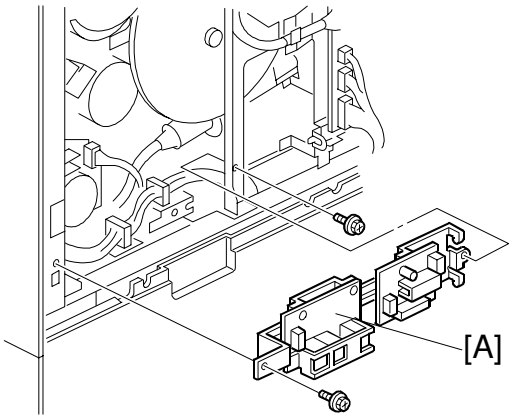
A293R907.WMF



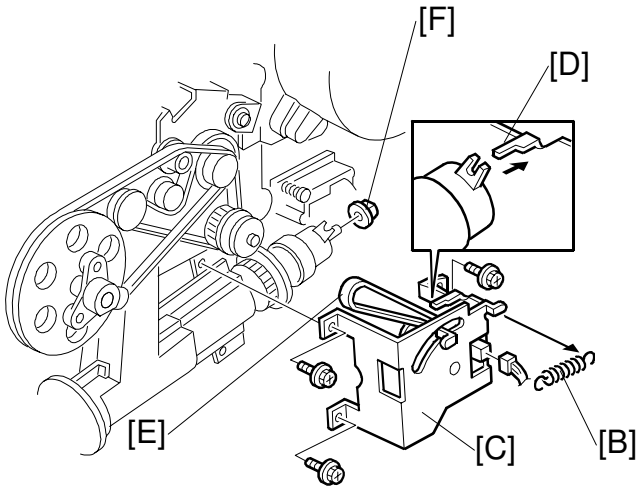
A293R574.WMF

1. Turn off the main switch.
2. Remove the rear cover and the fly wheel. (Refer to Development Motor Replacement.)
3. Loosen the tension brackets [A] (2 screws).
4. Remove the timing belts [B] from the drum motor's pulleys.
5. Remove the support plate [C].
6. Replace the drum motor unit [D] (3 screws, 1 connector).
   NOTE: When re-installing the drum motor unit, re-install the support plate before attaching the timing belt and the tension bracket.

6.5.3 TONER OUTPUT AND RECYCLING PUMP UNIT REPLACEMENT



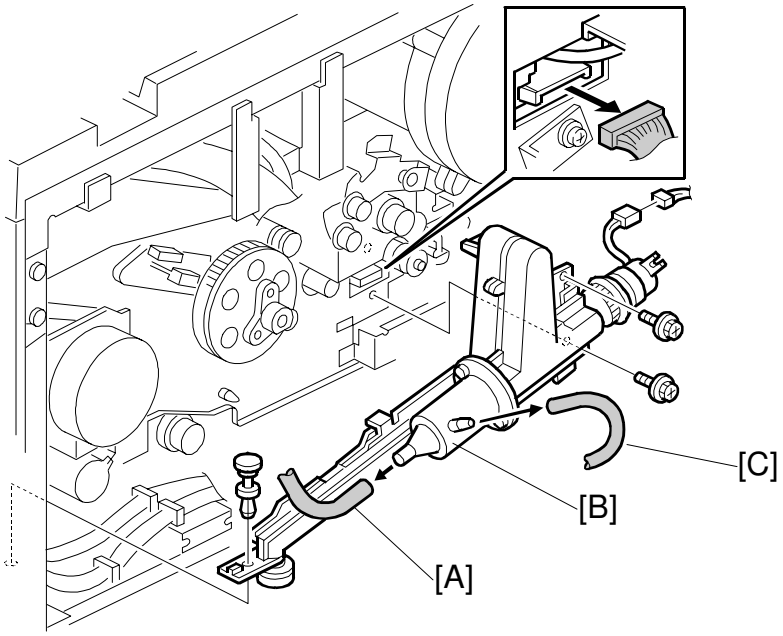
A293R909.WMF



A293R575.WMF

NOTE: Before starting the procedure, remove the drum unit and the transfer belt unit to prevent toner from dropping into the machine.

1. Turn off the main switch.
2. Remove the rear cover and fly wheel. (Refer to Development Motor Replacement.)
3. Remove the DRB board assembly [A] (2 screws).
4. Lower the I/O Board (4 screws).
5. Remove the spring [B].
6. Remove the toner recycling clutch bracket [C] (3 screws, 1 connector)
   NOTE: When reinstalling the bracket [C], put the pin on the stopper [D] into the cutout in the clutch.
7. Remove the timing belt [E] from the drum motor's pulley.
8. Remove the bushing [F].
   NOTE: Be careful not to drop the bushing.
9. Remove the by-pass feed motor. (Refer to By-pass Feed Motor/Clutch Replacement.)

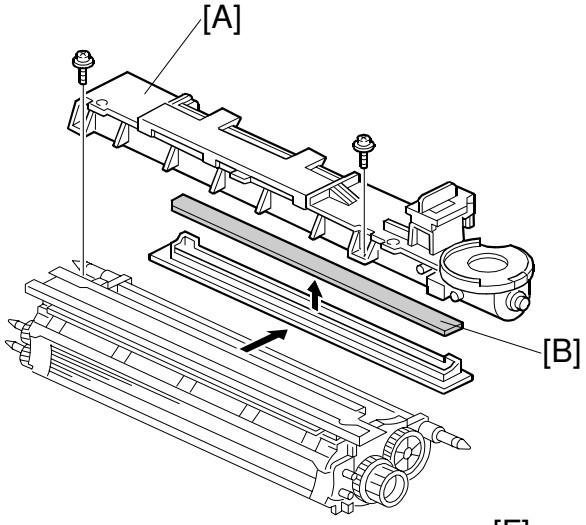


A293R576.WMF

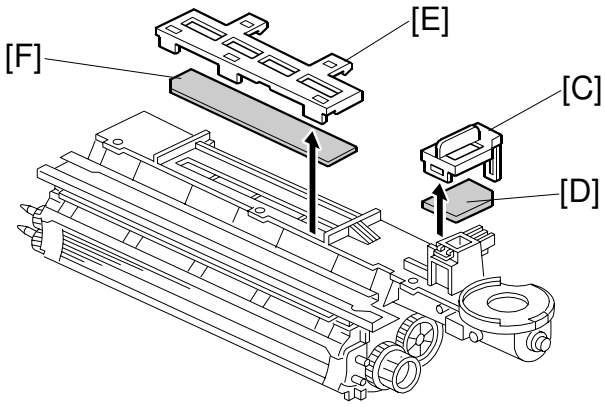
10. Release the toner recycling tube [A] from the pump unit.
    NOTE: When turning the end of the tube downwards, prevent the toner in it from dropping into the machine.
11. Release the air tube [B].
12. Remove the toner output and recycling pump unit [C] (2 screws, 1 pin connectors).
    NOTE: The lower part of the pin (push lock) drops easily.

6.6 DEVELOPMENT AND TONER SUPPLY

6.6.1 DEVELOPMENT AND AIR DUST FILTER REPLACEMENT



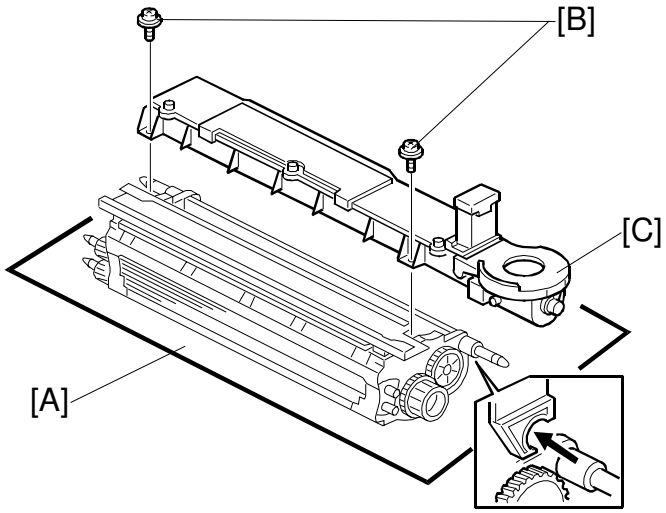
A293R302.WMF



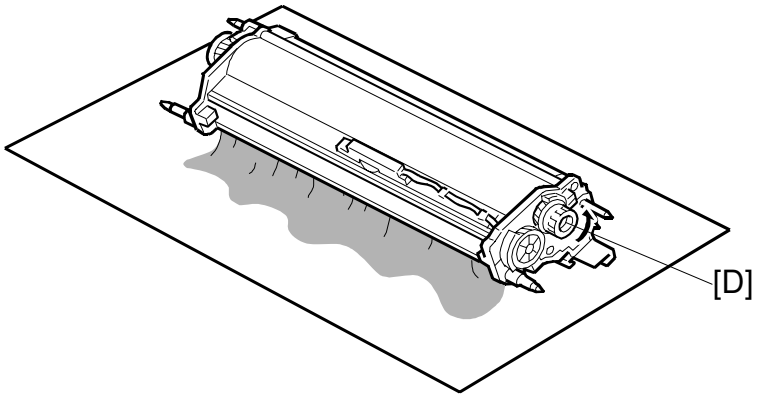
A293R301.WMF

1. Take out the development unit. (Refer to Development Unit Removal.)
2. Remove the toner hopper [A] (two screws).
3. Replace the development filter [B].
4. Remove the front air dust filter cover [C] (1 hook).
5. Replace the front air dust filter [D].
6. Remove the central air dust filter cover [E].
7. Replace the central air dust filter [F].

6.6.2 DEVELOPER REPLACEMENT

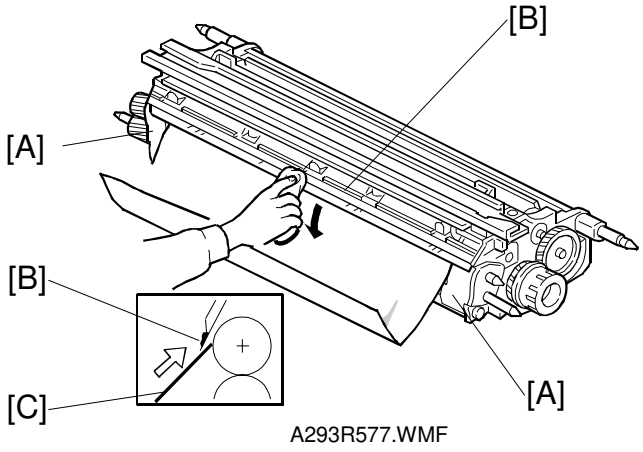


A293R674.WMF

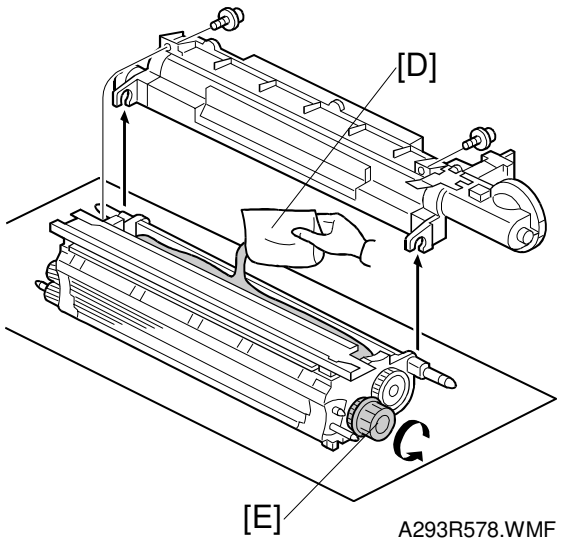


A293R675.WMF

1. Take out the development unit. (Refer to Development Unit Removal.)
2. Place the development unit on a sheet of paper [A].
3. Remove the two screws [B] that hold the toner hopper [C].
4. Remove the toner hopper from the development unit.
5. Turn over the development unit then turn the paddle roller knob [D] to empty the remaining developer onto the sheet. (The one-way clutch in the knob [D] allows the paddle roller to be turned counterclockwise only.)
   NOTE: Dispose of used developer in accordance with local regulations. Make sure that no developer remains on the development rollers or in the development unit.



A293R577.WMF

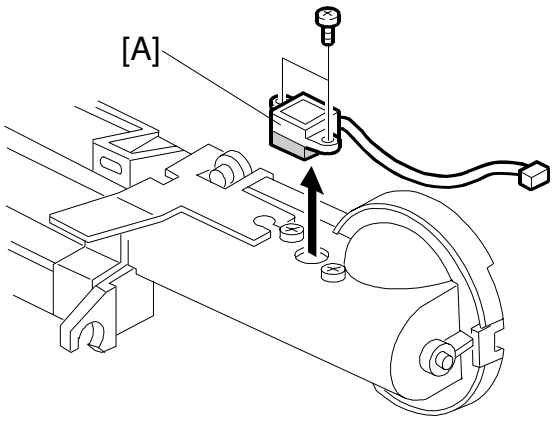


A293R578.WMF

6. Clean the side seals [A] and entrance seal [B].
   NOTE: Cover the sleeve rollers with a sheet of paper [C] to prevent the used developer from being attracted to the sleeve rollers.
7. Pour in one pack of developer [D] evenly across the width of the development unit, while turning the knob [E].
8. Re-install the toner hopper, then re-assemble the machine.
   NOTE: 1) Be sure to connect the connectors after installing the development unit in the machine.
   2) Tilt the toner hopper so that there is toner near the toner end sensor.
9. Turn on the main switch, then perform developer initial setting (SP mode No. 2-801).

NOTE: 1) Enter the SP mode before the machine automatically starts the auto process control. If you could not enter the SP mode before this starts, do the developer initial setting after the print key turns green. Do not turn off the main switch until the developer initial setting has finished.
2) Do not make any copies with the new developer before completing the developer initial setting, otherwise toner density control will be abnormal.
3) When the developer initial setting did not complete correctly, you cannot exit the SP mode by pressing the "Quit" key. If this problem occurs, turn the main switch off and on, then perform the initial setting again. If the result is the same, see "SC341 or 342" in the troubleshooting section.

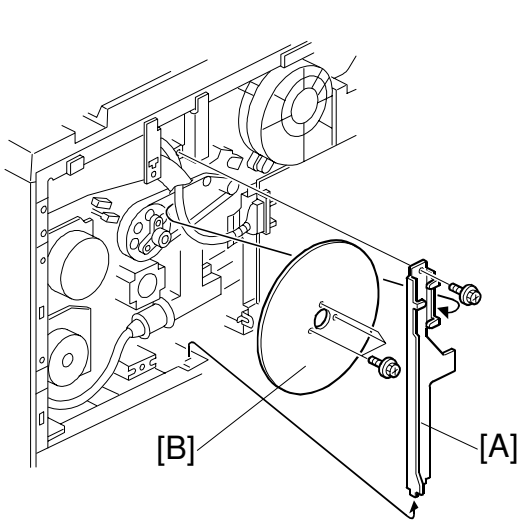
6.6.3 TONER END SENSOR REPLACEMENT



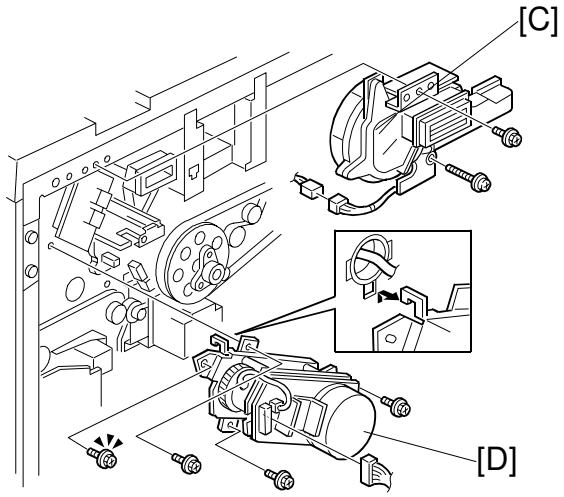
A293R579.WMF

1. Take out the toner hopper. (Refer to Developer Replacement.)
2. Replace the toner end sensor [A].

6.6.4 DEVELOPMENT MOTOR REPLACEMENT



A293R580.WMF

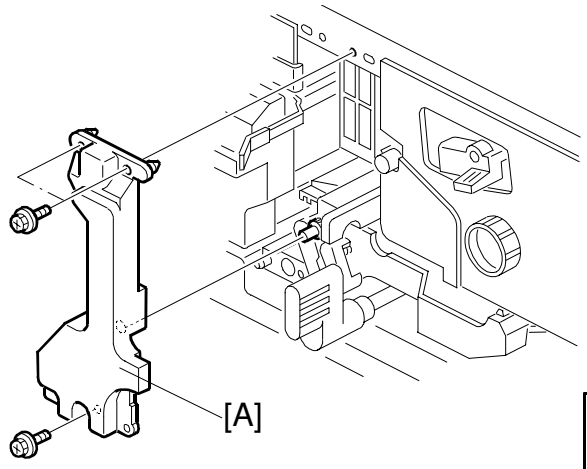


A293R908.WMF

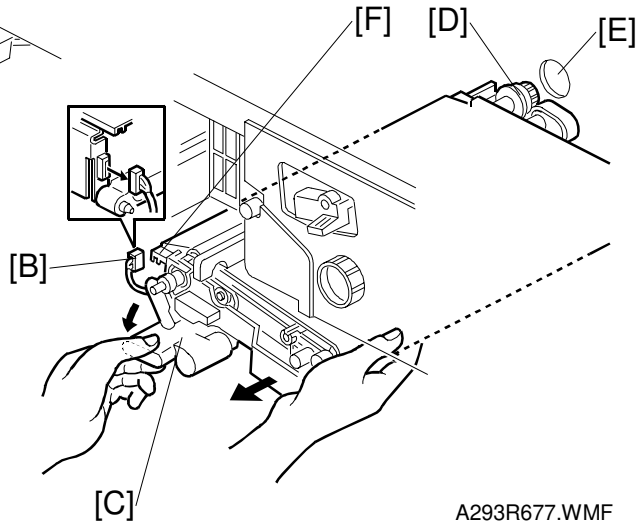
1. Turn off the main switch.
2. Remove the rear covers. (Refer to Exterior Cover Removal.)
3. Remove the harness-guide bracket [A] (1 screw).
4. Remove the fly wheel [B] (3 screws).
5. Remove the drum cooling fan [C].
6. Replace the development motor unit [D] (3 screws, 1 connector, and 1 hook).

6.7 TRANSFER BELT UNIT

6.7.1 TRANSFER BELT UNIT REMOVAL/INSTALLATION



A293R676.WMF



A293R677.WMF

- Removal -

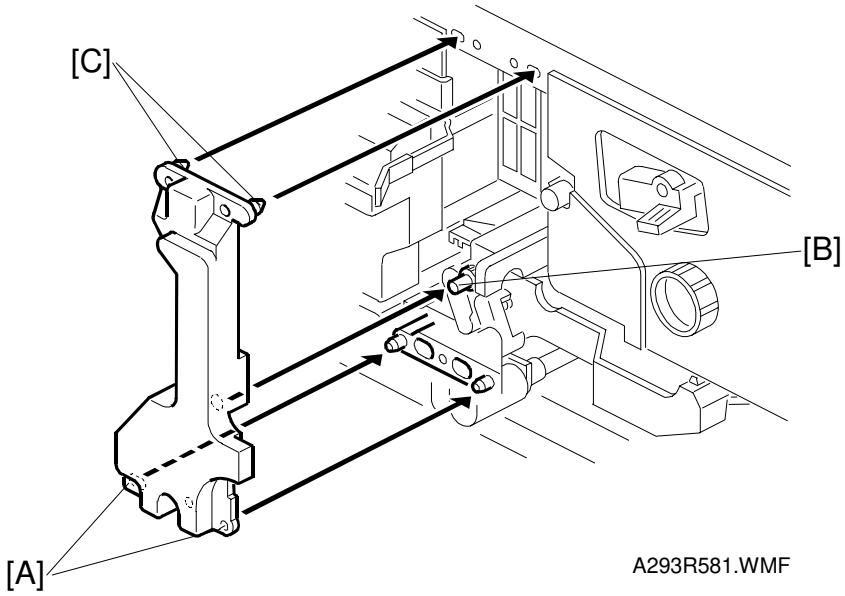
1. Turn off the main switch.
2. Remove the transfer belt unit prop [A] (3 screws).
3. Disconnect the connector [B].
4. While turning the lever [C] counterclockwise, take out the transfer belt unit.

   NOTE: 1) Do not touch the transfer belt with bare hands.
   2) Take care not to scratch the drum with the transfer belt unit. Be careful when installing the transfer belt unit.

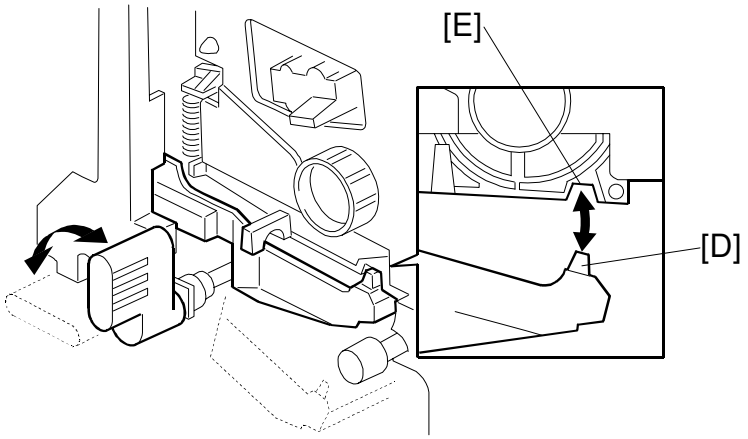
- Installation -

1. While turning the lever [C] counterclockwise, install the transfer belt unit.

   NOTE: 1) Insert the gear [D] into the opening [E] in the rear frame.
   2) Place the slot [F] in the transfer belt unit on the rail.



A293R581.WMF

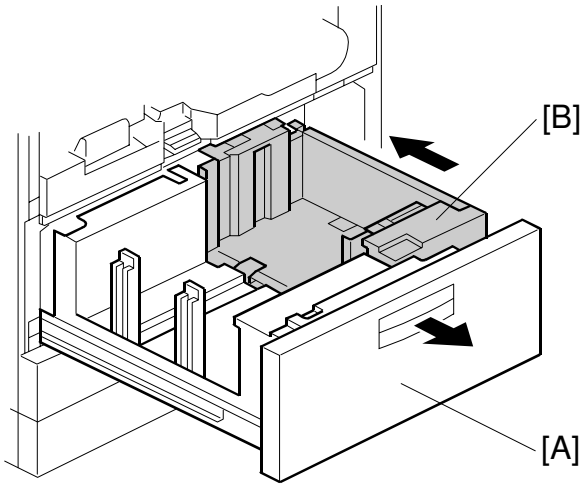


A293R401.WMF

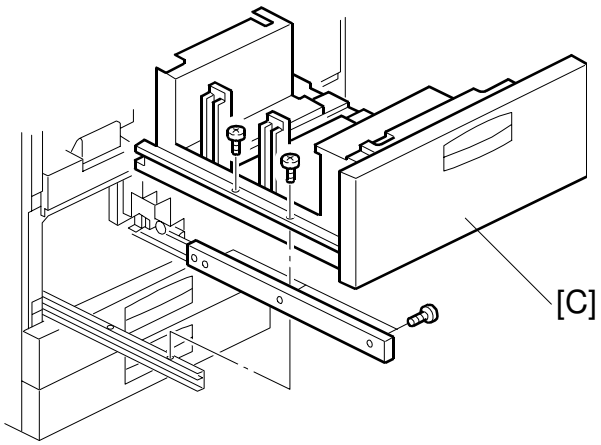
2. Attach the transfer belt unit prop (3 screws).
   NOTE: To attach the transfer belt unit prop easily, set the following in order: lower pins [A], drive roller shaft [B], upper pins [C].
3. After installation, check the following points:
   1) The transfer belt unit must move up and down smoothly.
   2) Part [D] of the transfer belt unit must be behind the drum stay.
   3) Part [D] of the transfer belt unit must be set in the indent [E] in the drum unit casing.

6.8 PAPER FEED

6.8.1 PAPER TRAY REMOVAL



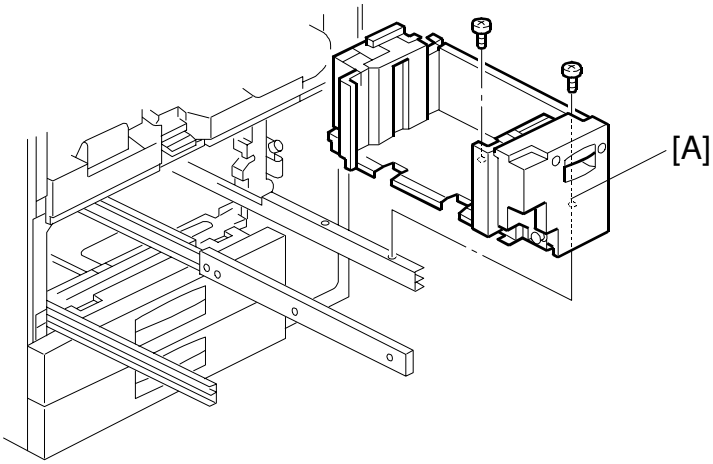
A293R582.WMF



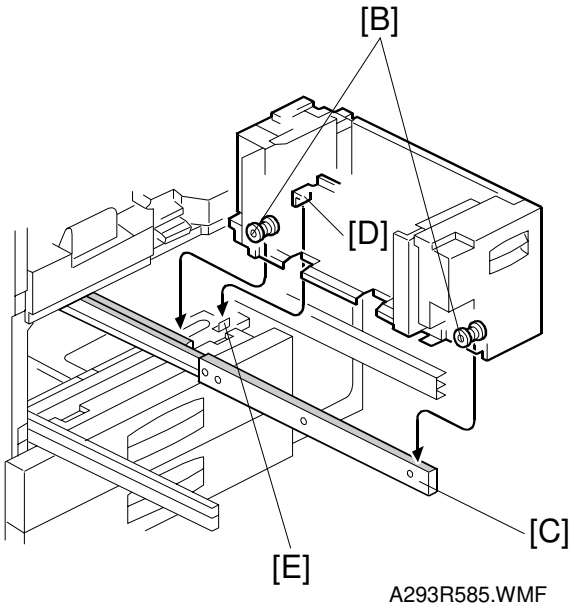
A293R583.WMF

Tandem Tray Removal

1. Open the front cover.
2. Draw out the tandem feed tray [A] fully to separate the right tandem tray [B] from the left one.
3. Remove the left tandem tray [C] (5 screws).



A293R584.WMF



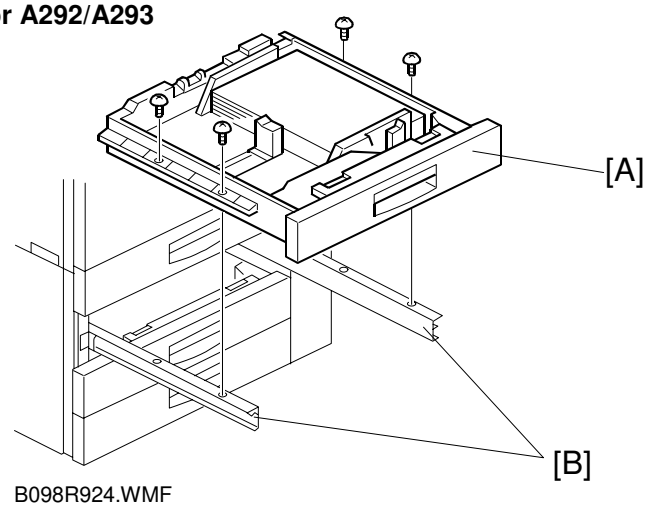
A293R585.WMF

4. Remove the right tandem tray [A] (2 screws).

NOTE: 1) When re-installing the right tandem tray, make sure that the wheels [B] ride on the slide rail [C].
2) When re-installing the right tandem tray, make sure that the tandem tray stopper [D] is set behind the stopper [E] on the copier frame.

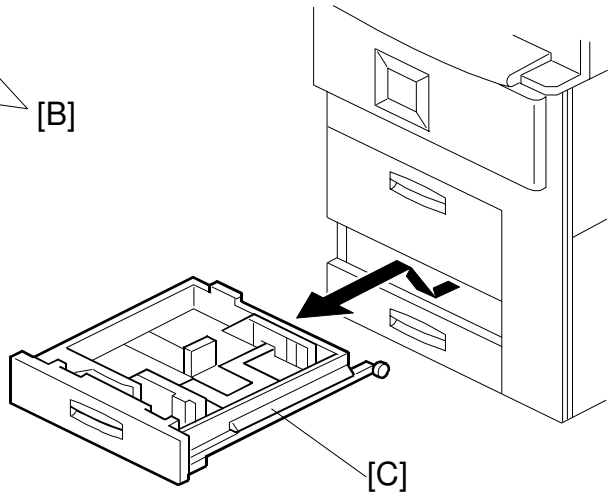
Universal trays (Customer adjust/Technician adjust) Removal

for A292/A293



B098R924.WMF

for B098



B098R919.WMF

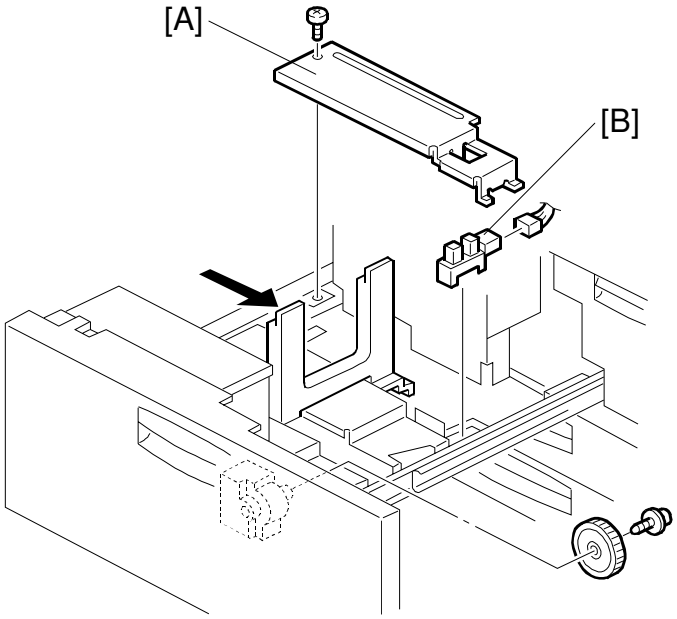
For A292/A293

1. Draw out the tray.
2. Remove the tray [A] from both guide rails [B] as shown (4 screws).

For B098

1. Draw out the tray [C] and remove it as shown.

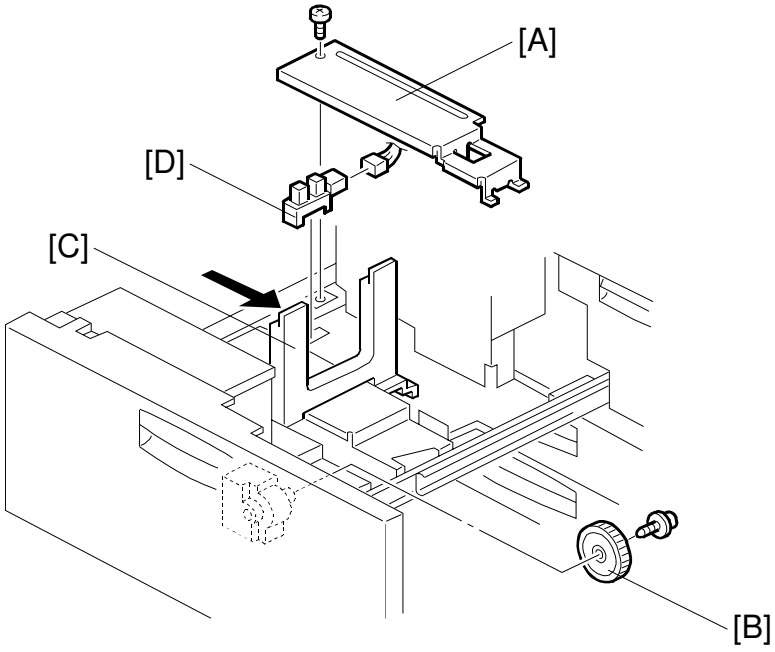
6.8.2 REAR FENCE RETURN SENSOR REPLACEMENT



A293R586.WMF

1. Turn off the main switch.
2. Draw out the tandem feed tray.
3. Remove the rear bottom plate [A] (1 screw).
4. Replace the return sensor [B] (1 connector).

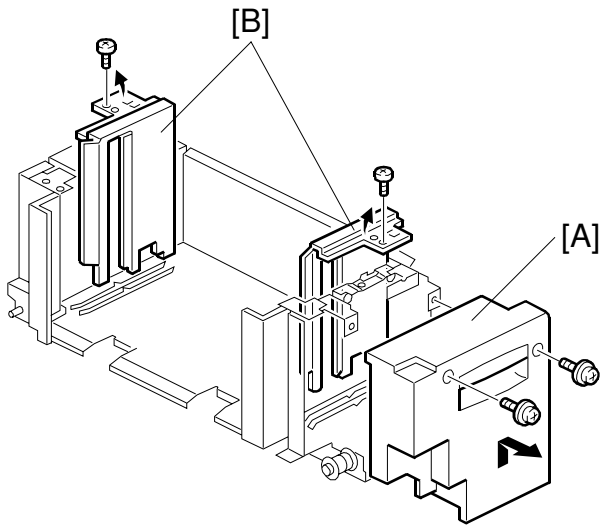
6.8.3 REAR FENCE HP SENSOR REPLACEMENT



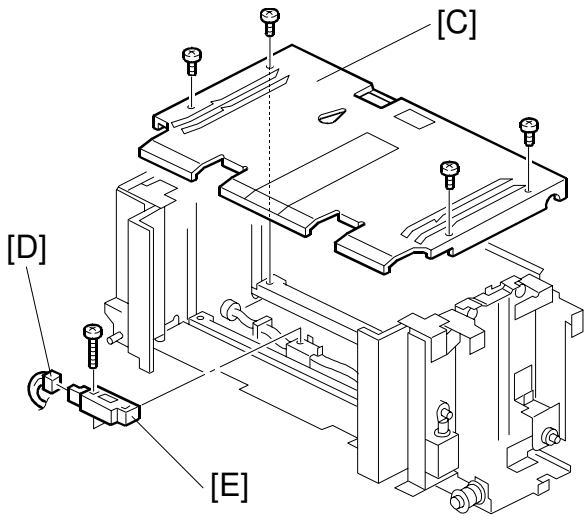
A293R589.WMF

1. Turn off the main switch.
2. Draw out the tandem feed tray.
3. Remove the rear bottom plate [A] (1 screw).
4. Remove the back fence transport gear [B] (1 screw).
5. Move the back fence [C] to the right.
6. Remove the rear HP sensor [D] (1 connector).

6.8.4 BOTTOM PAPER SENSOR REPLACEMENT



A293R587.WMF

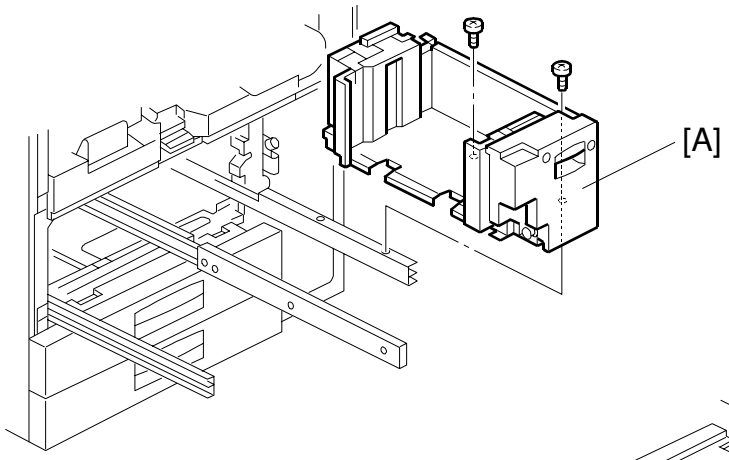


A293R588.WMF

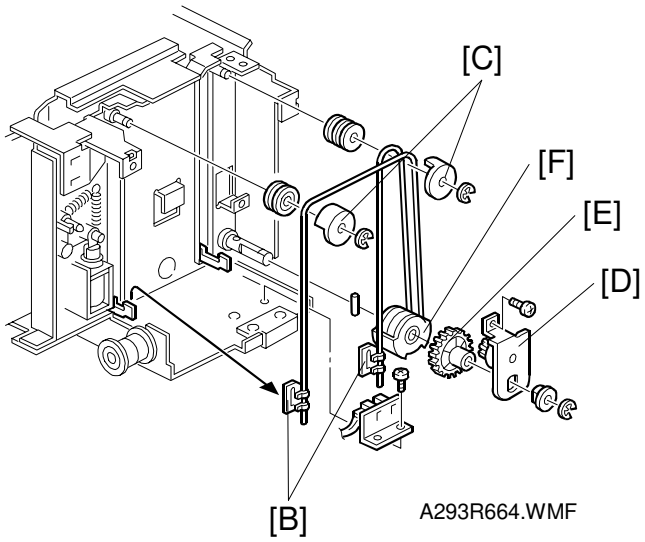
1. Turn off the main switch.
2. Remove the right tandem tray. (Refer to Paper Tray Removal.)
3. Remove the inner cover [A] (2 screws).
4. Remove the side fences [B] (1 screw each).
5. Remove the bottom plate [C] (4 screws).
6. Disconnect the connector [D].
7. Replace the bottom paper sensor [E] (1 screw).

6.8.5 BOTTOM PLATE LIFT WIRE REPLACEMENT

NOTE: Before replacing the rear bottom plate lift wire, remove the front bottom plate lift wire. It is necessary to remove the shaft for replacing the rear bottom plate lift wire.

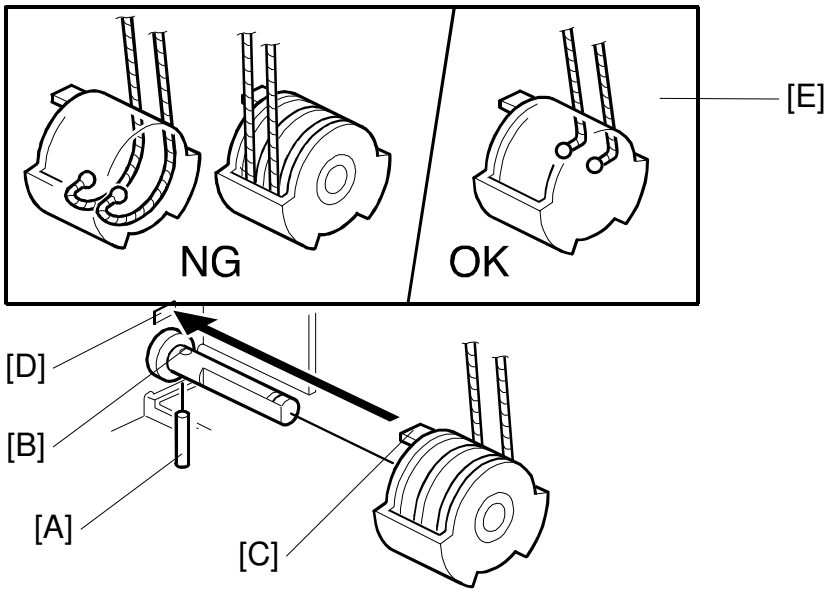


A293R663.WMF



A293R664.WMF

1. Remove the right tandem tray. (Refer to Paper Tray Removal.)
2. Remove the inner cover [A] (2 screws).
3. Slightly lift the front bottom plate and unhook the wire stoppers [B].
4. Remove the wire covers [C] (1 E-ring each).
5. Remove the bracket [D] (1 screw, 1 E-ring, 1 bushing).
6. Remove the gear [E].
7. Replace the bottom plate lift wire [F].

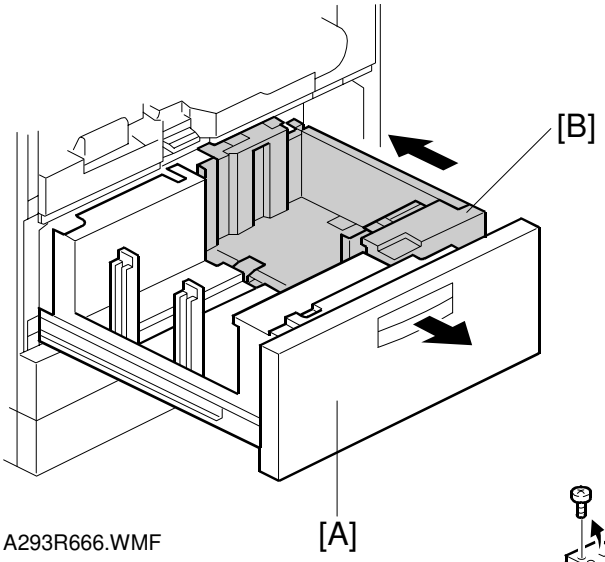


A293R665.WMF

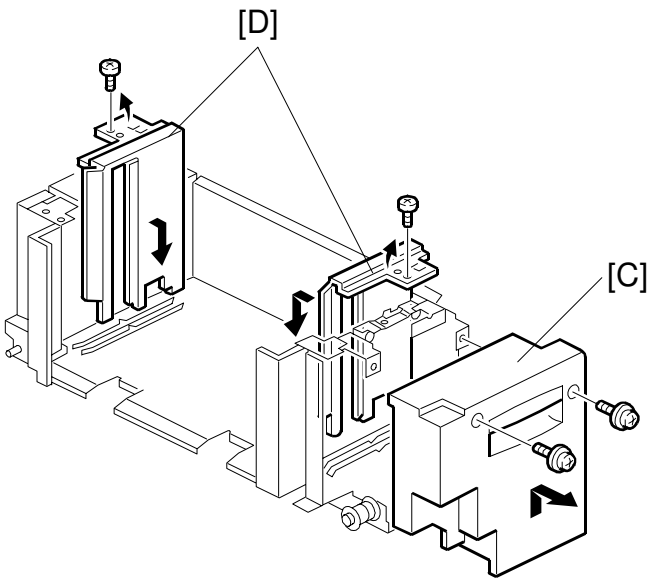
NOTE: When re-installing the bottom plate lift wire:
1) Set the positioning pin [A] in the hole [B] and set the projection [C] in the hole [D].
2) Position the wire as shown [E].
3) Do not cross the wires.

6.8.6 TANDEM LCT PAPER SIZE CHANGE

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

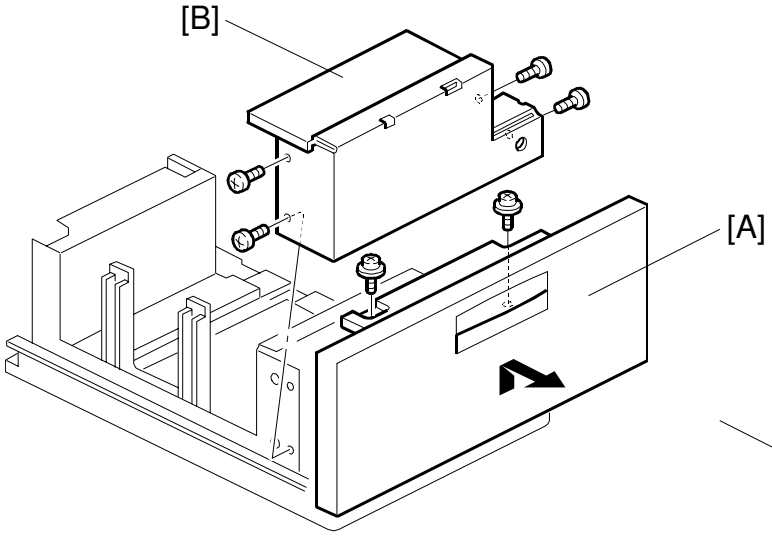


A293R666.WMF

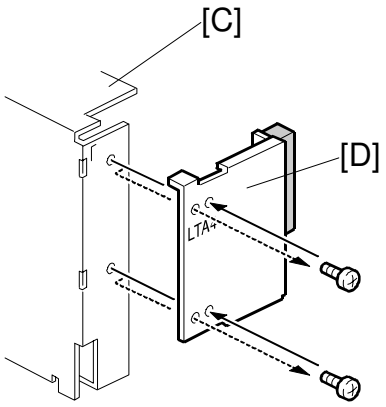


A293R667.WMF

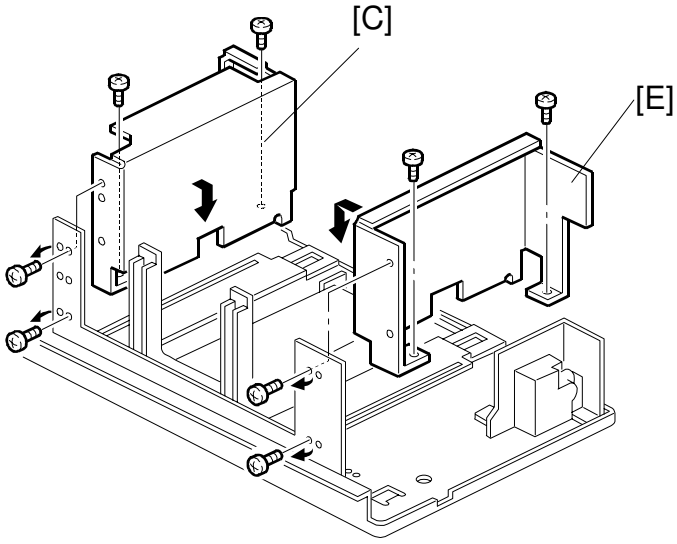
1. Open the front cover.
2. Completely pull out the tandem feed tray [A] to separate right tandem tray [B] from the left tandem tray.
3. Remove the right tandem inner cover [C] (2 screws).
4. Re-position the side fences [D] (1 screw each).
   A4: Outer slot position
   LT: Inner slot position
5. Re-install the right tandem inner cover [C].



A293R668.WMF

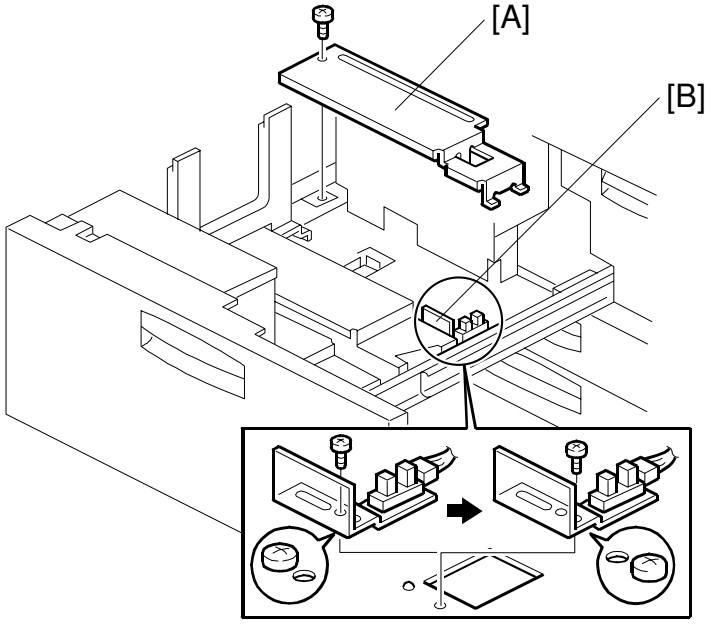


A293R543.WMF



A293R669.WMF

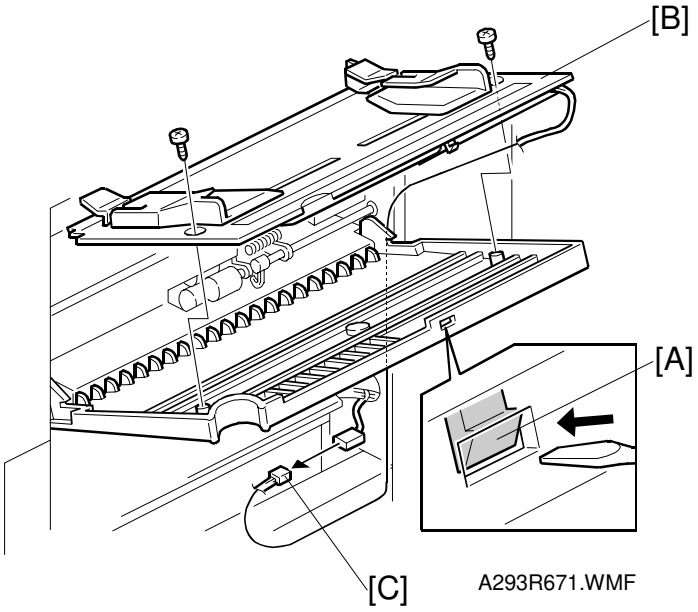
6. Remove the tray cover [A] (2 screws).
7. Remove the DC motor cover [B] (4 screws).
8. Remove the rear side fence [C] (4 screws) and re-position the rear cover [D] (2 screws).
9. Re-position the side fences [C] [E] (4 screws).
   A4: Outer slot position
   LT: Inner slot position
10. Re-install the DC motor cover and the tray cover.



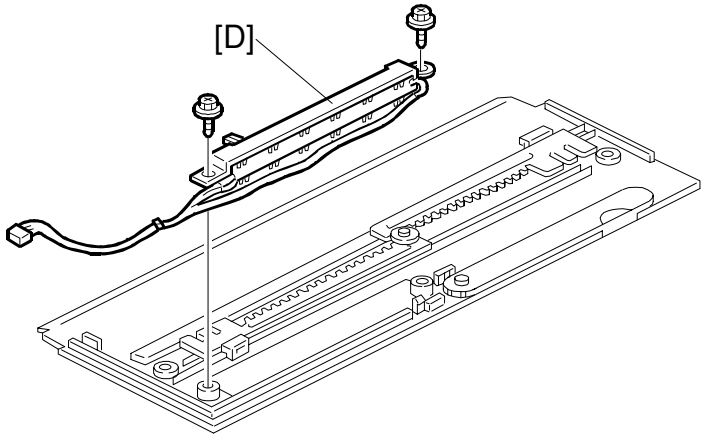
A293R670.WMF

11. Remove the rear bottom plate [A] (1 screw).
12. Re-position the return position sensor bracket [B] (1 screw). To use the paper tray for A4 size, set the screw on the left hole as shown. (For LT size, the screw should be placed on the right.)
13. Reinstall the rear bottom plate.
14. Enter System Setting in User Tools, and select the paper size that you just set the fences up for.

6.8.7 BY-PASS PAPER SIZE BOARD REPLACEMENT

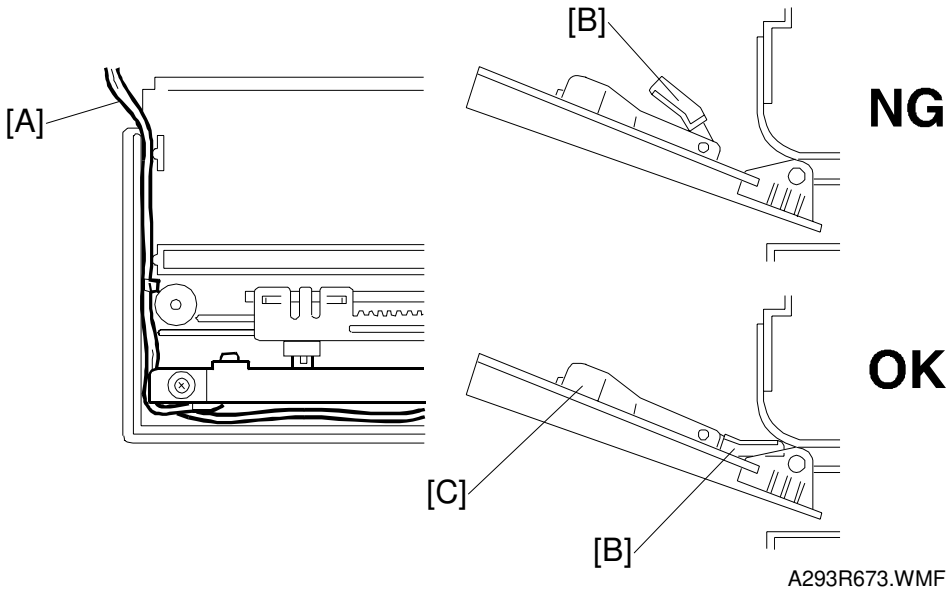


A293R671.WMF



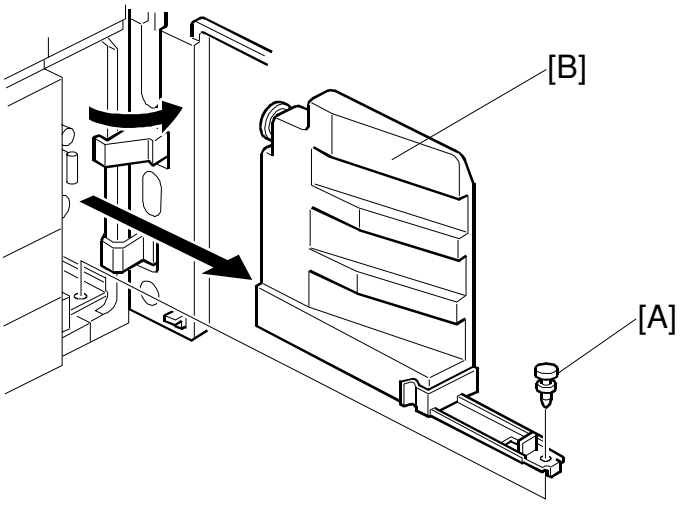
A293R672.WMF

1. Turn off the main switch.
2. Open the by-pass table and remove the feed unit cover. (Refer to Right Cover Removal.)
3. While pushing the hook [A] with a flat-head screwdriver as shown, remove the table assembly [B] (2 screws, 1 connector [C]).
4. Remove the by-pass paper size board [D] (2 screws).

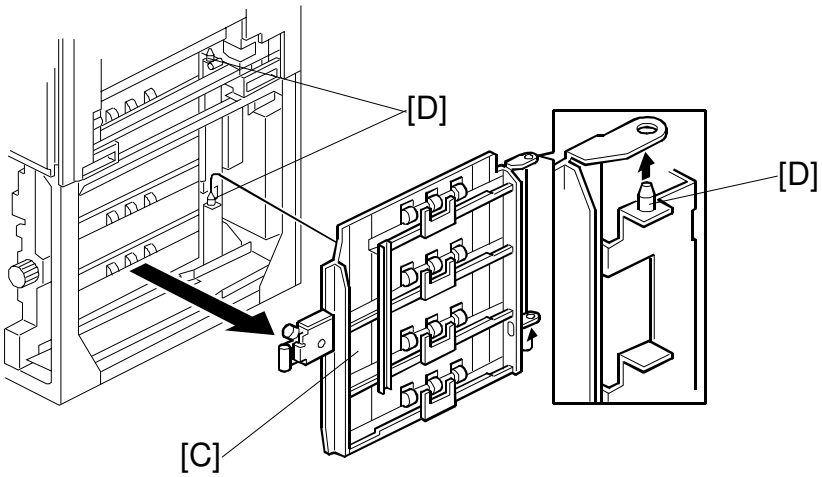


5. Re-install the by-pass paper size sensor, then reassemble the by-pass feed table.
   NOTE: When installing the table assembly, route the wires [A] correctly as shown.
   The paper guides [B] must be in the lower position as shown.
6. Perform the by-pass tray paper size correction (SP1-904) as follows.
   1) Press the 1904-1 key and place the side fence [C] at the minimum paper size position (width = 100 mm). Then press the Start key on the touch panel.
   2) Press the 1904-2 key and place the side fence [C] at the maximum paper size position (width = A3). Then press the Start key on the touch panel.

6.8.8 PAPER FEED CLUTCH/RELAY CLUTCH REMOVAL

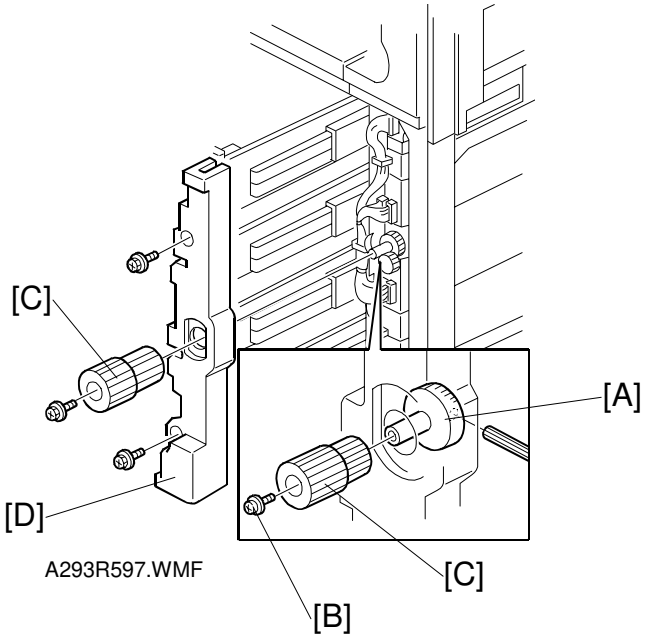


A293R651.WMF

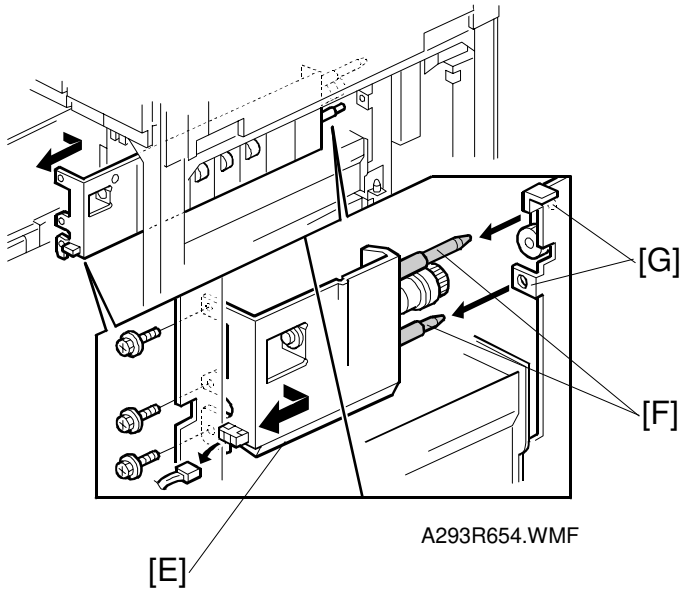


A293R650.WMF

1. Turn off the main switch, then open the right front door and remove the push-lock [A].
2. Remove the toner collection bottle [B].
   NOTE: If the LCT is installed, remove it from the copier.
3. Remove the lower right cover. (Refer to Lower Right Cover Removal.)
4. Remove the vertical transport guide [C].
   NOTE: When reinstalling the guide, rest it on the upper and lower pins [D].

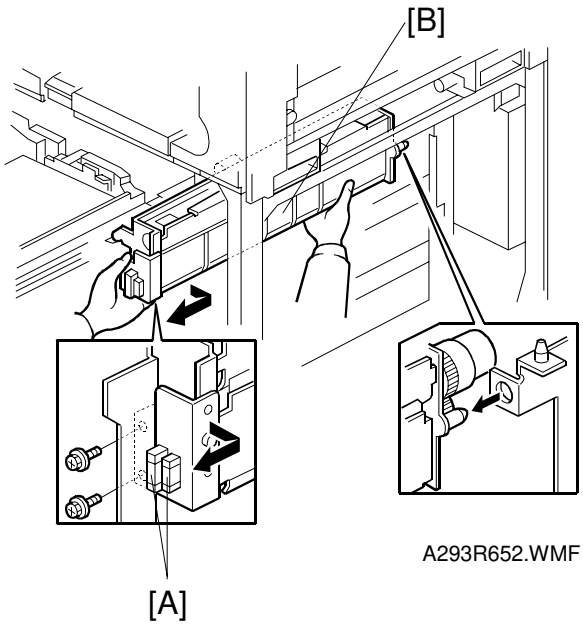


A293R597.WMF

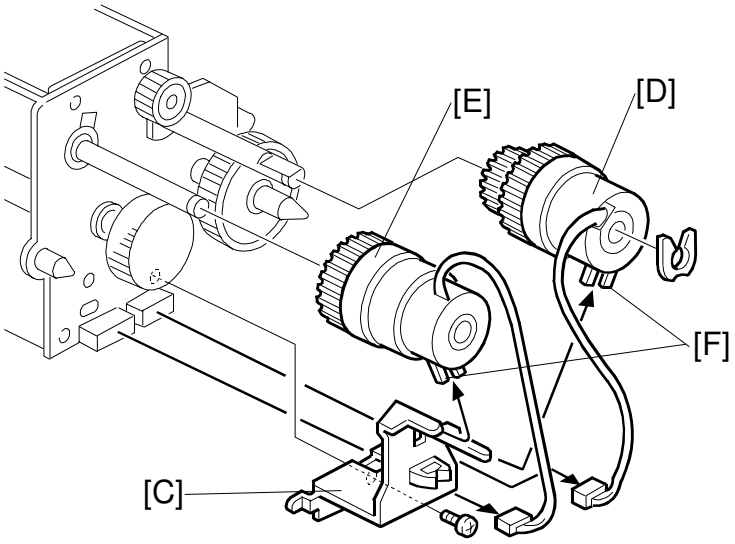


A293R654.WMF

5. While holding the shaft [A] with an Allen key, remove the screw [B], then remove the knob [C].
6. Pull out all paper trays, then remove the paper tray unit inner cover [D] (2 screws).
7. Hold the inner vertical transport guide [E] and pull out it (3 screws, 1 connector).
   NOTE: When re-installing the inner vertical transport guide, make sure to set the pins [F] of the inner vertical guide into the holes [G] in the main frame.



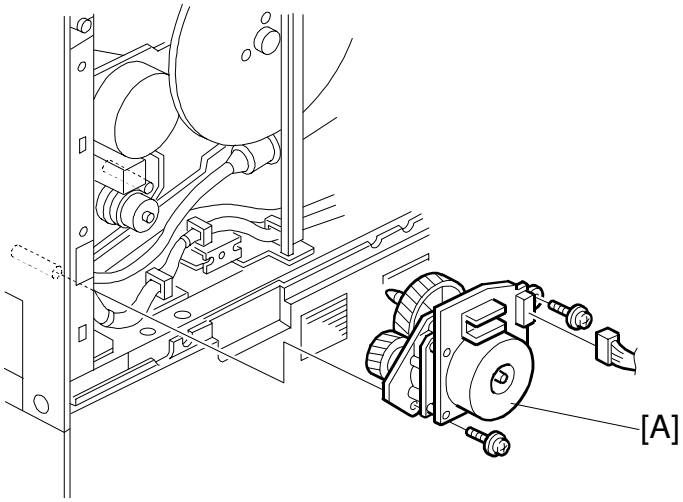
A293R652.WMF



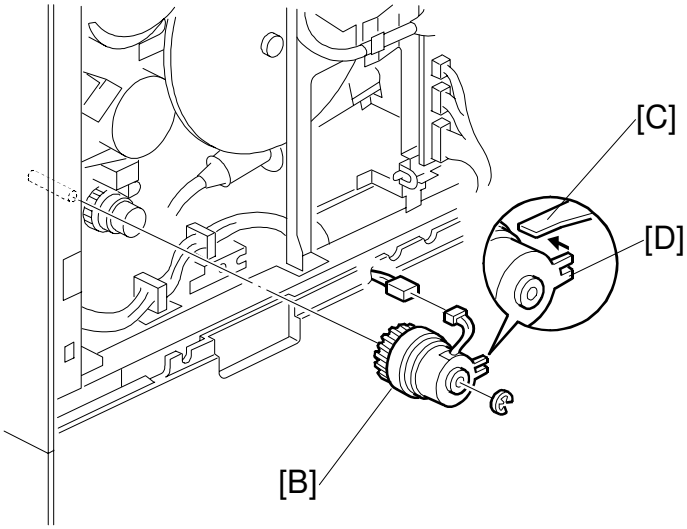
A293R653.WMF

8. Fully draw out the paper tray.
9. Disconnect the connectors [A].
10. Grasp the tray feed unit [B] and pull it out (2 screws).
    NOTE: Before removing the 1st paper feed unit, remove the inner vertical transport guide. Otherwise the 1st paper feed unit may be damaged.
11. Remove the bracket [C] (1 screw).
12. Remove the paper feed clutch [D] (1 hook, 1 connector).
13. Remove the relay clutch [E] (1 connector).
    NOTE: When re-installing the clutches, put the stopper [F] of the clutch on the correct hook on the bracket.

6.8.9 BY-PASS FEED MOTOR/CLUTCH REMOVAL



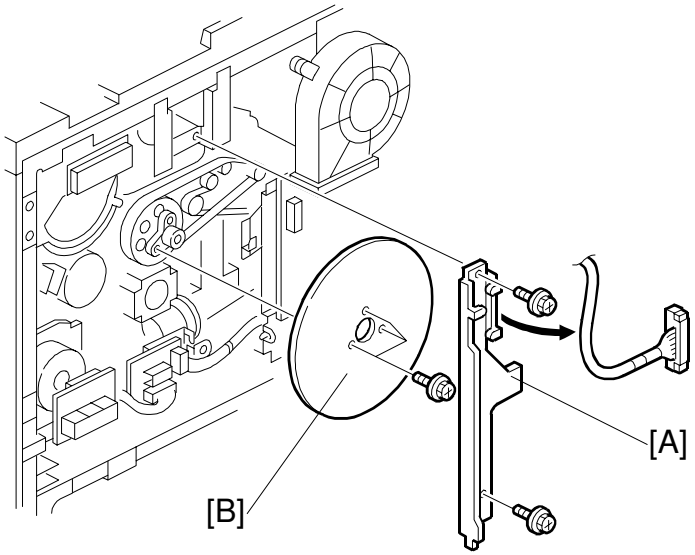
A293R592.WMF



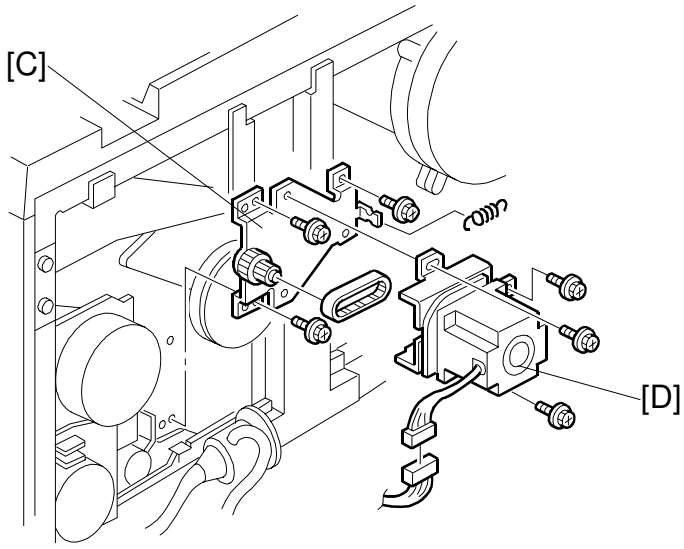
A293R910.WMF

1. Turn off the main switch.
2. Remove the upper rear cover. (Refer to Upper Rear Cover Removal.)
3. Remove the bracket of the CSS board and DRB board (2 screws).
4. Remove the by-pass feed motor [A] (2 screws, 1 connector).
5. Remove the by-pass feed clutch [B] (1 connector, 1 E-ring).
   NOTE: When re-installing the by-pass feed clutch, set the clutch pin [C] in the cutout [D] of the stopper.

6.8.10 REGISTRATION MOTOR REMOVAL



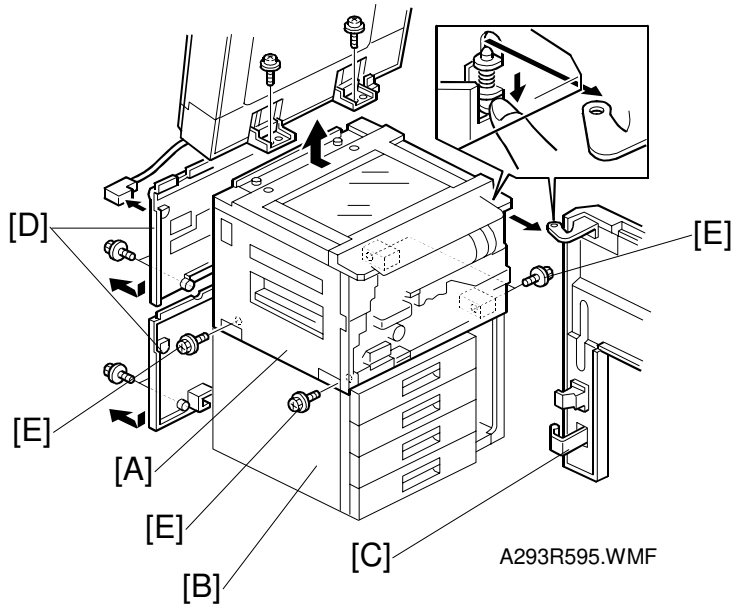
A293R905.WMF

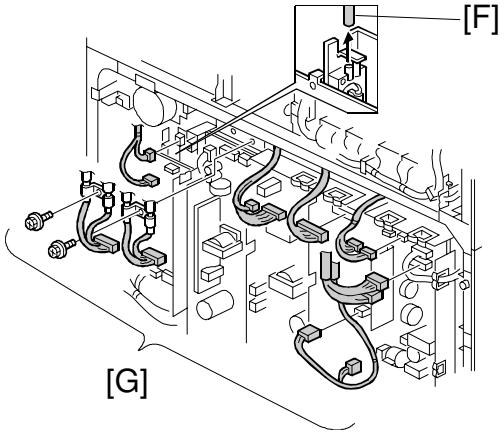


A293R593.WMF

1. Turn off the main switch.
2. Remove the upper rear cover. (Refer to Cover Removal.)
3. Remove the bracket [A] (2 screws).
4. Remove the fly wheel [B] (3 screws).
5. Remove the bracket [C] with the motor (3 screws, 1 connector).
6. Remove the registration motor [D] (3 screws, 1 timing belt, and 1 spring).

6.8.11 PAPER TRAY UNIT REMOVAL



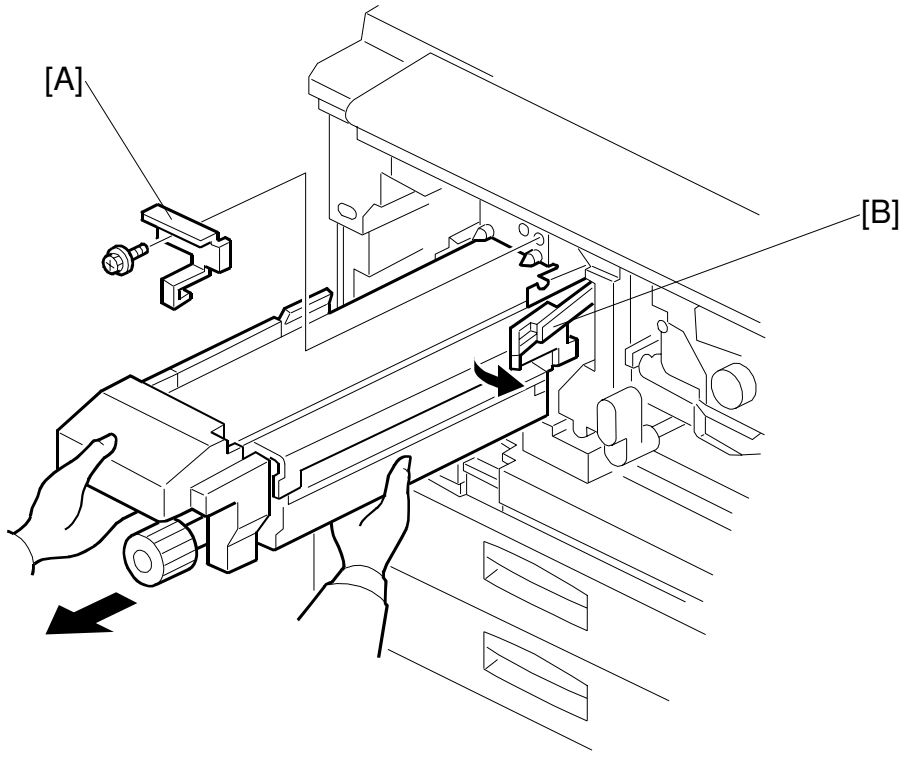


To facilitate transportation, the upper part of the copier (copier main frame) [A] and the lower part of the copier (paper tray unit) [B] can be separated as follows:

1. Turn off the main switch.
2. Remove the document feeder (2 screws, 1 connector)
3. Remove the front cover [C]. (Refer to Front Cover Removal.)
4. Remove the rear covers [D].
5. Remove the four screws [E].
6. Remove the air tube [F].
7. Disconnect the thirteen connectors [G] (2 screws).
8. Remove the copier main frame [A] from the paper tray unit [B].
   NOTE: When re-installing the copier main frame on the paper tray unit, do not pinch the cable between the copier main frame and the paper feed unit.

6.9 FUSING UNIT

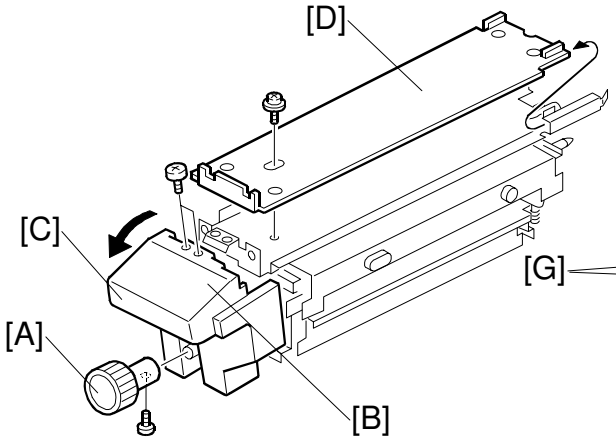
6.9.1 FUSING UNIT REMOVAL



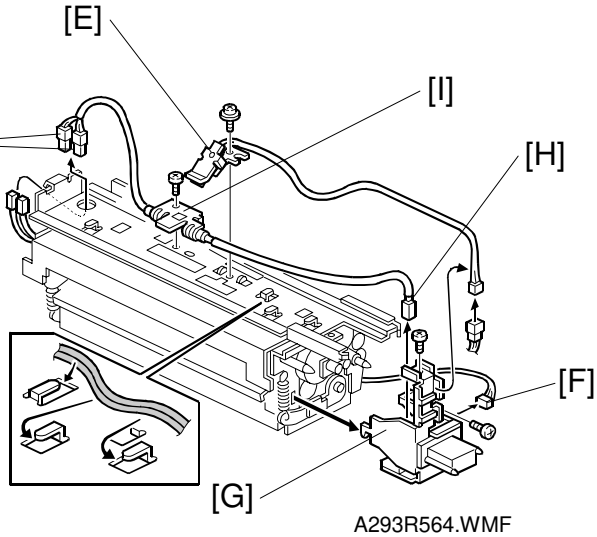
A293R501.WMF

1. Turn off the main switch.
2. Open the front door.
3. Remove the stopper [A] (1 screw).
4. While releasing the lever [B], pull out the fusing unit as shown.
   NOTE: Hold the bottom of the fusing unit as shown.

6.9.2 FUSING THERMISTOR/THERMOFUSE/THERMOSTAT REPLACEMENT



A293R502.WMF



A293R564.WMF

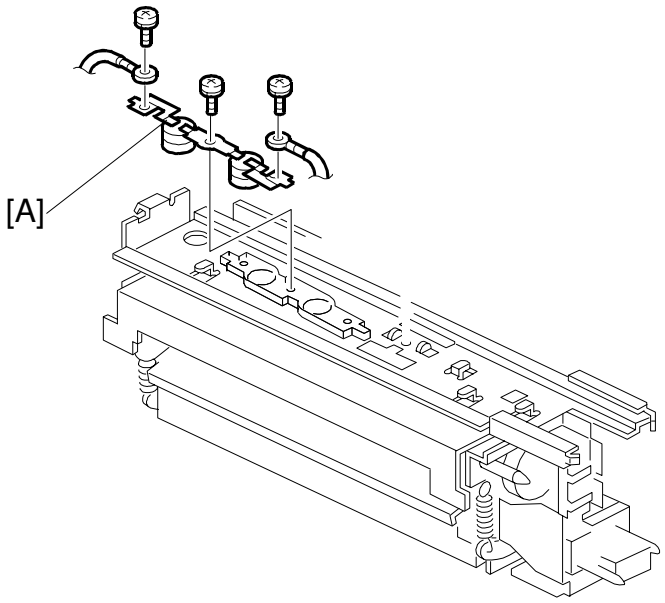
Fusing Thermistor Replacement

1. Remove the fusing unit. (Refer to Fusing Unit Removal.)
2. Remove the knob [A] (1 screw).
3. Remove the two screws that hold the fusing front cover [B].
4. Pull the lever [C], then lower the cover [B] to unhook the fusing unit.
5. Remove the fusing unit upper cover [D] (1 screw).
6. Replace the thermistor [E] (1 screw, 1 connector).
   NOTE: When re-assembling the fusing unit, secure the harness in the clamps correctly. Apply a little silicone oil to the point where the thermistor contacts the hot roller.

Fusing Thermofuse Replacement (for A292/A293 only)

1. Remove the fusing unit upper cover [D]. (Refer to Fusing Thermistor Replacement.)
2. Disconnect the connector [F].
3. Remove the terminal bracket [G] (2 screws).
4. Disconnect the three connectors [H].
5. Replace the fusing thermofuse [I] (1 screw).
   NOTE: When re-assembling the fusing unit, secure the harness in the clamps correctly.

Fusing Thermostat Replacement (for B098 only)

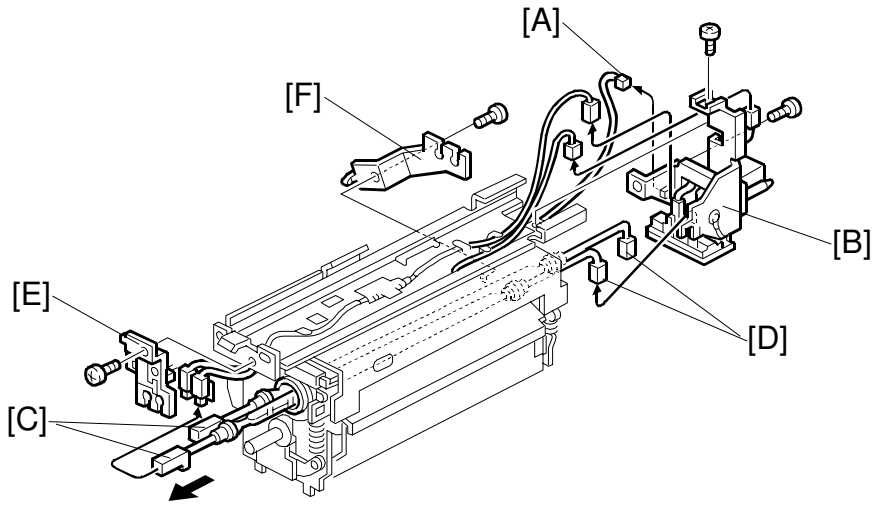


B098R920.WMF

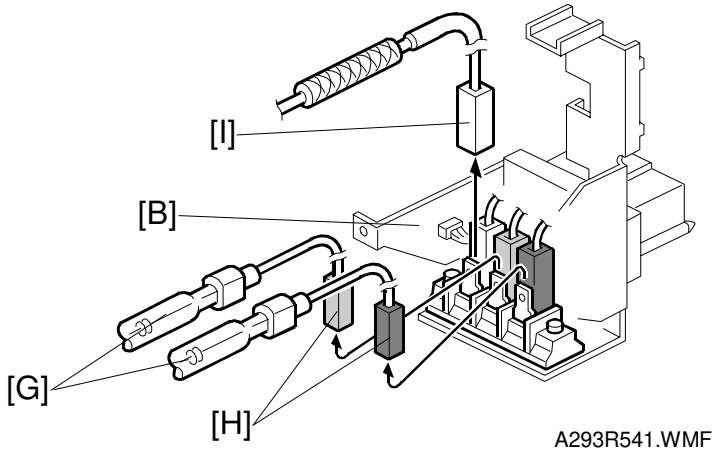
Fusing Thermostat Replacement (for B098 only)

1. Remove the fusing unit upper cover. (Refer to Fusing Thermistor Replacement.)
2. Replace the fusing thermostat [A] (3 screws).
   NOTE: When re-assembling the fusing unit, secure the harness in the clamps correctly.

6.9.3 FUSING LAMP REPLACEMENT



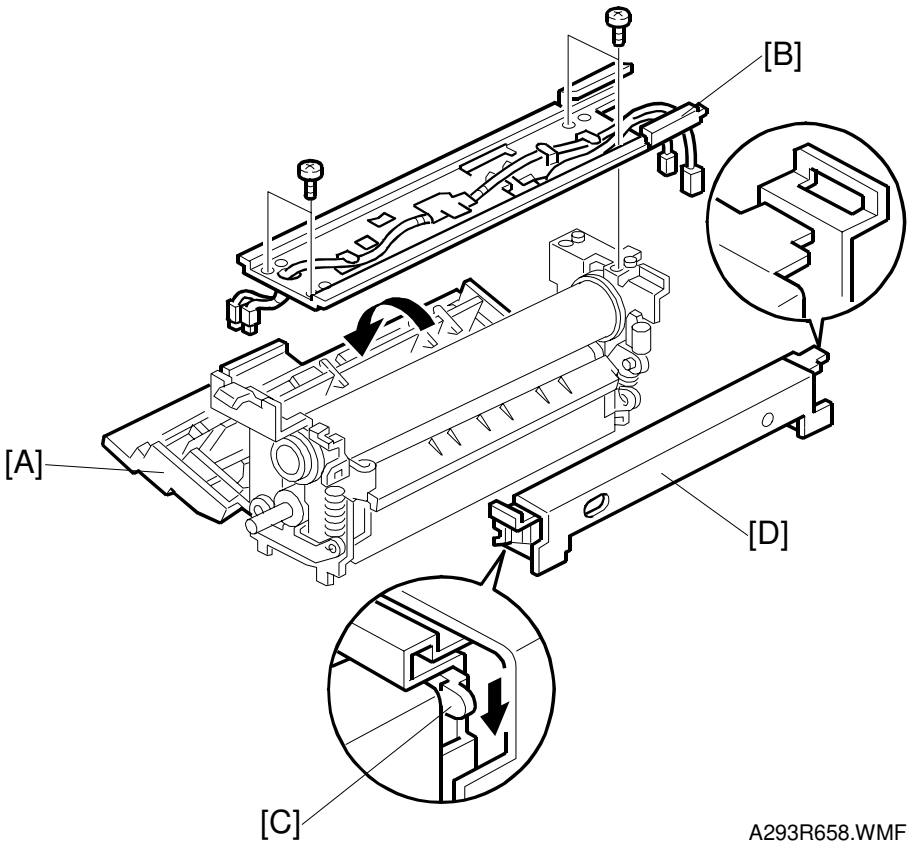
A293R542.WMF



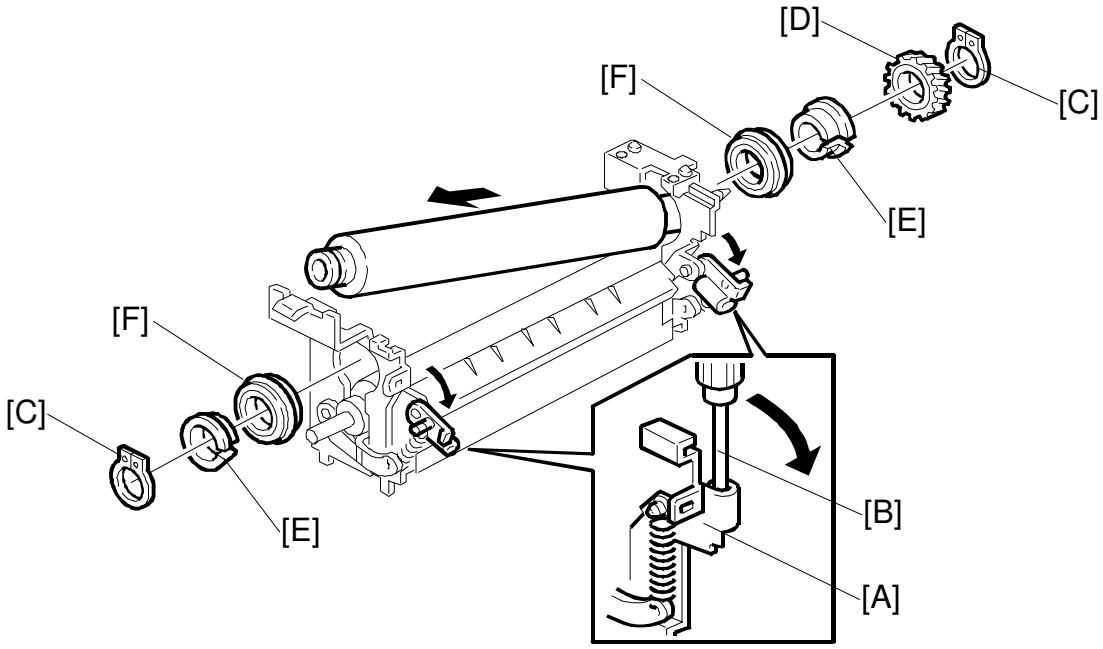
A293R541.WMF

1. Remove the fusing unit. (Refer to Fusing Unit Removal.)
2. Disconnect the connector [A].
3. Remove the terminal bracket [B] (2 screws).
4. Disconnect the front connectors [C] and the rear connectors [D].
5. Remove the front fusing lamp holder [E] (1 screw) and the rear fusing lamp holder [F] (1 screw).
6. Replace the fusing lamps [G].
   NOTE: At the rear terminal, make sure to connect the connectors [H] (Blue: 120V Machine, Green: 230V Machine) and white connector (from the thermofuse) [I] in the correct positions on the terminal.

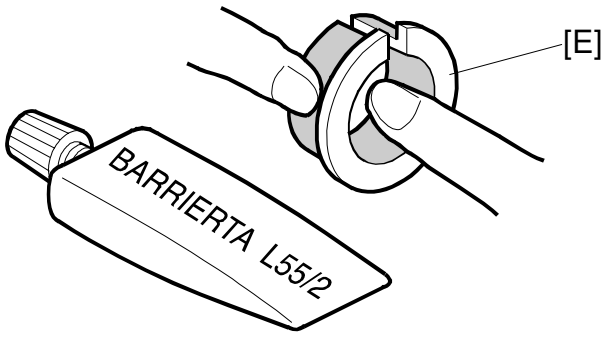
6.9.4 HOT ROLLER REPLACEMENT



1. Remove the fusing lamps. (Refer to Fusing Lamp Replacement.)
2. Lower the fusing exit assembly [A].
3. Remove the upper stay [B] (4 screws).
4. Lower the lever [C] and remove the oil supply unit [D].



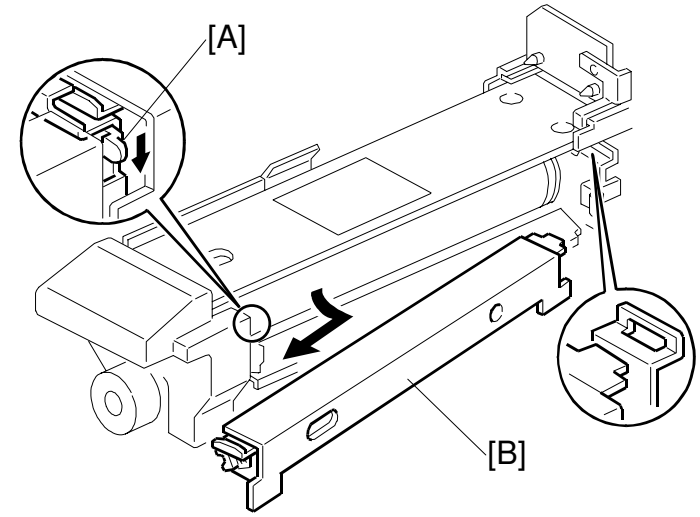
A293R659.WMF



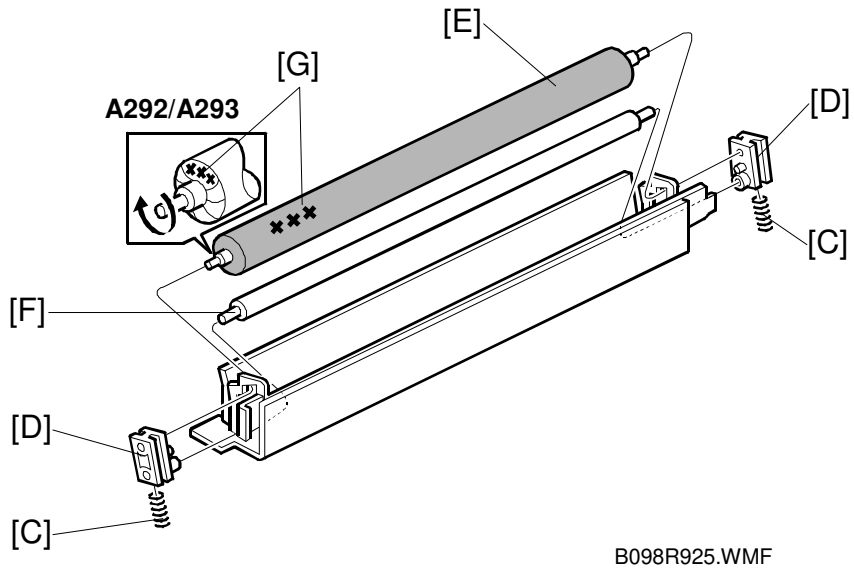
A293R660.WMF

5. Lower the pressure spring holders [A] at both sides using a screwdriver [B] as a lever.
6. Remove the front and rear C-rings [C], gear [D], isolating bushings [E], and bearings [F].
   NOTE: When installing a new hot roller:
   1) Lubricate the inner and outer surfaces of the isolating bushings [E] with BARRIERTA L55/2 grease.
   2) Lubricate the fusing drive gears and their shafts with G501grease.
   3) Peel off 3 cm (1 inch) from both ends of the protective sheet, and install the new hot roller.
      Before applying fusing pressure, remove the rest of the protective sheet.

6.9.5 OIL SUPPLY/CLEANING ROLLER REPLACEMENT



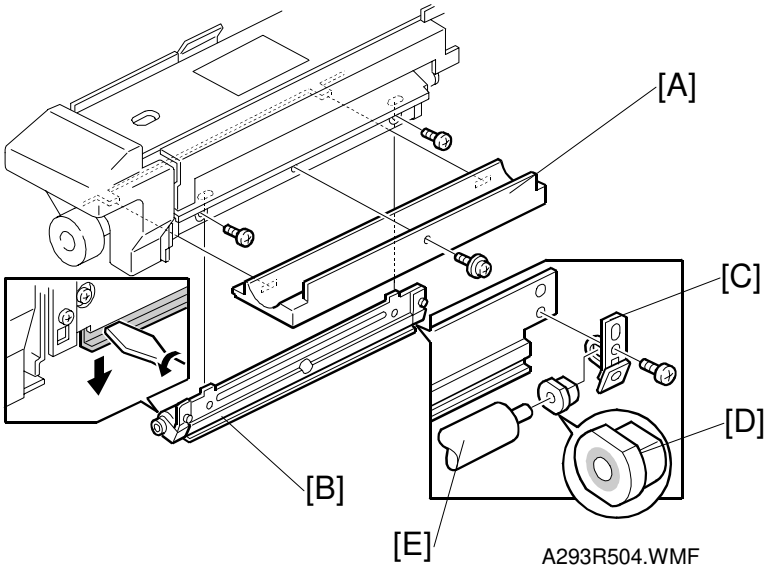
A293R503.WMF



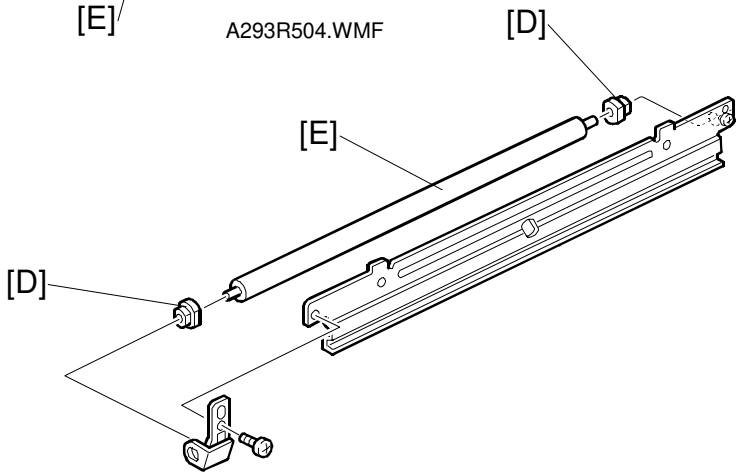
B098R925.WMF

1. Pull out the fusing unit.
2. While lowering the lever [A], remove the oil supply unit [B].
3. Remove the springs [C].
4. Remove the bushings [D].
5. Remove the oil supply roller [E], and the cleaning roller [F].
6. Install the new cleaning roller and oil supply roller. Then reassemble the unit.
   NOTE: The lot number [G] of the oil supply roller should be at the front side of the machine.

6.9.6 PRESSURE ROLLER CLEANING ROLLER REPLACEMENT



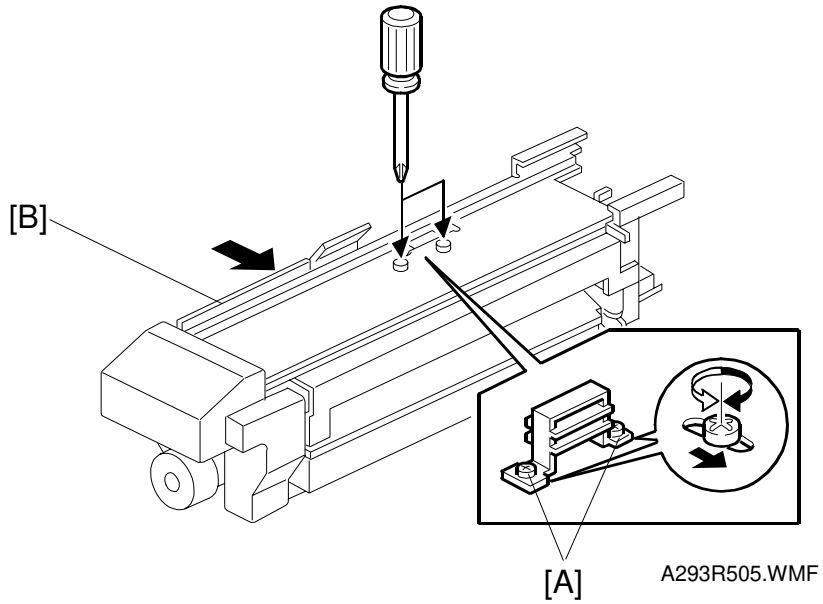
A293R504.WMF



A293R553.WMF

1. Pull out the fusing unit.
2. Remove the bottom plate [A] (1 screw).
3. Remove the cleaning roller unit [B] (2 screws).
4. Remove the brackets [C] (1 screw each).
5. Remove the bushings [D].
6. Replace the cleaning roller [E].
7. Reassemble the unit.

6.9.7 MAGNET POSITION ADJUSTMENT

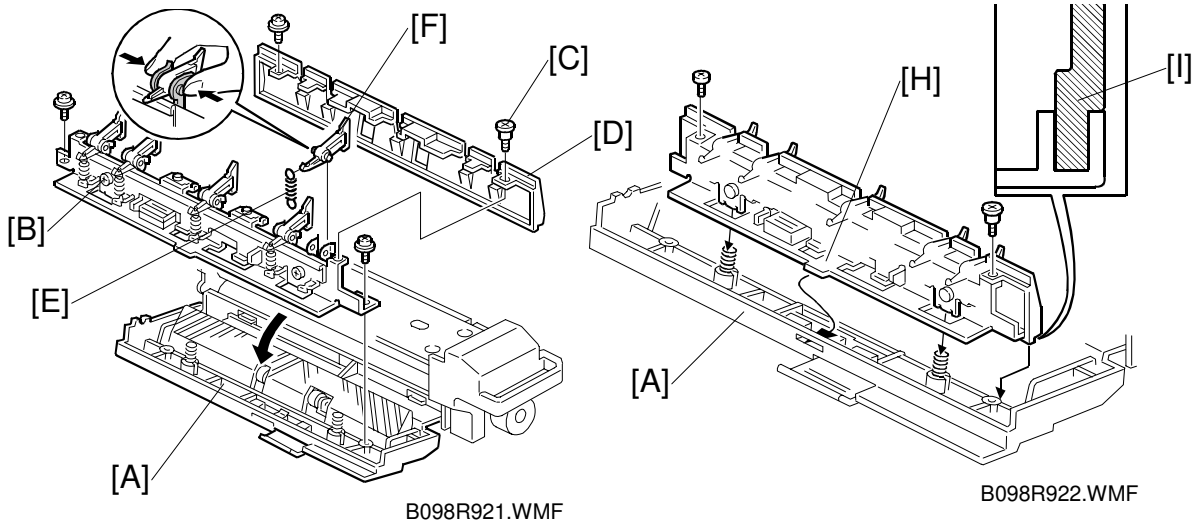


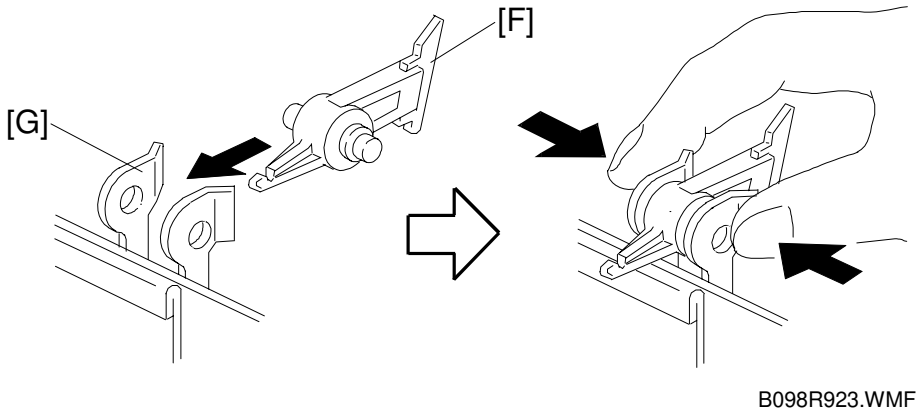
NOTE: This is to ensure that the strippers contact the hot roller.

1. Remove the fusing unit. (Refer to Fusing Unit Removal.)
2. Remove the fusing upper cover (1 screw). (Refer to Fusing Thermistor Replacement.)
3. Loosen the 2 screws [A].
4. Tighten the 2 screws [A] while pushing the exit cover [B] in the arrow direction.
   NOTE: Do not push the exit cover too firmly because the magnetic power may weaken.
5. Check that the exit cover closes easily by opening and closing it several times.

6.9.8 HOT ROLLER STRIPPER PAWL REPLACEMENT

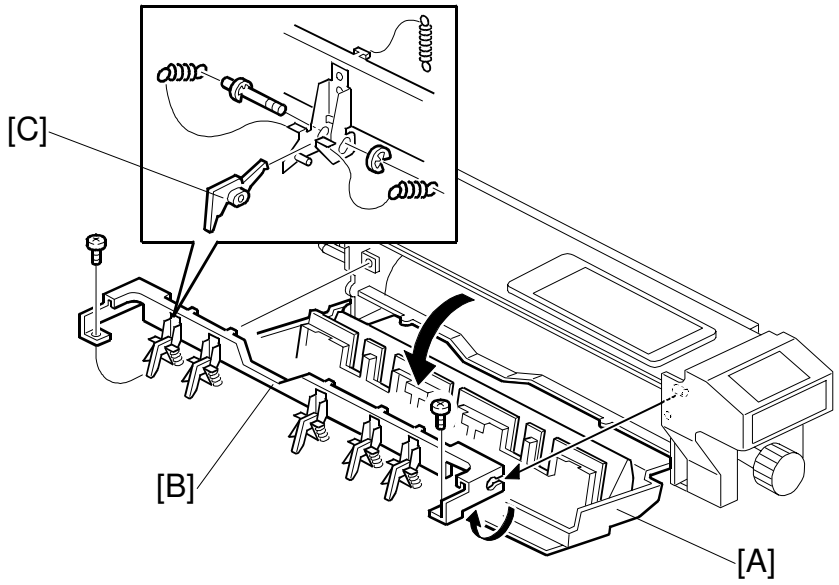
For A292/A293





1. Turn off the main switch and pull out the fusing unit.
2. Lower the fusing exit assembly [A].
3. Remove the fusing exit guide [B] (2 screws).
4. Remove the two screws (the front screw [C] is a stepped screw) that hold the upper exit guide [D].
5. Unhook the spring [E] then replace the pawls [F].
   NOTE: 1) After installing the new pawls, check that they are correctly held by the holders [G] as shown. If not, remove the pawl and bend the sides of the holder inward. Apply Barrierta L55/2 grease to the inner surfaces of the holder.
   2) When re-attaching the upper exit guide, put the hook [H] in the opening in the fusing exit assembly and fit the rib [I] in the rail.

For B098

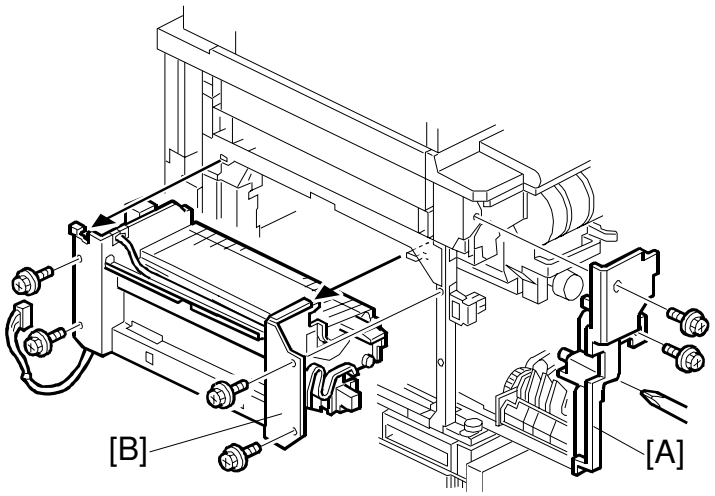


B098R911.WMF

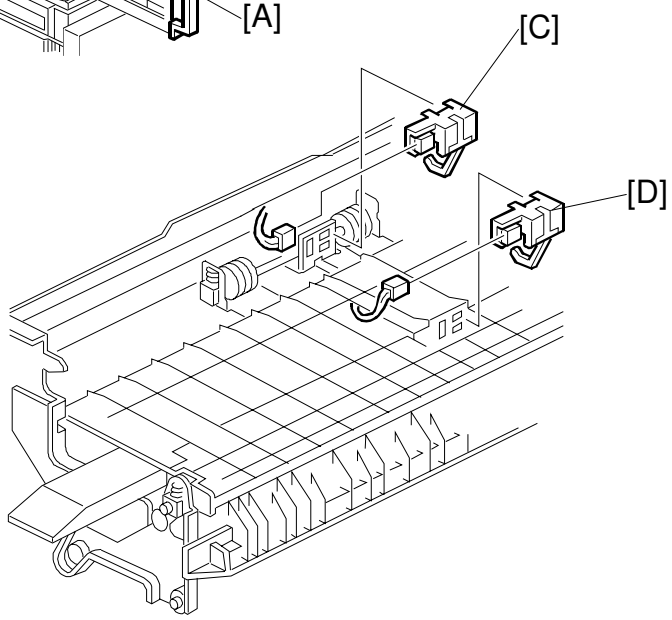
1. Remove the fusing unit. (Refer to Fusing Unit Removal.)
2. Lower the fusing exit assembly [A].
3. Gently lift the hot roller stripper unit [B] (as shown by the arrow) and remove (2 screws).
4. Replace the hot roller strippers [C] (1 E-ring, 3 springs)

6.10 PAPER EXIT/DUPLEX UNIT

6.10.1 1ST AND 2ND EXIT SENSOR



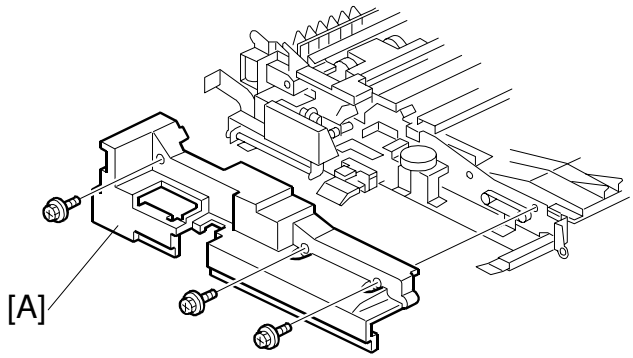
A293R554.WMF



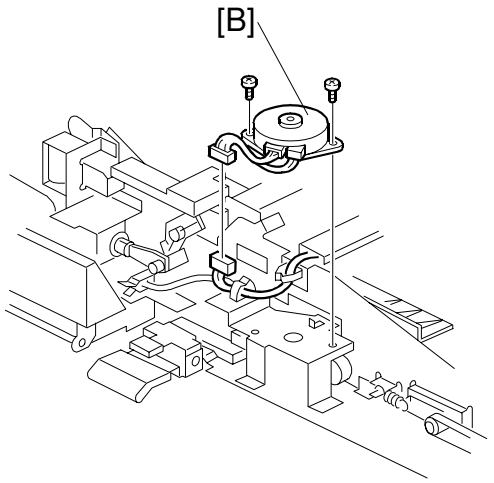
A293R555.WMF

5. Open the front door.
6. Pull out the duplex unit.
7. Remove the left cover (see Exterior).
8. Remove the left inner cover [A] (2 screws).
9. Remove the paper exit unit [B] (4 screws, 1 connector).
10. Remove the 1st exit sensor [C] (1 connector).
11. Remove the 2nd exit sensor [D] (1 connector).

6.10.2 JOGGER MOTOR



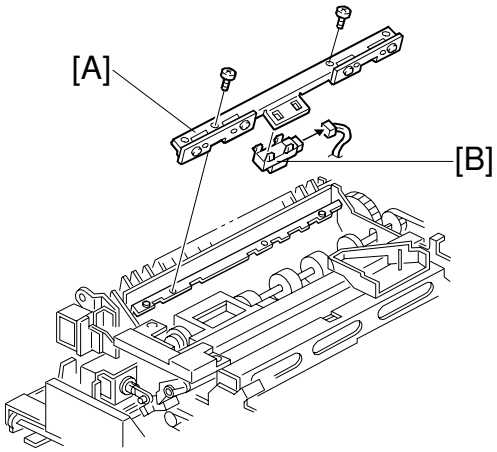
A293R804.WMF



A293R805.WMF

1. Open the front door.
2. Pull out the duplex unit.
3. Remove the duplex front cover [A] (3 screws).
4. Remove the jogger motor [B] (2 screws, 1 connector).

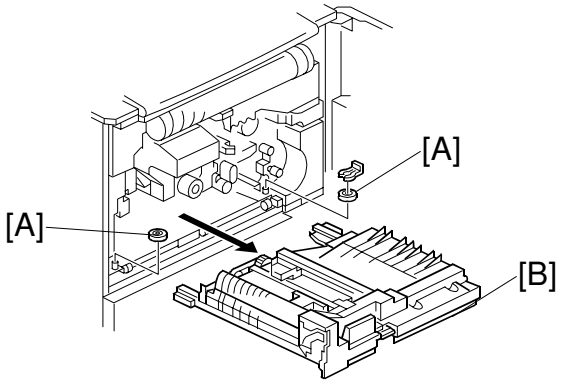
6.10.3 DUPLEX ENTRANCE SENSOR



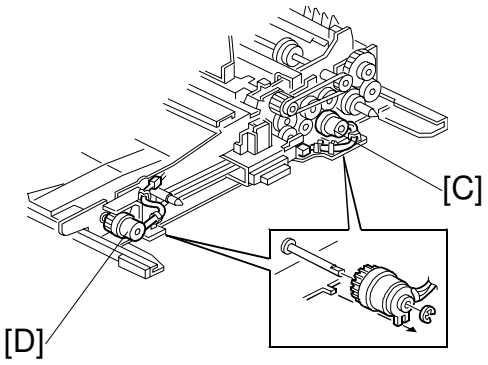
A293R556.WMF

1. Open the front door.
2. Pull out the duplex unit.
3. Remove the sensor bracket [A] (2 screws).
4. Remove the duplex entrance sensor [B] (1 connector).

6.10.4 DUPLEX TRANSPORT/DUPLEX FEED CLUTCHES



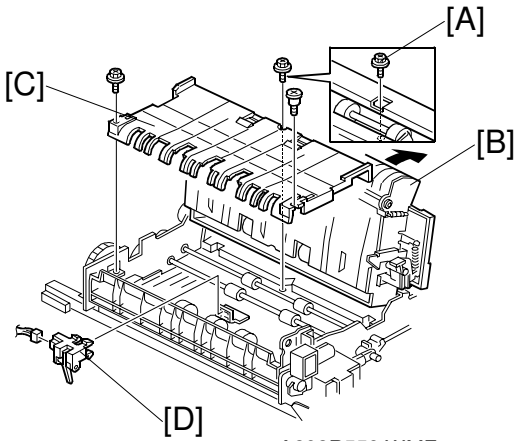
A293R803.WMF



A293R557.WMF

1. Open the front door.
2. Pull out the duplex unit.
3. Remove the two pulleys [A] (1 snap ring each).
4. Remove the duplex unit [B].
5. Remove the duplex transport clutch [C] (1 E-ring).
6. Remove the duplex feed clutch [D] (1 E-ring).

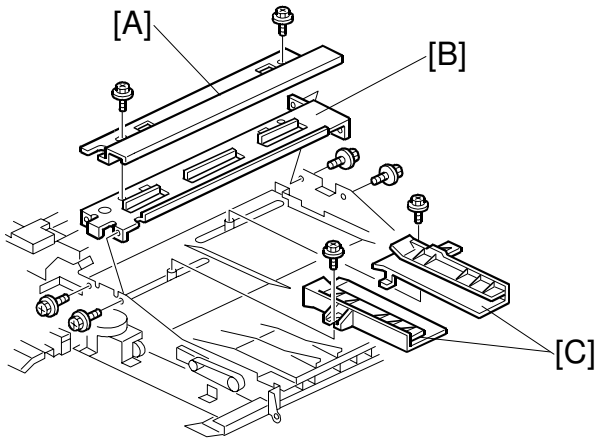
6.10.5 DUPLEX TRANSPORT SENSOR 1



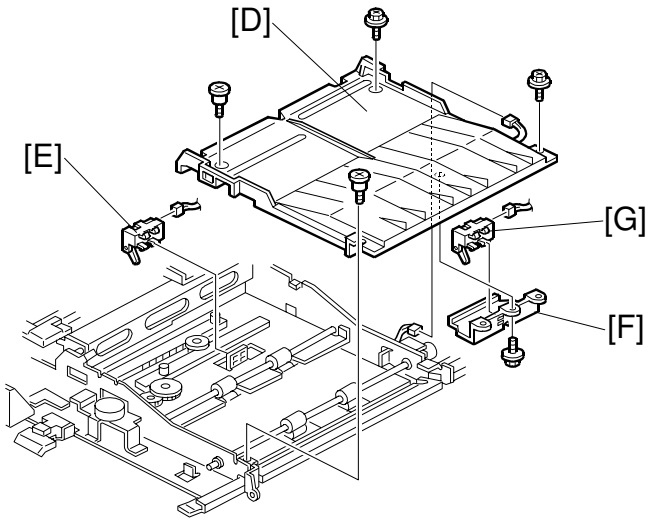
A293R558.WMF

1. Open the front door.
2. Pull out the duplex unit.
3. Remove the screw [A].
4. Open the inverter roller unit [B] (pull the jam removal lever E4).
5. Remove the guide [C] (2 screws).
6. Remove duplex transport sensor 1 [D] (1 connector).

6.10.6 DUPLEX TRANSPORT SENSORS 2 & 3



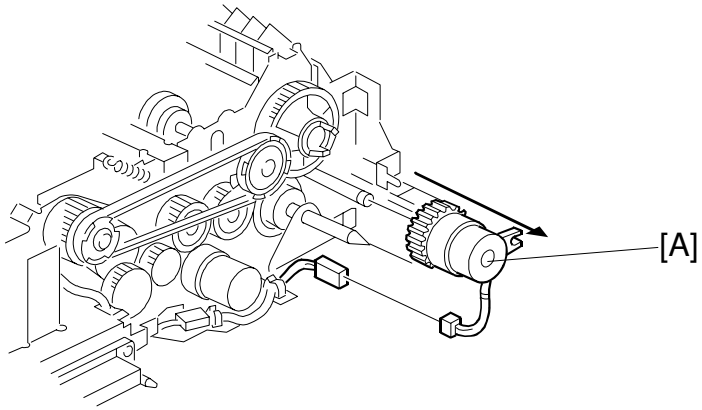
A293R806.WMF



A293R559.WMF

1. Open the front door.
2. Pull out and remove the duplex unit (see Duplex Transport/Duplex Feed Clutch Removal).
3. Remove the duplex front cover (see Jogger Motor Removal).
4. Remove the cover bracket [A] (2 screws).
5. Remove the center bracket [B] (4 screws, 2 connectors).
6. Remove the jogger fences [C] (1 screw each).
7. Remove the upper duplex cover [D] (4 screws, 1 connector).
8. Remove duplex transport sensor 2 [E] (1 connector).
9. Remove the duplex transport sensor bracket [F] (1 screw).
10. Remove duplex transport sensor 3 [G] (1 connector).

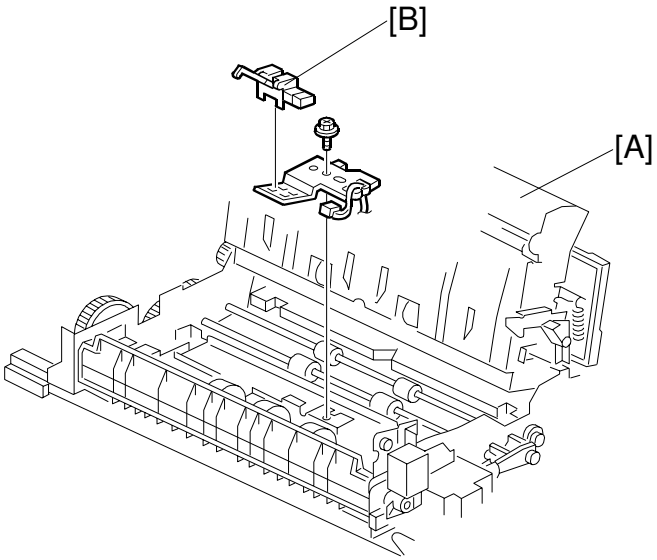
6.10.7 INVERTER EXIT CLUTCH



A293R802.WMF

1. Remove the duplex unit.
2. Remove the inverter exit clutch [A] (1 connector).

6.10.8 DUPLEX INVERTER SENSOR

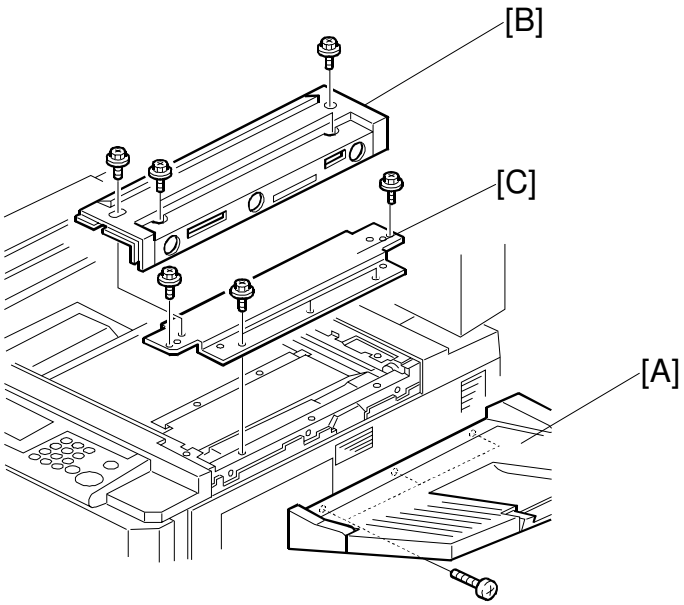


A293R801.WMF

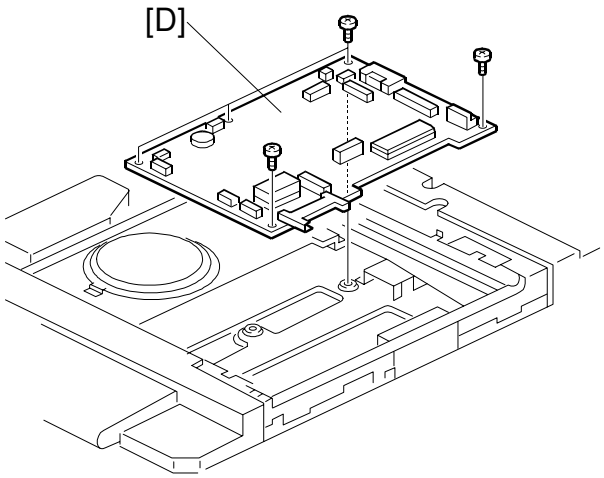
1. Open the front door and pull out the duplex unit.
2. Open the “E4” part [A].
3. Remove the paper guide plate (2 screws, 1 shoulder screw).
4. Remove the duplex inverter sensor [B] (1 bracket, 1 screw, 1 connector).

6.11 BOARDS AND OTHER ITEMS

6.11.1 BICU BOARD



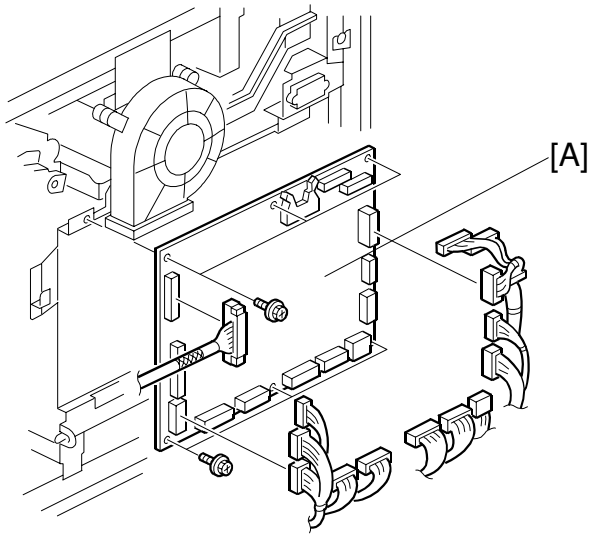
A293R560.WMF



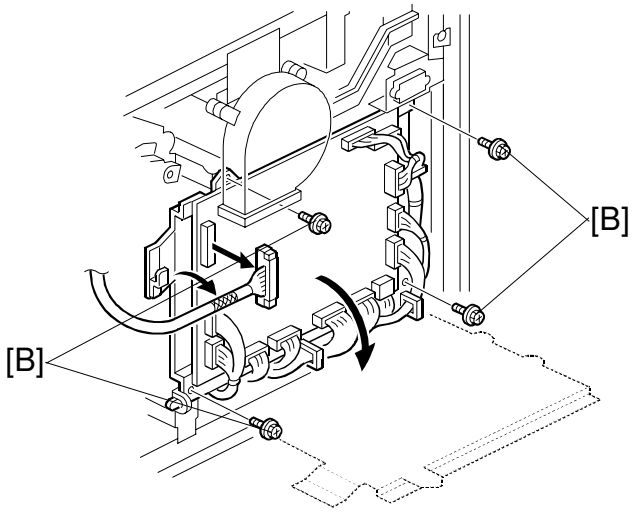
A293R005.WMF

1. Remove the lens block assembly. (Refer to Lens Block Removal.)
2. Remove the original exit tray [A] (3 screws).
3. Remove the upper right cover [B] (4 screws).
4. Remove the right stay [C] (6 screws).
5. Remove the BICU board [D] (7 screws, all connectors).
6. Remove the NV-RAM from the old BICU board and install it on the new board.

6.11.2 I/O BOARD



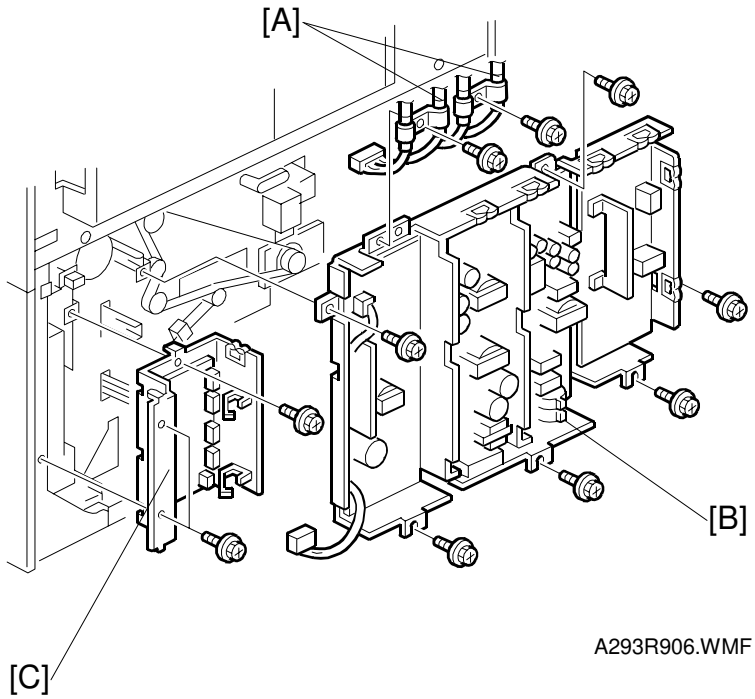
A293R904.WMF



A293R903.WMF

1. Turn off the main switch.
2. Remove the upper rear cover (Refer to Upper Rear Cover Removal.)
3. Disconnect all connectors from the I/O Board [A].
4. Remove the I/O board [A] (6 screws).
   NOTE: If the screws [B] of the I/O board bracket are removed, the I/O board can be swung out.

6.11.3 PSU



1. Turn off the main switch.
2. Remove the upper and lower rear cover. (Refer to Upper and Lower Rear Cover Removal.)
3. Remove the harness clamps [A] (2 screws).
4. Remove the PSU [B] (6 screws, all connectors).

6.11.4 PAPER FEED CONTROL BOARD (PFC)

1. Turn off the main switch.
2. Remove the lower rear cover. (Refer to Lower Rear Cover Removal.)
3. Remove the Paper Feed Control Board [C] (3 screws, all connectors).

6.12 COPY IMAGE ADJUSTMENTS: PRINTING/SCANNING

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

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

6.12.1 PRINTING

NOTE: 1) Make sure the paper is installed correctly in each paper tray before you start these adjustments.
2) Use the Trimming Area Pattern (SP2-902-3, No. 10) to print the test pattern for the following procedures.
3) Set SP 2-902-3 to 0 again after completing these printing adjustments.

Registration - Leading Edge

1. Check the leading edge registration using the Trimming Area Pattern, and adjust it using SP1-001 if necessary. The specification is: 3 ± 2 mm.

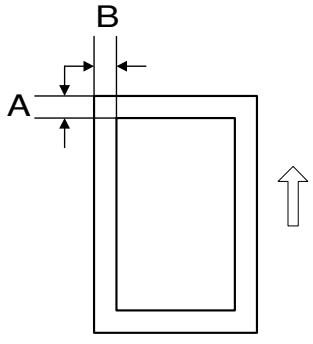
Registration – Side-to-Side

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

Using SP Mode

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

	SP mode	Specification
Tray 1	SP1-002-1	2 ± 1.5 mm
Tray 2	SP1-002-2	
Tray 3	SP1-002-3	
Duplex Tray	SP1-002-5	
By-pass Tray	SP1-002-6	
LCT	SP1-002-7	



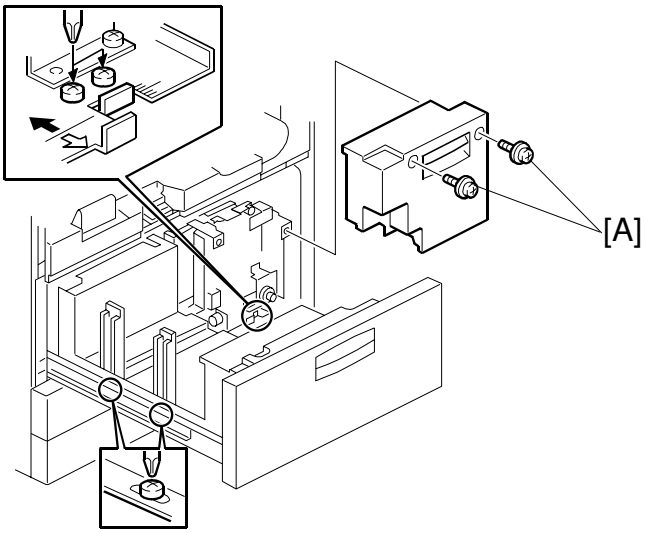
A293R678.WMF

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

Mechanical Adjustment

NOTE: This adjustment is especially necessary if the punched hole position varies between trays.

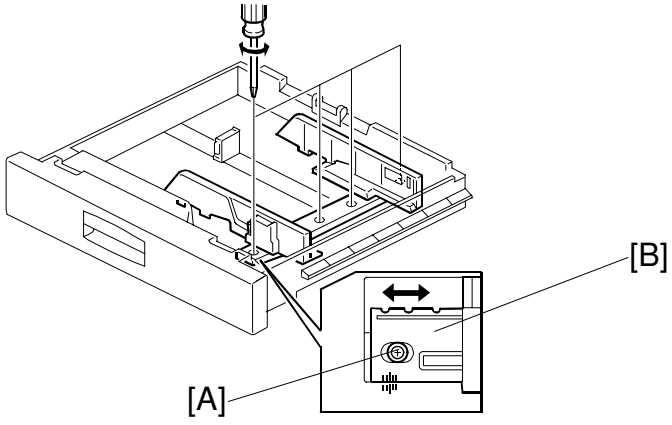
Tray 1



A293R571.WMF

1. Loosen the screws [A].
2. Reposition the tray and tighten the screws [A].

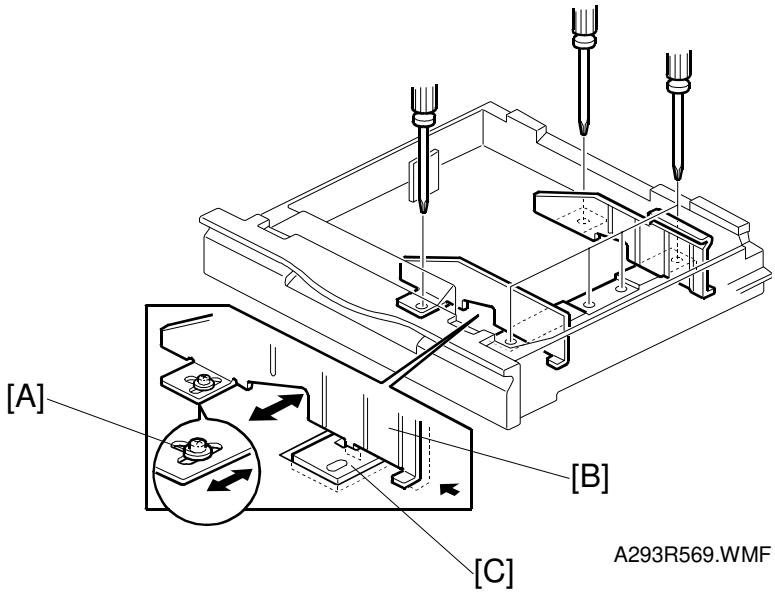
Tray 2



A293R568.WMF

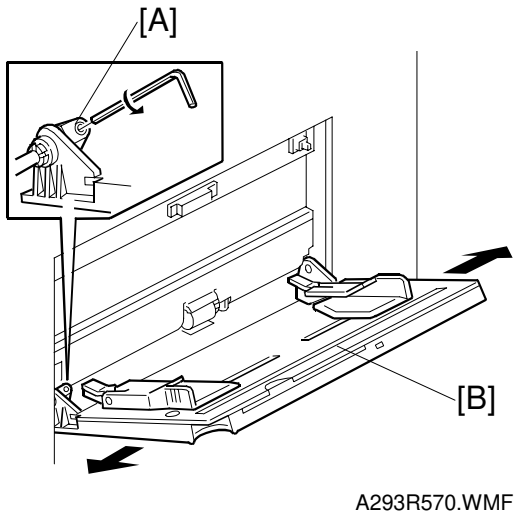
1. Loosen the screw [A].
2. Reposition the positioning plate [B] and tighten the screw [A].

Tray 3



1. Loosen the 6 screws [A].
2. Reposition the side fences [B] and support plate [C].
3. Tighten the 6 screws.

By-pass Tray



1. Loosen the screw [A].
2. Reposition the tray [B] and tighten the screw [A].

7. TROUBLESHOOTING

7.1 SERVICE CALL CONDITIONS

7.1.1 SUMMARY

The SC code types and the procedures to reset them are explained in the following table.

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

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

7.1.2 SC CODE DESCRIPTIONS

SC101: Exposure lamp error

- Definition - [D]

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

- Possible cause -

- Exposure lamp defective
- Lamp regulator defective
- Exposure lamp connector defective
- Dirty standard white plate
- Dirty scanner mirror or scanner mirror out of position
- SBU board defective
- SBU connector defective
- Lens block out of position

SC120: Scanner home position error 1

-Definition- [D]

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

- Possible causes -

- Scanner home position sensor defective
- Scanner motor defective
- Scanner motor drive board defective
- Scanner home position sensor connector defective
- Scanner drive motor connector defective

SC121: Scanner home position error 2

-Definition- [D]

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

- Possible causes -

- Scanner home position sensor defective
- Scanner drive motor defective
- Scanner motor drive board defective
- Scanner home position sensor connector defective
- Scanner drive motor connector defective

SC124: Scanner motor encoder signal error

-Definition- [D]

No encoder signal from the scanner motor

-Possible cause-

- Scanner motor connector defective
- Scanner motor defective
- MCU defective
- Scanner wire, timing belt, pulley out of position
- PSU defective

SC125: Scanner motor speed error 1

-Definition- [D]

The scanner stops before the scanner HP sensor is on when returning.

The scanner speed when the scanner HP sensor turns on is slower than the specified speed.

-Possible cause-

- Scanner motor defective
- MCU defective
- Too much load on scanner drive

SC126: Scanner motor speed error 2

-Definition- [D]

The scanner overruns the scanner HP sensor by more than 10 mm when returning.

-Possible cause-

- Scanner motor defective
- MCU defective
- Too small load on scanner drive

SC127: Scanner motor encoder rotating direction error

-Definition- [D]

The scanner moves in the opposite direction from the instructed direction when initializing.

-Possible cause-

- Scanner motor defective
- MCU defective

SC128: Scanner motor start error

-Definition- [D]

The scanner motor speed does not reach the target speed until starting to read the original.

-Possible cause-

- Scanner motor defective
- MCU defective
- PSU defective
- Too much load on scanner drive

SC129: Scanner motor speed control error

-Definition- [D]

The scanner speed is out of standard during scanning.

-Possible cause-

- Scanner motor defective
- PSU defective
- MCU defective
- Scanner drive defective

SC130: SBU error

-Definition- [D]

When the main switch is turned on, the BICU cannot receive the correct signal from the SBU.

-Possible cause-

- SBU defective
- BICU defective
- Cable between SBU and BICU defective

SC300: Charge corona output error 1

-Definition- [D]

The feedback voltage from the charge corona unit is too high.

- Possible causes -

- Charge P.P. defective
- Poor charge corona unit connection

SC301: Charge corona output error 2

-Definition- [D]

The control PWM for the charge corona unit is too high.

- Possible causes -

- Charge P.P. defective
- Poor charge corona unit connection

SC302: Charge corona output error 3

-Definition- [D]

The control PWM for the charge grid is too high.

- Possible causes -

- Charge P.P. defective
- Poor charge corona unit connection

SC303: Charge corona output error 4

-Definition- [D]

The feedback voltage from the charge grid is too high.

- Possible causes -

- Charge P.P. defective
- Poor charge corona unit connection

SC305: Charge corona wire cleaner error 1

-Definition- [C]

The charge corona wire cleaner does not return to its home position.

- Possible causes -

- Charge corona wire cleaner motor defective
- Charge P.P. defective
- IOB defective

SC306: Charge corona wire cleaner error 2

-Definition- [D]

The charge corona wire cleaner motor connector is not connected.

- Possible causes -

- The charge corona wire cleaner motor connector is not connected.

SC310: Potential sensor error 1

Definition- [C]

When calibrating the drum potential sensor at the process control initial setting, the drum potential sensor output voltage is out of specification.

- Possible causes -

- Potential sensor defective
- Poor connection between the potential sensor and the I/O board (IOB)
- IOB defective
- Poor connection between the drum unit and the I/O board (IOB)
- Development power pack defective

SC311: Potential sensor error 2

Definition- [C]

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

- Possible causes -

- Potential sensor defective
- Poor connection between the potential sensor and the I/O board (IOB)
- IOB defective
- Poor connection between the drum unit and the I/O board (IOB)
- Development power pack defective

SC312: Potential sensor error 4

Definition- [C]

When adjusting the drum potential (V_D) at the process control initial setting, the drum potential sensor detects that V_D is more than V_G (grid voltage).

- Possible causes -

- Potential sensor defective
- Poor connection between the potential sensor and the I/O board (IOB)
- IOB defective
- Poor connection between the drum unit and the I/O board (IOB)
- Development power pack defective
- Dirty or worn charge corona wire

SC314: Potential sensor error 5

Definition- [C]

When adjusting the drum potential (V_H) for LD power adjustment during the process control initial setting, the first time the V_H pattern is made, the drum potential sensor detects that V_H is more than 500V.

- Possible causes -

- Potential sensor defective
- Poor connection between the potential sensor and the I/O board (IOB)
- IOB defective
- Poor connection between the drum unit and the I/O board (IOB)
- LD unit defective

SC321: No laser writing signal (F-GATE) error 1

- Definition- [D]

The laser writing signal (F-GATE) does not go to LOW for more than 15 seconds after the copy paper reaches the registration sensor.

- Possible causes -

- BICU board defective
- Poor connection of the printer controller
- Printer controller defective

SC322: 1st laser synchronization error

-Definition- [D]

The 1st laser synchronization signal cannot be detected by the main scan synchronization detector board even if the laser diodes are activated.

- Possible causes -

- Poor connection between the laser synchronization detector board and the LD unit
- Laser synchronization detector board out of position
- Laser synchronization detector board defective
- LD unit defective

SC323: LD drive current over

-Definition- [D]

The LD drive board applies more than 110 mA to the LD.

- Possible causes -

- LD unit defective (not enough power, due to aging)
- Poor connection between the LD unit and the BICU board
- BICU defective

SC326: 2nd laser synchronization error

-Definition- [D]

The 2nd laser synchronization signal cannot be detected by the main scan synchronization detector board even if the laser diodes are activated.

- Possible causes -

- Poor connection between the laser synchronization detector board and the LD unit
- Laser synchronization detector board out of position
- Laser synchronization detector board defective
- LD unit defective

SC327: LD unit home position error 1 *(A292/A293 only)*

-Definition- [D]

The LD unit home position sensor does not detect an on condition when the LD unit moves to its home position.

- Possible causes -

- LD unit home position sensor defective
- LD positioning motor defective

LD unit movement blocked because of incorrect connector routing

SC328: LD unit home position error 2 *(A292/A293 only)*

-Definition- [D]

The LD unit home position sensor does not detect an off condition when the LD unit moves from its home position.

- Possible causes -

- LD unit home position sensor defective
- LD positioning motor defective
- LD unit movement blocked because of incorrect connector routing

SC329: LD unit home position error 3 *(A292/A293 only)*

-Definition- [D]

When the LD unit moves to switch the laser beam pitch (except for initial movement at adjustment), the LD unit HP sensor turns on before the movement reaches the adjusted value.

-Possible cause-

- When the main switch is on: SP2-109-3 or SP2-109-4 is not done after SP5-801 is performed.
- While printing: The LD unit does not move so well because of an unexpected failure, such as the cable being pinched somewhere.
- LD unit defective

SC330: LD unit no initial setting *(A292/A293 only)*

-Definition- [D]

The main switch is on or a printing/copying job starts without doing SP2-109-3 or SP2-109-4 after SP5-801 is performed.

-Possible cause-

- SP2-109-3 or SP2-109-4 is not done after SP5-801 is performed.

SC331: LD unit home position error 4 *(A292/A293 only)*

-Definition- [D]

When the LD unit moves to switch the laser beam pitch, the LD unit HP sensor does not turn on, even when the expected time for reaching the home position comes, according to the data for the present position stored in NVRAM.

-Possible cause-

- The LD unit does not move so well because of an unexpected failure, such as the cable being pinched somewhere.
- LD unit defective
- HP sensor defective
- NVRAM defective

SC332: LD unit present position error *(A292/A293 only)*

-Definition- [D]

When the LD unit moves to switch the laser beam pitch, the data for the present position stored in NVRAM is out of the adjustment range.

-Possible cause-

- The LD unit does not move so well because of an unexpected failure, such as the cable being pinched somewhere.
- LD unit defective
- HP sensor defective
- NVRAM defective

SC335: Polygonal mirror motor error 1

-Definition- [D]

The XSCRDY signal does not become low within 20 seconds after the polygonal mirror motor turns on or the polygon motor speed is changed.

-Possible cause-

- Poor cable connection to the polygonal mirror motor driver.
- Polygonal mirror motor (driver) defective
- BICU defective

SC336: Polygonal mirror motor error 2

-Definition- [D]

The XSCRDY signal does not become high within 20 seconds after the polygonal mirror motor turns off.

-Possible cause-

- Poor cable connection to the polygonal mirror motor driver.
- Polygonal mirror motor (driver) defective
- BICU defective

SC337: Polygonal mirror motor error 3

-Definition- [D]

The XSCRDY signal becomes high while the polygonal mirror motor turns on, even though there was no demand for either turning off the motor or changing the motor speed.

-Possible cause-

- Poor cable connection to the polygonal mirror motor driver.
- Polygonal mirror motor (driver) defective
- BICU defective

SC338: Polygonal mirror motor error 1

-Definition- [D]

The XSCRDY signal does not become stable within 20 seconds after the polygonal mirror motor turns on or off or the polygon motor speed is changed.

-Possible cause-

- Poor cable connection to the polygonal mirror motor driver.
- Polygonal mirror motor (driver) defective
- BICU defective

SC340: TD sensor output error

-Definition- [C]

The TD sensor output voltage (Vt), which is measured during each copying process, is one of the following 10 times consecutively.

1) Vt = 0.5 volts or lower
2) Vt = 4.0 volts or higher

-Possible cause-

- TD sensor defective
- Poor connection between the TD sensor and the I/O board.
- I/O board defective

NOTE: In this error condition, the toner supply is controlled using pixel count and Vsp/Vsg.

SC341: TD sensor adjustment error 1

-Definition- [D]

During the TD sensor auto adjustment, the TD sensor output voltage (Vt) is 2.5 volts or higher even though the control voltage is set to the minimum value (PWM = 0)

NOTE: When this error occurs, the indication of SP2-906-1 is 0.00V.

-Possible cause-

- TD sensor defective
- Poor connection between the TD sensor and the I/O board.
- I/O board defective

NOTE: In this error condition, the toner supply is controlled using pixel count and Vsp/Vsg.

SC342: TD sensor adjustment error 2

-Definition- [D]

During the TD sensor auto adjustment, the TD sensor output voltage (Vt) does not come in the target range (2.5 ± 0.1V) within 20 seconds.

NOTE: When this error occurs, the indication of SP2-906-1 is 0.00V.

-Possible cause-

- TD sensor defective
- Poor connection between the TD sensor and the I/O board.
- I/O board defective

NOTE: In this error condition, the toner supply is controlled using pixel count and Vsp/Vsg.

SC345: Development bias leak

-Definition- [D]

A development bias leak signal is detected.

- Possible causes -

- Poor connection between the development bias terminal and the development P.P.
- Development P.P. defective

SC350: ID sensor error 1

-Definition- [C]

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

1) Vsp ≥ 2.5V
2) Vsp = 0V

- Possible causes -

- ID sensor defective
- ID sensor connector defective
- Poor ID sensor connector connection
- I/O board (IOB) defective
- Charge or development power pack defective
- Dirty ID sensor
- Defect at ID sensor pattern writing area of the drum

SC351: ID sensor error 2

-Definition- [C]

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

1) Vsg< 2.5V
2) Vsg = 0V
3) The ID sensor output voltage is 5.0V and the PWM signal input to the ID sensor is 0 when checking the ID sensor pattern

- Possible causes -

- ID sensor defective
- ID sensor connector defective
- Poor ID sensor connector connection
- I/O board (IOB) defective
- Charge or development power pack defective
- Dirty ID sensor
- Defect at the ID sensor pattern writing area of the drum

SC352: ID sensor error 3

-Definition- [C]

For 2 s during the ID sensor pattern check, the ID sensor pattern edge voltage is not 2.5V.

- Possible causes -

- ID sensor defective
- ID sensor connector defective
- Poor ID sensor connector connection
- I/O board (IOB) defective
- Charge or development power pack defective
- Dirty ID sensor
- Defect at the ID sensor pattern writing area of the drum

SC353: ID sensor error 4

-Definition- [C]

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

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

- Possible causes -

- ID sensor defective
- ID sensor connector defective
- Poor ID sensor connector connection
- I/O board (IOB) defective
- Charge or development power pack defective
- Dirty ID sensor
- Defect at the ID sensor pattern writing area of the drum

SC354: ID sensor error 5

-Definition- [C]

Vsg falls out of the adjustment target (4.0 ± 0.2V) during Vsg checking.

- Possible causes -

- ID sensor defective
- ID sensor connector defective
- Poor ID sensor connector connection
- I/O board (IOB) defective
- Charge or development power pack defective
- Dirty ID sensor
- Defect at the ID sensor pattern writing area of the drum

SC360: Hard disk detection error 1

-Definition- [B]

When the main switch turns on, the machine does not detect the connection signal from the HDD.

-Possible cause-

- Poor connection between the HDD and BICU
- Poor connection on the dc power connector to the HDD
- HDD defective
- BICU defective

SC362: Hard disk detection error 2

-Definition- [B]

When the power switch on the operation panel turns on, the machine does not detect the connection signal from the HDD.

-Possible cause-

- Poor connection between the HDD and BICU
- Poor connection on the dc power connector to the HDD
- HDD defective
- BICU defective

SC364: Hard disk drive error

-Definition-

The image data stored in the HDD cannot be output properly.

– Possible causes –

- When this SC occurs only once, this problem will be solved after turning the main power switch off and on.
- When this SC occurs while performing SP4-911-1 (HDD media check), it can be cured by doing SP4-911-2 (HDD formatting).
- HDD defective

SC366: Hard disk bad sector maximum

-Definition – [D]

The number of bad sectors on the HDD is over the maximum number.

-Possible Cause-

- HDD defective
- NVRAM defective

SC367: Hard disk (HDD:R) bad sector maximum

-Definition –

The number of bad sectors on the HDD is over the maximum number.

-Possible Cause-

- HDD defective
- NVRAM defective

SC370: IMAC (image compression IC) input FIFO error

-Definition- [D]

An input FIFO error occurs while inputting image processing in the ASIC (IMACB), which handles image compression and image data transmission.

-Possible cause-

- BICU defective

SC372: IMAC (image compression IC) output FIFO error

-Definition- [D]

An output FIFO error occurs while outputting image processing in the ASIC (IMACB), which handles image compression and image data transmission.

-Possible cause-

- BICU defective

SC374: IMAC (image compression IC) modes setting error

-Definition-

A mode setting error occurs by changing settings during image processing in the ASIC (IMACB), which handles image compression and image data transmission.

-Possible cause-

- BICU defective

SC376: Data transmission error

-Definition- [D]

A data transmission error occurred at the ASIC which controls data transmission and compression during connecting mode.

-Possible cause-

- Defective connection board
- Defective or disconnected interface cable
- Defective SBICU

SC380: Data transmission time out (video input)

-Definition- [D]

Data input to the IC which controls data transfer and compression is not completed within 20 seconds.

-Possible cause-

- BICU defective
- SBU defective
- Printer controller defective

SC382: Data transmission time out (video output)

-Definition- [D]

Data output from the IC which controls the data transfer and compression is not completed within 20 seconds.

-Possible cause-

- BICU defective
- LD board defective

SC384: Data transmission time out (connect copy)

-Definition- [D]

Data transmission to the memory does not finish properly within 20 seconds after the start of data transmission.

-Possible cause-

- Defective connection board
- Defective or disconnected interface cable
- Defective SBICU

SC386: Data transmission time out (Hard disk write)

-Definition- [D]

Data input to the IC which controls the data transfer and compression is not completed with in 20 seconds.

-Possible cause-

- BICU defective
- SBU defective
- Printer controller defective

SC390: CRC error

-Definition- [D]

Electrical noise causes sent data and received data to differ. A CRC check can detect this error.

-Possible cause-

- Defective connection board
- Defective or disconnected interface cable

SC391: Image storage address error

-Definition- [D]

The SBICU receives an image data output request signal for data that is not stored in memory.

-Possible causes-

- SBICU defective

SC400: Transfer roller leak error

-Definition- [D]

A transfer roller current leak signal is detected.

- Possible causes -

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

SC401: Transfer roller open error

-Definition- [D]

The transfer roller current feedback signal is not detected.

- Possible causes -

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

SC430: Quenching lamp error

-Definition- [C]

When finishing the process control initial setting, the drum potential which is detected by the drum potential sensor is out of the normal range.

- Possible causes -

- Quenching lamp defective
- Poor connection between quenching lamp and charge power pack

SC440: Main motor lock

-Definition- [D]

The main motor lock signal remains low for 2 seconds while the main motor is on.

- Possible causes -

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

SC441: Development motor lock

-Definition- [D]

The development motor lock signal remains low for 2 seconds while the development motor is on.

- Possible causes -

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

SC493: Exhaust fan motor lock

-Definition- [D]

The exhaust fan motor lock signal remains high for 5 seconds while the exhaust fan motor is on.

-Possible cause-

- Exhaust fan motor defective
- Too much load on the fan

SC494: Fusing exhaust fan motor lock

-Definition- [D]

The fusing exhaust fan motor lock signal remains high for 5 seconds while the fusing exhaust fan motor is on.

-Possible cause-

- Exhaust fan motor defective
- Too much load on the fan

SC495: Toner recycling unit error

-Definition- [D]

The toner recycling sensor output signal does not change within 500 ms after the main motor turns on.

- Possible causes -

- Too much load on the drive mechanism
- Toner end sensor detective
- Poor connection on the sensor connector

SC496: Toner collection bottle error

-Definition- [D]

The toner collection bottle set switch remains off when the front door is closed.

- Possible causes -

- No toner collection bottle
- Poor connection on the switch connector

SC497: Toner recycling motor error

-Definition- [D]

The toner recycling motor connector set signal remains off for 1 second.

- Possible causes -

- Toner recycling motor defective
- Poor connection on the motor connector

SC501: 1st tray lift malfunction

-Definition- [B]

- The lift sensor is activated before the pick-up solenoid is activated when the tray is pushed in.
- The lift sensor is not activated within 10 seconds after the tray lift motor starts lifting the bottom plate.
- The lift sensor remains activated for 1.5 seconds after the tray lift motor starts lowering the bottom plate.
- The tray down sensor is not activated within 10 seconds after the tray lift motor starts lowering the bottom plate because of a paper end condition.

-Possible cause-

- Tray lift motor defective or poor connection
- Lift sensor defective or poor connection
- Tray down sensor defective or poor connection
- Pick-up solenoid defective or poor connection

SC502: 2nd tray lift malfunction

-Definition- [B]

SC503: 3rd tray lift malfunction

-Definition- [B]

- The lift sensor is activated before the pick-up solenoid is activated when the tray is pushed in.
- The lift sensor is not activated within 10 seconds after the tray lift motor starts lifting the bottom plate.
- The lift sensor remains activated for 1.5 seconds after the tray lift motor starts lowering the bottom plate.

-Possible cause-

- Tray lift motor defective or poor connection
- Lift sensor defective or poor connection
- Pick-up solenoid defective or poor connection

SC505: LCT tray malfunction (optional LCT)

-Definition- [B]

- The lift sensor is not activated within 60 seconds after the tray lift motor starts lifting the bottom plate.
- The tray down sensor is not activated within 60 seconds after the tray lift motor starts lowering the bottom plate.
- The lift sensor and tray down sensor are activated at the same time.
- The lift sensor is not activated even when the pick-up roller is still lifted up by the top of paper.

-Possible cause-

- Tray lift motor defective or poor connection
- Lift sensor defective or poor connection
- Pick-up solenoid defective or poor connection
- Paper end sensor defective

SC510: Paper feed motor locks

-Definition- [B]

- The lock signal from the paper feed motor is detected for 3,000 ms during rotation.
- Poor connection is checked once when the main switch is on.

-Possible cause-

- Paper feed motor defective or poor connection
- Too much load on the drive mechanism
- Lower front door safety switch defective
- Lower front door safety switch bracket deformation

SC511: LCT motor lock (optional LCT)

-Definition- [B]

- The lock signal from the LCT transport motor is detected for 50 ms during rotation. (The detection period does not include 300 ms of the starting up.)
- Poor connection is checked once when the main switch is on.

-Possible cause-

- LCT transport motor defective or poor connection
- Too much load on the drive mechanism

SC515: Tandem rear fence motor error

-Definition- [B]

- When the tray is pushed in, the rear fence return sensor and the rear fence HP sensor are already on.
- The rear fence return sensor is not on within 10 seconds after the rear fence motor starts.
- The rear fence HP sensor is not on within 10 seconds after the rear fence starts moving to the home position.

-Possible cause-

- Rear fence motor defective or poor connection
- Too much load on the drive mechanism

<Note> The other trays are still available to use.

SC516: Tandem side fence motor error

-Definition- [B]

Japanese version only

SC520: Duplex jogger motor error 1

-Definition- [D]

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

- Possible causes -

- Jogger fence motor defective or poor connection
- Too much load on the drive mechanism

SC521: Duplex jogger motor error 2

-Definition- [D]

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

- Possible causes -

- Jogger fence motor defective or poor connection
- Too much load on the drive mechanism

SC530: By-pass feed motor lock

-Definition- [D]

A by-pass feed motor lock signal is detected for more than 2 seconds during rotation.

- Possible causes -

- By-pass feed motor defective or poor connection
- Too much load on the drive mechanism

SC531: Fusing/duplex motor lock

-Definition- [D]

A fusing/duplex motor lock signal is detected for more than 2 seconds during rotation.

- Possible causes -

- Fusing/duplex motor defective or poor connection
- Too much load on the drive mechanism

SC541: Fusing thermistor open

-Definition- [A]

The fusing temperature detected by the thermistor is below 7°C for 35 seconds.

- Possible causes -

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

SC542: Fusing temperature warming-up error

-Definition- [A]

The fusing temperature does not reach the fusing standby temperature within 5 minutes after the main power switch is turned on.

- Possible causes -

- Fusing thermistor defective or out of position
- Fusing lamp open
- Fusing thermofuse open
- BICU defective
- Power supply board defective
- Poor fusing unit connection

SC543: Fusing overheat error 1 (software)

-Definition- [A]

A fusing temperature of over 230°C is detected for 5 seconds by the fusing thermistor.

- Possible causes -

- Fusing thermistor defective
- BICU defective
- I/O board (IOB) defective

SC544: Fusing overheat error 1 (hardware)

-Definition- [A]

The BICU detects an overheat error even if the protection in the software does not work.

-Possible cause-

- Fusing thermistor defective
- BICU defective
- I/O board defective

SC545: Fusing overheat error 2

-Definition- [A]

The fusing lamp stays on at full power for 45 seconds while in the stand-by condition after warming-up is completed.

- Possible causes -

- Fusing thermistor out of position

SC546: Fusing ready temperature malfunction

-Definition- [A]

- A change in the fusing temperature by 20°C or more compared with the temperature of 1 second ago occurs 2 times consecutively.
- A change in the fusing temperature by 20°C or more compared with the temperature of 1 second ago occurs 3 times consecutively for 1 minute.

-Possible cause-

- Poor connection on the thermistor
- Poor connection on the fusing unit connector

SC547: Zero cross signal malfunction

-Definition- [D]

- When the main switch is on, the frequency measured by the number of zero cross signals for 500 ms is larger than 66Hz or smaller than 45Hz.
- It is measured 3 times consecutively for 500 ms that the interval between a zero cross signal and the next one is 7.5 ms or shorter.

-Possible cause-

- Power supply unit defective
- Noise on the ac power line

SC590: Toner collection motor error

-Definition- [D]

The toner collection motor sensor output does not change for 3 seconds while the toner collection motor is on.

- Possible causes -

- Toner collection motor defective
- Too much load on the drive mechanism
- Poor toner collection motor connector connection
- IOB defective
- Toner collection motor sensor defective

SC601: Communication error between BICU and MCU

-Definition- [D]

The BICU cannot communicate with the MCU board properly.

- Possible causes -

- Poor connection between the BICU and MCU
- MCU defective
- BICU defective

SC602: Communication error between BICU and HDD controller

-Definition- [D]

The BICU cannot communicate with the HDD controller properly.

- Possible causes -

- Poor connection between the BICU board and HDD control board
- BICU board defective

SC620: Communication error between BICU and ADF 1

-Definition- [D]

The TXD and RXD signals between BICU and ADF main board do not stabilize.

- Possible causes -

- Poor connection between the BICU board and ADF main board
- Noise on interface cable

SC621: Communication error between BICU and ADF 2

-Definition- [D]

The TXD and RXD signals between BICU and ADF main board do not stabilize.

- Possible causes -

- Poor connection between the BICU board and ADF main board
- ADF main board defective
- BICU board defective

SC622: Communication error between BICU and ADF 3

-Definition- [D]

Software error after abnormal user operation.

- Possible causes -

- Software error

SC625: Communication error between BICU and finisher 1

-Definition- [D]

The acknowledge signal does not come back from the finisher or mailbox to the BICU board 3 times consecutively.

-Possible cause-

- Finisher or mailbox main board defective
- BICU board defective
- Poor connection between BICU board and finisher or mailbox main board
- Noise on the interface cable

SC626: Communication error between BICU and finisher 2

-Definition- [D]

The BICU board receives a low signal even when the communication line is connected between the BICU board and the finisher or mailbox.

-Possible cause-

- Finisher or mailbox main board defective
- BICU board defective
- Poor connection between BICU board and finisher or mailbox main board
- Noise on the interface cable
- Finisher or mailbox is installed with B098

SC630: CSS (RSS) communication error between line adapter and CSS center

-Definition- [C]

Japan only

SC635: Communication error between BICU and paper feed board 1

-Definition- [D]

The acknowledge signal does not come back from the paper feed board to the BICU board 3 times consecutively.

-Possible cause-

- Paper feed board defective
- BICU board defective
- Poor connection between BICU board and paper feed board
- Noise on the interface cable

SC636: Communication error between BICU and paper feed board 2

-Definition- [D]

The BICU board receives a low signal even when the communication line is connected between the BICU board and the paper feed board.

-Possible cause-

- Paper feed board defective
- BICU board defective
- Poor connection between BICU board and paper feed board
- Noise on the interface cable

SC700: ADF original pick-up malfunction 1

-Definition- [D]

The pick-up roller H.P sensor signal does not change after the pick-up motor has turned on.

- Possible causes -

- Pick-up roller H.P sensor defective
- Pick-up motor defective
- Timing belt out of position
- ADF main board defective

SC701: ADF original pick-up malfunction 2

-Definition- [D]

The pick-up roller HP sensor is not activated even after the pick-up motor turns on.

-Possible cause-

- Pick-up roller HP sensor defective
- Pick-up motor defective
- ADF main board defective

SC702: ADF feed-in motor lock

-Definition- [D]

1) The encoder signal cannot be detected within a specific time when the feed-in motor is on.
2) The pulse signal from the length sensor is not detected within a specific time when the feed-in motor is on.

-Possible cause-

- Feed-in motor defective
- Length sensor defective
- Cable for length sensor or feed-in motor defective
- Main board defective

SC703: ADF transport motor lock

-Definition- [D]

The encoder signal cannot be detected within a specific time when the transport motor is on.

-Possible cause-

- Transport motor defective
- Cable for transport motor defective
- Main board defective

SC704: ADF feed-out motor lock

-Definition- [D]

The encoder signal cannot be detected within a specific time when the feed-out motor is on.

-Possible cause-

- Feed-out motor defective
- Cable for feed-out motor defective
- Main board defective

SC705: ADF bottom plate motor error

-Definition- [D]

1) The bottom plate position sensor does not turn on when the bottom plate motor lifts the bottom plate.
2) The bottom plate HP sensor does not turn on when the bottom plate motor lowers the bottom plate.

-Possible cause-

- Bottom plate position sensor defective
- Bottom plate HP sensor defective
- Bottom plate motor defective
- Main board defective

SC720: Finisher transport motor error

-Definition- [B]

The encoder pulse of the transport motor does not change state (high/low) within a certain period of time.

-Possible cause-

- Finisher transport motor defective or poor connection
- Finisher main board defective
- Too much load on drive mechanism

SC722: Finisher jogger motor error

-Definition- [B]

1) The finisher jogger H.P sensor remains de-activated for more than a certain time when returning to home position.
2) The finisher jogger H.P sensor remains activated for more than a certain time when moving away from home position.

- Possible causes -

- Jogger H.P sensor defective
- Jogger motor defective

SC724: Finisher staple hammer motor error

-Definition- [B]

Stapling does not finish within a certain time after the staple hammer motor turned on.

- Possible causes -

- Staple hammer motor defective
- Staple jam

SC725: Finisher stack feed-out motor error

- Definition - [B]

The stack feed-out belt H.P sensor does not activate within a certain time after the stack feed-out motor turned on.

- Possible causes -

- Stack feed-out H.P sensor defective
- Stack feed-out motor defective

SC726: Finisher shift/lift motor error

- Definition - [B]

1) Tray shift does not finish within a certain time after the shift motor turned on.
2) The stack height sensor does not activate within a certain time after the shift tray lift motor turned on.

- Possible causes -

- Shift motor defective
- Shift tray lift motor defective

SC727: Finisher stapler rotation motor error

- Definition - [B]

1) Stapler rotation does not finish within a certain time after the stapler rotation motor turned on.
2) The stapler does not return to its home position within a certain time after stapling finished.

- Possible causes -

- Stapler rotation motor defective
- Poor stapler rotation motor connection

SC729: Finisher punch motor error

- Definition - [B]

The punch H.P sensor does not activate within a certain time after the punch motor turned on.

- Possible causes -

- Punch motor defective
- Punch H.P sensor defective
- Poor punch motor connection

SC730: Finisher stapler position motor error

- Definition - [B]

1) The stapler H.P. sensor stays on for longer than normal when the stapler motor turns on to return the stapler to its home position.
2) The stapler H.P sensor does not turn on within a certain time after the stapler motor turned on to move the stapler away from home position.

- Possible causes -

- Stapler motor defective
- Stapler H.P sensor defective
- Poor stapler motor connection

SC731: Finisher paper exit guide plate motor lock

-Definition- [B']

The exit plate HP sensor does not turn on within 800 ms when the exit plate returns to its home position.

-Possible cause-

- Exit plate motor defective
- Too much load to exit plate motor
- Exit plate motor connector defective
- Exit plate HP sensor defective
- Main board defective

SC735: Finisher pre-stack motor error

-Definition- [B]

It occurs 2 times consecutively that the pre-stack HP sensor is not activated within 400 pulses after the pre-stack motor starts.

-Possible cause-

- Pre-stack HP sensor defective or poor connection
- Pre-stack motor defective
- Finisher main board defective
- Too much load on the drive mechanism

SC736: Finisher paper exit guide plate motor error

-Definition- [B]

It occurs 2 times consecutively that the paper exit guide plate HP sensor is not activated within 750 ms after the paper exit guide plate motor starts.

-Possible cause-

- Paper exit guide plate sensor defective or poor connection
- Paper exit guide plate motor defective
- Finisher main board defective
- Too much load on the drive mechanism

SC737: Finisher staple waste full

-Definition- [B]

The box for staple waste becomes full.

-Possible cause-

- Box is full of staple waste
- Staple waste sensor defective

SC738: Finisher shift tray lift motor error

-Definition- [D]

It occurs 2 times consecutively that;

1) The stack height sensor is not activated within 50 seconds after the motor starts lifting the tray.
2) The stack height sensor is still activated 5 seconds after the motor starts lowering the tray.

-Possible cause-

- Stack height sensor defective or poor connection
- Shift tray lift motor defective
- Finisher main board defective
- Too much load on the drive mechanism

SC740: 1,000-sheet finisher error in finisher area

- Definition – [D]

NOTE: When this SC is displayed, check SP7-902 (SC detail). The first 2 digits indicate the type of error.

Example: 740 **01**00000000000000

01: Shutter movement error

1) The shutter position switch does not turn on within 1 second after the transport motor starts to turn in reverse.
2) The shutter sensor does not deactivate within 1 second after the transport motor starts to turn in reverse.
3) The shutter position switch is off when the shift tray safety switch is off.

- Possible causes -

- Transport motor defective
- Shutter position switch defective
- Shift tray safety switch defective

02: Exit motor error

1) After the exit motor turns on, the exit motor sensor does not send the proper signal to the finisher board.
2) The exit motor sensor does not send the clock signal to the finisher board for certain period while the exit motor is on.

- Possible causes -

- Exit motor defective
- Exit motor sensor defective

03: Upper exit plate movement error

1) The upper exit guide 2 switch does not turn on within 1s after the guide plate motor turns on.
2) The upper exit guide sensor does not activate within 1s after the guide plate motor turns on.
3) The upper exit guide 2 switch does not turn on when the shift tray safety switch is off.

- Possible causes -

- Guide plate motor defective
- Upper exit guide 2 switch defective
- Upper exit guide sensor defective
- Shift tray safety switch defective

04: Jogger motor error

1) After the jogger motor turns on to move the jogger fence from its home position, the jogger HP sensor does not deactivate within 2s.
2) After the jogger motor turns on to return the jogger fence to its home position, the jogger HP sensor does not activate within 2s.

- Possible causes -

- Jogger motor defective
- Jogger HP sensor defective

05: Stapler motor error

1) After the stapler motor turns on to move the stapler unit from its home position, the stapler unit HP sensor does not deactivate within 4s.
2) After the stapler motor turns on to return the stapler unit to its home position, the stapler unit HP sensor does not activate within 4s.

- Possible causes -

- Stapler motor defective
- Stapler unit HP sensor defective

06: Staple hammer motor error

1) The staple hammer HP sensor does not deactivate within 0.5s after the staple hammer motor turns on.
2) The staple hammer HP sensor does not activate within 0.5s after the staple hammer motor turns on.

- Possible causes -

- Staple hammer motor defective
- Staple hammer HP sensor defective

07: Tray lift motor error

1) The tray lift motor does not stop within 15s after being turned on.
2) The shift tray HP sensor does not activate within 15s after the tray lift motor turns on.
3) The shift tray upper limit switch turns on while the shift tray is being raised.
4) Lift motor sensors 1 & 2 do not send the clock signals to the finisher board every 200ms while the tray lift motor is on.

- Possible causes -

- Tray lift motor defective
- Lift motor sensor 1 defective
- Lift motor sensor 2 defective
- Shift tray HP sensor defective
- Shift tray upper limit switch defective

08: Shift tray height sensor error

1) Abnormal communication data between finisher board and shift tray height sensor.
2) No communication between finisher board and shift tray height sensor for a certain period.
3) The finisher board detects a connection error with the connector for the shift tray height sensor.
4) Adjustment error during shift tray height sensor adjustment.

- Possible causes -

- Shift tray height sensor defective
- Finisher board defective

09: Back-up RAM error

The check sum is abnormal when the main switch is turned on.

- Possible causes -

- Finisher board defective

0A: Communication error

Communication error between finisher board and booklet unit board.

- Possible causes -

- Finisher board defective
- Booklet unit board defective
- Poor connection of the interface harness

SC741: 1000 sheet finisher error in saddle stitching area

- Definition – [D]

NOTE: When this SC is displayed, check SP7-902 (SC detail). The first 2 digits indicate the type of error.

Example: 741 **01**00000000000000

01: Positioning plate motor error

1) After the positioning plate motor turns on to move the positioning plate from its home position, the positioning plate HP sensor does not deactivate within 1.25s.
2) After the positioning plate motor turns on to return the positioning plate to its home position, the positioning plate HP sensor does activate within 1s.

- Possible causes -

- Positioning plate motor defective
- Positioning plate HP sensor defective

02: Folder roller motor error

1) The folder roller motor sensor doesn't send the clock pulse to the booklet unit board within a certain period after the folder roller motor turns on.

- Possible causes -

- Folder roller motor defective
- Folder roller motor sensor defective

03: Shutter guide motor error

1) After the shutter guide motor turns on to move the shutter guide from its home position, the shutter guide HP sensor does not deactivate within 0.4s.
2) After the shutter guide motor turns on to return the shutter guide to its home position, the shutter guide HP sensor does not activate within 1s.

- Possible causes -

- Shutter guide motor defective
- Shutter guide HP sensor defective

04: Booklet jogger motor error

1) After the booklet jogger motor turns on to move the booklet jogger plate from its home position, the booklet jogger HP sensor does not deactivate within 0.5s.
2) After the booklet jogger motor turns on to return the booklet jogger plate to its home position, the booklet jogger HP sensor does not activate within 1s.

- Possible causes -

- Booklet jogger motor defective
- Booklet jogger HP sensor defective

05: Stapler motor error

1) The front staple hammer HP switch does not turn off within 0.5s after the front stapler motor turns on.
2) The front staple hammer HP switch does not turn on within 0.5s after the front stapler motor turns on during jam recovery.
3) The rear staple hammer HP switch does not turn off within 0.5s after the rear stapler motor turns on.
4) The rear staple hammer HP switch does not turn on within 0.5s after the rear stapler motor turns on during jam recovery.

- Possible causes -

- Front stapler motor defective
- Front staple hammer HP switch defective
- Rear stapler motor defective
- Rear staple hammer HP switch defective

06: Folder plate motor error

1) After the folder plate motor turns on to return the folder plate to its home position, the folder plate HP sensor does not activate within 0.3s.
2) After the folder plate motor turns on to move the folder plate from its home position, the folder plate HP sensor does not deactivate within 0.3s.
3) After the folder plate motor turns on to return the folder plate to its home position, the folder plate return sensor does not deactivate within 0.3s.
4) The folder plate return sensor does not activate within 0.3s after the HP sensor deactivates.
5) The pulse count from the folder plate motor sensor is lower than the target minimum.

- Possible causes -

- Folder plate motor defective
- Folder plate HP sensor defective
- Folder plate return sensor defective
- Folder plate motor sensor defective

07: Connector error

1) The connector of the shutter guide HP sensor is not connected.
2) The connector of the folder plate HP sensor is not connected.
3) The connector of the folder plate return sensor is not connected.

- Possible causes -

- Poor connection or no connection of the shutter guide HP sensor connector
- Poor connection or no connection of the folder plate HP sensor connector
- Poor connection or no connection of the folder plate return sensor connector

08: Switch error

1) When the booklet entrance guide sensor, lower door sensor and booklet exit cover sensor are all activated (doors closed), the booklet entrance guide safety switch does not turn on within 1s after a copy job or warm-up idling begins.
2) When the booklet entrance guide sensor, lower door sensor and booklet exit cover sensor are all activated (doors closed), the lower door safety switch does not turn on within 1s after a copy job or warm-up idling begins.
3) When the booklet entrance guide sensor, lower door sensor and booklet exit cover sensor are all activated (doors closed), the booklet exit cover safety switch does not turn on within 1s after a copy job or warm-up idling begins.

- Possible causes -

- Booklet entrance guide safety switch defective
- Lower door safety switch defective
- Booklet exit cover safety switch defective

SC900: Electrical total counter error

-Definition- [D]

The total counter contains something that is not a number.

- Possible causes -

- NVRAM defective

SC901: Mechanical total counter error

-Definition- [D]

The mechanical counter is not connected.

-Possible cause-

- Mechanical total counter defective
- Mechanical total counter connector not connected

SC951: F-gate signal error 2

-Definition- [D]

When the IPU has already received the F-gate signal (laser writing start trigger signal), the IPU receives another F-gate signal.

- Possible causes -

- SBICU defective

SC953: Scanner image setting error

-Definition- [D]

The settings that are required for image processing using the scanner are not sent from the IPU.

- Possible causes -

- Software defective

SC954: Printer image setting error

-Definition- [D]

The settings that are required for image processing using the printer controller are not sent from the IPU.

- Possible causes -

- Software defective

SC955: Memory setting error

-Definition- [D]

The settings that are required for image processing using the memory are not sent from the IPU.

- Possible causes -

- Software defective

SC956: Scanner setting ID error

-Definition- [D]

The ID that is sent from the IPU for scanner parameter setting is different from expected.

-Possible cause-

- Software error

SC957: Scanner return ID error

-Definition- [D]

The ID that is sent from the IPU for the scanner return signal is different from expected.

-Possible cause-

- Software error

SC958: Scanner ready ID error

-Definition- [D]

The ID that is sent from the IPU for the scanner ready signal is different from expected.

-Possible cause-

- Software error

SC959: Printer setting ID error

-Definition- [D]

The ID that is sent from the IPU for the printer setting signal is different from expected.

-Possible cause-

- Software error

SC960: Printer return ID error

-Definition- [D]

The ID that is sent from the IPU for the printer return signal is different from expected.

-Possible cause-

- Software error

SC961: Printer ready ID error

-Definition- [D]

The ID that is sent from the printer controller in the printer controller printing ready condition is incorrect.

- Possible causes -

- Software defective

SC962: Memory setting ID error

-Definition- [D]

The ID that is sent from the memory when the IPU sent the memory ready signal is incorrect.

- Possible causes -

- Software defective

SC963: Memory finishing ID error

-Definition- [D]

The ID that is sent from the memory when the IPU sent the memory finish signal is incorrect.

- Possible causes -

- Software defective

SC964: Printer ready error

-Definition- [D]

The print ready signal is not generated for more than 17 seconds after the IPU received the print start signal.

- Possible causes -

- Software defective

SC966: No laser writing signal (F-GATE) error 2

- Definition - [D]

The level of the laser writing signal (F-GATE) fails to reach LOW for more than 15 seconds after the copy paper reaches the registration sensor.

- Possible causes -

- Poor cable connection with the polygon mirror motor driver
- Polygon mirror motor (driver) defective
- BICU defective

SC970: Scanner ready error

-Definition- [D]

The MCU does not send the ready signal for 10 seconds after the scanning start command is sent to the MCU.

-Possible cause-

- Communication error between BICU and MCU
- MCU software defective
- Buffer is full

SC980: HDD access error

-Definition- [D]

Incorrect parameter is sent from the BICU to the HDD controller.

- Possible causes -

- Software defective
- BICU defective

SC982: HDD construction error

-Definition- [D]

A HDD that does not have the correct specifications has been installed.

- Possible causes -

- Insufficient memory
- Incorrect hard disk type

SC984: HDD response error

-Definition- [D]

The HDD controller does not generate any response when the BICU sends a read/write signal to the HDD controller.

- Possible causes -

- Software defective
- HDD defective or poor connection

SC990: Software performance error

-Definition- [D]

The software performs an unexpected function.

- Possible causes -

- Software defective

NOTE: When this SC occurs, the file name, address, and data will be stored in the NVRAM. These data can be checked by entering SP mode then pressing "0".

Note the above data and the situation in which this SC occurs. Then report the data and conditions to your technical control center

7.2 ELECTRICAL COMPONENT DEFECTS

7.2.1 SENSORS

Component (Symbol)	Connector No.	Condition	Symptom
Scanner Home Position (S1)	CN555-2 (MCU)	Stays On	SC121 is displayed.
		Stays Off	SC120 is displayed.
Original Width (S2)	CN555-6, 7, 8 (MCU)	Stays On	The CPU cannot detect the original size properly. APS and ARE do not function correctly.
		Stays Off	The CPU cannot detect the original size properly. APS and ARE do not function correctly.
Original Length-1 (S3)	CN555-11 (MCU)	Stays On	The CPU cannot detect the original size properly. APS and ARE do not function correctly.
		Stays Off	The CPU cannot detect the original size properly. APS and ARE do not function correctly.
Original Length-2 (S4)	CN555-14 (MCU)	Stays On	The CPU cannot detect the original size properly. APS and ARE do not function correctly.
		Stays Off	The CPU cannot detect the original size properly. APS and ARE do not function correctly.
LD Unit Home Position (S5)	CN202-8 (IOB)	Stays On	SC328 is displayed when the laser beam pitch is changed.
		Stays Off	SC327 is displayed when the laser beam pitch is changed.
Drum Potential Sensor (S6)	CN206-A12 (IOB)	Open	The machine quits auto process control and enters fixed toner supply mode.
		Shorted	
Toner Density (TD) (S7)	CN211-B9 (IOB)	Stays On	SC340 is displayed.
		Stays Off	SC340 is displayed.
Image Density (ID) (S8)	CN206-B11 (IOB)	Open	SC352 is displayed after copying.
		Shorted	SC350 is displayed after copying.
Toner End (S9)	CN211-B5 (IOB)	Open	“Toner End” is displayed even if there is enough toner in the toner hopper.
		Shorted	“Toner End” is not displayed even if there is no toner in the toner hopper.
Toner Collection Motor (S10)	CN270-7 (PFB)	Stays On	SC495 is displayed.
		Stays Off	SC495 is displayed.
Toner Recycling (S11)	CN207-B2 (IOB)	Stays On	SC495 is displayed.
		Stays Off	SC495 is displayed.
1st Paper Feed (S12)	CN271-2 (PFB)	Stays On	“Paper Jam” is displayed even if there is no paper.
		Stays Off	“Paper Jam” is displayed whenever a copy is made.

Component (Symbol)	Connector No.	Condition	Symptom
2nd Paper Feed (S13)	CN273-A2 (PFB)	Stays On	"Paper Jam" is displayed even if there is no paper.
		Stays Off	"Paper Jam" is displayed whenever a copy is made.
3rd Paper Feed (S14)	CN273-B2 (PFB)	Stays On	"Paper Jam" is displayed even if there is no paper.
		Stays Off	"Paper Jam" is displayed whenever a copy is made.
1st Tray Lift (S15)	C271-8 (PFB)	Stays On	SC501 is displayed.
		Stays Off	SC501 is displayed.
2nd Tray Lift (S16)	CN273-A8 (PFB)	Stays On	SC502 is displayed.
		Stays Off	SC502 is displayed.
3rd Tray Lift (S17)	CN273-B8 (PFB)	Stays On	SC503 is displayed.
		Stays Off	SC503 is displayed.
1st Paper End (S18)	CN271-5 (PFB)	Stays On	"Paper End" is displayed even if there is paper in the 1st paper tray.
		Stays Off	"Paper End" is not displayed even if there is no paper in the 1st paper tray.
2nd Paper End (S19)	CN273-A5 (PFB)	Stays On	"Paper End" is displayed even if there is paper in the 2nd tray.
		Stays Off	"Paper End" is not displayed even if there is no paper in the 2nd tray.
3rd Paper End (S20)	CN273-B5 (PFB)	Stays On	"Paper End" is displayed even if there is paper in the 3rd tray.
		Stays Off	"Paper End" is not displayed even if there is no paper in the 3rd tray.
By-pass Paper End (S21)	CN211-A5 (IOB)	Stays On	"Paper End" is displayed even if there is paper in the by-pass tray.
		Stays Off	"Paper End" is not displayed even if there is no paper in the by-pass tray.
1st Paper Near End (S22)	CN265-B6 (PFB)	Stays On	"Paper Near End" is not displayed even if the tray is almost empty.
		Stays Off	"Paper Near End" is displayed even if there is enough paper in the paper tray.
2nd Paper Near End (S23)	CN263-2 (PFB)	Stays On	"Paper Near End" is not displayed even if the tray is almost empty.
		Stays Off	"Paper Near End" is displayed even if there is enough paper in the paper tray.
3rd Paper Near End (S24)	CN263-7 (PFB)	Stays On	"Paper Near End" is not displayed even if the tray is almost empty.
		Stays Off	"Paper Near End" is displayed even if there is enough paper in the paper tray.
Rear Fence HP (S25)	CN266-5 (PFB)	Stays On	SC515 is displayed.
		Stays Off	SC515 is displayed.

Component (Symbol)	Connector No.	Condition	Symptom
Rear Fence Return (S26)	CN266-9 (PFB)	Stays On	SC515 is displayed.
		Stays Off	SC515 is displayed.
Front Side Fence Open (S27)	CN265-A3 (PFB)	Stays On	SC515 may display.
		Stays Off	SC515 may display.
Front Side Fence Close (S28)	CN265-A6 (PFB)	Stays On	SC515 may display.
		Stays Off	SC515 may display.
Rear Side Fence Open (S29)	CN265-A9 (PFB)	Stays On	SC515 may display.
		Stays Off	SC515 may display
Rear Side Fence Close (S30)	CN265-A12 (PFB)	Stays On	SC515 may display
		Stays Off	SC515 may display
Right Tray Down (S31)	CN265-B3 (PFB)	Stays On	The bottom plate is not lowered when paper on the left tray shift to the right tray, and paper is set in the improper position. When the main switch turn on, no paper is indicated on the display even if there is paper on the right tray.
		Stays Off	The bottom plate lift lower locks at the lowest position.
Right Tray Paper (S32)	CN265-B9 (PFB)	Stays On	The bottom plate rises and falls even if there is no paper.
		Stays Off	The bottom plate close not rise even if there is paper on the tray.
Left Tandem Tray Paper (S33)	CN266-11 (PFB)	Stays On	The rear fence moves back and forth continuously.
		Stays Off	The paper on the left tray is not moved to the right tray. No paper is indicated event if there is paper on the left tray.
Duplex Entrance (S34)	CN208-B14 (IOB)	Stays On	“Paper Jam” is displayed even if there is no paper.
		Stays Off	“Paper Jam” is displayed whenever a copy is made.
Duplex Inverter (S35)	CN208-B17 (IOB)	Stays On	“Paper Jam” is displayed even if there is no paper.
		Stays Off	“Paper Jam” is displayed whenever a copy is made.
Duplex Transport 1 (S36)	CN208-B5 (IOB)	Stays On	“Paper Jam” is displayed whenever a copy is made.
		Stays Off	“Paper Jam” is displayed even if there is no paper.
Duplex Transport 2 (S37)	CN208-B8 (IOB)	Stays On	“Paper Jam” is displayed whenever a copy is made.
		Stays Off	“Paper Jam” is displayed even if there is no paper.

Component (Symbol)	Connector No.	Condition	Symptom
Duplex Transport 3 (S38)	CN208-B11 (IOB)	Stays On	“Paper Jam” is displayed whenever a copy is made.
		Stays Off	“Paper Jam” is displayed even if there is no paper.
Duplex Jogger HP (S39)	CN208-B2 (IOB)	Stays On	SC521 is displayed.
		Stays Off	SC520 is displayed.
Relay (S40)	CN211-A8 (IOB)	Stays On	“Paper Jam” is displayed even if there is no paper.
		Stays Off	“Paper Jam” is displayed whenever a copy is made.
Registration (S41)	CN211-A1 (IOB)	Stays On	“Paper Jam” is displayed even if there is no paper.
		Stays Off	“Paper Jam” is displayed whenever a copy is made.
Guide Plate Position (S42)	CN209-6 (IOB)	Stays On	A paper jam will occur when the guide plate is opened.
		Stays Off	“Guide Plate Close” is displayed after the front door is closed even if the guide plate is closed.
Fusing Exit (S43)	CN207-B8 (IOB)	Stays On	“Paper Jam” is displayed even if there is no paper.
		Stays Off	“Paper Jam” is displayed whenever a copy is made.
1st Exit (S44)	CN204-B2 (IOB)	Stays On	“Paper Jam” is displayed whenever a copy is made.
		Stays Off	“Paper Jam” is displayed even if there is no paper.
2nd Exit (S45)	CN204-B5 (IOB)	Stays On	“Paper Jam” is displayed whenever a copy is made.
		Stays Off	“Paper Jam” is displayed even if there is no paper.
Tray Paper Limit (S46) (Option)	CN204-B8 (IOB)	Stays On	Paper jams may occur.
		Stays Off	“Paper Full on Exit Tray” is displayed.

7.2.2 SWITCHES

Component (Symbol)	Connector No.	Condition	Symptom
Main Power (SW1)	CN101-1, 2 CN111-1, 2	Open	The machine does not turn on.
		Shorted	The machine does not turn off.
Front Door Safety (SW3,5)	CN403-1, 3 (LDU)	Open	SC322 is displayed.
		Shorted	-
Front Door Safety (SW4)	CN152-3, 6, 7 (CNB)	Stays On	"Close the Door" is displayed even if the front cover is closed. SC440, 441, or 531 is displayed.
		Stays Off	"Close the Door" is not displayed even if the front cover is opened.
Lower Front Door Safety (SW6)	CN268-1 (PFB)	Open	SC506 is displayed.
		Shorted	-
Toner Collection Bottle Set (SW7)	CN268-10 (PFB) CN270-10	Open	SC 496 is displayed.
		Shorted	No caution is displayed on the operation panel even if the toner collection bottle is set incorrectly.
Toner Overflow (SW8)	CN270-12 (PFB)	Open	"Full Used Toner Bottle" is displayed even if the toner collection bottle is not full.
		Shorted	"Full Used Toner Bottle" is not displayed even if the toner collection bottle is full.
Paper Size (SW9)	CN262-8,9,10,11,12 (PFB)	Open	The CPU cannot detect the proper paper size, and misfeeds may occur when a copy is made.
		Shorted	

7.3 BLOWN FUSE CONDITIONS

Fuse	Rating		Symptom when turning on the main power switch
	115V	210 ~ 230V	
Power Supply Board			
FU101	12A/250V	6.3A/250V	No response
FU102	6.3A/125V	6.3A/125V	Nothing is displayed on LCD.
FU103	6.3A/125V	6.3A/125V	SC101 is displayed.
FU104	6.3A/125V	6.3A/125V	The ADF does not work.
FU105	6.3A/125V	6.3A/125V	SC520 is displayed.
FU106	6.3A/125V	6.3A/125V	SC530 is displayed after the start key is pressed.
FU107	6.3A/125V	6.3A/125V	SC542 is displayed.