# Gestetner RロCon savin 



## A229

SERVICE MANUAL

PN: RCSMA229

# Gestetner RICOM 53VII 



# Gestetner RICOOM SaVII 

A229<br>SERVICE MANUAL

## WARNING

The Service Manual contains information regarding service techniques, procedures, processes and spare parts of office equipment distributed by Ricoh Corporation. Users of this manual should be either service trained or certified by successfully completing a Ricoh Technical Training Program.

Untrained and uncertified users utilizing information contained in this service manual to repair or modify Ricoh equipment risk personal injury, damage to property. or loss of warranty protection.

Ricoh Corporation

## LEGEND

| PRODUCT CODE | COMPANY |  |  |
| :--- | :---: | :---: | :---: |
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## ©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 when 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 since 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.
> $\triangle$ WARNING
> Use of controls, or adjustment, or performance of procedures other than those specified in this manual may result in hazardous radiation exposure.



## OVERALL INFORMATION

## 1. OVERALL MACHINE INFORMATION

### 1.1 SPECIFICATIONS

### 1.1.1 COPIER ENGINE

Configuration:
Copy Process:
Originals:
Original Size:

Original Alignment:
Copy Paper Size:

Duplex Copying:

Copy Paper Weight:

Reproduction Ratios:

Console
Dry electrostatic transfer system
Sheet/Book
Maximum A3/11" x 17"
Minimum B6, $51 / 2 " x 81 / 2 "$ (using ADF)
Rear left corner
Maximum
A3/11" x 17" (1st/2nd Tray, By-pass)
B4/8 1/2" x 14" (3rd Tray)
Minimum
B5/8 $1 / 2^{\prime \prime} \times 11$ " lengthwise (1st Paper Tray)
A5/51/2" x 81/2" (2nd Tray)
B5/8 $1 / 2$ " x 11" (3rd Paper Tray)
A6/51/2" x 81/2" lengthwise (By-pass)
Tandem Paper Tray (1st Tray)
A4/B5/8 $1 / 2$ " $\times 11^{\prime \prime}$ sideways only
Maximum A3/11" x 17"
Minimum A5/51/2" x 81/2" lengthwise
Paper tray: $52.3 \sim 127.9 \mathrm{~g} / \mathrm{m}^{2}, 14 \sim 34 \mathrm{lb}$
Bypass feed table: $52.3 \sim 163 \mathrm{~g} / \mathrm{m}^{2}, 14 \sim 43 \mathrm{lb}$
Duplex copying: $64 \sim 104.7 \mathrm{~g} / \mathrm{m}^{2}, 17 \sim 28 \mathrm{lb}$
6 reduction and 5 enlargement

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

Zoom: 32 ~ 400\%
$\Rightarrow$ Copy Speed:

| A229 (65 CPM) | Max. 65 cpm (A4 / $81 / 2{ }^{\prime \prime \prime} \times 11$ " sideways) |
| :---: | :---: |
| A229 (55 CPM) | Max. 55 cpm (A4 / $81 / 2^{\prime \prime} \times 11^{\prime \prime}$ sideways) |
| Resolution: | Scanning: 400 dpi Printing: $\quad 400 \mathrm{dpi}$ $\quad 600 \mathrm{dpi}$ (Printer Mode Only) |
| 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 3.7 s (Face up mode) Less than 5.5 s (Face down mode) |
| Copy Number Input: | Ten-key pad, 1 to 999 |
| Copy Paper Capacity: | Tray 1: 1000 sheets(when used as a tandem tray) <br> Tray 2: 550 sheets <br> Tray 3 (LCT): 1500 sheets By-pass Tray: 50 sheets |
| Copy Tray Capacity: (Output Tray) | A4/8 $1 / 2^{\prime \prime} \times 11^{\prime \prime}: 500$ sheets ( $100 \mu \mathrm{~m}$ thickness paper) A3/11" x 17": 250 sheets |
| Memory Capacity: | $\begin{aligned} & \text { RAM: 12MB } \\ & \text { HDD: } 1.7 \mathrm{~GB} \end{aligned}$ |
| Toner Replenishment: | Cartridge exchange (1220g/ cartridge) |
| Toner Yield: | 42k copies <br> (A4 sideways, 6\% full black, 1 to 3 copying, including toner recycling ratio 20\%) |
| Power Source: | North America: $120 \mathrm{~V}, 60 \mathrm{~Hz}, 20 \mathrm{~A}$ <br> Europe/Asia: $220 \sim 240 \mathrm{~V}, 50 \mathrm{~Hz} / 60 \mathrm{~Hz}, 10 \mathrm{~A}$ |

Power Consumption: A229 copier (120 V Model)

|  | Copier only | Full system* |
| :---: | :---: | :---: |
| Warm-up | About 1.290 kW | About 1.310 kW |
| Stand-by | About 0.235 kW | About 0.255 kW |
| Copying | About 1.560 kW | About 1.650 kW |
| Maximum | Less than 1.75 kW | Less than 1.75 kW |
| Energy Saver | About 0.210 kW | About 0.230 kW |
| Low Power | About 0.205 kW | About 0.225 kW |
| Off Mode | About 0.017 kW | About 0.017 kW |

A229 copier (220 to 240 V Model)

|  | Copier only | Full system* |
| :---: | :---: | :---: |
| Warm-up | About 1.250 kW | About 1.270 kW |
| Stand-by | About 0.245 kW | About 0.260 kW |
| Copying | About 1.500 kW | About 1.600 kW |
| Maximum | Less than 1.75 kW | Less than 1.75 kW |
| Energy Saver | About 0.220 kW | About 0.235 kW |
| Low Power | About 0.215 kW | About 0.230 kW |
| Off Model | About 0.017 kW | About 0.017 kW |

*Full System: Mainframe with LCT and Finisher

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

|  | Copier only | Full system |
| :---: | :---: | :---: |
| Stand-by | Less than $50 \mathrm{~dB}(A)$ | Less than $50 \mathrm{~dB}(A)$ |
| Copying (ADF 1 to 1) | Less than $72 \mathrm{~dB}(A)$ | Less than $72 \mathrm{~dB}(A)$ |
| Copying (From Memory) | Less than $71 \mathrm{~dB}(A)$ | Less than $71 \mathrm{~dB}(A)$ |

Sound Pressure Level: These measurements were made in accordance with ISO 7779.

|  | Copier only | Full system |
| :---: | :---: | :---: |
| Stand-by | Less than $40 \mathrm{~dB}(A)$ | Less than $40 \mathrm{~dB}(A)$ |
| Copying (ADF 1 to 1) | Less than $60 \mathrm{~dB}(A)$ | Less than $61 \mathrm{~dB}(A)$ |
| Copying (From Memory) | Less than $59 \mathrm{~dB}(A)$ | Less than $59 \mathrm{~dB}(A)$ |

## SPECIFICATIONS

| Dimensions: | $690 \times 750 \times 1138 \mathrm{~mm}\left(27.2^{\prime \prime} \times 29.5 " \times 44.8^{\prime \prime}\right)$ |
| :--- | :--- |
| $(\mathrm{W} \times \mathrm{D} \times \mathrm{H})$ | (without ADF right exit tray, and options) |
| Weight: | 188 kg (without options) |

Optional Equipment: - Output tray (A814-01)

- Finisher (A697)
- Large capacity tray (A698)
- Punch unit (A812)


### 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: $52 \sim 128 \mathrm{~g} / \mathrm{m}^{2}, 14 \sim 34 \mathrm{lb}$
Thin Original Mode: $40 \sim 128 \mathrm{~g} / \mathrm{m}^{2}, 11 \sim 34 \mathrm{lb}$ Duplex Original Mode: $52 \sim 105 \mathrm{~g} / \mathrm{m}^{2}, 14 \sim 28 \mathrm{lb}$
Table Capacity:
100 sheets ( $80 \mathrm{~g} / \mathrm{m}^{2}, 20 \mathrm{lb}$ )
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 from the copier
Power Consumption:
70 W
Dimensions (W x D x H): $680 \times 529.5 \times 150 \mathrm{~mm}$

### 1.2 MACHINE CONFIGURATION



| Item | Machine Code | No. |
| :--- | :---: | :---: |
| Mainframe | A229 | 3 |
| Output Tray | A814-01 | 2 |
| Finisher | A697 | 1 |
| Large Capacity Tray | A698 | 4 |
| Punch Unit (Option for Finisher) | A812-17 (3 holes) |  |

MECHANICAL COMPONENT LAYOUT

### 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 (By-pass Tray)
26. Registration Rollers (By-pass Tray)
27. Transfer Belt Unit
28. Relay Roller
29. Vertical Transport Rollers
30. Feed Roller
31. Separation Roller
32. Tray 1 (Tandem Tray)
33. Tray 2 (550-sheet Tray)
34. Tray 3 (1500-sheet lage capacity 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



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 (1500-sheet LCT)
5. Tray 2 (550-sheet Tray)
6. Tray 1 (Tandem Tray)
7. Duplex Unit
8. Finisher
9. Inverter Unit
10. Shift Tray
11. Upper Tray

### 1.5 COPY PROCESS



## 1. EXPOSURE

Two xenon lamps expose 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 only once 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 SBICU 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 developed 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
(1) Cleaning Unit
(2) Scanner Unit
(3) Transfer Belt Unit
(4) Fusing Unit
(5) Duplex Unit
(6) Paper Feed Units
(7) Toner Hopper
(8) Development Unit
(9) Drum

### 1.6.2 ADF



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

### 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 <br> No. |
| :---: | :---: | :---: | :---: |
| Motors |  |  |  |
| M1 | Scanner | Drives the 1st and 2nd. | 17 |
| M2 | Polygonal Mirror | Turns the polygonal mirror. | 25 |
| M3 | LD Positioning | Rotates the LD unit to adjust the LD beam pitch when a different resolution is selected. | 29 |
| M4 | Drum | Drives the drum and cleaning unit. | 39 |
| M5 | Development | Drives the development unit. | 40 |
| M6 | Toner Supply | Rotates the toner bottle to supply toner to the development unit. | 48 |
| M7 | Charge Corona Wire Cleaner | Drives the charge corona wire cleaner. | 90 |
| M8 | Fusing/Duplex | Drives the fusing unit, duplex unit, inverter unit, and paper exit rollers. | 37 |
| M9 | Toner Collection | Transports the collected toner to the toner collection bottle. | 5 |
| M10 | Toner Recycling | Drives the air pump to send recycled toner to the development unit. | 8 |
| M11 | Paper Feed | Drives all feed and transport rollers in the paper tray unit. | 46 |
| M12 | 1st Tray Lift | Raises and lowers the bottom plate in the 1st paper tray. | 44 |
| M13 | 2nd Tray Lift | Raises the bottom plate in the 2nd paper tray. | 45 |
| M14 | 3rd Tray Lift | Raises and lowers the bottom plate in the 3rd paper tray. | 137 |
| M15 | By-pass Feed | Drives the by-pass feed rollers. | 43 |
| M16 | Registration | Drives the registration rollers. | 42 |
| M17 | Rear Fence Drive | Moves the paper stack in the left tandem tray to the right tandem tray. | 72 |
| M18 | Side Fence Drive | Opens and closes the front and rear side fences of the tandem tray. | 77 |
| M19 | Jogger | Drives the jogger fences to square the paper stack in the duplex unit. | 80 |
| M20 | Optics Cooling Fan | Removes heat from the optics unit. | 24 |
| M21 | Polygonal Mirror <br> Motor Cooling Fan | Removes heat from around the polygonal mirror motor. | 49 |
| M22 | Exhaust Fan | Removes heat from around the fusing unit. | 38 |

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| Symbol | Name | Function | Index No. |
| :---: | :---: | :---: | :---: |
| M23 | Fusing Fan | Removes heat from around the fusing unit. | 50 |
| M24 | Duplex Cooling Fan | Removes heat from around the duplex unit. | 47 |
| M25 | PSU Cooling Fan | Removes heat from around the PSU. | 59 |
| Magnetic Clutches |  |  |  |
| MC1 | Toner Supply | Turns the toner supply roller to supply toner to the development unit. | 41 |
| MC2 | Toner Recycling | Drives the toner recycling unit. | 2 |
| MC3 | 1st Paper Feed | Starts paper feed from tray 1. | 112 |
| MC4 | 2nd Paper Feed | Starts paper feed from tray 2. | 115 |
| MC5 | 3rd Paper Feed | Starts paper feed from tray 3. | 120 |
| MC6 | By-pass Feed | Starts paper feed from the by-pass table. | 100 |
| MC7 | Duplex Transport | Drives the duplex transport rollers to transport the paper to the duplex feed rollers. | 67 |
| MC8 | Duplex Feed | Starts paper feed out of the duplex tray back into the machine via to the relay rollers. | 70 |
| MC9 | 1st Vertical Relay | Drives the 1st vertical transport rollers. | 113 |
| MC10 | 2nd Vertical Relay | Drives the 2nd vertical transport rollers. | 116 |
| MC11 | 3rd Vertical Relay | Drives the 3rd vertical transport rollers. | 119 |
| MC12 | Relay | Drives the relay rollers. | 103 |
| Switches |  |  |  |
| SW1 | Main Power | Provides power to the machine. If this is off, only the heaters receive power. | 11 |
| SW2 | Operation | Provides power for machine operation. The machine still has power if this switch is off. | 30 |
| SW3 | Front Door Safety Switch 1 | Cuts the +5 V LD dc power line. | 12 |
| SW4 | Front Door Safety Switch 2 | Detects if the front door is open or not, and cuts the +24 V dc power line. | 13 |
| SW5 | Front Door Safety Switch 3 | Cuts the +5 V LD dc power line. | 14 |
| SW6 | Lower Front Door Safety | Cuts the +24 V dc power line. | 10 |
| SW7 | Toner Collection Bottle Set | Detects if the toner collection bottle is set or not. | 7 |
| SW8 | Toner Overflow | Detects when the toner collection bottle is full. | 6 |


| Symbol | Name | Function | Index No. |
| :---: | :---: | :---: | :---: |
| SW9 | Paper Size | Determines the size of paper in tray 2. | 3 |
| SW10 | 3rd Tray Down | Lowers the tray 3 (LCT) bottom plate | 136 |
| SW11 | By-pass Tray | Detects if the by-pass tray is open or closed. | 97 |
| Solenoids |  |  |  |
| SOL1 | Transfer Belt Lift | Controls the up-down movement of the transfer belt unit. | 92 |
| SOL2 | 1st Pick-up | Controls the up-down movement of the pick-up roller in tray 1. | 111 |
| SOL3 | 2nd Pick-up | Controls the up-down movement of the pick-up roller in tray 2. | 117 |
| SOL4 | 3rd Pick-up | Controls the up-down movement of the pick-up roller in tray 3. | 121 |
| SOL5 | By-pass Pick-up | Controls the up-down movement of the pick-up roller for by-pass feed. | 98 |
| SOL6 | 1st Separation Roller | Controls the up-down movement of the separation roller in tray 1. | 114 |
| SOL7 | 2nd Separation Roller | Controls the up-down movement of the separation roller in tray 2. | 118 |
| SOL8 | 3rd Separation Roller | Controls the up-down movement of the separation roller in tray 3. | 122 |
| SOL9 | Tandem Lock | Releases the left tandem feed tray so that it can be separated from the right tandem feed tray. | 4 |
| SOL10 | Duplex Junction Gate | Moves the junction gate to direct copies to the duplex tray or to the paper exit. | 82 |
| SOL11 | Reverse Roller | Controls the up-down movement of the reverse trigger roller. | 81 |
| SOL12 | Guide Plate | Opens the guide plate when a paper misfeed occurs around this area. | 102 |
| SOL13 | Duplex Exit Junction Gate | Opens the inverter gate during a duplex job. | 96 |
| Sensors |  |  |  |
| S1 | Scanner HP | Informs the CPU when the 1st and 2nd scanners are at home position. | 35 |
| S2 | Original Width | Detects original width. This is one of APS (Auto Paper Select) sensors. | 36 |
| S3 | Original Length 1 | Detects original length. This is one of APS (Auto Paper Select) sensors. | 18 |
| S4 | Original Length 2 | Detects original length. This is one of APS (Auto Paper Select) sensors. | 20 |
| S5 | LD Unit Home Position | Informs the CPU when the LD unit is at home position. | 28 |
| S6 | Drum Potential | Detects the drum surface potential. | 88 |


| Symbol | Name | Function | Index No. |
| :---: | :---: | :---: | :---: |
| S7 | Toner Density (TD) | Detects the amount of toner in the developer. | 95 |
| S8 | Image Density (ID) | Detects the density of the ID sensor pattern on the drum. | 91 |
| S9 | Toner End | Detects toner end. | 94 |
| S10 | Toner Collection Motor | Monitors the toner collection motor. | 9 |
| S11 | Toner Recycling | Monitors the toner recycling and collection unit operation. | 1 |
| S12 | 1st Paper Feed | Controls the 1st paper feed clutch off/on timing and the 1st pick-up solenoid off timing. | 129 |
| S13 | 2nd Paper Feed | Controls the 2nd paper feed clutch off/on timing and the 2nd pick-up solenoid off timing. | 126 |
| S14 | 3rd Paper Feed | Controls the 3rd paper feed clutch off/on timing and the 3rd pick-up solenoid off timing. | 125 |
| S15 | 1st Tray Lift | Detects when the paper in tray 1 is at the correct height for paper feed. | 132 |
| S16 | 2nd Tray Lift | Detects when the paper in tray 2 is at the correct height for paper feed. | 128 |
| S17 | 3rd Tray Lift | Detects when the paper in tray 3 is at the correct height for paper feed. | 123 |
| S18 | 1st Paper End | Informs the CPU when tray 1 runs out of paper. | 130 |
| S19 | 2nd Paper End | Informs the CPU when tray 2 runs out of paper. | 127 |
| S20 | 3rd Paper End | Informs the CPU when tray 3 runs out of paper. | 124 |
| S21 | By-pass Paper End | Informs the CPU that there is no paper in the by-pass feed table. | 99 |
| S22 | 1st Paper Near End | Informs the CPU when the paper in tray 1 is almost finished. | 110 |
| S23 | 2nd Paper Near End | Informs the CPU when the paper in tray 2 is almost finished. | 131 |
| S24 | 3rd Paper Near End | Informs the CPU when the paper in tray 3 is almost finished. | 133 |
| S25 | Rear Fence HP | Informs the CPU when the tandem tray rear fence is in the home position. | 79 |
| S26 | Rear Fence Return | Informs the CPU when the tandem tray rear fence is in the return position. | 78 |
| S27 | Side Fence Close | Detects whether the tandem tray side fence is closed or not. | 75 |
| S28 | Side Fence Positioning | Informs the CPU when the tandem tray side fences are open. | 74 |

## ELECTRICAL COMPONENT DESCRIPTION

| Symbol | Name | Function | Index No. |
| :---: | :---: | :---: | :---: |
| S29 | Base Plate Down | Detects when the bottom plate is completely lowered to stop the 1st tray lift motor. | 76 |
| S30 | Left Tandem Paper End | Informs the CPU when the left tandem tray runs out of paper. | 73 |
| S31 | 3rd Tray Paper | Detects whether there is paper or not in tray 3. | 135 |
| S32 | Tray Down Sensor | Informs the CPU when the bottom plate is completely lowered, to stop the 3rd tray lift motor. | 134 |
| S33 | Duplex Entrance Sensor | Detects the leading and trailing edges of the paper to determine the reverse roller solenoid on or off timing. | 65 |
| S34 | Duplex Transport Sensor 1 | Detects the position of paper in the duplex unit. | 66 |
| S35 | Duplex Transport Sensor 2 | Detects the position of paper in the duplex unit. | 68 |
| S36 | Duplex Transport Sensor 3 | Detects the position of paper in the duplex unit. | 71 |
| S37 | Duplex Jogger HP | Detects if the duplex jogger fences are at the home position or not. | 69 |
| S38 | Relay | Detects misfeeds. | 104 |
| S39 | Registration | Detects misfeeds. | 106 |
| S40 | Guide Plate Position | Detects whether the registration guide plate is closed or not. | 105 |
| S41 | Fusing Exit | Detects misfeeds. | 107 |
| S42 | Exit | Detects misfeeds. | 108 |
| S43 | Tray Paper Limit | Detects paper overflow on the output tray. | 109 |
| PCBs |  |  |  |
| PCB1 | SBICU | Controls all base engine functions both directly and through other control boards. | 23 |
| PCB2 | PSU | Provides dc power to the system and ac power to the fusing lamp and heaters. | 57 |
| PCB3 | IOB | Controls the mechanical parts of the machine (excluding the scanner unit section), and the fusing lamp. | 52 |
| PCB4 | SBU | Contains the CCD, and outputs a video signal to the SBICU board. | 21 |
| PCB5 | Scanner Motor Drive | Drives the scanner motor. | 51 |
| PCB6 | Lamp Regulator | Provides dc power to the exposure lamp. | 22 |
| PCB7 | DC/DC Converter | Generates dc voltages. | 19 |
| PCB8 | LDDR | Controls the laser diodes. | 27 |


| Symbol | Name | Function | Index No. |
| :---: | :---: | :---: | :---: |
| PCB9 | Interface | Passes signals and dc supplies from the PSU and IOB to motors and other components. | 64 |
| PCB10 | Paper Feed Control Board (PFB) | Controls the mechanical parts of all paper feed sections. | 58 |
| PCB11 | Operation Panel 1 | Controls the components on the righthand side of the operation panel. | 31 |
| PCB12 | Operation Panel 2 | Controls the components on the lefthand side of the operation panel. | 34 |
| PCB13 | LCD Control | Controls the LCD. | 33 |
| PCB14 | By-pass Paper Size | Detects the paper width on the bypass tray. | 101 |
| PCB15 | Mother (Option) | Connects the printer control board. | 54 |
| PCB16 | Printer Control (Option) | Receives print data from a PC. | 55 |
| Lamps |  |  |  |
| L1 | Exposure Lamps | Apply high intensity light to the original for exposure. | 15 |
| L2 | Fusing Lamp 1 | Provides heat to the hot roller. | 86 |
| L3 | Fusing Lamp 2 | Provides heat to the hot roller. | 85 |
| L4 | Quenching | Neutralizes any charge remaining on the drum surface after cleaning. | 89 |
| Power Packs |  |  |  |
| PP1 | Charge | Provides high voltage for the charge corona wires and the grid plate. | 87 |
| PP2 | Development | Provides high voltage for the development unit. | 56 |
| PP3 | Transfer | Provides high voltage for the transfer belt. | 93 |
| Others |  |  |  |
| TF1 | Fusing Thermofuse | Opens the fusing lamp circuit if the fusing unit overheats. | 84 |
| TH1 | Fusing Thermistor | Detects the temperature of the hot roller. | 83 |
| H1 | Optics AntiCondensation | Turns on when the main switch is off to prevent moisture from forming on the optics. | 16 |
| H2 | Drum | Turns on when the main switch is off to prevent moisture from forming around the drum. | 63 |
| H3 | Tray Heater 1 | Turns on when the main switch is off to keep paper dry in the paper tray. | 62 |
| H4 | Tray Heater 2 | Turns on when the main switch is off to keep paper dry in the paper tray. | 60 |

## ELECTRICAL COMPONENT DESCRIPTION

| Symbol | Name | Function | Index <br> No. |
| :---: | :--- | :--- | :---: |
| CB1 | Circuit Breaker | Provides back-up high current <br> protection for the electrical <br> components. | 61 |
| HDD 1 | HDD | Scanned image data is compressed <br> and held here temporarily. | 53 |
| LCD 1 | LCD | Displays the operation menus and <br> messages. | 32 |
| LSD 1 | Laser Synchronization <br> Detector | Detects the laser beam at the start of <br> the main scan. | 26 |
| TP1 | Touch Panel | Monitors the key matrix. | $(32)$ |

### 1.7.2 ADF

| Symbol | Name | Function | Index No. |
| :---: | :---: | :---: | :---: |
| Motors |  |  |  |
| M1 | Pick-up | Moves the pick-up roller up and down. | 2 |
| M2 | Feed-in | Drives the feed belt, and the separation, pick-up, and transport rollers. | 6 |
| M3 | Transport | Drives the transport belt. | 7 |
| M4 | Feed-out | Drives the exit and inverter rollers. | 11 |
| M5 | Bottom plate | Moves the bottom plate up and down. | 5 |
| 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. | 9 |
| S2 | DF Position | Detects whether the DF is lifted or not. | 10 |
| S3 | Original Set | Detects whether an original is on the table. | 23 |
| S4 | Bottom Plate HP | Detects whether the bottom plate is in the down position or not. | 17 |
| S5 | Bottom Plate Position | Detects when the original is at the correct position for feeding. | 24 |
| S6 | Pick-up Roller HP | Detects whether the pick-up roller is up or down. | 1 |
| S7 | Entrance | Detects when to start 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 determine the original length, and checks for misfeeds. | 22 |
| S8 | Registration | Detects the leading edge of the original to determine the original length, detects when to stop the original on the exposure glass, and checks for misfeeds. | 18 |
| S9 | Original Width 1 | Detects the original width. | 21 |
| S10 | Original Width 2 | Detects the original width. | 20 |
| S11 | Original Width 3 | Detects the original width. | 19 |
| S12 | Exit | Detects when to stop the transport belt motor and checks for misfeeds. | 15 |
| S13 | Inverter | Detects when to turn the inverter gate and exit gate solenoids off and checks for misfeeds. | 14 |
| S14 | Feed Cover | Detects whether the feed cover is open or not. | 3 |
| S15 | Exit Cover | Detects whether the exit cover is open or not. | 12 |
| Solenoids |  |  |  |
| SOL1 | Exit Gate | Opens and closes the exit gate. | 13 |
| SOL2 | Inverter Gate | Opens and closes the inverter gate. | 16 |
|  |  |  |  |

## ELECTRICAL COMPONENT DESCRIPTION

| Symbol | Name | Function | Index No. |
| :--- | :--- | :--- | :---: |
| PCBs |  |  | 8 |
| PCB1 | DF Main | Controls the DF and communicates with the <br> main copier boards. | 8 |
| PCB2 | DF Indicator | Indicates whether an original has been <br> placed in the feeder; and indicates whether <br> SADF mode has been selected. | 4 |
|  |  |  |  |

## DETAILED DESCRIPTIONS

## 2. DETAILED DESCRIPTIONS

### 2.1 DOCUMENT FEEDER

### 2.1.1 PICK-UP ROLLER RELEASE MECHANISM



When the original set sensor is off (no original on the original tray), the pick-up roller stays 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 MECHANISM



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.

When the bottom plate position sensor turns off during original feed, 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 MECHANISM




The original separation system is an FRR system. The pick-up roller [A], feed belt [B], and separation roller [C] are driven by the feed-in motor [D].
To drive this mechanism, the feed-in motor turns in the forward direction.
When two sheets of the original are fed by 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 MECHANISM



When the leading edge of the original turns the entrance sensor [A] on, the feed-in motor [B] changes direction, and turns in reverse. However, the transport rollers [C] keep turning in the same direction because of a combination of one-way clutches (see the next page).

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 Pickup Roller Release Mechanism).

### 2.1.5 ORIGINAL FEED DRIVE MECHANISM



The separation roller [A] and transport rollers [B] always turn in the same direction because of a combination of gears and one-way clutches, even if the feed-in motor [C] changes direction. However, the feed belt [D] stops during original feed.
The gears H, L, and M each have a one-way clutch.

## Original Feed Start

When the feed-in motor turns on, the drive is transferred as follows:

$$
\begin{aligned}
\mathrm{E} \rightarrow \mathrm{H} & \rightarrow \mathrm{~K} \rightarrow \text { Feed Belt [D] } \\
& \longrightarrow \mathrm{L} \rightarrow \text { Separation Roller [A] } \\
& \longrightarrow \mathrm{G} \rightarrow \mathrm{I} \rightarrow \mathrm{~J} \rightarrow \text { Transport Roller }
\end{aligned}
$$

## Original Feed

When the leading edge of the original turns on the entrance sensor, the feed-in motor turns in reverse, and the drive is transferred as follows:

$$
\begin{aligned}
\mathrm{E} \rightarrow \mathrm{~F} \rightarrow \mathrm{G} \rightarrow \mathrm{M} & \rightarrow \text { Separation Roller } \\
\longleftrightarrow \mathrm{I} & \rightarrow \mathrm{~J} \rightarrow \text { Transport Roller }
\end{aligned}
$$

### 2.1.6 ORIGINAL SIZE DETECTION



The DF detects original width using three original width sensors-1 [A], $-2[B],-3[C]$, and detects original length using entrance sensor [D] and registration sensor [E]. The CPU counts the feed-in motor pulses between when the leading edge of the original turns on the registration sensor and when the trailing edge of the original turns off the entrance sensor.

The machine detects the original size from the combination of readings from all sensors.

### 2.1.7 ORIGINAL TRANSPORT MECHANISM




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 five pressure rollers which give the proper pressure between the belt and original. The pressure roller [C] closest to the left original scale is made of rubber for the stronger pressure needed for thick originals. The other rollers are sponge rollers.
Since the copier's original position is at the left rear corner, the original [D] fed from the DF must also be at this position. But if the original was to be 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.

### 2.1.8 ORIGINAL SKEW CORRECTION MECHANISM



The transport belt motor remains energized to carry the original approximately 7 mm past the left scale $[\mathrm{A}]$ (see the middle drawing). Then the motor stops and reverses to feed the original back against the left scale (see the bottom drawing). This forces the original to hit the left scale and this aligns the trailing edge to minimize the 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 any 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 mode 6-006.

### 2.1.9 ORIGINAL INVERSION AND FEED-OUT MECHANISM

## General Operation



When the scanner reaches the return position, the copier's CPU sends the feed-out signal to the DF. When 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 and 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 allow the best 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 Mechanism



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 and 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 Mechanism (Single-Sided Original Mode)



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 approximately 30 mm before the trailing edge of the original turns off the exit sensor.

## Original Exit Mechanism (Double-Sided Original Mode)



The exit gate solenoid $[A]$ turns on and the inverter gate solenoid $[B]$ remains off, and 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].

### 2.1.10 JAM CONDITIONS



1. The entrance sensor [I] has still not turned on when the feed-in motor has fed the original twice the length [A] (between the original set position and the entrance sensor).
2. The registration sensor [J] has still not turned on when the feed-in motor has fed the original the length $[\mathrm{B}]$ (between the pre-feed position and the entrance sensor).
3. The entrance sensor has still not turned off when the feed-in motor has fed the original 1062 mm .
4. The registration sensor has still not turned off when the feed-in motor has fed the original twice the length [C] (between the entrance sensor and the registration sensor).
5. The exit sensor $[K]$ has still not turned on when the transport and feed-out motors have fed the original the distance $[\mathrm{N}]$.
$\mathrm{N}=\mathrm{F}+600 \mathrm{~mm}-(\mathrm{D}+\mathrm{E})$
F: Length between the original scale and the exit sensor
D+E : Total length of the originals on the exposure glass (e.g., for two A4 sideways pages. If there is only one page on the glass, E is zero)
6. The exit sensor has still not turned off when feed-out motor has fed the original the length [G] (between the exit roller [L] and the exit sensor) +65 mm after reducing the feed-out speed.
7. The inverter sensor $[\mathrm{M}]$ is still not on when the feed-out motor has fed the original twice the length $[\mathrm{H}]$ (between the exit sensor and the inverter sensor).
8. The exit sensor has still not turned off when the feed-out motor has fed the original the length of the original after the inverter sensor [ M ] turned on.
9. The inverter sensor has still not turned off when the feed-out motor has fed the original twice the length $[\mathrm{H}]$ (between the exit sensor and the inverter sensor) after the exit sensor turned off.

DOCUMENT FEEDER

### 2.1.11 TIMING CHARTS

## A4 Sideways: One-Sided Original (Three Pages)



## A3: Two-Sided Original (One Page)



### 2.2 SCANNING

### 2.2.1 OVERVIEW



The original is illuminated by the two exposure lamps (xenon lamps 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 two exposure lamps and the 1st mirror.
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 [D] 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.
The optics anti-condensation heater [E] (a standard component for this machine, located on the optics base plate) turns on while the main switch is off, to prevent moisture from forming on the optics.

### 2.2.2 SCANNER DRIVE



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

The scanner motor drive board controls the scanner drive motor. In full size mode, the 1 st scanner speed is $330 \mathrm{~mm} / \mathrm{s}$ during scanning. The 2 nd 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 SBICU 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



There are three reflective sensors in the optics cavity for original size detection. The original width sensor [ A ] detects the original width, and the original length sensor-1 [B] and original length sensor-2 [C] detect the original length. These are the APS (Auto Paper Select) sensors.

Inside each APS sensor, there is an LED [D] and either three photoelectric devices [E] (for the width sensor) or one photoelectric device (for each length sensor). In the width sensor, the light generated by the LED is broken up into three beams and each beam scans a different point of the exposure glass (in each length sensor, there is only one beam). If the original or DF cover is present over the scanning point, the beam is reflected and each reflected beam exposes a photoelectric device and activates it.

While the main switch is on, these sensors are active and the original size data is always sent to the main CPU. However, the main CPU checks the data only when the DF is being closed (see the next page).

| Original Size |  | Length Sensor |  | Width Sensor |  |  | SP4301 Display |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| A4/A3 Version | LT/DLT Version | 2 | 1 | 3 | 4 | 5 |  |
| A3 | 11 " x 17" | 0 | 0 | 0 | 0 | 0 | 00011111 |
| B4 | 10 " 14 " | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | O | X | 00011110 |
| F4 | 81/2" x 14" (8" x 13") | O | $\bigcirc$ | O | X | X | 00011100 |
| A4-L | 81/2" x 11" | X | 0 | 0 | X | X | 00001100 |
| B5-L | - | X | 0 | X | X | X | 00001000 |
| A5-L | 51/2" x 81/2" | X | X | X | X | X | 00000000 |
| A4-S | 11 " x 81/2" | X | X | 0 | O | O | 00000111 |
| B5-S | - | X | X | $\bigcirc$ | $\bigcirc$ | X | 00000110 |
| A5-S | 81/2" x 51/2" | X | X | 0 | X | X | 00000100 |

-L: Lengthwise, -S: Sideways, O: Paper Present, X: Paper Absent

The original size data is taken by the main CPU when the DF position sensor [A] 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



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 SBICU (Scanner, Base-engine, and Image Processing Control Unit) board.

The SBICU 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, $\gamma$ correction, gradation processing, and video path control
- Memory Controller: Image compression, image rotation, interface with HDD controller, image repeat, and combine originals

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

### 2.3.2 SBU



The CCD converts the light reflected from the original into an analog signal. The CCD line has 5,000 pixels and the resolution is 400 dpi ( 15.7 lines $/ \mathrm{mm}$ ).

The CCD has two output lines, for odd and even pixels, to the analog processing IC. There are two analog processing ICs; one handles odd pixels and the other handles even pixels. The analog processing IC performs the following operations on the signals from the CCD.

1. Z/C (Zero Clamp):

Adjusts the black level reference for even pixels to match the odd pixels.
2. Signal Amplification

The analog signal is amplified by operational amplifiers in the AGC circuit. The maximum gains of the operational amplifiers are controlled by the CPU on the SBICU board.
After the above processes, the analog signals are converted to 8 -bit signals by the A/D converter. This gives a value for each pixel on a scale of 256 grades. Then, this data goes to the SBICU board. Two 8-bit signals are sent to the SBICU board.

### 2.3.3 AUTO IMAGE DENSITY (ADS)



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 SBICU 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



The image data from the SBU goes to the IPU (Image Processing Unit) IC on the SBICU 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. $\gamma$ 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

The following tables show the image processing path and the related SP modes used for each image processing mode.
The user can adjust many of the image processing parameters with a UP mode (Copy Features - General Features - Original Mode Quality Level), using fixed settings such as Sharp, Normal, and Soft. Each of these fixed settings has different parameter settings. The user's changes do not affect the SP mode settings.
If the user is not satisfied with any of the available settings for this UP mode, the technician can adjust the SP modes. However, the SP mode settings are not used unless the user selects 'SP Mode Changed' with the UP Mode.


For more details about the settings available for the user, see Service Tables Image Quality Setting by UP Mode.

## Text Mode

In text mode, there is no text/image separation, and the entire image is processed as a text area. 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 | SP4903-033 (Background Erase Level) |
|  | Independent Dot Erase | SP4903-028 (Independent Dot Erase Level) |
| Filtering | $\underset{\text { MTF }}{\downarrow}$ | SP4903-011 to 014 <br> (MTF Filter Coefficient - Main Scan) SP4903-020 to 023 * <br> (MTF Filter Strength - Main Scan) SP4903-041 to 044 * <br> (MTF Filter Coefficient - Sub Scan) SP4903-050 to 053 * <br> (MTF Filter Strength - Sub Scan) |
| Magnification | Main Scan Magnification | SP2909-001 (Main Scan Magnification) |
| ID Control | $\gamma$ Correction |  |
| Gradation | Grayscale Processing |  |

## Photo Mode

There is no text/image separation, and the entire image is processed as a photo area.

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


## Text/Photo Mode

When text/photo mode is selected, text/photo separation is done. A text filter or photo filter is applied to each image area. The gradation process also depends on whether the image area is text or photo.
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 | Text/Photo Separation | SP4912-001 to 005 * <br> Edge Detection Parameters <br> SP4912-017 <br> (Text/Photo Separation Level) <br> SP4908 * <br> Text/Photo Separation Method |
|  | Background Erase | SP4903-034 * <br> (Background Erase Level) <br> SP4906 * <br> (Background Erase On/Off) |
|  | Independent Dot Erase | SP4903-030 <br> (Independent Dot Erase Level) |
| Filtering | MTF/Smoothing | SP4903-017* <br> (MTF Filter Coefficient-Text Areas) SP4903-047* <br> (Filter Type: MTF or Smoothing Photo Areas) |
| Magnification | Main Scan Magnification | SP2909-001 <br> (Main Scan Magnification) |
| ID Control | $\gamma$ Correction |  |
| Gradation | Error Diffusion and Text/Photo Separation | SP49077* <br> (Text/Photo Auto Separation) <br> SP4904-007 * <br> (Gradation Process in Text Areas) <br> SP4904-008 * <br> (Gradation Process in Photo Areas) |

## 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 | Independent Dot Erase | SP4903-031 (Independent Dot Erase Level) |
| Filtering | MTF | SP4903-018 * <br> (MTF Filter Coefficient - Pale Originals) |
| Magnification | Main Scan Magnification | $\begin{array}{ll} \text { SP2909-001 } \\ \text { (Main Scan Magnification) } \end{array}$ |
| ID Control | $\gamma$ Correction |  |
| Gradation | Grayscale Processing |  |

## 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 | SP4903-035 (Background Erase Level) |
|  | Independent Dot Erase | SP4903-032 <br> (Independent Dot Erase Level) |
| Filtering | MTF | SP4903-019* <br> (MTF Filter Coefficient - Generation Copy) |
| Magnification | Main Scan Magnification | SP2909-001 <br> (Main Scan Magnification) |
| ID Control | $\gamma$ Correction |  |
| Gradation | Grayscale <br> Processing/Line Width Correction | Width Correction Type |

### 2.3.6 AUTO SHADING



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 TEXT/PHOTO AREA SEPARATION



This is used only in text/photo mode.
Text/photo separation is done at two points during image processing. The first one is immediately after auto shading, and is a complex process involving comparison with surrounding pixels and the use of matrixes. The second process comes at the end of the image processing path, and is a simple process that only examines surrounding pixels as part of the error diffusion process for text/photo mode.
The above drawing shows the data path during the first text/photo area separation process.

The image data coming in after auto shading is tested by edge determination and dot screen determination at the same time to separate the image into text and photo areas. Then the results of both these tests go to a final evaluation, to identify image and text areas.

## Edge Determination

Edges of letters and parts of images are detected by checking for strong contrast, continuity of black pixels, and continuity of white pixels around the black pixels.
The detected edges are treated with an MTF filter, which is part of the text/photo separation process, and not the same as the one used in the filtering step of the image processing path.
The filter strength can be changed in the main scan and sub scan directions with SP mode (SP4912-01 and 02).
After filtering, the edge pixels are divided into four shades (black, dark gray, pale gray, and white). The threshold levels to distinguish between the shades are determined by SP4912-003 to 005.

## Dot Screen Determination

The machine determines whether the pixel is in a dot screen area or not. The process can be adjusted with SP4912-017.
The page is divided into $4 \times 4$ blocks of pixels. Each block [A] is placed at the center of a $5 \times 3$ array of these blocks, and becomes either text or photo, depending on the other blocks in the $5 \times 3$ area.
If the number of dot screen blocks in the $5 \times 3$ area exceeds a threshold, the central block is determined to be an image area. (The threshold is 2 : if two or more of the blocks in the $5 \times 3$ area are dot screen, then all the pixels in the central block are determined to be in an image area.)

| Dot <br> Screen |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| Dot <br> Screen | Dot <br> Screen |  |  |  |
| Dot <br> Screen | Dot <br> Screen | Dot <br> Screen |  |  |

## Determined to be Photo



Determined to be Text

## Final Evaluation

The final evaluation depends on the result of dot screen and edge determination as follows.

| Dot Screen | Edge | Final Evaluation |
| :---: | :---: | :---: |
| No | No | Photo |
| No | Yes | Text |
| Yes | No | Photo |
| Yes | Yes | Photo |

The type of filtering to be used depends on the result of the final evaluation.

### 2.3.8 BACKGROUND ERASE



By default, this process is used only in text mode, text/photo mode, and generation copy mode.

Usually, dirty background is erased using Auto Image Density (ADS). However, sometimes, dirty background areas will still appear. These can be erased by Background Erase.

If any low image density data which is lower than a threshold level remains after auto shading, this data will be treated as " 0 " which is equal to "White".

By inputting a larger value, darker backgrounds can be eliminated.
The threshold level can be changed with SP mode, as shown below.

| SP Mode No. | Image Processing Mode | Threshold Level (Default) |
| :---: | :---: | :---: |
| SP4903-33 | Text Mode | 15 |
| SP4903-34 | Text/Photo Mode | 15 |
| SP4903-35 | Generation Copy Mode | 15 |

Any low image density data lower than this threshold level remaining after auto shading will be treated as background.

There is not a sudden cutoff at the threshold. Below the threshold [A], the image data is made paler than it normally would be, until at a certain point [B], it becomes white. This avoids errors during MTF filtering caused by sudden changes in the data around the threshold level area.

### 2.3.9 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 completely erased, or to be reduced in image density.

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

If all of the surrounding pixels are smaller than the threshold value (stored in SP4-$903-28,30,31$ or 32 ), the object pixel is either changed to 0 (white) or reduced in density to an average of the surrounding pixels. This depends on the SP mode setting.
In the drawing below, the surrounding pixels are all less than 64. If the SP mode value is " 12 ", the object pixel value is reduced from " 50 " to " 30 ", the average value of the surrounding pixels. If the SP mode value is " 4 ", the object pixel is deleted (changed to white).

| 20 | 40 | 30 | 20 | 40 |
| :---: | :---: | :---: | :---: | :---: |
| 30 | 0 | 70 | 30 | 30 |
| 30 | 10 | 50 | 20 | 30 |
| 60 | 20 | 0 | 30 | 0 |
| 20 | 30 | 40 | 30 | 30 |

$50 \quad$ Object pixel
$\square$ Surrounding pixels to be used for calculation


Ignored pixels

Average of surrounding pixels:

$$
\begin{array}{r}
(20+40+30+20+40+30+30+30+30+60+0+20+30+40+30+30) / 16 \\
=30
\end{array}
$$

The threshold level for deciding whether a dot is independent can be changed using SP mode. The default value of this threshold level is different for each image processing mode. As shown below, in Text/Photo mode, independent dots are reduced, but in Text, Pale, or Generation mode, they are erased.

| SP Mode No. | Image Processing Mode | Default Value (SP Setting) |
| :---: | :---: | :---: |
| SP4903-28 | Text Mode | 2 |
| SP4903-30 | Text/Photo Mode | 9 |
| SP4903-31 | Pale Mode | 1 |
| SP4903-32 | Generation Mode | 1 |

NOTE: Settings 0 and 8: Disable this function.
Settings 1 to 7: Erase detected independent dots
Settings 9 to 15: Reduce the density of detected independent dots

Each SP mode has 16 possible settings, as follows.
( $\mathrm{A}=$ Surrounding pixel with the highest value)

| SP mode <br> value | Function | SP mode <br> value | Function |
| :---: | :---: | :---: | :--- |
| 0 | Disabled | 8 | Disabled |
| 1 | If $A<16$, the central pixel is <br> deleted (changed to white) | 9 | If $A<16$, the density is <br> reduced to the average |
| 2 | If $A<32$, the central pixel is <br> deleted (changed to white) | 10 | If $A<32$, the density is <br> reduced to the average |
| 3 | If $A<48$, the central pixel is <br> deleted (changed to white) | 11 | If $A<48$, the density is <br> reduced to the average |
| 4 | If $A<64$, the central pixel is <br> deleted (changed to white) | 12 | If $A<64$, the density is <br> reduced to the average |
| 5 | If $A<80$, the central pixel is <br> deleted (changed to white) | 13 | If $A<80$, the density is <br> reduced to the average |
| 6 | If $A<96$, the central pixel is <br> deleted (changed to white) | 14 | If $A<96$, the density is <br> reduced to the average |
| 7 | If $A<128$, the central pixel is <br> deleted (changed to white) | 15 | If $A<128$, the density is <br> reduced to the average |

### 2.3.10 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 $\rightarrow$ Filtering

## 2. $65 \%$ reduction or higher <br> Filtering $\rightarrow$ 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 lead to the occurrence of moiré in the image.

When adjusting a filter, adjust the coefficient first. If that does not satisfy the user, then adjust the strength (it may be necessary to do some fine tuning with the coefficient after adjusting the strength).

For text mode, 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. This is effective when putting more weight on improving the resolution when copying from "continuous tone" originals.
For text/photo mode, a different MTF filter is applied for the text and photo areas that were determined during text/photo separation. The filter type for each area may be changed with SP mode. This is done in SP4903-017 for text areas, and SP4903-047 for photo areas.

## Main scan magnification/reduction



140\% Enlargement

Scanned Data Points
Calculated Data Points Enlarged Image Data Points


Reduction and enlargement in the sub scan direction are done by changing the scanner speed. However, reduction and enlargement in the main scan direction are handled by the IPU chip on the SBICU 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 SP 4903-5 to test the IPU IC.

### 2.3.11 GAMMA $(\gamma)$ 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 data for the scanner and printer gamma correction are fixed and stored in the memory. There are no SP adjustments in this machine.

### 2.3.12 GRADATION PROCESSING

There are two basic types of gradation processing

- Printing multi-bit per pixel data as it is (i.e., keeping many image density levels available for each pixel; in this machine)
- Reducing the number of possible output levels per pixel, by using only a few of the range of possible output levels
Various processes are available to try to reproduce various types of original as faithfully as possible.

In this model, these are three processes:

1. Grayscale processing
2. Error diffusion
3. Dithering

These three processes are used as follows (default setting).

| Text mode | Grayscale processing |
| :--- | :--- |
| Text/photo mode: | Error diffusion |
| Photo mode: | Error diffusion or dithering |
| Generation Copy Mode: | Grayscale processing + line width correction |
| Pale mode: | Grayscale processing |

The above information is expressed in the diagram in the Image Processing Path section.

## Error Diffusion and Dithering

The error diffusion process 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.
In the dithering process, each pixel is compared with a pixel in a dither matrix. Several matrixes are available, to increase or decrease the detail on the copy.
Compared 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 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 either dithering or one of two types of error diffusion can be selected with SP4904-024,. When dithering is selected, the setting of SP4904-002 will decide which dithering matrix is used.
In Text/Photo Mode, the error diffusion process that is used depends on the image area type (text or photo) as shown below. Therefore, before error diffusion, a simple text/photo separation process is performed (as mentioned earlier, in the Text/Photo Separation section).

| Area | Error Diffusion Type | Related SP Mode |
| :--- | :--- | :--- |
| Text Area | 1 dot error diffusion | SP4904-007 |
| Photo Area | 2 dot error diffusion | SP4904-008 |

## Grayscale Processing

The eight-bit data arriving from the gamma correction circuit is passed on unchanged.

### 2.3.13 LINE WIDTH CORRECTION

This function is effective only in generation copy mode.
Usually, lines will bulge in the main scan direction as a result of the negative/positive development system that is used in this model. So, pixels on edges between black and white areas are compared with adjacent pixels, and if the pixel is on a line, the line thickness will be reduced.
The line width correction is done in the IPU chip.
The line width correction type can be selected with SP4904-6.

### 2.3.14 COMPRESSION AND STORAGE

## Circuit



The compression and storage circuit consists of the GA1 IC, GA2 IC, DRAM, and the hard disk drive. The functions of each device are as follows.

GA 1:

GA 2:

DRAM (12 MB):
Hard Disk Drive:

Compressing/decompressing the 8-bit image data Image rotation Image data transfer to the HDD, FIFO memory, and GA2 Controls the HDD
Compressing and decompressing the image data Image rotation
Image transfer to the DRAM, and GA 1
Image repeat Image combine
Stores compressed data from GA1
Stores compressed data
Electrical sort
Misfeed back-up

## Compression



## Sub Scan Direction

After image processing, the image data from the IPU first goes to the FIFO block. This block consists of 14 FIFO memories ( 7 for data input, 7 for data output). FIFOs are used because four scan lines are compressed at the same time to improve the image compression speed.
The image data then goes to the GA1 IC, where the image data for a whole page is divided into many blocks (the block size is $4 \times 4$ pixels) as shown above left. Then, each block is compressed and sent to DRAM through GA2 to store the data.
When the HDD is ready to receive the data, the data passes to GA2 where it is compressed some more, and sent to the HDD.
When it is time to output the data, the data flow is reversed, and the data is decompressed. The decompressed data goes back to the FIFO block.

## Image Rotation

This copier contains 12 MB of DRAM. This is enough to hold two A4 (LT) size images (this allows the user to scan one original while printing another).

### 2.4 LASER EXPOSURE

### 2.4.1 OVERVIEW

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

Exposure of the drum by the laser beam creates the latent image. The laser beam makes the main scan while drum rotation controls the sub scan.

The combined strength of both beams is 0.5 mW on the drum surface at a wavelength of 780 nm .

The polygon motor speed is as follows.

| Resolution | Modes | Motor Speed <br> (rpm) |
| :---: | :---: | :---: |
| 400 dpi | Copy, Printer | Approx. 25984 |
| 600 dpi | Printer | Approx. 38976 |

There are up to 16 image density levels for each pixel. To realize this, this machine uses a form of pulse width modulation. In this machine, pulse width modulation consists of the following processes:

- Laser diode pulse positioning
- Laser diode power/pulse width modulation

Laser diode power and pulse width modulation is done by the laser diode drive board (LDDR). Briefly, the width of the laser pulse for a pixel depends on the output level (from 0 to 15) required for the pixel.
This machine can also change the laser pulse position (at the left side of the pixel, at the center, or at the right side) automatically, depending on the location of the image pixel so that the edges of characters and lines become cleaner. There is no SP mode adjustment for this, unlike in some earlier models.

### 2.4.2 OPTICAL PATH



The output path from the laser diode to the drum is shown above.
The LD unit [A] outputs two laser beams to the polygonal mirror [B] (six mirrors) through the cylindrical lens [C] and the 1st mirror [D].

Each surface of the polygon mirror reflects two full main scan lines. The laser beams go to the F-theta mirror [E], mirror [F], BTL (barrel toroidal Iens) [G], and mirror $[\mathrm{H}]$. Then these laser beams go to the drum through the toner shield glass [I].
The laser synchronizing detector [J] determines the main scan starting position.

### 2.4.3 AUTO POWER CONTROL



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.

### 2.4.4 DUAL BEAM WRITING



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 0.06 mm (at 400 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.

### 2.4.5 LASER BEAM PITCH CHANGE MECHANISM



A printer option is available for this machine and the resolution of the printer is 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.

### 2.4.6 LD SAFETY SWITCHES



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 SBICU board.
When the front 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 $100^{\circ} \mathrm{C}$ and SP3901 is on).

1) Potential Sensor Calibration
2) VSG Adjustment
3) VG(Grid Voltage) Adjustment
4) LD Power Adjustment
5) Vref Update

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



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 SBICU 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 -200 V and -700 V 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, SC370-02 is logged and auto process control turns off. The VG and LD power adjustments are skipped; VG is set to the value stored in SP2-001-01, and LD power is set to the values stored in SP2-103.

## VsG adjustment

This calibrates the ID sensor output for a bare drum to $4.0 \pm 0.2 \mathrm{~V}$. 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, SC350 is logged and toner density control is done using the TD sensor and image pixel count.

For details of how the machine determines an abnormal sensor detection, see section 6 (Troubleshooting).

## Vg Adjustment



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 SBICU checks VD using the drum potential sensor [A]. If it is not within the target range ( $-900 \mathrm{~V} \pm 10 \mathrm{~V}$ ), the SBICU 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 previous value and SC 370 is logged.

For details of how the machine determines an abnormal sensor detection, see section 6 (Troubleshooting).

## LD power adjustment



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

The Vh pattern is developed using the current LD power (the density is the same as the ID sensor pattern). The drum potential sensor detects the potential on this pattern. The LD power is adjusted until VH becomes -300V +-20V.

This is done only during process control initial setting.
The latest VH 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 VH cannot be adjusted to within the standard within 25 attempts, LD power is set to the latest value (the one used for the $25^{\text {th }}$ attempt) and SC 370 is logged.
For details of how the machine determines an abnormal sensor detection, see section 6 (Troubleshooting).

## 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 $+\Delta$ VREF
$\Delta \mathrm{VREF}$ is determined using the following Vsp/Vsg and VREF- VT table

|  | Vsp/Vsg (B) |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| VREF- VT <br> (A) |  | B < 0.055 | $0.055<\mathrm{B}=<0.07$ | . . . . . . . . | $0.15<B$ |
|  | $\mathrm{A}=<-0.2$ | 0.25 | 0.22 | : | -0.03 |
|  | $-0.2<\mathrm{A}=<-0.1$ | 0.25 | 0.22 | : | -0.05 |
|  | : | : | : | : | : |
|  | : | : | . | : | : |
|  | $0.2<\mathrm{A}$ | 0 | 0.05 | : | -0.25 |

## VT : TD Sensor Output

When SC350 (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:

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

### 2.5.3 DRIVE MECHANISM



The drive from the drum motor $[A]$ is transmitted to the drum, the cleaning unit and the toner recycling unit [D] through some timing belts, gears, the drum drive shaft [ B ], and the cleaning unit coupling [C].
The drum motor has a drive controller, which outputs a motor lock signal when the rotation speed is out of the specified range.

The fly-wheel [E] on the end of the drum drive shaft stabilizes the rotation speed.

### 2.5.4 DRUM CHARGE

## Overview



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 (-1200 $\mu \mathrm{A}$ ).
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



Air flowing around the charge corona wire may deposit toner particles on the corona wires. These particles may interfere with charging and cause high 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, but only if the fusing temperature is less than $100^{\circ} \mathrm{C}$

### 2.5.5 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 $[\mathrm{B}]$ 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 recycling unit.
To remove any accumulated toner at the edge of the cleaning blade, the drum turns in reverse for about 4 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



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

## Cleaning Blade Pressure Mechanism and Side-to-Side Movement



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.

Toner Recycling and Waste Toner Collection Mechanism

## Toner Recycling

[K]



This machine has a toner recycling system, using a screw-pump unit. This mechanism reduces the amount of waste toner by $90 \%$.
Only toner which is transferred from the drum cleaning blade is recycled. Toner collected from the transfer belt cleaning blade is not recycled, but is transported to the toner collection bottle for waste toner through the toner collection tube [A].
The toner recycling unit is driven by the drum motor via timing belts, gears and the toner recycling clutch $[\mathrm{B}]$.
The recycled toner from the drum collected by the cleaning coil [C] is dropped on the screw [D] in the toner recycling unit, then transported to the screw-pump [E]. The screw-pump consists of the rotor [F] and the stator [G]. The rotor turns inside the stator, and pushes the recycled toner through the screw-pump as shown. The toner recycling motor [H] drives the air pump [I] This pump blows the toner out of the screw-pump through the toner recycling tube [J] towards the development unit [K].
The toner recycling sensor [L] monitors the rotation of the drive gear. If toner is clogged and the coil cannot move when the motor is switched on, an SC495 is generated.


The toner recycling unit mechanism is controlled by the image pixel count. The recycling clutch $[A]$ is engaged for 2 seconds after making the equivalent of about 100 copies of a $6 \%$ test chart. The air pump also turns on for 6 seconds at the same interval.

When the recycled toner cannot be transported to the development unit (for example, if the toner recycling clutch is slipping or toner is clogged in the tube or the screw pump), the recycling unit [B] starts to fill up with recycled toner
The tower above the recycling unit is divided into two partitions. The right-hand partition contains toner from the drum cleaning unit, and the left-hand partition contains toner from the transfer belt cleaning unit.
The wall between the partitions contains agitators [C] that prevent toner from completely filling the right-hand partition if the recycling mechanism gets clogged with toner. The agitators move sideways, and any toner that is piled too high moves into the toner collection tube [D]. This toner is transported to the toner collection bottle as waste toner.

## Waste Toner Collection



Toner collected by the transfer belt unit is transported to the toner collection bottle [A] through the toner collection tube. Three helical coils transport the toner.

One coil [B] feeds the toner in from the transfer belt unit. The next coil [C], driven by the drum motor via drive belts, feeds the toner through the toner collection tube, and the final coil [D], driven by the toner collection motor [E], feeds the toner to the toner collection bottle. This toner is to be disposed of as waste.

The toner collection motor sensor [F] monitors the rotation of the toner collection coil using the actuator disk [G] to prevent the coil from being damaged by toner clogged in the collection tube.
When the toner collection bottle becomes full, the toner pressure in the bottle increases and presses the gear [H] against the toner overflow switch [I]. After the toner overflow switch is activated, the copy job is allowed to end, or up to 100 continuous copies can be made, then copying is disabled and the service call "full toner collection bottle" is displayed on the LCD.

This condition can be cleared by de-actuating the toner overflow switch while deactuating then actuating the toner collection bottle switch [J].

DRUM UNIT

### 2.5.6 OTHERS

## Air Flow Around the Drum



The exhaust fan $[A]$ located above the fusing unit provides air flow to the charge corona unit to prevent uneven build-up of negative ions that can cause uneven drum surface charge.

An ozone filter [B] absorbs the ozone around the drum.
The exhaust fan turns slowly during stand-by and turns quickly during copying to keep the temperature inside the machine constant.

To prevent foreign matter from entering the copier inside, there is a dust protection filter in the entrance [C] of the duct.

## Pick-off Mechanism



The pick-off pawls are always in contact with the drum surface as a result of light 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].

## DRUM UNIT

## Quenching



In preparation for the next copy cycle, light from the quenching lamp [ $A$ ] neutralizes any charge remaining on the drum.
The quenching lamp consists of a line of 16 red LEDs extending across the full width of the drum.

### 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 [l]
- 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 a finer toner (about $7.5 \mu \mathrm{~m}$ ) and developer (about $70 \mu \mathrm{~m}$ ). 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 -150 V ) and white areas are at a high negative charge (about -950 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 DRIVE MECHANISM



The gears of the development unit are driven by the development drive gear [A] when the development motor [B] (a dc servomotor) turns.

The gears of the toner hopper are driven by the toner supply roller drive gear [C] when the toner supply clutch [D] activates.

The above gears are helical gears. Helical gears are more quiet than normal gears. The teeth of the development drive gear are chamfered so that they smoothly engage the development roller gear $[E]$ when the unit is installed.

### 2.6.4 CROSSMIXING



This copier uses a standard cross-mixing mechanism to keep the toner and developer evenly mixed. It also helps agitate the developer to prevent developer clumps from forming and helps create the triboelectric charge.
The developer on the turning development rollers $[\mathrm{A}]$ is split into two parts by the doctor blade $[B]$. The part that stays on the development rollers forms the magnetic brush and develops the latent image on the drum. The part that is trimmed off by the doctor blade goes to the backspill plate [C].

As the developer slides down the backspill plate to the agitator [D], the mixing vanes [E] move it slightly toward the rear of the unit. Part of the developer falls into the auger inlet and is transported to the front of the unit by the auger [F].
The agitator moves the developer slightly to the front as it turns, so the developer stays level in the development unit.

### 2.6.5 DEVELOPMENT BIAS



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 lower sleeve roller through the receptacle [B] and the lower sleeve roller shaft [C]. Then the bias is applied to the upper sleeve roller and the lower casing through the rear sleeve roller holder, which is made of conductive resin.

The bias applied to the lower casing prevents toner from being attracted back from the drum.

### 2.6.6 TONER SUPPLY

## Toner Bottle Mechanism



The bottle drive mechanism transports toner from the bottle to the toner supply unit $[A]$. A worm gear $[B]$ on the toner supply motor [C] drives this mechanism. The toner bottle [D] has a spiral groove that helps move toner to the supply unit.

When the toner bottle holder is opened, the shutter hook [E] moves the toner shutter, which shuts the opening of the toner supply unit and prevents the toner in the toner holder from spilling out.

## Toner Supply Mechanism



When the toner supply clutch $[A]$ turns on, the agitator $[B]$ mixes the recycled toner transported by the air tube [G] with new toner. Then it moves the toner from front to rear and sends it to the toner supply roller.

The toner supply clutch [A] inside the development motor unit [C] transfers drive from the development motor to the toner supply roller gear [D], which drives the agitator gear [E]. Toner is caught in the grooves in the toner supply roller [F]. Then, as the grooves turn past the opening, the toner falls into the development unit.

## Toner End Detection



The toner end sensor [A] detects whether sufficient toner remains in the toner hopper or not. The toner end sensor checks for a toner end condition once when the toner supply clutch turns on. When there is only a small amount of toner inside the toner hopper and pressure on the toner end sensor becomes low, the toner end sensor outputs a pulse signal (once per copy).

### 2.6.7 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 or ID sensor is defective.


## 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 2.5 V . This value will be used as the TD sensor reference voltage (VREF).

## 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 every 50 copies (or at the end of a copy job of more than 50 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 $\mathrm{V}_{\mathrm{T}}$. This is done every 50 copies (or at the end of a copy job of more than 50 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 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 - $\mathrm{VT}^{\prime}$ ".

## Toner Supply Clutch On Time Calculation

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

### 2.6.8 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 1.1 s . 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

After the toner near end is displayed, 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 .

### 2.6.9 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 TD sensor.
At this time, the drum and development motor, charge and development bias turn on.

The toner supply motor turns on for 1.1 s , then the toner supply clutch turns on for 1 s . 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 VREF.

If VT is less than or equal to VREF (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 VREF, the CPU turns on the toner supply clutch for 1 s again until VT becomes less than or equal to VREF.
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.

### 2.6.10 ABNORMAL TD SENSOR CONDITIONS

The TD sensor is checked every copy. If the reading from the TD sensor becomes abnormal during a copy job, the machine holds the GAIN factor constant to allow toner supply to vary with only the pixel count for the rest of the copy job. Then at the end of the job, an SC code is generated and the machine must be repaired.

If there are no spare ID or TD sensors, the toner supply mode can be set to image pixel count mode using SP 2-208-1.
Details of how the machine determines an abnormal sensor detection are listed in section 6 (Troubleshooting - SC390).

### 2.7 IMAGE TRANSFER AND PAPER SEPARATION

### 2.7.1 OVERVIEW



This model uses a transfer belt unit consists of the following parts:
[A] Transfer belt
A belt (length: 321 mm ) with high electrical resistance which holds a high positive electrical potential to attract toner from the drum to the paper. Also, the electrical potential attracts the paper itself and helps the paper to separate from the drum.
[B] Transfer bias roller
Applies transfer voltage to the transfer belt.
[C] Transfer belt lift lever (driven by a solenoid)
Lifts the transfer belt into contact with the drum.
[D] Transfer power pack
Generates a constant transfer current.
[E] Cleaning roller and cleaning roller cleaning blade
Removes toner remaining on the transfer belt to prevent the rear side of the paper from getting dirty

### 2.7.2 IMAGE TRANSFER AND PAPER SEPARATION MECHANISM

The registration rollers [A] feed the paper $[B]$ to the gap between the drum [C] and the transfer belt [D].


As soon as the leading edge of the paper reaches the gap between the transfer belt and the drum, the transfer belt lift lever [ E ] raises the transfer belt into contact with the drum. The lift lever is driven by a solenoid


Then a positive charge is applied to the transfer belt through the transfer bias roller [F] to attract the negatively charged toner [G] from the drum. It also attracts the paper and separates it from the drum


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 ( 11 and $\mathrm{I}_{2}$ ) fed back from the drive rollers at each end of the transfer belt to adjust the transfer current.

Then, the power pack adjusts $I_{t}$ to keep the current through the drum (I3) 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.

### 2.7.3 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 $[\mathrm{B}]$ 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 support spring [F] helps the solenoid to raise the transfer belt.
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 VD, VH, 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.

### 2.7.4 PAPER TRANSPORTATION AND BELT DRIVE MECHANISM



The transfer belt is driven by the drum motor [A] through belts and gears. Since the transfer belt electrically attracts the paper [B], a transport fan is not required.
At the turn in the transfer belt, the belt is discharged by the transfer belt drive roller [C] to reduce paper attraction, and the paper separates from the belt as a result of its own stiffness.

The tapered parts [D] at both sides of the roller [E] help keep the transfer belt [F] in the center, so that it does not run off the rollers.


### 2.7.5 TRANSFER BELT CLEANING MECHANISM



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.

### 2.7.6 TONER COLLECTION MECHANISM



Transfer belt drive is transmitted to the toner collection coil [A] through idle gears [B]. The toner collection coil [C] transports the collected toner to the toner recycling unit [D] and from there it goes to the waste toner collection bottle. See Drum Cleaning and Toner Recycling for details.

### 2.8 PAPER FEED

### 2.8.1 OVERVIEW



This model has three built-in paper feed trays: tandem feed tray [A] (500 + 500 sheets), universal tray [B] ( 550 sheets) and built-in LCT [C] (1500 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 1 to 3
[C] Vertical Relay Clutches 1 to 3
[D] Relay Clutch
[E] By-pass Feed Motor
[F] By-pass Feed Clutch

The paper feed motor [A] drives feed, pick-up, and separation rollers in trays 1, 2, and 3 via timing belts, clutches [B], and gears. The paper feed motor also drives the vertical transport rollers. Drive is transferred to each of the three 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 the relay roller and all the rollers in the by-pass tray via gears and a clutch [F].

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

## PAPER FEED

### 2.8.3 TRAY POSITIONING MECHANISM - TRAYS 1 AND 2



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

### 2.8.4 PAPER LIFT MECHANISM - TRAYS 1 AND 2



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].


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 proper paper feed level, 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 and the lift sensor is deactivated. Then 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 arm shaft [H], then the tray bottom plate [I] drops under its own weight.

### 2.8.5 PICK-UP AND FEED MECHANISM - TRAYS 1 TO 3

## Overview



Drive from the paper feed motor is transmitted to the gear $[A]$ in the paper feed unit via the timing belt [B].
Then the gear [A] transmits the drive to the pick-up [C], paper feed [D] and separation [E] rollers via gears and the paper feed clutch [F].
The gear [A] also transmits the drive to the vertical transport roller [G] via gears and the vertical relay clutch $[\mathrm{H}]$.

## Pick-up and Feed

[I]


If a paper feed station is not selected, its separation roller solenoid [A] de-activates and the separation roller [B] can turn freely in the opposite direction to paper feed.

When the paper feed station is selected and the start key is pressed, the feed clutch [C], separation roller solenoid [A], and the pick-up solenoid [D] all turn on.

When the feed clutch [C] activates to transfer drive to the feed roller [E], the pick-up roller [F] also turns because it is linked to the feed roller by an idle gear [G].

When the separation roller solenoid [A] turns on, the separation roller [B] contacts the paper feed roller [E] and turns with the feed roller in spite of the torque limiter in the separation roller, which forces it in the opposite direction.

When the pick-up solenoid [D] activates, the pick-up roller [F] lowers to make contact with the top sheet of the paper stack and send it to the paper feed and separation rollers.
When the paper feed sensor $[\mathrm{H}]$ detects the leading edge of the paper, the pick-up solenoid de-energizes to lift the pick-up roller [F], and the vertical relay clutch [I] energizes to feed the paper to the vertical paper feed section.

## Separation Roller Release Mechanism



The separation roller $[A]$ is normally away from the feed roller [B]. When the paper feed station is selected, the separation roller solenoid [C] contacts the separation roller with the feed roller as explained on the previous two pages.

This contact/release mechanism has the following three advantages:

1. When the paper feed motor turns on, all the separation rollers in the three feed stations rotate. If the separation roller is away from the feed roller, it reduces the load on the paper feed motor and drive mechanism, and it also reduces wear to the rubber surface of the separation roller caused by friction between the separation roller and the feed roller.
2. After paper feed is completed, paper sometimes remains between the feed and separation rollers. If the feed tray is drawn out in this condition, this paper might be torn. When the separation roller is away from the feed roller, the remaining paper can be removed from between the rollers.
3. When paper misfeeds occur around this area, the user can easily pull out the jammed paper between the feed and the separation rollers if the separation roller is away from the feed roller.

After paper feed and the paper feed clutch turns off, the paper feed motor still turns the separation roller [A] in reverse. The separation roller, still contacting the feed roller, turns the feed roller in reverse for 100 ms . Then the separation solenoid turns off.

## PAPER FEED

## Paper Skew Prevention Mechanism



The paper press arms [A] on each side press down both sides of the paper, especially if the paper is curled. This helps to prevent paper skew or jams.

### 2.8.6 VERTICAL TRANSPORT MECHANISM



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



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.

## Registration Drive Mechanism



The registration motor $[A]$ drives the lower registration roller $[B]$ through a timing belt [C] and some gears. Drive is transmitted to the upper registration roller [D] via two gears [E] at the front.
There is a paper dust remover [F] at the center of the upper registration roller [D]. This is in line with the feed rollers, where most paper dust is generated. Clean the dust remover every PM visit.

## PAPER FEED

## Guide Plate Release Mechanism



When a paper misfeed occurs between the vertical transport rollers and the registration rollers, the lower paper guide plate [A] automatically opens.

When the registration sensor is not activated at a certain jam check timing, the guide plate solenoid $[B]$ turns on. The lever [C] raises the lock lever [D] on the guide plate to release it from the pin [E] on the rear side frame. Then the guide plate falls open.

The actuator [F] on the guide plate activates the guide plate position sensor [G] when the guide plate opens.
To prevent the guide plate from being left open, if the guide plate position sensor is activated, copying is disabled and a caution is displayed on the LCD panel.

### 2.8.8 PAPER NEAR-END/END DETECTION - TRAYS 1 TO 3



## Near-end Detection

A feeler $[A]$ on the lift arm shaft rotates counterclockwise as the paper is used up. When about 50 sheets are left on the tray, the feeler activates the paper near end sensor [B].

## End Detection

If there is paper in the tray, the paper end feeler [C] is raised by the paper stack and the paper end sensor [D] is deactivated. When the paper tray runs out of paper, the paper end feeler drops into the cutout [E] in the tray bottom plate and the paper end sensor is activated.

### 2.8.9 PAPER SIZE DETECTION - TRAY 2



| SW <br> Actuated-0 <br> De-actuated-1 | Paper size | L: Lengthwise <br> S: Sideways |
| :---: | :---: | :---: |
|  | A4/A3 <br> Version | LT/DLT <br> Version |
| 00111 | A3-L | $11 \times 17-\mathrm{L}$ |
| 00011 | $81 / 4 \times 13$ | $81 / 2 \times 14-\mathrm{L}$ |
| 10011 | A4-L | $81 / 2 \times 11-\mathrm{L}$ |
| 01001 | A4-S | $81 / 2 \times 11-\mathrm{S}$ |
| 00100 | $81 / 2 \times 13$ | $51 / 2 \times 81 / 2-\mathrm{S}$ |
| 00010 | - | $8 \times 10-\mathrm{S}$ |
| 00001 | A5-S | $8 \times 10-\mathrm{L}$ |
| 10000 | $8 \mathrm{k}-\mathrm{L}$ (Taiwan version only) | $8 \times 13-\mathrm{L}$ |
| 11000 | $16 \mathrm{k}-\mathrm{L}$ (Taiwan version only) | $10 \times 14-\mathrm{L}$ |
| 11100 | $16 \mathrm{k}-$ S (Taiwan version only) | $11 \times 15-\mathrm{L}$ |
| 1110 | $*$ | $*$ |

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.

### 2.8.10 BUILT IN LCT

## Paper Tray Lift Mechanism



Drive from the reversible LCT motor [A] is transmitted through a worm gear [B] to the drive pulley shaft [C]. The tray wires [D] are secured in the slots [E] at the ends of the tray support rods [F] and [G].
When the LCT motor turns forward and the drive pulley shaft [C] turns counterclockwise, the tray support rods and the tray bottom plate $[\mathrm{H}]$ move upward. The tray goes up until the top of the paper stack pushes up the pick-up roller, and the $3^{\text {rd }}$ tray lift sensor is activated.
The paper near end sensor [I] detects the paper near end condition when it is activated by the actuator [J] on the rear end of the right support rod [G].
To lower the tray bottom plate [H], the LCT motor reverses and the drive pulley shaft [C] turns clockwise. The tray support rods and the tray bottom plate move downward. The tray goes down until the tray down sensor $[\mathrm{K}]$ is activated by the actuator [J].

When the paper is present and the tray is up the tray paper set sensor [L] is blocked. When paper runs out and the tray lowers it can not raise again until the tray paper set sensor is unblocked by the addition of paper.

## PAPER FEED

## Tray Lock Mechanism



When the tray bottom plate starts moving up, the tray lock lever [A] drops into the opening in the base plate to engage the stopper [B], locking the tray in position. This prevents the tray from being pulled out while the bottom plate is up.
When the bottom plate is lowered to the bottom position, the bottom plate presses down the pin [C] on the lock lever. The opposite end of the lever then moves up, allowing the tray to be pulled out.

### 2.8.11 BY-PASS FEED TABLE

## Feed Mechanism/Paper End Detection




The by-pass feed table uses an FRR feed system. The by-pass feed motor [A] drives the rollers. The pick-up solenoid [B] drops the pick-up roller onto the top sheet of paper, and the by-pass feed clutch [C] transfers drive from the motor to the feed roller.

The by-pass paper end sensor [D] detects if there is paper on the by-pass feed table.

When there is no paper on the by-pass feed table, the paper end feeler [E] drops into the cutout in the lower guide plate and the paper end sensor deactivates. When there is paper on the by-pass feed table, the paper pushes up the feeler to activate the paper end sensor. The CPU turns off the paper end indicator on the LCD panel and turns the start key from red to green.

## PAPER FEED

## Table Open/Close Detection



The by-pass tray switch $[A]$ detects when the by-pass feed table $[B]$ is opened. Then the CPU turns on the by-pass feed indicator on the operation panel. The start key LED remains red until paper is placed on the tray (see the previous page).

In this model, opening the by-pass feed table does not shift the copier into interrupt mode. The selected modes and input data before opening the by-pass feed table remain. Also, other paper trays can be selected while the by-pass feed table is open.

## Paper Size Detection



The by-pass paper size sensor [A] (variable resistor) monitors the paper width. The rear side fence is connected to the by-pass paper size sensor actuator. When the paper side fences $[\mathrm{B}]$ and $[\mathrm{C}]$ are positioned to match the paper width, the electrical resistance of the sensor changes in accordance with the side fence position, This informs the CPU of the paper width.
For the first copy from the by-pass feed table, the scanner makes a full distance scan. For example, for A4 sideways copy paper (the same width as A3), the scanner scans the full A3 length of the exposure glass. However, the registration sensor measures the length of the first sheet of paper (by monitoring the leading and trailing edges). For the second and following copies, the copier uses the correct paper length.

### 2.8.12 TANDEM FEED TRAY

## Overview



500 sheets of paper can be placed 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 stack in the left tray is automatically moved across to the right tray. After that, paper feed resumes.

Normally both the right and the left trays are joined together by the tray lock hook [C]. During copying, if there is no paper in the left tray, the left tray is released and can be pulled out to add paper, without interrupting copying from the stack in the right side of the tray.

## Side Fence Drive Mechanism



The side fences [A] of the right tray are normally closed. They open only when the stack of paper in the left tray is being moved across to the right tray.
The side fences are driven by the side fence drive motor $[B]$ (a stepper motor). When the paper stack in the left tray is being moved to the right tray, the side fence drive motor turns counterclockwise to open the side fences until the side fence positioning sensor [C] is activated.
After the rear fence [D] in the left tray has pushed the stack into the right tray, the side fence drive motor turns clockwise to close the side fences, until the side fence close sensor [E] is actuated. Then, a message is displayed advising the user to load some paper into the left side of the tandem tray.

## Rear Fence Drive Mechanism



When the paper end sensor [A] in the left tray detects paper but the paper end sensor in the right tray detects a paper end condition, the rear fence drive motor [B] (a dc motor) in the left tray turns counterclockwise to drive the rear fence [C] to push the paper stack into the right tray.

When the actuator on the rear fence activates the return position sensor [D], the rear fence drive motor turns clockwise until the actuator activates the rear fence home position sensor [E].
The whole process takes about 5 seconds.

## Tray Lock Mechanism



Normally, the tray lock lever [A] is in the cutout [B] in the left tray [C], locking it in place. During copying, if paper in the left tray runs out, the tandem lock solenoid [D] turns on to release the tray lock lever so that the left tray can be separated from the right tray.

## Tray Lifting and Lowering Mechanism

The tray lift mechanism is the same as described in 'Paper Lift Mechanism'.
However, the tray bottom plate has to be lowered without the tray being pulled out.
This must happen before the stack in the left tray is moved across to the right side of the tray.

When it is time to move the stack, the tray lift motor lowers the bottom plate until the actuator on the bottom of the plate enters the base plate down sensor (no diagram available). Then the stack in the left side of the tray is moved across to the right as described in earlier sections.

### 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 pressure roller [B].
There are two fusing lamps in the hot roller. Both lamps are 550 W lamps. They switch on and off together, with a slight delay between to minimize the load on the PSU.

The fusing lamps turn on and off to keep the operating temperature at $185^{\circ} \mathrm{C}$. The CPU monitors the hot roller surface temperature through a thermistor [D] which is in contact with the hot roller surface. A thermofuse [E] protects the fusing unit form overheating.

The hot roller strippers [F] separate the copy paper from the hot roller and direct it to the fusing exit rollers [G]. 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 [H] on the pressure lever [I] adjusts the roller pressure.
The oil supply roller [J] applies a light coat of silicone oil to the hot roller. The oil supply cleaning roller $[\mathrm{K}]$ removes the paper dust accumulated on the cleaning roller.

### 2.9.2 FUSING ENTRANCE GUIDE



The entrance guide $[\mathrm{A}]$ 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



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.

### 2.9.4 FUSING LAMP CONTROL

(200

When the main switch is turned on, the CPU turns on the two fusing lamps.
When the fusing temperature reaches $180^{\circ} \mathrm{C}$, the machine starts the process control data initial setting. If the fusing temperature was already above $100^{\circ} \mathrm{C}$ when the main switch was turned on, process control initial setting is not done.

When the CPU detects a fusing temperature of $200^{\circ} \mathrm{C}$, the copier starts fusing idling. The idling period can be adjusted with SP mode 1-103. If the fusing temperature was already above $100^{\circ} \mathrm{C}$ when the main switch was turned on, the copier does not go into the fusing idling mode.

When fusing idling has finished, the warm-up period is completed and the Ready indicator turns on. After this, fusing temperature is kept at $185^{\circ} \mathrm{C}$.
The CPU changes the fusing lamp on period depending on the temperature measured by the thermistor to keep the fusing temperature as close as possible to the target temperature.

### 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 PAPER EXIT MECHANISM



Drive from the fusing/duplex motor $[A]$ is transmitted to the paper exit roller $[B]$ and transport rollers [C].
The curl correction roller [D] removes the paper curl caused by the fusing unit, to prepare it for the next process (duplexing or finishing).
To feed the printed page from the fusing unit straight through to the output tray or finisher, the duplex exit junction gate solenoid [E] energizes to open the junction gate $[F]$. To feed the page to the inverter and duplex unit, the solenoid stays off.

## PAPER EXIT/DUPLEX

### 2.10.3 DUPLEX DRIVE MECHANISM



The duplex drive gear $[A]$ transmits drive from the fusing/duplex drive motor $[B]$ to the duplex unit.

The duplex transport clutch [C] transmits this drive to the duplex transport section, and the duplex feed clutch [D] transmits it to the duplex paper feed-out section.
The inverter exit roller [E] is driven by the gear [A], and this roller always turns while the fusing/duplex drive motor is on.

### 2.10.4 INVERTER

## Feed-in and Jogging



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).

## PAPER EXIT/DUPLEX

## Feed-out


[B]


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.

### 2.10.5 DUPLEX TRAY FEED MECHANISM



In duplex mode, after the paper leaves the inverter, the duplex junction gate 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.

### 2.10.6 BASIC DUPLEX FEED OPERATION

To increase the productivity of duplex copying, a non-stacking style duplex mechanism is adopted. This type of mechanism allows more than one page to be processed at once, in a process called 'interleaving'. Examples of this are given below.

For paper lengths up to A4/Letter lengthwise, the top duplex speed is possible, with the duplex unit processing three sheets of copy paper at the same time.

For paper longer than this, the duplex tray can still process two sheets of copy paper at once.
In case of single set duplex copy job, the duplex stores only one sheet of copy paper.

## Up to A4 / Letter lengthwise

The duplex unit can process three sheets of copy paper
Example: A 14-page copy. The large numbers in the illustration show the order of pages. The small numbers in circles show the order of sheets of copy paper (if shaded, this indicates the second side).


1. The first 3 sheets are fed and printed.
1) 1st sheet printed (1st page)
2) 2nd sheet printed (3rd page)
3) 3rd sheet printed (5th page)

2. The first 3 sheets go into the duplex unit.
3. The 4 th sheet is fed in.
4. The back of the 1 st sheet is printed (2nd page).
5. The 4th sheet is printed (7th page).
6. The 1 st sheet is fed out (1st and 2 nd pages printed).
7. The 4th sheet is directed to the duplex unit.
8. The back of the 2 nd sheet is printed (4th page).
9. The 5 th sheet is fed.


## PAPER EXIT/DUPLEX

10. The 2nd sheet is fed out (3rd and 4th pages printed).
11. The 5th sheet is printed (9th page) and directed to the duplex unit.
12. The back of the 3rd sheet (6th page) is printed.
13. The 6th sheet is fed and printed (11th page).

14. The 3rd sheet (5th and 6th pages) is fed out
15. The back of the 4th sheet (8th page) is printed.
16. The 7th sheet is fed and printed (13th page).
17. The back of the 5 th sheet
 (10th page) is printed.
18. The 4th and 5th sheets are fed out (pages 7 to 10).
19. The back of the 6th (12th page) and 7th (14th page) sheets are printed.

20. The 6th and 7th sheets are fed out (pages 11 to 14).

## Longer than A4 / Letter lengthwise

The duplex unit can process two sheets of copy paper
Example: 8 pages. A 14-page copy. The large numbers in the illustration show the order of pages. The small numbers in circles show the order of sheets of copy paper (if shaded, this indicates the second side).


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

2. The first 2 sheets go into the duplex unit

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

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

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.


### 2.11 ENERGY SAVER MODES

### 2.11.1 OVERVIEW



When the machine is not used, the energy saver function reduces power consumption by decreasing the fusing temperature.

This machine has three energy saver modes.

1) Energy saver mode
2) Low power mode
3) Off mode (this has two modes, Auto Off Mode and Weekly Timer Off Mode)

These modes are controlled by the following UP modes.

- Low power timer: The machine enters energy saver mode when this runs out
- Low power shift timer: The machine enters low power mode when this runs out
- Auto off timer: The machine enters auto off mode when this runs out
- Weekly timer programming: Programs a timer for the machine to switch itself on and off (this is for Weekly Timer Off Mode)
- Auto off mode disabling (User Tools - System Setting - Count Manager - AOF) If auto off mode is disabled, the machine will never enter auto off mode. The fusing lamps will always stay on, but the machine will still be able to enter energy saver and low power modes.
The way that the machine operates depends on the combination of installed equipment (copier only, copier/printer).


### 2.11.2 ENERGY SAVER MODE

## Entering energy saver mode

The machine enters energy saver mode when one of the following is done.

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

NOTE: If the low power timer is 0 , the machine will wait for the low power shift timer to run out, and then it will go straight to low power mode (see Low Power Mode).

- The Clear Mode/Energy Saver Key is held down for a second.


## What happens in energy saver mode

When the machine enters energy saver mode, the fusing lamp drops to $182^{\circ} \mathrm{C}$, and the operation panel indicators are turned off except for the Energy Saver LED and the Power LED. There is only one energy saver level.

If the CPU receives the image print out command from an application (e. g. to print data from a PC), the fusing temperature rises to print the data. However, the operation panel stays off.

## Return to stand-by mode

If one of the following is done, the machine returns to stand-by mode:

- The Clear Mode/Energy Saver Mode key is pressed
- Any key on the operation panel is pressed
- An original is placed in the ADF
- The ADF is lifted
- A sheet of paper is placed in the by-pass feed table

The recovery time from energy saver to raise the fusing temperature is less than 1 second.

NOTE: The polygon motor needs 10 seconds to reach the correct speed.

| Mode | Operation <br> Switch | Energy <br> Saver LED | Fusing <br> Temp. | System +5V | Main Power <br> LED |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Energy Saver | On | On | $182^{\circ} \mathrm{C}$ | On | On |

### 2.11.3 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 default is $177^{\circ} \mathrm{C}$ ). 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. The default (from $177^{\circ} \mathrm{C}$ ) is about 20 seconds.

| Recovery <br> Time | Operation <br> Switch | Energy <br> Saver LED | Fusing <br> Temp. | System <br> $+5 V$ | Main Power <br> LED |
| :---: | :---: | :---: | :---: | :---: | :---: |
| About <br> 20 seconds | On | On | $177^{\circ} \mathrm{C}$ | On | On |

### 2.11.4 OFF MODE

Off mode has two separate modes.

- Auto Off Mode (Sleep mode)
- Weekly Timer Off Mode


## Off Mode (Sleep Mode)

## Entering off mode

The machine enters off mode when one of the following is done.

- The auto off timer runs out after the end of a job
- The operation switch is pressed to turn the power off


## What happens in off mode

When the machine enters auto off mode, the operation switch turns off automatically. The fusing lamp and all dc supplies except +5 VE (+5V for energy saver mode) turns off. At this time, only the main power LED is lit.

| Operation <br> Switch | Energy <br> Saver LED | Fusing Temp. | System +5V | Main Power <br> LED |
| :---: | :---: | :---: | :---: | :---: |
| Off | Off | Room Temp. <br> (Fusing lamp off) | Off | On |

NOTE: Only +5 VE is supplied to the SBICU.
LED $(+5 \mathrm{~V})$ is supplied to the operation panel from the SBICU.

## Returning to stand-by mode

The machine returns to stand-by mode when the operation switch is pressed.

## Printing incoming data

If the machine receives print data from a PC, the fusing temperature rises to print the data. However, the operation panel stays off. After completing the print job, the machine returns to off mode (sleep mode).

## Weekly Timer Off Mode

## Weekly timer

The user can program 'on periods' and 'off periods' for each day of the week.

## Entering weekly timer off mode

The machine enters this mode when:

- The auto off timer runs out after the end of a job, and the weekly timer has already reached the start of an off period
- The operation switch is pressed to turn the power off, and the weekly timer has already reached the start of an off period
- The weekly timer reaches the start of an off period while in Off Mode.


## What happens in weekly timer off mode

When the machine enters this mode, the operation switch turns off automatically. The fusing lamp and all dc supplies except +5 VE ( +5 V for energy saver mode) turn off. At this time, only the main power LED is lit.

| Operation <br> Switch | Energy <br> Saver LED | Fusing Temp. | System +5V | Main Power <br> LED |
| :---: | :---: | :---: | :---: | :---: |
| Off | Off | Room Temp. <br> (Fusing lamp off) | Off | On |

NOTE: Only +5 VE is supplied to the SBICU.
LED $(+5 \mathrm{~V})$ is supplied to the operation panel from the SBICU.

## Returning to stand-by mode

If a weekly timer code (Key Operator Code for Off Setting - UP mode) is registered, the machine returns to stand-by mode when the operation switch is pressed and the weekly timer code is entered.
If a weekly timer code is not registered, the machine returns to stand-by mode when the operation switch is pressed.

## Printing received data

If no weekly timer code is registered:
If the machine receives print data from a PC, the fusing temperature rises to print the data. However, the operation panel stays off. After completing the print job, the machine returns to weekly timer off mode.

If a weekly timer code is registered:
When print data is sent from a PC, the printer stays off-line. After someone enters the weekly timer code, the printer will go on-line and print the data.

### 2.11.5 SUMMARY

For reference, the following flow chart summarizes the various energy saver modes, and their entry and exit conditions.

*Change to: Ready within $\pm$ minutes/seconds

## INSTALLATION

## 3. INSTALLATION PROCEDURE

### 3.1 INSTALLATION REQUIREMENTS

### 3.1.1 ENVIRONMENT

1. Temperature Range:
2. Humidity Range: $10^{\circ} \mathrm{C}$ to $32^{\circ} \mathrm{C}\left(50^{\circ} \mathrm{F}\right.$ to $\left.89.6^{\circ} \mathrm{F}\right)$
3. Ambient Illumination: 15\% to 80\% RH
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 $0.10 \mathrm{mg} / \mathrm{m}^{3}\left(2.7 \times 10^{-6} \mathrm{oz} / \mathrm{yd}^{3}\right)$
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 $2,000 \mathrm{~m}$ ( 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 $5 \mathrm{~mm}\left(0.2^{\prime \prime}\right)$ of level
2. Right to left: Within $5 \mathrm{~mm}\left(0.2^{\prime \prime}\right)$ 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.


More than 70 cm, 27.6"

### 3.1.4 POWER REQUIREMENTS

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

1. Input voltage level:
2. Permissible voltage fluctuation:

120 V/60 Hz: More than 20 A 220~240 V/50-60 Hz: More than 10 A 10\%

### 3.2 COPIER (A229)

### 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 (-10, -22 machines) ..... 1
2. Operation Instructions - English (-10, -22, -26, -29 machines) ..... 1
3. Operation Instructions - Chinese (-62 machines) ..... 1
4. NECR with Envelope - English (-17 machines) ..... 1
5. NECR - Multi-language (-27, -29, -62 machines) ..... 1
6. User Survey Card (-17 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 $-\mathrm{M} 4 \times 8$ ..... 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 <br> Rating voltage for Peripherals

Make sure to plug the cables into the correct sockets.


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


## © CAUTION <br> 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 (AH013008) and levelling feet (AH011004) are available as spare parts.

1. Remove all strips of tape as shown above.
2. Keep the factory setting data sheet [C] for future usage.
3. Draw out trays 1 and 2, and take out the accessory items [D] placed inside.

4. Open the front cover and remove the strips of tape $[A]$.
5. Remove the blade release pin [B] together with the transfer belt lock plate [C] (1 screw).
6. 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.

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

12. Disconnect two connectors $[A]$.
13. 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.
14. Remove two screws [E] that hold the toner hopper [F].
15. Remove the toner hopper by lifting it out.

16. Pour in one pack of developer $[A]$ while turning the knob $[B]$. Distribute the developer evenly along the development unit.
17. Attach the toner hopper [C] to the development unit ( 2 screws).
18. Install the development unit in the machine.
19. Connect two connectors [D].
20. 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 $[\mathrm{H}]$.

21. 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].
22. Install a toner bottle by following the instructions on the decal.
23. 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 $[\mathrm{H}]$.

24. Install the original exit tray [A] (3 screws).
25. Connect the ARDF connector [B] to the socket at the rear of the copier.
26. Attach the face up decal [C] to the feed tray as shown.
27. Plug in the power cord, then turn on the main power switch and the operation switch. The machine automatically enters the process control data initial setting mode. This takes about 5 minutes.
NOTE: Do not turn off the main switch during the process control data initial setting mode.

Do not make any copies until after SP2963 has finished in step 29.
28. 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.

$$
\mathrm{C} / \theta \rightarrow(\rightarrow) \rightarrow(7 \rightarrow 0
$$


29. Select "Copy SP" $[A]$ 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 [B] on the LCD.

NOTE: This SP mode performs the TD initial setting, then the forced toner supply. It will stop automatically when both procedures have finished.
30. Initialize the mechanical counter using SP7-825.
31. If necessary, select the correct display language (SP5-009).
32. Press the "Exit" key [C] on the LCD to exit SP mode.
33. Change the paper size for all paper trays to suit the customer's requests. (See section 3.3 "Paper Size Change" for details.)
34. Attach the appropriate paper size decals, which are included as accessories, to each paper feed tray.
35. Check copy quality and machine operation.
$\Rightarrow$ NOTE: The Drum Heater, Optics Anti-Condensation Heater and the two Tray Heaters, which turn on during the machine OFF condition are installed on the machine but the connectors, CN102 and CN103 on the PSU are not connected. Please connect the connectors when necessary.

### 3.3 PAPER SIZE CHANGE

If the customer requests, change the paper size as follows.

### 3.3.1 550-SHEET PAPER TRAY (TRAY 2)

NOTE: At the factory, this tray is set up for A3 or DLT depending on the machine destination code.


Slide the paper size slider [A] to the paper size indication that matches the paper size in the tray. The following paper sizes can be selected with the paper size slider.

| A4/A3 Version | LT/DL Version |
| :---: | :---: |
| A3 (lengthwise) | $11^{\prime \prime} \times 17^{\prime \prime}$ |
| A4 (lengthwise) | $81 / 2^{\prime \prime} \times 14^{\prime \prime}$ |
| A4 (sideways) | $81 / 2^{\prime \prime} \times 11^{\prime \prime}$ |
| A5 (sideways) | $11^{\prime \prime} \times 81 / 2^{\prime \prime}$ |
| $81 / 4^{\prime \prime} \times 13^{\prime \prime}$ (lengthwise) | $81 / 2^{\prime \prime} \times 51 / 2^{\prime \prime}$ |
| $81 / 2^{\prime \prime} \times 13^{\prime \prime}$ (lengthwise) | $8^{\prime \prime} \times 101 / 2^{\prime \prime}$ |
| $*$ | $11^{\prime \prime} \times 15^{\prime \prime}$ |
| - | $10^{\prime \prime} \times 14^{\prime \prime}$ |
| - | $8^{\prime \prime} \times 10^{\prime \prime}$ |
| - | $8^{\prime \prime} \times 13^{\prime \prime}$ |
| - | $*$ |
| - |  |

NOTE: When the paper size slider is set at the " $*$ " position, a wider range of paper sizes can be selected using the System Settings in the User Tools.

### 3.3.2 1,500-SHEET PAPER TRAY (TRAY 3)

NOTE: 1) At the factory, this tray is set up for A4 or LT sideways depending on the machine destination code.
2) A protection bracket $[A]$ on the guide rail of the end fence $[B]$ prevents users from putting stacks of paper in the empty space (this would lead to machine damage). If the user requests paper which is larger than A4 or LT sideways, this bracket must be removed (2 screws).


1. Draw out the third feed tray [C].
2. Change the position of the front and the rear side fences [D] (1 screw each) and the end fence [B] (one screw) to match the required paper size.
3. Remove the protection bracket if the paper size will be larger than A4 sideways.

[B]

| 颭System Setings |  |  |  | Exit |
| :---: | :---: | :---: | :---: | :---: |
| Selat onfe ofthe fillowing defall sestings. |  |  |  |  |
| Baxic Page 1 Easic Page | Set Time | Paper Sie Seting | Count Manager |  |
| Operetion Panel Beperer | On |  | mito ofit imer | Sman |
| Fexdy Operation Panel Beeper | $0{ }^{0}$ |  | Low Powe Sinit Time | 15 min. |
| Copy Cound lisplay | Up |  | Laupemerer Tiner | 60.sec. |
| Aita fiespusise (Human) Sensoir | Ves |  | noffeep toin) | $0{ }^{\circ}$ |
| Adto Tray swithing | Ves |  | ADF Oring. Fiedion | ADF EX. Tray |


4. Press the "User Tools/Counter" key.
5. Press the "System Settings" key [A].
6. Press the "Paper Size Setting" key [B], then press the "Tray 3: Paper Size Setting" key [C]. Then press the appropriate paper size key.
7. Press the "Exit" key [D] twice to leave UP mode.
8. Check the copy quality and machine operation.

### 3.3.3 TANDEM FEED TRAY PAPER SIZE CHANGE (TRAY 1)

NOTE: At the factory, this tray is set up for A4 or LT sideways. Only B5, A4, or LT sideways paper can be used for tandem feed. If the user requests other paper sizes than these, this tray will be used as a fixed tray.


- To use as a tandem feed tray for A4, LT, or B5 sideways paper -

1. Draw out the tandem feed tray $[A]$.
2. Remove the rear and front side fences $[B]$ (one screw and one pushlock each) on the right tandem tray.
3. Re-position the end fences [C] on both rear and front side fences (1 screw each) to match the required paper size.

[D]
D]

4. Re-install both side fences $[A]$ in the appropriate position for the required paper size, as shown.
NOTE: The position of the side fence holders [B] and the pins [C] on the rack gear is different for each paper size (from the outside pin: A4, 11", B5).
5. Change the position of the front and rear side fences [D] (2 screws each) and end fence [E] (2 screws) on the left tandem tray to match the required paper size.
6. Enter System Settings in User Tools, and select the paper size that you just set the fences up for.


- To used as a fixed tray for paper longer than A4/Letter sideways -

1. Draw out the tandem feed tray.
2. Remove the rear and the front side fences $[A]$ (1 screw and 1 push-lock pin each) on the right tandem tray.
3. Remove the end fences $[B]$ from both the rear and the front side fences (2 screws each).
NOTE: It is not necessary to re-install the end fences.
4. Install both side fences in the appropriate position for the required paper size (one screw and one lock pin for each side fence).
NOTE: Support plates [C] are used only for A4, B5, and letter lengthwise sizes.
Keep the end fences and support plates for future use.

5. Change the position of the front and rear side fences [A] (2 screws each) and end fence [B] (2 screws) of the left tandem tray to match the required paper size.
6. Enter System Settings in User Tools, and select the paper size that you just set the fences up for.

### 3.3.4 OPTIONAL LCT

Refer to Side Fence Position Change in the LCT service manual.

### 3.3.5 CHANGING THE UNIVERSAL TRAY PAPER-SIZE

At the factory, the universal paper tray is set to $A 4 / 81 / 2^{\prime \prime} \times 11$ " sideways. Normally, the customer changes the paper size by following the operating instructions.

Only when the customer needs A5/51/2" x 81/2" (lengthwise) duplex copies does a service representative need to change the paper size. In this case, proceed as follows:


1. Install the front and rear side fences $[A]$ according to the paper size (2 screws). Front fence: A0966549
Rear fence: A0966550
Binding self tapping screw - M4 x 8: 04140082B
2. Change the position of the size sensor slider $[B]$ to the asterisk position.
3. Enter SP mode (No. 5112) and select "Yes" (non-standard paper size can be input for tray 2.)
4. Select the paper size (A5/51/2" x 81/2" lengthwise paper size) using an UP mode.

### 3.4 LCT (A698)

### 3.4.1 ACCESSORY CHECK

Check the accessories in the box against 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 (Multi-language) ..... 1

### 3.4.2 INSTALLATION PROCEDURE



## © CAUTION <br> Unplug the copier power cord before starting the following procedure.

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

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] in the copier (3 screws - M4 x 8).

8. Attach the LCT connector $[A]$ to the copier.
1) Remove the three caps $[B]$.
2) Fit the two pins [C] on the LCT connector into the two holes [D] in the copier.
3) Attach the LCT connector to the copier ( 3 screws - M4 x 16).
9. Remove the screw that holds the upper cover hinge [E], then slide the LCT cover [F] to the right and remove it ( 1 screw).
10. Remove the rear upper cover [G] (2 screws).


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

| $\triangle$ CAUTION |
| :--- |
| Place the LCT on the bottom plates [B] of the LCT connector properly (the |
| sides of the LCT and the copier must be parallel). |

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

15. Connect the connectors.

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

16. Secure the protective earth wire $[A]$ to the copier ( 1 screw - M4 x 6).
17. Attach the rear upper cover [B] (2 screws).
18. Attach the LCT cover [C] (1 screw).
19. Plug in the copier and check the machine's operation.

NOTE: The copier automatically recognizes that the LCT has been installed.

### 3.5 3,000-SHEET FINISHER (A697)

### 3.5.1 ACCESSORY CHECK

Check the accessories in the box against the following list.

Description
Q'ty Description Q'ty

1. Front Joint Bracket........................ 1 9. Tapping Screw - M $4 \times 14$.............. 4
2. Rear Joint Bracket ........................ 1 10. Tapping Screw - M3 x $8 . . . . . . . . . . . . . ~ 4$
3. Entrance Guide Plate.................... 1 11. Cushion ....................................... 1
4. Shift Tray ..................................... 1
5. Exit Guide Mylar for the A229 ....... 1
6. Shift Tray Guide for the A232........ 1
7. Staple Position Decal.................... 1
8. Tapping Screw - M3 x 6 ............... 2
9. Upper Grounding Plate for the A232 copier.
10. Installation Procedure (English)... 1
11. New Equipment Condition Report
(Multi-language)....................... 1


## 3,000-SHEET FINISHER (A697)

### 3.5.2 INSTALLATION PROCEDURE



1. Unpack the finisher and remove the tapes.

2. Remove the four plastic caps $[A]$ from the copier's left cover.
3. Remove the connector cover [B].
4. Install the front joint bracket [C] and rear joint bracket [D] (2 screws - M4 x 14 each).
5. Peel off the backing of the double-sided tape that is attached to the lower grounding plate [E].
6. Attach the lower grounding plate to the bottom edge of the paper tray unit as shown.

7. Attach the cushion $[A]$ to the plate as shown.
8. Install the entrance guide plate $[B]$ (2 screws).
9. Open the front door of the finisher, and remove the screw [C] which secures the locking lever [D]. Then pull the locking lever.
10. 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 [E].
11. Secure the locking lever ( 1 screw) and close the front door.
12. Attach the exit guide mylar [F] to the anti-static brush bracket located above the upper tray exit roller as shown.
13. Install the shift tray [G] (4 screws).
14. Connect the finisher cable $[H]$ to the main machine.
15. Attach the staple position decal [I] to the ARDF as shown.
16. Turn on the main power switch and check the finisher operation.
3.6 PUNCH UNIT INSTALLATION (A812)
3.6.1 ACCESSORY CHECK
Check the accessories in the box against the following list.
Description ..... Q'ty
17. Spacer -2 mm ..... 1
18. Spacer - 1 mm ..... 2
19. Stepped Screw - Short ..... 1
20. Stepped Screw - Long ..... 1
21. Punch Unit Knob ..... 1
22. Spring ..... 1
23. Harness - Long ..... 1
24. Harness - Short ..... 1
25. Hopper ..... 1
26. Punch Position Decal ..... 1
27. Tapping Screw $-\mathrm{M} 4 \times 10$ ..... 2
28. Screw with Flat Washer - M4 x 6 ..... 1
29. New Equipment Condition Report (Multi-language) ..... 1

### 3.6.2 PUNCH UNIT INSTALLATION



## .CAUTION <br> 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).

4. Install the spacer [A] (thickness $=2 \mathrm{~mm}$ ).

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]).

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 finisher control board 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.

### 3.7 OUTPUT TRAY (A814)

### 3.7.1 ACESSORY CHECK

Check the accessories in the box against the following list.
Description ..... Q'ty

1. Output Tray ..... 1
2. Tray Paper Limit Sensor Feeler ..... 1
3. Feeler Securing Bracket ..... 1
4. Tapping Screw - M3 $\times 6$ ..... 1

### 3.7.2 OUTPUT TRAY INSTALLATION PROCEDURE



1. Remove the left cover $[A]$ ( 2 screws).
2. Attach the sensor feeler $[B]$ to the feeler securing bracket $[C]$, and install it in the copier as shown (1 screw).
3. Reinstall the left cover and install the output tray [D] as shown.

### 3.8 KEY COUNTER INSTALLATION



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 $[\mathrm{E}]$ 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).

## SERVICE TABLES

## 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 spilled 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 set 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 those 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 (SP2801) 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.

NOTE: Hold the c/ه key for more than 3 seconds.
2) A menu of SP modes is displayed on the LCD.


Wersion 7.15 uk

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 SBICU board software version.


## SERVICE PROGRAM MODE

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


## 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.

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


## 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.

2. Touch the 2nd level program.

| SP Mode (Serviceman) |  |  | Copy mode | Frev. wenu | Exit |
| :---: | :---: | :---: | :---: | :---: | :---: |
| SP Wode Class 1 No. Select |  |  | $\cdots \times \mathrm{mox}$ |  |  |
| 1001 | Leading Edge Registration <br> Side-to-side Registration <br> Registration Buckle Adjustmert <br> By-pass Feed Paper Size Display <br> Duplex Fence Adjustrment <br> Fusing Iding <br> Fusing Temperature Control | $11055^{-}$ | Fusing Temperature didjustment <br> Fusing Temperature Display <br> CPM Down for Thick Faper <br> Bypass TrayPaper Size Conrection <br> Thick Paper - By-pass Tray |  |  |
| $1010{ }^{\text {a }}$ |  | 1106 |  |  |  |
| 1013-* |  | 1901-* |  |  |  |
| 1007 |  | 1904-* |  |  |  |
| 1001 |  | 1905 |  |  |  |
| 1103 |  |  |  |  |  |
| 1104 |  |  |  | 4 Pre | F Next |

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


## 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 囲 key.

NOTE: 1) If you forget to touch the "Start" key or OK key, the previous value remains.
2) To change from " + " to "-" use the "•" key before entering the required value, to change from - to + use the Clear/Stop key.
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). | $\begin{aligned} & +9 \sim-9 \\ & 0.1 \mathrm{~mm} / \mathrm{step} \\ & \mathbf{+ 3 . 0 ~ m m} \end{aligned}$ |
|  |  |  | Use the "•" key to toggle from + to - and the Clear/Stop key to toggle from - to + before entering the value. The specification is $0 \pm 2.0 \mathrm{~mm}$.. <br> The specification is $3 \pm 2 \mathrm{~mm}$. See "Replacement and Adjustment - Copy Image Adjustments" for details. |  |
| 1-002 | Side-to-Side Registration |  |  |  |  |
|  | 1 | Tray-1 |  | * | Adjusts the printing side-to-side registration from the 1st paper feed station using the trimming area pattern (SP2-9023, No.10). | $\begin{aligned} & \hline+9 \sim-9 \\ & 0.1 \mathrm{~mm} / \mathrm{step} \\ & \mathbf{+ 0 . 0 ~ m m} \end{aligned}$ |
|  |  |  | Use the "•" key to toggle from + to - and the Clear/Stop key to toggle from - to + before entering the value. The specification is $0 \pm 2.0 \mathrm{~mm}$. <br> See "Replacement and Adjustment - Copy Image Adjustments" for details on SP1-002. |  |  |  |
|  | 2 | Tray - 2 | * | Adjusts the printing side-to-side registration from the 2nd paper feed station using the trimming area pattern (SP2-902-3, No.10). | $\begin{aligned} & +9 \sim-9 \\ & 0.1 \mathrm{~mm} / \mathrm{step} \\ & \mathbf{+ 0 . 0 ~ m m} \end{aligned}$ |  |
|  |  |  |  | Use the "•" key to toggle from + to - and the Clear/Stop key to toggle from - to + before entering the value.The specification is $0 \pm 2.0 \mathrm{~mm}$. |  |  |
|  | 3 | Tray - 3 | * | Adjusts the printing side-to-side registration from the 3rd paper feed station using the trimming area pattern (SP2-902-3, No.10). | $\begin{aligned} & \hline+9 \sim-9 \\ & 0.1 \mathrm{~mm} / \text { step } \\ & \mathbf{+ 0 . 0 ~ m m} \end{aligned}$ |  |
|  |  |  |  | Use the "•" key to toggle from + to - and the Clear/Stop key to toggle from - to + before entering the value. <br> The specification is $0 \pm 2.0 \mathrm{~mm}$. |  |  |
|  | 4 | Tray - 4 | * | Japanese version only. |  |  |
|  | 5 | Duplex Tray | * | Adjusts the printing side-to-side registration from the duplex tray using the trimming area pattern (SP2-902-3, No.10). | $\begin{aligned} & +9 \sim-9 \\ & 0.1 \mathrm{~mm} / \mathrm{step} \\ & \mathbf{+ 0 . 0 ~ m m} \end{aligned}$ |  |
|  |  |  |  | Use the "•" key to toggle from + to - and the Clear/Stop key to toggle from - to + before entering the value. <br> The specification is $0 \pm 2.0 \mathrm{~mm}$. |  |  |



| Mode No. <br> (Class $1,2 \& 3$ ) |  |  |  | Function | Settings |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 1-105 | Fusing Temperature Adjustment |  |  |  |  |
|  | 1 | By-pass |  | Adjusts the fusing temperature for paper fed from a by-pass tray. <br> Use the "•" key to toggle from + to - and the Clear/Stop key to toggle from - to + before entering the value. | $\begin{array}{\|l} \hline 170 \sim 200 \\ 1^{\circ} \mathrm{C} / \text { step } \\ \mathbf{1 8 5}^{\circ} \mathrm{C} \end{array}$ |
|  | 2 | OHP | * | Adjusts the fusing temperature for OHP sheets fed from the by-pass feed unit. Use the "•" key to toggle from + to - and the Clear/Stop key to toggle from - to + before entering the value. | $\begin{aligned} & +10 \sim-10^{\circ} \mathrm{C} \\ & 1^{\circ} \mathrm{C} / \text { step } \\ & 0\left(165^{\circ} \mathrm{C}\right) \end{aligned}$ |
|  | 3 | Thick Paper | * | Adjusts the fusing temperature for thick paper fed from the by-pass feed unit. Use the "•" key to toggle from + to - and the Clear/Stop key to toggle from - to + before entering the value. | $\begin{array}{\|l} \hline+5 \sim-10^{\circ} \mathrm{C} \\ 1^{\circ} \mathrm{C} / \text { step } \\ 0\left(195^{\circ} \mathrm{C}\right) \end{array}$ |
| 1-106 | Fusing Temperature Display |  |  |  |  |
|  |  |  |  | Displays the fusing temperature. |  |
| 1-901 | CPM Change for Thick Paper |  |  |  |  |
|  | 1 | Tray 1 |  | Selects the copy speed when the fusing temperature goes down when using thick paper. <br> During a long copy run, the hot roller cools down. This may cause poor fusing. To prevent this, the copy speed can be reduced when the temperature reaches a certain level. <br> The 4th tray is used for the Japanese version only. | $\begin{array}{\|c\|} \hline \text { 0: None } \\ \text { 1:50 cpm - } \\ 165^{\circ} \mathrm{C} \\ \text { 2: } 45 \mathrm{cpm}- \\ 175^{\circ} \mathrm{C} \end{array}$ |
|  | 2 | Tray 2 |  |  |  |
|  | 3 | Tray 3 | * |  |  |
|  | 4 | Tray 4 | * |  |  |
|  | 5 | LCT | * |  |  |
| 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 (A4 sideways). | 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. <br> 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. <br> After replacing the drum or charge corona wire, change this value to the default. | $\begin{aligned} & -600 \sim-1300 \\ & 10 \mathrm{~V} / \text { step } \\ & -1000 \mathrm{~V} \end{aligned}$ |
| 2-001 | 2 | $\begin{aligned} & \text { ID Sensor } \\ & \text { Pattern } \end{aligned}$ | * | 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. | $\begin{aligned} & -600 \text { ~-1300 } \\ & 10 \mathrm{~V} / \text { step } \\ & -650 \mathrm{~V} \end{aligned}$ |


| Mode No.  <br> (Class $1,2 \& 3)$  |  |  |  | Function | Settings |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 2-001 | Charge Corona Bias Adjustment |  |  |  |  |
|  | 3 | Total Corona Current | * | Adjusts the current applied to the charge corona wire. <br> Factory use only. | $\begin{aligned} & -900 ~-1500 \\ & 10 \mu \mathrm{~A} / \text { step } \\ & -1200 \mu \mathrm{~A} \end{aligned}$ |
|  | 4 | Image Area | * | Adjusts the voltage applied to the grid plate during copying when auto process control is on . <br> This voltage changes every time auto process control starts up (every time the machine is switched on) | $\begin{aligned} & -600 \sim-1300 \\ & 10 \mathrm{~V} / \text { step } \\ & -1000 \mathrm{~V} \end{aligned}$ |
|  | 5 | OHP Sheet | * | Adjusts the voltage applied to the grid plate when OHP mode is selected. <br> Use this if there is a copy quality problem when making OHPs. <br> Normally there is no need to adjust this. See 2-001-1. | $\begin{aligned} & -600 \text { ~ - } 1300 \\ & 10 \mathrm{~V} \text { step } \\ & -780 \mathrm{~V} \end{aligned}$ |
| 2-101 | Printing Erase Margin |  |  |  |  |
|  | 1 | Leading Edge | * | Adjusts the leading edge erase margin. <br> The specification is $3 \pm 2 \mathrm{~mm}$. See "Replacement and Adjustment - Copy Image Adjustments" for more on SP2-101. | $\begin{aligned} & 0.0 \sim 9.0 \\ & 0.1 \mathrm{~mm} / \mathrm{step} \\ & 2.0 \mathrm{~mm} \end{aligned}$ |
|  |  |  |  |  |  |
|  | 2 | Trailing Edge |  | Adjusts the trailing edge erase margin. | $\begin{aligned} & 0.0 \sim 9.0 \\ & 0.1 \mathrm{~mm} / \mathrm{step} \\ & 2.0 \mathrm{~mm} \end{aligned}$ |
|  |  |  | * | The specification is $3 \pm 2 \mathrm{~mm}$. |  |
|  | 3 | Left | * | Adjusts the left side erase margin. | $\begin{aligned} & 0.0 \sim 9.0 \\ & 0.1 \mathrm{~mm} / \mathrm{step} \\ & 2.0 \mathrm{~mm} \end{aligned}$ |
|  |  |  |  | The specification is $2 \pm 1.5 \mathrm{~mm}$. |  |
|  | 4 | Right | * | Adjusts the right side erase margin. The specification is $2+2.5 /-1.5 \mathrm{~mm}$. | $\begin{aligned} & 0.0 \sim 9.0 \\ & 0.1 \mathrm{~mm} / \mathrm{step} \\ & 2.0 \mathrm{~mm} \end{aligned}$ |
|  |  |  |  |  |  |
| 2-103 | LD Power Adjustment |  |  |  |  |
|  | L | LD1-400dpi | * | Adjusts the power of LD1 for 400 dpi resolution. <br> Do not change the value. | $\begin{aligned} & -127 \sim+127 \\ & 1 / \text { step } \\ & 1=1.1 \mu \mathrm{~W} \\ & +0 \\ & \hline \end{aligned}$ |
|  | 2 | LD1-600dpi |  | Adjusts the power of LD1 for 600 dpi resolution. | $\begin{aligned} & -127 \sim+127 \\ & 1 / \text { step } \\ & 1=1.1 \mu \mathrm{~W} \\ & +0 \\ & \hline \end{aligned}$ |
|  |  |  |  | Do not change the value. |  |
|  | 3 | LD2 - 400dpi | * | Adjusts the power of LD2 for 400 dpi resolution. <br> Do not change the value. | $\begin{aligned} & -127 \sim+127 \\ & 1 / \text { step } \\ & 1=1.1 \mu \mathrm{~W} \\ & +0 \end{aligned}$ |
|  | 4 | LD2 - 600dpi | * | Adjusts the power of LD2 for 600 dpi resolution. | $\begin{aligned} & \hline-127 \sim+127 \\ & 1 / \text { step } \\ & 1=1.1 \mu \mathrm{~W} \\ & +0 \end{aligned}$ |
|  |  |  |  | Do not change the value. |  |
|  | 5 | LD1 Power Adjustment (Start/End) | * | Factory use only. Do not use this SP mode. | $\begin{aligned} & \text { Start } \\ & \text { Stop } \end{aligned}$ |
|  | 6 | LD2 Power Adjustment (Start/End) | * | Factory use only. Do not use this SP mode. | Start Stop |


| Mode No.(Class 1, 2 \& 3) |  |  |  | Function | Settings |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 2-109 | Laser Beam Pitch Adjustment |  |  |  |  |
|  | 1 | 400 dpi | * | Adjusts the laser beam pitch value for 400 dpi resolution. | $\begin{aligned} & 0 \sim 262 \\ & 4 \text { pulses/step } \\ & 144 \end{aligned}$ |
|  |  |  |  | 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 <br> Adjustment - Laser Beam Pitch Adjustment" for details. |  |
|  | 2 | 600 dpi | * | Adjusts the laser beam pitch value for 600 dpi resolution. | $\begin{aligned} & \hline 0 \sim 284 \\ & 4 \text { pulses/step } \\ & 168 \end{aligned}$ |
|  |  |  |  | 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. <br> After inputting a value for SP2-109-2, this SP must be used. | Start |
|  | 5 | Auto Pitch Adjustment Interval | * | Inputs the interval for the automatic laser beam pitch adjustment | $\begin{aligned} & 0 \sim 65535 \\ & 1 / \text { step } \\ & 1000 \text { times } \end{aligned}$ |
|  |  |  |  | When the number of times that the resolution been changed reaches this value, the laser unit position is automatically corrected. |  |
|  | 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- <br> 109-7. <br> After replacing the LD unit, this SP mode <br> must be done. |  |
| 2-110 | Test Mode dpi |  |  |  |  |
|  |  |  |  | Designer use only. Do not change this value. | $\begin{aligned} & \text { 0: } 400 \mathrm{dpi} \\ & 1: 600 \mathrm{dpi} \\ & 2: 15.4 \times 16 \\ & 3: 16 \times 15.4 \end{aligned}$ |




| Mode No.(Class 1, 2 \& 3) |  |  |  | Function | Settings |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 2-506 | Cleaning Interval - Multiple Copy |  |  |  |  |
|  | 1 | Operation | * | Selects whether multiple copy jobs are stopped at regular intervals for the following purposes. <br> 1. Stop and turn the drum motor in reverse to clean the cleaning blade edge <br> 2. Make an ID sensor pattern to correct the toner density control. <br> The interval depends on SP2-506-2. <br> Use if the drum gets dirty or images get too pale or too dark during a long job. | $\begin{aligned} & 1: \text { No } \\ & 2: \text { Yes } \end{aligned}$ |
|  | 2 | Interval | * | Selects the interval at which multi copy jobs are stopped. | $\begin{aligned} & \hline 1 \sim 100 \\ & 1 \text { minute/step } \\ & 15 \text { minutes } \end{aligned}$ |
| 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 2.5 V . After finishing this, the TD sensor output voltage is displayed. | Start |
|  |  |  | Use this mode only after changing the TD sensor or the developer. |  |
| 2-803 | Corona Wire Cleaner On |  |  |  |  |
|  |  |  |  |  | Turns on the corona wire cleaner manually. | Start |
|  |  |  |  | When copy density across the paper is uneven at EM, clean the wire with this mode. |  |  |
| 2-804 | Corona Wire Cleaner Operation Setting |  |  |  |  |  |
|  | 1 | On/Off |  | Selects whether corona wire cleaner operation is done. | 1:Operate (yes) <br> 0:don't operate (No) |  |
|  |  |  |  | When 'Operate' is selected, the period is set with SP2-804-2. |  |  |
|  |  | Operation Interval | * | Selects the operation interval of the corona wire cleaner. | $\begin{aligned} & 100 \sim 10 \mathrm{k} \\ & 100 \text { print/step } \\ & \mathbf{5} \text { k } \end{aligned}$ |  |
| 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. | Start |  |
|  |  |  |  | This SP mode is useful for finding whether the SBICU or the SBU is defective. If the printout is not OK, the SBICU is defective. |  |  |
|  | 3 | Printing Test Pattern |  | Prints the printer test patterns. See section 4.2.3. for how to print test patterns. <br> Example: 10. Trimming Area <br> This SP mode is useful for finding whether the LDDR or the SBICU is defective. If the printout is not $O K$, the LDDR is defective. | Start |  |
| 2-906 | Vcont Manual Setting |  |  |  |  |  |
|  |  |  | * | Factory use only. | 10 V |  |




| Mode No.(Class 1, 2 \& 3) |  |  |  | Function | Settings |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 2-265 | Toner Pump Adjustment |  |  |  |  |
|  | 6 | Aggregate of Toner Waste | * | Factory use only |  |
| 2-966 | Periodic Auto Process Control |  |  |  |  |
|  |  |  |  | Select whether process initial setting is started at periodical interval if the following conditions exist. | $\begin{aligned} & \text { OFF } \\ & \text { ON } \end{aligned}$ |
|  |  |  |  | 1. 24 hours or more have been passed since the last Process Control Initial Setting <br> 2. The copy job is finished. |  |

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| Mode No.(Class 1, 2 \& 3) |  |  |  | Function | Settings |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 4-008 | Scanner Sub Scan Magnification |  |  |  |  |
|  |  |  |  | Adjusts the magnification in the sub scan direction for scanning. <br> If this value is changed, the scanner motor speed is changed. | $\begin{aligned} & -0.9 ~+0.9 \\ & 0.1 \% / \text { step } \\ & +0.0 \% \end{aligned}$ |
|  |  |  | Use the "•"key to toggle from + to - and Clear/Stop key to toggle from - to + before entering the value. |  |
| 4-010 | Scanner Leading Edge Registration |  |  |  |  |
|  |  |  |  |  | Adjusts the leading edge registration for scanning. | $\begin{aligned} & -9.0 \sim+9.0 \\ & 0.1 \mathrm{~mm} / \mathrm{step} \\ & +0.0 \mathrm{~mm} \end{aligned}$ |
|  |  |  | (-): The image moves in the direction of the leading edge <br> Use the " 0 " key to toggle from + to - and Clear/Stop key to toggle from - to + before entering the value. |  |  |  |
| 4-011 | Scanner Side-to Side Registration |  |  |  |  |  |
|  |  |  | , | Adjusts the side-to-side registration for scanning. | $\begin{aligned} & -6.0 \sim+6.0 \\ & 0.1 \mathrm{~mm} / \mathrm{step} \\ & \mathbf{+} \mathbf{0 . 0 ~ m m} \end{aligned}$ |  |
|  |  |  | (-): The image disappears at the left side. (+): The image appears at the left side. Use the " $\bullet$ " key to toggle from + to - and Clear/Stop key to toggle from - to + before entering the value. |  |  |  |
| 4-012 | Scanner Erase Margin |  |  |  |  |  |
|  | 1 | Leading Edge |  | * | Adjusts the leading edge erase margin for scanning. | $\begin{aligned} & 0.0 \sim 0.9 \\ & 0.1 \mathrm{~mm} / \text { step } \\ & 0.5 \mathrm{~mm} \end{aligned}$ |
|  |  |  | Do not adjust this unless the user wishes to have a scanner margin that is greater than the printer margin. |  |  |  |
|  | 2 | Trailing Edge | * | Adjusts the trailing edge erase margin for scanning. <br> See the comment for SP 4-012-1. | $\begin{aligned} & \hline 0.0 \sim 0.9 \\ & 0.1 \mathrm{~mm} / \text { step } \\ & 0.5 \mathrm{~mm} \end{aligned}$ |  |
|  | 3 | Left | * | Adjusts the left side erase margin for scanning. | $\begin{aligned} & 0.0 \sim 0.9 \\ & 0.1 \mathrm{~mm} / \text { step } \end{aligned}$ |  |
|  |  |  |  | See the comment for SP 4-012-1. | 0.5 mm |  |
|  | 4 | Right | * | Adjusts the right side erase margin for scanning. | $\begin{aligned} & 0.0 \sim 0.9 \\ & 0.1 \mathrm{~mm} / \text { step } \\ & 0.5 \mathrm{~mm} \end{aligned}$ |  |
|  |  |  |  | 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 <br> 1: Start |  |


| 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. <br> Bit 0: Width sensor 1 <br> Bit 1: Width sensor 2 <br> Bit 2: Width sensor 3 <br> Bit 3: Length sensor 1 <br> Bit 4: Length sensor 2 <br> See "Detailed Section Descriptions Original Size Detection in Platen Mode" for more details. | $00000000$ <br> 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. <br> If "A5 length/51/2" x 81/2" is selected, paper sizes that cannot be detected by the APS sensors are regarded as A5 lengthwise or 51/2" x 81/2". <br> If "Not detected" is selected, "Cannot detect original size" will be displayed. |  | $\begin{aligned} & \text { 0: Not } \\ & \text { detected } \\ & \text { 1: A5 length / } \\ & 51 / 2^{\prime \prime} \times 81 / 2^{\prime \prime} \end{aligned}$ |
| 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. <br> This SP mode is for factory use only. Do not use this SP mode. | Start |
| 4-901 | SBU Adjustment |  |  |  |  |
|  | 1 | $\begin{aligned} & \text { E/O } \\ & \text { Adjustment - } \\ & \text { E ch } \end{aligned}$ |  | Checks the difference value of the black level for the EVEN channel after adjusting the black level at power-up. <br> This SP mode is for designer use only. Do not use this SP mode. | $\begin{aligned} & 0 \sim 255 \\ & 1 / \text { step } \\ & 147 \end{aligned}$ |
|  | 2 | $\begin{aligned} & \text { E/O } \\ & \text { Adjustment - } \\ & \text { O ch } \end{aligned}$ | * | Checks the difference value of the black level for the ODD channel after adjusting the black level at power-up. <br> This SP mode is for designer use only. Do not use this SP mode. | $\begin{aligned} & 0 \text { ~255 } \\ & 1 / \text { step } \\ & 127 \end{aligned}$ |
|  | 3 | Bk Adjustment - E ch | * | Checks the value of the black level for the EVEN channel after adjusting the black level at power-up. <br> This SP mode is for designer use only. Do not use this SP mode. | $\begin{aligned} & 0 \sim 255 \\ & 1 / \text { step } \\ & 127 \end{aligned}$ |
|  | 4 | Bk Adjustment <br> - O ch | * | Checks the value of the black level for the ODD channel after adjusting the black level at power-up. <br> This SP mode is for designer use only. Do not use this SP mode. | $\begin{aligned} & 0 \sim 255 \\ & 1 / \text { step } \\ & 145 \end{aligned}$ |


| Mode No.(Class 1, 2 \& 3) |  |  |  | Function | Settings |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 4-901 | SBU Adjustment |  |  |  |  |
| 4 | 5 | Digital Gain Adjustment E ch | * | Checks the AGC gain value of the white level for the EVEN channel after adjusting the white level at power-up. <br> This SP mode is for designer use only. Do not use this SP mode. | $\begin{aligned} & 0 \sim 1 \\ & 1 / \text { step } \\ & 0 \end{aligned}$ |
|  | 6 | Digital Gain Adjustment Och | * | Checks the AGC gain value of the white level for the ODD channel after adjusting the white level at power-up. <br> This SP mode is for designer use only. Do not use this SP mode. | $0 \sim 1$ <br> 1/step <br> 0 |
|  | 7 | Analog Gain Adjustment Ech | * | Checks the AGC gain value of the white level for the EVEN channel after adjusting the white level at power-up. <br> This SP mode is for designer use only. Do not use this SP mode. | $\begin{aligned} & 0 \sim 255 \\ & 1 / \text { step } \\ & 46 \end{aligned}$ |
|  | 8 | Analog Gain Adjustment Och | * | Checks the AGC gain value of the white level for the ODD channel after adjusting the white level at power-up. <br> This SP mode is for designer use only. Do not use this SP mode. | $\begin{aligned} & 0 \sim 255 \\ & 1 / \text { step } \\ & 46 \end{aligned}$ |
|  | 9 | Standard White Level Adjustment | * | Checks the value of the standard white level after adjusting the white level. <br> This SP mode is for factory use only. Do not use this SP mode. | $\begin{aligned} & 0 \sim 255 \\ & \text { ~ step } \\ & 110 \end{aligned}$ |
|  | 10 | A/D Standard Voltage in AE Mode | * | Adjusts the upper limit voltage for $A / D$ conversion in ADS mode. <br> This SP mode is for designer use only. Do not use this SP mode. | $\begin{aligned} & 0 \sim 255 \\ & 1 / \text { step } \\ & 191 \end{aligned}$ |
|  | 11 | Image Data Path Setting |  | This SP mode is for designer use only. Do not change the value. | 0 |
|  | 12 | Gain Adjustment - E ch | * | Checks the AGC gain value of the white level for the EVEN channel after adjusting the white level in the factory. <br> This SP mode is for factory use only. Do not use this SP mode. | $\begin{aligned} & \text { INIT_GAIN(E) } \\ & =\mathrm{b} 7 ; 023 \end{aligned}$ |
|  | 13 | Gain Adjustment Och | * | Checks the AGC gain value of the white level for the ODD channel after adjusting the white level in the factory. <br> This SP mode is for factory use only. Do not use this SP mode. | $\begin{aligned} & \text { INIT_GAINO } \\ & =\mathrm{b} 7 ; 023 \end{aligned}$ |
|  | 14 | Standard <br> White Level <br> Adjustment at Factory | * | Checks the value of the standard white level in the factory. <br> This SP mode is for factory use only. Do not use this SP mode. | $\begin{aligned} & \text { INIT_REF = } \\ & 110 \end{aligned}$ |
|  | 15 | Overflow Flag |  | Checks the overflow flag data during the automatic scanner adjustment. <br> This SP mode is for designer use only. | $\begin{aligned} & \text { OFO/SGDO } \\ & =0000 \\ & \text { OFE/SGDO } \\ & =0000 \end{aligned}$ |


|  <br>  <br> Mode No. |  |  | Function |  | Settings |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 4-901 | SBU Adjustment |  |  |  |  |
|  | 16 | Time Out Flag |  | Checks the time out flag data during the automatic scanner adjustment. | $\begin{aligned} & \text { TIME } \\ & \text { OUT/SGDO } \\ & =\mathbf{0 0 0 0} \end{aligned}$ |
|  |  |  |  | This SP mode is for designer use only. |  |
|  | 17 | Error Flag |  | Checks the error flag data during the automatic scanner adjustment. | $\begin{aligned} & \text { GAIN/OET = } \\ & 000 \\ & \text { REF/OT=00 } \end{aligned}$ |
|  |  |  |  | This SP mode is for designer use only. |  |
|  | 18 | White Level Data |  | Checks either the maximum or minimum white shading data. | 0: Maximum <br> 1: Minimum |
|  |  |  |  | This SP mode is for designer use only. |  |
| 4-903 | Filter Setting |  |  |  |  |
|  | 2 | Filter Mode Setting |  | This SP mode is designer use only. | $0 \sim$0 |
|  |  |  |  | Do not change the value. |  |
|  | 5 | Full Size Mode |  | Selects whether the copy is always in full size mode even if the magnification ratio has been changed. | 0: Normal operation <br> 1: Always full size mode |
|  |  |  |  | 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. |  |
|  | 7 | Image Shift in Magnification Mode |  | Adjusts the pixel shift amount in the main scan direction in magnification mode. <br> This SP mode is for designer use only. | $\begin{array}{\|l} \hline 0 \sim 5120 \\ 1 / \text { step } \\ 0 \end{array}$ |
|  | 11 | $\begin{aligned} & \text { Filter Level } \\ & \text { (25\% ~ 64\%) } \end{aligned}$ |  | Selects the MTF filter coefficient in the main scan direction for $25 \% \sim 64 \%$ reduction for text mode. <br> 0:Weak 6:Strong <br> This SP is ignored unless the user selects 'SP Mode Changed' in UP mode. | $\begin{aligned} & 0 \sim 6 \\ & 1 / \text { step } \\ & \mathbf{1} \end{aligned}$ |
|  | 12 | $\begin{aligned} & \hline \text { Filter Level } \\ & (65 \% \sim 154 \%) \end{aligned}$ |  | Selects the MTF filter coefficient in the main scan direction for $65 \%$ ~ $154 \%$ magnification for text mode. <br> 0:Weak 6:Strong <br> This SP is ignored unless the user selects 'SP Mode Changed' in UP mode. | $\begin{array}{\|l\|} \hline 0 \sim 6 \\ 1 / \text { step } \\ 2 \end{array}$ |
|  | 13 | $\begin{aligned} & \hline \text { Filter Level } \\ & (155 \% \sim 256 \%) \end{aligned}$ |  | Selects the MTF filter coefficient in the main scan direction for $155 \%$ ~ $256 \%$ <br> enlargement for text mode. <br> 0:Weak 6:Strong <br> This SP is ignored unless the user selects 'SP Mode Changed' in UP mode. | $\begin{aligned} & \hline 0 \sim 6 \\ & 1 / \text { step } \\ & 5 \end{aligned}$ |
|  | 14 | $\begin{aligned} & \text { Filter Level } \\ & (257 \% \sim 400 \%) \end{aligned}$ |  | Selects the MTF filter coefficient in the main scan direction for $257 \%$ ~ 400\% <br> enlargement for text mode. <br> 0:Weak 6:Strong <br> This SP is ignored unless the user selects 'SP Mode Changed' in UP mode. | $\begin{aligned} & \hline 0 \sim 6 \\ & 1 / \text { step } \\ & 6 \end{aligned}$ |


| Mode No.(Class 1, $2 \& 3$ ) |  |  |  | Function | Settings |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 4-903 | Filter Setting |  |  |  |  |
|  | 15 | MTF Filter in Photo Mode |  | Selects the MTF filter coefficient for photo mode, if MTF is enabled for this mode with SP 4-904-3. <br> 0:Weak 4:Strong <br> This SP is ignored unless the user selects 'SP Mode Changed' in UP mode. | $\begin{aligned} & 0 \sim 4 \\ & 1 / \text { step } \\ & 2 \end{aligned}$ |
|  | 16 | Smoothing Filter in Photo mode | * | Selects the smoothing filter coefficient for photo mode. <br> 0:Weak 7:Strong <br> This SP is ignored unless the user selects 'SP Mode Changed' in UP mode. | $\begin{aligned} & 0 \sim 7 \\ & 1 / \text { step } \\ & 1 \end{aligned}$ |
|  | 17 | Filter Level Text/Photo Mode |  | Selects the MTF filter coefficient for text areas in text/photo mode. <br> 0 :Use the filter coefficient and strength level for letter mode. <br> 1:Weak 5:Strong <br> This SP is ignored unless the user selects 'SP Mode Changed' in UP mode. | $\begin{aligned} & 0 \sim 5 \\ & 1 / \text { step } \\ & 0 \end{aligned}$ |
|  | 18 | Filter Level in Pale Mode |  | Selects the table of the MTF filter coefficient for pale original mode <br> $0:$ Use the filter coefficient level for text mode. <br> 1:Weak 5:Strong <br> This SP is ignored unless the user selects 'SP Mode Changed' in UP mode. | $\begin{aligned} & 0 \sim 5 \\ & 1 / \text { step } \\ & 0 \end{aligned}$ |
|  | 19 | Level in Generation Copy | * | Selects the MTF filter coefficient for generation copy mode $0:$ Use the filter coefficient level for text mode. <br> 1:Weak 5:Strong <br> This SP is ignored unless the user selects 'SP Mode Changed' in UP mode. | $\begin{aligned} & 0 \sim 5 \\ & 1 / \text { step } \\ & 3 \end{aligned}$ |
|  | 20 | Filter Strength ( $25 \%$ ~ 64\%) | * | Selects the MTF strength in the main scan direction for $25 \%$ ~ $64 \%$ reduction for text mode. <br> This SP is ignored unless the user selects 'SP Mode Changed' in UP mode. | $\begin{aligned} & 0: \times 0.25 \\ & 1: \times 0.5 \\ & 2: \times 1 \\ & 3: \times 2 \\ & 4: \times 4 \end{aligned}$ |
|  | 21 | Filter Strength ( $65 \%$ ~ $154 \%$ ) | * | Selects the MTF strength in the main scan direction for $65 \% \sim 154 \%$ magnification for text mode. <br> This SP is ignored unless the user selects 'SP Mode Changed' in UP mode. | $\begin{aligned} & 0: \times 0.25 \\ & 1: \times 0.5 \\ & 2: \times 1 \\ & 3: \times 2 \\ & 4: \times 4 \end{aligned}$ |
|  | 22 | Filter Strength (155\% ~ 256\%) | * | Selects the MTF strength in the main scan direction for $155 \%$ ~ $256 \%$ enlargement for text mode. <br> This SP is ignored unless the user selects 'SP Mode Changed' in UP mode. | $\begin{aligned} & 0: \times 0.25 \\ & 1: \times 0.5 \\ & 2: \times 1 \\ & 3: \times 2 \\ & 4: \times 4 \end{aligned}$ |


| Mode No.(Class $1,2 \& 3$ ) |  |  |  | Function | Settings |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 4-903 | Filter Setting |  |  |  |  |
|  | 23 | Filter Strength ( $257 \%$ ~ 400\%) | * Selects the MTF strength in the main scan direction for $257 \%$ ~ $400 \%$ enlargement for text mode. <br> This SP is ignored unless the user selects 'SP Mode Changed' in UP mode. |  | $\begin{aligned} & 0: \times 0.25 \\ & 1: \times 0.5 \\ & 2: \times 1 \\ & 3: \times 2 \\ & 4: \times 4 \end{aligned}$ |
|  | 28 | Independent Dot Erase Text Mode |  | Selects the independent dot erase level for <br> text mode. <br> Refer to "Detailed Section Description - <br> Independent Dot Erase" for details. | $\begin{aligned} & 0 \sim 15 \\ & 1 / \text { step } \\ & 2 \end{aligned}$ |
|  | 30 | Independent Dot Erase Text/Photo Mode |  | Selects the independent dot erase level for text/photo mode. <br> Refer to "Detailed Sectional Description Independent Dot Erase" for details. | $\begin{aligned} & 0 \sim 15 \\ & 1 / \text { step } \\ & 9 \end{aligned}$ |
|  | 31 | Independent Dot Erase Pale Mode |  | Selects the independent dot erase level for pale mode. <br> Refer to "Detailed Section Description Independent Dot Erase" for details. | $\begin{aligned} & 0 \sim 15 \\ & 1 / \text { step } \\ & \mathbf{1} \end{aligned}$ |
|  | 32 | Independent Dot Erase Generation Copy Mode |  | Selects the independent dot erase level for generation copy mode. <br> Refer to "Detailed Sectional Description Independent Dot Erase" for details. | $\begin{aligned} & 0 \sim 15 \\ & 1 / \text { step } \\ & \mathbf{1} \end{aligned}$ |
|  | 33 | Scanner Gamma Thresh Level Text | * | Adjust the threshold level for the background erase function in letter mode. <br> A larger value reduces dirty background. This SP is ignored unless the user selects 'SP Mode Changed' in UP mode. | $\begin{aligned} & 0 \sim 255 \\ & 1 / \text { step } \\ & 15 \end{aligned}$ |
|  | 34 | Scanner Gamma Thresh Level Text/Photo |  | Adjust the threshold level for the background erase function in text/photo mode. <br> A larger value reduces dirty background. This SP is ignored unless the user selects 'SP Mode Changed' in UP mode. | $\begin{aligned} & 0 \sim 255 \\ & 1 / \text { step } \\ & 15 \end{aligned}$ |
|  | 35 | Scanner Gamma Thresh Level Generation Copy |  | *Adjust the threshold level for background <br> erase in generation copy mode. | $\begin{array}{\|l} \hline 0 \sim 255 \\ 1 / \text { step } \\ 15 \end{array}$ |
|  | 41 | MTF Filter Level $\text { ( } 25 \% \text { ~ 64\%) }$ | * Selects the MTF filter coefficient in the sub scan direction for $25 \% \sim 64 \%$ reduction for text mode. <br> 0:No filter, 1:Weak 8:Strong <br> This SP is ignored unless the user selects 'SP Mode Changed' in UP mode. |  | $\begin{aligned} & \hline 0 \sim 8 \\ & 1 / \text { step } \\ & 3 \end{aligned}$ |
|  | 42 | MTF Filter Level (65\% ~ 154\%) |  | Selects the MTF filter coefficient in the sub scan direction for $65 \%$ ~ $154 \%$ magnification for text mode. 0:No filter, 1:Weak 8:Strong This SP is ignored unless the user selects 'SP Mode Changed' in UP mode. | $\begin{aligned} & 0 \sim 8 \\ & 1 / \text { step } \\ & 4 \end{aligned}$ |


| Mode No.(Class 1, $2 \& 3$ ) |  |  |  | Function | Settings |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 4-903 | Filter Setting |  |  |  |  |
|  | 43 | MTF Filter Level ( $155 \%$ ~ 256\%) |  | Selects the MTF filter coefficient in the sub scan direction for $155 \%$ ~ $256 \%$ enlargement for text mode. <br> 0 :No filter <br> 1:Weak 8:Strong <br> This SP is ignored unless the user selects 'SP Mode Changed' in UP mode. | $\begin{aligned} & 0 \sim 11 \\ & 1 / \text { step } \\ & 3 \end{aligned}$ |
|  | 44 | MTF Filter Level (257\% ~ 400\%) |  | Selects the MTF filter coefficient in the sub scan direction for $257 \%$ ~ 400\% <br> enlargement for text mode. <br> $0:$ No filter, $1:$ Weak $8: S$ trong <br> This SP is ignored unless the user selects 'SP Mode Changed' in UP mode. | $\begin{aligned} & 0 \sim 8 \\ & 1 / \text { step } \\ & 8 \end{aligned}$ |
|  | 47 | Filter Type in Photo Area (Text/Photo mode) |  | Selects the MTF or smoothing filter coefficient for photo areas in text/photo mode. <br> 0:MTF Filter - Weak <br> 1:MTF Filter - Medium <br> 2:MTF Filter - Strong <br> 3:No filter <br> 4:Smoothing Filter - Weak <br> 5:Smoothing Filter - Medium <br> 4:Smoothing Filter - Strong <br> This SP is ignored unless the user selects 'SP Mode Changed' in UP mode. | $\begin{aligned} & 0 \sim 6 \\ & 1 / \text { step } \\ & 2 \end{aligned}$ |
|  | 50 | MTF Filter Strength (25\% ~ 64\%) | * | Selects the MTF strength in the sub scan direction for $25 \%$ ~ $64 \%$ reduction in text mode. <br> This SP is ignored unless the user selects 'SP Mode Changed' in UP mode. | $\begin{aligned} & 0: \times 0.25 \\ & 1: \times 0.5 \\ & 2: \times 1 \\ & 3: \times 2 \\ & 4: \times 4 \end{aligned}$ |
|  | 51 | MTF Filter Strength ( $65 \%$ ~ 154\%) | * | Selects the MTF strength in the sub scan direction for $65 \% \sim 154 \%$ magnification in text mode. <br> This SP is ignored unless the user selects 'SP Mode Changed' in UP mode. | $\begin{aligned} & 0: \times 0.25 \\ & 1: \times 0.5 \\ & 2: \times 1 \\ & 3: \times 2 \\ & 4: \times 4 \end{aligned}$ |
|  | 52 | MTF Filter Strength (155\% ~ 256\%) |  | Selects the MTF strength in the sub scan direction for $155 \%$ ~ $256 \%$ enlargement in text mode. <br> This SP is ignored unless the user selects 'SP Mode Changed' in UP mode. | $\begin{aligned} & 0: \times 0.25 \\ & 1: \times 0.5 \\ & 2: \times 1 \\ & 3: \times 2 \\ & 4: \times 4 \end{aligned}$ |
|  | 53 | MTF Filter Strength (257\% ~ 400\%) |  | Selects the MTF strength in the sub scan direction for $257 \%$ ~ $400 \%$ enlargement in text mode. <br> This SP is ignored unless the user selects 'SP Mode Changed' in UP mode. | $\begin{aligned} & 0: \times 0.25 \\ & 1: \times 0.5 \\ & 2: \times 1 \\ & 3: \times 2 \\ & 4: \times 4 \end{aligned}$ |


| Mode No.(Class $1,2 \& 3)$ |  |  |  | Function | Settings |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 4-904 | IPU Setting -1 |  |  |  |  |
|  | 1 | Laser Pulse Positioning in Text and Text/Photo |  | Selects whether or not laser pulse positioning control is used in text and text/photo modes <br> Do not change the value. | $\begin{aligned} & \text { 0: Off } \\ & \text { 1: On } \end{aligned}$ |
|  | 2 | Dither Matrix Selection |  | Selects the dither matrix for photo mode when SP4-904-24 is " 2 ". <br> If " 0 " is selected, the image will be sharper. <br> This SP is ignored unless the user selects 'SP Mode Changed' in UP mode. | $\begin{aligned} & 0: 4 \times 4 \\ & 1: 6 \times 6 \end{aligned}$ |
|  | 3 | Filter Type Selection Photo Mode |  | Selects the filter type for photo mode. Coefficients used: 0: SP4-903-15, 1: SP4-903-16 If " 0 " is selected, the image will be sharper. However, dot screen areas will be faint. <br> This SP is ignored unless the user selects 'SP Mode Changed' in UP mode. | $\begin{aligned} & \text { 0: MTF } \\ & \text { 1: } \text { Smoothing } \end{aligned}$ |
|  | 6 | Generation Mode |  | Selects the line width correction type for generation copy mode. <br> In copied original mode, lines may bulge in the main scan direction. Adjust this SP mode until the result is satisfactory. <br> This SP is ignored unless the user selects 'SP Mode Changed' in UP mode. | 0: Not corrected <br> 1: Thin line-1 <br> 2: Thin line2 <br> 3: Thick line |
|  | 7 | Gradation Process in Text Area | * Selects the process used for text areas in text/photo mode. <br> 0: 1-dot grayscale <br> 1: 1-dot - 9 level error diffusion <br> If " 1 " is selected, the image becomes sharper in focus. However, gradation will be reduced. <br> This SP is ignored unless the user selects 'SP Mode Changed' in UP mode. |  |  |
|  | 8 | Gradation Process in Photo Area |  | Selects the process used for photo areas in text/photo mode. <br> 0 : 1-dot grayscale <br> 1: 1-dot-9 level error diffusion <br> 2: 2-dot grayscale <br> 3: 2-dot-17 level error diffusion |  |
|  |  |  |  | As the setting increases from 1 to 3, the image becomes sharper in focus. However, gradation will be reduced. This SP is ignored unless the user selects 'SP Mode Changed' in UP mode. |  |
|  | 9 | $\begin{aligned} & \text { Image Data } \\ & \text { Path } \end{aligned}$ | Selects one of the following video data outputs, which will be used for printing. <br> 0 : After image scanning <br> 1: After image data form application <br> 2: After gradation processing <br> 3: Test pattern <br> 4: Normal video processing <br> Do not change the value. |  |  |
|  |  |  |  |  |  |



| Mode No.(Class $1,2 \& 3$ ) |  |  |  | Function | Settings |
| :---: | :---: | :---: | :---: | :---: | :---: |
| $\begin{aligned} & \text { (Class } \\ & \hline 4-908 \end{aligned}$ | Text/Photo Separation Method |  |  |  |  |
|  |  |  |  | Select the text/photo separation processing type during the auto text/photo separation stage. <br> This SP is ignored unless the user selects 'SP Mode Changed' in UP mode. | 0 : Letter and photo filters <br> 1: Text filter only <br> 2: Photo filter only |
| 4-909 |  |  |  |  |  |
|  | IPU Setting - 2  <br> 1 $\begin{array}{l}\text { Laser Pulse } \\ \text { Position } \\ \text { Threshold }\end{array}$ |  |  | Decides the threshold level for selecting the type of laser pulse width modulation that is used <br> Do not change the value. | $\begin{aligned} & 0 \sim 255 \\ & 1 / \text { step } \\ & 32 \end{aligned}$ |
|  |  |  |  |  |  |
|  | 2 | Thin Line Level 1 White |  | Decides the threshold value for a pixel to be white when line width correction type 1 is performed. <br> Do not change the value. | $\begin{aligned} & \hline 0 \sim 15 \\ & 1 / \text { step } \\ & 3 \end{aligned}$ |
|  |  |  |  |  |  |
|  | 3 | Thin Line Level 1 - Black |  | Decides the threshold value for a pixel to be black when line width correction type 1 is performed. | $\begin{aligned} & 0 \sim 15 \\ & 1 / \text { step } \\ & 13 \end{aligned}$ |
|  |  |  |  | Do not change the value. |  |
|  | 4 | Thin Line Level 2 White |  | Decides the threshold value for a pixel to be white when line width correction type 2 is performed. | $\begin{aligned} & 0 \sim 15 \\ & 1 / \text { step } \\ & 4 \end{aligned}$ |
|  |  |  |  | Do not change the value. |  |
|  | 5 | Thin Line Level 2 - Black |  | Decides the threshold value for a pixel to be black when line width correction type 2 is performed. | $\begin{aligned} & 0 \sim 15 \\ & 1 / \text { step } \\ & \mathbf{1 2} \end{aligned}$ |
|  |  |  |  | Do not change the value. |  |
|  | 6 | Error Diffusion Table |  | Selects the gamma table for error diffusion. <br> Do not change the value. | 0: Gamma table 0 <br> 1: Gamma table 1 |
|  | 7 | $\begin{aligned} & \hline \text { Edge } \\ & \text { Detection } 1 \end{aligned}$ |  | Decides the threshold value for detecting an edge. | $\begin{aligned} & 0 \sim 255 \\ & 1 / \text { step } \\ & 128 \end{aligned}$ |
|  |  |  |  | Do not change the value. |  |
|  | 8 | $\begin{aligned} & \text { Edge } \\ & \text { Detection } 2 \end{aligned}$ |  | Decides the threshold value for detecting an edge. | $\begin{aligned} & \hline 0 \sim 255 \\ & 1 / \text { step } \\ & 128 \end{aligned}$ |
|  |  |  |  | Do not change the value. |  |
|  | 19 | Image Data Path - <br> Application | Selects one of the following video data outputs, which will be used for application. <br> 0 : After image scanning <br> 1: After image processing <br> 2: After MSU <br> 3: Normal operation |  |  |
|  |  |  |  | Do not change the value. |  |


| Mode No.(Class $1,2 \& 3)$ |  |  | Function | Settings |
| :---: | :---: | :---: | :---: | :---: |
| 4-909 | IPU Setting - 2 |  |  |  |
|  | 20 | Image Data Path - Printing | Selects one of the following video data outputs, which will be used for printing. <br> 0 : After image processing <br> 1: After MSU <br> 2: From application <br> 3: Normal operation |  |
|  |  |  | Do not change the value. |  |
| 4-910 | Data Compression |  |  |  |
|  | 1 | Data Compression | Designer use only <br> Do not change the value. | $\begin{aligned} & \hline 0: \text { ON } \\ & 1: \text { OFF } \end{aligned}$ |
|  |  |  |  |  |
|  | 2 | Data Compression Threshold | Designer use only | $\begin{aligned} & 0 \sim 255 \\ & 1 / \text { step } \\ & 8 \end{aligned}$ |
|  |  |  |  |  |
|  | 3 | ABS Core | Designer use only <br> Do not change the value. | $\begin{aligned} & \text { 0: ON } \\ & \text { 1:OFF } \end{aligned}$ |
|  |  |  |  |  |
| 4-911 | HDD |  |  |  |
|  | 1 | HDD Media Check | Checks for bad sectors on the hard disk that develop during machine use. This takes 4 minutes. | Start |
|  |  |  | 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. <br> 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. |  |
|  | 2 | HDD Formatting | Formats the hard disk. This takes 4 minutes. <br> 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. <br> 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. <br> 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 |
|  | 8 | HDD Model Name Display | Displays the model name of the HDD. <br> If the HDD is not installed or the HDD connector is not connected, SC360 will be displayed. However, the user can make single copies. |  |


| Mode No. <br> (Class $1,2 \& 3$ ) |  |  |  | Function | Settings |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 4-912 | Text/Photo Separation Setting |  |  |  |  |
|  | 1 | MTF Filter (Sub Scan) Edge |  | Selects the strength of the MTF filter (sub scan) for edge detection in text/photo separation processing. <br> This SP is ignored unless the user selects 'SP Mode Changed' in UP mode. | $\begin{aligned} & 0 \sim 7 \\ & 1 / \text { step } \\ & 0 \end{aligned}$ |
|  | 2 | MTF Filter (Main Scan) Edge | * | Selects the strength of the MTF filter (main scan) for edge detection in text/photo separation processing. <br> This SP is ignored unless the user selects 'SP Mode Changed' in UP mode. | $\begin{aligned} & 0 \sim 7 \\ & 1 / \text { step } \\ & 0 \end{aligned}$ |
|  | 3 | White <br> Threshold Level - Edge Detection | * | Selects the threshold level for white for edge detection in letter/photo separation processing. <br> This SP is ignored unless the user selects 'SP Mode Changed' in UP mode. | $\begin{aligned} & 0 \sim 255 \\ & 1 / \text { step } \\ & 16 \end{aligned}$ |
|  | 4 | Gray <br> Threshold Level - Edge Detection | * | Selects the threshold level for gray for edge detection in letter/photo separation processing. <br> This SP is ignored unless the user selects 'SP Mode Changed' in UP mode. | $\begin{aligned} & \hline 0 \sim 255 \\ & 1 / \text { step } \\ & 32 \end{aligned}$ |
|  | 5 | Black <br> Threshold Level - Edge Detection | * | Selects the threshold level for black for edge detection in letter/photo separation processing. <br> This SP is ignored unless the user selects 'SP Mode Changed' in UP mode. | $\begin{aligned} & 0 \sim 255 \\ & 1 / \text { step } \\ & 120 \end{aligned}$ |
|  | 6 | Peak Thresh Level Change | * | This SP mode is for designer use only. | $\begin{aligned} & \hline 0 \sim 255 \\ & 1 / \text { step } \\ & 80 \\ & \hline \end{aligned}$ |
|  | 7 | Bottom Thresh Level Change | * | This SP mode is for designer use only. | $\begin{aligned} & 0 \sim 255 \\ & 1 / \text { step } \\ & 155 \end{aligned}$ |
|  | 8 | H. Max. Thresh Level (Sub Scan) Half Tone | * | This SP mode is for designer use only. | $\begin{aligned} & 0 \sim 255 \\ & 1 / \text { step } \\ & 16 \end{aligned}$ |
|  | 9 | L. Max Thresh Level (Sub Scan) Half Tone | * | This SP mode is for designer use only. | $\begin{aligned} & 0 \sim 255 \\ & 1 / \text { step } \\ & 30 \end{aligned}$ |
|  | 10 | H. Min. Thresh Level (Sub Scan) - Half Tone | * | This SP mode is for designer use only. | $\begin{aligned} & 0 \sim 255 \\ & 1 / \text { step } \\ & 40 \end{aligned}$ |
|  | 11 | $\begin{array}{\|l} \hline \text { L. Min. Thresh } \\ \text { Level (Sub } \\ \text { Scan) - Half } \\ \text { Tone } \\ \hline \end{array}$ | * | This SP mode is for designer use only. | $\begin{aligned} & 0 \sim 255 \\ & 1 / \text { step } \\ & 20 \end{aligned}$ |
|  | 12 | H. Max. Thresh Level (Main Scan) Half Tone | * | This SP mode is for designer use only. | $\begin{aligned} & 0 \sim 255 \\ & 1 / \text { step } \\ & 16 \end{aligned}$ |


| $\begin{aligned} & \text { Mode No. } \\ & \hline \text { (Class } 1,2 \& 3 \text { ) } \end{aligned}$ |  |  |  | Function | Settings |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 4-912 | Text/Photo Separation Setting |  |  |  |  |
|  | 13 | L. Max. Thresh Level (Main Scan) Half Tone | * | This SP mode is for designer use only. | $\begin{aligned} & 0 \sim 255 \\ & 1 / \text { step } \\ & 30 \end{aligned}$ |
|  | 14 | H. Min. Thresh Level (Main <br> Scan) - Half <br> Tone | * | This SP mode is for designer use only. | $\begin{aligned} & 0 \sim 255 \\ & 1 / \text { step } \\ & 40 \end{aligned}$ |
|  | 15 | L. Min. Thresh Level (Main <br> Scan) - Half <br> Tone | * | This SP mode is for designer use only. | $\begin{aligned} & 0 \sim 255 \\ & 1 / \text { step } \\ & 20 \end{aligned}$ |
|  | 16 | $5 \times 3$ Block Thresh Level - Half Tone | * | This SP mode is for designer use only. | $\begin{aligned} & 0 \sim 15 \\ & 1 / \text { step } \end{aligned}$ |
|  | 17 | Half Tone Separation Level |  | Selects the dot screen detection level. <br> 0. Setting of SP4-921-008~015 <br> 1. Letter priority - strong <br> 2. Letter priority - weak <br> 3. Standard <br> 4. Photo priority - weak <br> 5. Photo priority - strong <br> Do not use ' 0 '; this is for factory use only. | $\begin{aligned} & 0 \sim 5 \\ & 1 / \text { step } \\ & 3 \end{aligned}$ |
|  | 18 | Effective <br> Magnification <br> Ratio | * | Selects the maximum magnification that can be used with dot screen detection. | $\begin{aligned} & 100 \sim 400 \\ & 1 / \text { step } \\ & 109 \end{aligned}$ |
| 5-009 | Language Selection |  |  |  |  |
|  |  |  |  | Selects the operation panel language. A language card is required except for English, German and Italian. After changing the setting for this SP mode, turn the main power switch off and on. |  |
| 5-019 | Tray Paper Size Selection |  |  |  |  |
|  | , | LCT | * | Selects the paper size in the optional LCT. | $\begin{aligned} & \hline \text { A4 } \\ & \text { LT } \\ & \text { B5 } \end{aligned}$ |
| 5-024 | mm/inch Display Selection |  |  |  |  |
|  |  |  | * | Selects what unit is used. | $\begin{aligned} & \text { 0: mm } \\ & \text { 1: inch } \end{aligned}$ |
|  |  |  |  | After selecting the unit, turn the main power switch off and on. |  |
| 5-104 | A3/DLT Double Count |  |  |  |  |
|  |  |  | * | Specifies whether the counter is doubled for A3/11"x17" paper. | $\begin{aligned} & \text { NO } \\ & \text { YES } \end{aligned}$ |
|  |  |  |  | If "1" is selected, the total counter and the current user code counter count up twice when $A 3 / 11^{\prime \prime x} 17^{\prime \prime}$ paper is used. |  |
| 5-106 | ID Shift Level |  |  |  |  |
|  | 6 | ADS Level Selection | * | Selects the image density level that is used in ADS mode. | $\begin{aligned} & 1 \sim 7 \\ & 1 \text { notch /step } \end{aligned}$ $4$ |



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| 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. <br> To perform the free run, select "ON" <br> 1) Select " $O N$ ". <br> 2) Select "Exit". <br> 3) Select "Copy Mode". <br> 4) Make the required settings (such as the number of copies.). <br> 5) Press the Start key. <br> After finishing the free run, return this SP to "OFF" |  | $\begin{aligned} & \text { OFF } \\ & \text { ON } \end{aligned}$ |
| 5-803 | Input Check |  |  |  |  |
|  | $\begin{aligned} & 1 \sim \\ & 14 \end{aligned}$ |  |  | Displays the signals received from sensors and switches. <br> See the "Input Check" section for details. |  |
| 5-804 | Output Check |  |  |  |  |
|  | $\begin{aligned} & 1 ~ \\ & 97 \end{aligned}$ |  |  | Turns on the electrical components individually for test purposes. See the "Output Check" section for details. | $\begin{aligned} & \hline \text { ON } \\ & \text { OFF } \end{aligned}$ |
| 5-807 | Option Connection Check |  |  |  |  |
|  | 1 | ADF |  | Checks the connectors to the optional peripherals. | 0: Not connected <br> 1: Connected |
|  | 2 | Bank |  |  |  |
|  | 3 | LCT |  |  |  |
|  | 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. <br> Use the " $\bullet$ " 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. <br> Press the "Clear modes" key to delete the telephone number. |  |
|  | 2 | Service Fax <br> 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 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 5-990 | SMC Print |  |  |  |  |
|  | 5 | Copy Program No. 10 |  | Prints the Copy Mode list (UP Mode No.10) See the "System Parameter and Data Lists" section for how to print the lists. | Start |
|  | 6 | SP <br> (Large Font) |  | Prints the SP mode data list with a large font size. <br> See the "System Parameter and Data Lists" section for how to print the lists. <br> Use this SP mode when sending the SMC list by fax. | Start |
| 6-006 | DF Registration Adjustment |  |  |  |  |
|  | 1 | Side-to-Side |  | Adjusts the printing side-to-side registration in the ADF mode. | $\begin{aligned} & -3 \sim+3 \\ & 0.1 \mathrm{~mm} / \mathrm{step} \\ & +0.0 \mathrm{~mm} \end{aligned}$ |
|  |  |  |  | Use the "•" key to toggle from + to - and Clear/Stop key to toggle from - to + before entering the value. |  |
|  | 2 | Leading Edge (Thin Original) | * | Adjusts the original stop position. | $\begin{aligned} & -29 ~+29 \\ & 0.18 \\ & \mathrm{~mm} / \text { step } \\ & \mathbf{+ 0 . 0 \mathrm { mm }} \end{aligned}$ |
|  |  |  |  | Use the "•" key to toggle from + to - and Clear/Stop key to toggle from - to + before entering the value. |  |
|  | 3 | Leading Edge (Duplex-front) | * | Adjusts the original stop position against the original left scale in one-sided original mode. | $\begin{aligned} & -29 \sim+29 \\ & 0.18 \\ & \mathrm{~mm} / \text { step } \\ & +\mathbf{0 . 0} \mathrm{mm} \end{aligned}$ |
|  |  |  |  | Use the "•" key to toggle from + to - and Clear/Stop key to toggle from - to + before entering the value. |  |
|  | 4 | Reading Edge (Duplex-rear) | * | Adjusts the original stop position against the original left scale in two-sided original mode. | $\begin{aligned} & \hline-29 \sim+29 \\ & 0.1 \mathrm{~mm} / \mathrm{step} \\ & +\mathbf{0 . 0 \mathrm { mm }} \end{aligned}$ |
|  |  |  |  | Use the "•" key to toggle from + to - and Clear/Stop key to toggle from - to + before entering the value. |  |
| 6-007 | ADF Input Check |  |  |  |  |
|  | 1 | Group 1 |  | Displays the signals received from sensors and switches of the ADF. <br> See the "Input Check" section for details. |  |
|  | 2 | Group 2 |  | Displays the signals received from sensors and switches of the ADF. <br> See the "Input Check" section for details. |  |
| 6-008 | ADF Output Check |  |  |  |  |
|  |  |  |  | Turns on the electrical components of the ADF individually for test purposes. <br> 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. | $\begin{aligned} & \text { OFF } \\ & \text { ON } \end{aligned}$ |
|  |  |  |  | This is a general free run controlled from the copier. For more detailed free run modes, see the 'Test Points/Dip Switches/LEDs'section. |  |





| Mode No. <br> (Class 1, 2 \& 3) |  |  |  | Function | Settings |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 7-304 | Total Copies By Copy Mode |  |  |  |  |
|  | 10 | Combine | * | Displays the total number of prints by copy mode. |  |
|  | 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 | $\begin{aligned} & \text { Batch (SADF) } \\ & \text { Mode } \end{aligned}$ | * |  |  |
|  | 22 | Mixed Size Mode | * |  |  |
|  | 23 | Thin Original |  |  |  |
| 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 $2 \sim 5$ | * |  |  |
|  | 3 | 1 to $6 \sim 10$ | * |  |  |
|  | 4 | 1 to $11 \sim 20$ |  |  |  |
|  | 5 | 1 to $21 \sim 50$ | * |  |  |
|  | 6 | 1 to 51~100 |  |  |  |
|  | 7 | 1 to $100 \sim 300$ |  |  |  |
|  | 8 | 1 to 301 ~ | * |  |  |
| 7-306 | Copy : Each Mode Job |  |  |  |  |
|  | 1 | 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 | * |  |  |
| 7-320 | Copy Server: Scanned Storage |  |  |  |  |
|  | 1 | Total Number of Originals Scanned | * | Displays the total number of stored originals in the copy server. |  |
| 7-321 | Copy Server : Each Size of Original |  |  |  |  |
|  | 4 | A3 | * | Displays the total number of stored originals in the server by size. |  |
|  | 5 | A4 | * |  |  |
|  | 6 | A5 | * |  |  |
|  | 13 | B4 | * |  |  |
|  | 14 | B5 | * |  |  |
|  | 32 | DLT | * |  |  |
|  | 36 | LG | * |  |  |
|  | 38 | LT | * |  |  |



| Mode No. <br> (Class 1, 2 \& 3) |  |  |  | Function | Settings |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 7-328 | Copy Server : Copy Number of Each Job |  |  |  |  |
|  | 1 | Duplex Copy | * | Displays the total number of duplex prints of one-sided originals from the copy server. |  |
|  | 2 | Duplex Original | * | Display the total number of prints of twosided originals from the copy server. |  |
| 7-330 | Tandem Job |  |  |  |  |
|  | Japanese version only |  |  |  |  |
| 7-331 | Tandem : Copy |  |  |  |  |
|  | 1 | Copy Number of Master | * | Japanese version only |  |
|  | 2 | Copy Number of Slave | * | Japanese version only |  |
| 7-332 | Tandem : Copy Number of Each Master Mode |  |  |  |  |
|  | 1 | Original Mode : Text | * | Japanese version only |  |
|  | 2 | Original Mode : Text/Photo | * |  |  |
|  | 3 | Original Mode : Photo | * |  |  |
|  | 4 | Original Mode <br> : Generation | * |  |  |
|  | 5 | Original Mode : Pale | * |  |  |
|  | 6 | Punch | * |  |  |
|  | 7 | Repeat |  |  |  |
|  | 8 | Sort |  |  |  |
|  | 9 | Staple |  |  |  |
|  | 10 | Series | * |  |  |
|  | 11 | Erase |  |  |  |
|  | 12 | Duplex Copy | * |  |  |
|  | 13 | ADF Mode | * |  |  |
|  | 14 | Double Copy |  |  |  |
|  | 15 | Duplex Original | * |  |  |
|  | 16 | Interrupt | * |  |  |
|  | 17 | Combine 1 Side | * |  |  |
|  | 18 | Combine 2 Side | * |  |  |
|  | 19 | Booklet | * |  |  |
|  | 20 | Magazine | * |  |  |
|  | 21 | Batch Mode |  |  |  |
|  | 22 | Mixed Sizes | * |  |  |
|  | 23 | Thin | * |  |  |
| 7-333 | Tandem : Copy Number of Each Slave Mode |  |  |  |  |
|  | 1 | Original Mode : Text | * | Japanese version only |  |
|  | 2 | Original Mode : Text/Photo | * |  |  |
|  | 3 | Original Mode : Photo | * |  |  |





| Mode No. <br> (Class 1, 2 \& 3) |  |  |  | Function | Settings |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 7-505 | Original Jam Counter by Jam Location |  |  |  |  |
|  | 1 | At Power On |  | Displays the total number of original jams by location. <br> (Entrance and Registration Sensor) <br> (Exit and Inverter Sensor) |  |
|  | 3 | ADF Feed-in Sensor | * |  |  |
|  | 4 | ADF Feed-out Sensor | * |  |  |
| 7-506 | Jam Counter by Copy Size |  |  |  |  |
|  | 4 | 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 | ${ }^{\star}$ |  |  |
|  | 134 | A5 Lengthwise | * |  |  |
|  | 141 | B4 Lengthwise | ${ }^{*}$ |  |  |
|  | 142 | B5 Lengthwise | * |  |  |
|  | 160 | DLT | * |  |  |
|  | 164 | LG | * |  |  |
|  | 166 | LT Lengthwise | * |  |  |
|  | 172 | HLT <br> Lengthwise |  |  |  |
| 7-507 | Jam History |  |  |  |  |
|  | 1 | Copy : Latest | * | Displays the following items for the most recent 10 jams. <br> 1. Last 5 digits of the total counter value <br> 2. Paper size <br> 3. Detected position <br> 4. Stuck or not fed |  |
|  | 2 | Previous | * |  |  |
|  | 3 | 2 nd Previous | * |  |  |
|  | 4 | 3 rd Previous | * |  |  |
|  | 5 | 4 th Previous | * |  |  |
|  | 6 | 5 th Previous | * |  |  |
|  | 7 | 6 th Previous | * |  |  |
|  | 8 | 7 th Previous | * |  |  |
|  | 9 | 8 th Previous | * |  |  |
|  | 10 | 9 th Previous | * |  |  |
|  | 11 | Original : Latest | * |  |  |
|  | 12 | Previous | * |  |  |
|  | 13 | 2 nd Previous | * |  |  |
|  | 14 | 3 rd Previous | * |  |  |
|  | 15 | 4 th Previous | * |  |  |
|  | 16 | 5 tht Previous | * |  |  |
|  | 17 | 6 th Previous | * |  |  |
|  | 18 | 7 th Previous | * |  |  |
|  | 19 | 8 th Previous | * |  |  |
|  | 20 | 9 th Previous | * |  |  |



| Mode No. <br> (Class 1, 2 \& 3) |  |  | Function | Settings |
| :---: | :---: | :---: | :---: | :---: |
| 7-902 | SC Details |  |  |  |
|  | 1 | Latest | Displays details about latest SCs. Not all SCs have these details. |  |
|  | 2 | Latest 1st |  |  |
|  | 3 | Latest 2nd |  |  |
| 7-904 | Copy Counter Reset - Copy Mode |  |  |  |
|  |  Resets all counters of SP7-304. |  |  | Start |
| 7-905 | Copy Counter Reset - Multiple Copy Mode |  |  |  |
|  |  | $0$ | 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 | Copy : Clear Original Number |  |  |  |
|  |  |  | Resets all counters of SP7-002-2. | Start |
| 7-920 | Copy Server : Clear Scanned Storage |  |  |  |
|  |  |  | Resets the counter of SP7-320. | Start |
| 7-921 | Copy Server : Clear Original Number of Each Size |  |  |  |
|  |  |  | Resets all counters of SP7-321. | Start |
| 7-923 | Copy Server : Clear Print Number of Each Copy |  |  |  |
|  |  |  | Resets all counters of SP7-323 | Start |
| 7-924 | Copy Server : Clear Print Job Logging |  |  |  |
|  |  |  | Resets all counters of SP7-324 | Start |
| 7-925 | Copy Server : Clear Print Job Page Distribution |  |  |  |
|  |  |  | Resets all counters of SP7-325 | Start |
| 7-926 | Copy Server : Clear Print Job File Distribution |  |  |  |
|  |  |  | Resets all counters of SP7-326 | Start |
| 7-927 | Copy Server : Clear Print Job Set Distribution |  |  |  |
|  |  |  | Resets all counters of SP7-327. | Start |

### 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. Press exit, then 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. Reset the test pattern to 0 .
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-dot) |
| 1 | Grayscale 1 | 8 | Vertical Lines (2-dot) |
| 2 | Grayscale 2 | 9 | Hatch Pattern |
| 3 | Grayscale 3 | 10 | Cross Pattern |
| 4 | Grayscale 4 | 11 | Slant Pattern |
| 5 | Grayscale 5 | 12 | Cross Stitch (400 dpi) |
| 6 | Vertical Lines (256-greyscale) | 13 | Cross Stitch (600 dpi) |

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

| No. | Test Pattern | No. | Test Pattern |
| :---: | :--- | :---: | :--- |
| 0 | None | 11 | Argyle Pattern |
| 1 | Vertical Line (1-dot) | 12 | 16 Grayscales (Horizontal) |
| 2 | Horizontal Line (1-dot) | 13 | 16 Grayscales (Vertical) |
| 3 | Vertical Line (2 dot) | 14 | 16 Grayscales (Vert./Hor.) |
| 4 | Horizontal Line (2-dot) | 15 | 16 Grayscales (Vert./Hor Overlay) |
| 5 | Grid Pattern (Single-dot) | 16 | Not used |
| 6 | Grid Pattern (Double-dot) | 17 | Horizontal Line (1-dot) |
| 7 | Alternating Dot Pattern | 18 | Grid Pattern (Single-dot) |
| 8 | Full Dot Pattern | 19 | Grid Pattern (Double-dot) |
| 9 | Black Band | 20 | Alternating Dot Pattern |
| 10 | Trimming Area | 21 | Blank Page |

### 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. (See the table below)
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.


| Class 3 no. | Bit no. | Description | Reading |  |
| :---: | :---: | :---: | :---: | :---: |
|  |  |  | 0 | 1 |
| 1 (Paper Feed <br> 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 | Not Used |  |  |
|  | 0 | 1st Near End Sensor | Not detected | Near end |
| 2(Paper Feed2) | 7 | Not used |  |  |
|  | 6 | Not used |  |  |
|  | 5 | Tray Construction 1 | $\begin{array}{ll}4: 0,5: 1 & \text { Export } \\ 4: 1,5: 1 & \text { Japan }\end{array}$ |  |
|  | 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 Feed3 ) | 7 | Left Tandem Tray Set Detection 2 (Connector) | Set | Not set |
|  | 6 | Side Fence Positioning Sensor | Not Detected | Fence Detected |
|  | 5 | Base Plate 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 Feed3 ) | 1 | Left Tandem Paper End Sensor | Not paper end | Paper end |
|  | 0 | Right Tandem Tray Set Detection 2 (Connector) | Set | Not set |
| $\begin{gathered} 4 \\ \text { (Paper Feed } \end{gathered}$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 Feed5 ) | 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 PaperFeed 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 <br> (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 |


| Class 3 no. | Bit no. | Description | Reading |  |
| :---: | :---: | :---: | :---: | :---: |
|  |  |  | 0 | 1 |
| 8(I/O BoardDip Switch101) | 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 |
| 9 (Motor Lock /Transport) <br> /Transport) | 7 | Drum Motor Lock | Overload | Normal |
|  | 6 | By-pass Feed Motor Lock | Overload | Normal |
|  | 5 | Development Motor Lock | Overload | Normal |
|  | 4 | Fusing Motor Lock | Overload | Normal |
|  | 3 | Not Used |  |  |
|  | 2 | Fusing Exit Sensor | Paper detected | No paper |
|  | 1 | Exit Sensor | Paper detected | No paper |
|  | 0 | Tray Paper Limit Sensor | Not full | Full |
| $\begin{gathered} 10 \\ \text { (Duplex) } \end{gathered}$ | 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 |
| $\begin{gathered} 11 \\ (\text { LCT1) } \end{gathered}$ | 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 |
| $\begin{gathered} 12 \\ \text { (LCT2) } \end{gathered}$ | 7 | Fusing Zero Cross | Detected | Not detected |
|  | 6 | Not Used |  |  |
|  | 5 | Front Door Safety Switch | Closed | Open |
|  | 4 | Not Used |  |  |


| Class 3 no. | Bit no. | Description | Reading |  |
| :---: | :---: | :---: | :---: | :---: |
|  |  |  | 0 | 1 |
| $\begin{gathered} 12 \\ \text { (LCT2) } \end{gathered}$ | 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 <br> (Registration) | 7 | LCT Paper Position Sensor | Detected | Not detected |
|  | 6 | Toner End Sensor | Toner End | Not toner end |
|  | 5 | By-pass Tray Switch | Closed | Open |
|  | 4 | Relay Sensor | Paper detected | No paper |
|  | 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 | Not used |  |  |
|  | 6 | Not used |  |  |
|  | 5 | Key Counter Set | Set | Not set |
|  | 4 | Total Counter Set | Set | Not set |
|  | 3 | Polygon Motor Cooling 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. | $\begin{gathered} \hline \text { Bit } \\ 7 \end{gathered}$ | $\begin{gathered} \hline \mathrm{Bit} \\ 6 \end{gathered}$ | $\begin{gathered} \hline \text { Bit } \\ 5 \end{gathered}$ | $\begin{gathered} \hline \hline \text { Bit } \\ 4 \\ \hline \end{gathered}$ | $\begin{gathered} \hline \hline \mathrm{Bit} \\ 3 \end{gathered}$ | Paper Width |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  | A/B size version | Inch version |
| 1 | 0 | 1 | 1 | 1 | 1 | A3 | DLT |
|  | 0 | 0 | 1 | 1 | 1 | 81/4 "x 13" | 81/2 "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 | 81/2 " $\times 13$ " | HLT sideways |
|  | 0 | 0 | 0 | 1 | 0 | - | $8^{\prime \prime} \times 101 / 2^{\prime \prime}$ |
|  | 0 | 0 | 0 | 0 | 1 | A5 sideways | 8 "x 10" |
|  | 1 | 0 | 0 | 0 | 0 | 8K lengthwise (Taiwan Version only) | 8 " $\times 13^{\prime \prime}$ |
|  | 1 | 1 | 0 | 0 | 0 | 16K lengthwise (Taiwan Version only) | $10^{\prime \prime} \times 14$ " |
|  | 1 | 1 | 1 | 0 | 0 | 16K sideways (Taiwan Version only) | $11^{\prime \prime} \times 15$ |
|  | 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

## WARNING:

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 ON to check that component.
4. Press "OFF" to end 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 | 38 | Relay Clutch (LCT) |
| 2 | 2nd Paper Feed Clutch | 39 | Registration Motor |
| 3 | 3rd Paper Feed Clutch | 40 | Guide Plate Solenoid |
| 4 | Not Used | 41 | Inverter Gate Solenoid |
| 5 | By-pass Feed Clutch | 42 | Not used |
| 6 | Paper Feed Clutch (LCT) | 43 | Duplex Transport Clutch |
| 7,8 | Not used | 44 | Duplex Feed Clutch |
| 9 | 1st Pick-up Solenoid | 45 | Duplex Inverter Gate Solenoid |
| 10 | 2nd Pick-up Solenoid | $47 \sim 52$ | Reverse Roller Solenoid |
| 11 | 3rd Pick-up Solenoid | 53 | Development Motor |
| 12 | Not Used | 54 | Toner Recycling Motor |
| 13 | By-pass Pick-up Solenoid | 55 | Not used |
| 14 | Pick-up Solenoid (LCT) | 56 | Toner Supply Motor |
| 15,16 | Not used | 57 | Transfer Belt Solenoid |
| 17 | 1st Separation Roller Solenoid | $58 \sim 61$ | Not used |
| 18 | 2nd Separation Roller Solenoid | 62 | Quenching Lamp |
|  |  | 63 | Charge Corona |
| 19 | 3rd Separation Roller Solenoid | 64 | Grid Plate |
| $20 \sim 23$ | Not used | 65,66 | Not used |
| 24 | Rear Fence Motor | 67 | Development Bias |
| 25 | LCT Motor (LCT) | 68 | Not used |
| 26 | Paper Feed Motor | 69 | Transfer Belt Bias |
| 27 | By-pass Feed Motor | 70 | ID Sensor |
| 28 | Drum Motor | $\sim 73$ | Not used |
| $29 \sim 30$ | Not used | 74 | Optics Cooling Fan |
| 31 | Fusing/Duplex Motor | 75 | Duplex Cooling Fan |
| 32 | 1st Vertical Relay Clutch | 76 | Exhaust Fan (Low speed) |
| 33 | 2nd Vertical Relay Clutch | 77 | Exhaust Fan (High speed) |
| 34 | 3rd Vertical Relay Clutch | 78 | Fusing Fan |
| 35 | Not used | Not used |  |
| 36 | Relay Clutch |  |  |


| No. | Description | No. | Description |
| :---: | :--- | :---: | :--- |
| 37 | Not used | 80 | Tray Junction Gate Solenoid <br> (Finisher) |
| 81 | Stapler Junction Gate Solenoid <br> (Finisher) | 90 | Laser Diode |
| 82 | Positioning Roller Solenoid <br> (Finisher) | 91 | Not used |
| 83 | Not used | 92 | Tray Lift Motor (Finisher) |
| 84 | Mechanical Counter | 93 | Jogger Motor (Finisher) |
| 85 | Upper Transport Motor (Finisher) | 94 | Stapler Motor (Finisher) |
| 86 | Lower Transport Motor (Finisher) | 95 | Stack Feed-out Belt Motor <br> (Finisher) |
| 87 | Shift Tray Exit Motor (Finisher) | 96 | Shift Motor (Finisher) |
| 88 | Staple Hammer Motor (Finisher) | 97 | Stapler Rotation Motor (Finisher) |
| 89 | Punch Motor (Punch Unit) | $98 \sim 99$ | 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 |

### 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
5) SP5-990-5 : Copy mode list (UP mode No.10)
6) SP5-990-6 : SP mode data list with a large font size
2. Select the paper size and press "Start" on the display.
3. After printing the list, 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 DOWNLOAD

In this machine, the SBICU software is upgraded using a flash memory card.
There are two program download procedures. One downloads from the flash memory card to the SBICU. The other downloads from the SBICU to a flash memory card.
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.


## Downloading to the SBICU

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

## Flash Card Ltility

## Cand - - ROW

Card:2Z297560 ROW:A2Z97560
Do you INSTALL this card?

5. Touch "Install". The machine erases the current software, then writes the new software to the SBICU. This takes about 3 minutes.
Display during erasing

| Flash Card Lutilty |  |
| :---: | :---: |
|  | Cand - ROW <br> Cand:AZ297560 FOM:AZ297560 <br> Erasing.. $\qquad$ <br> ADRS=200000h RDT=0000h WDT=0000h |

Display during writing

| Flash Cardutility |  |
| :---: | :---: |
|  | $\mathrm{Cand}-\mathrm{FOM}$ <br> Cand:A2297560 ROW:AZ297560 <br> Writing... *x $\qquad$ <br> ADRS $=0680000 \mathrm{~h}$ RDT=0000h WDT=0000 |

Display when the download is complete


If downloading failed, an error message appears on the display. At this time, touch the "OK" key to re-try the download.

## Download from SBICU to Flash Memory Card



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.

| Flash Card Ltility |  |  |
| :---: | :---: | :---: |
| FOM $->\mathrm{Card}$ <br> ROM:AZ297560 Card:M2295103G <br> Do you COPY intemal ROM to card? |  |  |
|  | VERIFY |  |

5. Touch the "COPY" key. The machine erases the current software, then writes the new software to the flash memory card. This takes about 3 minutes. The display changes in the same way as for "Download from flash memory card to SBICU".

### 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.

### 4.4.3 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.

### 4.4.4 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 |
|  | Copy Output Tray |
| 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 | Tray 1 Paper Size Setting |
|  | Tray 2 Paper Size Setting |
|  | Tray 3 Paper Size Setting |
|  | By-pass Tray : Special Paper Indication |
|  | Tray 1: Special Paper Indication |
|  | Tray 2 : Special Paper Indication |
|  | Tray 3 : Special Paper Indication |
| Count Manager | LCT : Special Paper Indication |
|  | Set User Code |
|  | Key Counter |
|  | AOF (Keep it on) |

## 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 |  |
|  | Paper Tray Priority |  |
| General Features 2/3 | Shortcut R/E |  |
|  | R/E Priority |  |
|  | Duplex Mode Priority |  |
|  | Copy Orientation in Duplex Mode |  |
|  | Original Orientation in Duplex Mode |  |
|  | Book Duplex |  |
|  | Initial Mode |  |
|  | Maximum Copy Quantity |  |
|  | Original Beeper |  |
| $\begin{aligned} & \text { General } \\ & \text { Features } 3 / 3 \end{aligned}$ | Shortcut : F1 |  |
|  | Shortcut: F2 |  |
|  | Shortcut: F3 |  |
|  | Shortcut: F4 |  |
|  | Shrink \& Center Ratio |  |
| Reproduction <br> Ratio $1 / 2$ | Enlarge 1 |  |
|  | Enlarge 2 |  |
|  | Enlarge 3 |  |
|  | Enlarge 4 |  |
|  | Enlarge 5 |  |
|  | Priority Setting : Enlarge |  |
| Reproduction Ratio 1/2 | Reduce 1 |  |
|  | Reduce 2 |  |
|  | Reduce 3 |  |
|  | Reduce 4 |  |
|  | Reduce 5 |  |
|  | Reduce 6 |  |
|  | Priority Setting : Reduce |  |


| Tab | Item | Detail |
| :---: | :---: | :---: |
| $\begin{aligned} & \text { Page Format } \\ & 1 / 2 \end{aligned}$ | Cover Mode |  |
|  | Copy Back Cover |  |
|  | Front Margin : Left/Right |  |
|  | Back Margin : Left Right |  |
|  | Front Margin : Top/Bottom |  |
|  | Back Margin : Top/Bottom |  |
|  | $1 \rightarrow 2$ Duplex Auto Margin Adjust |  |
|  | Ease Border |  |
|  | Combine Original Shadow Erase |  |
| $\begin{aligned} & \text { Page Format } \\ & 2 / 2 \end{aligned}$ | Erase Center |  |
|  | Repeat Separation Line |  |
|  | Double Copies Separation Line |  |
|  | Combine Separation Line |  |
|  | Booklet/Magazine Original Orientation |  |
| Input Output | Individual Input/Output Operation |  |
|  | Next Job Scan Start |  |
|  | Batch (SADF) Auto Reset Time |  |
|  | ADRF Original Table Rise Time |  |
|  | Platen Mode Exit |  |
|  | Duplex : Auto Eject |  |
|  | Combine : Auto Eject |  |
|  | Rotate Sort Auto Paper Continue |  |
|  | Auto Sort Mode |  |
|  | Memory Full Auto Scan Restart |  |
| Count Manager | Check/Rest/Print Copy Counter | Print |
|  |  | Reset Counter |
|  |  | Reset All |
|  | User Code Register/Change/Delete | Register |
|  |  | Change |
|  |  | Delete User Code |
|  |  | Delete All User Code |

### 4.4.5 IMAGE QUALITY SETTING BY UP MODE

The 'Original Mode Quality Level in Copy Features' UP mode is related to the 'MTF Filter Settings' SP mode.


If a setting from the above three columns $[A]$ is selected, the MTF coefficient (SP4-$903-011$ to 019, 041 to 047) and MTF strength (SP4-903-20 to 23, 050 to `053) are fixed. Any changes to the SP mode settings are not reflected in the copy. To use the settings specified by SP mode, the user must select "SP mode Changed" [B].

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

## Text mode

Magnification Ratio: 32-64\%

| MTF Filter Strength | Strong |  |  | Weak |  |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| UP mode |  | Sharp |  |  | Normal |  | Soft |
| Coefficient Level - Main Scan <br> SP4-903-011 | 6 | 4 | 6 | 5 | 1 | 2 | 1 |
| Coefficient Level - Sub Scan <br> SP4-903-041 | 8 | 6 | 8 | 7 | 3 | 4 | 2 |
| Strength Level - Main Scan <br> SP4-903-020 | 4 | 3 | 2 | 2 | 2 | 1 | 0 |
| Strength Level - Sub Scan <br> SP4-903-050 | 4 | 3 | 2 | 2 | 2 | 1 | 0 |

Magnification Ratio: 65-154\%

| MTF Filter Strength | Strong |  |  |  | $r$ |  |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| UP mode |  |  |  |  |  |  |  |  |

Magnification Ratio: 155-256\%

| MTF Filter Strength | Strong |  |  | Weak |  |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| UP mode |  |  | Sharp |  | Normal |  | Soft |
| Coefficient Level - Main Scan <br> SP4-903-013 | 6 | 5 | 6 | 5 | 5 | 1 | 1 |
| Coefficient Level - Sub Scan <br> SP4-903-043 | 8 | 7 | 8 | 7 | 7 | 2 | 3 |
| Strength Level - Main Scan <br> SP4-903-022 | 4 | 3 | 2 | 2 | 1 | 2 | 0 |
| Strength Level - Sub Scan <br> SP4-903-052 | 4 | 4 | 3 | 2 | 2 | 2 | 1 |

Magnification Ratio: 257-400\%

| MTF Filter Strength | Strong |  |  | Weak |  |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| UP mode |  |  | Sharp |  | Normal |  | Soft |
| Coefficient Level - Main Scan <br> SP4-903-014 | 3 | 6 | 4 | 5 | 6 | 1 | 5 |
| Coefficient Level - Sub Scan <br> SP4-903-044 | 5 | 8 | 8 | 7 | 8 | 2 | 7 |
| Strength Level - Main Scan <br> SP4-903-023 | 4 | 3 | 3 | 2 | 1 | 2 | 0 |
| Strength Level - Sub Scan <br> SP4-903-053 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |

## Text/Photo Mode

Text areas and photo areas in text/photo mode use different filters. However, the filter for text areas is used for the entire image (including photo areas) if the magnification ratio is $110 \%$ or more. (This threshold magnification ratio of $110 \%$ can be changed with SP4-912-018.)

Text areas
Magnification Ratio: 32 - 64\% (Text Areas)

| MTF Filter Strength | Strong |  |  |  |  |  |  | Normal |  |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| UP mode | Letter <br> Mode |  |  |  |  |  |  |  |  |  |  |
| Coefficient Level <br> SP4-903-017 | 5 | 4 | 3 | 2 | 1 | 0 |  |  |  |  |  |

Magnification Ratio: 65 - 109\% (Text Areas)

| MTF Filter Strength | Strong |  |  |  |  |  |  | Weak |
| :--- | :---: | :---: | :---: | :---: | :---: | ---: | :---: | :---: |
| UP mode | Letter <br> Mode |  | Normal |  |  |  |  |  |
| Coefficient Level | 5 | 4 | 3 | 2 | 1 | 0 |  |  |
| SP4-903-017 | 5 | 4 |  |  |  |  |  |  |

Magnification Ratio: 110 - 154\% (All Areas: Text Mode)

| MTF Filter Strength | Strong |  |  |  |  |  |  | Normal |  |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| UP mode | Letter <br> Mode |  |  |  |  |  |  |  |  |  |  |
| Coefficient Level <br> SP4-903-017 | 5 | 4 | 3 | 2 | 1 | 0 |  |  |  |  |  |

Magnification Ratio: 155 - 256\% (All Areas: Text Mode)

| MTF Filter Strength | Strong |  |  |  |  |  |  |  | Noak |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| UP mode | Letter <br> Mode |  | Normal |  |  |  |  |  |  |
| Coefficient Level <br> SP4-903-017 | 5 | 4 | 3 | 2 | 1 | 0 |  |  |  |

Magnification Ratio: 257 - 400\% (All Areas: Text Mode)

| MTF Filter Strength | Strong <br> UP mode |  |  |  |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: |
| Letter <br> Mode |  | Normal |  |  | Weak |  |
| Coefficient Level <br> SP4-903-017 | 5 | 4 | 3 | 2 | 1 | 0 |

Magnification Ratio: 32 - 109 \% (Photo areas, and all areas when the user selects Photo Mode)

| Filter Type | Smoothing | Smoothing | Smoothing | none | MTF | MTF | MTF |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Filter Strength | Strong | Medium | Weak |  | Strong | Medium | Weak |
| UP Mode |  |  |  | -Normal <br> -Text mode <br> •Photo mode |  |  |  |
| (all areas) |  |  |  |  |  |  |  |$|$

## Photo Mode

The smoothing filter is always used in this mode, whether the user selects "Continuous Tone", "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.

| Smoothing Filter <br> Strength | Strong |  | Weak |  |  |  |  |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| UP Mode |  |  | Screened <br> Printed |  | Normal | Continuous <br> Tone |  |  |  |
| Coefficient Level <br> SP4-903-016 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |  |

If the user selects "SP Mode Changed" to use another smoothing filter setting, SP4-904-003 (Filter Type Selection in Photo Mode) should be "1: Smoothing".
If the user selects "SP Mode Changed" to use an MTF filter setting for photo mode, SP4-904-003 (Filter Type Selection in Photo Mode) should be "0: MTF".

## Pale Mode

Magnification Ratio: 32 - 64\%

| MTF Filter Strength | Strong |  |  |  | Weak |  |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: |
| UP mode |  | Sharp |  | Normal | Soft |  |
| Coefficient Level |  |  |  |  |  |  |
| SP4-903-018 | 5 | 4 | 3 | 2 | 1 | 0 |

Magnification Ratio: 65 - 109\%

| MTF Filter Strength | Strong |  |  |  |  |  |  |  | Weak |
| :--- | :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| UP mode |  | Sharp |  | Normal | Soft |  |  |  |  |
| Coefficient Level |  |  |  |  |  |  |  |  |  |
| SP4-903-018 | 5 | 4 | 3 | 2 | 1 | 0 |  |  |  |

Magnification Ratio: 110 - 154\%

| MTF Filter Strength | Strong |  | Weak |  |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: |
| UP mode |  | Sharp |  | Normal | Soft |  |
| Coefficient Level <br> SP4-903-018 | 5 |  |  |  |  |  |

Magnification Ratio: 155-400\%

| MTF Filter Strength | Strong |  |  |  |  |  |  |  | Weak |  |  |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: | ---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| UP mode |  | Sharp |  | Normal | Soft |  |  |  |  |  |  |  |  |
| Coefficient Level |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SP4-903-018 | 5 | 4 | 3 | 2 | 1 | 0 |  |  |  |  |  |  |  |

## Generation Mode

Magnification Ratio: 32 - 64\%

| MTF Filter Strength | Strong |  |  |  |  |  |  |  |  | Seak |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| UP mode |  | Sharp | Normal |  | Soft |  |  |  |  |  |
| Coefficient Level <br> SP4-903-019 | 5 | 4 | 3 | 2 | 1 | 0 |  |  |  |  |

Magnification Ratio: 65 - 109\%

| MTF Filter Strength | Strong |  | Weak |  |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: | ---: |
| UP mode |  | Sharp | Normal |  | Soft |  |
| Coefficient Level <br> SP4-903-019 | 5 | 4 | 3 | 2 |  |  |

Magnification Ratio: 110 - 154\%

| MTF Filter Strength | Strong |  | Weak |  |  |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| UP mode |  | Sharp | Normal |  | Soft |  |  |
| Coefficient Level <br> SP4-903-019 | 5 | 4 | 3 | 2 | 1 |  |  |

Magnification Ratio: 155-400\%

| MTF Filter Strength | Strong |  |  |  |  |  |  |  | Weak |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| UP mode |  | Sharp | Normal |  | Soft |  |  |  |  |
| Coefficient Level <br> SP4-903-019 | 5 | 4 | 3 | 2 | 1 | 0 |  |  |  |

### 4.5 TEST POINTS/DIP SWITCHES/LEDS

### 4.5.3 DIP SWITCHES

ADF Main Board

| DPS101 |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- |
| $\mathbf{4}$ | $\mathbf{3}$ | $\mathbf{2}$ | $\mathbf{1}$ |  |
| 0 | 0 | 0 | 0 | Nermal operating mode |
| 0 | 0 | 0 | 1 | Free run: one-sided original, thin mode, with originals |
| 0 | 0 | 1 | 0 | Free run: one-sided original, with originals |
| 0 | 0 | 1 | 1 | Free run: one-sided original, no originals |
| 0 | 1 | 0 | 0 | Free run: two-sided original, with original |
| 0 | 1 | 0 | 1 | Free run: two-sided original, no original |
| 0 | 1 | 1 | 0 | Motor test |
| Others |  |  |  | Do not select |

I/O Board Dip SW101

| No. | Description | Function |
| :--- | :--- | :--- |
| 1 | Do not use | Should be OFF |
| 2 | Do not use | Should be OFF |
| 3 | SC codes display | ON : SC codes are not displayed |
| 4 | Do not use | Should be OFF |
| 5 | Do not use | Should be OFF |
| 6 | Version setting | $6:$ OFF 7:OFF -> Japanese version |
| 7 | Version setting | $6:$ ON 7:OFF -> 115V version |
|  |  | $6:$ OFF 7:ON -> 220/240V version |
| 8 | Do not use | Should be OFF |

### 4.5.4 TEST POINTS

I/O Board

| Number | Monitored Signal |
| :--- | :--- |
| TP163 | +5 V |
| TP165 | Ground |
| TP167 | +24 V |
| TP168 | +5 VE |
| TP170 | -12 V |
| TP171 | +12 V |
| TP172 | 5 V DC |
| TP173 | +24VINT |

## Paper Feed Board

| Number | Monitored Signal |
| :--- | :--- |
| TP102 | +24 V |
| TP103 | Ground |
| TP104 | Ground |
| TP105 | +5 V |

ADF Main Board

| No. | Label | Monitored Signal |
| :---: | :---: | :--- |
| TP100 | GND | Ground |
| TP101 | Vcc | +5 V |
| TP102 | VA | +24 V |
| TP103 | TXD | TXD to the copier |
| TP104 | RXD | RXD from the copier |

### 4.5.5 FUSES

PSU

| Number | Description |
| :--- | :--- |
| FU101 | Protects the ac input line. |
| FU102 | Protects +24 V |
| FU103 | Protects +24 V |
| FU104 | Protects +24 V |
| FU105 | Protects +24 V |
| FU106 | Protects +24 V |
| FU107 | Protects +24 V |
| FU108 | Protects +24 V |
| FU109 | Protects +12 V |
| FU110 | Protects +5 V |
| FU111 | Protects +5 V |
| FU112 | Protects -12 V |
| FU113 | Protects +5 V |
| FU114 | Protects +5 V |
| FU115 | Protects +5 V |
| FU116 | Protects +24V |

## ADF Main Board

| No. | Function |
| :---: | :--- |
| FU101 | Protects the 24 V line. |

### 4.5.6 VARIABLE RESISTORS

ADF Main Board

| No. | Function |
| :---: | :--- |
| VR101 | Adjusts the original registration for the 1st side of the <br> original. |
| VR102 | Adjusts the original stop position against the left scale <br> for the 2nd side of the original. |
| VR103 | Not used |

### 4.5.7 LEDS

BICU

| Number | Monitored Signal |
| :--- | :--- |
| LED102 | Blinking : Normal <br> Stays on or off : CPU defective |
| LED103 | Turns on when the main power switch on. |
| LED104 | Blinking : Normal <br> Stays on or off : HDD abnormal |
| LED105 | Off : Normal |
| LED106 | Blinking : Normal |

## Paper Feed Board

$\Rightarrow$| Number | Monitored Signal |
| :--- | :--- |
| LED101 | Turns on 500ms interval : Normal (software) <br> Turns on 200ms interval : Software error is happening <br> Stays ON or OFF : Paper feed board defective |

### 4.6 SPECIAL TOOLS AND LUBRICANTS

### 4.6.3 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 |

### 4.6.4 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 |

### 4.7 PREVENTIVE MAINTENANCE SCHEDULE

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 | 150K | 300K | 450K | NOTE |
| :---: | :---: | :---: | :---: | :---: | :---: |
| SCANNER/OPTICS |  |  |  |  |  |
| 1st Mirror |  | C | C | C | Optics cloth |
| 2nd Mirror |  | C | C | C | Optics cloth |
| 3rd Mirror |  | C | C | C | Optics cloth |
| 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 |
| APS Sensors |  | C | C | C | Dry cloth |
| Optics Dust Filter |  | I | R | 1 |  |
|  |  |  |  |  |  |
| AROUND THE DRUM |  |  |  |  |  |
| Charge Corona Wire |  | R | R | R |  |
| Charge Corona Casing |  | C | C | C | Damp cloth |
| Charge Corona Wire Cleaner |  | C | R | C | Blower brush |
| Drum Potential Sensor |  | C | C | C | Blower brush |
| Charge Corona Grid |  | R | R | R |  |
| ID Sensor |  | C | C | C | Blower brush; initialize with SP3-001-2 after cleaning. |
| Quenching Lamp |  | C | C | C | Dry cloth |
| Wire Cleaner Coil and Grounding Plate |  | I | I | I | Electrical connection check |
| Drum Entrance Seal |  | C | R | C | Dry cloth |
| Pick-off Pawls |  | C | C | C | Clean with dry cloth; replace if necessary. |
| Cleaning Blade |  | R | R | R |  |
| Cleaning Brush |  |  | R |  |  |
| Cleaning Brush Seal |  |  | C |  |  |
| Cleaning Side Seals |  | I | I | I |  |
| Cleaning Entrance Seal |  | C | C | C | Clean with dry cloth; replace if necessary |
|  |  |  |  |  |  |
| DEVELOPMENT UNIT |  |  |  |  |  |
| Developer |  |  | R |  | Perform TD sensor setting (SP 2801) after replacing. |
| 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 |  | R | R | R |  |
| Air Filter - Small |  | R | R | R |  |
| Development Roller Shaft (Lower) |  | L | L | L | Lubricate with KS660 (G0049668) |
| 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 |
|  |  |  |  |  |  |


|  | EM | 150K | 300K | 450K | NOTE |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Toner Bottle Holder |  | C | C | C | Dry cloth or vacuum cleaner |
| Toner Hopper Entrance |  | C | C | C | Dry cloth |
|  |  |  |  |  |  |
| PAPER FEED (Main frame and by-pass tray) |  |  |  |  |  |
| Registration Rollers |  | C | C | C | Water or alcohol |
| Relay Roller |  | C | C | C | Water or alcohol |
| Paper Dust Remover |  | C | C | C | Dry cloth |
| Paper Feed Roller (bypass tray) |  | R | R | R | Replace the pick-up, feed, and separation rollers as a set. <br> Check the counter value for the by-pass tray (SP7-204-6). If the value has reached 150k, replace the rollers. After replacing the rollers, reset the counter (SP7-816-6). |
| Registration Sensor |  | C | C | C | Blower brush |
| Relay Sensor |  | C | C | C | Blower brush |
|  |  |  |  |  |  |
| PAPER FEED (For each paper feed station) |  |  |  |  |  |
| Paper Feed Guide Plate |  | C | C | C | Water or alcohol |
| Paper Feed Rollers |  | R | R | R | 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 150k, replace the rollers. After replacing the rollers, reset the counter (SP7-816). |
| Vertical Transport Roller |  | C | C | C | Water or alcohol |
| Paper Feed Sensor |  | C | C | C | Blower brush |
|  |  |  |  |  |  |
| TRANSFER BELT UNIT |  |  |  |  |  |
| Transfer Belt |  | C | R | C | Dry cloth |
| Cleaning Roller Cleaning Blade |  | R | R | R |  |
| Transfer Entrance Guide Plate |  | C | C | C | Dry cloth |
| Belt Drive/Guide/ Bias Roller/Cleaning Roller |  |  | C |  | Alcohol |
| Transfer Exit Guide Plate |  | C | C | C | Dry cloth |
|  |  |  |  |  |  |
| FUSING/PAPER EXIT |  |  |  |  |  |
| Hot Roller |  | R | R | R |  |
| Hot Roller Bearings | I | I | I | I | Replace if necessary. |
| Pressure Roller |  | C | R | C | Use a suitable solvent. |
| Pressure Roller Bearings |  | I | R | I |  |
| Fusing Thermistor | I | I | I | I | Replace if necessary. |
| Hot Roller Strippers | C | C | R | C | 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. |


|  | EM | 150K | 300K | 450K | NOTE |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Oil Supply Roller |  | R | R | R | Replace these parts as a set. |
| Oil Supply Cleaning Roller |  | R | R | R |  |
| Cleaning Roller Brush (EU only) |  | C | R | C | Dry cloth |
| Cleaning Roller Support Plate | 1 | 1 | 1 | 1 | Replace if out of shape |
| Fusing Entrance and Exit Guide Plates |  | C | C | C | Clean with water or alcohol |
| Transport/Exit Rollers |  |  | C |  | Water |
| Exit Anti-static Brush |  | 1 | 1 | 1 |  |
| 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 |  | 1 | 1 | 1 |  |
| Reverse Junction Gate |  | C | C | C | Dry cloth |
| OTHERS |  |  |  |  |  |
| Ozone Filter |  |  | R |  |  |
| Used Toner Tank | I | I | I | 1 | Replace if necessary (about $1,500 \mathrm{k}$ 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 | 150K | 300K | 450K | NOTE |
| :---: | :---: | :---: | :---: | :---: | :---: |
| LCT |  |  |  |  |  |
| Paper Feed Roller |  | R | R | R | Check the counter value for the LCT (SP7-204-5). If the value has reached 150 k , replace the rollers. After replacing the rollers, reset the counter (SP7-816-5). |
| Pick-up Roller |  | R | R | R |  |
| Separation Roller |  | R | R | R |  |
| Bottom Plate Pad |  | C | C | C | Dry or damp cloth |
| Paper Feed Clutch |  |  |  |  | Replace at 1,500k |
| Relay Clutch |  |  |  |  | Replace at 1,500k |
| Pick-up Solenoid |  |  |  |  | Replace at 1,500k |


|  |  |  |  |  |  |
| :--- | :---: | :---: | :---: | :---: | :--- |
| EM |  |  |  |  |  |
| 150K | 300K | 450K | NOTE |  |  |
| 3,000-SHEET FINISHER | C |  |  |  | Clean with water or alcohol. |
| Rollers | I | I | I | I | Replace if necessary. |
| Brush Roller | C | C | C | C | Clean with a dry cloth. |
| Discharge Brush | C |  |  |  | Blower brush |
| Sensors | I | I | I | I | Replace if necessary. |
| Jogger Fences | I | I | I | I | Empty the hopper. |
| Punch Waste Hopper | I |  |  |  |  |

## REPLACEMENT AND ADJUSTMENT

## 5. REPLACEMENT AND ADJUSTMENT

| $\triangle$ CAUTION |
| :--- |
| Turn off the main power switch and unplug the machine before attempting <br> any of the procedures in this section. |

### 5.1 EXTERIOR

### 5.1.1 FRONT

## Front Door



1. Open the front door $[\mathrm{A}]$.
2. Lower the pin $[B]$ to unhook the upper hinge bracket $[C]$.
3. Unhook the lower pin [D].

## EXTERIOR

### 5.1.2 RIGHT



## Paper Feed Cover

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

## Upper Right Cover

1. Remove the paper feed cover [A] (2 screws).
2. Remove the upper right cover [B] (2 screws).

## Lower Right Cover

1. Remove the paper feed cover [A] (2 screws).
2. Remove the lower right cover [C] (2 screws).

NOTE: When re-installing the upper and lower right cover, put the hooks in the holes in the frame.

### 5.1.3 LEFT



## Upper Left Cover

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

## Lower Left Cover

1. Remover the lower left cover [B] (2 screws).

NOTE: When re-installing the covers, put the hooks in the holes in the frame.

## EXTERIOR

### 5.1.4 REAR



## Upper Rear Cover

1. Turn off the main switch.
2. Disconnect the ADF connector $[A]$.
3. Remove the upper rear cover $[B]$ (2 screws).

## Lower Rear Cover

1. Turn off the main switch.
2. Remove the lower rear cover [C] (2 screws).

NOTE: When re-installing the upper and lower rear cover, hook the cover onto the frame as shown in the diagram..

### 5.2 DOCUMENT FEEDER

### 5.2.1 COVER REMOVAL



## Front Cover Removal

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

## Rear Cover Removal

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

## Left Cover Removal

1. Remove the front cover.
2. Remove the grounding wire ( 1 screw).
3. Remove the left cover [C] ( 1 screw, 1 connector).

## Upper Exit Cover Removal

1. Remove the front cover.
2. Remove the upper exit cover [D] (1 screw).


## Original Tray Removal

1. Remove the front and rear covers.
2. Remove the original tray $[\mathrm{A}]$ (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).

### 5.2.2 FEED UNIT REMOVAL AND SEPARATION ROLLER REPLACEMENT



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 $[F]$.

### 5.2.3 FEED BELT REPLACEMENT



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.

### 5.2.4 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.

### 5.2.5 SENSOR REPLACEMENT

## Entrance and Registration Sensors



## 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. Release the transport belt unit [C].
2. Remove the sensor bracket [D] (1 screw).
3. Replace the registration sensor [E] (1 connector, 1 screw).

## Width Sensor



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



## 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. Remove the right lower cover [E] (4 screws).
3. Remove the guide plate [F] (3 screws).
4. Replace the inverter sensor [G] (1 connector).

### 5.2.6 TRANSPORT BELT REPLACEMENT



1. Remove the front cover.
2. Remove the lower two screws $[A]$ securing the transport belt assembly $[B]$.
3. Remove the upper four screws [C] securing the transport belt assembly.
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.
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.

### 5.3 SCANNER UNIT

### 5.3.1 EXPOSURE GLASS



1. Open the ADF.
2. Remove the rear scale $[A]$ (3 screws).
3. Remove the left scale $[B]$ (2 screws).
4. Remove the exposure glass [C].

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

### 5.3.2 OPERATION PANEL



1. Remove the operation panel [A] (2 screws, 1 connector).

### 5.3.3 LENS BLOCK



1. Remove the exposure glass. (See Exposure Glass.)
2. Remove the lens cover [A] (12 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.

### 5.3.4 ORIGINAL SIZE SENSORS



1. Remove the exposure glass. (See Exposure Glass.)
2. Remove the original width sensor $[A]$ ( 1 screw, 1 connector).
3. Remove the lens cover $[B]$ ( 12 screws).
4. Remove the original length sensors [C] (1 screw and 1 connector each).

### 5.3.5 EXPOSURE LAMP



1. Remove the ADF.
2. Remove the scanner rear cover. (See Scanner Wire.)
3. Remove the exposure glass. (See Exposure Glass.)
4. Slide the 1 st scanner $[A]$ to the cutout $[B]$ in the rear scanner frame.
5. Remove the exposure lamp [C] (1 screw, 2 connectors).

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

NOTE: When reinstalling, make sure that the front side of the lamp [D] is properly positioned on the lamp holder [E] as shown.

### 5.3.6 SCANNER H.P SENSOR



1. Remove the operation panel. (See Operation Panel.)
2. Open the front door and swing out the toner bottle.
3. Remove the operation panel bottom cover [A] (4 screws - see Scanner Wire).
4. Remove the scanner H.P sensor bracket [B] (1 screw).
5. Remove the scanner H.P sensor [C] (1 connector).

### 5.3.7 SCANNER MOTOR/SCANNER MOTOR DRIVE BOARD



## Scanner Motor

1. Remove the scanner rear cover. (See Covers - Rear.)
2. Remove the exhaust fan $[A]$ ( 1 screw, 1 connector, 2 snap fit screws).

NOTE: Do not lose the mylar [B].
3. Replace the scanner motor [C] with the bracket (3 screws, 1 connector, 1 spring).
4. Do the scanner and printer copy adjustments. (See Replacement and Adjustment - Copy Image Adjustments.)

## Scanner Motor Drive Board

1. Do steps 1 and 2 of the scanner motor removal.
2. Replace the scanner motor drive board [D] (1 screw and 3 connectors).

### 5.3.8 SCANNER WIRES



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).


3. Remove the left upper stay [A] (2 screws).
4. Remove the right upper stay [B] (3 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).

7. Remove the ARDF support brackets [A] (4 screws each).
8. Remove the scanner upper frame [B] (4 screws).
9. Remove the fan duct [C] (1 screw).


## Rear Scanner Drive Wire

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


## Front Scanner Drive Wire

18. Remove the inner cover [A] (3 screws).
19. Remove the HDD grounding screw [B].
20. Loosen the rear scanner securing screws [C].
21. Remove the front scanner securing screws [D].
22. Gently lift up the scanner unit from the front side until the front pulley is accessible. Then put in a pair of screw drivers [E] in the position shown, to hold the unit open.
NOTE: There are cables around the scanner unit. Make sure not to lift up the scanner unit more than necessary.

23. Remove the front scanner wire bracket [A], tension spring [B], and the wire tension bracket [C] (1 screw). Then remove the front scanner wire.

## Reinstallation

24. 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 7 times, and the other side (ring side) [E] once as shown (©). Secure the pulley with tape to keep this condition.
25. Place the pulley on the scanner drive shaft.
26. Secure the pulley with the Allen screw in the position where the Allen screw hole faces up.
27. Wind the end of the new wire with the ball as shown ((2), (3), and (4)).
28. Wind the end of the new wire with the ring as shown (5), (6), and (7).
29. Install the tension spring on the tension bracket (7)), and slightly tighten the tension bracket.

30. Install the 1st scanner and adjust the position with the positioning tools (P/N A0069104) [A].
31. Secure the 1st scanner with the scanner wire bracket ( 1 screw).
32. Fully tighten the tension bracket.
33. 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.
34. Reassemble the scanner and do the scanner and printer copy adjustments (see Replacement and Adjustment - Copy Image Adjustments).

### 5.3.9 OPTICS DUST FILTER



1. Remove the right exit tray $[A]$ ( 3 screws).
2. Remove the upper right cover [B] (4 screws).
3. Replace the optics dust filter [C].

### 5.4 LASER UNIT

| $\triangle$ WARNING |
| :--- |
| Turn off the main power switch and unplug the machine before attempting <br> any of the procedures in this section. Laser beams can seriously damage <br> your eyes. |

### 5.4.1 CAUTION DECAL LOCATIONS

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


### 5.4.2 LD UNIT REPLACEMENT



## $\triangle$ 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] (2 screws).
3. Replace the LD unit [B] (2 screws and 6 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 (see the following procedure).
6. 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.

### 5.4.3 LASER BEAM PITCH ADJUSTMENT

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
- SP2-902-2, no.12: IPU Test Pattern - Cross Stitch - 400 dpi
- SP2-902-2, no.13: IPU Test Pattern - Cross Stitch - 600 dpi

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.

## LASER UNIT

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.)
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



### 5.4.4 POLYGON MIRROR MOTOR REPLACEMENT



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.)

### 5.4.5 LASER SYNCHRONIZATION DETECTOR REPLACEMENT



1. Turn off the main power switch and unplug the machine.
2. Remove the drum unit. (See Drum Unit Removal.)
3. Remove the laser synchronization detector securing plate [A] using a small screwdriver (1 screw).
4. Replace the laser synchronization detector $[B]$ (1 connector).

NOTE: When reinstalling the securing plate, make sure to screw it in only after a clicking sound is heard, which ensures that it is installed in the correct position.

### 5.5 DRUM UNIT

### 5.5.1 DRUM UNIT REMOVAL AND DRUM REPLACEMENT



1. Take out the development unit. (Refer to Development Unit Removal.)
2. Lower the transfer belt unit.
3. Take out the drum unit by holding the knob [A].

NOTE: 1) Cover the drum unit with a sheet of paper to protect it from light when the drum unit is left outside the machine for servicing.
2) Do not touch the drum surface with bare hands.
4. Disconnect the connector of the drum potential sensor [B].
5. Open the upper drum unit (2 screws [C]).
6. Replace the drum [D]. Then remove the drum protective sheet from the new drum.
NOTE: If it is hard to completely set the drum unit in the machine because the gear is disengaged, push in the drum unit while holding down the cleaning blade release knob [E].
After installing a new drum, do the following SP modes: 2-001-1 (charge corona voltage - reset to the defaults), then 2-962 (process control initialization).

### 5.5.2 QUENCHING LAMP REPLACEMENT



1. Remove the drum. (Refer to Drum Unit Removal and Drum Replacement.)

NOTE: Wrap a protective sheet or a few sheets of paper around the drum to protect it from light.
2. Slightly pull up the quenching lamp cable $[A]$, then release the hook $[B]$ at the center of the quenching lamp.
NOTE: Do not pull the wire too strongly.
3. Disconnect the connector $[\mathrm{A}]$.
4. Replace the quenching lamp.

### 5.5.3 GRID PLATE/CHARGE CORONA WIRE/WIRE CLEANER REPLACEMENT



1. Take out the charge corona unit [A] (1 screw, 1 connector).
2. Remove the grid plate [B] (1 plastic screw, 4 hooks).

NOTE: When installing the grid plate, do not tighten the plastic screw [C] too strongly.
3. Remove the front grid terminal [D], then the front end block cover [E].
4. Remove the terminal spring [F].
5. Slide the rear grid terminal [G] to the rear and remove it, then remove the rear end block cover [H].
6. Remove the charge corona wire [I].

7. Remove the wire cleaner $[A]$ (1 snap ring).
8. Install the wire cleaner and the charge corona wire.

NOTE: Locate the joint part $[B]$ of the wire in the rear end block as shown.

After installing new wires, reset SP 2-001-1 and 2-001-4 (corona voltages) to the defaults. Then do SP 2-962 (process control initialization).

### 5.5.4 DRUM ENTRANCE SEAL AND DRUM POTENTIAL SENSOR REPLACEMENT



1. Take out the drum unit. (Refer to Drum Unit Removal.)
2. Remove the drum entrance seal [A].
3. Disconnect the connector [B].

NOTE: Before removing the drum potential sensor, put a few sheets of paper between the sensor and the drum to protect the drum surface.
4. Remove the drum potential sensor [C] and the grounding plate [D] (2 screws).
5. Replace the drum potential sensor [C].

[^1]
### 5.5.5 CLEANING BLADE REPLACEMENT



1. Remove the drum. (Refer to Drum Unit Removal and Drum Replacement.)
2. Remove the cleaning blade $[A]$ ( 2 screws).
3. Clean the entrance seal $[B]$, side seals $[C]$ and cleaning brush $[D]$.

NOTE: When a vacuum cleaner is used, to protect the electrical parts from static electricity, disconnect the connector on the charge power pack and remove the ID sensor as follows:

1) Disconnect the 12P connector on the charge power pack [E].
2) Remove the screw $[\mathrm{F}]$ and separate the upper and lower drum units.
3) Remove the spur bracket [G] and pick-off pawl bracket [H] (2 screws).
4) Disconnect the connector [I].
5) Slide the pick-off pawl bracket to the rear, while turning it counterclockwise (as seen from the front),.
4. Install the new cleaning blade.

NOTE: Do not clean the edge of the cleaning blade with a cloth; this damages the edge and causes black lines on copies.
Do not touch the edge of the new cleaning blade. If some setting powder or toner on the blade edge is removed, apply toner at that place.
When installing the cleaning blade, do not pinch the side seals.

### 5.5.6 CLEANING BRUSH REPLACEMENT



1. Remove the cleaning blade. (Refer to Cleaning Blade Replacement.)
2. Remove the coupling gear $[A]$ ( 1 screw).
3. Remove the bushing $[B]$ ( 1 screw).
4. Pull the cleaning brush shaft to the rear to release the cleaning brush [C], then remove the cleaning brush.

NOTE: Do not touch the cleaning brush with bare hands.
After replacement, clean the ID sensor surface. Then do SP 3-001-2 to initialize the sensor.

### 5.5.7 PICK-OFF PAWL REPLACEMENT



1. Take out the pick-off pawl unit. (Refer to Cleaning Blade Replacement.)
2. Remove the bushing $[\mathrm{A}]$ ( 1 screw and 1 retaining ring).
3. While pulling the shaft $[B]$ to the rear, turn the pick-off pawl about 45 degrees clockwise (as viewed from the front) in order to move up the pick-off pawl.
4. Replace the pick-off pawl [C].

NOTE: Do not forget to hook the tension spring [D].
After replacement, check that the pick-off pawl moves smoothly.

### 5.5.8 OZONE FILTER REPLACEMENT



1. Open the front doors and open the toner bottle holder.
2. Remove the transfer belt unit prop [A] (3 screws).
3. Remove the ozone filter unit $[B]$.
4. Replace the ozone filter [C].

NOTE: To attach the transfer belt unit prop easily, set the following in order: lower pins [D], drive roller shaft [E], upper pins [F].

### 5.5.9 DRUM MOTOR REPLACEMENT



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. Replace the drum motor unit [C] (3 screws, 1 connector).

### 5.5.10 TONER OUTPUT AND RECYCLING PUMP UNIT REPLACEMENT



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. Lower the I/O Board (4 screws).
4. Remove the spring $[A]$.
5. 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.
6. Remove the timing belt [B] from the drum motor's pulley.
7. Remove the bushing $[E]$.

NOTE: Be careful not to drop the bushing.
8. Remove the by-pass feed motor. (Refer to By-pass Feed Motor/Clutch Replacement.)
9. Release the toner recycling tube $[F]$ from the pump unit.

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

### 5.5.11 AIR PUMP AND TONER COLLECTION MOTOR REPLACEMENT



1. Open the front doors then remove the toner collection bottle $[A]$ (1 push-lock [B]).
2. Remove the upper and lower rear covers. (Refer to Upper and Lower Rear Cover Removal.)
3. Remove the paper feed unit control board. (Refer to Paper Feed Control Board Removal)
4. Remove the air pump unit [C] (1 tube, 1 connector and 2 screws).
5. Remove the toner collection motor [ D ] ( 2 connectors, 2 screws).

NOTE: When re-installing the toner collection motor, be sure to put the 2 positioning pins in the holes in the machine rear frame.

### 5.6 DEVELOPMENT AND TONER SUPPLY

### 5.6.1 DEVELOPMENT UNIT REMOVAL



1. Turn off the main switch.
2. Open the front doors.
3. Remove the shutter inner cover [A]. (1 screw)
4. Release the shutter lever $[B]$ (fully to the front).

NOTE: When attaching the shutter inner cover [A], hang the shutter lever [B] on the hook [C].

5. Open the toner bottle holder $[A]$.
6. Remove the screw $[B]$ that holds the drum stay.
7. Remove the drum stay knob [C] then take out the drum stay [D].
8. Disconnect the two connectors [E].
9. Pull out the development unit $[\mathrm{F}]$.

NOTE: 1) To prevent scratches on the drum, push the development unit to the right while pulling it out.
2) When installing the development unit, do not forget to connect the two connectors [E].
3) When installing the drum stay, be careful not to pinch the cables. Also, keep the cables away from the gears [G].
4) When pulling out the development unit, do not hold the knob $[\mathrm{H}]$.
5) Keep the development unit connector as far as possible away from the development unit when cleaning the unit with a vacuum cleaner.
6) Do not touch the pins of the development unit connector when carrying the development unit away from the main frame or cleaning it.

### 5.6.2 DEVELOPMENT AND AIR DUST FILTER REPLACEMENT



1. Take out the development unit. (Refer to Development Unit Removal.)
2. Remove the development guide rail [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].

### 5.6.3 DEVELOPER REPLACEMENT



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.

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. 2801).

NOTE: 1) Do not make any copies with the new developer before completing the developer initial setting, otherwise toner density control will be abnormal.
2) 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 "SC390" in the troubleshooting section.

### 5.6.4 DEVELOPMENT ENTRANCE, FRONT, AND REAR SIDE SEALS



1. Remove the developer. (Refer to Developer Replacement.)
2. Replace the developer entrance seal [A] (2 screws, 2 hooks).
3. Replace the front and rear side seals $[B]$.

NOTE: When re-assembling the development unit, use new side seals and align the edges of the side seals with the corner [C] and the edge [D] as shown.
There is no need to change the developer with this procedure.

### 5.6.5 TONER DENSITY SENSOR REPLACEMENT



1. Remove the developer. (Refer to Developer Replacement.)
2. Replace the TD sensor [A] (2 screws).

NOTE: Before installing the TD sensor, clean the development unit well so that no carrier particles remain in the gap between the TD sensor and the development unit casing.
3. Install the new developer and
4. Perform the developer initial setting (SP2-801) then process control initialization (SP 2-962).

NOTE: Do not make any copies before completing the developer initial setting (SP 2-801).

### 5.6.6 TONER END SENSOR REPLACEMENT



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

### 5.6.7 DEVELOPMENT MOTOR REPLACEMENT



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. Replace the development motor unit [C] (3 screws, 1 connector, and 1 hook).

### 5.7 TRANSFER BELT UNIT

### 5.7.1 TRANSFER BELT UNIT REMOVAL/INSTALLATION



## - 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.

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.

### 5.7.2 TRANSFER BELT REPLACEMENT



1. Take out the transfer belt unit. (Refer to Transfer Belt Unit Removal.)
2. While raising the knob [A], disconnect the two connectors $[B]$.
3. Turn the transfer belt upper unit [C] 90 degrees counterclockwise, then raise and remove it.
4. Remove the screws [D].

5. Turn the belt drive roller holder [ A ] clockwise (front view) and remove the bias terminal [B] (1 screw).
6. Replace the transfer belt [C].

NOTE: 1) Before installing the transfer belt, clean both sides of the transfer belt with a dry cloth (do not use alcohol).
2) Before installing the transfer belt, clean the following items with alcohol.

- Belt drive roller [D]
- Belt roller [E]
- Bias roller [F]

3) Position the transfer belt at the center of the belt roller [E]. (Both marks [H] should be visible.)
4) Set the transfer belt under the bias terminals [B] and [I].

### 5.7.3 BIAS ROLLER CLEANING BLADE REPLACEMENT



1. Remove the transfer belt unit. (Refer to Transfer Belt Replacement.)
2. Remove the cleaning roller cleaning blade $[A]$.
3. Clean the cleaning bias roller $[B]$.

NOTE: When using a vacuum cleaner, to protect the transfer power pack from static electricity, remove the power pack connectors [C].
4. Install the new cleaning blade.

NOTE: Do not touch the edge of the cleaning blade. If some of the setting powder on the blade edge is removed, apply setting powder or toner at that place.

### 5.8 PAPER FEED

### 5.8.1 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 nine connectors [G].
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 cables between the copier main frame and the paper feed unit.

### 5.8.2 PAPER TRAY REMOVAL

## Tandem Tray Removal


[H]


1. Open the front door and draw out the tandem tray.
2. While pushing the release lever $[A]$ to the right with a screwdriver $[B]$, slightly push the right tandem tray [C] to separate it from the left tandem tray [D].
3. Remove the stopper [E] ( 1 screw ).
4. Remove the left tandem tray [D] from the left guide rail [F] (2 screws).
5. While holding the right tandem tray [C] from the bottom, remove the right tandem tray from the right guide rail [G] (2 screws).
NOTE: 1) If the two screws are removed without holding the right tandem tray, the tray will drop out.
2) Be careful not to deform the grounding plate $[\mathrm{H}]$ when reinstalling the left tandem tray.

## PAPER FEED

## Universal Tray/Built-in LCT Removal



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

### 5.8.3 PAPER FEED ROLLER REPLACEMENT



1. Turn off the main switch.
2. Remove the paper tray which the feed rollers need replacing for. (Refer to Paper Tray Removal.)
3. Remove the pick-up roller [A] (1 snap ring).
4. Remove the feed roller $[B]$ (1 snap ring).
5. Remove the snap ring [C] for the separation roller [D], then separate the separation roller [D] from the torque limiter [E].
6. After installing new rollers, reset the copy counter for the paper tray (SP 7-816).

NOTE: 1) The paper feed (pick-up, feed, separation) rollers used in the 1st ~3rd feed units in the paper tray unit are different from the feed rollers used in the by-pass feed table and 3.5 k LCT.
2) Do not touch the surface of the rollers with bare hands.

## PAPER FEED

### 5.8.4 TANDEM REAR FENCE DRIVE BELT REMOVAL




1. Draw out the tandem tray.
2. Separate the right tandem tray from the left tandem tray [A]. (Refer to Tandem Tray Removal.)
3. Remove the rear fence $[B]$ on the left tandem tray (2 screws).
4. Remove the rear base plate [C] with the rear fence drive motor [D] (3 screws, 1 connector, 1 grounding screw, and 1 grounding plate [E]).
5. Remove the end fence [F] (2 screws).
6. Remove the center bottom plate [G] (2 screws).

7. Disconnect the three connectors $[A]$.
8. Loosen the screw $[B]$ and unhook the spring [C].
9. Remove the timing belt [D].

NOTE: When installing the timing belt, hook the spring [C] first, then tighten the screw [B].

### 5.8.5 TANDEM SIDE FENCE MOTOR REMOVAL



1. Remove the bottom plate $[A]$ of the right tandem tray (2 nylon rivets [B]).
2. Raise the lift arm [C] (2 screws).
3. Remove the cover [D] (1 screw).
4. Remove the motor/bracket assembly [E] (2 screws [F]).
5. Remove the side fence motor [G] (2 screws [H], 1 connector).

NOTE: When installing the side fence drive motor, move both side fences to the innermost position, then set the motor gear between the two rack gears [I].

### 5.8.6 3RD TRAY PAPER SENSOR REMOVAL



1. Remove the built-in LCT. (Refer to Paper Tray Removal.)
2. Remove the front side fence $[A]$ (1 screw).
3. Remove the rear side fence $[B]$ ( 1 screw).
4. Remove the tray bottom plate [C] (4 screws).
5. Remove the bracket/sensor assembly [D] (1 screw).
6. Remove the paper sensor [E] (1 connector).

## PAPER FEED

### 5.8.7 3RD TRAY LIFT WIRE REMOVAL



1. Remove the built-in LCT. (Refer to Paper Tray Removal.)
2. Remove the front cover [A] (4 screws, 1 connector, 3 hooks).
3. Remove the 3rd tray lift motor unit $[B]$ ( 4 screws, 1 connector).

4. Remove the spring $[A]$.
5. Remove the wire $[B]$.
6. Wind the end of the new wire with no marking around the tray lift drive pulley $[\mathrm{C}]$ in the correct direction, as shown. (1).
7. Route the wire, with the ball, as shown ((2), (3), (4), (5), (6), (7), and (8)).
8. Wind the end of wire with marking around the tray lift drive pulley in the correct direction, as shown (9).
9. Put the spring back on the wire tension bracket.
10. Wind the new tray lift wire for the other side as well.

### 5.8.8 PAPER FEED CLUTCH/RELAY CLUTCH REMOVAL



1. Turn off the main switch, then open the right front door and remove the pushlock [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].

5. Remove the knob [C] (1 Screw).
6. Pull out all paper trays, then remove the paper tray unit inner cover [D] (2 screws).
7. Remove the two connectors [E].
8. Remove the support bracket [F] (1 screw).

NOTE: The support bracket is used only for the first feed station.

9. Fully draw out the paper tray.
10. Remove the two screws [A] that hold the tray feed unit [B].
11. Disconnect the connectors [C].
12. Remove the tray feed unit.
13. Remove the bracket [D] (1 screw).
14. Remove the paper feed clutch [E] (1 hook, 1 connector).
15. Remove the relay clutch [F] (1 connector).

NOTE: When re-installing the clutches, put the stopper [G] of each clutch on the correct hook on the bracket.

### 5.8.9 BY-PASS FEED TABLE REMOVAL



1. Remove the right inner cover. (Refer to Right Inner Cover Removal.)
2. Remove the total counter with bracket $[A]$ ( 1 screw, 1 connector).
3. Loosen the Allen screw $[B]$ on the hinge.
4. Remove the hinge pin [C] (1 screw).
5. Remove the by-pass feed table (1 connector).

### 5.8.10 BY-PASS FEED ROLLER REPLACEMENT



1. Open the by-pass feed table, then remove the cover [A] (3 screws).
2. Replace the pick-up roller $[B]$ (1 snap ring) and the feed roller [C] (1 snap ring).

NOTE: The paper feed (pick-up, feed, separation) rollers used in the by-pass feed table and LCT are different from the paper feed rollers used in the 1 st $\sim 3 r d$ feed units in the paper tray unit. They are not interchangeable.
3. Remove the feed unit cover. (Refer to Right Cover Removal.)
4. Replace the separation roller [D] (1 snap ring).

### 5.8.11 BY-PASS PAPER SIZE BOARD REPLACEMENT



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. Calibrate the by-pass paper size sensor using SP mode1-904 as follows.
1) Enter SP1-904-001 and place the side fence [C] at the A6 lengthwise ( 100 mm ) sideways position on the paper size decal on the table. Then press "Start" on the operator panel.
2) Enter SP1-904-002 and place the side fence [C] at the A4 sideways position on the paper size decal on the table. Then press "Start" on the operator panel.

### 5.8.12 BY-PASS FEED MOTOR/CLUTCH REMOVAL



1. Remove the upper rear cover. (Refer to Upper Rear Cover Removal.)
2. Remove the by-pass feed motor [ A ] ( 2 screws, 1 connector).
3. Remove the guide plate solenoid $[B]$ ( 1 screw, 1 connector). See Copier Feed Unit Removal
4. Remove the clutch stopper [C] (1 screw).
5. Remove the by-pass feed clutch [D] (1 connector).

NOTE: When re-installing the by-pass feed clutch [D], put the pin [E] on the clutch in the cutout [F] in the stopper.

### 5.8.13 REGISTRATION MOTOR REMOVAL



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

### 5.8.14 PAPER DUST REMOVER REMOVAL



1. Remove the development unit. (Refer to Development Unit Removal.)
2. While pushing down the hook lever [A], remove the paper dust remover [B].
3. Remove paper dust inside the paper dust remover and clean inside it with a dry cloth or a blower-brush.

## PAPER FEED

### 5.8.15 REGISTRATION SENSOR REMOVAL



1. Remove the relay roller knob $[A]$ ( 1 screw).
2. Remove the registration roller knob $[B]$ ( 1 screw ).
3. Remove the right inner cover [C] (1 screw).
4. Disconnect the connector [D].
5. Pull out the registration sensor assembly [E].
6. Clean the sensor [F] with a blower brush.

### 5.8.16 COPIER FEED UNIT REMOVAL



1. Remove the development unit. (Refer to Development Unit Removal.)
2. Remove the right inner cover and the registration roller knob. (Refer to Registration Sensor Removal.)
3. Remove the by-pass feed motor. (Refer to By-pass Feed Motor/Clutch Removal.)
4. Remove the three connectors [A] for the guide plate solenoid, the pick-up solenoid, and the relay clutch.
NOTE: Before disconnecting the connectors, make sure to identify them. Some of the connectors use identical pin leads but they are not interchangeable. Take special care not to misconnect the guide plate solenoid and registration clutch connectors.
5. Remove the upper right cover and the paper feed unit cover. (Refer to Cover Removal.)

6. Disconnect the three connectors $[A]$.
7. Draw out the duplex unit about 10 cm .
8. Remove the copier feed unit [B] (4 screws).

NOTE: When installing the copier feed unit in the copier:

1) Do not pinch the harness.
2) Keep the duplex unit drawn out.
3) Fit the two cutouts [C] on the pins [D].

### 5.9 FUSING UNIT

### 5.9.1 FUSING UNIT REMOVAL



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.

### 5.9.2 FUSING THERMISTOR AND FUSING THERMOFUSE REPLACEMENT



## 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

1. Remove the fusing unit upper cover [D]. (Refer to Fusing Thermistor Replacement.)
2. Remove the terminal bracket [F] (2 screws).
3. Disconnect the three connectors [G].
4. Replace the fusing thermofuse $[\mathrm{H}]$ (1 screw).

NOTE: When re-assembling the fusing unit, secure the harness in the clamps correctly.

### 5.9.3 FUSING LAMP REPLACEMENT



1. Remove the fusing unit. (Refer to Fusing Unit Removal.)
2. Remove the terminal bracket [A] (2 screws).
3. Disconnect the front connectors [B] and the rear connectors [C].
4. Remove the front fusing lamp holder [D] (1 screw) and the rear fusing lamp holder [E] (1 screw).
5. Replace the fusing lamps [F]

NOTE: At the rear terminal, make sure to connect the green connectors [G] and white connector (from the thermofuse) $[\mathrm{H}]$ in the correct positions on the terminal.


NOTE: 2) When re-installing the thermistor, thermofuse, and lamps, secure all harnesses in the clamps [A] correctly and do not locate them in the area indicated as ' NG ' $[\mathrm{B}]$.
3) When re-installing the lamps, check that the grounding brush [C] contacts the hot roller [D].
4) When re-installing the lamps, check that they are installed correctly, and that they can move slightly from front to rear.

### 5.9.4 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].


5. Lower the pressure spring holders $[\mathrm{A}]$ at both sides using a screwdriver $[\mathrm{B}]$ as a lever.
6. Remove the front and rear C-rings [C], gear [D], anti-static spacers [E], isolating bushings [F], and bearings [G].
NOTE: When installing a new hot roller:
1) Lubricate the inner and outer surfaces of the isolating bushings [F] 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.

### 5.9.5 PRESSURE ROLLER AND BEARING REPLACEMENT



1. Remove the hot roller. (Refer to Hot Roller Replacement.)
2. Remove the lower fusing entrance guide $[A]$ (2 screws).
3. Lift the pressure roller $[B]$ and remove it.
4. Replace the pressure roller and bearings [C].

NOTE: When installing a new pressure roller:

1) Lubricate the roller shaft and the inner surface of the bearings with BARRIERTA L55/2 grease.
2) Lubricate the fusing drive gears and their shafts with G501 grease.
5. Re-assemble the machine.

### 5.9.6 HOT ROLLER STRIPPER PAWL REPLACEMENT

[B]


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 $[\mathrm{H}]$ in the opening in the fusing exit assembly and fit the rib [I] in the rail.

### 5.9.7 FUSING PRESSURE ADJUSTMENT



1. Make a black copy (sky shot, $A 3 / D o u b l e ~ L e t t e r ~ p a p e r) . ~$
2. As soon as the paper starts to exit, open the front door to stop the paper in the fusing unit.
3. Wait about 20 seconds, then turn the fusing knob quickly to deliver the paper.
4. Measure the nip band width $[A]$ at the center.
5. If the nip band width is not within $8.8 \pm 0.5 \mathrm{~mm}$, change the spring hook position [B].

### 5.9.8 OIL SUPPLY/CLEANING ROLLER REPLACEMENT



1. Pull out the fusing unit.
2. Lower the lever [A].
3. Remove the oil supply unit [B].
4. Remove the upper entrance guide [C] (1 screw).
5. Remove the mylar bracket [D] (2 screws).
6. Remove the springs [E].
7. Remove the bushings [F].

8. Remove the oil supply roller [G], and the cleaning roller [ H$]$.
9. Install the new cleaning roller [H], and oil supply roller [G]. Then reassemble the unit.
NOTE: Assemble the cleaning roller [H], oil supply roller [G], and bushings [F]. Then, install the assembled parts on the bracket [I].

### 5.9.9 PRESSURE ROLLER CLEANING ROLLER REPLACEMENT



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

### 5.10 PAPER EXIT/DUPLEX UNIT

### 5.10.1 EXIT SENSOR/FUSING EXIT SENSOR



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

### 5.10.2 JOGGER MOTOR



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 bracket $[B]$ ( 2 screws).
5. Remove the jogger motor [C] (2 screws, 1 connector).

### 5.10.3 DUPLEX ENTRANCE SENSOR



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).

### 5.10.4 DUPLEX TRANSPORT/DUPLEX FEED CLUTCHES



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).

### 5.10.5 DUPLEX TRANSPORT SENSOR 1



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 level E4).
5. Remove the guide [C] (2 screws).
6. Remove duplex transport sensor 1 [D] (1 connector).

### 5.10.6 DUPLEX TRANSPORT SENSORS 2 \& 3



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).

## PAPER EXIT/DUPLEX UNIT

### 5.10.7 JOGGER HP SENSOR



1. Open the front door.
2. Pull out the duplex unit.
3. Remove the duplex unit. (See Duplex Transport/Feed Clutch Removal.)
4. Remove the duplex connector bracket [A] (2 screws).
5. Remove the jogger HP sensor [B] (1 connector).

### 5.11 BOARDS AND OTHER ITEMS



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 right inner cover [D] (3 screws).
6. Remove the SBICU board [E] (7 screws, all connectors).
7. Remove the NV-RAM [F] from the old SBICU board and install it on the new board.

### 5.11.2 HARD DISK DRIVE



1. Remove the upper right cover. (Refer to Upper Right Cover Removal.)

Remove the hard disk ground plate [A] (3 screws).
Replace the hard disk [B] (2 screws, 2 connectors).
NOTE: Do not drop the hard disk or shock it violently.
After replacing the hard disk, do SP4-911-006 "Bad Sector Information Reset."

### 5.11.3 I/O BOARD



1. Turn off the main switch, and unplug the machine.
2. Remove the upper rear cover (Refer to Upper Rear Cover Removal.)
3. Disconnect all connectors from 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.

### 5.11.4 PSU



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

### 5.11.5 PAPER FEED CONTROL BOARD (PFC)

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

### 5.12 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.

### 5.12.1 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: $3 \pm 2 \mathrm{~mm}$.

## 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 |
| :--- | :--- | :--- |
| 1st paper feed | SP1-002-1 |  |
| 2nd paper feed | SP1-002-2 |  |
| Srd paper feed <br> (Optional PFU tray 1), | SP1-002-3 |  |
| 4th paper feed | (Optional PFU tray 2) | SP1-002-4 |
| (1.5 mm |  |  |
| Duplex | SP1-002-5 |  |
| By-pass feed | SP1-002-6 |  |
| LCT | SP1-002-7 |  |



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

## Mechanical Adjustment

- Side-to-side Positioning Adjustment (Tandem Tray and Built-in LCT) -

When the tray is put in the paper feed unit, the side-to-side positioning plate [C] presses the feed tray against the rubber stopper on the frame of the paper tray unit. By moving the positioning plate, the tray position can be changed to adjust the side-to-side registration.
NOTE: Do this mechanical adjustment only if the side-to-side registration cannot be adjusted to within standard using SP mode. In such a case, do the mechanical adjustment first, then adjust with the SP mode.


- Side-to-side Positioning (Except for the Tandem Tray and Built-in LCT) -

Side plates $[\mathrm{A}]$ are fixed to the positioning plate [B]. By moving the positioning plate (fixed with four screws), the paper position can be changed to adjust the side-toside registration.
nоте: Do this mechanical adjustment only if the side-to-side registration cannot be adjusted to within standard using SP mode. In such a case, do the mechanical adjustment first, then adjust with the SP mode.


## Blank Margin

NOTE: If the leading edge/side-to-side registration can not be adjusted within the specifications, adjust the leading/left side edge blank margin.

1. Check the trailing edge and right side edge blank margins using the Trimming Area Pattern, and adjust them using the following SP modes if necessary.

|  | SP mode | Specification |
| :--- | :--- | :--- |
| Trailing edge | SP2-101-2 | More than 1.0 mm |
| Right edge | SP2-101-4 | More than 0.5 mm |
| Leading edge | SP2-101-1 | $3 \pm 2 \mathrm{~mm}$ |
| Left edge | SP2-101-3 | $2 \pm 1.5 \mathrm{~mm}$ |

A: Trailing Edge Blank Margin
B: Right Edge Blank Margin
C: Leading Edge Blank Margin
D: Left Edge Blank Margin


### 5.12.2 PARALLELOGRAM IMAGE ADJUSTMENT

Do the following procedure if a parallelogram type image is printed while using a trimming area pattern to adjust the printing registration or the printing margin.

NOTE: 1) The following procedure should be done after adjusting the side-to-side registration for each paper tray.
2) This adjustment is only effective for a parallelogram image caused by the printer. It should not be applied if the skew is caused by the scanner.


1. Check whether a parallelogram image appears as shown on the next page when printing a trimming area pattern (SP2-902-3, No. 10). If it appears, do the following.
2. Remove the exposure glass (see Replacement and Adjustment - Exposure Glass Removal).
3. Remove the three caps [A].
4. Make a note of the position of the laser unit using the scale through the hole [B].
5. Loosen the three screws [C] that hold the laser unit.

6. Adjust the laser unit position using a flat screwdriver [A] as shown.

If the right side of the trimming area pattern is down by about 1 mm as shown [B], the laser unit should be rotated about one tick mark in the direction of the black arrow as shown [C]. If the opposite side is down, adjust in the opposite direction.
NOTE: The laser unit rotates around the point [D].
7. Tighten the three screws to secure the laser unit.
8. Replace the caps and exposure glass.
9. Print the trimming area pattern to check the image. If it is still skewed, repeat steps 2 to 8.

### 5.12.3 SCANNING

NOTE: 1) Before doing the following scanner adjustments, check the printing registration/side-to-side adjustment and the blank margin adjustment.
2) Use an OS-A3 test chart to perform the following adjustments.

## Registration: Platen Mode

1. Place the test chart on the exposure glass and make a copy from one of the feed stations.
2. Check the leading edge and side-to-side registration, and adjust them using the following SP modes if necessary.

|  | SP mode |
| :--- | :--- |
| Leading Edge | SP4-010 |
| Side-to-side | SP4-011 |

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

## Magnification

note: Use an OS-A3 test chart to perform the following adjustment.

## Scanner Sub Scan Magnification

## A: Sub Scan Magnification



### 5.12.4 ADF IMAGE ADJUSTMENT

## Registration



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

nоте: Make a temporary test chart as shown above left using A3/DLT paper.

1. Place the temporary test chart on the ADF and make a copy from one of the feed stations.
2. Check the registration, and adjust using the following SP modes if necessary.

|  | SP mode |
| :--- | :---: |
| Side-to-side Registration | SP6-006-1 |
| Leading Edge Registration (Thin original <br> mode) | SP6-006-2 |
| Leading Edge Registration (Single- <br> sided/Duplex: front) | SP6-006-3 |
| Leading Edge Registration (Duplex: rear) | SP6-006-4 |

### 5.13 TOUCH SCREEN CALIBRATION

After doing a memory all clear or when the touch panel detection mechanism is not working properly, calibrate the touch screen as follows.

1. Press the following keys in sequence to enter touch screen calibration mode.



## ⒸAUTION <br> Do not execute any of the other items in the self diagnostic menu.

2. The "Self Diagnostics Menu" screen will appear.

Press the \# key to select the "Touch Screen Adj." Mode.

3. The "Touch Screen Adj." calibration screen will appear. Touch the upper left corner then the lower right corner of the panel using a pointed (but not sharp!) tool.
4. Touch a few spots on the LCD touch panel, and confirm that the marker (a small circle) appears on the screen at exactly the same location as where it is touched. If it does not, touch "Cancel" on the adjustment screen. Then repeat the calibration procedure.
5. Touch "Ok" on the adjustment screen.
6. Touch "[q] Exit" and "Execute" to exit the self diagnostics menu.

## TROUBLESHOOTING

## 6. TROUBLESHOOTING

### 6.1 SERVICE CALL CONDITIONS

### 6.1.1 SUMMARY

There are 4 levels of service call conditions.

| Level | Definition | Reset Procedure |
| :---: | :--- | :--- |
| A | To prevent the machine from being damaged, <br> the SC can only be reset by a service <br> representative (see the note below). The <br> copier cannot be operated at all. | Enter SP mode, then turn the <br> main power switch off and <br> on. |
| B | The SC can be reset by turning the main <br> power switch off and on if the SC was caused <br> by incorrect sensor detection. | Turn the operation switch or <br> main power switch off and <br> on. <br> A level B' SC can only be <br> reset by turning the main <br> power switch off and on. |
| C | The copier can be operated as usual except <br> for the unit related to the service call. | Turn the operation switch off <br> and on. |
| D | The SC history is updated. The machine can <br> be operated as usual. | The SC will not be displayed. <br> All that happens is that the <br> SC history is updated. |

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.

### 6.1.2 SC CODE DESCRIPTIONS

## SC101: Exposure lamp error

- Definition - [B]

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- [B]
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- [B]
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


## SC302-01: Charge corona output error 1

-Definition- [B]
The feedback voltage from the charge corona unit is too high.

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


## SC302-02: Charge corona output error 2

-Definition- [B]
The control PWM for the charge corona unit is too high.

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


## SC302-03: Charge corona output error 3

-Definition- [B]
The control PWM for the charge grid is too high.

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


## SC302-04: Charge corona output error 4

-Definition- [B]
The feedback voltage from the charge grid is too high.

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


## SC303-01: Charge corona wire cleaner error 1

-Definition- [B]
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


## SERVICE CALL CONDITIONS

## SC303-02: Charge corona wire cleaner error 2

-Definition- [B]
The charge corona wire cleaner motor connector is not connected.

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


## SC320: Polygon motor error

-Definition- [B]
The polygon motor does not reach its operating speed within 20 seconds after the polygon motor on signal, or the lock signal is still activated for more than 20 seconds after the polygon motor off signal.

- Possible causes -
- Polygon motor defective
- Poor connection between the polygon motor driver and the SBICU board
- SBICU board defective


## SC321: No laser writing signal (F-GATE) error 1

- Definition- [B]

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 -
- SBICU board defective
- Poor connection of the printer controller
- Printer controller defective


## SC322: 1st laser synchronization error

-Definition- [B’]
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- [B']
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 SBICU board
- SBICU defective


## SC326: 2nd laser synchronization error

-Definition- [B]
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

-Definition- [B']
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

-Definition- [B']
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


## SERVICE CALL CONDITIONS

## SC329: Laser beam pitch adjustment error

-Definition- [B]
The LD unit home position sensor does not detect an on condition while changing the LD unit position for correcting the LD position or changing the dpi.

- Possible causes -
- The laser beam pitch adjustment (SP2-109-3 and 4) was not done after replacing the NVRAM or doing an NVRAM clear.
- The laser beam pitch adjustment (SP2-109-3 and 4) was not done after replacing the LD unit.
- LD unit movement blocked because of incorrect connector routing


## SC350-1: ID sensor error 1

-Definition- [D]
One of the following ID sensor output voltages was detected twice consecutively when checking the ID sensor pattern.

1) $\mathrm{Vsp} \geq 2.5 \mathrm{~V}$
2) $\mathrm{Vsp}=0 \mathrm{~V}$

- 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


## SC350-2: ID sensor error 2

-Definition- [D]
One of the following ID sensor output voltages was detected twice consecutively when checking the ID sensor pattern.

1) $\mathrm{Vsg}<2.5 \mathrm{~V}$
2) $\mathrm{Vsg}=0 \mathrm{~V}$
3) The ID sensor output voltage is 5.0 V 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


## SC350-3: ID sensor error 3

-Definition- [D]
For 2 s during the ID sensor pattern check, the ID sensor pattern edge voltage is not 2.5 V .

- 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


## SC350-4: ID sensor error 4

-Definition- [D]
One of the following ID sensor output voltages is detected at ID sensor initialization.

1) $\mathrm{Vsg}<4.0 \mathrm{~V}$ when the maximum PWM input (255) is applied to the ID sensor.
2) $\mathrm{Vsg} \geq 4.0 \mathrm{~V}$ 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


## SC350-5: ID sensor error 5

-Definition- [D]
Vsg falls out of the adjustment target ( $4.0 \pm 0.2 \mathrm{~V}$ ) 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 drive error 1

-Definition- [B]
The machine does not detect the connection signal from the HDD.

- Possible causes -
- Poor connection between the HDD and SBICU
- The dc power connector to the HDD is disconnected
- HDD defective
- SBICU defective


## SC361: Hard disk drive error 2

- 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


## SC362: IMAC (image compression IC) error

-Definition- [B]
An error occurs during image processing in the IMAC, which handles image compression and image data transmission.

- Possible causes -
- SBICU defective


## SC363: Data Transmission Error

- Definition -

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


## SC364: Data Transmission Time-out Error

- Definition -

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


## SC365: Image storage address error

-Definition- [B]
The SBICU receives an image data output request signal for data that is not stored in memory.

- Possible causes -
- SBICU defective


## SC366: CRC Error

- Definition -

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


## SC370-01: Potential sensor error 1

Definition- [D]
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


## SC370-02: Potential sensor error 2

## Definition- [D]

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


## SC370-03: Potential sensor error 3

Definition- [D]
When adjusting VG for the unexposed drum during process control initial setting, 1000 V is applied to the charge grid, the drum potential sensor should detect a VD of about -900 V, but detects that VD is more than -970 V .

- 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


## SERVICE CALL CONDITIONS

## SC370-04: Potential sensor error 4

Definition- [D]
When adjusting the drum potential $(\mathrm{VD})$ at the process control initial setting, the drum potential sensor detects that $\mathrm{V}_{\mathrm{D}}$ is more than $\mathrm{VGG}^{\text {(grid voltage) }}$.

- 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


## SC370-05: Potential sensor error 5

Definition- [D]
When adjusting the drum potential ( $\mathrm{VH}_{\mathrm{H}}$ ) for LD power adjustment during the process control initial setting, the first time the $\mathrm{V}_{\text {н }}$ pattern is made, the drum potential sensor detects that $\mathrm{V}_{\mathrm{H}}$ is more than 500 V .

- 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


## SC370-06: Potential sensor error 6

## Definition- [D]

When adjusting VG for the unexposed drum during process control initial setting, -1000 V is applied to the charge grid, the drum potential sensor should detect a Vd of about -900 V. However, the drum potential sensor detects that $\mathrm{V}_{\mathrm{D}}$ does not become $-900+10 \mathrm{~V}$ after 5 attempts.

- 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


## SC370-07: Potential sensor error 7

Definition- [D]
When adjusting the drum potential (VH) for half tone at the process control initial setting, the drum potential sensor detects that VH does not become $-300+20 \mathrm{~V}$ even though the LD power has been changed twenty times five times.

- 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
- Poor drum cleaning


## SC390-1: TD sensor error 1

-Definition- [B]
The TD sensor output voltage is less than 0.5 V or more than 4.0 V 10 times consecutively during copying.

- Possible causes -
- TD sensor defective
- Poor connection between the TD sensor and the I/O board (IOB)
- I/O board (IOB) defective


## SC390-2: TD sensor error 2

-Definition- [B]
One of the following TD sensor output voltages is detected during TD sensor initial setting.

1) Less than 2.5 V when the maximum PWM (255) is applied to the TD sensor.
2) 2.5 V or more when minimum PWM (0) is applied to the TD sensor.

- Possible causes -
- TD sensor defective
- Poor connection between the TD sensor and the I/O board (IOB)
- I/O board (IOB) defective


## SERVICE CALL CONDITIONS

## SC390-3: TD sensor error 3

-Definition- [B]
The TD sensor output voltage is not adjusted to $2.5+0.1 \mathrm{~V}$ within 20 s during TD sensor initial setting.

- Possible causes -
- TD sensor defective
- Poor connection between the TD sensor and the I/O board (IOB)
- I/O board (IOB) defective


## SC391: Development bias leak

-Definition- [B]
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


## SC401-1: Transfer roller leak error

-Definition- [B]
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.


## SC401-2: Transfer roller open error

-Definition- [B]
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- [D]
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: Drum motor lock

-Definition- [B]
The drum motor lock signal is longer than 2 seconds while the drum motor is on.

- Possible causes -
- Too much load on the drive mechanism
- Drum motor defective
- Poor drum motor connector connection
- Interface board defective


## SC441: Development motor lock

-Definition- [B]
The development motor lock signal is longer than 2 seconds while the development motor is on.

- Possible causes -
- Too much load on the drive mechanism
- Development motor defective
- Poor drum motor connector connection
- Interface board defective


## SC491: Polygonal mirror cooling fan motor lock

-Definition- [B]
The polygonal mirror cooling fan motor lock signal is longer than 5 seconds while the polygonal mirror cooling fan motor is on.

- Possible causes -
- Too much load on the drive mechanism
- Polygonal mirror cooling fan motor defective
- Poor drum motor connector connection


## SC495: Toner recycling unit error

-Definition- [B]
The toner recycling sensor output signal does not change within 500 ms when the drum motor turns on.

- Possible causes -
- Too much load on the drive mechanism
- Toner recycling clutch defective
- Toner recycling clutch connector connection
- Toner recycling sensor connector connection


## SERVICE CALL CONDITIONS

## SC496: Toner collection bottle error

-Definition- [B]
The toner collection bottle set switch remains off.

- Possible causes -
- No toner collection bottle
- Toner collection bottle switch defective


## SC497: Toner recycling motor error

-Definition- [B]
The toner recycling motor connector set signal remains off.

- Possible causes -
- The toner recycling motor connector is disconnected.


## SC501: 1st tray lift malfunction

-Definition- [C]
One of following conditions is detected in the 1st tray.

1) The 1 st lift sensor is not activated after the tray lift motor has been on for 10 seconds.
2) The 1 st lift sensor is already activated when the 1 st tray is placed in the machine.

- Possible causes -
- 1st lift sensor defective
- 1st tray lift motor defective
- Poor 1st tray lift motor connection


## SC502: 2nd tray lift malfunction

-Definition- [C]
One of following conditions is detected in the 2nd tray.

1) The 2nd lift sensor is not activated after the tray lift motor has been on for 10 seconds.
2) The 2nd lift sensor is already activated when the 2nd tray is placed in the machine.

- Possible causes -
- 2nd lift sensor defective
- 2nd tray lift motor defective
- Poor 2nd tray lift motor connection


## SC503: 3rd tray lift malfunction

-Definition- [C]
One of following conditions is detected in the 3rd tray.

1) The 3rd lift sensor is not activated after the tray lift motor has been on for 10 seconds.
2) The 3rd lift sensor is already activated when the 3rd tray is placed in the machine.

- Possible causes -
- 3rd lift sensor defective
- 3rd tray lift motor defective
- Poor 3rd tray lift motor connection


## SC506: Paper feed motor lock

-Definition- [C]
A paper feed motor lock signal is detected for more than 50 ms during rotation.

- Possible causes -
- Paper feed motor defective
- Too much load on the drive mechanism
- Poor paper feed motor connector connection


## SC507: LCT motor lock (optional LCT)

-Definition- [C]
A main motor lock signal is detected for more than 50 ms during rotation.

- Possible causes -
- LCT motor defective
- Too much load on the drive mechanism
- Poor motor connector connection


## SERVICE CALL CONDITIONS

## SC508: Tandem rear fence motor error

-Definition- [C]
One of following conditions is detected in the tandem tray.

1) When the tray is placed in the machine, the rear fence return sensor and the rear fence HP sensor are already on.
2) It takes 10 seconds or more for the rear fence return sensor to detect the on condition after the rear fence motor starts.
3) It takes 10 seconds or more for the rear fence HP sensor to detect the on condition after this fence starts moving to the home position.

- Possible causes -
- Rear fence motor defective
- Too much load on the drive mechanism
- Poor motor connector connection


## SC509: Tandem side fence motor error 1

-Definition- [C]
One of following conditions is detected in the tandem tray.

1) When the side fence motor turns on to open the side fence, the side fence positioning sensor does not detect an on condition for 2 seconds or more.
2) When the side fence motor turns on to close the side fence, the side fence close sensor does not detect an on condition for 2 seconds or more.

- Possible causes -
- Side fence motor defective
- Too much load on the drive mechanism
- Poor motor connector connection


## SC510: LCT tray malfunction (optional LCT)

-Definition- [C]

1) The LCT lift sensor does not activate for more than 18 seconds after the LCT motor starts to lift the bottom plate.
2) The LCT down sensor does not activate for more than 18 seconds after the LCT motor starts to lower the bottom plate.
3) The LCT lift sensor is already activated when the LCT cover is closed after paper is loaded.
4) During paper lifting, the LCT lift sensor does not activate for more than 2.5 seconds after the paper end sensor turned on.

- Possible causes -
- LCT lift motor defective
- Pick-up solenoid defective
- Poor motor connector connection
- Poor pick-up solenoid connector connection
- Paper end sensor defective
- LCT lift sensor defective
- LCT lower limit sensor defective


## SC511: Tandem side fence motor error 2

-Definition- [C]
When the side fence motor turns on to close the side fence, the side fence close sensor does not detect an on condition for 2 seconds or more.

- Possible causes -
- Side fence motor defective
- Too much load on the drive mechanism
- Poor motor connector connection


## SC521-1: Duplex jogger motor error 1

-Definition-[C]
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
- Too much load on the drive mechanism
- Poor motor connector connection


## SERVICE CALL CONDITIONS

## SC521-2: Duplex jogger motor error 2

-Definition- [C]
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
- Too much load on the drive mechanism
- Poor motor connector connection


## SC530: By-pass feed motor lock

-Definition- [C]
A by-pass feed motor lock signal is detected for more than 20s during rotation.

- Possible causes -
- By-pass feed motor defective
- Too much load on the drive mechanism
- Poor by-pass feed motor connector connection
- IOB defective


## SC531: Fusing/duplex motor lock

-Definition- [C]
A fusing/duplex motor lock signal is detected for more than 2 s during rotation.

- Possible causes -
- Fusing/duplex motor defective
- Too much load on the drive mechanism
- Poor fusing/duplex motor connector connection
- IOB defective


## SC541: Fusing thermistor open

-Definition- [A]
The fusing temperature detected by the thermistor was below $7^{\circ} \mathrm{C}$ for 16 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
- SBICU defective
- Power supply board defective
- Poor fusing unit connection


## SC543: Fusing overheat error 1

-Definition- [A]
A fusing temperature of over $231^{\circ} \mathrm{C}$ is detected for 5 seconds by the fusing thermistor.

- Possible causes -
- Fusing thermistor defective
- SBICU defective
- I/O board (IOB) 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]
The fusing temperature goes $20^{\circ} \mathrm{C}$ below or $20^{\circ} \mathrm{C}$ over the stand-by temperature after warm-up is completed.

- Possible causes -
- Poor thermistor connector connection
- Poor fusing unit connection


## SERVICE CALL CONDITIONS

## SC547: Zero cross signal malfunction

-Definition- [A]
Zero cross signals are not detected within a certain period after the main power switch has been turned on.

- Possible causes -
- Power supply board defective
- Noise on the ac power line


## SC590: Toner collection motor error

-Definition- [B]
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 SBICU and SBU

-Definition- [B']
The SBICU cannot communicate with the SBU board properly.

- Possible causes -
- Poor connection between the SBICU and SBU
- SBU defective
- SBICU defective


## SC602: Communication error between SBICU and HDD controller

-Definition- [B]
The SBICU cannot communicate with the HDD controller properly.

- Possible causes -
- Poor connection between the SBICU board and HDD control board
- SBICU board defective


## SC620-1: Communication error between SBICU and ADF 1

-Definition- [B]
The TXD and RXD signals between SBICU and ADF main board do not stabilize.

- Possible causes -
- Poor connection between the SBICU board and ADF main board
- Noise on interface cable


## SC620-2: Communication error between SBICU and ADF 2

-Definition- [B]
The TXD and RXD signals between SBICU and ADF main board do not stabilize.

- Possible causes -
- Poor connection between the SBICU board and ADF main board
- ADF main board defective
- SBICU board defective


## SC620-3: Communication error between SBICU and ADF 3

-Definition- [B]
Software error after abnormal user operation.

- Possible causes -
- Software error
$\Rightarrow$ SC621-1: Communication error between SBICU board and Finisher
-Definition- [B]
If ACK does not return within 100 msec . after data has been sent from the SBICU board to the finisher, the data is resent. Even if data has been has been sent three times, the ACK does not return.
-Possible Cause-
- Poor connection between the SBICU board and the Finisher Main Board
- Finisher main board defective
- SBICU board defective


## $\Rightarrow$ SC621-2: Communication error between SBICU Board and Finisher.

-Definition- [B]
During communication between the finisher main board and the SBICU board, a break signal is sent from the finisher main board.
-Possible Cause-

- Poor connection between the SBICU Board and the Finisher Main Board
- Finisher main board defective
- SBICU board defective


## SC623: Communication error between SBICU and paper feed board

-Definition- [B]
The SBICU cannot communicate with the paper feed board properly.

- Possible causes -
- Poor connection between the SBICU board and the paper feed board
- Paper feed board defective
- SBICU board defective
- Noise on interface cable


## SC624: Communication error between SBICU and LCT

-Definition- [B]
The SBICU cannot communicate with the LCT properly.

- Possible causes -
- Poor connection between the SBICU board and the LCT interface board
- LCT interface board defective
- SBICU board defective
- Noise on interface cable

SC630: CSS (RSS) communication error between line adapter and CSS center (Japan only)

## SC700: ADF original pick-up malfunction

-Definition- [B]
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 table lift-up malfunction

-Definition- [B']
The bottom plate position sensor does not activate when the original table motor lifts the original table.

- Possible causes -
- Bottom plate H.P sensor defective
- Bottom plate motor defective
- ADF main board defective
- Bottom plate position sensor defective


## 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


## SERVICE CALL CONDITIONS

## 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


## SC900: Electrical total counter error

-Definition- [A]
The total counter contains something that is not a number.

- Possible causes -
- NVRAM defective


## SC951: F-gate signal error 2

-Definition- [B’]
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- [B']
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- [B']
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- [B']
The settings that are required for image processing using the memory are not sent from the IPU.

- Possible causes -
- Software defective


## SERVICE CALL CONDITIONS

## SC959: Printer setting ID error

-Definition- [B']
The ID that is required for image processing using the printer is not sent from the IPU.

- Possible causes -
- Software defective


## SC960: Printer return ID error

-Definition- [B']
The ID that is sent from the printer controller after finishing the printout is incorrect.

- Possible causes -
- Software defective


## SC961: Printer ready ID error

-Definition- [B']
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- [B']
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- [B']
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- [B']
The print ready signal is not generated for more than 17 seconds after the IPU received the print start signal.

- Possible causes -
- Software defective


## SC980: HDD access error

-Definition- [B]
Incorrect parameter sent to the HDD controller.

- Possible causes -
- Software defective
- SBICU defective


## SC981: HDD response error

-Definition- [B']
The HDD controller does not generate any response when the IPU sends a read/write signal to the HDD controller.

- Possible causes -
- Software defective
- HDD defective


## SC982: HDD construction error

-Definition- [B']
A HDD that does not have the correct specifications has been installed.

- Possible causes -
- Hard disk defective
- Incorrect hard disk type


## SERVICE CALL CONDITIONS

## SC990: Software performance error

-Definition- [B']
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

### 6.2 ELECTRICAL COMPONENT DEFECTS

### 6.2.1 SENSORS

| Component (Symbol) | CN | Condition | Symptom |
| :---: | :---: | :---: | :---: |
| Scanner Home Position (S1) | $\begin{aligned} & \text { CN312-7 } \\ & \text { (SBICU) } \end{aligned}$ | Stays On | SC121 is displayed. |
|  |  | Stays Off | SC120 is displayed. |
| Original Width (S2) | $\begin{gathered} \text { CN312- } \\ \text { 4.5.6 } \\ \text { (SBICU) } \end{gathered}$ | Stays On | The CPU cannot detect the original size properly. APS and AR/E do not function correctly. |
|  |  | Stays Off | The CPU cannot detect the original size properly. APS and AR/E do not function correctly. |
| Original Length-1 (S3) | $\begin{aligned} & \hline \text { CN305-7 } \\ & \text { (SBICU) } \end{aligned}$ | Stays On | The CPU cannot detect the original size properly. APS and AR/E do not function correctly. |
|  |  | Stays Off | The CPU cannot detect the original size properly. APS and AR/E do not function correctly. |
| Original Length-2 (S4) | $\begin{array}{\|l\|} \hline \text { CN314-3 } \\ \text { (SBICU) } \end{array}$ | Stays On | The CPU cannot detect the original size properly. APS and AR/E do not function correctly. |
|  |  | Stays Off | The CPU cannot detect the original size properly. APS and AR/E do not function correctly. |
| LD Unit Home Position (S5) | $\begin{gathered} \text { CN218-8 } \\ (\mathrm{IOB}) \end{gathered}$ | 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) | CN206A12 (IOB) | Open | The machine quits auto process control and enters fixed toner supply mode. |
| $\begin{aligned} & \text { Toner Density } \\ & \text { (TD) (S7) } \end{aligned}$ | CN211-B6(IOB) | Stays On | SC390-01 is displayed. |
|  |  | Stays Off | SC390-01 is displayed. |
| Image Density <br> (ID) (S8) | CN206B11 (IOB) | Open | SC350-03 is displayed after copying. |
|  |  | Shorted | SC350-01 is displayed after copying. |
| Toner End (S9) | CN211B2 (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) | $\begin{gathered} \hline \text { CN268-7 } \\ \text { (PFB) } \end{gathered}$ | Stays On | SC495 is displayed. |
|  |  | Stays Off | SC495 is displayed. |
| $\begin{aligned} & \text { Recycle Toner } \\ & \text { (S11) } \end{aligned}$ | $\begin{gathered} \text { CN207- } \\ \text { B2 } \\ \text { (IOB) } \\ \hline \hline \end{gathered}$ | Stays On | SC495 is displayed. |
|  |  | Stays Off | SC495 is displayed. |

## ELECTRICAL COMPONENT DEFECTS

| Component (Symbol) | CN | Condition | Symptom |
| :---: | :---: | :---: | :---: |
| 1st Paper Feed (S12) | $\begin{gathered} \text { CN269- } \\ \text { A2 } \\ \text { (PFB) } \end{gathered}$ | Stays On | "Paper Jam" is displayed even if there is no paper. |
|  |  | Stays Off | "Paper Jam" is displayed whenever a copy is made. |
| 2nd Paper <br> Feed (S13) | $\begin{gathered} \text { CN269- } \\ \text { B2 } \\ \text { (PFB) } \end{gathered}$ | Stays On | "Paper Jam" is displayed even if there is no paper. |
|  |  | Stays Off | "Paper Jam" is displayed whenever a copy is made. |
| $\begin{gathered} \text { 3rd Paper Feed } \\ (\mathrm{S} 14) \end{gathered}$ | $\begin{gathered} \text { CN270-2 } \\ (\mathrm{PFB}) \end{gathered}$ | Stays On | "Paper Jam" is displayed even if there is no paper. |
|  |  | Stays Off | "Paper Jam" is displayed whenever a copy is made. |
| 1st Lift (S15) | $\begin{gathered} \hline \text { CN269- } \\ \text { A8 } \\ \text { (PFB) } \\ \hline \end{gathered}$ | Stays On | SC501 is displayed. |
|  |  | Stays Off | SC501 is displayed. |
| 2nd Lift (S16) | $\begin{gathered} \text { CN269- } \\ \text { B8 } \\ \text { (PFB) } \\ \hline \end{gathered}$ | Stays On | SC502 is displayed. |
|  |  | Stays Off | SC502 is displayed. |
| 3rd Lift (S17) | $\begin{gathered} \text { CN270-8 } \\ \text { (PFB) } \\ \hline \end{gathered}$ | Stays On | SC503 is displayed. |
|  |  | Stays Off | SC503 is displayed. |
| $\begin{aligned} & \text { 1st Paper End } \\ & \text { (S18) } \end{aligned}$ | $\begin{gathered} \text { CN269- } \\ \text { A5 } \\ \text { (PFB) } \end{gathered}$ | 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) | $\begin{gathered} \hline \text { CN269- } \\ \text { B5 } \\ \text { (PFB) } \end{gathered}$ | 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) | $\begin{aligned} & \hline \text { CN270-5 } \\ & \text { (PFB) } \end{aligned}$ | 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. |
| $\begin{gathered} \hline \text { By-pass Paper } \\ \text { End (S21) } \end{gathered}$ | $\begin{gathered} \hline \text { CN211- } \\ \text { A5 } \\ \text { (IOB) } \end{gathered}$ | 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. |
| $\begin{aligned} & \text { 1st Near End } \\ & \text { (S22) } \end{aligned}$ | $\begin{array}{\|c\|} \hline \text { CN262-2 } \\ \text { (PFB) } \end{array}$ | 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. |
| $\begin{aligned} & \text { 2nd Near End } \\ & \text { (S23) } \end{aligned}$ | $\begin{gathered} \text { CN262-5 } \\ \text { (PFB) } \end{gathered}$ | 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. |


| Component (Symbol) | CN | Condition | Symptom |
| :---: | :---: | :---: | :---: |
| $\begin{aligned} & \text { 3rd Near End } \\ & \text { (S24) } \end{aligned}$ | $\begin{gathered} \hline \text { CN263-2 } \\ \text { (PFB) } \end{gathered}$ | 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. |
| $\begin{aligned} & \hline \text { Rear Fence HP } \\ & \text { (S25) } \end{aligned}$ | $\begin{gathered} \hline \text { CN264- } \\ \text { B6 } \\ \text { (PFB) } \\ \hline \end{gathered}$ | Stays On | SC508 is displayed |
|  |  | Stays Off | SC508 is displayed |
| Rear Fence Return (S26) | $\begin{gathered} \text { CN264- } \\ \text { B10 } \\ \text { (PFB) } \\ \hline \end{gathered}$ | Stays On | SC508 is displayed |
|  |  | Stays Off | SC508 is displayed |
| $\begin{aligned} & \hline \text { Side Fence } \\ & \text { Close (S27) } \end{aligned}$ | $\begin{gathered} \text { CN264- } \\ \text { A7 } \\ \text { (PFB) } \end{gathered}$ | Stays On | SC511 is displayed |
|  |  | Stays Off | SC509 is displayed |
| Side Fence Position (S28) | $\begin{gathered} \text { CN264- } \\ \text { A14 } \\ \text { (PFB) } \\ \hline \end{gathered}$ | Stays On | SC511 is displayed |
|  |  | Stays Off | SC509 is displayed |
| Base Plate <br> Down (S29) | $\begin{gathered} \text { CN264- } \\ \text { A11 } \\ \text { (PFB) } \end{gathered}$ | Stays On | The bottom plate is not lowered when paper in the tray shifts to the right tray. SC511 will be displayed. |
|  |  | Stays Off | The bottom plate lift lever locks at the lowest position. |
| Left TandemTray Paper End(S30) | $\begin{gathered} \hline \text { CN264- } \\ \text { B12 } \\ \text { (PFB) } \end{gathered}$ | Stays On | The paper in the left tray is not moved to the right tray. |
|  |  | Stays Off | The rear fence moves back and forth continuously. |
| $\begin{aligned} & \text { 3rd Tray Paper } \\ & \text { (S31) } \end{aligned}$ | $\begin{gathered} \text { CN274- } \\ 12 \\ \text { (PFB) } \end{gathered}$ | Stays On | The bottom plate does not rise even if there is paper in the tray. |
|  |  | Stays Off | The bottom plate rises and falls even if there is no paper. |
| Tray Down (S32) | $\begin{aligned} & \hline \text { CN274-5 } \\ & \text { (PFB) } \end{aligned}$ | Stays On | When the bottom plate lowers, it locks at the lowest position. (SC510) |
|  |  | Stays Off | "Paper End" is displayed even if there is paper in the tray. |
| Duplex Entrance (S33) | CN208B14 (IOB) | Stays On | "Paper Jam" is displayed even if there is no paper. |
|  |  | Stays Off | "Paper Jam" is displayed whenever a copy is made. |
| DuplexTransport 1(S34) | $\begin{gathered} \text { CN208- } \\ \text { B5 } \\ \text { (IOB) } \end{gathered}$ | Stays On | "Paper Jam" is displayed whenever a copy is made. |
|  |  | Stays Off | "Paper Jam" is displayed even if there is no paper. |
| $\begin{gathered} \text { Duplex } \\ \text { Transport } 2 \\ \text { (S35) } \end{gathered}$ | $\begin{gathered} \hline \text { CN208- } \\ \text { B11 } \\ \text { (IOB) } \end{gathered}$ | 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) | CN | Condition | Symptom |
| :---: | :---: | :---: | :---: |
| Duplex Transport 3 (S36) | $\begin{gathered} \text { CN208- } \\ \text { B11 } \\ \text { (IOB) } \end{gathered}$ | Stays On | "Paper Jam" is displayed whenever a copy is made. |
|  |  | Stays Off | "Paper Jam" is displayed even if there is no paper. |
| $\begin{gathered} \text { Duplex Jogger } \\ \text { HP (S37) } \end{gathered}$ | $\begin{gathered} \text { CN208- } \\ \text { B2 } \\ \text { (IOB) } \\ \hline \end{gathered}$ | Stays On | SC521-02 is displayed. |
|  |  | Stays Off | SC521-01 is displayed. |
| Relay (S38) | $\begin{gathered} \text { CN211- } \\ \text { A8 } \\ \text { (IOB) } \end{gathered}$ | Stays On | "Paper Jam" is displayed even if there is no paper. |
|  |  | Stays Off | "Paper Jam" is displayed whenever a copy is made. |
| Registration (S39) | $\begin{gathered} \hline \text { CN211- } \\ \text { A1 } \\ \text { (IOB) } \end{gathered}$ | Stays On | "Paper Jam" is displayed even if there is no paper. |
|  |  | Stays Off | "Paper Jam" is displayed whenever a copy is made. |
| $\begin{gathered} \text { Guide Plate } \\ \text { Position (S40) } \end{gathered}$ | $\begin{gathered} \text { CN209-6 } \\ (\mathrm{IOB}) \end{gathered}$ | 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. |
| $\begin{aligned} & \text { Fusing Exit } \\ & \text { (S41) } \end{aligned}$ | $\begin{gathered} \text { CN204- } \\ \text { B2 } \\ \text { (IOB) } \end{gathered}$ | Stays On | "Paper Jam" is displayed whenever a copy is made. |
|  |  | Stays Off | "Paper Jam" is displayed even if there is no paper. |
| $\begin{aligned} & \text { Paper Exit } \\ & \text { (S42) } \end{aligned}$ | $\begin{gathered} \text { CN204- } \\ \text { B5 } \\ \text { (IOB) } \end{gathered}$ | 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 (S43) | $\begin{gathered} \text { CN204- } \\ \text { B8 } \\ \text { (IOB) } \\ \hline \end{gathered}$ | Stays On | Paper jams may occur. |
|  |  | Stays Off | "Paper Full on Exit Tray" is displayed. |

NOTE: "Stays on" means that the actuator is in the sensor for a photointerrupter.

### 6.2.2 SWITCHES

| Component (Symbol) | CN | Condition | Symptom |
| :---: | :---: | :---: | :---: |
| Main Power (SW1) | $\begin{gathered} \hline \text { CN100- } \\ 1,2,3,4 \\ \text { (PSU) } \end{gathered}$ | Open | The machine does not turn on. |
|  |  | Shorted | The machine does not turn off. |
| Front DoorSafety (SW3,5) | $\begin{gathered} \text { CN103- } \\ 1,2 \\ \text { (LDDR) } \end{gathered}$ | Open | SC322 is displayed. |
|  |  | Shorted | - - |
| $\begin{gathered} \text { Front Door } \\ \text { Safety (SW4) } \end{gathered}$ | $\begin{gathered} \text { CN152- } \\ 1,2,3,4,5, \\ 6 \\ \text { (I/F } \\ \text { Board) } \end{gathered}$ | Open | "Close the Door" is displayed even if the front cover is closed. SC440, 441, or 531 is displayed. |
|  |  | Shorted | "Close the Door" is not displayed even if the front cover is opened. |
| Lower Front Door Safety (SW6) | $\begin{gathered} \text { CN266- } \\ 1,3 \\ \text { (PFB) } \\ \hline \end{gathered}$ | Open | SC506 is displayed. |
|  |  | Shorted |  |
| TonerCollectionBottle (SW7) | $\begin{gathered} \hline \text { CN268- } \\ 10 \\ \text { (PFB) } \end{gathered}$ | 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) | $\begin{gathered} \hline \text { CN268- } \\ 12 \\ \text { (PFB) } \end{gathered}$ | 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. |
| $\begin{gathered} \hline \text { Paper Size } \\ \text { (SW9) } \end{gathered}$ | $\begin{gathered} \hline \text { CN262- } \\ 7,8,9,10, \\ 11,12 \\ (\text { PFB }) \\ \hline \end{gathered}$ | Open | The CPU cannot detect the proper paper size, and misfeeds may occur when a copy is made. |
|  |  | Shorted |  |
| 3rd Tray Down (SW10) | CN274-2 <br> (PFB) | Open | The 3rd tray bottom plate stays at its lowest position. |
|  |  | Shorted | The 3rd tray bottom plate stays at its highest position. |
| By-pass Tray(SW11) | $\begin{gathered} \hline \text { CN211- } \\ \text { B8 } \\ \text { (IOB) } \\ \hline \end{gathered}$ | Open | "Open the by-pass tray" is displayed even if the by-pass tray is open. |
|  |  | Shorted | - |

### 6.3 BLOWN FUSE CONDITIONS

| Fuse | Rating |  | Symptom when turning on the main power switch |
| :---: | :---: | :---: | :---: |
|  | 115V | 210 ~ 230V |  |
| Power Supply Board |  |  |  |
| $\begin{gathered} \text { FU101 } \\ \text { 120VAC } \end{gathered}$ | 12A/250V | 6.3A/250V | No response |
| $\begin{aligned} & \text { FU102 } \\ & \text { 24VDC } \end{aligned}$ | 6.3A/125V | 6.3A/125V | SC521-02 is displayed. |
| $\begin{aligned} & \hline \text { FU103 } \\ & \text { 24VDC } \end{aligned}$ | 6.3A/125V | 6.3A/125V | SC391-01 and "Paper Jam" is displayed. When cleared, SC441 is displayed |
| $\begin{aligned} & \text { FU104 } \\ & \text { 24VDC } \end{aligned}$ | 6.3A/125V | 6.3A/125V | SC401-02 is displayed after the print key is pressed. Finisher does not work |
| $\begin{aligned} & \text { FU105 } \\ & \text { 24VDC } \end{aligned}$ | 6.3A/125V | 6.3A/125V | The ADF does not work and SC391 is displayed |
| $\begin{aligned} & \text { FU106 } \\ & \text { 24VDC } \end{aligned}$ | 6.3A/125V | 6.3A/125V | SC121 is displayed. |
| $\begin{aligned} & \hline \text { FU107 } \\ & \text { 24VDC } \end{aligned}$ | 6.3A/125V | 6.3A/125V | If the 1st tray is selected, SC501 is displayed. <br> If the 2nd tray is selected, SC502 is displayed. |
| $\begin{aligned} & \text { FU108 } \\ & \text { 24VDC } \end{aligned}$ | 4A/125V | 4A/125V | No display on the operation panel. |
| $\begin{aligned} & \text { FU109 } \\ & \text { 12VDC } \end{aligned}$ | 2A/125V | 2A/125V | "Please wait" remains in the display. |
| $\begin{gathered} \text { FU110 } \\ \text { 5VDC } \end{gathered}$ | 5A/125V | 5A/125V | No display on the operation panel and the scanner motor keeps returning the scanner to home position. |
| $\begin{aligned} & \text { FU111 } \\ & \text { 5VDC } \end{aligned}$ | 5A/125V | 5A/125V | No response |
| $\begin{aligned} & \text { FU112 } \\ & \text { 12VDC } \end{aligned}$ | 2A/125V | 2A/125V | SC401-01 is displayed after the Print key is pressed. |
| FU113 5VDC | 5A/125V | 5A/125V | The machine continuously reports a misfeed, shuts down and restarts. |
| $\begin{aligned} & \text { FU114 } \\ & \text { 5VDC } \end{aligned}$ | 5A/125V | 5A/125V | No display LCT motor and paper feed solenoid engage. |
| FU115 5VDC | 5A/125V | 5A/125V | SC401-02 is displayed after the Print key is pressed. |
| $\begin{aligned} & \text { FU116 } \\ & \text { 24VDC } \end{aligned}$ | 6.3A/125V | $6.3 \mathrm{~A} / 125 \mathrm{~V}$ | SC401-02 is displayed after the Print key is pressed. |

FINISHER A697

## 1. OVERALL MACHINE INFORMATION

### 1.1 SPECIFICATIONS

The punch unit is an option for this machine.

Paper Size:

Paper Weight:

Paper Capacity:

No punch mode
Shift Tray: A3 to B5/DLT to LT
(B6 lengthwise in no shift mode and no staple mode)
Upper Tray: A3 to A6 lengthwise/DLT to HLT
Punch mode
2 holes: A3 to A5/DLT to LT
3 holes: A3, B4, A4 sideways, B5 sideways DLT, LT sideways

No punch mode
No staple mode: $52 \mathrm{~g} / \mathrm{m}^{2} \sim 157 \mathrm{~g} / \mathrm{m}^{2}, 14 \sim 42 \mathrm{lb}$
Staple mode: $\quad 64 \mathrm{~g} / \mathrm{m}^{2} \sim 80 \mathrm{~g} / \mathrm{m}^{2}, 17 \sim 21 \mathrm{lb}$
Punch mode
2 holes: $52 \mathrm{~g} / \mathrm{m}^{2} \sim 128 \mathrm{~g} / \mathrm{m}^{2}, 14 \sim 34 \mathrm{lb}$
3 holes: $52 \mathrm{~g} / \mathrm{m}^{2} \sim 105 \mathrm{~g} / \mathrm{m}^{2}, 14 \sim 28 \mathrm{lb}$
Shift tray/no staple mode ( $80 \mathrm{~g} / \mathrm{m}^{2}, 20 \mathrm{lb}$ ):

|  | Punch mode | No punch mode |
| :---: | :---: | :---: |
| A4 sideways <br> LT sideways | 2,500 sheets | 3,000 sheets |
| Other sizes | 1,500 sheets | 1,500 sheets |

Shift tray/staple mode/punch mode ( $80 \mathrm{~g} / \mathrm{m}^{2}, 20 \mathrm{lb}$ ):

|  | Pages/set | Sets |
| :---: | :---: | :---: |
| B5, A4 lengthwise <br> LT lengthwise | 2 to 9 | 150 |
|  | 10 to 40 | 150 to 37 |
| A4 <br> LT sideways | 2 to 9 | 150 |
|  | 10 to 40 | 250 to 63 |
| Other sizes | 2 to 9 | 100 |
|  | 10 to 25 | 150 to 60 |

Shift tray/staple mode/no punch mode ( $80 \mathrm{~g} / \mathrm{m}^{2}, 20 \mathrm{lb}$ ):

|  | Pages/set | Sets |
| :---: | :---: | :---: |
| B5, A4 lengthwise <br> LT lengthwise | 2 to 9 | 150 |
|  | 10 to 50 | 150 to 30 |
| A4 sideways <br> LT sideways | 2 to 9 | 150 |
|  | 10 to 50 | 300 to 60 |
|  | 2 to 9 | 100 |

Upper tray ( $80 \mathrm{~g} / \mathrm{m}^{2}, 20 \mathrm{lb}$ ):

|  | Punch mode | No punch mode |
| :---: | :---: | :---: |
| A4/LT or smaller | 200 sheets | 250 sheets |
| Larger than A4/LT | 50 sheets | 50 sheets |

Stapler Capacity (pages/set, $80 \mathrm{~g} / \mathrm{m}^{2}, 20 \mathrm{lb}$ paper):

|  | Punch mode | No punch mode |
| :---: | :---: | :---: |
| A4/LT or smaller | 40 sheets | 50 sheets |
| Larger than A4/LT | 25 sheets | 30 sheets |

Staple Position: 4 positions

1 staple: 3 positions
(Front, Rear, Rear-Oblique)
2 staple: 1 position
Staple Replenishment: Cartridge (5,000 staples)
Power Source:
24 Vdc (from copier)
Power Consumption: 48 W
Weight: $\quad 45 \mathrm{~kg}$
Size (W x D x H): $\quad 625 \mathrm{~mm} \times 545 \mathrm{~mm} \times 960 \mathrm{~mm}$

### 1.2 MECHANICAL COMPONENT LAYOUT



1. Upper Tray
2. Upper Tray Exit Roller
3. Upper Transport Roller
4. Tray Junction Gate
5. 1st Entrance Roller
6. Punch Unit
7. 2nd Entrance Roller
8. Punch Waste Hopper
9. Stapler Junction Gate
10. Lower Transport Rollers
11. Alignment Brush Roller
12. Stapler
13. Positioning Roller
14. Stack Feed-out Belt
15. Middle Transport Roller
16. Shift Tray Exit Roller
17. Shift Tray

### 1.3 ELECTRICAL COMPONENT LAYOUT



1. Shift Tray Lift Motor
2. Shift Tray Exit Motor
3. Upper Transport Motor
4. Tray Junction Gate Solenoid
5. Punch Board
6. Punch Motor
7. Punch HP Sensor
8. Hopper Sensor
9. Entrance Sensor
10. Main Board
11. Positioning Roller Solenoid
12. Lower Transport Motor
13. Front Door Safety Switch
14. Stapler Tray Entrance Sensor
15. Shift Tray Lower Limit 1 Sensor
16. Shift Tray Lower Limit 2 Sensor
17. Stapler Motor
18. Stapler Rotation Motor
19. Stapler Rotation HP Sensor
20. Stapler HP Sensor
21. Staple End Switch
22. Cartridge Set Switch
23. Staple Hammer HP Sensor
24. Staple Hammer Motor
25. Stapler Tray Paper Sensor
26. Stack Feed-out Belt HP Sensor
27. Jogger Fence HP Sensor
28. Jogger Motor
29. Stack Feed-out Motor
30. Shift Tray Half-turn Sensor
31. Shift Motor
32. Shift Tray Exit Sensor
33. Stack Height 2 Sensor
34. Stack Height 1 Sensor
35. Shift Tray Upper Limit Switch
36. Stapler Junction Gate Solenoid
37. Upper Tray Paper Limit Sensor
38. Upper Tray Exit Sensor

### 1.4 ELECTRICAL COMPONENT DESCRIPTION

| Symbol | Name | Function | Index No. |
| :---: | :---: | :---: | :---: |
| Motors |  |  |  |
| M1 | Upper Transport | Drives the entrance rollers, the middle and upper transport rollers, and upper tray exit roller. | 3 |
| M2 | Lower Transport | Drives the lower transport rollers, the alignment brush roller, and the positioning roller. | 12 |
| M3 | Jogger | Moves the jogger fence. | 28 |
| M4 | Stapler | Moves the staple unit from side to side. | 17 |
| M5 | Stapler Rotation | Rotates the stapler 45 degrees. | 18 |
| M6 | Staple Hammer | Drives the staple hammer. | 24 |
| M7 | Stack Feed-out | Drives the stack feed-out belt. | 29 |
| M8 | Shift Tray Exit | Drives the exit roller for the shift tray. | 2 |
| M9 | Shift | Moves the shift tray from side to side. | 31 |
| M10 | Shift Tray Lift | Moves the shift tray up or down. | 1 |
| M11 | Punch | Drives the punch shaft and roller. | 6 |
| Sensors |  |  |  |
| S1 | Entrance | Detects the copy paper entering the finisher and checks for misfeeds. | 9 |
| S2 | Stapler Tray Entrance | Detects the copy paper entering the staple tray and checks for misfeeds. | 14 |
| S3 | Jogger Fence HP | Detects the home position of the jogger fence. | 27 |
| S4 | Stapler Tray Paper | Detects the copy paper in the staple tray. | 25 |
| S5 | Stapler HP | Detects the home position of the staple unit for side-to-side movement. | 20 |
| S6 | Stapler Rotation HP | Detects the home position of the stapler unit for 45-degree rotation. | 19 |
| S7 | Staple Hammer HP | Detects the home position of the staple hammer. | 23 |
| S8 | Stack Feed-out Belt HP | Detects the home position of the stack feedout belt. | 26 |
| S9 | Shift Tray Exit | Checks for misfeeds at the shift tray. | 32 |
| S10 | Stack Height 1 | Detects when the top of the copy paper stack in the shift tray is at the correct position. | 34 |
| S11 | Stack Height 2 | Detects when the top of the copy paper stack in the shift tray has become too high. | 33 |
| S12 | Upper Tray | Checks for misfeeds at the upper tray. | 38 |
| S13 | Upper Tray Paper Limit | Detects when the paper stack height in the upper tray is at its upper limit. | 37 |
| S14 | Shift Tray Half-turn | Detects the return position for side-to-side movement of the shift tray. | 30 |

## ELECTRICAL COMPONENT DESCRIPTION

| Symbol | Name | Function | Index No. |
| :---: | :---: | :---: | :---: |
| S15 | Shift Tray Lower Limit 1 | Detects when the shift tray is nearly at its lower limit. | 15 |
| S16 | Shift Tray Lower Limit 2 | Detects when the shift tray is at its lower limit. | 16 |
| S17 | Hopper | Detects when the punch waste hopper is full and detects when the punch tray is set. | 8 |
| S18 | Punch HP | Detects the home position of the punch shaft and roller. | 7 |
| Switches |  |  |  |
| SW1 | Front Door Safety | Cuts the dc power when the front door is opened. | 13 |
| SW2 | Shift Tray Upper Limit | Cuts the power to the shift tray lift motor when the shift tray position is at its upper limit. | 35 |
| SW3 | Staple End | Detects the staples in the cartridge. | 21 |
| SW4 | Cartridge Set | Detects the staple cartridge in the stapler. | 22 |
| Solenoids |  |  |  |
| SOL1 | Tray Junction Gate | Drives the tray junction gate. | 4 |
| SOL2 | Stapler Junction Gate | Drives the stapler junction gate. | 36 |
| SOL3 | Positioning Roller | Moves the positioning roller against the stapling tray. | 11 |
| PCBs |  |  |  |
| PCB1 | Main | Controls the finisher and communicates with the copier. | 10 |
| PCB2 | Punch | Passes signals between the punch unit and the finisher main board. | 5 |

### 1.5 DRIVE LAYOUT




1. Shift Tray Exit Roller
2. Shift Motor
3. Shift Tray
4. Alignment Brush Roller
5. Positioning Roller
6. Lower Transport Rollers 2 and 3
7. Lower Transport Motor
8. Middle Transport Roller
9. Lower Transport Roller 1
10. Shift Tray Exit Motor
11. 2nd Entrance Roller
12. 1st Entrance Roller
13. Upper Transport Roller
14. Upper Transport Motor
15. Upper Tray Exit Roller
16. Shift Tray Lift Motor
17. Stack Feed-out Motor
18. Jogger Motor
19. Jogger Fence
20. Stack Feed-out Belt
21. Stapler Motor
22. Stapler Rotation Motor

## 2. DETAILED DESCRIPTIONS

### 2.1 TRAY AND STAPLER JUNCTION GATE MECHANISM

- Upper tray mode -

- Sort/stack mode -


Depending on the finishing mode, the copies are directed up, straight through, or down by the combination of the tray junction gate $[A]$ and stapler junction gate [B]. These gates are controlled by the tray junction gate solenoid [C] and stapler junction gate solenoid [D].

## Upper tray mode

The tray junction gate solenoid turns on. The copies go up to the upper tray.

## Sort/stack mode

The tray junction gate solenoid and the stapler junction gate solenoid remain off. The copies are sent to the shift tray directly.

## Staple mode

The tray junction gate solenoid remains off and the stapler junction gate solenoid turns on. The copies go downwards to the jogger unit.

### 2.2 JOGGER UNIT PAPER POSITIONING MECHANISM



In staple mode, each sheet of copy paper is vertically and horizontally aligned when it arrives in the jogger unit.

## Vertical Paper Alignment

After the trailing edge of the copy passes the stapler tray entrance sensor [A], the positioning roller solenoid $[\mathrm{B}]$ is energized for 280 ms to push the positioning roller [C] into contact with the paper. The positioning roller and alignment brush roller [D] rotate to push the paper back and align the trailing edge of the paper against the stack stopper [E].

## Horizontal Paper Alignment

When the print key is pressed, the jogger motor [F] turns on and the jogger fences [G] move to the waiting position, which is 7 mm wider on both sides than the selected paper.
When the trailing edge of the paper passes the staple unit entrance sensor, the jogger motor turns on for approximately 70 ms to move the jogger fences 5 mm towards the paper. After a short time, the jogger motor turns on again approximately for 60 ms for the horizontal paper alignment then goes back to the waiting position.

### 2.3 STAPLER UNIT MOVEMENT MECHANISM



## Side-to-side:

The stapler motor $[A]$ moves the stapler $[B]$ from side to side. After the start key is pressed, the stapler moves from its home position to the stapling position.
If two-staple-position mode is selected, the stapler moves to the front stapling position first, then moves to the rear stapling position. However, for the next copy set, it staples in the reverse order (at the rear side first then at the front side).
After the job is completed, the stapler moves back to its home position. This is detected by the stapler HP sensor [C].

## Rotation:

In the oblique staple position mode, the stapler rotation motor [D] rotates the stapler $45^{\circ}$ after it moves to the stapling position.

### 2.4 STAPLER



The staple hammer $[A]$ is driven by the staple hammer motor $[B]$ via gears [C], two cams [D], and two links [E].

When the aligned copies are brought to the stapling position by the positioning roller, alignment brush roller and jogger fences, the staple hammer motor starts. When the cams complete one rotation, the staple hammer home position sensor [F] turns on, detecting the end of the stapling operation. The staple hammer motor then stops.

There are two sensors in the stapler. One is the staple end switch [G] for detecting staple end conditions (it detects when there is only one sheet of staples left in the cartridge). The other is the cartridge set switch $[\mathrm{H}]$ for detecting whether a staple cartridge is installed.

When a staple end or no cartridge condition is detected, a message is displayed advising the operator to install a staple cartridge. If this condition is detected during a copy job, the indication will appear, but the copy job will not stop.
The staple cartridge has a clinch area [I], in which jammed staples are left. Operators can remove the jammed staples from this area.

### 2.5 FEED-OUT MECHANISM



After the copies have been stapled, the stack feed-out motor [A] starts. The pawl [B] on the stack feed-out belt [C] transports the set of stapled copies up and feeds it to the exit roller [D]. The shift tray exit roller [D] takes over the stack feed-out after the leading edge reaches this roller.
Just before the stapled copies pass through the shift tray exit sensor, the stack-feed-out motor turns off 600 ms to wait until the exit rollers have completely fed the stapled stack out to the shift tray [E]. Then, the stack-feed-out motor turns on again until the pawl actuates the stack feed-out belt home position sensor [F].

### 2.6 SHIFT TRAY UP/DOWN MECHANISM



The shift tray lift motor [A] controls the vertical position of the shift tray $[B]$ through gears and timing belts [C]. When the main switch is turned on, the tray is initialized at the upper position. The tray is moved up until stack height sensor 1 [D] is deactuated.

During copying, the actuator feeler [E] gradually rises as the copy stack grows, and the actuator gradually moves towards stack height sensor 2 [F].

In sort/stack mode, if stack height sensor 2 is actuated for 3 seconds, the shift tray lift motor lowers the shift tray for 15 ms .
In staple mode, when the stack feed-out motor starts, the tray is moved down until stack height sensor 1 is actuated and then moved up until stack height sensor 1 is de-actuated. This corrects the current tray position. Then, the tray is moved down again until stack height sensor 1 is actuated to make space for the coming set of copies and then moved up until stack height sensor 1 is de-actuated. This means the tray lowers earlier in staple mode, to prevent the next copy suddenly exceeding the space currently available on the tray.
For both modes, the shift tray will rise until stack height sensor 1 is de-actuated when the user takes the stack of paper from the shift tray.
This machine has two shift tray lower limit sensors 1 [G], 2 [H]. Shift tray lower limit sensor 1 detects the near lower limit and sensor 2 detects the lower limit. When the actuator [I] enters sensor 1, a message will be displayed and copying will continue. When the actuator enters sensor 2, a message will be displayed and copying will stop.

The shift tray upper limit switch [J] prevents the drive gear from being damaged if stack height sensor 1 fails. When the shift tray pushes up the shift tray positioning roller $[\mathrm{K}]$, the switch will cut the power to the shift tray lift motor.

### 2.7 SHIFT TRAY SIDE-TO-SIDE MECHANISM



In sort/stack mode, the shift tray [A] moves from side to side to separate the sets of copies.

The horizontal position of the shift tray is controlled by the shift motor [B] and shift gear disk [C]. After one set of copies is made and delivered to the shift tray, the shift motor turns on, driving the shift gear disk and the shaft [D]. The end fence [E] is positioned by the shaft, creating the side-to-side movement.
When the shift gear disk has rotated 180 degrees (when the shift tray is fully shifted across), the cut-out in the shift gear disk turns on the shift tray half-turn sensor [F] and the shift motor stops. The next set of copies is then delivered. The motor turns on, repeating the same process and moving the tray back to the previous position.

### 2.8 PUNCH UNIT DRIVE MECHANISM



The punch unit makes 2 or 3 holes (depending on the type of punch unit) at the trailing edge of the paper.
The punch unit is driven by the punch motor [A]. The punch motor turns on 78 ms after the trailing edge of the paper passes through the entrance sensor [B], and makes the punch holes.
The home position is detected by the punch HP sensor [C]. When the cut-out on the punch shaft gear disk [D] enters the punch HP sensor, the punch motor stops.

The punch position is adjusted as follows:
Right to left: SP mode
Front to rear: Spacers

### 2.9 PUNCH WASTE COLLECTION MECHNISM



The punch waste is collected in the punch waste hopper [A], which is under the punch unit.
When the punch waste covers the hole $[B]$ in the hopper, the hopper sensor [C] turns on and a message will be displayed after the copy job finishes.

The hopper sensor also works as the hopper set sensor. If the punch waste hopper is not set, the hopper sensor moves away from the hole in the hopper holder [D] and a message is displayed. This message is the same as for the hopper full condition.

### 2.10 JAM CONDITIONS

1. The entrance sensor does not turn on within 450 ms after the copier exit sensor turns off.
2. The entrance sensor does not turn off within $1,325 \mathrm{~ms}$ after it turns on.
3. The upper tray exit sensor does not turn on within $1,630 \mathrm{~ms}$ after the entrance sensor turns on.
4. The upper tray exit sensor does not turn off within $1,325 \mathrm{~ms}$ after it turns on.
5. In sort/stack mode, the shift tray exit sensor does not turn on within $2,090 \mathrm{~ms}$ after the entrance sensor turns on.
6. In sort/stack mode, the shift tray exit sensor does not turn off within $1,325 \mathrm{~ms}$ after it turns on.
7. In staple mode, the stapler tray entrance sensor does not turn on within 3,700 ms after the entrance sensor turns on.
8. In staple mode, the stapler tray entrance sensor does not turn off within 1,325 ms after it turns on.
9. In staple mode, the stapler tray paper sensor does not turn off within 250 pulses of the stack feed-out motor after it starts.
10. In staple mode, the shift tray exit sensor does not turn off within $1,260 \mathrm{~ms}$ after the stack feed-out motor starts.

### 2.11 TIMING CHARTS

### 2.11.1 A4 SIDEWAYS (2 SHEETS): NORMAL AND PUNCH MODE



### 2.11.2 A4 SIDEWAYS (2 SHEETS): SORT/STACK AND PUNCH MODE



TIMING CHARTS
2.11.3 A4 SIDEWAYS (2 SHEETS): STAPLE AND PUNCH MODE


## 3. SERVICE TABLES

### 3.1 DIP SWITCHES

| DPS100 |  |  |  |  | DPS101 |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| Description |  |  |  |  |  |  |  |  |
| $\mathbf{1}$ | $\mathbf{2}$ | $\mathbf{3}$ | $\mathbf{4}$ | $\mathbf{1}$ | $\mathbf{2}$ | $\mathbf{3}$ | $\mathbf{4}$ |  |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Default |
| 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | Stack feed-out motor on |
| 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | Free run: sort/stack mode |
| 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | Free run: one staple (front side) |
| 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | Free run: two staples |

NOTE: Do not use any other settings.

### 3.2 TEST POINTS

| No. | Label |  |
| :---: | :---: | :---: |
| TP101 | (GND) | Ground |

### 3.3 LED

| No. | Function |
| :---: | :---: |
| LED100 | Monitors the stack feed-out motor speed. |

### 3.4 VARIABLE RESISTORS

| No. | Function |
| :---: | :---: |
| VR100 | Adjust the stack feed-out motor speed. |

### 3.5 FUSES

| No. |  |
| :---: | :---: |
| FU100 | Protects 24 V. |

## 4. REPLACEMENT AND ADJUSTMENT <br> 4.1 COVER REPLACEMENT



## Rear Cover

1. Remove the rear cover [A] (3 screws).

## Upper Left Cover

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

## Upper Cover

1. Remove the upper left cover.
2. Remove the upper cover [C] (2 screws).

## Front Door

1. Remove the upper left cover.
2. Remove the upper cover.
3. Remove the upper bracket $[\mathrm{D}]$ (1 screw).
4. Remove the front door [E].

## Left Front Cover

1. Remove the rear cover.
2. Remove the upper cover.
3. Remove the front door.
4. Remove the left front cover [F] (2 screws).


## Shift Tray

1. Remove the rear cover $[A]$.
2. Rotate the shift tray lift motor and lower the shift tray $[B]$.
3. Remove the shift tray ( 4 screws).

## Lower Left Cover

1. Remove the shift tray.
2. Remove the upper left cover [C].
3. Remove the upper cover [D].
4. Remove the front door [E].
5. Remove the left front cover [F].
6. Remove the lower left cover [G] (4 screws).

## Right Cover

1. Remove the right cover [H] (2 screws).

## Front Shift Tray Cover

1. Remove the front shift tray cover [I] (1 screw).

## Rear Shift Tray Cover

1. Remove the rear shift tray cover [J] (1 screw).

### 4.2 POSITIONING ROLLER REPLACEMENT



1. Open the front door.
2. Remove the snap ring [A].
3. Release the rubber belt [B].
4. Replace the positioning roller [C].

### 4.3 ALIGNMENT BRUSH ROLLER REPLACEMENT



1. Open the front door and pull out the jogger unit.
2. Remove the rear cover.
3. Remove the main board [A] (6 screws, all connectors).
4. Remove a screw $[B]$ and a tension spring [C] for the tension bracket [D], and release the tension of the timing belt.
5. Remove the front side E-ring [E] and bushing [F].
6. Remove the alignment brush roller assembly.
7. Remove the timing pulley [G] (1 E-ring).
8. Replace the alignment brush roller $[\mathrm{H}]$ ( 1 spacer, 1 bushing).

### 4.4 SENSOR REPLACEMNT

### 4.4.1 STACK HEIGHT SENSOR 1 AND 2



1. Remove the upper left cover.
2. Remove the upper cover.
3. Remove the sensor feeler $[A]$ ( 1 screw, 1 connector).
4. Remove the sensor bracket $[B]$ ( 1 screw).
5. Replace the stack height sensor 1 [C] or 2 [D].

### 4.4.2 UPPER TRAY PAPER LIMIT AND EXIT SENSOR



1. Remove the upper left cover.
2. Remove the upper cover.

## Upper Tray Paper Limit Sensor

3. Remove the sensor bracket $[A]$ (1 screw).
4. Replace the upper tray paper limit sensor [B] (1 connector).

## Upper Tray Exit Sensor

3. Remove the sensor bracket [C] (1 screw).
4. Replace the upper tray exit sensor [D] (1 connector).

### 4.4.3 SHIFT TRAY EXIT SENSOR



1. Remove the rear cover.
2. Remove the upper left cover.
3. Remove the upper cover.
4. Open the front door and remove the upper exit guide $[A]$ (1 plastic clip).
5. Remove the guide stay $[B]$ (2 screws).
6. Remove the discharge brush [C] (2 screws).
7. Replace the shift tray exit sensor [D] (1 screw, 1 connector).

### 4.4.4 ENTRANCE AND STAPLER TRAY ENTRANCE SENSOR



1. Remove the finisher from the copier.

## Entrance Sensor

2. Remove the sensor bracket $[A]$ ( 1 screw).
3. Replace the entrance sensor $[B]$ ( 1 screw, 1 connector).

## Stapler Tray Entrance Sensor

2. Remove the sensor bracket [C] (1 screw).
3. Replace the stapler tray entrance sensor [D] (1 screw, 1 connector).

### 4.4.5 STAPLER ROTATION HP SENSOR



1. Remove the stapler unit.
2. Remove the screw $[\mathrm{A}]$ and rotate the stapler bracket $[\mathrm{B}]$.
3. Remove the sensor bracket [C] (1 screw).
4. Replace the stapler rotation HP sensor [D] (1 connector).

### 4.5 STAPLER REMOV AL



1. Open the front door and pull out the jogger unit.
2. Move the stapler to the front.
3. Remove the stapler $[A]$ ( 1 screw, 1 connector).

### 4.6 PUNCH POSITION ADJUSTMENT



## Right to left

This position is adjusted by SP modes.

## Front to rear

The optional punch units have the following 3 spacers as accessories.
1 mm thickness: 2 pcs
2 mm thickness: 1 pc
The punch position can be adjusted by up to 4 mm by combinations of the 3 spacers.

### 4.7 STACK FEED-OUT MOTOR SPEED ADJUSTMENT

NOTE: This adjustment is required after replacing the main board.

1. Set the DIP switches on the finisher main board as follows.

| DIP SW | $\mathbf{1}$ | $\mathbf{2}$ | $\mathbf{3}$ | $\mathbf{4}$ |
| :---: | :---: | :---: | :---: | :---: |
| DIP100 | On | On | Off | On |
| DIP101 | On | Off | Off | Off |

2. If LED100 remains lit, turn VR100 counterclockwise until LED100 starts blinking.
3. Turn VR100 clockwise until the LED stops blinking and remains lit.

### 4.8 ROM HISTORY

| A697 Firmware Modification History (3000 Sheet Finisher) |  |  |  |
| :---: | :---: | :---: | :---: |
| Description of Modification | Level | Prod. Date | Ver. |
| Corrects the following: <br> - While receiving a fax in Energy Saver Mode, the A697 power comes on and initializes. <br> - When stacking with curled paper, the tray will move up and down slightly while the stapler is waiting for the remaining page(s) of a staple set. This slight up and down movement from the tray will tend to align any paper that slides out from the stack. | A6975656E | Not Available | E |
| Corrects the following: <br> - Occurrences of SC990. <br> - Defective paper exit for LG, DLT, A3 and B4 paper sizes. <br> - Two staples missing when B5 size paper is selected. <br> - Stacking problems occur when paper curls during manual staple mode. <br> - During Shift mode, the exit roller rolls up the paper if the paper curl is large. (Modification of the shift tray height in shift mode, exit roller rotation speed and shift tray lowering timing.) | A6975656D | Nov. 1998 Production | D |
| Corrects the following: <br> - When a jam occurs in the finisher, if the jam is not removed, the staple movement motor will not shut off. <br> - When the power save mode command from the main unit is received, the machine initializes. | A6975656C | Sept. 1998 Production | C |
| Corrects the following: <br> - To improve the stacking in the shift tray during stapling, the following modifications were implemented. <br> 1. The initial lowering timing of the shift tray is now faster and the stack start time has been modified to allow the shift tray to return to the top position first. <br> 2. The line velocity for the exit roller has been changed from $600 \mathrm{~mm} / \mathrm{sec}$ to $700 \mathrm{~mm} / \mathrm{sec}$. The paper exit pawl speed has also been changed. <br> 3. The timing for lowering the shift tray has been changed to $50 \mathrm{~mm} / \mathrm{sec}$ after the exit sensor has detected the leading edge of the paper. | A6975656B | July 1998 Production | B |
| Corrects the following: <br> - Modification to allow Chinese paper sizes. <br> - Modification of the start of the shift tray in staple mode. <br> - Corrected the problem of an SC not being displayed even though there was a problem with the paper exit pawl home position sensor during initialization. <br> - If the diagonal staple mode was selected when there was a problem with the stapler rotation motor home position sensor an SC occurred. | A6975656A | July 1998 Production | A |

## LARGE CAPACITY TRAY A698

# 1. OVERALL MACHINE INFORMATION <br> 1.1 SPECIFICATIONS 

Paper Size:
Paper Weight:
Tray Capacity:
Remaining Paper Detection:
Power Source:
Power Consumption:
Weight:
Size (W x D x H) :

A4 sideways, B5 sideways, LT sideways
$64 \mathrm{~g} / \mathrm{m}^{2} \sim 105 \mathrm{~g} / \mathrm{m}^{2}, 16 \mathrm{lb} \sim 24 \mathrm{lb}$
3,500 sheets ( $80 \mathrm{~g} / \mathrm{m}^{2}, 20 \mathrm{lb}$ )
4 steps
$24 \mathrm{Vdc}, 5 \mathrm{Vdc}$ (from copier)
48 W
22 kg
$403 \mathrm{~mm} \times 529 \mathrm{~mm} \times 608 \mathrm{~mm}$

### 1.2 MECHANICAL COMPONENT LAYOUT



1. Paper Feed Sensor
2. Paper Feed Roller
3. Pick-up Solenoid
4. Lift Sensor
5. Paper End Sensor
6. LCT Motor
7. Pick-up Roller
8. Paper Near End Sensor
9. Paper Height Sensor 1
10. Paper Height Sensor 2
11. Paper Tray
12. Paper Height Sensor 3
13. Lift Motor
14. Down Sensor
15. Tray Drive Belt
16. Paper Position Sensor
17. Separation Roller
18. Relay Roller

### 1.3 ELECTRICAL COMPONENT LAYOUT



1. Paper Feed Sensor
2. Lift Sensor
3. Pick-up Solenoid
4. Relay Clutch
5. Paper Feed Clutch
6. LCT Motor
7. Feed Unit Cover Switch 1
8. Feed Unit Cover Switch 2
9. Near End Sensor
10. Paper Height Sensor 1
11. Paper Height Sensor 2
12. Paper Height Sensor 3
13. LCT Interface Board
14. Lift Motor
15. Down Sensor
16. Tray Cover Switch 1
17. Tray Cover Switch 2
18. Tray Cover Switch 3
19. Down Switch
20. Paper Position Sensor
21. Paper End Sensor

### 1.4 ELECTRICAL COMPONENT DESCRIPTIONS

| Symbol | Name | Function | Index No. |
| :---: | :---: | :---: | :---: |
| Motors |  |  |  |
| M1 | LCT | Drives all rollers. | 6 |
| M2 | Lift | Drives the paper tray up or down. | 14 |
| Sensors |  |  |  |
| S1 | Paper End | Informs the copier when the paper has run out. | 21 |
| S2 | Paper Feed | Detects the copy paper coming to the relay roller and checks for misfeeds. | 1 |
| S3 | Lift | Detects when the paper is at the correct paper feed height. | 2 |
| S4 | Down | Detects when the tray is completely lowered, to stop the LCT motor. | 15 |
| S5 | Paper Height 1 | Detects the paper height. | 10 |
| S6 | Paper Height 2 | Detects the paper height. | 11 |
| S7 | Paper Height 3 | Detects the paper height. | 12 |
| S8 | Near End | Detects the paper height. | 9 |
| S9 | Paper Position | Detects when the top of the paper stack is at the correct position for paper feed. | 20 |
| Switches |  |  |  |
| SW1 | Tray Cover 1 | Detects whether the tray cover is opened or not. | 16 |
| SW2 | Tray Cover 2 | Ensures that +24 V can be passed to the lift motor whether the cover is open or closed. | 17 |
| SW3 | Tray Cover 3 |  | 18 |
| SW4 | Feed Unit Cover 1 | Detects whether the feed unit cover is opened or not. | 7 |
| SW5 | Feed Unit Cover 2 | Ensures that +24 V can be passed to the lift motor whether the cover is open or closed. | 8 |
| SW6 | Down | Lowers the LCT bottom plate if pressed. | 19 |
| Solenoids |  |  |  |
| SOL1 | Pick-up | Controls up-down movement of the pickup roller. | 3 |
| Magnetic Clutches |  |  |  |
| MC1 | Paper Feed | Drives the paper feed roller. | 5 |
| MC2 | Relay | Drives the relay roller. | 4 |
| PCBs |  |  |  |
| PCB1 | LCT Interface | Controls the LCT and communicates with the copier. | 13 |

### 1.5 DRIVE LAYOUT



1. Relay Roller
2. Paper Feed Roller
3. Relay Clutch
4. Paper Feed Clutch
5. LCT Motor
6. Lift Motor
7. Tray Drive Shaft
8. Tray Drive Belt
9. Pick-up Roller
10. Separation Roller

## 2. DETAILED DESCRIPTIONS

### 2.1 PAPER FEED MECHANISM



This LCT uses an FRR paper feed system (paper feed roller [A], separation roller [B], pick-up roller [C]), and those rollers are driven by the LCT motor [D].
When the start key is pressed, the paper feed clutch [E], relay clutch [F], and pickup solenoid [G] energize. The pick-up roller touches the paper and feeds it to the copier.
When the leading edge of the paper reaches the paper feed sensor, the pick-up solenoid turns off and the pick-up roller lifts away from the paper.

### 2.2 TRAY LIFT MECHANISM



The lift motor $[A]$ controls the vertical position of the tray bottom plate $[B]$ through gears and timing belts [C].

## Tray lifting conditions

When the lift sensor [D] turns off during copying, the tray lift motor raises the tray bottom plate until the tray lift sensor turns on again.
To position the top of the paper stack at the correct height, the pick-up solenoid [E] turns on to lower the pick-up roller onto the paper and the lift motor raises the tray bottom plate until the tray lift sensor turns on. Then the motor turns in reverse to lower the tray until the lift sensor turns off, then it changes direction again to lift the tray until the lift sensor turns on again, then it stops. The above procedure is done in the following conditions.

- Just after the main switch is turned on
- Just after the tray cover is closed
- Just after leaving the energy saving mode


## Tray lowering conditions

In the following conditions, the lift motor lowers the tray bottom plate until the down sensor turns on.

- Just after the paper end sensor turns on
- Just after the down switch is pressed by the user


If the down switch $[A]$ is pressed, or paper runs out, or a paper jam occurs in the LCT, the LCT motor [B] lowers the bottom plate until the paper position sensor [C] activates. At this point, the bottom plate (or the top sheet of paper) is positioned about 5 cm below the paper feed height. This gives enough space for the user to add about 500 sheets of paper.
If the down switch is then pressed again, the bottom plate moves down once again until the top sheet of paper just passes the paper position sensor. In this way, the bottom plate lowers 5 cm at each press of the down switch. This allows the customer to replenish paper in convenient amounts and at the same position.

### 2.3 PAPER STACK HEIGHT DETECTION



The amount of the paper in the tray is detected by four sensors (paper height sensor $1[A], 2[B], 3[C]$ and near end sensor [D].)

| Sensor | Remaining amount | Display |
| :---: | :---: | :---: |
| Near End Sensor | Approx. 80 sheets |  |
| Paper Height 1 Sensor | Approx. 300 sheets | $=$ |
| Paper Height 2 Sensor | Approx. 1000 sheets | $\bar{Z}$ |
| Paper Height 3 Sensor | Approx. 2000 sheets | $\overline{\text { In }}$ |

## 3. SERVICE TABLES

### 3.1 TEST POINTS

| No. | Label | Monitored Signal |
| :---: | :---: | :---: |
| TP100 | 24 V | +24 V |
| TP101 | GND | Ground |
| TP102 | CGND | Ground |
| TP103 | Vcc |  |

## 4. REPLACEMENT AND ADJUSTMENT

### 4.1 COVER REMOVAL



## Tray Cover

1. Remove the tray cover [A] (1 screw).

## Right Cover

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

## Front Cover

1. Remove the right cover.
2. Remove the front cover [C] (3 screws).

## Upper Rear Cover

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


## Lower Rear Cover

1. Remove the tray cover.
2. Remove the upper rear cover.
3. Remove the lower rear cover [A] (3 screws).

## Feed Unit Cover

1. Remove the front cover.
2. Remove the front hinge cover [B] (1 screw).
3. Remove the feed unit cover [C].

### 4.2 ROLLER REPLACEMENT

### 4.2.1 PAPER FEED, SEPARATION, AND PICK-UP ROLLERS



1. Push the down switch to lower the tray bottom plate.
2. Open the feed unit cover.

## Pick-up Roller

3. Replace the pick-up roller [A] (1 snap ring).

## Paper Feed Roller

3. Replace the paper feed roller [B] (1 snap ring).

## Separation Roller

3. Replace the separation roller [C] (1 snap ring).

### 4.3 PAPER END SENSOR REPLACEMENT


[A]


1. Push the down switch to lower the tray.
2. Remove the feed unit and tray cover.
3. Remove the side fence screws $[A]$.
4. Mark the stay position [B]
5. Remove the stay [C] (2 screw).
6. Replace the paper end sensor [D] ( 1 screw, 1 connector).

NOTE: When reinstalling the stay, make sure that the side-to side registration is correct (make a test copy). If it must be adjusted, move the stay across as shown in the above drawing (an SP can also be adjusted).

### 4.4 PAPER FEED SENSOR REPLACEMENT



1. Open the feed unit cover [A].
2. Remove the paper feed sensor bracket [B] (2 screws).
3. Replace the paper feed sensor [C] (1 screw, 1 connector).

### 4.5 PAPER POSITION SENSOR REPLACEMENT



1. Remove the LCT.
2. Open the tray cover and feed unit cover.
3. Remove the sensor cover [A] (2 screws).
4. Replace the paper position sensor [B] (1 screw, 1 connector).

### 4.6 PICK-UP SOLENOID REPLACEMENT



1. Open the feed unit cover.
2. Remove the upper rear cover [A] (2 screws).
3. Remover the solenoid cover $[B]$ ( 1 screw).
4. Replace the pick-up solenoid [C] (2 screws, 1 connector).

### 4.7 LIFT MOTOR REPLACEMENT



1. Remove the upper and lower rear covers.
2. Replace the lift motor [A] (2 screws, 1 connector).

### 4.8 SIDE FENCE POSITION CHANGE



1. Cover the paper position sensor.
2. Push the down switch to lower the tray bottom plate to its lowest position.
3. Open the tray cover.
4. Remove the right cover.
5. Remove the front and rear side fences [A, B] (1 screw each).
6. Install the side fences in the correct position.
7. Input the paper size with SP5-019.

## COPIER CONNECTOR KIT A808

1. OVERALL MACHINE INFORMATION

### 1.1 OVERVIEW



This kit connects two A229 copiers. If the user wishes to have two copiers work on one copy job, the user starts the job on one copier. The copy job will also be made on the other copier.

The copier on which the user pressed the "Connect" key on the display is known as the "Master Unit" and the other copier is the "Slave Unit".
Features for the job can only be selected on the master unit.
There is no restriction on the two connected copiers and their configurations (65 cpm copier or 55 cpm copier, with finisher or without finisher etc). However, with some combinations, the available functions are limited.
NOTE: The printer and document server functions cannot use the copy connect mode.

## OVERALL MACHINE INFORMATION

### 1.2 FUNCTION LIST

The following tables shows which functions can use copy connect mode.
$O$ : Can use $\times$ : Cannot use

| Item |  | Comments |
| :---: | :---: | :---: |
| - Paper Selection |  |  |
| Manual Paper Selection | O |  |
| Auto Paper Selection | 0 |  |
| By-pass Tray | 0 | Only for cover and slip sheet modes. |
| - Image Adjustment |  |  |
| Auto Image Density | O |  |
| Manual image density | 0 |  |
| Original Mode | O |  |
| - Reduce/Enlarge |  |  |
| Auto Reduce/Enlarge | O |  |
| Preset Reduce/Enlarge | 0 |  |
| Zoom | O |  |
| Size Magnification | 0 |  |
| Directional Magnification | O |  |
| Directional Size Magnification | O |  |
| $\square$ Duplex |  |  |
| 1 sided $\rightarrow 2$ sided | O |  |
| 2 sided $\rightarrow 2$ sided | 0 |  |
| 2 sided $\rightarrow 1$ sided | O |  |
| - Combine |  |  |
| 1 sided 2 pages $\rightarrow$ Combine 1 side | O |  |
| 1 sided 4 pages $\rightarrow$ Combine 1 side | O |  |
| 1 sided 8 pages $\rightarrow$ Combine 1 side | O |  |
| 1 sided 4 pages $\rightarrow$ Combine 2 side | O |  |
| 1 sided 8 pages $\rightarrow$ Combine 2 side | 0 |  |
| 1 sided 16 pages $\rightarrow$ Combine 2 side | O |  |
| 2 sided 2 pages $\rightarrow$ Combine 1 side | O |  |
| 2 sided 4 pages $\rightarrow$ Combine 1 side | O |  |
| 2 sided 8 pages $\rightarrow$ Combine 1 side | O |  |
| 2 sided 4 pages $\rightarrow$ Combine 2 side | 0 |  |
| 2 sided 8 pages $\rightarrow$ Combine 2 side | O |  |
| 2 sided 16 pages $\rightarrow$ Combine 2 Side | O |  |
| - Book |  |  |
| Book $\rightarrow 1$ sided | $\times$ |  |
| Book $\rightarrow 2$ sided | $\times$ |  |
| Multi $\rightarrow 2$ sided | $\times$ |  |
| Booklet | $\times$ |  |
| Magazine | $\times$ |  |
| ■ Cover / Slip Sheet |  |  |
| Front Cover | O |  |
| Front / Back Cover | 0 |  |


| Item |  | Comments |
| :---: | :---: | :---: |
| Designate | $\times$ |  |
| Chapters | 0 |  |
| Slip sheet | 0 |  |
| - Edit Image |  |  |
| Double Copies | $\times$ |  |
| Image Repeat | $\times$ |  |
| Margin Adjustment | 0 |  |
| Erase Center | 0 |  |
| Erase Border | 0 |  |
| Centering | O |  |
| - Sort/Stack |  |  |
| Sort | O | A finisher should be installed on both machines. If there is a finisher on only one machine, the output is sorted but there is no shift-sort or rotate-sort separation. |
| Rotate Sort | O | Available when there is no finisher on either machine. If there is a finisher on only one machine, the output is sorted but there is no shift-sort or rotate-sort separation. |
| Stack | O | A finisher must be installed on both machines. |
| Staple | O | A finisher must be installed on both machines. |
| Punch | O | A finisher and punch kit must be installed on both machines. |
| $\square$ Special Original |  |  |
| Batch (SADF) Mode | O |  |
| Mixed Sizes Mode | 0 |  |
| Thin Mode | 0 |  |
| - Key |  |  |
| Interrupt | O | Only on the slave unit |
| Program | O | The master unit programs can be used. If the program contains settings that are not available in "Copy Connect Mode" or the slave unit does not support certain features in the program, they are ignored. |
| Sample Copy | O | Made only by the master unit. |
| Number | 0 |  |
| Clear/Stop | 0 |  |
| Start | 0 |  |
| $\square$ Display |  |  |

## OVERALL MACHINE INFORMATION

| Item |  | Comments |
| :--- | :--- | :--- |
| Number of Copies | OMaster Unit : Displays the total copy <br> number or master unit copy number. <br> Press the display to adjust these <br> settings. <br> Slave Unit : Display the slave unit <br> copy number. |  |
| Number of Originals | O | Master unit only |
| Memory Amount | $\times$ |  |
| Others | $\times$ |  |
| Next Job |  |  |

### 1.3 SPECIFICATIONS

Copy Speed:
Max:130 cpm (A4 / $81 ⁄ 2$ " $\times 11$ " sideways) (Two 65 cpm machines)
Max: 120 cpm (A4 / $81 / 2 " \times 11 "$ sideways)
(One 65 cpm machine and one 55 cpm machine)
Max: 110 cpm (A4 / $81 / 2 " \times 11 "$ sideways)
(Two 55 cpm machines)
Copy Number Input:
1 to 999

## 2. DETAILED DESCRIPTIONS

### 2.1 BASIC OPERATION

After the start key is pressed, all originals are read and stored on the HDD. At the same time, the data is sent to the slave unit and stored on its HDD.

After reading all originals, the master and slave units will begin printing. The CPU separates the job for both units. So, they finish at about same time.
The way that the copies are fed out depends on the copy mode, as follows.

### 2.1.1 NO SORT AND NO STAPLE MODE

$=$ Master Unit $=$
Exits face down, beginning with the copy of the 1st original.
$=$ Slave Unit =
Exits face up, beginning with the copy of the last original.

## Example:

Number of originals: 6, simplex copy mode, Number of copies: 3

| ter Unit |  | ave Unit |  |
| :---: | :---: | :---: | :---: |
| FVFVF | 3rd original - 3rd copy | - A A A | 4th original - 1st copy |
| FVFVF | 3rd original - 2nd copy | AAAAA | 4th original - 2nd copy |
| TVFVF | 3rd original - 1st copy | AAAAA | th original - 3rd copy |
| TVFVF | 2nd original - 3rd copy | AAAAA | th original - 1st copy |
| TVFVF | 2nd original - 2nd copy | AAAAA | th original - 2nd copy |
| TVFVF | d original - 1st copy | AAAAA | th original - 3rd copy |
| FVFVF | - 3rd copy | AAAAA | h original - 1st copy |
| FVFVF | inal - 2nd copy | AAAAA | original - 2nd copy |
| FVFVF | 1st original - 1st copy | AAAAA | original - 3rd copy |

$\boldsymbol{\nabla}$ : Face down, $\mathbf{A}$ : Face up
NOTE: The output quantity on the master and slave units depends on the paper feed tray position, image rotation, and copy speed. If more than two copies are made from an original, sometimes will print on different units (in the above example, the 1st copy of the 4 th original may be made on the master instead of the slave).

### 2.1.2 SORT, STAPLE MODE

The copies exit face down for both units.
Example:
Number of originals: 3, 1-sided to 1-sided copy mode, Number of sets: 6

| Master Unit |
| :---: |
| $\nabla \nabla \nabla \nabla \nabla$ |
| $\nabla \nabla \nabla \nabla \nabla$ |
| $\nabla \nabla \nabla \nabla \nabla$ |
| $\nabla \nabla \nabla \nabla \nabla$ |
| $\nabla \nabla \nabla \nabla \nabla$ |
| $\nabla \nabla \nabla \nabla \nabla$ |
| $\nabla \nabla \nabla \nabla \nabla$ |
| $\nabla \nabla \nabla \nabla \nabla$ |
| $\nabla \nabla \nabla \nabla \nabla$ |

3rd set - 3rd copy
3rd set - 2nd copy
3rd set - 1st copy
2nd set - 3rd copy
2nd set - 2nd copy
2nd set - 1st copy
1st set - 3rd copy
1st set - 2nd copy
1st set - 1st copy

| Slave Unit |  |
| :---: | :---: |
| FVFVF | 6th set - 3rd copy |
| VFVFV | 6th set - 2nd copy |
| FVFVF | 6th set - 1st copy |
| FVFVF | 5th set - 3rd copy |
| FVFVF | 5th set - 2nd copy |
| FVFVF | 5th set - 1st copy |
| FVFVF | 4th set - 3rd copy |
| FVFVF | set - 2nd copy |
| FVFVV | 4th set - 1st copy |

Face down

NOTE: The output quantity (sets) made by the master and slave units depends on the paper feed tray position, image rotation, and copy speed. A set of copies will not be divided between the two machines. For example, if paper runs out on one machine, the other machine will continue to work on other sets of copies, but will not complete the unfinished set for the machine that ran out of paper.

### 2.1.3 OPERATION IN IRREGULAR CONDITIONS

## Paper end during copying

When a machine enters the paper end condition, it stops and "add paper" is displayed. The other machine continues to make copies. The rest of the copy job is transferred to this machine.

If paper is replenished before the end of the job, the machine will automatically start. If the machine was part of the way through a set of copies, it will finish that set first. Then, if there are any sets still remaining, they will be re-allocated to both machines.

## Copy tray full

When copy tray is full, the machine stops and "paper is full" is displayed. If this occurs on the slave unit, it is displayed on the master unit also. The other machine continues with the rest of the job.

If the copies are removed from the copy tray before the end of the job, the machine will automatically start. If the machine was part of the way through a set of copies, it will finish that set first. Then, if there are any sets still remaining, they will be reallocated to both machines.

## Paper jam

When a paper jam occurs, the following indicators are displayed.

1) "Paper jam" is displayed on the master unit.
2) The machine having the jam condition is indicated on the master unit.
3) The jam position is displayed on the machine which has the paper jam.

When a machine has a paper jam, it stops and the above indicators are displayed. The other machine continues with the rest of the job.
If the jam is removed before the end of the job, the machine will automatically start. If the machine was part of the way through a set of copies, it will finish that set first. Then, if there are any sets still remaining, they will be re-allocated to both machines.


## . CAUTION <br> Unplug the machine power cord before starting the following procedure.

NOTE: Both machines should have the same program version. The software program version must be at least version A2297540G.

1. Open the DF.
2. Remove the rear scale [A] (3screws).
3. Remove the left scale $[B]$ (2 screws).
4. Remove the exposure glass [C].

NOTE: When reinstalling the exposure glass, make sure that the mark [D] is positioned at the rear left corner as shown.
5. Remove the original exit tray [E] (3 screws).
6. Remove the upper right cover [F] (4 screws).
7. Remove the right stay [G] (5 screws).

8. Remove the lens cover $[A]$ ( 12 screws).
9. Remove the right inner cover $[B]$ ( 4 screws).
10. Remove the paper feed cover [C] (2 screws).

NOTE: Remove LCT if installed before proceeding
11. Remove the upper right cover [D] (2 screws).
12. Remove the connector cover [ $E$ ] from the upper right cover.
13. Cut away the screw hole cover [F] from the upper right cover
14. Remove the connecting plate [G] (3 screws).

15. Connect the cable to the SBICU board connector CN317 [A].

NOTE: The terminal [B] should be to the right (as viewed from the front of the machine).
16. Connect the cable to the copy connection board [C].

NOTE: The terminal supporter [D] should be to the right (as viewed from the front of the machine).
17. Install the copy connection board (3 screws).

NOTE: Carefully tuck excess ribbon cable under the SBICU so it does not block the optics cooling fan.
18. Reassemble the machine.
19. Install the other copy connection board in the other machine using the same procedure (steps 1 to 18).
20. Connect the two machines with a cable [E] and hold it with a clamp [F] (1 screw) on each machine.
21. Check the operation.

## 4. SERVICE TABLES

### 4.1 GENERAL CAUTIONS

1. When downloading firmware to one of the machines, turn the other machine off.
2. Both copiers should have the same program version.
3. When removing the interface cable, turn off the power for both copiers.

### 4.2 SERVICE PROGRAM MODE

For all SP modes except SP5-104 (A3/DLT Double Count), the machines use their own settings.

The master and slave units use the setting of the master unit for SP5-104.
There is one new SP mode.

| Mode No. <br> (Class 1,2,3) |  | Function | Setting |
| :--- | :--- | :--- | :--- |
| $6-801$ | Communication Test | Start |  |
|  |  | Makes a communication test between the <br> main and sub unit |  |

### 4.3 USER PROGRAM MODE

### 4.3.1 UNIQUE UP MODES

The following UP mode is added for the connect copy function in the "Count Manager" of "Copy Features".

## Name:

Connect Copy

## Function:

This program selects whether the "Copy Connect" key is displayed or not.
If "No" is selected, the "Copy Connect" key is not displayed. Therefore, this machine will be the slave unit.

## Default:

Yes

### 4.3.2 UP MODE TABLE

The details of the relationship between each UP mode in the master and slave units are explained in the operating instructions.

## System Setting Table

O: Use Own Setting $\leftarrow$ : Use Master Unit Setting - No Relation

| Tab | Item | Master Unit | Slave Unit |
| :---: | :---: | :---: | :---: |
| Basic 1 | Operation Panel Beeper | O | O |
|  | Ready Operation Panel Beeper | $\bigcirc$ | 0 |
|  | Copy Count Display | - | - |
|  | Auto Response (Human) Sensor | 0 | OFF |
|  | Auto Tray Switching | 0 | 0 |
|  | Auto Off Timer | 0 | - |
|  | Low Power Shift Time | - | - |
|  | Low Power Timer | - | - |
|  | ADF Original Ejection | $\bigcirc$ | - |
|  | <F/F4> Size Setting | 0 | 0 |
| Basic 2 | Function Priority | - | - |
|  | System Reset | - | - |
|  | Output Priority | - | - |
|  | Function Reset Timer | - | - |
|  | Copy: Output Tray | 0 | 0 |
|  | Document Server: Output Tray | - | - |
|  | Printer: Output Tray | - | - |
|  | Interleave Print | - | - |

## SERVICE TABLES

| Tab | Item | Master Unit | Slave Unit |
| :---: | :---: | :---: | :---: |
| Set Time | Set Date | O | 0 |
|  | Set Time | 0 | 0 |
|  | Weekly Timer : Monday | 0 | - |
|  | Weekly Timer: Tuesday | 0 | - |
|  | Weekly Timer: Wednesday | 0 | - |
|  | Weekly Timer : Thursday | O | - |
|  | Weekly Timer : Friday | 0 | - |
|  | Weekly Timer : Saturday | 0 | - |
|  | Weekly Timer: Sunday | O | - |
|  | Key Operator Code for Off Setting | - | - |
| Paper Size Setting | Tray 1 Paper Size Setting | O | O |
|  | Tray 2 Paper Size Setting | 0 | 0 |
|  | Tray 3 Paper Size Setting | O | 0 |
|  | By-pass Tray : Special Paper Indication | O | 0 |
|  | Tray 1: Special Paper Indication | 0 | 0 |
|  | Tray 2 : Special Paper Indication | O | O |
|  | Tray 3: Special Paper Indication | 0 | 0 |
|  | LCT : Special Paper Indication | 0 | 0 |
| Counter Manager | Set User Codes | 0 | - |
|  | Key Counter | 0 | - |
|  | Key Operator Code | - | - |
|  | Memory Allocation | 0 | 0 |
|  | AOF (Keep it on) | - | - |

## Copy Feature Table

O : Use Own Setting
$\leftarrow$ : Use Master Unit Setting - No Relation

| Tab | Item | Master Unit | Slave Unit |
| :---: | :---: | :---: | :---: |
| $\begin{array}{\|l} \hline \text { General Features } \\ 1 / 3 \end{array}$ | Auto Paper Select Priority | $\bigcirc$ | - |
|  | Auto Paper Select Tray Display | 0 | - |
|  | Auto Image Density Priority | $\bigcirc$ | - |
|  | Original Mode Priority | 0 | - |
|  | Original Mode Display | 0 | - |
|  | Original Mode Quality Level | $\bigcirc$ | 0 |
|  | Original Image Density Level | 0 | 0 |
|  | Auto Reset Timer | 0 | - |
|  | Paper Tray Priority | 0 | 0 |
|  | Shortcut R/E | 0 | - |
|  | R/E Priority | 0 | - |
| $\begin{array}{\|l} \hline \text { General Features } \\ 2 / 3 \end{array}$ | Duplex Mode Priority | 0 | - |
|  | Copy Orientation in Duplex Mode | 0 | - |
|  | Original Orientation in Duplex Mode | 0 | - |
|  | Book Duplex | 0 | - |
|  | Initial Mode | 0 | - |
|  | Maximum Copy Quantity | 0 | - |
|  | Original Beeper | 0 | - |
| $\begin{aligned} & \hline \text { General Features } \\ & 3 / 3 \end{aligned}$ | Shrink \& Center Ratio | 0 | - |
|  | Shortcut: F1 | 0 | - |
|  | Shortcut: F2 | 0 | - |
|  | Shortcut: F3 | 0 | - |
|  | Shortcut : F4 | 0 | - |
|  | Job End Call | 0 | 0 |
| Reproduction Ratio 1/2 | Enlarge 1 | 0 | - |
|  | Enlarge 2 | 0 | - |
|  | Enlarge 3 | $\bigcirc$ | - |
|  | Enlarge 4 | $\bigcirc$ | - |
|  | Enlarge 5 | 0 | - |
|  | Priority Setting : Enlarge | 0 | - |
| Reproduction Ratio 2/2 | Reduce 1 | 0 | - |
|  | Reduce 2 | 0 | - |
|  | Reduce 3 | 0 | - |
|  | Reduce 4 | $\bigcirc$ | - |
|  | Reduce 5 | 0 | - |
|  | Reduce 6 | 0 | - |
|  | Priority Setting : Reduce | 0 | - |
| Page Format 1/2 | Cover Mode | 0 | - |
|  | Copy Back Cover | 0 | - |
|  | Front Margin : Left/Right | 0 | $\leftarrow$ |
|  | Back Margin : Left Right | 0 | $\leftarrow$ |
|  | Front Margin : Top/Bottom | 0 | $\leftarrow$ |
|  | Back Margin : Top/Bottom | $\bigcirc$ | $\leftarrow$ |
|  | $1 \rightarrow 2$ Duplex Auto Margin Adjust | 0 | $\leftarrow$ |
|  | Ease Border | 0 | $\leftarrow$ |
|  | Combine Original Shadow Erase | 0 | $\leftarrow$ |

## SERVICE TABLES

| Tab | Item | Master Unit | Slave Unit |
| :---: | :---: | :---: | :---: |
| Page Format 2/2 | Erase Center | $\bigcirc$ | $\leftarrow$ |
|  | Repeat Separation Line | - | - |
|  | Double Copies Separation Line | - | - |
|  | Combine Separation Line | 0 | $\leqslant$ |
|  | Booklet/Magazine Original Orientation | - | - |
| Input Output | Individual Input / Output Operation | 0 | - |
|  | Next Job Scan Start | - | - |
|  | Batch (SADF) Auto Reset Time | 0 | - |
|  | ADRF Original Table Rise Time | $\bigcirc$ | - |
|  | Platen Mode Exit | - | - |
|  | Duplex : Auto Eject | 0 | $\leftarrow$ |
|  | Combine : Auto Eject | $\bigcirc$ | $\leftarrow$ |
|  | Rotate Sort Auto Paper Continue | 0 | 0 |
|  | Auto Sort Mode | $\bigcirc$ | - |
|  | Memory Full Auto Scan Restart | 0 | $\leftarrow$ |
| Count Manager | Check/Rest/Print Copy Counter | - | - |
|  | User Code Register/Change/Delete | - | - |
|  | Face-Up/Down Selection in By-pass Mode | - | - |

## 5. TROUBLESHOOTING

Turning the main power switch off and on can reset the following SCs.
NOTE: If the problem concerns electrical circuit boards, first disconnect then reconnect the connectors before replacing the PCBs.

## SC363: Data Transmission Error

- Definition -

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


## SC364: Data Transmission Time-out Error

- Definition -

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


## SC366: CRC Error

- Definition -

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


# NINE-TRAY MAILBOX AND <br> BRIDGE UNIT G909/G912 

## 1. OVERALL MACHINE INFORMATION

### 1.1 SPECIFICATIONS

Number of Trays
Tray Capacity:
Paper Size for Trays:

Paper Weight:

Power Consumption:
Power Source:
Dimensions (W x D x H):
Weight:

9 trays and a proof tray
Trays and proof tray: 100 sheets ( $80 \mathrm{~g} / \mathrm{m}^{2}, 20 \mathrm{lb}$ )
Trays:
Maximum: A3 or 11" x 17"
Minimum: A5 (LEF) or 11 " $\times 81 / 2^{\prime \prime}$
Proof tray:
Maximum: A3 or 11" x 17"
Minimum: A6 (LEF) or 11 " $\times 81 / 2^{\prime \prime}$
Trays: $60 \sim 90 \mathrm{~g} / \mathrm{m}^{2}, 16 \sim 24 \mathrm{lb}$
Proof tray: $52 \sim 157 \mathrm{~g} / \mathrm{m}^{2}, 14 \sim 42 \mathrm{lb}$
48 W or less (average)
DC24 V, 5 V (supplied by the main machine)
$600 \times 545 \times 970 \mathrm{~mm}\left(23.6 " \times 21.5 " \times 38.2^{\prime \prime}\right)$
38 kg, 83.6 lb

- Specifications are subject to change without notice.

Legend:

| PRODUCT CODE | COMPANY |  |  |
| :---: | :---: | :---: | :---: |
|  | GESTETNER | RICOH | SAVIN |
| G909 | CS360 | CS360 | CS360 |
| G912 | BRIDGE UNIT <br> TYPE 460 | BRIDGE UNIT <br> TYPE 460 | BRIDGE UNIT <br> TYPE 460 |

## NOTE:

The installation of the G909 MailBox requires that the A688 Bridge Unit Type 450 and the A682 Paper Tray Unit (PS360) must also be installed.

### 1.2 COMPONENT LAYOUT

### 1.2.1 MECHANICAL COMPONENT LAYOUT



1. Bridge Exit Roller
2. Bridge Exit Sensor
3. Proof Tray
4. Bridge Relay Sensor
5. Relay Junction Gate
6. Proof Tray Paper Sensor
7. Proof Tray Paper Overflow Sensor
8. Proof Tray Exit Roller
9. Proof Tray Exit Sensor
10. Proof Tray Junction Gate
11. Entrance Roller
12. Entrance Sensor
13. Relay Sensor
14. Tray Exit Sensor 1
15. Vertical Transport Guide
16. Tray Exit Sensor 2
17. Tray Exit Sensor 3
18. Tray Gates
19. Paper Overflow Sensor
20. Paper Sensor
21. 9th Tray
22. 1st Tray
23. Bridge Unit

### 1.2.2 DRIVE LAYOUT



1. Proof Tray Exit Roller
2. Proof Tray Transport Motor
3. Bridge Exit Roller
4. Transport Motor
5. Entrance Roller
6. Vertical Transport Motor
7. Tray Feed-out Roller

## ELECTRICAL COMPONENT DESCRIPTIONS

### 1.3 ELECTRICAL COMPONENT DESCRIPTIONS

Refer to the electrical component layout and the point-to-point diagram, printed on waterproof paper and located in a protective sleeve for the component locations.

| Symbols | Name | Function | Index No. |
| :---: | :---: | :---: | :---: |
| Motors |  |  |  |
| M1 | Proof Tray Transport | Drives all the proof tray rollers. | 7 |
| M2 | Transport | Drives all rollers in the entrance area and all rollers in the bridge unit. | 8 |
| M3 | Vertical Transport | Drives all tray feed-out rollers. | 19 |
| Sensors |  |  |  |
| S1 | Bridge Exit | Detects misfeeds. | 1 |
| S2 | Bridge Relay | Detects misfeeds. | 2 |
| S3 | Proof Tray Paper Overflow | Detects paper overflow in the proof tray. | 3 |
| S4 | Proof Exit | Detects misfeeds. | 4 |
| S5 | Proof Cover | Detects whether the proof cover is open or closed. | 6 |
| S6 | Entrance | Detects copy paper entering the mail box and detects misfeeds. | 9 |
| S7 | Relay | Detects misfeeds. | 10 |
| S8 | Proof Tray Paper 1 (LED) | Informs the CPU when there is paper on the proof tray. | 14 |
| S9 | Proof Tray Paper 2 (Photo Transistor) | Informs the CPU when there is paper on the proof tray. | 13 |
| S10 | Tray Exit 1 | Detects misfeeds. | 21 |
| S11 | Tray Exit 2 | Detects misfeeds. | 25 |
| S12 | Tray Exit 3 | Detects misfeeds. | 29 |
| S13 | Tray Exit 4 | Detects misfeeds. | 32 |
| S14 | Paper 0 | Contains an LED for paper sensor 1. | 47 |
| S15 | Paper 1 | Informs the CPU when there is paper on the 1st tray. | 15 |
| S16 | Paper 2 | Informs the CPU when there is paper on the 2nd tray. | 43 |
| S17 | Paper 3 | Informs the CPU when there is paper on the 3rd tray. | 41 |
| S18 | Paper 4 | Informs the CPU when there is paper on the 4th tray. | 39 |
| S19 | Paper 5 | Informs the CPU when there is paper on the 5th tray. | 37 |
| S20 | Paper 6 | Informs the CPU when there is paper on the 6th tray. | 36 |
| S21 | Paper 7 | Informs the CPU when there is paper on the 7th tray. | 35 |
| S22 | Paper 8 | Informs the CPU when there is paper on the 8th tray. | 34 |


| Symbols | Name | Function | Index No. |
| :---: | :---: | :---: | :---: |
| S23 | Paper 9 | Informs the CPU when there is paper on the 9th tray. | 33 |
| S24 | Paper Overflow 1 | Detects paper overflow in the 1st tray. | 49 |
| S25 | Paper Overflow 2 | Detects paper overflow in the 2nd tray. | 46 |
| S26 | Paper Overflow 3 | Detects paper overflow in the 3rd tray. | 44 |
| S27 | Paper Overflow 4 | Detects paper overflow in the 4th tray. | 42 |
| S28 | Paper Overflow 5 | Detects paper overflow in the 5th tray. | 40 |
| S29 | Paper Overflow 6 | Detects paper overflow in the 6th tray. | 38 |
| S30 | Paper Overflow 7 | Detects paper overflow in the 7th tray. | 28 |
| S31 | Paper Overflow 8 | Detects paper overflow in the 8th tray. | 30 |
| S32 | Paper Overflow 9 | Detects paper overflow in the 9th tray. | 31 |
| Solenoids |  |  |  |
| SOL1 | Proof Tray Junction Gate | Opens and closes the proof junction gate to direct paper either into the proof tray or to the trays. | 17 |
| SOL2 | Relay Junction Gate | Opens and closes the relay junction gate to direct paper either to the bridge unit or to the trays. | 15 |
| SOL3 | 1st Tray | Opens and closes the 1st tray gate. | 16 |
| SOL4 | 2nd Tray | Opens and closes the 2nd tray gate. | 18 |
| SOL5 | 3rd Tray | Opens and closes the 3rd tray gate. | 20 |
| SOL6 | 4th Tray | Opens and closes the 4th tray gate. | 22 |
| SOL7 | 5th Tray | Opens and closes the 5th tray gate. | 23 |
| SOL8 | 6th Tray | Opens and closes the 6th tray gate. | 24 |
| SOL9 | 7th Tray | Opens and closes the 7th tray gate. | 26 |
| SOL10 | 8th Tray | Opens and closes the 8th tray gate. | 27 |
| PCBs |  |  |  |
| PCB1 | Main Control | Controls all sorter functions | 48 |
| PCB2 | Proof Control | Drives the motors in the proof unit and informs the sensor status to the main control board. | 5 |
| Switches |  |  |  |
| SW1 | Bridge Cover | Cuts the +24 V power line and detects when the bridge cover is opened. | 12 |
| SW2 | Front Cover | Cuts the +24 V power line and detects when the front cover is opened. | 11 |
|  |  |  |  |

## 2. DETAILED DESCRIPTIONS

### 2.1 BASIC OPERATION



## Proof Tray

When the proof tray is selected as the output tray and the exit sensor of the main machine is actuated by the leading edge of the paper, the transport motor and proof tray transport motor energize, causing the transport rollers to turn.

Soon after the motors start, the proof tray junction gate solenoid energizes and the proof tray junction gate $[A]$ is lowered so that the paper goes to the proof tray.

When the last page passes the proof tray exit sensor and feeds out, the proof tray junction gate solenoid and the proof tray transport motor de-energize.

## Bridge Unit

The relay junction gate $[B]$ in the bridge unit delivers the paper either to the finisher or down to the trays. When the finisher is selected as the output tray, the relay junction gate stays closed, and the paper goes to the bridge unit. When a tray is selected as the output tray, the relay junction gate solenoid energizes and the relay junction gate is open so that the paper goes downwards to the tray area.

## Trays

When the proof tray is selected as the output tray, the transport motor and the vertical transport motor energize. Each tray gate [C] is individually controlled by a solenoid. When a solenoid is energized, the tray gate opens and the paper goes into the tray.

### 2.2 PROOF TRAY SENSORS



### 2.2.1 PAPER SENSOR

The paper sensor in the proof tray consists of two sensor boards; one is an LED board $[A]$ and the other is a phototransistor board [B]. The sensor detects whether or not there is paper on the proof tray. When there is paper on the proof tray, the paper interrupts the light from the LED.

### 2.2.2 PAPER OVERFLOW SENSOR

There is also a paper overflow sensor [C] located in the proof tray. The machine detects paper overflow when the top sheet of the paper stack pushes up the sensor feeler. When this occurs, a message will be displayed on the operation panel and the machine stops printing until the paper stack on the proof tray is removed.

### 2.3 TRAY SENSORS




### 2.3.1 PAPER SENSOR

There is a paper sensor [A] for each tray (total 10 pcs ). The paper sensors in tray 1 to tray 8 contain an LED and a phototransistor. The paper sensor in the tray 0 contains only an LED. The paper sensor in tray 9 contains only a phototransistor. The paper detection mechanism and their function are the same as for the proof tray.

### 2.3.2 PAPER OVERFLOW SENSOR

There is a paper overflow sensor [B] above each tray. The machine detects paper overflow in a tray when the top of the paper stack pushes up the sensor feeler [C]. When this condition occurs, the printing job is stopped until the paper stack is removed.

### 2.3.3 TRAY EXIT SENSOR

There is a tray exit sensor board [D] above the 1st tray (the mounting above tray 1 is called 'tray 0 ') and on trays 3,6 , and 9 . The tray exit sensor board on trays 3 and 6 contains an LED and a phototransistor.

The tray exit sensor board above the 1st tray contains only an LED. The tray sensor board on the 9th tray contains only a phototransistor.
The machine detects paper leaving trays 1 to 3 using the sensor above tray 1 and the one on tray 3. When paper passes between those sensors, the light from the LED above tray 1 is interrupted.

### 2.4 TIMING CHART AND MISFEED DETECTION

A4 Sideways (to 1st Tray)


A4 Sideways (to Proof Tray)


## A4 Sideways (to Bridge Unit)



1. On check:

J1: The entrance sensor does not activate within 2460 pulses after the exit sensor of the main machine has been activated.
J2: The relay sensor does not activate within 1965 pulses after the entrance sensor has been activated.
J3: The proof tray exit sensor does not activate within 1665 pulses after the entrance sensor has been activated.
J4: The bridge relay sensor does not activate within 1954 pulses after the entrance sensor has been activated.
J5: The appropriate tray exit sensor does not activate within the appropriate number of pulses (see below) after the relay sensor has been activated.
J5 jam timing

| Tray Exit Sensor | Sensor 1 |  |  | Sensor 2 |  |  | Sensor 3 |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tray No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Pulses | 72 | 139 | 176 | 206 | 242 | 273 | 304 | 343 | 375 |

2. Off check

J6: A sensor does de-activate within the specified number of pulses after that sensor has been activated.
Number of pulses $=$ Paper length (in the paper feed direction) $\times 1.5$

$$
1 \text { pulse = } 0.1707 \text { mm }
$$

## 3. INSTALLATION PROCEDURE

### 3.1 MAILBOX (G909)

### 3.1.1 ACCESSORY CHECK

Check the accessories in the box against the following list.

| No. | Description | Q'ty | Note |
| :---: | :--- | :---: | :--- |
| 1 | Front Joint Bracket | 1 |  |
| 2 | Rear Joint Bracket | 1 |  |
| 3 | Exit Guide Mylar | 1 | For A229 |
| 4 | Proof Tray Attachment | 1 | For A230, A231, and A232 |
| 5 | Upper Grounding Plate | 2 | For A230, A231, and A232 <br> One for A230, A231, and A232 <br> Two for A229 |
| 6 | Lower Grounding Plate | 1 |  |
| 7 | Cushion | 4 |  |
| 8 | Tapping Screw - M4 x 14 | 1 |  |
| 9 | Tray Decals | 1 |  |
| 10 | Installation Procedure |  |  |



### 3.1.2 REQUIREMENT OPTIONS FOR MAIN MACHINE

When the mailbox is going to be installed to the A230, A231, or A232 machines, the following options for the main machine are required.

1. Bridge Unit Type 450 (A688)
2. Paper Tray Unit - PS360 (A682)

### 3.1.3 INSTALLATION PROCEDURE



- A230, A231 and A232 machines -


## . CAUTION <br> Unplug the main machines power cord before starting the following procedure.

NOTE: 1) When the finisher (A697) is installed on the machine, the bridge unit for the mailbox (G912) must be installed.
2) The bridge unit for the mailbox must be installed before installing the Mailbox on the main machine.

1. Unpack the finisher and carefully remove all the shipping tapes.

## - A230, A231, and A232 machines -

2. Attach the front joint bracket $[A]$ and rear joint bracket $[B]$ to the main machine (2 screws each).
3. Attach the upper grounding plate [C] (1 screw).
4. Peel off the backing of the double sided tape that is attached to the lower grounding plate [D].
5. Attach one lower grounding plate to the center of the bottom edge of the paper tray unit as shown.
Go to step 7.


- A229 machine -



## - A229 machines -

2. Remove the four plastic caps $[A]$ from the copier's left cover.
3. Remove the connector cover [B].
4. Attach the front joint bracket [C] and rear joint bracket $[D]$ to the main machine (2 screws each).
5. Peel off the backing of the double-sided tape that is attached to the lower grounding plate [E].
6. Attach two lower grounding plates to the bottom edge of the paper tray unit as shown.

## - All machines -

7. The position of the cushion [F] depends on which main machine the mailbox is installed to. Attach the cushion to the plate as follows:

- Position [G] for A230, A231, and A232 machines.
- Position [H] for A229 machines.

NOTE: When attaching the cushion to position [H], cut about 40 mm (1.6 inches) off one edge of the cushion.
8. Open the front cover [I] of the mailbox, and remove the screw [J] that secures the locking lever $[\mathrm{K}]$. Then pull the locking lever.
[D]


9. Align the mailbox on the joint brackets, and lock it in place by pushing the locking lever [A].
10. Secure the locking lever ( 1 screw) and close the front door.
11. Connect the mailbox cable $[B]$ to the main machine.
12. A230/A231/A232 machines only: Peel off the backing of the double-sided tape that is attached to the proof tray attachment [C].
13. Install the proof tray attachment on the proof tray.
14. A229 machines only: Install the exit guide mylar [D] on the upper cover just above the anti-static brush.
15. Power on the main switch and check the mailbox operation.

### 3.2 BRIDGE UNIT FOR MAILBOX (G912)

### 3.2.1 ACCESSORY CHECK

Check the accessories in the box against the following list.

| No. | Description | Q'ty |
| :---: | :--- | :---: |
| 1. | Guide Plate Bracket | 1 |
| 2 | Cable | 1 |
| 3 | Cover Switch | 1 |
| 4 | Grounding Bracket | 1 |
| 5 | Finisher Shielding Plate | 1 |
| 6 | Screw - M4 $\times 8$ | 9 |
| 7 | Screw - M $4 \times 4$ | 4 |
| 8 | Screw - M3 $\times 6$ | 2 |



## BRIDGE UNIT FOR MAILBOX (G912)

### 3.2.2 INSTALLATION PROCEDURE



## $\triangle$ CAUTION <br> Unplug the main machines power cord before starting the following procedure.

NOTE: 1) The bridge unit for the mailbox must be installed when the 3000 sheet finisher (A697) will be installed.
2) The 3000 sheet finisher (A697) can be installed only on the A232 and A229 machines.

1. Unpack the bridge unit and remove the shipping retainers $[A]$. NOTE: Do not remove the protective sheet [B] at this time.
2. Remove the mailbox if it has been previously installed.
3. Remove the rear cover [C] of the mailbox (8 screws).
4. Remove the proof tray unit [D] ( 6 screws, 1 connector).
5. Remove the cover [E].

6. Open the left front cover $[A]$ of the mailbox, and remove the inner plate $[B]$ ( 3 screws).
7. Install the guide plate bracket [C] (4 screws $-\mathrm{M} 4 \times 4$ ).
8. Route the cable [D] and affix it to the clamp as shown.
9. Connect the cover switch [E] to the cable then install the cover switch (2 screws $-\mathrm{M} 4 \times 8$ ).
10. Remove the paper guide plate $[\mathrm{F}]$ (2 screws).

11. Pull up the tab [A] of the protective sheet.

NOTE: 1) Do not remove the protective sheet at this time.
2) Make sure that all mylars are held between the two folded halves of the protective sheet.
12. Carefully turn over the bridge unit [B] and insert the protective sheet [C] into the gap [D] between the paper guides. Next, insert the bridge unit onto the mailbox [E].

NOTE: When holding the bridge unit, do not touch the timing belt. Otherwise the timing belt may come off the gear.
13. Remove the tape [F] of the protective sheet.
14. Open the upper paper guide [G] then pull out the protective sheet $[\mathrm{H}]$.

NOTE: Check that all mylars are set into the gap between the paper guides.

15. Secure the bridge unit [A] (4 screws - M4 x 8).
16. Route the cables $[B]$ through the openings [C].
17. Route the solenoid harness [D] through the opening [C].
18. Connect the cables to the solenoid and sensors and clamp the cable as shown.
19. Reinstall the rear cover and proof tray unit.
20. Install the mailbox on the main machine (refer to the Mailbox Installation procedure for more detail).

If the $\mathbf{3 0 0 0}$ sheet finisher (A697) is going to be installed, perform steps 21 to 25.
21. Install the front joint bracket [E] and rear joint bracket [F] which are contained in the finisher's accessory box.

22. Remove the seal $[A]$.
23. Attach the grounding bracket $[B]$ ( 3 screws $-\mathrm{M} 4 \times 8$ ).
24. Attach the shielding plate $[C]$ to the finisher ( 2 screws $-M 3 \times 8$ ).
25. Attach the finisher to the mailbox (refer to the Finisher Installation Procedure).
26. Power-on the main switch of the main machine and check the bridge unit operation. (Select a copy mode that uses the finisher.)

## 4. REPLACEMENT AND ADJUSTMENT

### 4.1 PROOF TRAY UNIT

### 4.1.1 PROOF TRAY SENSOR AND PAPER OVERFLOW SENSORS



1. Remove the rear cover [A] (8 screws).
2. Remove the proof tray unit [B] (6 screws).
3. Remove two screws [C], then turn over the proof tray unit.
4. Remove the sensor bracket [D] (2 screws, 1 clamp).
5. Remove the proof tray paper sensor [E] (1 screw each).
6. Remove the proof tray paper overflow sensor [F].

### 4.1.2 PROOF TRANSPORT UNIT

1. Remove the proof tray unit [B] and remove two screws [C].
2. Carefully turn over the proof tray unit and remove the proof transport unit [G] (2 screws).

### 4.2 TRAY UNIT

### 4.2.1 TRAYS



1. Remove the rear cover (8 screws).
2. Disconnect the cable [A] of the tray which will be removed.
3. Remove the grounding wire $[B]$ ( 1 screw, 1 washer) and remove the tray stopper [C].
NOTE: When reinstalling the tray stopper, push the stopper to the left against the tray.
4. Open the front cover [D] and remove the cover bracket [E] (1 screw), then remove the front cover.
5. Remove the two screws [F] which secure the tray.
6. Remove the tray [G]. (First move the tray to the left and gently flex it, then remove the tray.)

### 4.2.2 PAPER SENSOR, PAPER OVERFLOW SENSOR, AND TRAY EXIT SENSOR



NOTE: When removing the paper sensor or paper overflow sensor for the 1st tray, or the tray exit sensor above the 1st tray, first remove the 1st tray and remove the sensor cover, then remove these sensors.

1. Remove the tray (see Trays).
2. Remove the sensor cover [A] (3 screws).

## Paper Overflow Sensor

3. Remove the grounding wire $[B]$ ( 1 screw) and paper overflow sensor bracket [C] (1 screw).
4. Remove the paper overflow sensor [D] (1 connector).

## Paper Sensor

5. Remove the paper sensor [E] (1 screw, 1 connector).

## Tray Exit Sensor (above the 1st tray, and in the 3rd, 6th, and 9th trays)

6. Remove the tray exit sensor [F] (1 screw, 1 connector).
7. After replacing the tray exit sensor, perform the tray exit sensor adjustment (see Tray Exit Sensor Adjustment).
NOTE: After replacing the tray exit sensor, do not put the rear cover back on the mailbox, because the tray exit sensor adjustment must be performed first.

### 4.2.3 MAIN CONTROL BOARD



1. Remove the rear cover $[A]$ ( 8 screws).
2. Remove the main control board $[B]$ (all connectors).
3. After replacing the main control board, perform the tray exit sensor adjustment procedure (see Tray Exit Sensor Adjustment).

### 4.2.4 TRAY EXIT SENSOR ADJUSTMENT

This sensor adjustment must be performed after replacing the tray exit sensor or main control board, using the special paper that comes as a spare part for the tray exit sensor.

The tray exit sensor board has two devices: An LED and a phototransistor. So, when replacing the tray exit sensor on the 3rd tray, the sensor adjustment must be performed between trays 1 and 3 and between trays 4 and 6 . When replacing the main control board, this sensor adjustment must be performed for all sensors. The sensor adjustment procedure is as follows.


## Example: Sensor adjustment between trays 1 and 3

1. Insert the special paper (which comes with the tray exit sensor) into the entrance guide of the mailbox.
2. Turn the transport motor gear $[A]$ counterclockwise to transport the paper to the tray unit.
3. When the leading edge of the paper reaches the tray feed-out roller, turn the vertical transport motor [B] clockwise to transport the paper to the appropriate tray.
4. Open the tray gate by pushing the plunger of the tray solenoid [C], and transport the paper until half of it has fed out to the tray.
5. Change switches 1 and 2 of the DIP switch on the main control board to ON.
6. Make sure that the interface cable is connected to the main machine and turn the main switch on.
7. Fully turn the appropriate variable resistor (VR) [D] clockwise, then check that the appropriate LED [E] has turned off (the relationship between tray, VR, and LED are shown in the table below).

## TRAY UNIT

8. Turn back the VR slowly until the LED just turns on.
9. Measure the voltage between TP3 on the main control board and the frame of the mailbox and confirm the voltage is greater than 3.5 Vdc . If it is not, adjust the voltage using the VR (the relationship between tray, TP, and VR are shown in the table below).
10. Remove the special paper from the tray, then measure the voltage on the main control board in the same way as step 9. The voltage should be less than 1.2 Vdc.
11. After adjusting, change the DIP switch setting to the default (all switches off) and reassemble the machine.

| Adjusted Sensor | VR No. | LED No. | TP No. |
| :---: | :---: | :---: | :---: |
| Trays 1 to 3 | VR1 | LED 2 | TP3 |
| Trays 4 to 6 | VR2 | LED 3 | TP4 |
| Trays 7 to 9 | VR3 | LED 4 | TP13 |

NOTE: The DIP switches to change are the same regardless of the adjusted sensor.

## 5. SERVICE TABLES

### 5.1 DIP SWITCHES/VRIABLE RESISTORS/LEDS

### 5.1.1 DIP SWITCHES

| Item |  |  |  |  | $0=\mathrm{OFF} \quad 1=\mathrm{ON}$ |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | Switch No. |  |  |  | Function |
|  | 1 | 2 | 3 | 4 |  |
| Default | 0 | 0 | 0 | 0 |  |
| Motor Test | 1 | 0 | 0 | 0 |  |
| Solenoid Test | 0 | 1 | 0 | 0 |  |
| Tray Exit Sensor Check | 1 | 1 | 0 | 0 | When detecting paper between the 1st and 3rd trays, LED2 will light. |
|  |  |  |  |  | When detecting paper between the 4th and 6th trays, LED3 will light. |
|  |  |  |  |  | When detecting paper between the 7th and 9th trays, LED4 will light. |
| Paper Sensor Check (1st to 3rd trays) | 0 | 0 | 1 | 0 | When the 1st tray paper sensor is activated, LED2 will light. |
|  |  |  |  |  | When the 2nd tray paper sensor is activated, LED3 will light. |
|  |  |  |  |  | When the 3rd tray paper sensor is activated, LED4 will light. |
| Paper Sensor Check (4th to 6th trays) | 1 | 0 | 1 | 0 | When the 4th tray paper sensor is activated, LED2 will light. |
|  |  |  |  |  | When the 5th tray paper sensor is activated, LED3 will light. |
|  |  |  |  |  | When the 6th tray paper sensor is activated, LED4 will light. |
| Paper Sensor Check (7th to 9th trays) | 0 | 1 | 1 | 0 | When the 7th tray paper sensor is activated, LED2 will light. |
|  |  |  |  |  | When the 8th tray paper sensor is activated, LED3 will light. |
|  |  |  |  |  | When the 9th tray paper sensor is activated, LED4 will light. |
| Proof Tray Sensors Check | 1 | 1 | 1 | 0 | When the proof paper overflow sensor is activated, LED2 will light. |
|  |  |  |  |  | When the proof paper sensor is activated, LED3 will light. |
| Paper Overflow Sensor Check (1st to 3rd trays) | 0 | 0 | 0 | 1 | When the 1st paper overflow sensor is activated, LED2 will light. |
|  |  |  |  |  | When the 2nd paper overflow sensor is activated, LED3 will light. |
|  |  |  |  |  | When the 3rd paper overflow sensor is activated, LED4 will light. |
| Paper Overflow Sensor Check (4th to 6th trays) | 1 | 0 | 0 | 1 | When the 4th paper overflow sensor is activated, LED2 will light. |


| Item | Switch No. |  |  |  | Function |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | 1 | 2 | 3 | 4 |  |
| Paper Overflow Sensor Check (4th to 6th trays) | 1 | 0 | 0 | 1 | When the 5th paper overflow sensor is activated, LED3 will light. |
|  |  |  |  |  | When the 6th paper overflow sensor is activated, LED4 will light. |
| Paper Overflow Sensor Check (7th to 9th trays) | 0 | 1 | 0 | 1 | When the 7th paper overflow sensor is activated, LED2 will light. |
|  |  |  |  |  | When the 8th paper overflow sensor is activated, LED3 will light. |
|  |  |  |  |  | When the 9th paper overflow sensor is activated, LED4 will light. |
| Entrance, Bridge Relay, and Bridge Exit Sensor Check | 1 | 1 | 0 | 1 | When the entrance sensor is activated, LED4 will light. |
|  |  |  |  |  | When the bridge relay sensor is activated, LED3 will light. |
|  |  |  |  |  | When the bridge exit sensor is activated, LED2 will light. |
| Proof Exit and Relay Sensor Check | 0 | 0 | 1 | 1 | When the proof exit sensor is activated, LED4 will light. |
|  |  |  |  |  | When the relay sensor is activated, LED3 will light. |
| Free Run | 1 | 1 | 1 | 1 |  |

### 5.1.2 VARIABLE RESISTORS

| Number | Function |
| :---: | :--- |
| VR1 | Adjusts the tray exit sensor sensitivity between trays 1 and 3 |
| VR2 | Adjusts the tray exit sensor sensitivity between trays 4 and 6 |
| VR3 | Adjusts the tray exit sensor sensitivity between trays 7 and 9 |

### 5.1.3 LEDS

| Number | Monitored Signal |
| :---: | :--- |
| LED1 | Monitors the software operation. <br> Blinking: Normal operation <br> Others: Abnormal operation |
| LED2 | The LED lights when the appropriate sensor is activated. (Refer to the <br> DIP switch table for more details.) |
| LED3 |  |
| LED4 |  |

## TECHNICAL SERVICE BULLETINS

## TECHNICAL SERVICE BULLETIN

BULLETIN NUMBER: A229-001
01/06/99
APPLICABLE MODEL:
GESTETNER - 3265
RICOH - AFICIO 650
SAVIN - 9965DP

## SUBJECT: DEVELOPMENT ENTRANCE SEAL

## SYMPTOM:

Wear marks on the drum.

## CAUSE:

The lower seal of the Development Unit Entrance Seal Ass'y (P/N A2293092) may get pinched between the Developer and the Drum if a large amount of Developer accumulates near the photoconductor gap. The seal may be pulled out of position by the friction caused by the rotation of the Drum. In the worst case scenario, the seal would peel off.


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Page 2 of 2

## SOLUTION:

## Production Countermeasure:

The lenght of the lower seal will be returned to the original length of 17 mm from 18 mm . Though the 17 mm lower seal may wrap up, the function of this part is not adversely affected. The part number of the new Development Unit Entrance Seal Ass'y will be A2293091.

## Field Countermeasure:

Replace the original seal with the new Development unit Entrance Seal Ass'y(A2293091).

## Replacement Procedure:

1. Remove the 2 screws [A] that secure the entrance seal.
2. While pulling on the lock clip [B] slip off the Entrance Seal Ass'y [C].
3. Install a new Entrance Seal Ass'y.


|  |  |  |  |  | REFERENCE |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| OLD PART NO. | NEW PART NO. | DESCRIPTION | QTY | INT | PAGE | ITEM |
| A2293092 | A2293091 | Entrance Seal | 1 | 1 | 81 | 4 |

## UNITS AFFECTED:

Serial Number cut-in not available at time of publication.

## TECHNICAL SERVICE BULLETIN

BULLETIN NUMBER: A229-002
01/22/99
APPLICABLE MODEL:
GESTETNER - 9965DP
RICOH - AFICIO 650
SAVIN - 3265

## SUBJECT: SERVICE MANUAL - INSERT

## GENERAL:

The Service Manual page(s) listed below must be replaced with the page(s) supplied. Each bulletin package contains 1 set of replacement pages.

PAGES:
The revised areas have been highlighted by an arrow $\Rightarrow$.

- 4-73-4-74


### 4.5 TEST POINTS/DIP SWITCHES/LEDS

### 4.5.3 DIP SWITCHES

ADF Main Board

| DPS101 |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- |
| $\mathbf{4}$ | $\mathbf{3}$ | $\mathbf{2}$ | $\mathbf{1}$ |  |
| 0 | 0 | 0 | 0 | Nermal operating mode |
| 0 | 0 | 0 | 1 | Free run: one-sided original, thin mode, with originals |
| 0 | 0 | 1 | 0 | Free run: one-sided original, with originals |
| 0 | 0 | 1 | 1 | Free run: one-sided original, no originals |
| 0 | 1 | 0 | 0 | Free run: two-sided original, with original |
| 0 | 1 | 0 | 1 | Free run: two-sided original, no original |
| 0 | 1 | 1 | 0 | Motor test |
| Others |  |  |  | Do not select |

I/O Board Dip SW101

| No. | Description | Function |
| :--- | :--- | :--- |
| 1 | Do not use | Should be OFF |
| 2 | Do not use | Should be OFF |
| 3 | SC codes display | ON : SC codes are not displayed |
| 4 | Do not use | Should be OFF |
| 5 | Do not use | Should be OFF |
| 6 | Version setting | $6:$ OFF 7:OFF -> Japanese version |
| 7 | Version setting | $6:$ ON 7:OFF -> 115V version |
|  |  | $6:$ OFF 7:ON -> 220/240V version |
| 8 | Do not use | Should be OFF |

### 4.5.4 TEST POINTS

I/O Board

| Number | Monitored Signal |
| :--- | :--- |
| TP163 | +5 V |
| TP165 | Ground |
| TP167 | +24 V |
| TP168 | +5 VE |
| TP170 | -12 V |
| TP171 | +12 V |
| TP172 | 5 V DC |
| TP173 | +24VINT |

## Paper Feed Board

| Number | Monitored Signal |
| :--- | :--- |
| TP102 | +24 V |
| TP103 | Ground |
| TP104 | Ground |
| TP105 | +5 V |

ADF Main Board

| No. | Label | Monitored Signal |
| :---: | :---: | :--- |
| TP100 | GND | Ground |
| TP101 | Vcc | +5 V |
| TP102 | VA | +24 V |
| TP103 | TXD | TXD to the copier |
| TP104 | RXD | RXD from the copier |

### 4.5.5 FUSES

PSU

| Number | Description |
| :--- | :--- |
| FU101 | Protects the ac input line. |
| FU102 | Protects +24 V |
| FU103 | Protects +24 V |
| FU104 | Protects +24 V |
| FU105 | Protects +24 V |
| FU106 | Protects +24 V |
| FU107 | Protects +24 V |
| FU108 | Protects +24 V |
| FU109 | Protects +12 V |
| FU110 | Protects +5 V |
| FU111 | Protects +5 V |
| FU112 | Protects -12 V |
| FU113 | Protects +5 V |
| FU114 | Protects +5 V |
| FU115 | Protects +5 V |
| FU116 | Protects +24V |

## ADF Main Board

| No. | Function |
| :---: | :--- |
| FU101 | Protects the 24 V line. |

### 4.5.6 VARIABLE RESISTORS

ADF Main Board

| No. | Function |
| :---: | :--- |
| VR101 | Adjusts the original registration for the 1st side of the <br> original. |
| VR102 | Adjusts the original stop position against the left scale <br> for the 2nd side of the original. |
| VR103 | Not used |

TECHNICAL SERVICE BULLETIN

BULLETIN NUMBER: A229-003
01/22/99
APPLICABLE MODEL:
GESTETNER - 3255
RICOH - AFICIO 550
SAVIN - 9955DP

## SUBJECT: A229 DIFFERENCES BETWEEN 65 CPM AND 55 CPM MACHINES

## GENERAL:

The following table shows the differences between the 65 CPM and the 55 CPM machines.

| No. | Item | 65 CPM | 55 CPM |
| :---: | :--- | :--- | :--- |
| 1 | Copy Speed | 65 CPM Maximum <br> (A4 / 8 1/2 x 11 sideways) | 55 CPM Maximum <br> (A4 / 8 1/2 x 11 sideways) |
| 2 | 2nd Paper Tray <br> when using A5 / <br> $51 / 2 \times 81 / 2$ <br> (lengthwise) size <br> paper | When using the 2nd Tray with A5 / <br> $51 / 2 \times 81 / 2$ (lengthwise) size <br> paper, the side fences must be <br> modified by a service <br> representative. | The customer can now change the <br> side fences when using A5 /5 1/2 x <br> $81 / 2$ (lengthwise) size paper. |

NOTE: To Duplex A5 / 5 1/2 x 8 1/2 size paper, the paper must be installed lengthwise in the 2nd paper tray.

The following parts are unique to the 55 CPM machine.

| Part number | Description | Page | Index |
| :---: | :--- | :---: | :---: |
| A2291283 | Front Door (RIC) | 15 | 8 |
| A2291285 | Front Door (INF) | 15 | 8 |
| A2297027 | Model Name Plate - SVN 9955 DP | 15 | 17 |
| A2297014 | Model Name Plate - GES 3255 | 15 | 17 |
| A2299560 | SBICU Board - 115V | 43 | 13 |
| A2299561 | SBICU Board - 230V | 43 | 13 |
| A2295422 | Connecting Harness | 129 | 13 |

## GENERAL:

The Service Manual page(s) listed below must be replaced with the pages supplied. Each bulletin package contains 1 set of replacement pages.

## PAGES:

The revised areas have been highlighted by an arrow $\Rightarrow$.

- Legend Page
Updated Information (New Models Added)
- 1-1, 1-2
Updated Information (Copy Speed)
4.3.1 UNIQUE UP ..... 9-13
4.3.2 UP MODE TABLE ..... 9-13
System Setting Table ..... 9-13
Copy Features Table. ..... 9-15

5. TROUBLESHOOTING ..... 9-17

## 1. OVERALL MACHINE INFORMATION

### 1.1 SPECIFICATIONS

### 1.1.1 COPIER ENGINE

Configuration:
Copy Process:
Originals:
Original Size:

Original Alignment:
Copy Paper Size:

Duplex Copying:

Copy Paper Weight:

Reproduction Ratios:

Console
Dry electrostatic transfer system
Sheet/Book
Maximum A3/11" x 17"
Minimum B6, $51 / 2 " x 81 / 2 "$ (using ADF)
Rear left corner
Maximum
A3/11" x 17" (1st/2nd Tray, By-pass)
B4/8 1/2" x 14" (3rd Tray)
Minimum
B5/8 $1 / 2^{\prime \prime} \times 11$ " lengthwise (1st Paper Tray)
A5/51/2" x 81/2" (2nd Tray)
B5/8 $1 / 2$ " x 11" (3rd Paper Tray)
A6/51/2" x 81/2" lengthwise (By-pass)
Tandem Paper Tray (1st Tray)
A4/B5/8 $1 / 2$ " $\times 11^{\prime \prime}$ sideways only
Maximum A3/11" x 17"
Minimum A5/51/2" x 81/2" lengthwise
Paper tray: $52.3 \sim 127.9 \mathrm{~g} / \mathrm{m}^{2}, 14 \sim 34 \mathrm{lb}$
Bypass feed table: $52.3 \sim 163 \mathrm{~g} / \mathrm{m}^{2}, 14 \sim 43 \mathrm{lb}$
Duplex copying: $64 \sim 104.7 \mathrm{~g} / \mathrm{m}^{2}, 17 \sim 28 \mathrm{lb}$
6 reduction and 5 enlargement

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

Zoom: 32 ~ 400\%
$\Rightarrow$ Copy Speed:

| A229 (65 CPM) | Max. 65 cpm (A4 / $81 / 2{ }^{\prime \prime \prime} \times 11$ " sideways) |
| :---: | :---: |
| A229 (55 CPM) | Max. 55 cpm (A4 / $81 / 2^{\prime \prime} \times 11^{\prime \prime}$ sideways) |
| Resolution: | Scanning: 400 dpi Printing: $\quad 400 \mathrm{dpi}$ $\quad 600 \mathrm{dpi}$ (Printer Mode Only) |
| 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 3.7 s (Face up mode) Less than 5.5 s (Face down mode) |
| Copy Number Input: | Ten-key pad, 1 to 999 |
| Copy Paper Capacity: | Tray 1: 1000 sheets(when used as a tandem tray) <br> Tray 2: 550 sheets <br> Tray 3 (LCT): 1500 sheets By-pass Tray: 50 sheets |
| Copy Tray Capacity: (Output Tray) | A4/8 $1 / 2^{\prime \prime} \times 11^{\prime \prime}: 500$ sheets ( $100 \mu \mathrm{~m}$ thickness paper) A3/11" x 17": 250 sheets |
| Memory Capacity: | $\begin{aligned} & \text { RAM: 12MB } \\ & \text { HDD: } 1.7 \mathrm{~GB} \end{aligned}$ |
| Toner Replenishment: | Cartridge exchange (1220g/ cartridge) |
| Toner Yield: | 42k copies <br> (A4 sideways, 6\% full black, 1 to 3 copying, including toner recycling ratio 20\%) |
| Power Source: | North America: $120 \mathrm{~V}, 60 \mathrm{~Hz}, 20 \mathrm{~A}$ <br> Europe/Asia: $220 \sim 240 \mathrm{~V}, 50 \mathrm{~Hz} / 60 \mathrm{~Hz}, 10 \mathrm{~A}$ |

# Gestetner <br> RICOH 

TECHNICAL SERVICE BULLETIN

BULLETIN NUMBER: A229-004

```
APPLICABLE MODEL:
    GESTETNER - }326
    RICOH - AFICIO }65
    SAVIN - 9965DP
```

SUBJECT: PARTS CATALOG CORRECTION/ADDITIONS

## GENERAL:

The following parts corrections/additions are being issued for all A229 Parts Catalogs.

CORRECTIONS:

| OLD PART NO. | NEW PART NO. | REFERENCE |  |  |
| :---: | :---: | :--- | :---: | :---: |
| A0963103 | A2293092 | Entrance Seal | PAGE | ITEM |
| 58531190 | AA063591 | Spring - Cleaning Blade | 81 | 4 |
| A2293912 | A2293909 | Bias Terminal | 89 | 3 |
| AE042023 | AE042036 | Pressure Roller Cleaning Roller | 95 | 18 |
| A1764131 | A2474131 | Upper Entrance Guide | 97 | 9 |
| A1764141 | A2474141 | Oil Supply Roller Bracket | 97 | 11 |
| AA066294 | AA063294 | Pressure Spring | 97 | 12 |
| A2294082 | A2294085 | Oil Supply Unit | 97 | 13 |
| AA066299 | AA066309 | Torsion Spring | 97 | 21 |
| A0961172 | A2291139 | Tightener | 119 | 16 |
| AX060126 | AX060169 | Brushless Motor | 119 | 17 |
| A2291126 | A2291122 | Motor Bracket | 119 | 18 |
| AA043268 | AA043277 | Timing Belt -656P2M8 | 119 | 19 |
| A2293563 | A2293564 | Air Tube | 119 | 21 |
| A2295893 | A2295840 | ATA HDD | 125 | 12 |

## ADDITIONS:

|  |  |  |  |  |  |  |  | REFERENCE |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| NEW PART NO. | DESCRIPTION | QTY | PAGE | ITEM |  |  |  |  |  |
| 54421924 | Exposure Glass Cushion | 2 | 41 | 20 |  |  |  |  |  |



Continued.

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The illustration on page 14 of the A229 parts catalog have three \#17 items illustrated. Please delete the two parts circled as shown below.


Please Delete the following parts from your A229 Parts Catalog:

|  | REFERENCE |  |  |
| :---: | :--- | :---: | :---: |
| PART NUMBER |  | PAGE | ITEM |
| A2291686 | Rear Frame Shield | 47 | 27 |
| A2294144 | Cleaning Roller Bracket | 97 | 18 |
| A2294150 | Oil Supply Cleaning Blade | 97 | 19 |
| A2294146 | Cleaning Blade Support Plate | 97 | 20 |

## TECHNICAL SERVICE BULLETIN

BULLETIN NUMBER: A229-005
03/22/99

APPLICABLE MODEL:<br>GESTETNER - 3265<br>RICOH - AFICIO 650<br>SAVIN - 9965DP

## SUBJECT: SERVICE MANUAL - INSERT

## GENERAL:

The Service Manual page(s) listed below must be replaced with the page(s) supplied. Each bulletin package contains 1 set of replacement pages.

PAGES:

The revised areas have been highlighted by an arrow $\Rightarrow$.

- $4-19 \mathrm{~A} / \mathrm{B}$
- 4-21
- 4-39
- $4-49$

Updated Information (Additional Pages / Service Programs)
Updated Information (SP 4-008 Correction)
Updated Information (Service Programs Added)
Updated information (Service Program 7-823 Deleted / No SP 7-303)

| Mode No.(Class 1, 2 \& 3) |  |  |  | Function | Settings |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 2-265 | Toner Pump Adjustment |  |  |  |  |
|  | 6 | Aggregate of Toner Waste | * | Factory use only |  |
| 2-966 | Periodic Auto Process Control |  |  |  |  |
|  |  |  |  | Select whether process initial setting is started at periodical interval if the following conditions exist. | $\begin{aligned} & \text { OFF } \\ & \text { ON } \end{aligned}$ |
|  |  |  |  | 1. 24 hours or more have been passed since the last Process Control Initial Setting <br> 2. The copy job is finished. |  |

## THIS PAGE IS INTENTIONAL LEFT BLANK

| Mode No.(Class 1, 2 \& 3) |  |  |  | Function | Settings |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 4-008 | Scanner Sub Scan Magnification |  |  |  |  |
|  |  |  |  | Adjusts the magnification in the sub scan direction for scanning. <br> If this value is changed, the scanner motor speed is changed. | $\begin{aligned} & -0.9 ~+0.9 \\ & 0.1 \% / \text { step } \\ & +0.0 \% \end{aligned}$ |
|  |  |  | Use the "•"key to toggle from + to - and Clear/Stop key to toggle from - to + before entering the value. |  |
| 4-010 | Scanner Leading Edge Registration |  |  |  |  |
|  |  |  |  |  | Adjusts the leading edge registration for scanning. | $\begin{aligned} & -9.0 \sim+9.0 \\ & 0.1 \mathrm{~mm} / \mathrm{step} \\ & +0.0 \mathrm{~mm} \end{aligned}$ |
|  |  |  | (-): The image moves in the direction of the leading edge <br> Use the " 0 " key to toggle from + to - and Clear/Stop key to toggle from - to + before entering the value. |  |  |  |
| 4-011 | Scanner Side-to Side Registration |  |  |  |  |  |
|  |  |  | , | Adjusts the side-to-side registration for scanning. | $\begin{aligned} & -6.0 \sim+6.0 \\ & 0.1 \mathrm{~mm} / \mathrm{step} \\ & \mathbf{+} \mathbf{0 . 0 ~ m m} \end{aligned}$ |  |
|  |  |  | (-): The image disappears at the left side. (+): The image appears at the left side. Use the " $\bullet$ " key to toggle from + to - and Clear/Stop key to toggle from - to + before entering the value. |  |  |  |
| 4-012 | Scanner Erase Margin |  |  |  |  |  |
|  | 1 | Leading Edge |  | * | Adjusts the leading edge erase margin for scanning. | $\begin{aligned} & 0.0 \sim 0.9 \\ & 0.1 \mathrm{~mm} / \text { step } \\ & 0.5 \mathrm{~mm} \end{aligned}$ |
|  |  |  | Do not adjust this unless the user wishes to have a scanner margin that is greater than the printer margin. |  |  |  |
|  | 2 | Trailing Edge | * | Adjusts the trailing edge erase margin for scanning. <br> See the comment for SP 4-012-1. | $\begin{aligned} & \hline 0.0 \sim 0.9 \\ & 0.1 \mathrm{~mm} / \text { step } \\ & 0.5 \mathrm{~mm} \end{aligned}$ |  |
|  | 3 | Left | * | Adjusts the left side erase margin for scanning. | $\begin{aligned} & 0.0 \sim 0.9 \\ & 0.1 \mathrm{~mm} / \text { step } \end{aligned}$ |  |
|  |  |  |  | See the comment for SP 4-012-1. | 0.5 mm |  |
|  | 4 | Right | * | Adjusts the right side erase margin for scanning. | $\begin{aligned} & 0.0 \sim 0.9 \\ & 0.1 \mathrm{~mm} / \text { step } \\ & 0.5 \mathrm{~mm} \end{aligned}$ |  |
|  |  |  |  | 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 <br> 1: Start |  |




BULLETIN NUMBER: A229-006

GESTETNER - 3265/3255
RICOH - AFICIO 650/550
SAVIN - 9965DP/9955DP

## SUBJECT: OIL SUPPLY CLEANING ROLLER

## GENERAL:

A new style Oil Supply Cleaning Roller has been used from first mass-production to prevent black spots from appearing during cold starts with paper that contains high amounts of calcium carbonate. The following Part update is being issued for all A229 Parts Catalogs.


|  |  | REFERENCE |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| OLD PART NO. | NEW PART NO. | DESCRIPTION | QTY | PAGE | ITEM |
| AE042020 | AE042035 | Oil Supply Cleaning Roller | 1 | 97 | 14 |

## UNITS AFFECTED:

All copiers manufactured after the Serial Numbers listed below will have the new style Oil Supply Cleaning Roller installed during production.

| MODEL NAME | SERIAL NUMBER |
| :---: | :---: |
| Gestetner 3265 | From First Production |
| Gestetner 3255 | From First Production |
| Ricoh AFICIO 650 | From First Production |
| Ricoh AFICIO 550 | From First Production |
| Savin 9965DP | From First Production |
| Savin 9955DP | From First Production |

BULLETIN NUMBER: A229-007

## SUBJECT: DIRTY BACKGROUND AT THE LEADING EDGE OF COPY

## SYMPTOM:

Some toner is slightly visible at the leading edge of the copy.

## CAUSE

Overtoning in the Development Unit.

## SOLUTION:

Field Countermeasure:
Follow the flow chart for the adjustment procedure on the following pages to minimize the symptom. Please note that since this adjustment is to stabilize the toner amount in the development unit at a lower level, some customers may complain about a lighter image in the black solid areas. Especially, soon after installation and for the first several copies every morning. However, there is no problem with text area. Adjust the SP modes for the development bias to meet a required level for each customer.

## Production Countermeasure:

To minimize the dirty background, the factory settings of some SP modes have been changed to stabilize the toner amount in the development unit at a lower level, which prevents overtoning.

Because of the change of the factory settings of some SP modes, a lighter image may appear on black solid areas at installation.

The toner amount in the development unit is determined with a calculation including not only new toner but also recycled toner. At installation, the pipe for the recycled toner is empty and it takes approximately 1,000 to 2,000 copies for the recycled toner to migrate into the development unit.
This means that the toner amount in the development unit is less during the first 1,000 to 2,000 copies after installation and gradually becomes higher.
Please adjust the SP modes for the development bias to meet a required level for each customer.

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## Contents of New Factory Settings

The following settings have been changed.

1. SP2967 (Auto Image Density Adjustment)

Please note that this SP is available in the SBICU firmware version 7.42.1C level or higher.

| Old Setting | New Setting |
| :---: | :---: |
| OFF | ON |

Function: During the period of the process control after the main switch is turned on with the condition that the fusing temperature is under $100^{\circ} \mathrm{C}$. The toner amount in the development unit is checked and a small amount of toner is used if the amount is too high. Then, new values for Vref and Vt are determined.
2. SP2201-2 and SP2201-4 (Development Bias Adjustment)

|  | Old Setting | New Setting |
| :---: | :---: | :---: |
| SP2201-2 | 390 | 440 |
| SP2201-4 | 270 | 320 |

Function: To make the toner amount in the development unit lower and to make the chargeability of the toner higher.
3. SP2209 (Toner Supply Rate)

| Old Setting | New Setting |
| :---: | :---: |
| 650 | 850 |

Function: To make the amount of toner supplied for one time smaller and to make the chargeability of the toner higher.

## UNITS AFFECTED:

All A229 copiers manufactured after the Serial Numbers listed below will have the new factory settings set during production.

| MODEL NAME | SERIAL NUMBER |
| :---: | :--- |
| Gestetner 3265 | AS78120001 |
| Gestetner 3255 | From First Production |
| Ricoh AFICIO 650 | A7909410036 |
| Ricoh AFICIO 550 | From First Production |
| Savin 9965DP | 2B49410001 |
| Savin 9955DP | From First Production |

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## Field Countermeasure:

## Adjustment Procedure

1. Auto Image Density Adjustment Mode


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2. Laser Beam Pitch Adjustment
(This is to verify that the laser beam pitch is correctly adjusted.)


Continued...

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3. Development Bias Adjustment
(This is to adjust the development bias to an appropriate level for each customer.)


## TECHNICAL SERVICE BULLETIN

BULLETIN NUMBER: A229-008
APPLICABLE MODEL:
GESTETNER - 3265/3255
RICOH - AFICIO 650/550
SAVIN - 9965DP/9955DP

## SUBJECT: BLACK COPIES

## SYMPTOM:

Black copies are generated without a service code being generated. The copier stops operating with the message "Please wait" appearing in the display. If the condition persists, the SBICU board, Xenon Lamp Board and the two Lamp Regulators may become damaged.

## CAUSE:

The Lower Insulating Sheet (P/N A2291806) is not installed (See Figure A below). As the insulation on the Xenon Lamp Flexible Board (Ribbon Cable) (P/N A2295463) becomes worn, it will eventually short to the metal frame if the Lower Insulating Sheet is not installed.


## SOLUTION:

At the next service call, check that the Lower Insulating Sheet is installed on the top left rear of the Optics Frame. If it is not installed, as a temporary solution, put an insulating tape or mylar under the Ribbon Cable of the Xenon Lamp Flexible Board. Install a new Lower Insulating Sheet at the following visit. Please contact the TSD Hotline if the sheet is missing.

|  | REFERENCE |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| PART NUMBER. | DESCRIPTION | QTY | PAGE | ITEM |
| A2291806 | Lower Insulating Sheet | 1 | 47 | 14 |

NOTE: Please be advised that a limited quantity of A229's may exhibit black copies.

BULLETIN NUMBER: A229-009
06/25/99
APPLICABLE MODEL:
GESTETNER - 3265/3255
RICOH - AFICIO 650/550
SAVIN - 9965DP/9955DP

## SUBJECT: OPERATION PANEL ASSEMBLY

## GENERAL:

The LCDC Cover (P/N A2291433) index number 17 and the LCDC Board (P/N A2295200) index number 18 are not included in the Operation Panel Assembly (P/N A2291412 / A2291414) index number 1. The following illustration correction is being issued for all A229 Parts Catalogs. Please update your Parts Catalog with the following illustration change.

Operation Panel (A229)


REFERENCE

| PART NUMBER | DESCRIPTION | QTY | PAGE | ITEM |
| :---: | :--- | :---: | :---: | :---: |
| A2291412 | Operation Panel Ass'y (LT) | 1 | 19 | 1 |
| A2291414 | Operation Panel Ass'y (A4) | 1 | 19 | 1 |
| A2291433 | LCDC Cover | 1 | 19 | 17 |
| A2295200 | LCDC Board | 1 | 19 | 18 |

## SUBJECT: PARTS CATALOG UPDATES

## GENERAL:

The following parts updates are being issued for all A229 Parts Catalog. This information should be incorporated into all existing A229 Parts Catalog.

## INTERCHANGEABILITY CHART:

| 0 | OLD and NEW parts can be used in both OLD and <br> NEW machines. | 2 | NEW parts CAN NOT be used in OLD machines. <br> OLD parts can be used in OLD and NEW machines. |
| :---: | :--- | :---: | :--- |
| 1 | NEW parts can be used in OLD and NEW machines. <br> OLD parts CAN NOT be used in NEW machines. | 3 | OLD parts CAN NOT be used in NEW machines. <br> NEW parts CAN NOT be used in OLD machines. |
| 3/S | Must be installed as a set on units manufactured prior to the S/N cut-in. On units manufactured after the S/N cut-in or <br> previously modified, use the new part numbers individually. |  |  |

- UPDATE 1: FAN MOTORS- To reduce the fan noise, the motors have been replaced with new motors that produce less noise.

|  |  |  |  |  |  |  | REFERENCE |  |
| :---: | :--- | :--- | :---: | :---: | :---: | :---: | :---: | :---: |
| OLD PART NO. | NEW PART NO. | DESCRIPTION | QTY | PAGE | ITEM |  |  |  |
| A1762110 | A2472110 | Fan Motor-DC24V 10.8W | 1 | 129 | 10 |  |  |  |
| A0975553 | A2291195 Motor-11W | Cooling Fan Motor-DC24V 9.6W | 1 | 129 | 10 |  |  |  |

## UNITS AFFECTED:

All copiers manufactured after the Serial Numbers listed below will have the new motors installed.

| MODEL NAME | SERIAL NUMBER |
| :---: | :---: |
| Gestetner 3265 | N/A |
| Gestetner 3255 | 2B48120001 |
| Ricoh Aficio 650 | A7908110357 |
| Ricoh Aficio 550 | A7908120321 |
| Savin 9965DP | N/A |
| Savin 9955DP | 2B48120001 |

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- UPDATE 2: REVERSAL BRACKET - To increase durability, the shape of the Reversal Bracket has been changed. Please correct your Parts Catalog.

|  |  |  |  |  | REFERENCE |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| OLD PART NO. | NEW PART NO. | DESCRIPTION | QTY | INT | PAGE | ITEM |
| A2294633 | A2294640 | Reversal Bracket | 1 | 1 | 111 | 15 |

- UPDATE 3: TONER BOTTLE HOLDER ASSEMBLY - As per a field request, the Toner Bottle Holder Assembly has been registered as a Service Part. Please correct the illustration in the Parts Catalog as shown below.

The illustration for the part of Item 14 has been changed as shown below. The decal Item 32 is included in with the part Item 14. Please correct the Parts Catalog accordingly.

|  |  | REFERENCE |  |  |
| :---: | :---: | :---: | :---: | :---: |
| NEW PART NO. | DESCRIPTION | QTY | PAGE | ITEM |
| A2293202 | Toner Bottle Holder Assembly (RIC LT) | 1 | 77 | $33^{*}$ |
| A2293203 | Toner Bottle Holder Assembly (RIC A4) | 1 | 77 | $33^{*}$ |
| A2293204 | Toner Bottle Holder Assembly (Others) | 1 | 77 | $33^{*}$ |

* Denotes New Item


UPDATE 4: SIDE FENCE AND SEAL ON BYPASS TRAY - To minimize a possible noise generated when the side fences of the Bypass Tray are opened, the width of the Mylar Seal has been enlarged from 16 mm to 26 mm .

The illustrations for Items 8 and 11 have been changed. The Seal of Item 9 is included in with Items 8 and 11. Please correct your Parts Catalog as shown below.

| OLD PART NO | NEW PART NO. | DESCRIPTION | QTY | INT | PAGEERENCE |  |
| :---: | :---: | :--- | :---: | :---: | :---: | :---: |
| A1762741 | A2292866 | Front Side Fence | 1 | 1 | 51 | 8 |
| A0692645 | A2292870 | Seal - $0.2 \times 165 \times 47$ | 2 | 1 | 51 | 9 |
| A1762751 | A2292868 | Rear Side Fence | 1 | 1 | 51 | 11 |

19. By-pass Feed Unit (A229)


## UNITS AFFECTED:

All copiers manufactured after the Serial Numbers listed below will have the new style Seal and Side Fences installed during production.

| MODEL NAME | SERIAL NUMBER |
| :---: | :---: |
| Gestetner 3265 | N/A |
| Gestetner 3255 | 2B49010001 |
| Ricoh Aficio 650 | N/A |
| Ricoh Aficio 550 | A7908120889 |
| Savin 9965DP | N/A |
| Savin 9955DP | 2B49010001 |

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- UPDATE 5: OIL SUPPLY ROLLER - The Oil Supply Roller has been changed to standardize the part with current model as follows.

|  |  |  |  |  | REFERENCE |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| OLD PART NO. | NEW PART NO. | DESCRIPTION | QTY | INT | PAGE | ITEM |
| AE040023 | AE040016 | Oil Supply Roller | 1 | 0 | 97 | 16 |

- UPDATE 6: OPTICS/ ELECTRICAL SECTION - Please correct your Parts Catalog as follows below.

|  |  | REFERENCE |  |
| :---: | :--- | :---: | :---: |
| NEW PART NO. | DESCRIPTION | PAGE | ITEM |
| A8115450 | Printer Harness | 43 | $27^{*}$ |
| 11070880 | Fuse- $6.3 \mathrm{~A} 250 \mathrm{~V}(230 \mathrm{~V})$ | 131 | $109^{* *}$ |

* Denotes New Item
** Denotes Additional Item

|  |  | REFERENCE |  |  |
| :---: | :--- | :--- | :---: | :---: |
| PART NUMBER | OLD DESCRIPTION | NEW DESCRIPTION | PAGE | ITEM |
| 11070864 | Fuse - 12A 250V | Fuse $-12 \mathrm{~A} 250 \mathrm{~V}(115 \mathrm{~V})$ | 131 | 109 |
| 11070869 | Fuse -2 A 125 V | Fuse -6.3 A 125 V | 131 | 111 |

15. Optics Section 2 (A229)

16. Electrical Section 2 (A229)


Continued...

UPDATE 7: REVERSE GUIDE PLATE - To keep the paper transportation in good condition, the material used for the Reverse Guide Plate has been changed.

|  |  |  |  |  |  |  |  | REFERENCE |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| OLD PART NO. | NEW PART NO. | DESCRIPTION | QTY | INT | PAGE | ITEM |  |  |  |
| A2294483 | A2294477 | Reverse Guide Plate | 1 | 1 | 105 | 12 |  |  |  |

## UNITS AFFECTED:

All copiers manufactured after the Serial Numbers listed below will have the new style Reverse Guide Plate installed.

| MODEL NAME | SERIAL NUMBER |
| :---: | :---: |
| Gestetner 3265 | N/A |
| Gestetner 3255 | From First Production |
| Ricoh Aficio 650 | A7908110357 |
| Ricoh Aficio 550 | From First Production |
| Savin 9965DP | N/A |
| Savin 9955DP | From First Production |

- UPDATE 8: SUPPORT PLATE - To provide support under the 10 Key Board, the Support Plate (A2291472) has been added as shown below.

|  |  | REFERENCE |  |  |
| :---: | :---: | :---: | :---: | :---: |
| NEW PART NUMBER. | DESCRIPTION | QUATITY | PAGE | ITEM |
| A2291472 | Support Plate - Operation Panel | 1 | 19 | $27^{*}$ |

[^2]3. Operation Panel (A229)


Continued...

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Page 6 of 7

- UPDATE 8: SUPPORT PLATE - Continued...


## UNITS AFFECTED:

All copiers manufactured after the Serial Numbers listed below will have the new style Support Plate installed during production.

| MODEL NAME | SERIAL NUMBER |
| :---: | :---: |
| Gestetner 3265 | N/A |
| Gestetner 3255 | From First Production |
| Ricoh Aficio 650 | A7908110357 |
| Ricoh Aficio 550 | From First Production |
| Savin 9965DP | N/A |
| Savin 9955DP | From First Production |

- UPDATE 9: TONER BOTTLE MOTOR MECHANISM

PART 1 - To improve the strength of the Toner Bottle Mechanism, the following parts have been changed.

1. The thickness of the Toner Bottle Bracket has been increased from 1.2 mm to 1.6 mm , please see illustration on following page.
2. The length of the Idler Shaft has been extended from 50 mm to 51 mm , please see illustration on following page.
3. Arrow marked "2" in Step 5 of the Decal for toner replacement has been deleted as shown.

|  |  |  |  |  | REFERENCE |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| OLD PART NO. | NEW PART NO. | DESCRIPTION | QTY | INT | PAGE | ITEM |
| A2293238 | A2293248 | Toner Bottle Bracket | 1 | 1 | 77 | 2 |
| AA145811 | AA145817 | Idler Shaft - Toner Bottle | 1 | 1 | 77 | 5 |



Continued...

## Page 7 of 7

- UPDATE 9: TONER BOTTLE MOTOR MECHANISM - Continued...

PART 2 - To prevent damage to the gear, even if the Toner Bottle is turned clockwise when installed, a one-way mechanism has been added by using two gears.

|  |  |  |  | REFERENCE |  |  |
| :---: | :--- | :--- | :---: | :---: | :---: | :---: |
| OLD PART NO. | NEW PART NO. | DESCRIPTION | QTY | PAGE | ITEM | NOTE |
| AB017464 |  | Connecting Gear | $1-0$ | 77 | 3 |  |
|  | - A2293242 | Toner Bottle Joint Gear | $0-1$ | 77 | 3 | 1 |
|  | - A2293243 | Motor Joint Gear | $0-1$ | 77 | 34 | 1,2 |
|  | AA060291 | Spring | $0-1$ | 77 | 35 | 1,2 |
|  | AA132024 | Spacer - M6 | $0-1$ | 77 | 36 | 1,2 |

## NOTE:

1. Please note that the two gears, the Spring and the Spacer should be replaced at the same time.
2. Denotes New Item.


## UNITS AFFECTED:

All copiers manufactured after the Serial Numbers listed below will have the new style parts installed during production.

| MODEL NAME | SERIAL NUMBER |
| :---: | :---: |
| Gestetner 3265 | N/A |
| Gestetner 3255 | 3B89050001 |
| Ricoh Aficio 650 | N/A |
| Ricoh Aficio 550 | A9049040476 |
| Savin 9965DP | N/A |
| Savin 9955DP | 3B89050001 |

TECHNICAL SERVICE BULLETIN

BULLETIN NUMBER: A229-011
08/25/99
APPLICABLE MODEL:
GESTETNER - 3265/3255
RICOH - AFICIO 650/550
SAVIN - 9965DP/9955DP

## SUBJECT: PARTS CATALOG UPDATES

## GENERAL:

The following Parts Updates are being issued for all A229 Parts Catalogs.

- UPDATE 1: Seal - To prevent the bracket on the backside of the operation panel from touching and pushing the seal, the shape of the seal has been changed as shown below.


|  |  |  |  |  | REFERENCE |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| OLD PART NO. | NEW PART NO. | DESCRIPTION | QTY | INT | PAGE | ITEM |
| AA150636 | AA150704 | Seal - 90x29.5×0.2 | 1 | 1 | 41 | 8 |

## UNITS AFFECTED:

All A229 copiers manufactured after the Serial Numbers listed below will have the new style seal installed during production.

| MODEL NAME | SERIAL NUMBER |
| :--- | :--- |
| Gestetner 3265 | NA |
| Gestetner 3255 | From First Production |
| Ricoh Aficio 650 | A7908110357 |
| Ricoh Aficio 550 | From First Production |
| Savin 9965DP | NA |
| Savin 9955DP | From First Production |

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- UPDATE 2: Paper Feed Cushion - To minimize a noise from the paper feed section when feeding papers, a cushion has been added as shown.

26. Paper Feed Unit 2 (A229)


|  | REFERENCE |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| NEW PART NUMBER | DESCRIPTION | QTY | PAGE | ITEM |
| 54421924 | Exposure Glass Cushion | 1 | 65 | 17 |

## UNITS AFFECTED:

All A229 copiers manufactured after the Serial Numbers listed below will have the new style Paper Feed Cushion installed during production.

| MODEL NAME | SERIAL NUMBER |
| :--- | :--- |
| Gestetner 3265 | NA |
| Gestetner 3255 | From First Production |
| Ricoh Aficio 650 | A7908110357 |
| Ricoh Aficio 550 | From First Production |
| Savin 9965DP | NA |
| Savin 9955DP | From First Production |

- UPDATE 3: Tandem Tray - The part number for the Left Tandem Tray Assembly and Right Tandem Tray Assembly are incorrect please correct your Parts Catalog as shown below.

|  |  |  |  |  |  |  |  | REFERENCE |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| OLD PART NO. | NEW PART NO. | DESCRIPTION | QTY | PAGE | ITEM |  |  |  |  |
| A0966630 | A2296630 | Left Tandem Tray Ass'y | 1 | 53 | 3 |  |  |  |  |
| A1766650 | A2296650 | Right Tandem Tray Ass'y | 1 | 55 | 35 |  |  |  |  |

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- UPDATE 4: Lower Entrance Guide Plate - The index number is missing from the illustration on page 110 in parts catalog for the Lower Entrance Guide Plate (A2294623) please add the index number to your Parts Catalog.



## INTERCHANGEABILITY CHART:

| 0 | OLD and NEW parts can be used in both OLD and <br> NEW machines. | 2 | NEW parts CAN NOT be used in OLD machines. <br> OLD parts can be used in OLD and NEW machines. |
| :---: | :--- | :--- | :--- |
| 1 | NEW parts can be used in OLD and NEW machines. <br> OLD parts CAN NOT be used in NEW machines. | 3 | OLD parts CAN NOT be used in NEW machines. <br> NEW parts CAN NOT be used in OLD machines. |
| 3/S | Must be installed as a set on units manufactured prior to the S/N cut-in. On units manufactured after the S/N cut-in or <br> previously modified, use the new part numbers individually. |  |  |

BULLETIN NUMBER: A229-012
08/25/99
APPLICABLE MODEL:
GESTETNER - 3265/3255
RICOH - AFICIO 650/550
SAVIN - 9965DP/9955DP

## SUBJECT: THIRD TRAY LIFT MOTOR MALFUNCTION

## SYMPTOM:

The 3rd tray cannot be raised or lowered.

## CAUSE:

An IC on the Motor Control Board assembled on the lift motor is damaged and the lift motor cannot be controlled. Static electricity is a possible cause.

## SOLUTION:

To prevent the IC from being damaged, a resistor has been added to the Motor Control Board.
The part number of the motor assembly AX06-0130 has not been changed.

## How to Confirm New Motor Type:

There were two steps on the modification.
1st Step: A green dot mark has been added on the right side of the lot number label as shown.
2nd Step: The suffix of the part number has been changed from no suffix (AX060130) to "A" (AX060130 A) on the lot number label as shown.


## UNITS AFFECTED:

All A229 copiers manufactured after April 1999 production will have the new style 3rd Tray Lift Motor installed during production.

## TECHNICAL SERVICE BULLETIN

BULLETIN NUMBER: A229-013
09/07/99
APPLICABLE MODEL:
GESTETNER - 3265/3255
RICOH - AFICIO 650/550
SAVIN - 9965DP/9955DP

## SUBJECT: PARTS CATALOG UPDATES

## - UPDATE 1:

> REAR SPRING PLATE - To ensure conductivity between the Transfer Bias Roller and the Rear Spring Plate, a conductive sheet has been added to the Rear Spring Plate. The following part update is being issued for all A229 Parts Catalogs. Please update your Parts Catalogs with the following information.


| OLD PART No. | OLD PART No. | DESCRIPTION | QTY | INT | PAGEFERENCE | ITEM |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| A0963860 | A2473855 | Rear Spring Plate | 1 | 0 | 93 | 20 |

- UPDATE 2: EXIT REAR SIDE PLATE/PRESSURE SHAFT - To standardize parts with a new model, the following parts have been changed. The Exit Rear Side Plate and the Pressure Shaft must be replace as a set. The following parts updates are being issued for all A229 Parts Catalogs. Please update your Parts Catalogs with the following information.

|  |  |  |  |  | REFERENCE |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| OLD PART NO. | NEW PART NO. | DESCRIPTION | QTY | INT | PAGE | ITEM |
| A2294451 | A2934451 | Exit Rear Side Plate | 1 | 3/S | 107 | 3 |
| A2294466 | A2934466 | Pressure Shaft | 1 | 3/S | 107 | 10 |

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- UPDATE 3: TENSION SPRING - The following part update is being issued for all A229 Parts Catalogs. Please update your Parts Catalogs with the following information.


|  |  |  |  |  |  |  |  |  | REFERENCE |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| NEW PART NUMBER | DESCRIPTION | QTY | PAGE | ITEM |  |  |  |  |  |  |
| AA060722 | Tension Spring | 1 | 123 | $29^{*}$ |  |  |  |  |  |  |

* Denotes new item.
- UPDATE 4: PLATE NUT - To standardize parts with a new model, the following part has been changed. The following part update is being issued for all A229 Parts Catalogs. Please update your Parts Catalogs with the following information.

|  |  |  |  |  | REFERENCE |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| OLD PART NO. | NEW PART NO. | DESCRIPTION | QTY | INT | PAGE | ITEM |
| A0963182 |  | Plate Nut | 1 | 0 | 79 | 13 |
|  | $\rightarrow$ A2473123 | Plate Nut - Slitter |  |  |  |  |

## INTERCHANGEABILITY CHART:

| 0 | OLD and NEW parts can be used in both OLD and <br> NEW machines. | 2 | NEW parts CAN NOT be used in OLD machines. <br> OLD parts can be used in OLD and NEW machines. |
| :---: | :--- | :---: | :---: |
| 1 | NEW parts can be used in OLD and NEW machines. <br> OLD parts CAN NOT be used in NEW machines. | 3 | OLD parts CAN NOT be used in NEW machines. <br> NEW parts CAN NOT be used in OLD machines. |
| $3 / S$ | Must be installed as a set on units manufactured prior to the S/N cut-in. On units manufactured after the S/N cut-in or <br> previously modified, use the new part numbers individually. |  |  |

## TECHNICAL SERVICE BULLETIN

BULLETIN NUMBER: A229-014
09/10/99
APPLICABLE MODEL:
GESTETNER - 3265/3255
RICOH - AFICIO 650/550
SAVIN - 9965DP/9955DP

## SUBJECT: LIGHT COPIES

## SYMPTOM:

1. Image density is low at installation.
2. Image density decreases during a continuous copy run.
3. Copies display lower image density on the left and right sides, than in the middle. There is no problem with text areas.

## CAUSE:

The symptoms described above are caused by a combination of the following:

1. As described in Technical Service Bulletin A229-007, the factory settings for some SP modes have been changed to minimize the occurrence of dirty background. These changes may affect the image density, if an original contains a high percentage of black area or an original contains images with solid black areas on any side.
2. The value of the toner supply ratio set in the SP mode is too low with respect to the average percentage of black area in the originals used.
3. The base toner control level in the Development Unit is set lower than the expected image density level.

## SOLUTION:

Adjust the toner supply ratio and the bias voltages for the ID Sensor Pattern and for the image by following the adjustment procedure on the following pages.

NOTE: There might be some visible differences on half-tone areas and gray pattern areas between the first copy and the remaining copies in a multi-copy run. This is because non-compressed data is used for the first copy and compressed data stored on the hard disk is used for the remaining copies.

## UNITS AFFECTED:

All A229 copiers manufactured after the Serial Numbers listed below will have the new factory settings set during production.

| MODEL NAME | SERIAL NUMBER |
| :---: | :--- |
| Gestetner 3265 | 2B49410001 |
| Gestetner 3255 | From First Production |
| Ricoh AFICIO 650 | A7909410036 |
| Ricoh AFICIO 550 | From First Production |
| Savin 9965DP | 2B49410001 |
| Savin 9955DP | From First Production |

Continued...

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## ADJUSTMENT PROCEDURE:




TECHNICAL SERVICE BULLETIN

BULLETIN NUMBER: A229-015
APPLICABLE MODEL:
GESTETNER - 3265/3255
RICOH - AFICIO 650/550
SAVIN - 9965DP/9955DP

## SUBJECT: TONER BOTTLE INSTALLATION

## GENERAL:

This is to inform the technician of the possibility of encountering difficulties when installing the Toner
Collection Bottle.

## SYMPTOM:

When the toner collection bottle is installed, it might not be inserted all the way.
Please note that when removing the bottle $[A]$, the cap $[B]$ of the bottle hole might remain on the nozzle [C] and the sponge seal $[\mathrm{D}]$ inside the cap possibly drops into the bottle.


## CAUSE:

The positions of the hole [E] on the bottle and the toner collection nozzle [C] are mismatched by a few millimeters due to a production error on the Toner Collection Bottle.


Continued...

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Page 2 of 2

## FIELD COUNTERMEASURE:

The bottle can be installed with the following procedure.

1. Hold the bottle $[A]$ with one hand and the bottle holder $[F]$ with the other hand.
2. Push the bottle into the machine.


## PRODUCTION COUNTERMEASURE:

The production of the bottle has been reviewed and corrected at the factory.

## UNITS AFFECTED:

Serial Number cut-in not available at time of publication.

TECHNICAL SERVICE BULLETIN

BULLETIN NUMBER: A229-016
09/28/99
APPLICABLE MODEL:
GESTETNER - A229 for 3255/3265
RICOH - A229 for Aficio 550/650
SAVIN - A229 for 9955DP/9965DP

## SUBJECT: SECOND TRAY FOR A5/HLT LENGTHWISE

## GENERAL:

The following Parts Corrections are being issued for all A229 Parts Catalogs. These changes will allow A5/HLT to be fed from the second tray in the short edge feed direction (lengthwise).

|  |  |  |  |  | REFERENCE |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| OLD PART NO. | NEW PART NO. | DESCRIPTION | QTY | INT | PAGE | ITEM |
| A2296511 | A2296517 | Universal Tray - LT | 1 | 1 | 57 | 3 |
| A2296512 | A2296518 | Universal Tray - A4 | 1 | 1 | 57 | 3 |
| A0966534 | A2296534 | Front Side Fence | 1 | 3 | 57 | 14 |
| A0966556 | A2296556 | Tray Bottom Plate | 1 | 3 | 57 | 17 |
| A0966541 | A2296541 | Gear Side Fence | 1 | 3 | 57 | 19 |
| A0966544 | A2296544 | Side Fence Plate - A4 | 1 | 1 | 57 | 22 |
| A0966545 | A2296545 | Side Fence Plate - LT | 1 | 1 | 57 | 22 |
| A0966539 | AB014132 | Side Fence Gear | 2 | 3 | 57 | 23 |

## INTERCHANGEABILITY CHART:

| 0 | OLD and NEW parts can be used in both OLD and <br> NEW machines. | 2 | NEW parts CAN NOT be used in OLD machines. <br> OLD parts can be used in OLD and NEW machines. |
| :---: | :--- | :--- | :--- |
| 1 | NEW parts can be used in OLD and NEW machines. <br> OLD parts CAN NOT be used in NEW machines. | 3 | OLD parts CAN NOT be used in NEW machines. <br> NEW parts CAN NOT be used in OLD machines. |
| $3 / S$ | Must be installed as a set on units manufactured prior to the S/N cut-in. On units manufactured after the S/N cut-in or <br> previously modified, use the new part numbers individually. |  |  |

## UNITS AFFECTED:

All A229 copiers manufactured after the Serial Numbers listed below will have the new style Parts installed during production.

| MODEL NAME | SERIAL NUMBER |
| :--- | :--- |
| Gestetner 3255 | From first production |
| Gestetner 3265 | Serial no. not available |
| Ricoh Aficio 550 | From first production |
| Ricoh Aficio 650 | NA |
| Savin 9955DP | From first production |
| Savin 9965DP | NA |

## TECHNICAL SERVCE BULLEIIN

BULLETIN NUMBER: A229-017
APPLICABLE MODEL:
GESTETNER - 3265/3255
RICOH - AFICIO 650/550
SAMN - 9965DP/9955DP

## SUBJECT: BLANK IMAGE ON FIRST COPY / SC101

## SYMPTOM:

A blank image appears on the first copy and an SC101 message is displayed. This symptom is limited to the first copy after turning on the power. This symptom may not occur every time power is turned on, even on units that demonstrate this symptom.

## CAUSE:

The Exposure Lamp does not generate sufficient light during the first copy. While making a copy, the Exposure Lamp may be abnormally slow in reaching ready status. Therefore, the Lamp is not able to produce the required amount of light within the given time period. The source of this symptom has been identified as defective internal components in the Exposure Lamps that were produced in March, 1999.

## SOLUTION:

The Exposure Lamps produced in March, 1999 were installed in some machines manufactured in March, April and May, 1999. Please check the Exposure Lamp lot number by following the procedure outlined below, on units that are listed in the UNITS AFFECTED area of this bulletin. If the Exposure Lamp's lot number begins with " 39 ", the Lamp should be replaced. The lot number can be found on the black lamp cap on the rear side of the lamp. The lot number is also in black and therefore it may be difficult to read.

## Procedure for checking the Exposure Lamp lot numbers (and replacement, if necessary):

1. Remove the Exposure Glass.
2. Slide the 1st Scanner to the cutout in the rear Scanner Frame.
3. Read the lot number printed on the Exposure Lamp cap.
4. If the first two digits of the lot number are 39, replace the Exposure Lamp (either Field Replacement P/N A2299450 or New P/N AX500072). Follow the Replacement and Adjustment procedure on page 5-8 of the Service Manual.
5. Replacement and Adjustment procedure on page 6-5 of the Service Manual.

## GENERAL:

The following part update is being issued for all A229 Parts Catalogs. Please update your Parts Catalogs with the following information.

|  |  |  |  |  | REFERENCE |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| OLD PART NO. | FIELD <br> REPLACEMENT <br> NO. | NEW PART NO. | DESCRIPTION | QTY | PAGE | ITEM |
| AX500063 | A2299450 | AX500072 | Exposure Lamp | 1 | 45 | 3 |

Continued...

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## UNITS AFFECTED:

| MODEL NAME | MARCH SERIAL NUMBER | APRIL SERIAL NUMBER | MAY SERIAL NUMBER |
| :---: | :---: | :---: | :---: |
| Gestetner 3265 | - | 2B49440001-430 | 2 B49450001-206 |
| Gestetner 3255 | 2B49030001-240 | 3B89040001-200 | - |
| Ricoh AFICIO 650 | A7909031001-1532 | A9049040001-429 | - |
| Ricoh AFICIO 550 | A7909031533-2532 | - | - |
| Savin 9965DP | - | 2B49440001-430 | 2B49450001-206 |
| Savin 9955DP | 2B49030001-240 | 3B89040001-200 | - |

NOTE: An allocation for $100 \%$ of the affected machines will be shipped to their respective locations.

## TECHNICAL SERVICE BULLETIN

BULLETIN NUMBER: A229-018
APPLICABLE MODEL:
GESTETNER - 3265/3255
RICOH - AFICIO 650/550
SAVIN - 9965DP/9955DP

## SUBJECT: PARTS CATALOG UPDATES

- UPDATE 1: CLEANING BLADE SCREWS - To standardize parts with new model, the Philips Pan Head Screws securing the Cleaning Blade have been changed. The following part update is being issued for all A229 Parts Catalogs. Please update your Parts Catalogs with the following information.


| OLD PART NO. | NEW PART NO. | DESCRIPTION | QTY | INT | PAGEERENCE |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $03140060 B$ |  | Philips Pan Head Screw - M4x6 | 2 | 0 | 89 | 101 |
|  | $\rightarrow 03140040 B$ | Philips Pan Head Screw - M4x4 | 2 | 0 | 8 |  |

- UPDATE 2: ATA HARD DISK DRIVE - The ATA Hard Disk Drive has been changed because production of the old part has been discontinued. The following GENERAL: part update is being issued for all A229 Parts Catalogs. Please update your Parts Catalogs with the following information.

|  |  |  |  | REFERENCE |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| OLD PART NO. | NEW PART NO. | DESCRIPTION | QTY | INT | PAGE | ITEM |  |  |  |  |  |  |
| A2295480 | A2295841 | ATA HDD | 1 | 0 | 133 | 17 |  |  |  |  |  |  |

## UNITS AFFECTED:

A229 Serial Number cut-in not available at time of publication.

GR®®ロM TECHNICAL SERVICE BULLETIN

## BULLETIN NUMBER: A229-019

## APPLICABLE MODEL:

GESTETNER - 3265/3255
RICOH - AFICIO 650/550
SAVIN - 9965DP/9955DP

## SUBJECT: SERVICE MANUAL - INSERT

## GENERAL:

The Service Manual page(s) listed below must be replaced with the page(s) supplied. Each bulletin package contains 1 set of replacement pages.

PAGES:
The revised areas have been highlighted by an arrow $\Rightarrow$.

- $4-15$
- 4-49
- 6-21~22

Updated Information (SP 2-201-2)
Updated Information (SP 7-808)
Updated Information (Additional SC Codes)



## SC620-1: Communication error between SBICU and ADF 1

-Definition- [B]
The TXD and RXD signals between SBICU and ADF main board do not stabilize.

- Possible causes -
- Poor connection between the SBICU board and ADF main board
- Noise on interface cable


## SC620-2: Communication error between SBICU and ADF 2

-Definition- [B]
The TXD and RXD signals between SBICU and ADF main board do not stabilize.

- Possible causes -
- Poor connection between the SBICU board and ADF main board
- ADF main board defective
- SBICU board defective


## SC620-3: Communication error between SBICU and ADF 3

-Definition- [B]
Software error after abnormal user operation.

- Possible causes -
- Software error
$\Rightarrow$ SC621-1: Communication error between SBICU board and Finisher
-Definition- [B]
If ACK does not return within 100 msec . after data has been sent from the SBICU board to the finisher, the data is resent. Even if data has been has been sent three times, the ACK does not return.
-Possible Cause-
- Poor connection between the SBICU board and the Finisher Main Board
- Finisher main board defective
- SBICU board defective


## $\Rightarrow$ SC621-2: Communication error between SBICU Board and Finisher.

-Definition- [B]
During communication between the finisher main board and the SBICU board, a break signal is sent from the finisher main board.
-Possible Cause-

- Poor connection between the SBICU Board and the Finisher Main Board
- Finisher main board defective
- SBICU board defective


## SC623: Communication error between SBICU and paper feed board

-Definition- [B]
The SBICU cannot communicate with the paper feed board properly.

- Possible causes -
- Poor connection between the SBICU board and the paper feed board
- Paper feed board defective
- SBICU board defective
- Noise on interface cable


## SC624: Communication error between SBICU and LCT

-Definition- [B]
The SBICU cannot communicate with the LCT properly.

- Possible causes -
- Poor connection between the SBICU board and the LCT interface board
- LCT interface board defective
- SBICU board defective
- Noise on interface cable

SC630: CSS (RSS) communication error between line adapter and CSS center (Japan only)

## SC700: ADF original pick-up malfunction

-Definition- [B]
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


## TECHNICAL SERVICE BULLETIN

BULLETIN NUMBER: A229-020
APPLICABLE MODEL:
GESTETNER - 3265/3255
RICOH - AFICIO 650/550
SAVIN - 9965DP/9955DP

## SUBJECT: PARTS CATALOG UPDATES

## GENERAL:

The following Parts Updates are being issued for all A229 Parts Catalogs.

- UPDATE 1: PARTS STANDARDIZATION - Due to parts standardization with other models the following parts have changed, or have been deleted.


Page 105
47. Paper Exit Unit 3 (A229)


Page 107

REFERENCE

| OLD PART NO. | NEW PART NO. | DESCRIPTION | QTY | INT | PAGE | ITEM |
| :---: | :---: | :--- | :---: | :---: | :---: | :---: |
| A2294451 | A2934454 | Exit Rear Side plate | 1 | $3 / \mathrm{S}$ | 107 | 3 |
| A2294466 | A2934466 | Pressure Shaft | 1 | $3 / \mathrm{S}$ | 107 | 10 |
| 07200040 | 07200040 | Retaining Ring - M4 | $\mathrm{n}-\mathrm{n}-1$ | -- | 107 | 102 |
| 08053480 | 08053480 | Bushing - 6mm | $\mathrm{n}-\mathrm{n}-1$ | -- | 107 | 104 |
| AX200154 | AX200205 | Magnetic Clutch | 1 | 0 | 71 | 28 |
| AF022104 | AF022126 | Exit Roller - Driven | 1 | 0 | 103 | 15 |
| 11050113 |  | Edge - P108 | $1-0$ | -- | 105 | 101 |
| 11050283 |  | Clamp | $1-0$ | -- | 105 | 102 |

NOTE: Replace the Exit Rear Side Plate and pressure Shaft as a set only.

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Page 2 of 4

- UPDATE 2: TRANSFER UNIT ASSEMBLY - Due to the field's request, the Transfer Unit Assembly has been registered as a service part. This part includes all of the parts described on page 92 and 94 of the Parts Catalog.

|  | REFERENCE |  |  |  |
| :---: | :--- | :---: | :---: | :---: |
| NEW PART NUMBER | DESCRIPTION | QTY | PAGE | ITEM |
| A2293810 | Transfer Unit Ass'y | 1 | 93 | $* ~$ |

( ) DENOTES NEW ITEM

- UPDATE 3: SCREW FOR DRUM PULLEY - To facilitate assembly on the production line, the length of the screw fixing the Drum Pulley has been changed from 4 mm to 5 mm .

|  |  |  |  |  | REFERENCE |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| OLD PART NO. | NEW PART NO. | DESCRIPTION | QTY | INT | PAGE | ITEM |
| 05740040E |  | Hexagon Headless Set Screw M4x4 | 2-1 | -- | 121 | 105 |
|  | 05740050E | Hexagon Headless Set Screw M4x5 | 0-1 | 0 | 121 | 115 \% |

© DENOTES NEW ITEM

- UPDATE 4: Development Motor - To prevent paper jams in the paper feed section, the bushing of the Development Motor may leak a small amount of oil and contaminate a sensor or clutch. The bushing has been changed to a ball bearing type to prevent this so the part number of the Development Motor has been changed.

|  |  |  |  |  |  |  |  | REFERENCE |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| OLD PART NO. | NEW PART NO. | DESCRIPTION | QTY | INT | PAGE | ITEM |  |  |  |
| A1755305 | A2295305 | Development Motor - DC24 | 1 | 1 | 119 | 1 |  |  |  |

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## Page 3 of 4

## UNITS AFFECTED:

All A229 copiers manufactured after the Serial Numbers listed below will have the new style Development Motor installed during production.

| MODEL NAME | SERIAL NUMBER |
| :--- | :--- |
| Gestetner 3265 | NA |
| Gestetner 3255 | 2B48120001 |
| Ricoh Aficio 650 | NA |
| Ricoh Aficio 550 | From First Production |
| Savin 9965DP | NA |
| Savin 9955DP | 2B48120001 |

- UPDATE 5: DF FEED BELT SPRING - To reduce the deterioration of the DF Feed Belt, the Belt Guide Roller Spring have been changed to a stronger type. The new springs increase the friction between the Feed Belt and Separation Roller. This can prevent the Separation Roller from being turned in the opposite direction of the Feed Belt.

REFERENCE

| OLD PART NO. | NEW PART NO. | DESCRIPTION | QTY | INT | PAGE | ITEM |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| AA063318 | A8064261 | Spring - Belt Guide Roller | 2 | 1 | 25 | 13 |

## UNITS AFFECTED:

All A229 copiers manufactured after the Serial Numbers listed below will have the new style Belt Guide Roller Springs installed during production.

| MODEL NAME | SERIAL NUMBER |
| :--- | :--- |
| Gestetner 3265 | NA |
| Gestetner 3255 | 2B49020001 |
| Ricoh Aficio 650 | NA |
| Ricoh Aficio 550 | A7909020001 |
| Savin 9965DP | NA |
| Savin 9955DP | 2B49020001 |

- UPDATE 6: DF FEED BELT - To minimize deterioration of the surface of the DF Feed Belt the material and production process of the Feed Belt has been changed. Three other parts have also been changed to make the Feed Belt work smoothly because of the following reasons:
- If only the Feed Belt is replaced from the old type to the new type, the new Feed Belt may run onto the edge of the Feed Belt Rollers. Once the Feed Belt runs onto the edge of the Feed Belt Rollers, it tends to stay there and may cause a skew problem.
- Even if the Feed Belt runs onto the edge of the rollers, the new rollers and bracket can make the Feed Belt track back to its original position when the next job starts.

|  |  |  |  | REFERENCE |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| OLD PART NEW PART <br> NO. NO. | DESCRIPTION | QTY | INT | PAGE | ITEM |
| A8061296 | Transport Belt Roller | 1 | 3/S | 25 | 8 |
| - A8061293 | Feed Belt Drive Roller |  |  |  |  |
| A80612917 | Transport Belt Bracket | 1 | 3/S | 25 | 9 |
| -A8061292 | Feed Belt Bracket |  |  |  |  |
| A6801241 A8061295 | Feed Belt | 1 | 3 | 25 | 10 |
| A8061297 | Transport Belt Roller | 1 | 3/S | 25 | 11 |
| - A8061294 | Feed belt Driven Roller |  |  |  |  |

NOTE: If one of the old style parts is replaced, all four (4) parts must be replaced as a set.

## UNITS AFFECTED:

All A229 copiers manufactured after the Serial Numbers listed below will have the new style DF parts installed during production.

| MODEL NAME | SERIAL NUMBER |
| :--- | :--- |
| Gestetner 3265 | NA |
| Gestetner 3255 | 2B49050001 |
| Ricoh Aficio 650 | NA |
| Ricoh Aficio 550 | A9049060243 |
| Savin 9965DP | NA |
| Savin 9955DP | 2B49050001 |

## INTERCHANGEABILITY CHART:

| 0 | OLD and NEW parts can be used in both OLD and <br> NEW machines. | 2 | NEW parts CAN NOT be used in OLD machines. <br> OLD parts can be used in OLD and NEW machines. |
| :---: | :--- | :--- | :--- |
| 1 | NEW parts can be used in OLD and NEW machines. <br> OLD parts CAN NOT be used in NEW machines. | 3 | OLD parts CAN NOT be used in NEW machines. <br> NEW parts CAN NOT be used in OLD machines. |
| $3 / S$ | Must be installed as a set on units manufactured prior to the S/N cut-in. On units manufactured after the S/N cut-in or <br> previously modified, use the new part numbers individually. |  |  |

## TECHNICAL SERVICE BULLETIN

## BULLETIN NUMBER: A229-021

## APPLICABLE MODEL:

GESTETNER - 3265/3255
RICOH - AFICIO 650/550
SAVIN - 9965DP/9955DP

## SUBJECT: PARTS CATALOG UPDATES

- UPDATE 1: TENSION SPRING - To ensure that the plunger on the Duplex Inverter Solenoid moves smoothly, the Tension Spring has been changed to a weaker one. The following part update is being issued for all A229 Parts Catalogs. Please update your Parts Catalogs with the following information.


| OLD PART NO. | NEW PART NO. | DESCRIPTION | QTY | INT | PAGE | ITEM |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| AA060744 | AA060835 | Tension Spring | 1 | 1 | 115 | 7 |

## UNITS AFFECTED:

All A229 copiers manufactured after the Serial Numbers listed below will have the new style Tension Spring installed during production.

| MODEL NAME | SERIAL NUMBER |
| :---: | :--- |
| Gestetner 3265 | Not Available |
| Gestetner 3255 | 3B89090001 |
| Ricoh AFICIO 650 | Not Available |
| Ricoh AFICIO 550 | A9049090001 |
| Savin 9965DP | Not Available |
| Savin 9955DP | 3B89090001 |

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Page 2 of 2

- UPDATE 2: POWER CORD BUSHING - The following parts updates are being issued for all A229 Parts Catalogs. Please update your Parts Catalogs with the following information.

* Denotes new item.


## INTERCHANGEABILITY CHART:

| 0 | OLD and NEW parts can be used in both OLD and <br> NEW machines. | 2 | NEW parts CAN NOT be used in OLD machines. <br> OLD parts can be used in OLD and NEW machines. |
| :---: | :--- | :---: | :--- |
| 1 | NEW parts can be used in OLD and NEW machines. <br> OLD parts CAN NOT be used in NEW machines. | 3 | OLD parts CAN NOT be used in NEW machines. <br> NEW parts CAN NOT be used in OLD machines. |
| $3 / S$ | Must be installed as a set on units manufactured prior to the S/N cut-in. On units manufactured after the S/N cut-in or <br> previously modified, use the new part numbers individually. |  |  |

## BULLETIN NUMBER: A229-022

## APPLICABLE MODEL:

GESTETNER - 3265/3255
RICOH - AFICIO 650/550
SAVIN - 9965DP/9955DP

## SUBJECT: PARTS CATALOG UPDATES

## GENERAL:

The following Parts Updates are being issued for all A229 Parts Catalogs.

> - UPDATE 1: HDD Bracket - To facilitate assembly, one of the screws has been removed
> $\begin{aligned} & \text { UPDATE 1: } \quad \begin{array}{l}\text { HDD Bracket - To facilitate assembly, one of the screws has been removed } \\ \text { as shown in the illustration below. The shape of the HDD Ground Plate and }\end{array}\end{aligned}$ HDD Bracket has also been changed. Please replace as a set only if one of the old style parts need to be replaced.


|  | REFERENCE |  |  |  |  |  |  |  |  |
| :---: | :---: | :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| OLD PART NO. | NEW PART NO. | DESCRIPTION | QTY | INT | PAGE | ITEM |  |  |  |
| A2295897 | A2295843 | HDD Ground Plate | 1 | $3 / \mathrm{S}$ | 133 | 15 |  |  |  |
| A2295895 | A2295842 | HDD Bracket | 1 | $3 / \mathrm{S}$ | 133 | 16 |  |  |  |
| 08010153 |  | Bind Screw $-\mathrm{M} 6 \times 32$ | $5-4$ | -- | 133 | 109 |  |  |  |

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## Page 2 of 4

## UNITS AFFECTED:

All copiers manufactured after the Serial Numbers listed below will have the new style HDD Grounding Plate and HDD Bracket installed during production.

| MODEL NAME | SERIAL NUMBER |
| :--- | :--- |
| Gestetner 3265 | NA |
| Gestetner 3255 | 3B89070001 |
| Ricoh Aficio 650 | A7909070398 |
| Ricoh Aficio 550 | A9049070148 |
| Savin 9965DP | NA |
| Savin 9955DP | 3B89070001 |

- UPDATE 2: Retaining Ring - M4 - To minimize the play gap of the Timing Pulley Gear (AB017469) on the shaft, another Retaining Ring has been added.


|  |  | REFERENCE |  |  |
| :---: | :---: | :---: | :---: | :---: |
| PART NUMBER | DESCRIPTION | QTY | PAGE | ITEM |
| $07200040 B$ | Retaining Ring -M 4 | $1-2$ | 113 | 101 |

## UNITS AFFECTED:

All copiers manufactured after the Serial Numbers listed below will have the additional Retaining Ring installed during production.

| MODEL NAME | SERIAL NUMBER |
| :--- | :--- |
| Gestetner 3265 | NA |
| Gestetner 3255 | 3B89080001 |
| Ricoh Aficio 650 | NA |
| Ricoh Aficio 550 | A9049080056 |
| Savin 9965DP | NA |
| Savin 9955DP | 3B89080001 |

## Page 3 of 4

- UPDATE 3: Cover Sheet - The harness for the Anti-Condensation Heater may be damaged by the edge of the Third Paper Feed Tray when it is inserted. To prevent damage to the harness, a Cover Sheet has been added on the base frame as shown below.
< Machine Rear Side >


|  | REFERENCE |  |  |  |
| :---: | :--- | :---: | :---: | :---: |
| NEW PART NUMBER | DESCRIPTION | QTY | PAGE | ITEM |
| A2296080 | Cover Sheet | 1 | 139 | $34^{*}$ |

* DENOTES NEW ITEM


## UNITS AFFECTED:

All copiers manufactured after the Serial Numbers listed below will have the new Cover Sheet installed during production.

| MODEL NAME | SERIAL NUMBER |
| :--- | :--- |
| Gestetner 3265 | NA |
| Gestetner 3255 | 3B89070001 |
| Ricoh Aficio 650 | NA |
| Ricoh Aficio 550 | A9049070148 |
| Savin 9965DP | NA |
| Savin 9955DP | 3B89070001 |

- UPDATE 4: Paper End Feeler - The Paper End Feeler of the Third Paper Feed Tray may touch the bottom of the Second Paper Feed Tray. This may cause the paper in the third tray to be caught by the feeler and cause the paper to skew. This symptom may happen only on machines with the new Second Paper Feed Tray is installed.

NOTE: Refer to Technical Service Bulletin No. A229-16 for details regarding the new Second Paper Feed Tray.

| REFERENCE |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| OLD PART NO. | NEW PART NO. | DESCRIPTION | QTY | INT | PAGE | ITEM |  |  |
| A0966362 | A2296362 | Paper End Feeler | 1 | 1 | 65 | 2 |  |  |

## UNITS AFFECTED:

All copiers manufactured after the Serial Numbers listed below will have the new style Paper End Feeler installed during production.

| MODEL NAME | SERIAL NUMBER |
| :--- | :--- |
| Gestetner 3265 | NA |
| Gestetner 3255 | 3B89060001 |
| Ricoh Aficio 650 | NA |
| Ricoh Aficio 550 | A9049060243 |
| Savin 9965DP | NA |
| Savin 9955DP | 3B89060001 |

## INTERCHANGEABILITY CHART:

| 0 | OLD and NEW parts can be used in both OLD and <br> NEW machines. | 2 | NEW parts CAN NOT be used in OLD machines. <br> OLD parts can be used in OLD and NEW machines. |
| :---: | :--- | :--- | :--- |
| 1 | NEW parts can be used in OLD and NEW machines. <br> OLD parts CAN NOT be used in NEW machines. | 3 | OLD parts CAN NOT be used in NEW machines. <br> NEW parts CAN NOT be used in OLD machines. |
| $3 / S$ | Must be installed as a set on units manufactured prior to the S/N cut-in. On units manufactured after the S/N cut-in or <br> previously modified, use the new part numbers individually. |  |  |

TECHNICAL SERVICE BULLETIN

BULLETIN NUMBER: A229-023
01/24/2000

## APPLICABLE MODEL:

GESTETNER - 3265/3255
RICOH - AFICIO 650/550
SAVIN - 9965DP/9955DP

## SUBJECT: SERVICE MANUAL - INSERT

## GENERAL:

The Service Manual pages listed below must be replaced with the pages supplied. Each bulletin package contains 1 set of replacement pages.

PAGES:
The revised areas have been highlighted by an arrow $\Rightarrow$.

- 6-19 to 21

Updated Information (SC546-01 and SC546-02)

## 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
- SBICU defective
- Power supply board defective
- Poor fusing unit connection


## SC543: Fusing overheat error 1

-Definition- [A]
A fusing temperature of over $231^{\circ} \mathrm{C}$ is detected for 5 seconds by the fusing thermistor.

- Possible causes -
- Fusing thermistor defective
- SBICU defective
- I/O board (IOB) 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


## $\Rightarrow$ SC546-01: Fusing ready temperature malfunction

-Definition- [A]
The fusing temperature goes up or down by more than $20^{\circ} \mathrm{C}$ within 1 second and occurs two (2) times consecutively.

- Possible causes -
- Poor connection of thermistor
- Poor connection of fusing unit


## SC546-02: Fusing ready temperature malfunction

-Definition- [A]
The fusing temperature goes up or down by more than $20^{\circ} \mathrm{C}$ within 1 second and occurs three (3) times within 60 seconds.

- Possible causes -
- Poor connection of thermistor
- Poor connection of fusing unit


## SC547: Zero cross signal malfunction

## -Definition- [A]

Zero cross signals are not detected within a certain period after the main power switch has been turned on.

- Possible causes -
- Power supply board defective
- Noise on the ac power line


## SC590: Toner collection motor error

-Definition- [B]
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 SBICU and SBU

-Definition- [B']
The SBICU cannot communicate with the SBU board properly.

- Possible causes -
- Poor connection between the SBICU and SBU
- SBU defective
- SBICU defective
$\Rightarrow$ SC602: Communication error between SBICU and HDD controller -Definition- [B]

The SBICU cannot communicate with the HDD controller properly.

- Possible causes -
- Poor connection between the SBICU board and HDD control board
- SBICU board defective


## SC620-1: Communication error between SBICU and ADF 1

-Definition- [B]
The TXD and RXD signals between SBICU and ADF main board do not stabilize.

- Possible causes -
- Poor connection between the SBICU board and ADF main board
- Noise on interface cable


## SC620-2: Communication error between SBICU and ADF 2

-Definition- [B]
The TXD and RXD signals between SBICU and ADF main board do not stabilize.

- Possible causes -
- Poor connection between the SBICU board and ADF main board
- ADF main board defective
- SBICU board defective


## SC620-3: Communication error between SBICU and ADF 3

-Definition- [B]
Software error after abnormal user operation.

- Possible causes -
- Software error

SC621-1: Communication error between SBICU board and Finisher
-Definition- [B]
If ACK does not return within 100 msec . after data has been sent from the SBICU board to the finisher, the data is resent. Even if data has been has been sent three times, the ACK does not return.
-Possible Cause-

- Poor connection between the SBICU board and the Finisher Main Board
- Finisher main board defective
- SBICU board defective

TECHNICAL SERVICE BULLETIN

BULLETIN NUMBER：A229－024
02／02／2000

## APPLICABLE MODEL：

GESTETNER－3265／3255
RICOH－AFICIO 650／550
SAVIN－9965DP／9955DP

## SUBJECT：SERVICE MANUAL－INSERT

## GENERAL：

The Service Manual page listed below must be replaced with the page supplied．Each bulletin package contains 1 set of replacement pages．

PAGES：

The revised areas have been highlighted by an arrow $\Rightarrow$ ．
－4－75
Updated Information（LEDS）

### 4.5.7 LEDS

BICU

| Number | Monitored Signal |
| :--- | :--- |
| LED102 | Blinking : Normal <br> Stays on or off : CPU defective |
| LED103 | Turns on when the main power switch on. |
| LED104 | Blinking : Normal <br> Stays on or off : HDD abnormal |
| LED105 | Off : Normal |
| LED106 | Blinking : Normal |

## Paper Feed Board

$\Rightarrow$| Number | Monitored Signal |
| :--- | :--- |
| LED101 | Turns on 500ms interval : Normal (software) <br> Turns on 200ms interval : Software error is happening <br> Stays ON or OFF : Paper feed board defective |

### 4.6 SPECIAL TOOLS AND LUBRICANTS

### 4.6.3 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 |

### 4.6.4 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 |

RICOM:
TECHNICAL SERVICE BULLETIN

## BULLETIN NUMBER: A229-026

02/23/2000
APPLICABLE MODEL:
GESTETNER - 3265/3255
RICOH - AFICIO 650/550
SAVIN - 9965DP/9955DP

## SUBJECT: TRANSFER BELTS

## SYMPTOM:

Some Transfer Belts supplied as service parts may have a higher resistance value causing the Transfer Belt surface to become dirty with toner.

## CAUSE:

Transfer Belts are packaged in a box with a folded shape with no tension being applied to the belt.
Therefore, the belt will gradually increase in resistance in this condition.

## SOLUTION:

FIELD COUNTERMEASURE:
The resistance value will lower to a normal value after the belt is installed and is run for approximately 300 copy cycles.

## PRODUCTION COUNTERMEASURE:

The Transfer Belts with a lower resistance value will be selected and provided as service parts with a new part number (A2293899).

The production line will install non-selected Transfer Belts as before because tension is applied to the belt and it is not packaged with a folded shape.

There is a way to distinguish both belts. The sixth digit of the lot number of belt is different, $\mathbf{5}$ for Production line and 6 for Service parts. The lot number of the Transfer Belt is stamped on the inside edge of the belt.
<Example>
Production line $\quad 901145569$
Service parts
901146569

REFERENCE

| OLD PART NO. | NEW PART NO. | DESCRIPTION | QTY | INT | PAGE | ITEM |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| A2293852 | A2293899 | Transfer Belt | 1 | 1 | 93 | 5 |

NOTE: This part will be implemented as a service part only.

TECHNICAL SERVICE BULLETIN

BULLETIN NUMBER: A229-027
03/01/2000

## APPLICABLE MODEL:

GESTETNER - 3265/3255
RICOH - AFICIO 650/550
SAVIN - 9965DP/9955DP

## SUBJECT: SERVICE MANUAL - INSERT

## GENERAL:

The revised areas have been highlighted by an arrow $\Rightarrow$.

- 3-12

Updated Information (Installation)

29. Select "Copy SP" $[A]$ 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 [B] on the LCD.

NOTE: This SP mode performs the TD initial setting, then the forced toner supply. It will stop automatically when both procedures have finished.
30. Initialize the mechanical counter using SP7-825.
31. If necessary, select the correct display language (SP5-009).
32. Press the "Exit" key [C] on the LCD to exit SP mode.
33. Change the paper size for all paper trays to suit the customer's requests. (See section 3.3 "Paper Size Change" for details.)
34. Attach the appropriate paper size decals, which are included as accessories, to each paper feed tray.
35. Check copy quality and machine operation.
$\Rightarrow$ NOTE: The Drum Heater, Optics Anti-Condensation Heater and the two Tray Heaters, which turn on during the machine OFF condition are installed on the machine but the connectors, CN102 and CN103 on the PSU are not connected. Please connect the connectors when necessary.

## TECHNICAL SERVICE BULLETIN

BULLETIN NUMBER: A229-028
03/28/2000
APPLICABLE MODEL:
GESTETNER - 3265/3255
RICOH - AFICIO 650/550
SAVIN - 9965DP/9955DP

## SUBJECT: TORQUE LIMITERS / MAGNETIC CLUTCH

## GENERAL:

To improve the reliability and durability, the Magnetic Clutch and Torque Limiters have been changed. The following parts updates are being issued for all A229 Parts Catalogs. Please update your Parts Catalogs with the following information.

|  |  |  |  |  | REFERENCE |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| OLD PART NO. | NEW PART NO. | DESCRIPTION | QTY | INT | PAGE | ITEM |
| A2472900 | A2936399 | Torque Limiter - 53mm | 1 | 1 | 25 | 27 |
| A2472900 | A2936399 | Torque Limiter - 53mm | 1 | 1 | 67 | 4 |
| A2472900 | A2936399 | Torque Limiter - 53mm | 1 | 1 | 73 | 6 |
| AX200148 | AX200202 | Magnetic Clutch | 1 | 1 | 63 | 9 |

## UNITS AFFECTED:

All A229 copiers manufactured after the Serial Numbers listed below will have the new style Torque Limiters and Magnetic Clutch installed during production.

| MODEL NAME | SERIAL NUMBER |
| :---: | :--- |
| Gestetner 3265 | Not Available |
| Gestetner 3255 | 3B80020001 |
| Ricoh AFICIO 650 | Not Available |
| Ricoh AFICIO 550 | A9040020420 |
| Savin 9965DP | Not Available |
| Savin 9955DP | 3B80020001 |

## INTERCHANGEABILITY CHART:

| 0 | OLD and NEW parts can be used in both OLD and <br> NEW machines. | 2 | NEW parts CAN NOT be used in OLD machines. <br> OLD parts can be used in OLD and NEW machines. |
| :---: | :--- | :---: | :--- |
| 1 | NEW parts can be used in OLD and NEW machines. <br> OLD parts CAN NOT be used in NEW machines. | 3 | OLD parts CAN NOT be used in NEW machines. <br> NEW parts CAN NOT be used in OLD machines. |
| $3 / S$ | Must be installed as a set on units manufactured prior to the S/N cut-in. On units manufactured after the S/N cut-in or <br> previously modified, use the new part numbers individually. |  |  |


[^0]:    A229

[^1]:    . CAUTION
    After replacing the drum potential sensor, perform the process control data initial setting (SP mode No. 2-962).

[^2]:    * Denotes New Item

