# SECTION 1

# OVERALL MACHINE INFORMATION

# 1. SPECIFICATIONS

| | |
|---|---|
| Configuration: | Console |
| Copy Process: | Dry electrostatic transfer system |
| Toner Supply Control: | Fuzzy Control |
| Photoconductor: | OPC drum |
| Originals: | Sheet/Book |
| Original Size: | Maximum A3/11" x 17" |
| Original Alignment: | Left rear corner |
| Copy Paper Size: | Maximum A3/11" x 17"<br>Minimum A5/5 1/2" x 8 1/2" (Tray)<br>B5/8 1/2" x 11" (1.5K LCT)<br>A6/5 1/2" x 8 1/2" (By-pass) |
| Duplex Copying: | Maximum A3/11" x 17"<br>Minimum A5/5 1/2" x 8 1/2" (sideways) |
| Copy Paper Weight: | Paper tray: 52 ~ 128 g/m$^2$, 14 ~ 34 lb<br>Bypass feed table: 52 ~ 157 g/m$^2$, 14 ~ 42 lb<br>Duplex copying: 64 ~ 104 g/m$^2$, 17 ~ 24 lb |
| Reproduction Ratios: | 4 Enlargement and 6 Reduction |

| | A4/A3 Version | LT/LDG Version |
|---|---|---|
| Enlargement | 200%<br>141%<br>122%<br>115% | 200%<br>155%<br>129%<br>121% |
| Full Size | 100% | 100% |
| Reduction | 93%<br>82%<br>75%<br>71%<br>65%<br>50% | 93%<br>85%<br>77%<br>74%<br>65%<br>50% |

Power Source: 115V, 60Hz, more than 20A (for N.A)
220 ~ 240V, 50Hz/60Hz, more than 10A (for EU and AA)

Power Consumption: A095 and A096 copiers

| | Copier only | Full system* |
|---|---|---|
| Warm-up | 0.9 kVA | 0.9 kVA |
| Stand-by | 0.25 kVA | 0.25 kVA |
| Copying | 1.2 kVA | 1.3 kVA |
| Maximum | 1.45 kVA | 1.5 kVA |

*Full System:

- Mainframe with dual job feeder, compact sorter stapler and 3,500-sheet large capacity tray
- Mainframe with dual job feeder, floor type sorter stapler and 3,500-sheet large capacity tray
- Mainframe with recirculating document handler, finisher and 3,500-sheet large capacity tray

Noise Emission:

Sound pressure level: The measurements are made according to ISO7779

| | Copier only | Full system* |
|---|---|---|
| Copying | 55 dB (A) | 61 dB (A) |

Full System:

- Mainframe with dual job feeder, compact sorter stapler and 3,500-sheet large capacity tray
- Mainframe with dual job feeder, floor type sorter stapler and 3,500-sheet large capacity tray
- Mainframe with recirculating document handler, finisher and 3,500-sheet large capacity tray

Dimensions: 690 x 690 x 980 (W x D x H Mainframe only)
1280 x 690 x 1020 (W x D x H Mainframe with copy tray, platen cover)

Weight: Copier only: (Without the optional platen cover = Approximately 2 kg)
A095 copier: Approximately 151 kg
A096 copier: Approximately 163 kg

Zoom: From 50% to 200% in 1% steps

Copying Speed:

| | A4/LT (sideways) | A3/DLT | B4/LG |
|---|---|---|---|
| A095 copier | 45 | 23 | 27 |
| A096 copier | 55 | 28 | 35 |

Warm-up Time: Less than 5 minutes (20°C)

First Copy Time: 3.1 seconds (A4/8 1/2" x 11" sideways from the 1st feed station)

Copy Number Input: Number keys, 1 to 999 (count up or count down)

Manual Image Density Selection: 7 steps

Automatic Reset: 1 minute standard setting; can also be set from 1 second to 999 seconds or no auto reset.

Copy Paper Capacity:

- By-pass feed table: approximately 50 sheets
- Paper tray: approximately 550 sheets
- Tandem tray: approximately 500 sheets
- Large capacity tray: approximately 1500 sheets

Toner Replenishment: 1,100 g/cartridge

Optional Equipment:

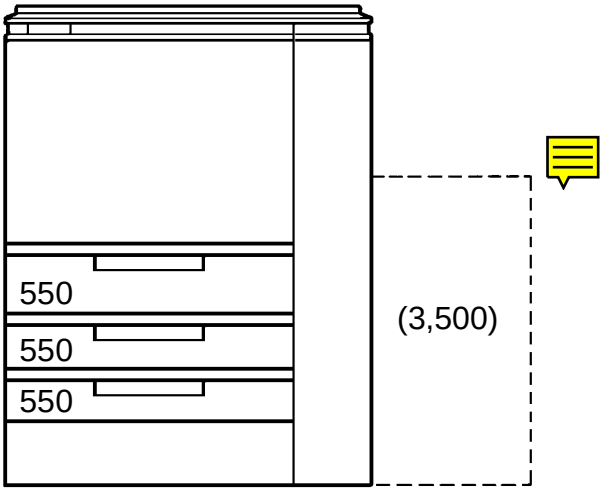
- Platen cover
- Dual job feeder
- Recirculating document handler
- 20 bin sorter stapler (Floor type)
- 20 bin compact sorter stapler
- Finisher
- 3500-sheet Large capacity tray
- Receiving Tray

# 2. MACHINE CONFIGURATION

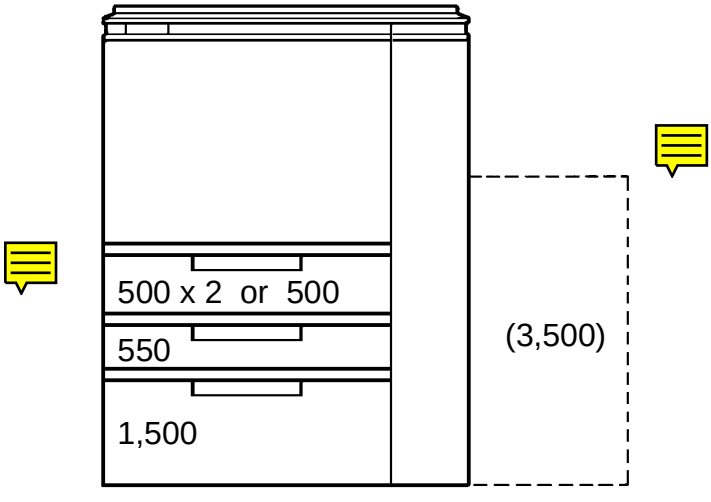
## 2.1 COPIER OVERVIEW

There are two types of mainframe.

**A095 copier**



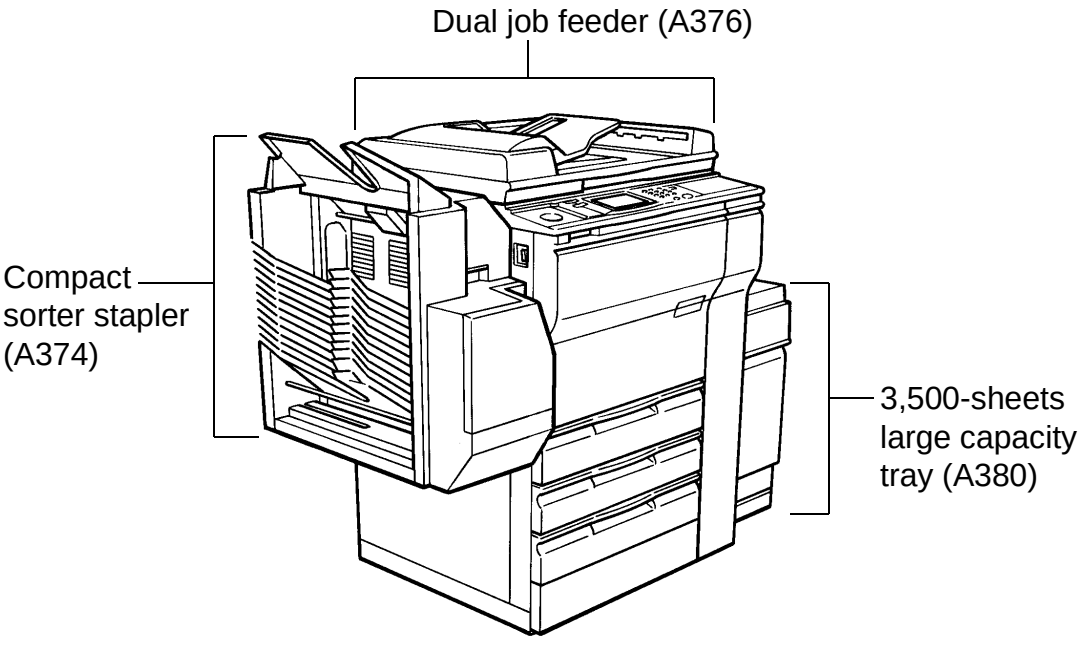

**A096 copier**



## 2.2 SYSTEM OVERVIEW

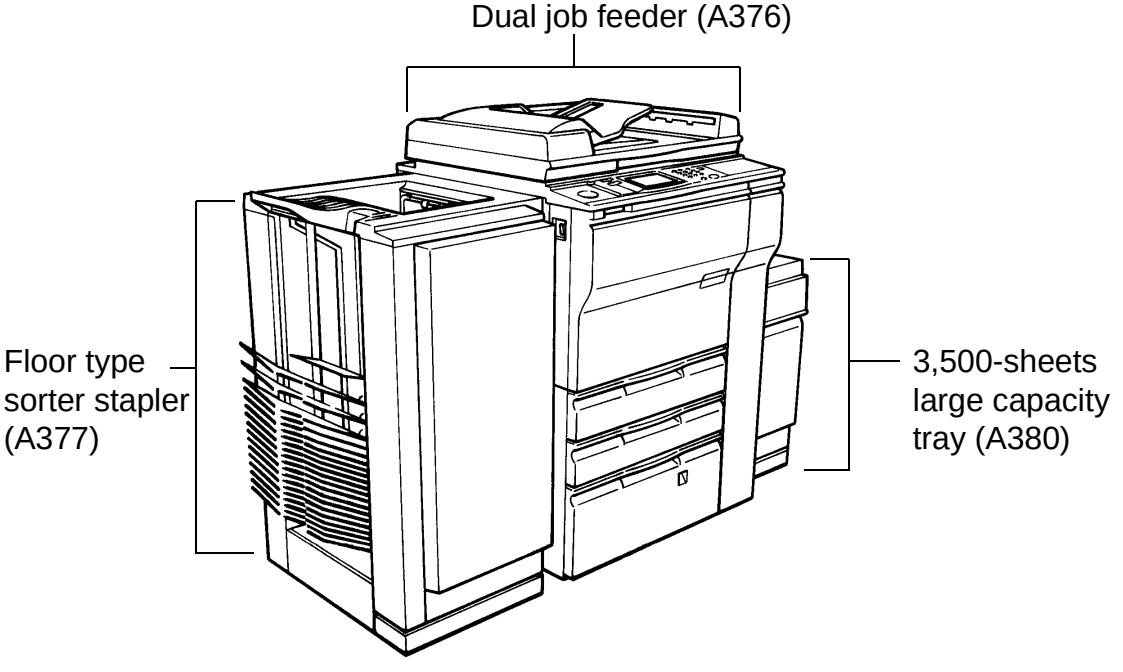
### System A

(The mainframe (A095) with dual job feeder and compact sorter stapler)



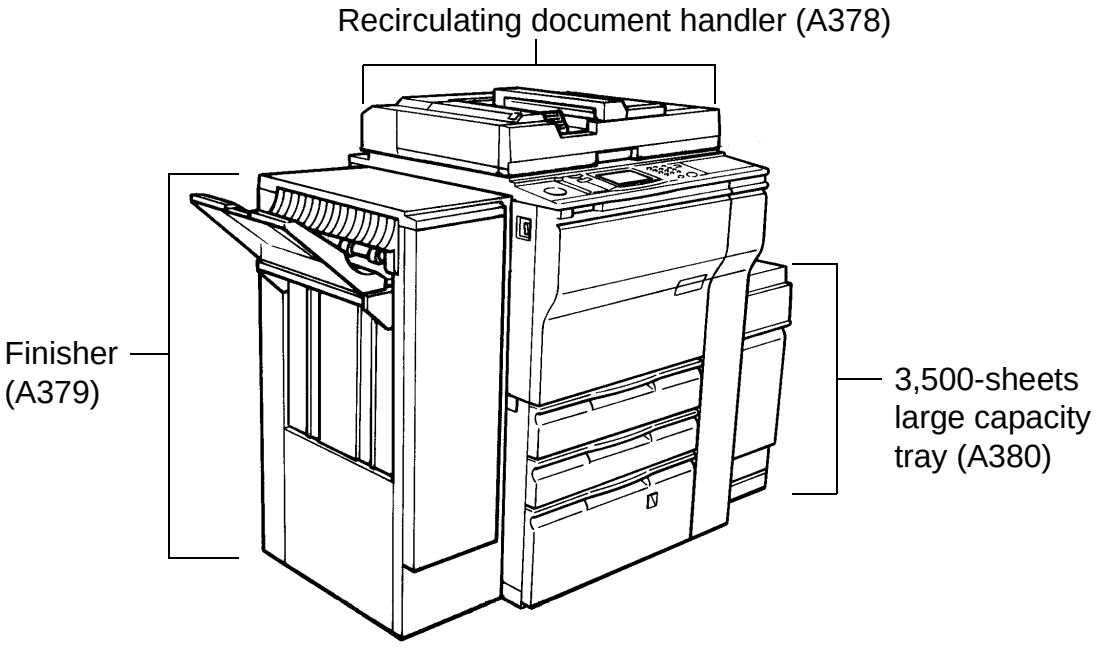

### System B

(Mainframe type (A095/A096) with dual job feeder and floor type sorter stapler. The mainframe in the illustration below is the A096.)

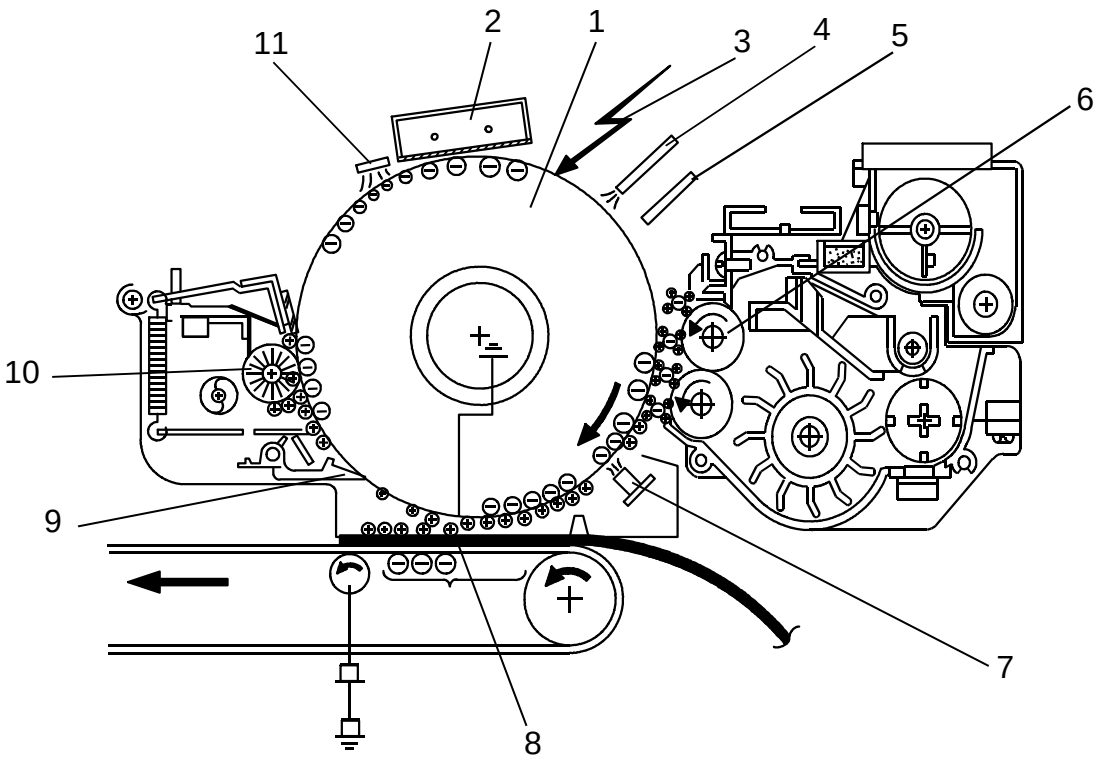


**System C**

(The mainframe (A096) with recirculating document handler and finisher)



# 3. COPY PROCESS AROUND THE DRUM




**1. OPC DRUM**
The organic photo conductive (OPC) drum (100 mm diameter) has high resistance in the dark and low resistance under light.

**2. DRUM CHARGE**
In the dark, the charge corona unit gives a uniform negative charge to the OPC drum. The charge remains on the surface of the drum. The amount of negative charge on the drum is proportional to the negative grid bias voltage applied to the grid plate on the charge corona unit.

**3. EXPOSURE**
An image of the original is reflected to the OPC drum surface via the optics section. The charge on the drum surface is dissipated in direct proportion to the intensity of the reflected light, thus producing an electrical latent image on the drum surface.

The amount of charge remaining as a latent image on the drum depends on the exposure lamp intensity controlled by the exposure lamp voltage.

**4. ERASE**
The erase lamp illuminates the areas of the charged drum surface that will not be used for the copy image. The resistance of drum in the illuminated areas drops and the charge on those areas dissipates.

**5. DRUM POTENTIAL SENSOR**
The drum potential sensor detects the electric potential on the drum to compensate image processing elements.

**6. DEVELOPMENT**
Positively charged toner is attracted to the negatively charged areas of the drum, thus developing the latent image. (The positive triboelectric charge of the toner is caused by friction between the carrier and toner particles.)

The development bias voltage applied to the development roller shaft controls two things:

1) The threshold level if toner is attracted to the drum or toner remains on the development roller.
2) The amount of toner to be attracted to the drum.

The higher the negative development bias voltage is, the less toner is attracted to the drum surface.

**7. PRE-TRANSFER LAMP (PTL)**
The PTL illuminates the drum to remove almost all the negative charge from the exposed areas of the drum. This makes image transfer easier.

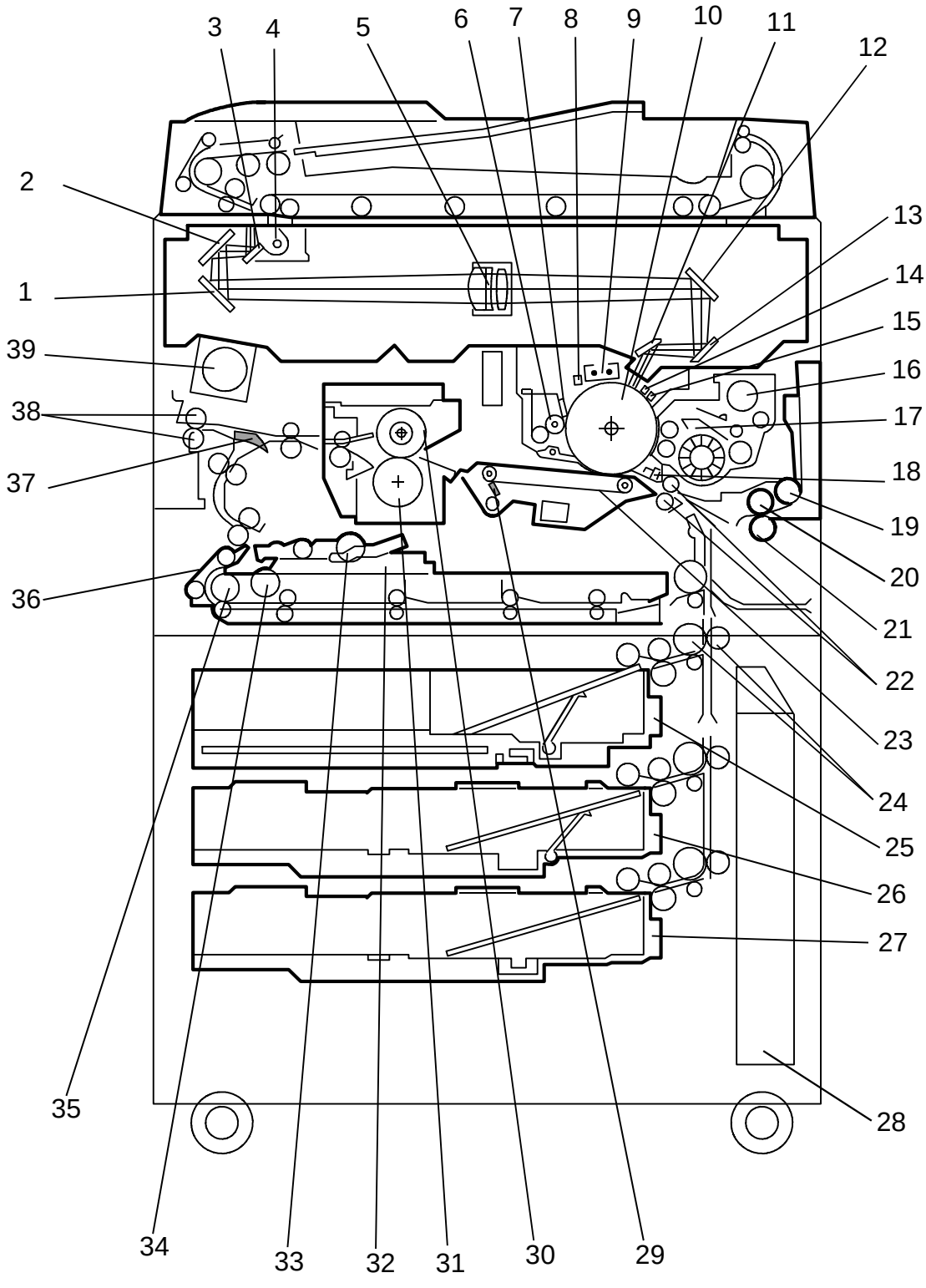
**8. IMAGE TRANSFER**
Paper is fed to the drum surface at the proper timing so as to align the copy paper and the developed image on the drum surface. Then, a negative charge is applied to the reverse side of the copy paper by the transfer belt, producing an electrical force which pulls the toner particles from the drum surface onto the copy paper. At the same time, the copy paper is electrically attracted to the transfer belt.

**9. PAPER SEPARATION**
Paper separates from the OPC drum by the electrical attraction between the paper and the transfer belt. The pick-off pawls help to separate the paper from the drum.

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

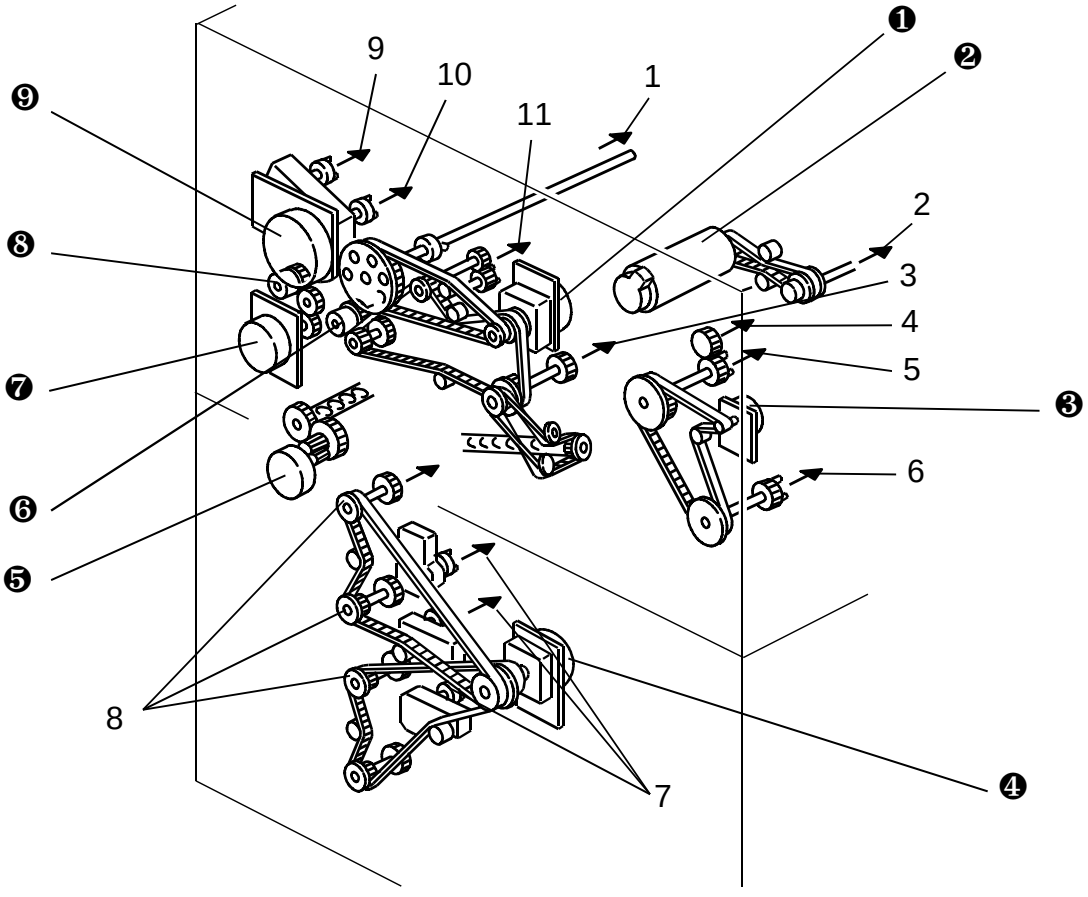
**11. QUENCHING**
Light from the quenching lamp electrically neutralizes the charge potential of the drum surface.

# 4. MECHANICAL COMPONENT LAYOUT



1. 3rd Mirror
2. 2nd Mirror
3. 1st Mirror
4. Exposure Lamp
5. Lens
6. Cleaning Brush
7. Cleaning Blade
8. Quenching Lamp
9. Charge Corona Unit
10. OPC Drum
11. 6th Mirror
12. 4th Mirror
13. 5th Mirror
14. Erase Unit
15. Drum Potential Sensor
16. Toner Hopper
17. Development Unit
18. Pre-Transfer Lamp
19. Pick-up Roller
20. Feed Roller
21. Separation Roller
22. Registration Rollers
23. Transfer Belt
24. Vertical Transport Rollers
25. Tandem Tray (A096 copier)
    550-sheet Tray (A095 copier)
26. Universal Tray
27. 1500-sheet LCT (A096 copier)
    550-sheet Tray (A095 copier)
28. Toner Collection Bottle
29. Transfer Belt Cleaning Blade
30. Hot Roller
31. Pressure Roller
32. Jogger Fences
33. Duplex Positioning Roller
34. Duplex Pick-up Roller
35. Duplex Feed Roller
36. Separation Belt
37. Junction Gate
38. Exit Rollers
39. Optics Cooling Fan

# 5. DRIVE LAYOUT

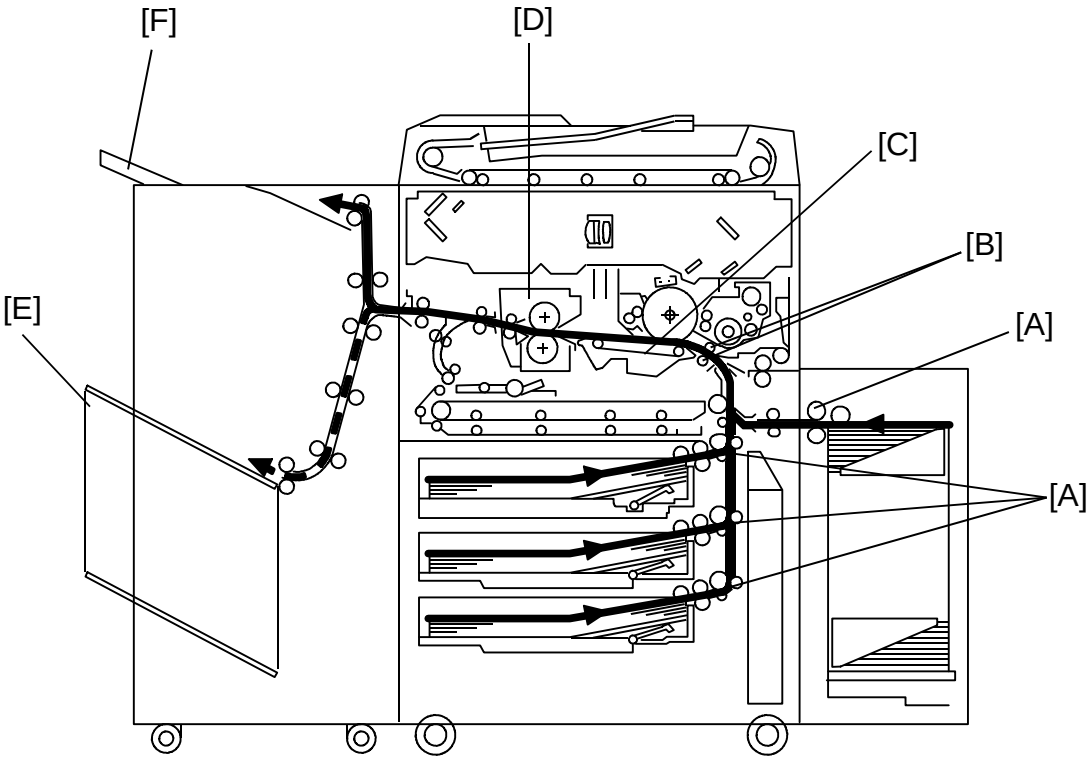



❶ Main Motor
❷ Scanner Drive Motor
❸ Fusing/Duplex Drive Motor
❹ Paper Feed Motor
❺ Toner Collection Motor
❻ Registration Clutch
❼ By-Pass Feed Motor
❽ BY-Pass Feed Clutch
❾ Development Drive Motor

1. OPC Drum
2. Scanner Unit
3. Transfer Belt Unit
4. Paper Exit Unit
5. Fusing Unit
6. Duplex Unit
7. Paper Trays
8. Paper Feed Units
9. Toner Hopper
10. Development Unit
11. Cleaning Unit

# 6. PAPER PATH

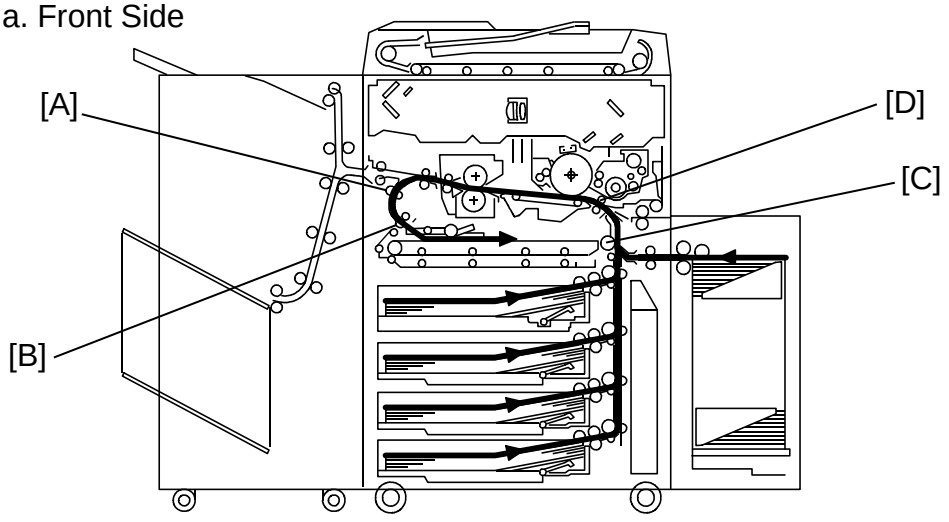
## 6.1 STANDARD COPYING



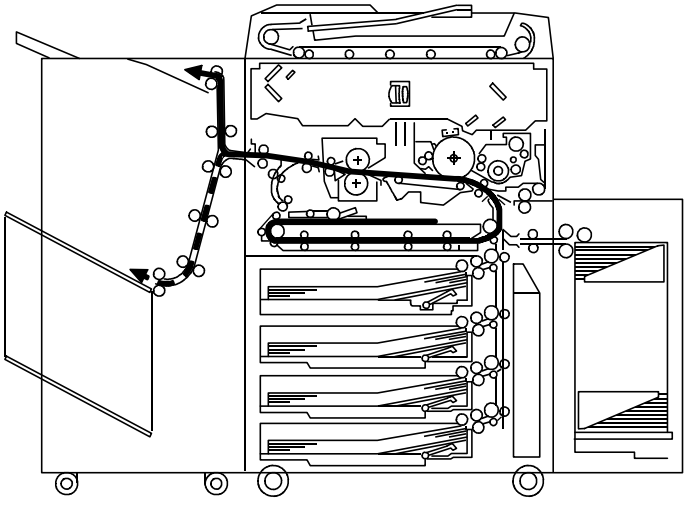

Paper feed begins from the exterior LCT, by-pass feed table or paper feed stations in the paper tray unit. The copy paper then follows one of two paths inside the copier. The path followed depends on which mode the operator has selected. For copy processing, all sheets follow the same paths from the paper feed mechanism [A] through the registration rollers [B], transfer belt [C], and fusing unit [D]. After that, copies are delivered to the sorter bins [E] or proof tray [F], however, 2 sided copies are diverted for further processing.

## 6.2 MULTIPLE 2-SIDED COPYING

a. Front Side




b. Rear Side



In this mode the junction gate [A] directs sheets exiting the fusing unit to the duplex tray entrance. After that, all sheets follow the path through the duplex entrance rollers [B].

After all front side copying is completed, the sheets on the duplex tray are fed in order from the bottom to the top and follow the path through the duplex feed mechanism and vertical transport rollers [C] to the registration rollers [D]. After that, these sheets follow the same path as standard copying from the registration rollers to the sorter.

# 7. ELECTRICAL COMPONENT DESCRIPTION

Refer to the electrical component layout on the reverse side of the attached Point to Point for symbols and index numbers.

| Symbol | Name | Function | Index No. |
|---|---|---|---|
| **Motors** | | | |
| M 1 | Scanner Drive | Drives the 1st and 2nd scanners (dc servo). | 42 |
| M 2 | Exhaust Fan | Removes the heat from around the fusing unit. | 43 |
| M 3 | Main | Drives the main unit components. | 44 |
| M 4 | Development Drive | Drives the development unit. | 45 |
| M 5 | By-pass Feed | Drives the by-pass feed rollers. | 46 |
| M 6 | 3rd Scanner Drive | Drives the 3rd scanner (dc stepper) | 47 |
| M 7 | Toner Bottle Drive | Rotates the toner bottle to supply toner to the toner hopper. | 48 |
| M 8 | Charge Wire Cleaner Drive | Drives the main charge wire cleaner to clean the charge wire. | 49 |
| M 9 | Jogger | Drives the jogger fences to square the paper stack in the duplex tray (dc stepper). | 50 |
| M10 | Lens Horizontal Drive | Shifts the lens horizontal position. | 51 |
| M11 | Lens Vertical Drive | Shifts the lens vertical position. | 52 |
| M12 | Optic Cooling Fan | Removes heat from the optics unit. | 53 |
| M13 | Fusing/Duplex Drive | Drives the fusing unit, the duplex unit, and the paper exit rollers. | 54 |
| M14 | Paper Feed | Drives all feed and transport rollers in the paper tray unit. | 90 |
| M15 | 1st Lift | Raises the bottom plate in the 1st paper tray. | 91 |
| M16 | 2nd Lift | Raises the bottom plate in the 2nd paper tray. | 92 |
| M17 | Toner Collection | Transports the collected toner to the toner collection bottle. | 93 |

| Symbol | Name | Function | Index No. |
|---|---|---|---|
| M18 | 3rd Lift (A095 copier only) | Raises the bottom plate in the 3rd paper tray. | 94 |
| M19 | Side Fence Drive (A096 copier only) | Opens and closes the front and the rear side fences of the tandem tray. | 95 |
| M20 | Rear Fence Drive (A096 copier only) | Moves the papers stacked in the left tandem tray to the right tandem tray. | 96 |
| M21 | LCT Motor (A096 copier only) | Lifts and lowers the LCT bottom plate to bring paper to the feed position and allow loading of the paper. | 127 |
| | | | |
| **Magnetic Clutches** | | | |
| MC1 | Toner Supply | Turns the toner supply roller to supply toner to the development unit. | 57 |
| MC2 | Registration | Drives the registration rollers. | 58 |
| MC3 | By-pass Feed | Starts paper feed from the by-pass feed table. | 60 |
| MC4 | Duplex Transport | Drives the duplex transport rollers to transport the paper to the vertical transport rollers. | 64 |
| MC5 | Duplex Feed | Starts paper feed from the duplex tray to the duplex transport rollers. | 65 |
| MC6 | 1st Feed | Starts paper feed from the 1st feed tray. | 99 |
| MC7 | 2nd Feed | Starts paper feed from the 2nd feed tray. | 101 |
| MC8 | 3rd Feed | Starts paper feed from the 3rd feed tray. | 104 |
| | | | |

| Symbol | Name | Function | Index No. |
|---|---|---|---|
| **Switches** | | | |
| SW1 | By-pass Table | Detects if the by-pass feed table is open or closed. | 25 |
| SW2 | Front Door Safety | Cuts the ac power line and detects if the front door is open or not. | 29 |
| SW3 | 1st Tray Set (A095 copier only) | Detects if the 1st tray is set or not. | 66 |
| SW4 | 2nd Paper Size | Determines what size paper is in the 2nd (universal) paper tray. | 67 |
| SW5 | Toner Overflow | Detects when the toner collection bottle is full. | 75 |
| SW6 | Toner Collection Bottle Set | Detects if the toner collection bottle is set or not. | 77 |
| SW7 | Lower Front Door Safety | Detects if the front door is open or not. | 83 |
| SW8 | 3rd Tray Set (A095 copier only) | Detects if the 3rd tray is set or not. | 84 |
| SW9 | Main | Provides power to the copier | 122 |
| SW10 | Tray Down (A096 copier only) | Lowers the LCT bottom plate. | 126 |
| | | | |
| **Solenoids** | | | |
| SOL 1 | Junction Gate | Moves the junction gate to direct copies to the duplex tray or to the paper exit. | 55 |
| SOL 2 | Duplex Positioning | Controls the up-down movement of the positioning roller. | 56 |
| SOL 3 | By-pass Pick-up | Controls the up-down movement of the pick-up roller for by-pass feed. | 59 |
| SOL 4 | Guide Plate | Opens the guide plate when a paper misfeed occurs around this area. | 61 |
| SOL 5 | Transfer Belt Positioning | Controls the up-down movement of the transfer belt unit. | 62 |

| Symbol | Name | Function | Index No. |
|---|---|---|---|
| SOL 6 | Pressure Arm | Presses the paper on the duplex tray against the duplex feed rollers. | 63 |
| SOL 7 | Tandem Lock | Locks the left tandem feed tray and separates the right and left tandem trays. | 97 |
| SOL 8 | 1st Pick-up | Controls the up-down movement of the pick-up roller in the 1st feed station. | 98 |
| SOL 9 | 1st Separation Roller | Controls the up-down movement of the separation roller in the 1st feed station. | 100 |
| SOL10 | 2nd Pick-up | Controls the up-down movement of the pick-up roller in the 2nd feed station. | 102 |
| SOL11 | 2nd Separation Roller | Controls the up-down movement of the separation roller in the 2nd feed station. | 103 |
| SOL12 | 3rd Pick-up | Controls the up-down movement of the pick-up roller in the 3rd feed station. | 105 |
| SOL13 | 3rd Separation Roller | Controls the up-down movement of the separation roller in the 3rd feed station. | 106 |
| | | | |
| **Sensors** | | | |
| S 1 | Scanner HP | Informs the CPU when the 1st and 2nd scanners are at the home position. | 1 |
| S 2 | Platen Cover Position–1 | Informs the CPU that the platen cover is in the up or down position (related to APS/ARE function). | 2 |
| S 3 | Platen Cover Position–2 | Informs the CPU that the platen cover is in the up or down position to detect if the original has been removed or not. | 3 |

| Symbol | Name | Function | Index No. |
|---|---|---|---|
| S 4 | Lens Vertical HP | Informs the CPU that the lens is at the full-size position. | 4 |
| S 5 | Lens Horizontal HP | Informs the CPU that the lens is at the horizontal home position. | 5 |
| S 6 | 3rd Scanner HP | Informs the CPU when the 3rd scanner is at the home position. | 6 |
| S 7 | By-Pass Paper End | Informs the CPU that there is no paper in the by-pass feed table. | 7 |
| S 8 | Guide Plate Position | Informs the CPU if the registration guide plate is closed or not. | 8 |
| S 9 | Jogger HP | Detects if the duplex jogger fences are at the home position or not. | 9 |
| S10 | Vertical Transport | Detects the leading edge of the paper to determine the paper feed timing of the next sheet. | 10 |
| S11 | Duplex Exit | Detects the leading edge of the paper to determine the duplex transport clutch on timing. | 11 |
| S12 | Duplex Entrance Sensor | Detects the leading edge of the paper to determine the duplex feed clutch off timing. | 12 |
| S13 | Duplex Paper End | Detects paper in the duplex tray. | 13 |
| S14 | Duplex Transport | Detects the leading edge of the paper to control the jogger motor and the positioning solenoid on timing. | 14 |
| S15 | Exit | Detects misfeeds. | 15 |
| S16 | Fusing Exit | Detects misfeeds. | 16 |
| S17 | Paper Guide | Detects misfeeds. | 17 |
| S18 | Auto Image Density | Senses the background density of the original. | 20 |
| S19 | Original Length–1 | Detects original length. | 21 |
| S20 | Original Length–2 | Detects original length. | 22 |
| S21 | Original Width | Detects original width. | 23 |

| Symbol | Name | Function | Index No. |
|---|---|---|---|
| S22 | By-Pass Paper Size | Informs the CPU what size paper is in the by-pass feed table. | 26 |
| S23 | Toner Density | Senses the amount of toner in the black developer. | 27 |
| S24 | Registration | Detects misfeeds and controls registration clutch off-on timing. | 28 |
| S25 | Toner End | Detects toner end condition. | 30 |
| S26 | Auto-Response | Returns the display from the screen saver. | 34 |
| S27 | Drum Potential | Detects the drum surface potential. | 39 |
| S28 | Image Density | Detects the density of the ID sensor pattern on the drum. | 41 |
| S29 | 1st Paper End | Informs the CPU when the 1st cassette runs out of paper. | 68 |
| S30 | 1st Paper Near End | Informs the CPU when the 1st cassette is in near end condition. | 69 |
| S31 | 1st Paper Feed | Controls the 1st paper feed clutch off/on timing and the 1st pick-up solenoid off timing. | 70 |
| S32 | 2nd Paper Near End | Informs the CPU when the 2nd cassette is in near end condition. | 71 |
| S33 | 1st Lift | Detects the correct feed height of the 1st cassette. | 72 |
| S34 | 2nd Paper End | Informs the CPU when the 2nd cassette runs out of paper. | 73 |
| S35 | Toner Collection Motor | Detects the toner collection motor operation. | 74 |
| S36 | 2nd Lift | Detects the correct feed height of the 2nd cassette. | 76 |
| S37 | 3rd Lift | Detects the correct feed height of the 3rd cassette. | 78 |
| S38 | 3rd Paper Near End (A095 copier only) | Informs the CPU when the 3rd cassette is in near end condition. | 79 |
| S39 | 3rd Paper End | Informs the CPU when the 3rd cassette runs out of paper. | 80 |

| Symbol | Name | Function | Index No. |
|---|---|---|---|
| S40 | 3rd Paper Feed | Controls the 3rd paper feed clutch off/on timing and the 3rd pick-up solenoid off timing. | 81 |
| S41 | 2nd Paper Feed | Controls the 2nd paper feed clutch off/on timing and the 2nd pick-up solenoid off timing. | 82 |
| S42 | Base Plate Down (A096 copier only) | Detects when the bottom plate is completely lowered to stop the 1st lift motor. | 85 |
| S43 | Side Fence Positioning (A096 copier only) | Informs the CPU when the tandem tray side fences are open. | 86 |
| S44 | Rear Fence Return (A096 copier only) | Informs the CPU when the tandem tray rear fence is in the return position. | 87 |
| S45 | Rear Fence HP (A096 copier only) | Informs the CPU when the tandem tray rear fence is in the home position. | 88 |
| S46 | Left Tandem Paper End (A096 copier only) | Informs the CPU when the left tandem tray runs out of paper. | 89 |
| S47 | LCT Near End (A096 copier only) | Detects the paper near end condition. | 123 |
| S48 | Tray Down (A096 copier only) | Detects when the tray is completely lowered to stop the LCT motor. | 124 |
| S49 | Tray Paper Set (A096 copier only) | Informs the CPU when the paper is set on the LCT bottom tray. | 125 |
| | | | |
| **PCBs** | | | |
| PCB 1 | AC Drive | Provides AC power to the exposure lamp and fusing lamp. | 108 |
| PCB 2 | Main | Controls all machine functions. | 109 |
| PCB 3 | Optic Control | Controls all optics components. | 110 |
| PCB 4 | High Voltage Control | Controls the output of both power packs and development bias. | 111 |

| Symbol | Name | Function | Index No. |
|---|---|---|---|
| PCB 5 | Paper Feed Control | Controls all components in the paper bank. | 112 |
| PCB 6 | DC Power Supply Unit | Provides DC power. | 113 |
| PCB 7 | Guidance | Controls the guidance display. | 120 |
| PCB 8 | Operation Panel | Controls the LED matrix, and monitors the key matrix. | 121 |
| | | | |
| **Lamps** | | | |
| L1 | Exposure | Applies high intensity light to the original for exposure. | 18 |
| L2 | Fusing | Provides heat to the hot roller. | 32 |
| L3 | Quenching | Neutralizes any charge remaining on the drum surface after cleaning. | 37 |
| L4 | Erase | Discharges the drum outside the image area. | 38 |
| L5 | Pre-transfer | Reduces the charge on the drum surface before transfer. | 40 |
| | | | |
| **Power Packs** | | | |
| PP1 | Transfer | Provides high voltage for the transfer belt and controls the transfer belt positioning solenoid. | 117 |
| PP2 | Charge | Provides high voltage for the charge corona wires, and the grid plate. Controls QL, PTL, and charge wire cleaner motor functions. | 119 |
| | | | |
| **Others** | | | |
| TS1 | Optics Thermoswitch | Opens the exposure lamp circuit if the optics unit overheats. | 19 |
| TF1 | Fusing Thermofuse | Opens the fusing lamp circuit if the fusing unit overheats. | 33 |
| TH1 | Fusing Thermistor | Senses the temperature of the hot roller. | 24 |

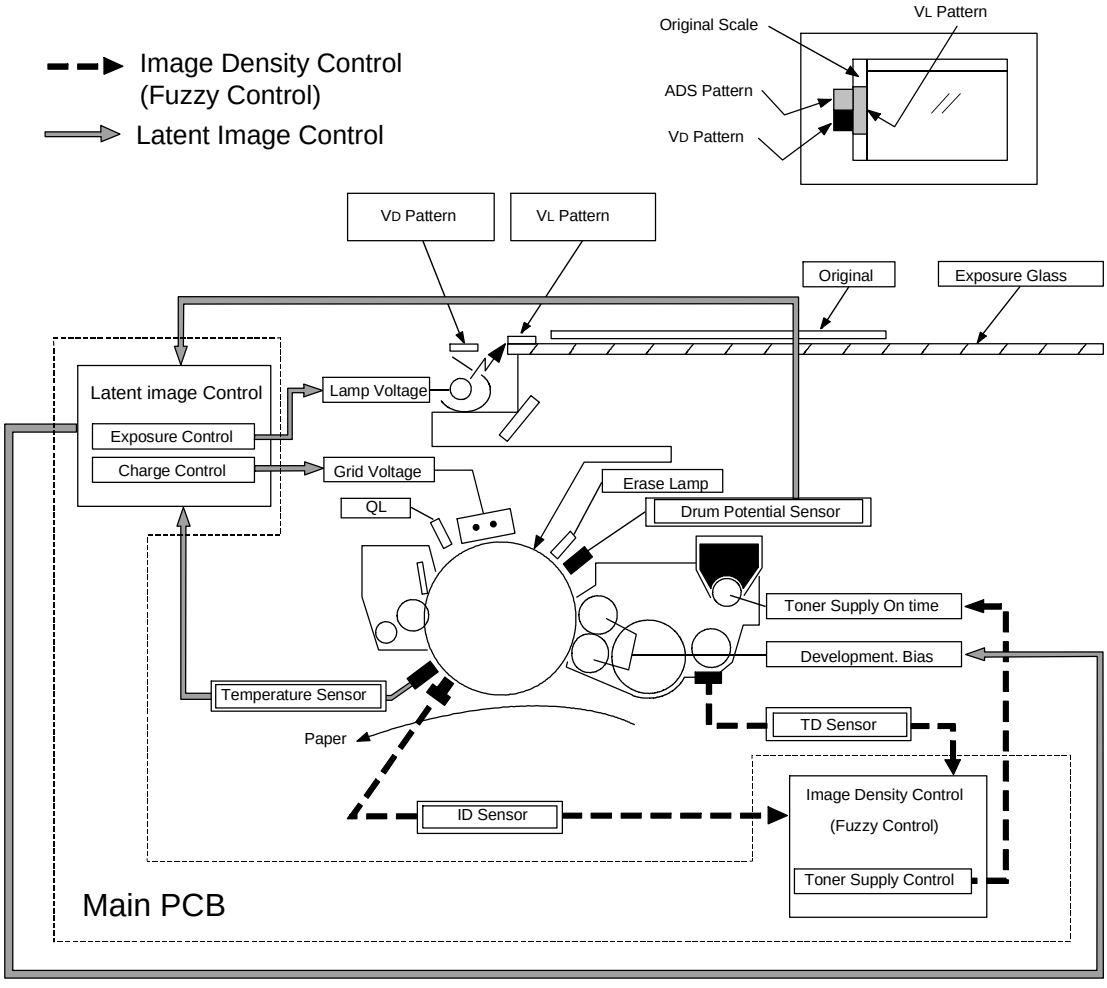
| Symbol | Name | Function | Index No. |
|---|---|---|---|
| TH2 | Optics Thermistor | Monitors the temperature of the optics cavity. | 36 |
| TH3 | Drum Thermistor (Located on the ID Sensor Ass'y) | Monitors the temperature of the OPC drum. | 41 |
| H1 | Transfer Anti-Condensation | Turns on when the main switch is off to prevent moisture from forming on the transfer belt. | 31 |
| H2 | Optics Anti-Condensation | Turns on when the main switch is off to prevent moisture from forming on the optics. | 35 |
| RA1 | Main Power Relay | Controls main power. | 107 |
| CO1 | Total Counter | Keeps track of the total number of copies made. | 114 |
| NF1 | Noise Filter | Removes electrical noise. | 115 |
| CB1 | Circuit Breaker | Provides back-up high current protection for the electrical components. | 116 |
| LA1 | Lightening Arrestor | Removes current surges from the AC input lines. | 118 |

# SECTION 2

# DETAILED SECTION DESCRIPTIONS

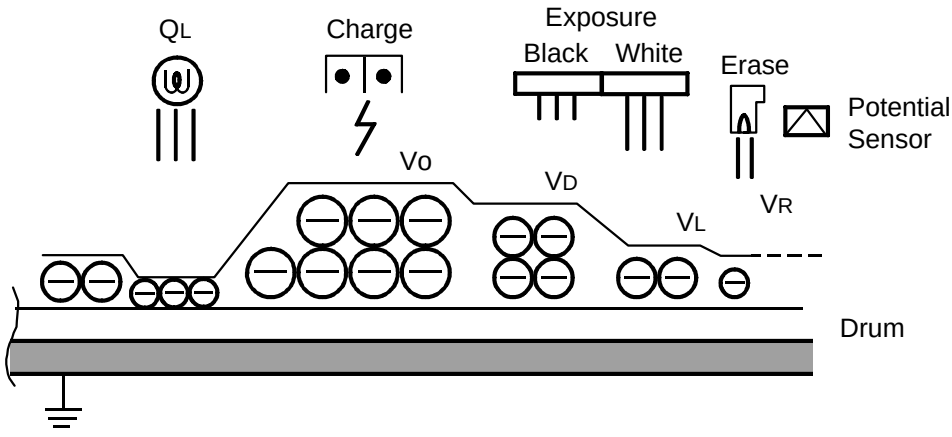
# 1. PROCESS CONTROL

## 1.1 OVERVIEW




This model uses two process control methods. One compensates for variation in the drum potential (latent image control) and the other controls the toner concentration and toner supply amount (image density control).

### 1.1.1 Latent Image Control




The figure shows the changes of the drum potential during the copy process.

| | |
|---|---|
| Vo: | The drum potential just after charging the drum. |
| VD (Dark Potential): | The drum potential just after exposing the black pattern (VD pattern) |
| VL (Light Potential): | The drum potential just after exposing the white pattern (VL pattern) |
| VR (Residual Voltage): | The drum potential just after the exposure of the erase lamp. |

After long usage following installation or a PM, drum potential will gradually increase due to the following factors:

Dirty optics or exposure lamp deterioration

Dirty charge corona wire and grid plate

Change of the drum sensitivity

In this copier, the change in drum potential is detected by the drum potential sensor and the following items are controlled to maintain good copy quality.

The grid bias voltage

The exposure lamp voltage

The development bias voltage.

A drum thermistor detects the drum temperature and this data is also used to control the above voltages. It is impossible to explain simply because it is controlled by methods developed in our laboratories using an artificial neural network.

### 1.1.2 Image Density Control

Image density is controlled by the following sensors:

Toner density sensor (TD sensor)

Image density sensor (ID sensor)



Data from the TD sensor is used to keep the toner concentration in the developer at a constant level. However, the image on the OPC drum varies due to the variation of toner chargeability (influenced by the environment) even if the toner concentration is constant. By the ID sensor compensation, toner concentration is changed to keep the image density on the OPC drum constant.

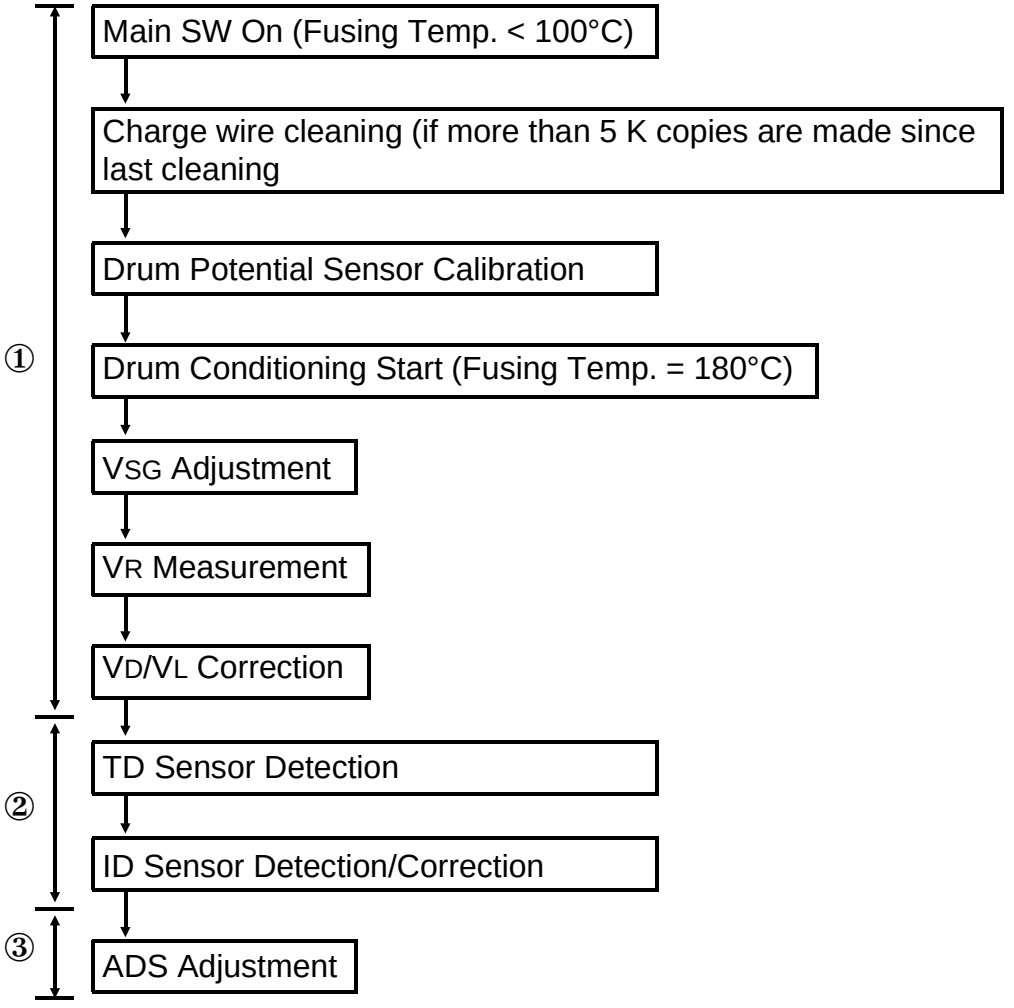
The following items are controlled to maintain a constant copy image density:

Toner supply clutch on time

Toner supply level data (VREF) of the TD sensor

## 1.2 PROCESS CONTROL DATA INITIAL SETTING

The following flow chart shows all the steps that will be performed whenever the machine is turned on while the hot roller temperature is below 100°C. This initializes all the process control settings.



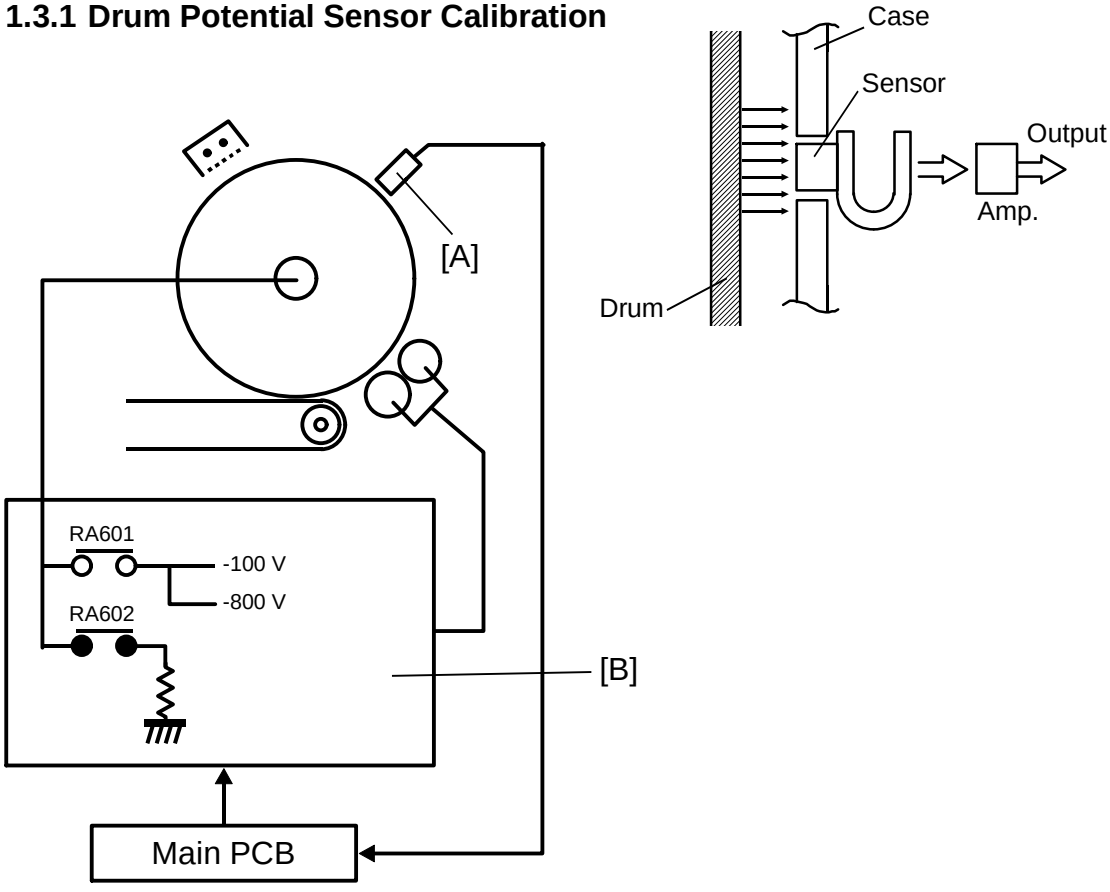

① : See Latent Image Control section (Page 2-5) for details.

② : See Image Density Control section (Page 2-12) for details.

③: See Optics section (Page 2-39) for details.

# 1.3 LATENT IMAGE CONTROL

## 1.3.1 Drum Potential Sensor Calibration




The drum potential sensor [A] is located just above the development unit. The sensor has a detector which detects the strength of the electric field from the electric potential on the drum. The output of the sensor depends on the strength of the electric field.

Since the output of the sensor is affected by environmental conditions, such as temperature and humidity, the sensor output is calibrated during process control data initial setting.

The High Voltage Control PCB [B] has two relay contacts. Usually RA602 grounds the drum. However, during the initial setting, the main PCB turns RA601 on and RA602 off and applies the voltage to the drum shaft.

By measuring the output of the drum potential sensor when –100 V and –800 V are applied to the drum, the sensor output is calibrated automatically. (The machine recognizes the relationship between actual drum potential and the potential sensor output.)

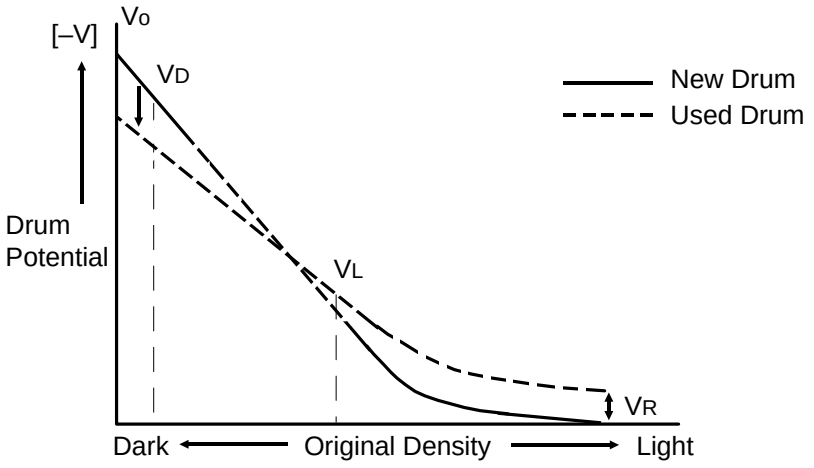
### 1.3.2 Drum Conditioning

When the fusing temperature reaches 180°C, the machine starts the drum conditioning process. In this mode, the main motor, main charge corona, erase lamp and development bias are activated for about 30 seconds and drum sensitivity and residual voltage ($V_R$) are stabilized, as in continuous copy runs.

### 1.3.3 $V_{SG}$ Adjustment

During drum conditioning, the ID sensor checks the bare drum's reflectivity and calibrates the output of the ID sensor to 4 ±0.2 V.

### 1.3.4 $V_R$ Measurement




The above figure shows the relationship between the drum potential and the original density. To get constant copy quality, this relationship must be maintained.

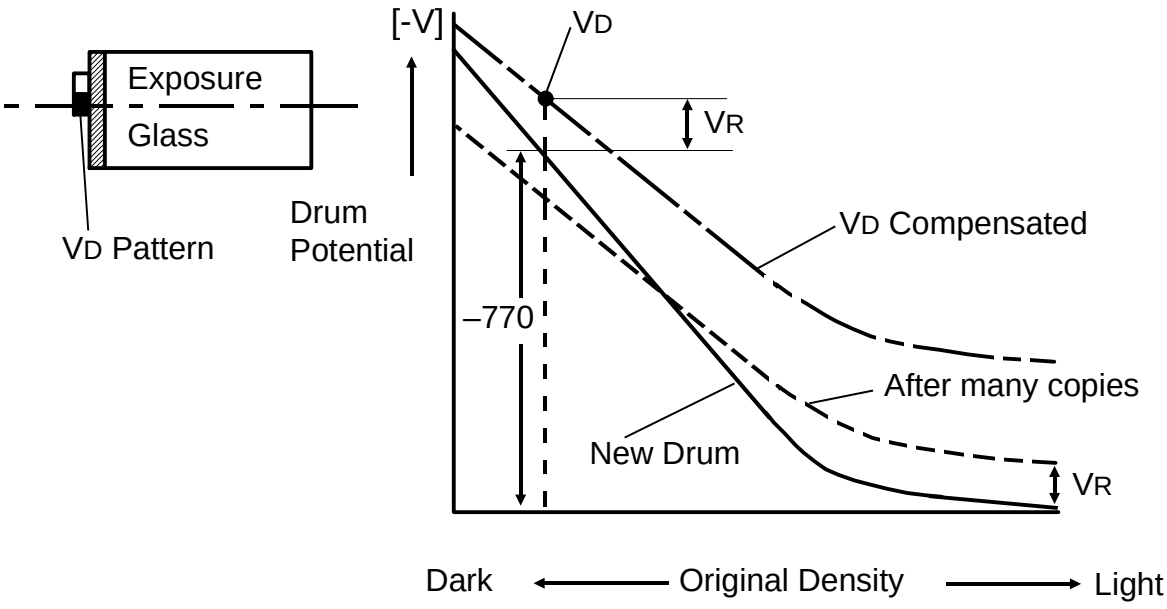
Since this relationship tends to change to the one represented by the dotted line by various factors, compensations are required.

The residual voltage ($V_R$) cannot be compensated even if the exposure lamp voltage is increased. Therefore, the $V_R$ change has to be compensated by other means.

The main control board checks the drum potential just after the erase lamp exposure by the drum potential sensor after drum conditioning. This measured drum potential is in fact $V_R$. This $V_R$ is used as the standard for the $V_D$ and $V_L$ corrections.

**NOTE:** In the figure above, the residual voltage ($V_R$) for the new drum is 0V. Actually, there is some residual voltage even on the new drum.

### 1.3.5 VD Correction




The drum potential just after the black pattern (VD Pattern) is exposed (VD: Dark Potential) tends to lower during drum life due to a decrease in the drum's capacity to carry a charge.

To check the actual VD, the first scanner moves to the home position and the VD pattern (Black) stuck on the bottom side of the exposure glass bracket is exposed on the drum.

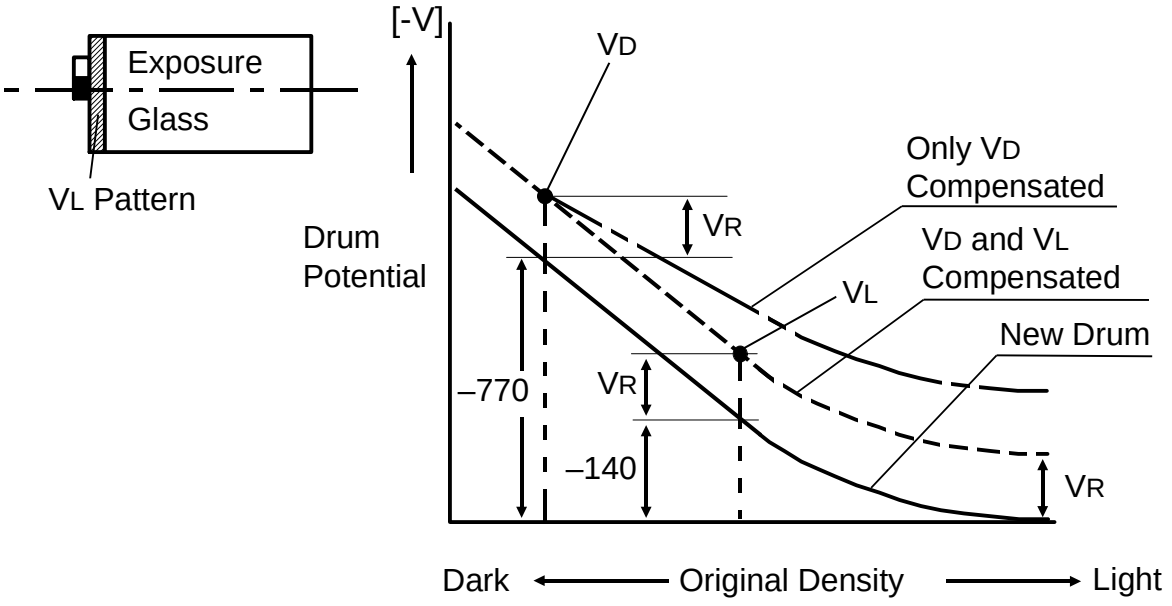
The main control board measures VD through the drum potential sensor and adjusts it to a target value by adjusting the grid bias voltage (VGRID).

On the other hand, there is a change of the drum residual voltage (VR), so that the target VD voltage is compensated as follows:

Target VD Value: VD = VR + (–770)

The adjusted grid bias voltage (VGRID) is kept in memory until the next process control data initial setting.

### 1.3.6 $V_L$ Correction




Dirty optics and/or exposure lamp deterioration decreases the intensity of the light that reaches the drum. In addition to this, the drum sensitivity also changes during the drum's life. These factors change the drum potential just after white pattern exposure ($V_L$: Light Potential).

To check the actual $V_L$, the first scanner moves under the $V_L$ pattern (White) stuck underneath the original scale. The pattern is exposed on the drum.

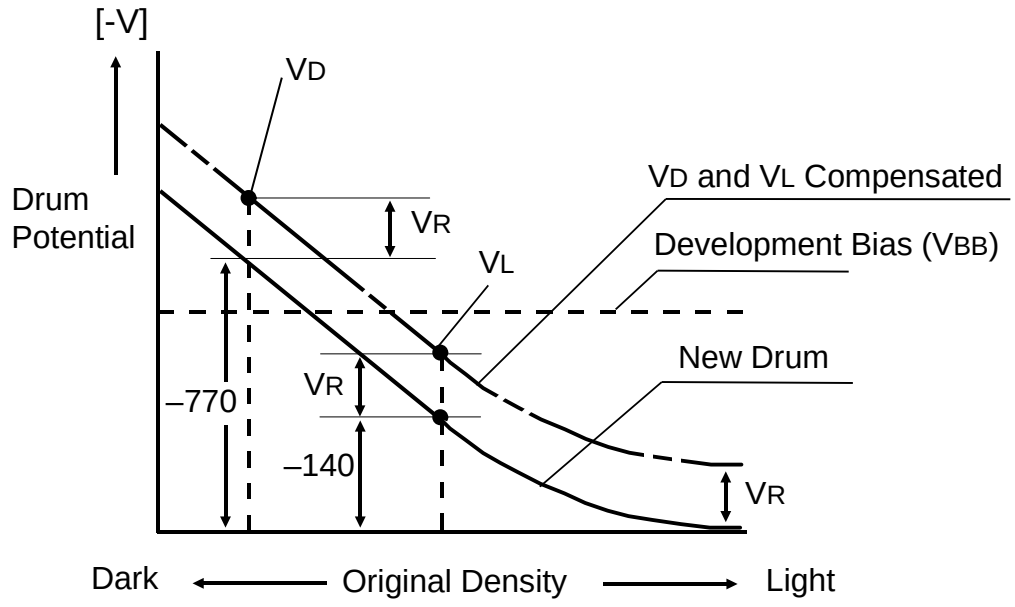
The main control board measures $V_L$ through the drum potential sensor and adjusts it to a target value by adjusting the exposure lamp voltage ($V_{LAMP}$).

The residual voltage ($V_R$) change also affects $V_L$, so that $V_L$'s target voltage is compensated as follows:

Target $V_L$ Value: $V_L = V_R + (-140)$

The adjusted exposure lamp voltage ($V_{LAMP}$) is stored in memory until the next process control data initial setting.

### 1.3.7 $V_R$ Correction



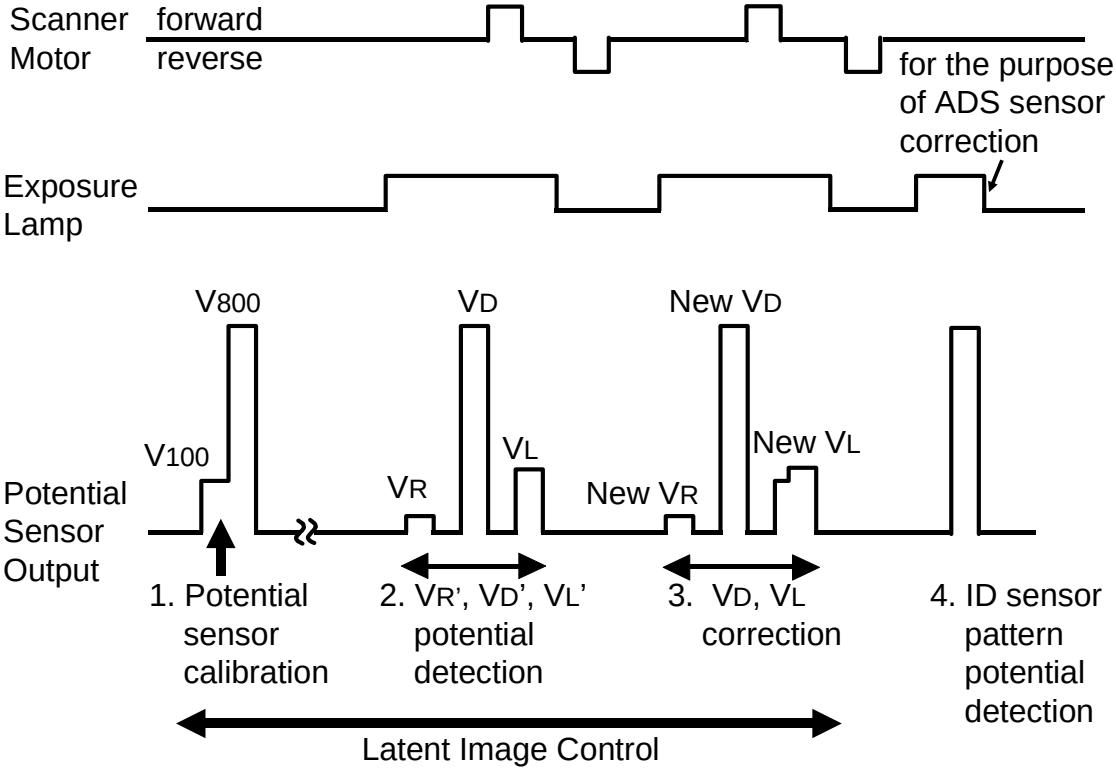

Potentials ($V_R$, $V_D$, $V_L$) are monitored by the potential sensor. (This is done only when the fusing temperature is less than 100°C after the machine is turned on.)
During the check cycle, the $V_D$ and $V_L$ patterns are exposed and the drum potential on the area where exposed by each pattern is checked by the potential sensor.

Compare the curve of the $V_D$ and $V_L$ compensated drum potential with the curve of the new drum, they are parallel but the compensated potential is still higher ($V_R$) than the new drum potential. To prevent dirty backgrounds due to increased residual potential, development bias ($V_{BB}$) is applied as follows:

$$V_{BB} = V_R + (-220)$$

### 1.3.8 Initial Setting Sequence

The following graph shows the sequence of events during process control data initial setting.




1. Potential sensor calibration
   By measuring the output of the drum potential sensor when –100 V and –800 V are applied to the drum, the sensor output ($V_{100}$ and $V_{800}$) is calibrated automatically (See page 2-5 for details).

2. $V_R$, $V_D$, $V_L$ potential detection
   After about 30 seconds of drum conditioning, $V_D$ and $V_L$ Patterns are developed by using the previous grid bias voltage ($V_{GRID}$) data and exposure lamp voltage ($V_{LAMP}$) data to detect the $V_R$, $V_D$, $V_L$ data.

   The machine calculates the new $V_{GRID}$ and $V_{LAMP}$ data using the detected $V_R$, $V_D$, $V_L$ data.

3. $V_D$ and $V_L$ corrections
   Using the calculated $V_{GRID}$ and $V_{LAMP}$ data, $V_R$, $V_D$, and $V_L$ patterns are developed again and the new $V_R$, $V_D$, and $V_L$ data are detected.

   If both $V_D$ and $V_L$ data are within specifications, the new $V_{GRID}$, $V_{LAMP}$ and development bias ($V_{BB}$) are determined based on the new $V_D$, $V_L$, and $V_R$ values.



Specifications:

$V_D = -770 + V_R \pm 20$ V

$V_L = -140 + V_R \pm 20$ V

If $V_D$ is outside specifications, $V_{GRID}$ is shifted one step. Then the $V_D$ pattern is measured again and $V_D$ is detected again.
The same is done for $V_L$ and $V_{LAMP}$.
The above process continues until both $V_D$ and $V_L$ fall within specifications.
The graph on the previous page shows the example when only $V_L$ was outside specifications at the first $V_L$ detection and it became within specifications after one $V_L$ correction ($V_{LAMP}$ is changed 0.5V/step , $V_{GRID}$ is changed 20V/step).

If $V_{100}$ or $V_{800}$ at drum potential sensor calibration is outside specifications or if $V_D$ or $V_L$ do not fall within specifications after $V_{GRID}$ or $V_{LAMP}$ are shifted to the maximum or minimum level, the machine stops $V_D$ or $V_L$ correction and uses the previous $V_{GRID}$ and $V_{LAMP}$ values during copying.
In this case, nothing is indicated on the machine but the SC counter is incremented.

Related SC codes (see troubleshooting section for details):

| Code | Condition |
|---|---|
| 361 | Incomplete drum potential sensor calibration |
| 364 | Abnormal $V_D$ detection |
| 365 | Abnormal $V_L$ detection |

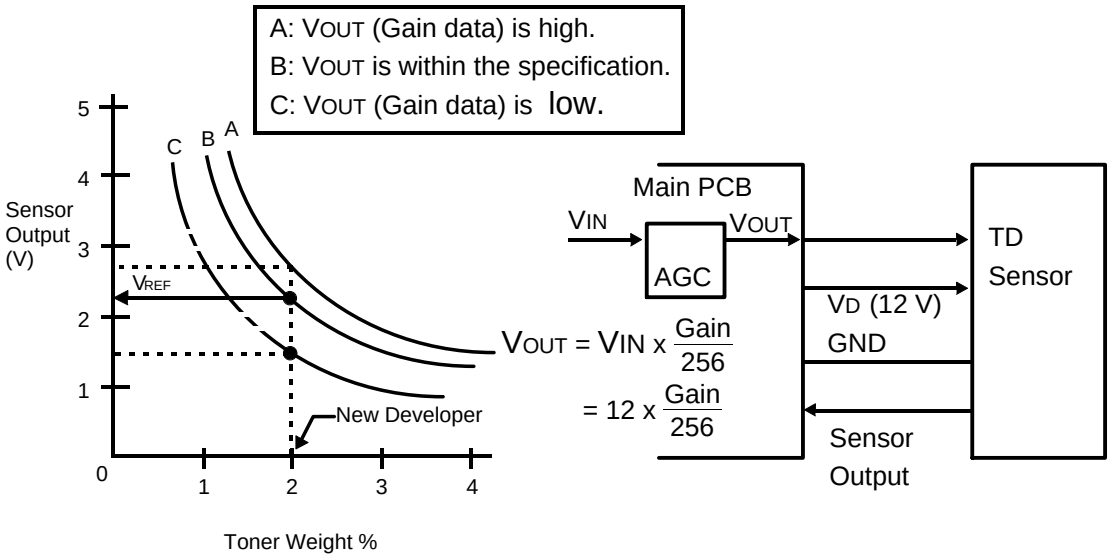
Development bias is also decided by using $V_R$ as follows.

$V_{BB} = V_R + (-220)$

4. ID sensor pattern potential detection
   This is performed to determine ID Sensor Bias Voltage. The details are explained in the development control section (see page 2-16).

# 1.4 IMAGE DENSITY CONTROL

## 1.4.1 Toner Density Sensor




Developer consists of carrier particles (iron) and toner particles (resin and carbon). Inside the development unit, developer passes through a magnetic field created by coils inside the toner density sensor. When the toner concentration changes, the voltage output by the sensor changes accordingly.

**<Toner Density Sensor Initial Setting>**

When new developer with the standard toner concentration (2.0% by weight, 20 g of toner in 1000 g of developer) is installed, developer initial setting must be performed by using SP mode ([1] SP Adjustment – PAGE 1).

During this setting, the output voltage (VOUT) from the auto gain control circuit (AGC) on the main control board PCB varies to change the output voltage from the toner density (TD) sensor. This is done by changing the gain data, see below.

$$V_{OUT} = V_{IN} \times \frac{\text{Gain Data}}{256} = 12 \times \frac{\text{Gain Data}}{256}$$

If the data is high, VOUT becomes high, and the sensor output voltage becomes high. As a result, the sensor characteristic becomes as illustrated by curve A. If the data is low, VOUT becomes low, and the sensor output voltage becomes low. As a result, the sensor characteristic shifts as illustrated by curve C.

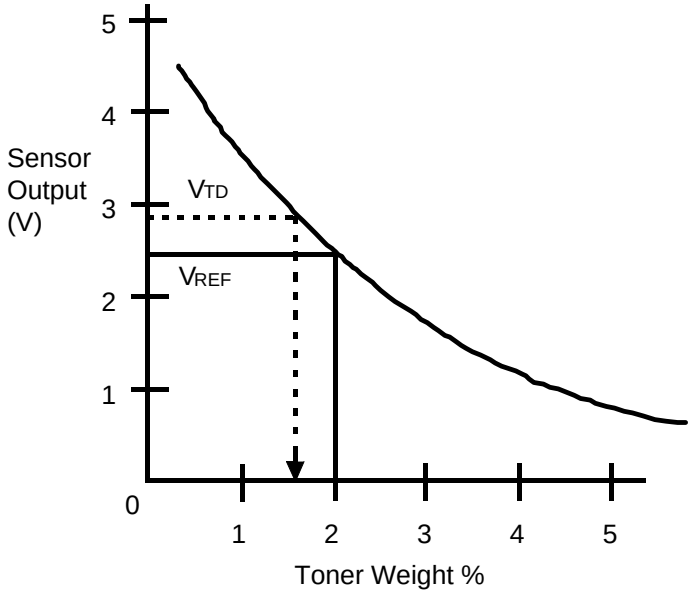
By selecting the proper gain data, the sensor output is set within the targeted control level ($V_{REF}$, $V_{REF}$ = 2.5 ± 0.1 V). Now, the sensor characteristic is illustrated by curve B and the TD sensor initial setting is completed.

The selected gain data is stored in memory, and $V_{OUT}$ from the auto gain control circuit stays constant during the toner sensor detection cycle.



**<Toner Supply Criteria>**

At every copy cycle, toner density in the developer is detected once. The sensor output voltage ($V_{TD}$) during the detection cycle is compared with the toner supply level voltage ($V_{REF}$).

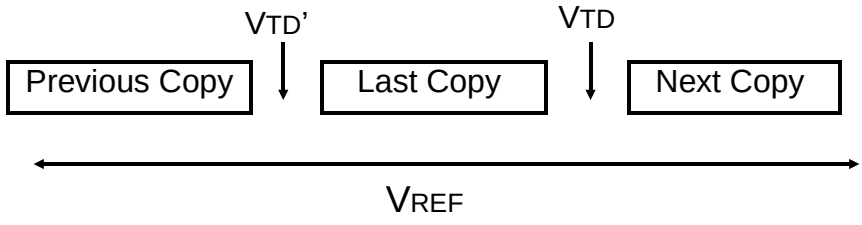


**<Toner Supply Clutch on Time>**

To stabilize toner concentration, toner supply amount (toner supply clutch on time) is controlled by referring to $V_{REF}$ and $V_{TD}$.
The toner supply amount is calculated at every copy. The toner supply amount is determined by using the following factors.

① $V_{REF} - V_{TD}$

② $V_{REF} - V_{TD}'$ ($V_{TD}'$ = $V_{TD}$ of the previous copy cycle)



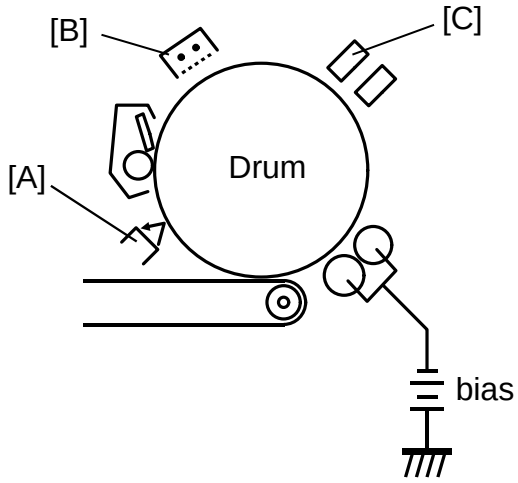

By referring to these factors, the machine recognizes the difference between the current toner concentration and the target toner concentration. The machine also understands how much toner concentration has changed and predicts how much the toner supply amount will probably change.
By changing the toner supply amount precisely, toner concentration (image density) is kept at a constant level.
Since the toner supply clutch on time updating is under fuzzy control, the relation among $V_{TD}$, $V_{TD}'$, $V_{REF}$ cannot be expressed by a simple algebraic formula.

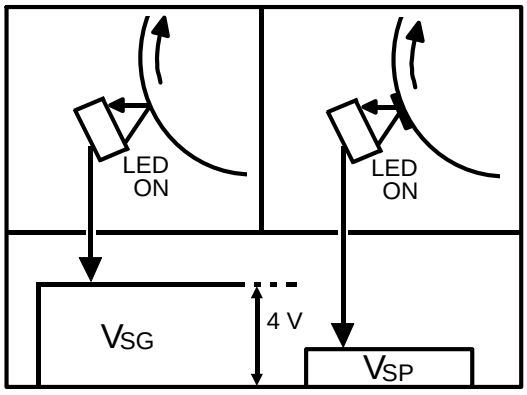
**<$V_{REF}$ Correction>**

The image on the OPC drum changes due to variation of toner chargeability (influenced by the environment) even if the toner concentration is constant. The image density sensor (ID sensor) directly checks the image on the OPC drum and shifts $V_{REF}$ data (under fuzzy control) to keep the image on the OPC drum constant, as explained in the next section.

**NOTE:** 1. Toner end condition is detected by the toner end sensor (see the development section for details).
2. The toner supply clutch turns on at the intervals between each copy process while image development is not performed.

### 1.4.2 Image Density Sensor Detection



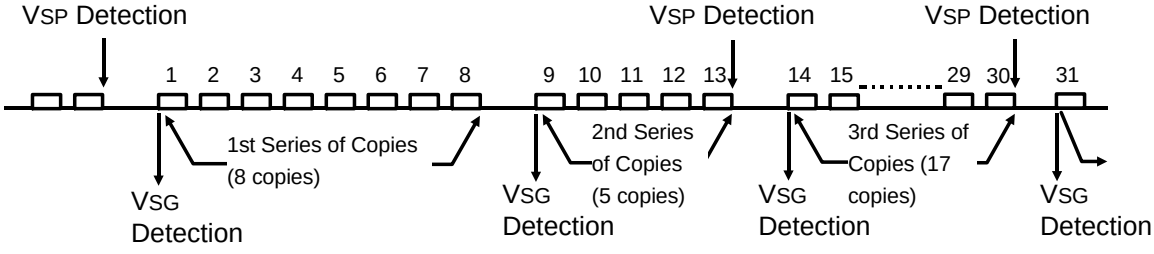





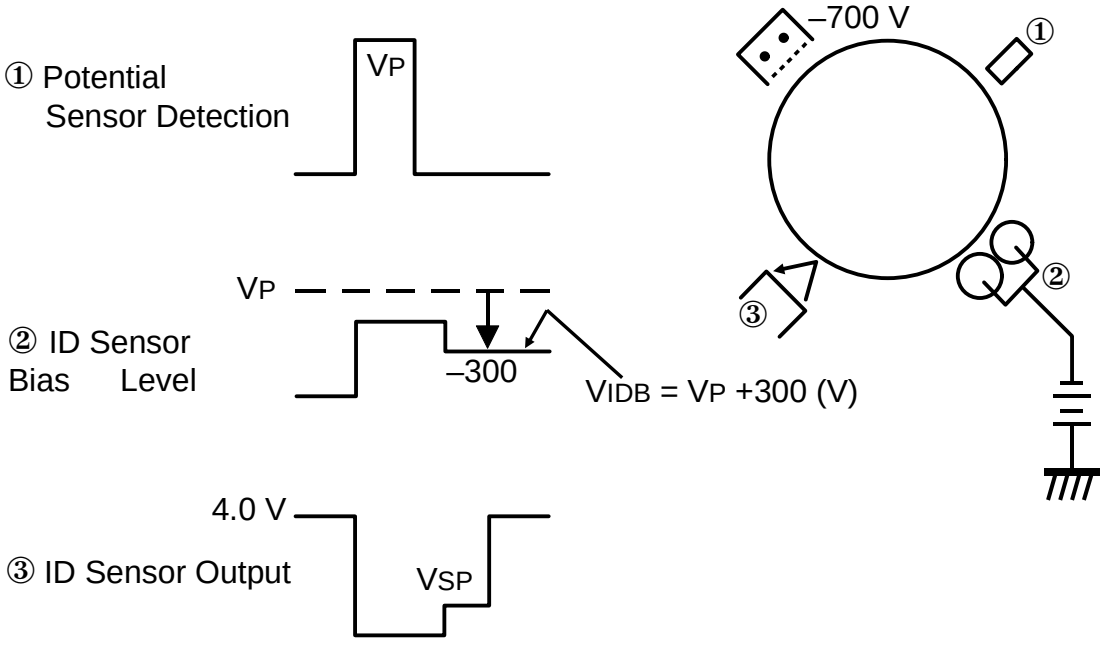

VSG and VSP are checked by the ID sensor [A]. The ID sensor is located underneath the drum cleaning section.
There is no ID sensor pattern in the optics, however, a pattern image is made on the OPC drum by the charge corona unit [B] and the erase lamp [C].

VSG is the ID sensor output when checking the erased drum surface.
VSP is the ID sensor output when checking the ID sensor pattern image.

To compensate for any variation in light intensity from the sensor LED, the reflectivity of both the erased drum surface and the pattern on the drum are checked.




VSG is detected every time the machine starts copying.
During VSG detection, the development sleeve rollers do not rotate and no development bias is applied.
VSP is detected after copying is completed if 10 or more copies have been made since VSP was last detected. Since the transfer belt must be released when checking VSP, a VSP check cannot be done during continuous copying.




While developing the ID sensor pattern, ID sensor bias is applied. ID sensor bias is determined during process control data initial setting as follows:

Apply charge while grid voltage is –700 V to create the ID sensor pattern.

Check the drum potential ($V_P$) of the latent image created by the charge with –700 V grid.

Adjust the ID sensor bias ($V_{IDB}$) so that it satisfies the following formula.

$$V_{IDB} = V_P - (-300)\ (V)$$
$$= V_P + 300\ (V)$$

Change the bias to the calculated $V_{IDB}$ and detect $V_{SP}$. $V_{SG}$ detected during $V_{SG}$ adjustment sequence in the process control data initial setting and $V_{SP}$ are used to determine $V_{REF}$ data at process control data initial setting. $V_{IDB}$ is not changed until the next process control data initial setting is done.

**<$V_{REF}$ correction timing>**

After the series of copies is completed in the case that 10 or more copies have been made, $V_{REF}$ is updated by referring to the previous $V_{REF}$ ($V_{REF}$'), $V_{SG}$, $V_{SP}$ and the current TD sensor output ($V_{TD}$).

Since this $V_{REF}$ data updating is under fuzzy control, the relationship among $V_{REF}$, $V_{REF}$', $V_{SG}$, $V_{SP}$ and $V_{TD}$ cannot be expressed by a simple algebraic formula.

$V_{REF}$ is updated not only at the above case. But also during developer initial setting and during process control data initial setting.

### 1.4.3 Sensor Abnormal Conditions

a. ID sensor ($V_{SG}$,$V_{SP}$) abnormal

Whenever $V_{SG}$ falls under 2.5 V or $V_{SP}$ rises over 2.5 V, the CPU fixes the $V_{REF}$ data and toner concentration is controlled only by using TD sensor output.

$V_{SG}$ and $V_{SP}$ are still detected as usual during abnormal conditions and if output returns to normal levels ($V_{SG} \geq 2.5$ V, $V_{SP} \leq 2.5$ V), the CPU returns the toner concentration control to normal mode.

b. TD sensor ($V_{TD}$) abnormal

Whenever $V_{TD}$ rises over 4.0 V or $V_{TD}$ falls under 0.5 V, the CPU shifts the toner supply to the fixed supply mode. In this condition, the CPU never stops the toner supply. The fixed toner supply amount can be changed in four steps (4%, 7%, 11%, 14%) by using SP mode. The default fixed toner supply amount is 4%.

$V_{TD}$ is still detected as usual during the abnormal condition and if its output returns to a normal level, the CPU returns the toner concentration control to normal mode.

c. Drum Potential Sensor abnormal

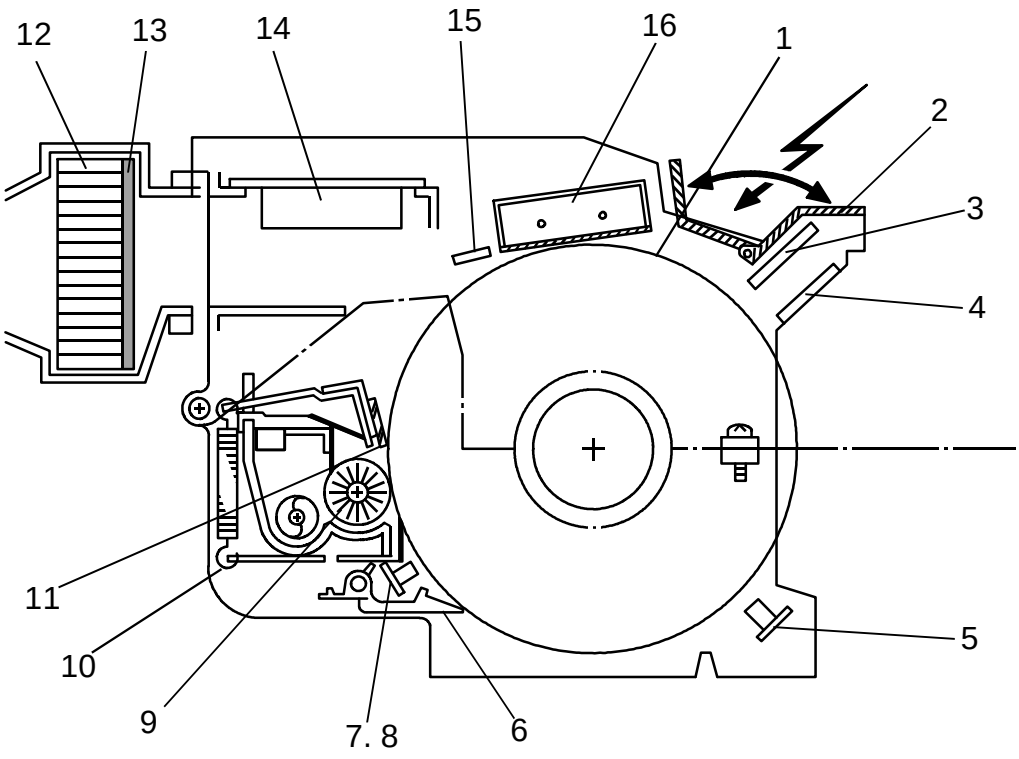
Whenever $V_{100}$ rises over 1.6 V or $V_{100}$ falls under 0.1 V or whenever $V_{800}$ rises over 5.0 V or $V_{800}$ falls under 2.7 V, the CPU also shifts the toner supply to the fixed supply mode, as for a TD sensor ($V_{TD}$) abnormal condition.

Related SC codes. (See troubleshooting section of details.):

| Code | Condition |
|---|---|
| 351 | Abnormal $V_{SG}$ Detection ($V_{SG} > 4.2$ V) |
| 352 | Incomplete TD Sensor Initial Setting |
| 353 | Abnormal $V_{SP}$ Detection ($V_{SP} > 2.5$ V) |
| 354 | Abnormal $V_{SG}$ Detection ($V_{SG} \leq 2.5$ V) |
| 355 | Abnormal $V_{TD}$ Detection ($V_{TD} > 4$ V) |
| 356 | Abnormal $V_{TD}$ Detection ($V_{TD} < 0.5$ V) |
| 357 | Abnormal $V_{SP}/V_{SG}$ Detection ($V_{SP}/V_{SG} \geq 0.25$ V) |
| 358 | Abnormal $V_{SP}/V_{SG}$ Detection ($V_{SP}/V_{SG} < 0.25$ V) |
| 361 | Incomplete Drum Potential Sensor Calibration |

# 2. DRUM UNIT

## 2.1 OVERVIEW




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

1. OPC Drum
2. OPC Drum Protective Shutter
3. Erase Lamp
4. Drum Potential Sensor
5. Pre-transfer Lamp
6. Pick-off Pawl
7. Image Density Sensor
8. Drum Thermistor
9. Cleaning Brush
10. Toner Collection Coil
11. Cleaning Blade
12. Ozone Filter
13. Cleaning Filter
14. Charge Power Pack
15. Quenching Lamp
16. Main Charge Corona Unit

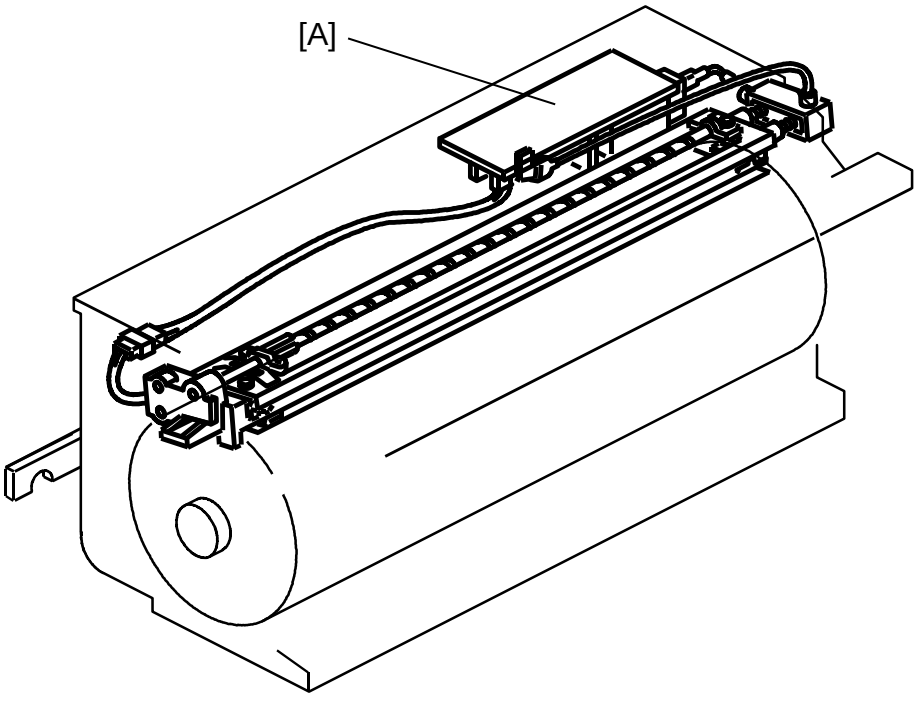
## 2.2 OPC DRUM CHARACTERISTICS

An OPC has the characteristics of:

1. Being able to accept a high negative electrical charge in the dark. (The electrical resistance of a photoconductor is high in the absence of light.)
2. Dissipating the electrical charge when exposed to light. (Exposure to light greatly increases the conductivity of a photoconductor.)
3. Dissipating an amount of charge in direct proportion to the intensity of the light. That is, where stronger light is directed to the photoconductor surface, a smaller voltage remains on the OPC.
4. Being less sensitive to changes in temperature (when compared to selenium F type drums).
5. Being less sensitive to changes in rest time (light fatigue). This makes it unnecessary to compensate development bias voltage for variations in rest time.

# 2.3 DRUM CHARGE

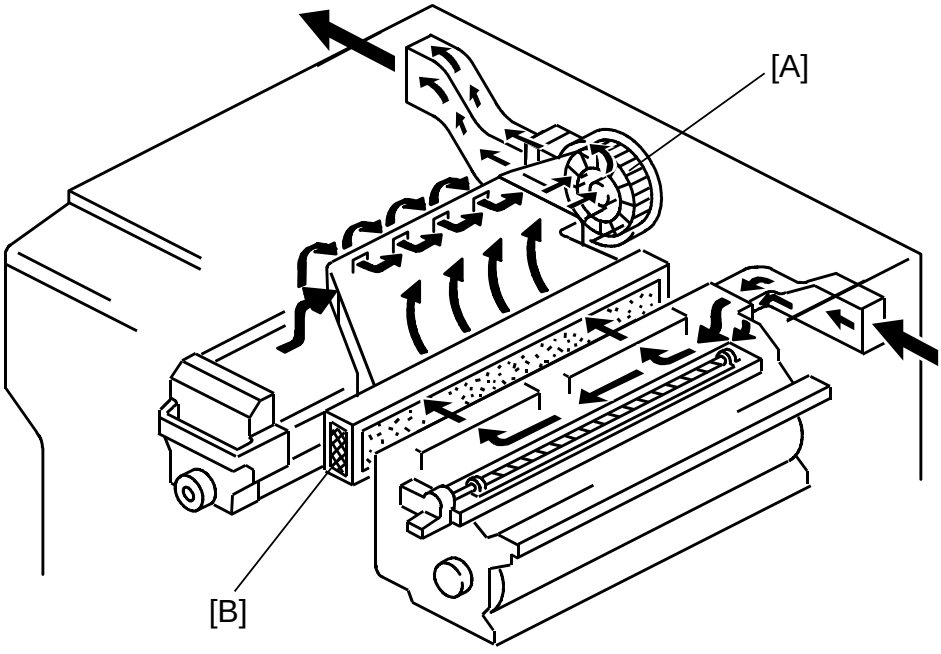
## 2.3.1 Overview




This copier uses a double corona wire scorotron system for drum charge. Two corona wires are required to give sufficient negative charge on the drum surface because of a rather high drum speed (330 mm/sec.). The stainless steel grid plate makes the corona charge uniform and controls the amount of negative charge on the drum surface by applying the negative grid bias voltage.

The charge power pack [A] gives a constant corona current to the corona wires (1100 μA) and bias voltage to the grid plate is automatically controlled to maintain proper image density according to the change of the OPC drum potential due to dirty grid plate and charge corona casing.

### 2.3.2 Air Flow Around the Drum

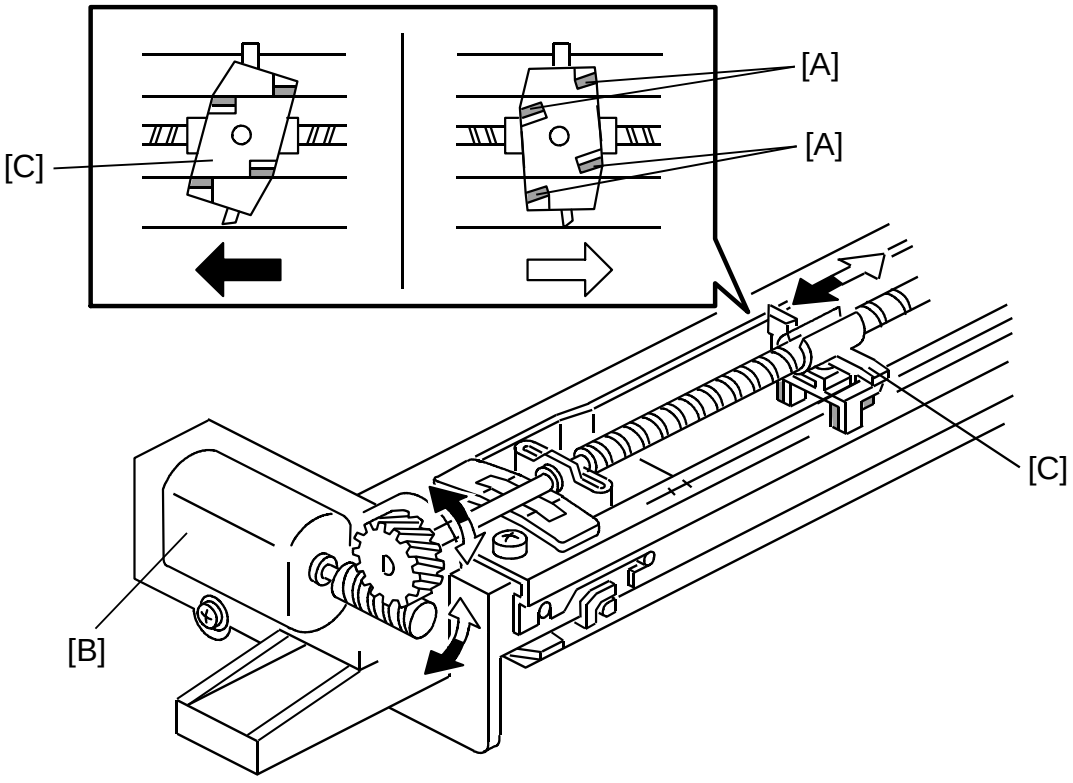



The exhaust fan [A] located above the fusing unit provides an air flow to the charge corona unit to prevent uneven built-up of negative ions that can cause an uneven charge of the drum surface as shown.

An ozone filter [B] absorbs the ozone ($O_3$) around the drum.

The exhaust fan rotates slowly during stand-by and rotates quickly during copying to keep the temperature inside the machine constant.

### 2.3.3 Charge Wire Cleaning Mechanism




The flow of air around the charge corona wire may deposit toner particles on the corona wires. These particles may interfere with charging and cause low density bands on copies.

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

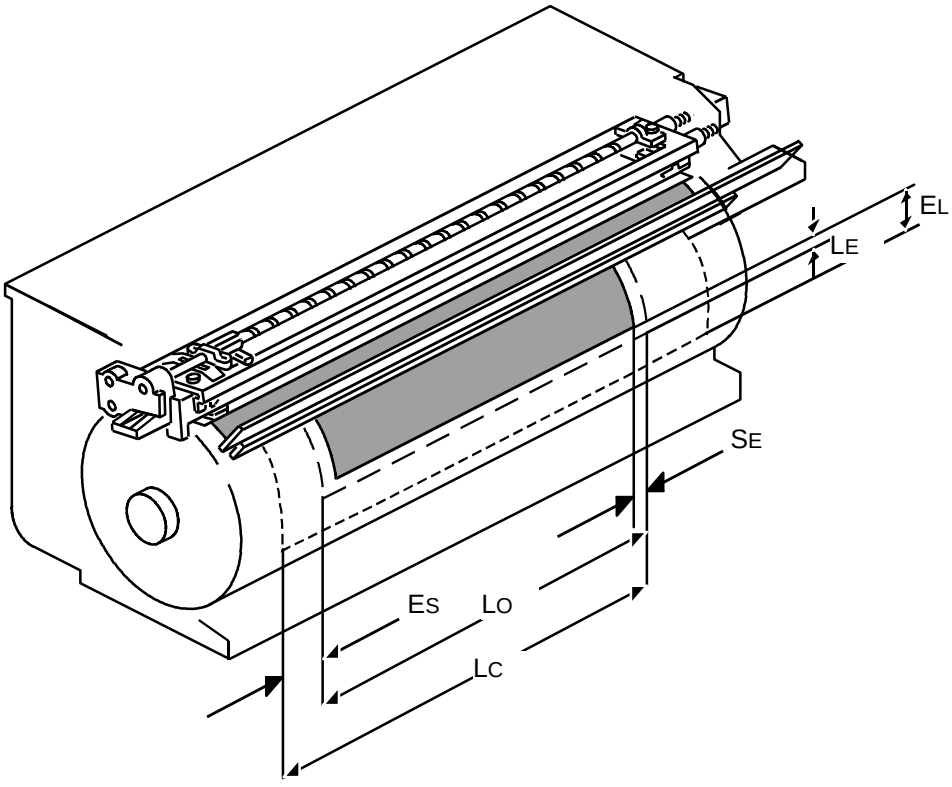
The wire cleaner is driven by a dc motor [B]. Normally the wire cleaner [C] is located at the front end position (home position). After 5000 or more copies are made and fusing temperature is less than 100°C after the main switch is turned on, the wire cleaner motor turns on to bring the wire cleaner to the rear end 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.

There are no home position and return position sensors. The CPU monitors the input voltage (5 V). When the wire cleaner reaches the end, it is stopped and the motor is locked. At this time, input voltage slightly decreases (to about 4 V) and the CPU judges to rotate the motor in reverse.

# 2.4 ERASE

## 2.4.1 Overview




| | | |
|---|---|---|
| LE: | Lead edge erase margin | 3.5 ± 2.5 mm |
| SE: | Side erase margin | total of both sides 3 mm or less |
| Lo: | Original width | |
| Lc: | Charged width of drum | |
| EL: | Lead edge erase | |
| Es: | Side erase | |

The erase lamp unit consists of a line of 123 LEDs extending across the full width of the drum, the width of each being about 2.5 mm. In editing mode, the appropriate LED's turn on according to the customer's designation.

### 2.4.2 Lead Edge and Trail Edge Erase

The entire line of LEDs turns on when the main motor turns on. They stay on until the erase margin slightly overlaps the lead edge of the original image on the drum (lead edge erase margin). It prevents the shadow of the original lead edge from appearing on the copy paper. This lead erase margin is also necessary for the lead edge of the copy paper to separate from the hot roller. The width of the lead edge erase margin can be adjusted by SP mode (1 SP Adjustment mode: PAGE 3).

When the scanner reaches the return position, the charge corona, the grid bias, and the exposure lamp turn off. However, the charged area on the drum surface is a little longer than the actual original length in order to have the entire latent image of the original.
The entire line of LEDs turn on when the trail edge of the latent image has passed under the erase lamp unit. This prevents developing unnecessary parts of the drum surface, reducing toner consumption and drum cleaning load.
The LEDs stay on to erase the lead edge of the latent image in the next copy cycle. After the final copy, the erase lamps turn off at the same time as the main motor.

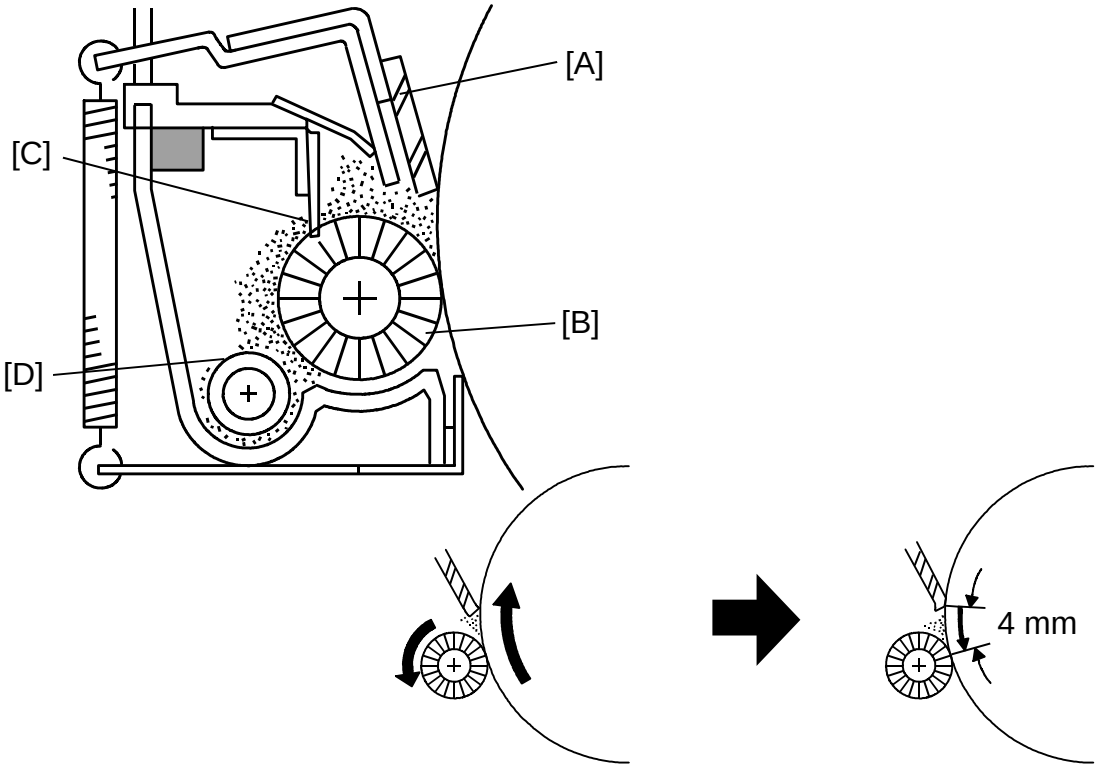
### 2.4.3 Side Erase

Based on the combination of copy paper size and the reproduction ratio data, the LEDs turn on in blocks. This prevents the shadow of the original side edge and unexposed front and rear sides of the drum surface in reduction mode from being developed. This reduces toner consumption and drum cleaning load.

In the DJF mode, the horizontal original standard position on the exposure glass is 5 mm away from the rear scale.
In the RDH mode, the horizontal center of the original is aligned with the center of the exposure glass.
On the other hand, the horizontal original standard position on the exposure glass in the platen cover mode is the rear scale edge.
To erase the shadow made by the edge of the rear scale in platen cover mode, one more LED at the front side turns on. This is in addition to the LED's on in DJF and RDH modes.

# 2.5 CLEANING

## 2.5.1 Overview




This copier uses the counter blade system for drum cleaning.
The blade [A] is angled against drum rotation. This counter blade system has the following advantages:

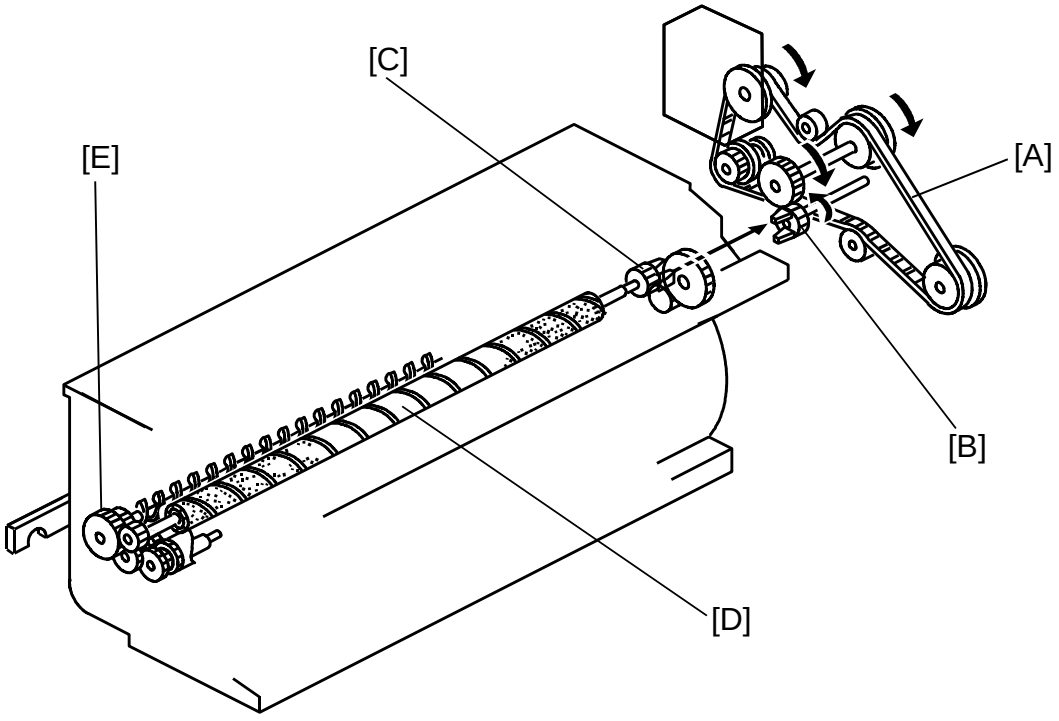
- Less wearing of the cleaning blade edge.
- High cleaning efficiency.

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

The cleaning brush [B] is used to support the cleaning blade.
The brush collects toner from the drum surface and scraped by the cleaning blade. Toner on the cleaning brush is scraped off by the mylar [C] and falls to the toner collection coil [D]. Toner is transported to the toner collection bottle by the toner collection coil.

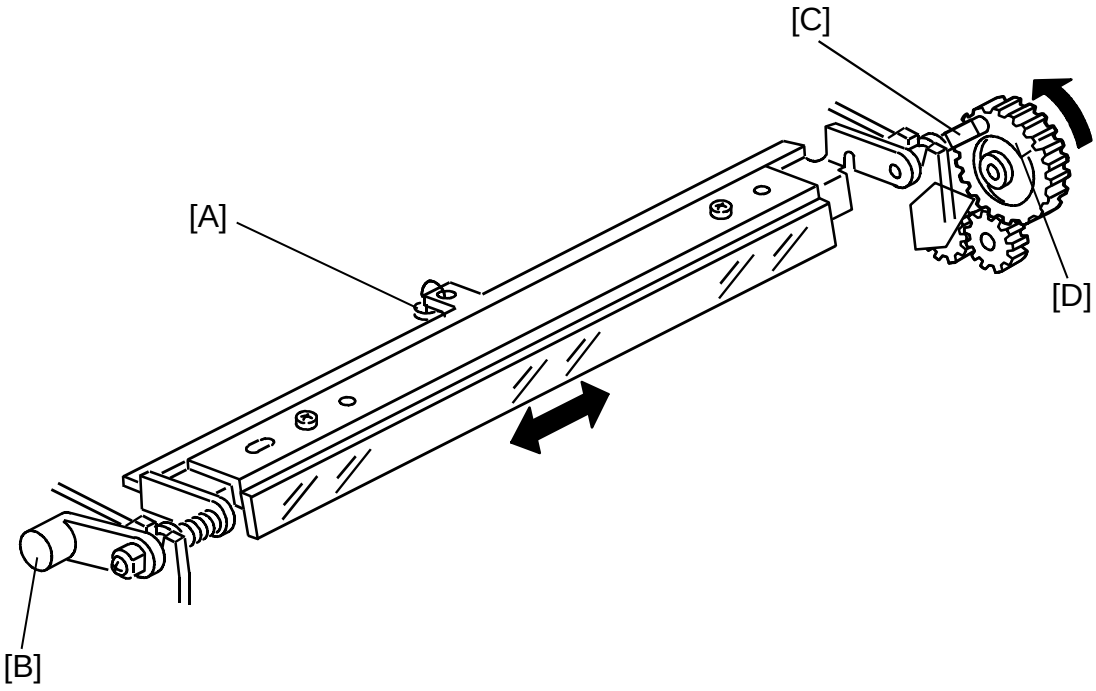
To remove the accumulated toner at the edge of the cleaning blade, the drum turns in reverse for about 4 mm at the end of every copy job. The accumulated toner is removed by the cleaning brush by this action.

### 2.5.2 Drive Mechanism




The drive force from the main 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 force to the front side through the cleaning brush [D]. The force at the front side is used for the toner collection coil gear [E].

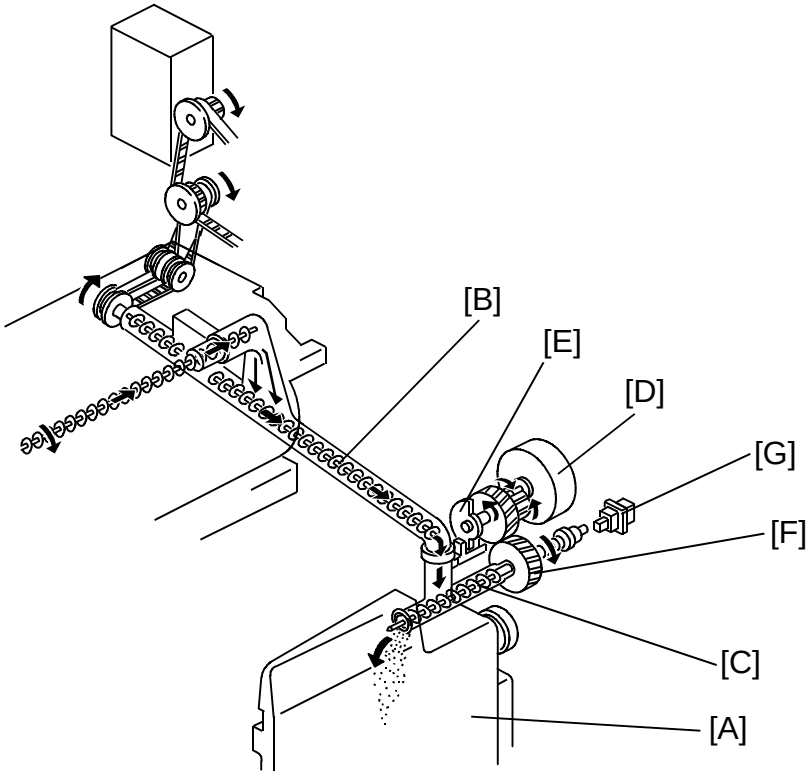
### 2.5.3 Cleaning Blade Pressure Mechanism and Side-to-Side Movement




The spring [A] always pushes the cleaning blade against the OPC drum. The cleaning blade pressure can be manually released by pushing up the release lever [B]. To prevent cleaning blade deformation during the transportation, the release lever is 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 gives a side-to-side movement to the blade. This movement helps to disperse accumulated toner to prevent early blade edge deterioration.

### 2.5.4 Toner Collection Mechanism



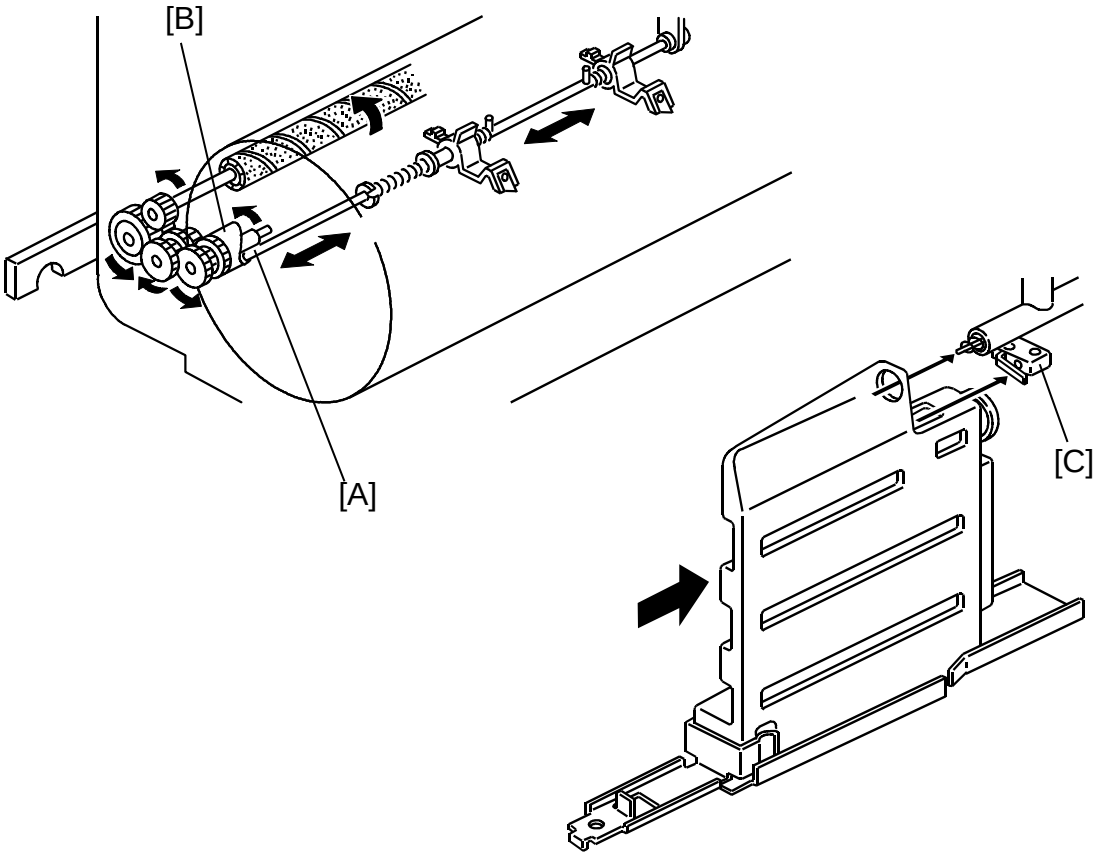

Toner collected by the cleaning unit is transported to the toner collection bottle [A] through the toner collection tubes. Three helical coils are used for toner transport.

One coil [B] is driven by the main motor via drive belts and the other coil [C] is driven by an independent toner collection drive motor [D].

The actuator disk [E] on the toner collection drive motor monitors the proper rotation of the toner collection coil [C] to prevent the coil from being damaged by toner clogged in the collection tube. The main PCB monitors the sensor output and increases the motor speed if the sensor monitors that the toner collection motor rotates at a speed lower than normal. Also, the CPU will display an SC 342 if no signal changes (ON $\rightarrow$ OFF) are detected for more than 2.55 seconds while the toner collection motor is turning.

When the toner collection bottle [A] become full, the toner pressure in the bottle increases and presses the gear [F] against the toner overflow switch [G]. After the toner overflow switch is activated, the finishing of the copy job, or up to 100 continuous copies, is allowed, then copying is prohibited and the service call "full toner collection bottle" indication is displayed on the LCD.

This condition can be cleared by de-actuating the toner overflow switch while de-actuating then actuating the toner collection bottle switch ([C] in next page).



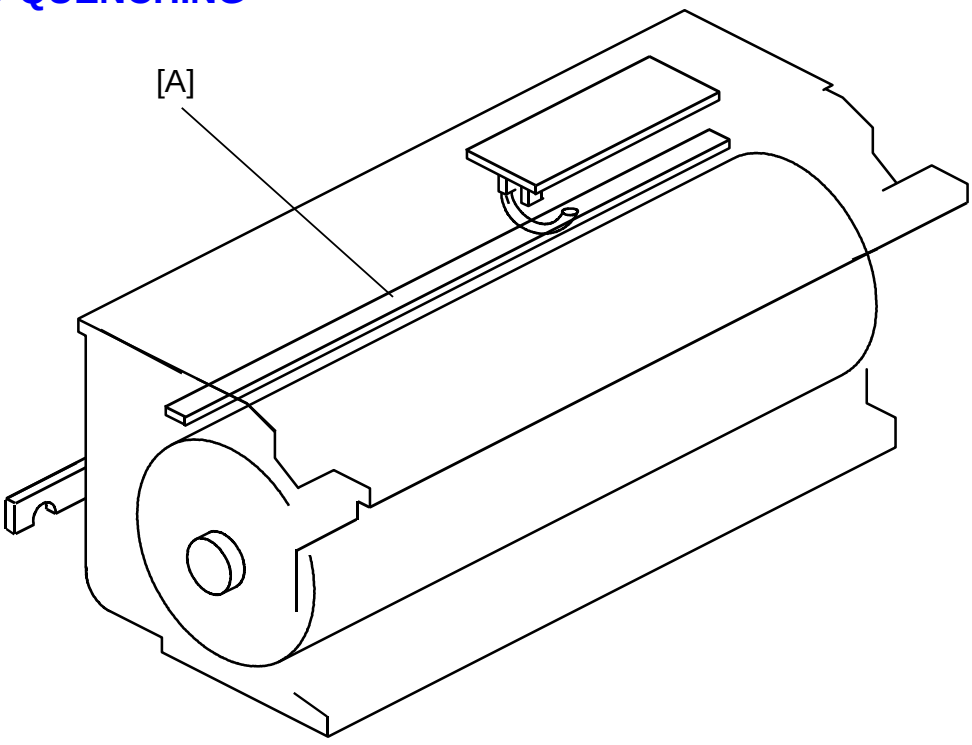

### 2.5.5 Pick-off mechanism

The pick-off pawls are always in contact with the drum surface with weak spring pressure. They move side to side during the copy cycle. This movement is made via a shaft [A] and an eccentric cam [B].

### 2.5.6 Toner Collection Bottle Set Detection

The toner collection bottle set switch [C] prohibits machine operation by indicating SC343 while the toner collection bottle is not set.

## 2.6 QUENCHING



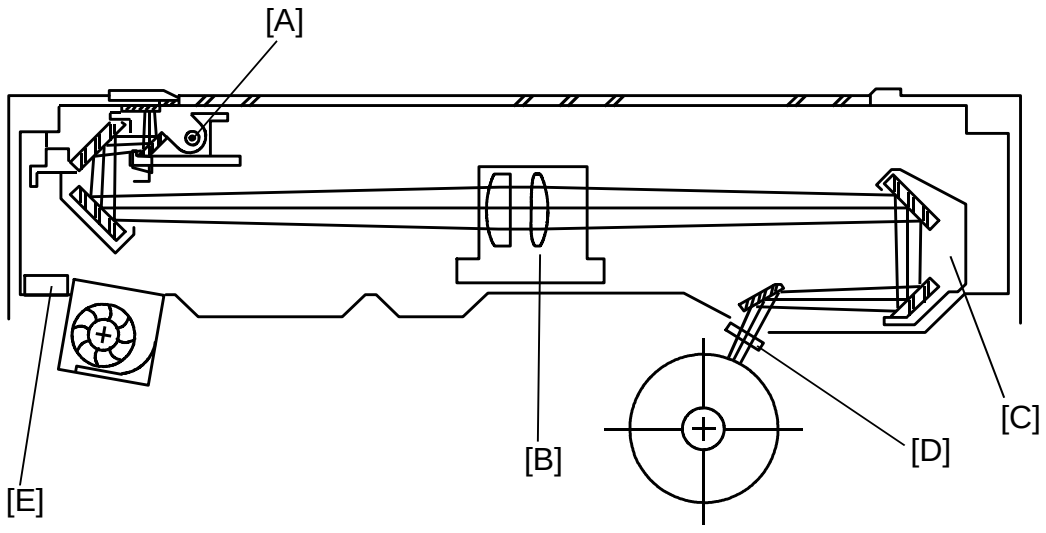

In preparation for the next copy cycle, light from the quenching lamp (QL) [A] neutralizes any charge remaining on the drum.

The quenching lamp consists of a line of 16 LEDs extending across the full width of the drum.

Yellow colored LEDs are used for QL to reduce ultra violet light which would cause light fatigue on the OPC drum.

# 3. OPTICS

## 3.1 OVERVIEW




The optics unit reflects an image of the original on the exposure glass onto the OPC drum. This forms a latent electrical image of the original.

On this model a halogen lamp (85 V 230 W) is used for the exposure lamp [A]. Lamp surface is frosted to ensure even exposure.

Six mirrors are used to make the optics unit smaller and obtain the wide reproduction ratio range (50 ~ 200%).

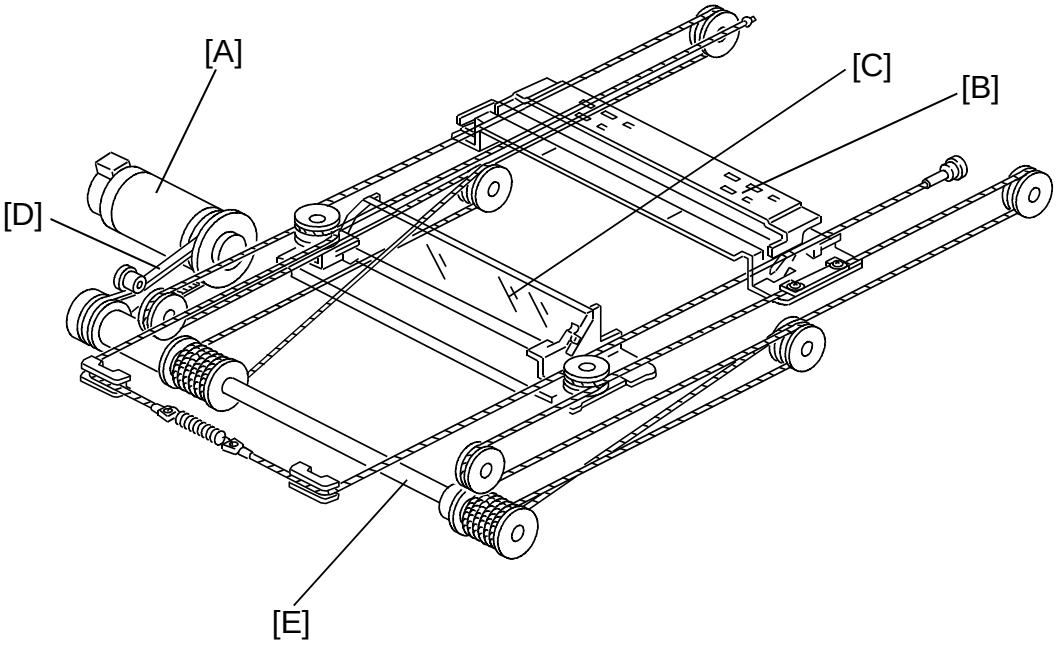
The lens [B] is driven by two stepping motors for (1) vertical direction (parallel to the paper feed direction) and (2) horizontal direction movements.

To correct focal length change in reduction and enlargement modes, the third scanner unit [C] (4th and 5th mirrors) position is changed by a stepping motor.

The toner shielding filter [D] is green (a green filter partly absorbs red light) to improve red original duplication.

The optic anti-condensation heater [E] (located on the optic base plate) turns on while main switch is turned off to prevent the moisture from forming on the optics.

## 3.2 SCANNER DRIVE

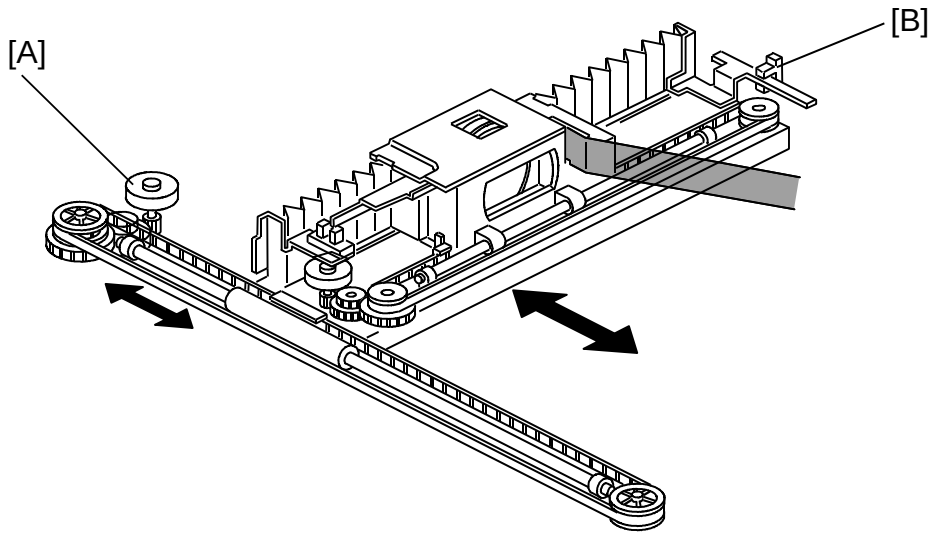


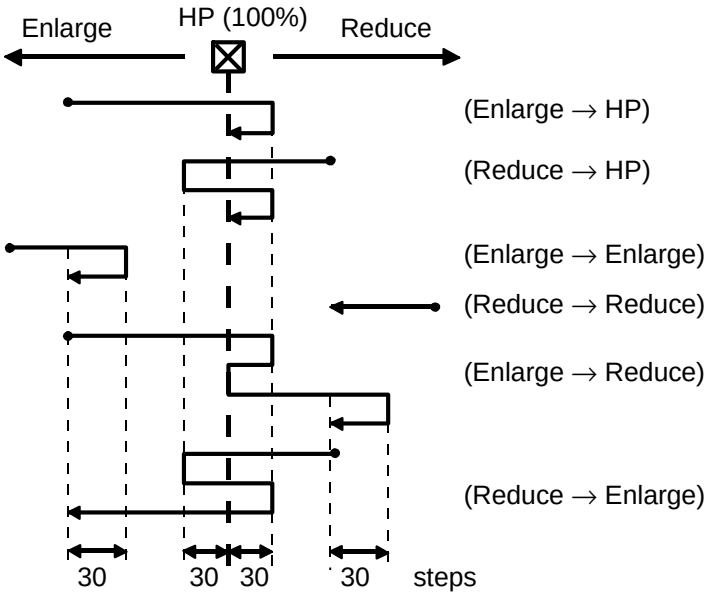

A dc servo motor is used as the scanner drive motor [A]. Scanner drive speed is 330 mm/sec. during scanning, and 1950 mm/sec. when the scanner goes back.

The scanner drive motor drives the first [B] and second scanners [C] using two scanner drive wires via the timing belt [D] and the scanner drive shaft [E]. The second scanner speed is half of the first scanner speed.

The scanner drive wire is not directly wound around the pulley on the scanner drive motor.

## 3.3 VERTICAL LENS DRIVE



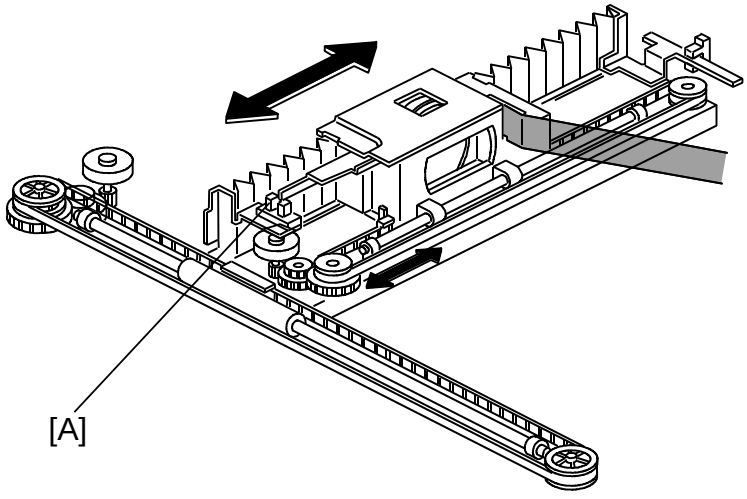



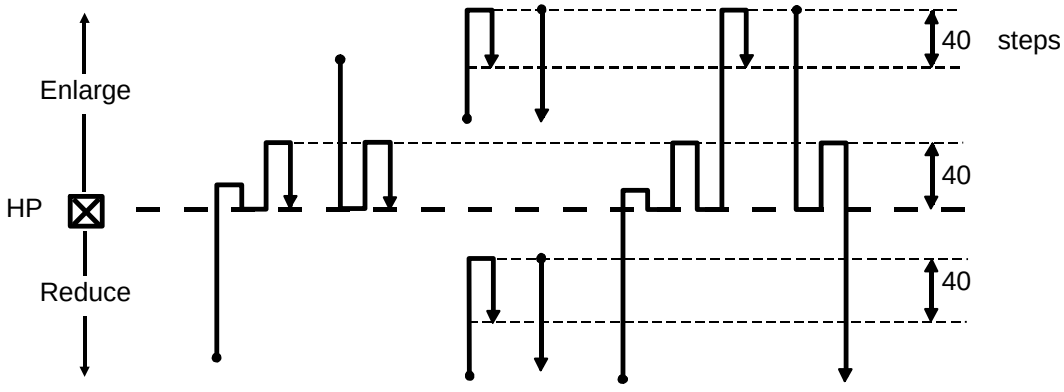

The lens vertical drive motor [A] changes the lens vertical position in accordance with the selected reproduction ratio.

A stepping motor (approx. 0.095 mm/step) is used to drive the lens through the lens drive belt. The maximum lens vertical shift distance is 290 mm (from the position at 50% to the position at 200%).

The lens vertical home position sensor [B] detects the lens vertical position for full size mode. The optic control PCB keeps track of the lens position based on the number of pulses sent to the lens vertical drive motor.

## 3.4 HORIZONTAL LENS DRIVE




The original horizontal position on the exposure glass varies depending on the mode (such as platen, DJF and RDH modes) for easy original handling. However, the center is the standard position for paper feed.

Therefore, the lens horizontal position has to be changed according to paper size, reproduction ratio, original feed modes and the edit modes (centering, margin adjust, etc.).

A stepping motor (approx. 0.07 mm/step) is used to drive the lens through the lens drive belt.

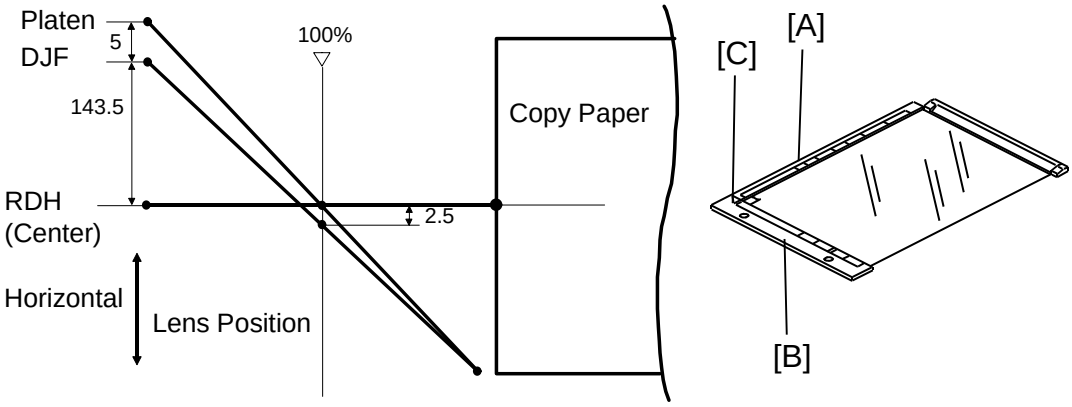
The lens horizontal home position sensor [A] is used to detect the lens horizontal position for A4/LT sideways, in full size and platen mode.

The other positions are determined by counting the number of motor drive pulses.

Since this model has a horizontal lens drive mechanism, side-to-side registration adjustment for each feed station can be done easily by using SP mode (1 SP Adjustment mode: PAGE 4).

# 3.5 HORIZONTAL LENS POSITIONING

## 3.5.1 For Original Position




There are three standard original positions for the platen, DJF and RDH modes.

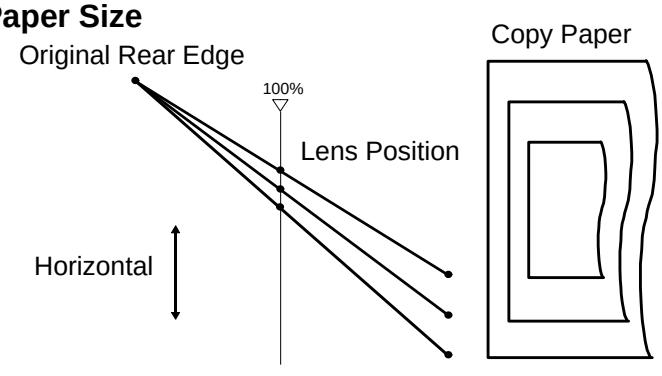
In platen mode, the original is aligned with both the rear [A] and the left [B] original scales (rear left corner [C] is the standard position).

In RDH mode, the original position is the center of the left scale [B].

In DJF mode, the original position is 5 mm to front of the platen mode original position to maintain the original transport path (5 mm from the rear scale).

The above figure shows the lens horizontal positions for each original mode when identical size paper is used.

## 3.5.2 For Paper Size

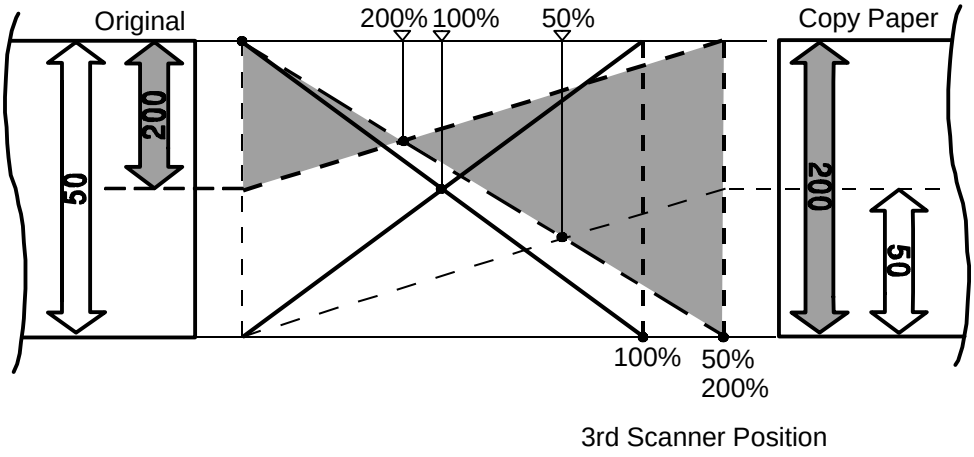



To keep high paper feed performance, the center is assigned as the paper feed standard position. Therefore, the lens horizontal position is changed according to the paper size.

The figure shows the lens horizontal position for each paper size in full size mode.

### 3.5.3 For Reproduction Ratio

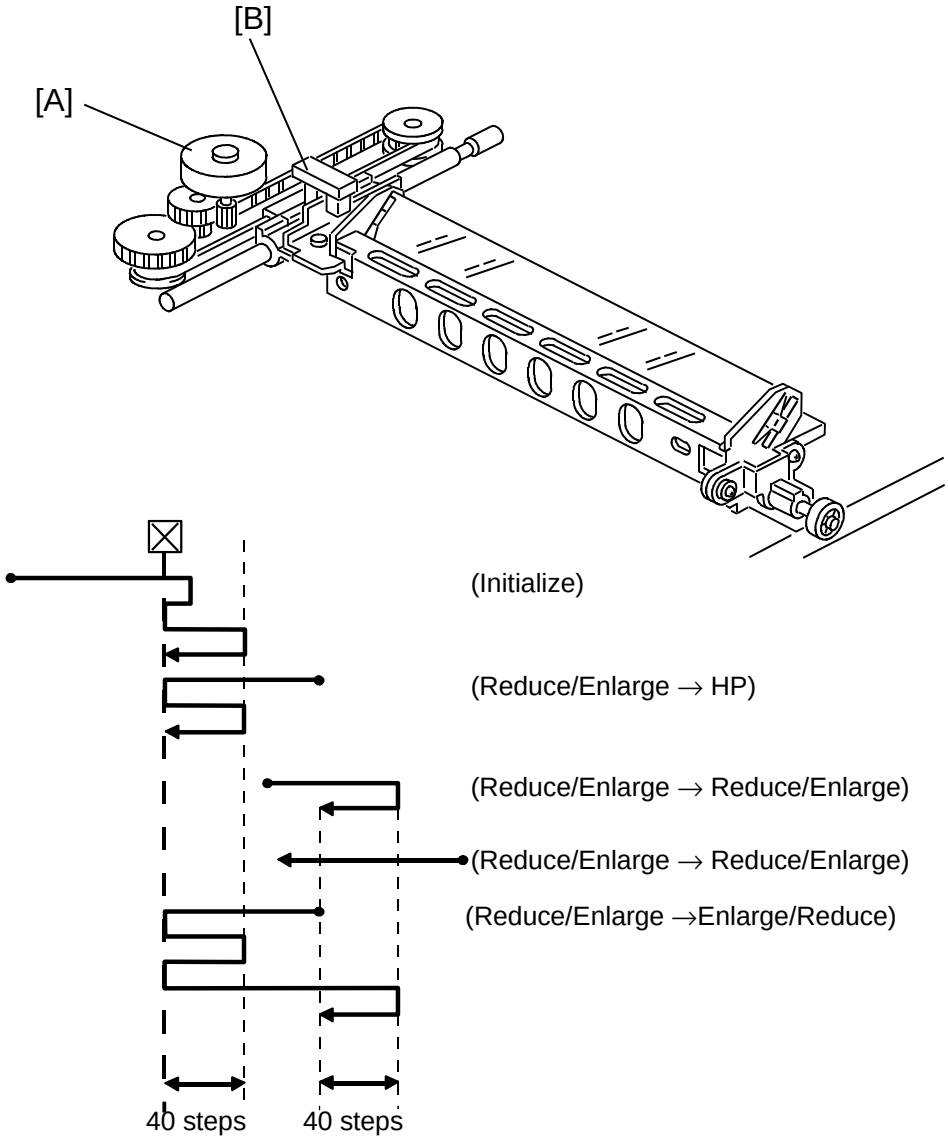
Original Rear Edge




When the reproduction ratio is changed, the vertical position of the lens is changed. At the same time, the total focal length has to be changed to adjust the image focusing. For this focal length change, the horizontal position of the 3rd scanner is also adjusted. The maximum 3rd mirror shift distance is 50 mm (from the position at 100% to the position at 50, 200%).

The figure shows the lens horizontal position for 50, 100 and 200%.

## 3.6 3RD SCANNER DRIVE

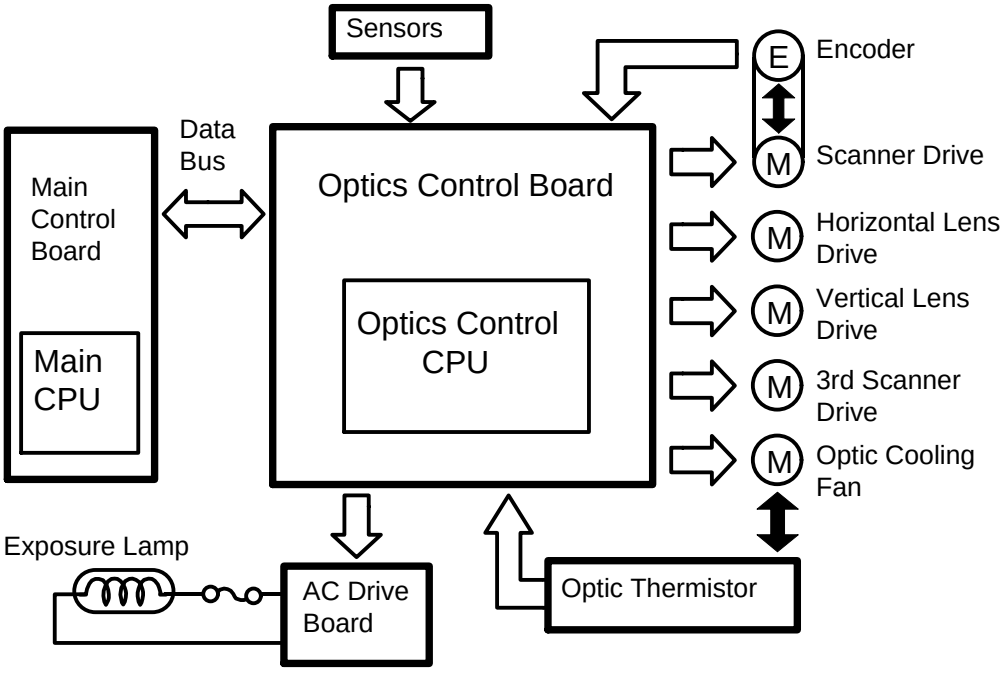



To compensate the focus for reproduction and lens position changes, the 3rd scanner (4th and 5th mirrors) position is changed.

A stepping motor [A] (approx. 0.095 mm/step) is used for the 3rd scanner drive.

The 3rd scanner home position sensor [B] is used to detect the unit position for full size mode. The optic control PCB keeps track of the unit position based on the number of motor drive pulses.

## 3.7 OPTICS CONTROL CIRCUIT




The optic control board communicates with the main board through a data bus. The optics control board monitors all the sensor signals, encoder output, thermistor output and controls all motors in the optics.

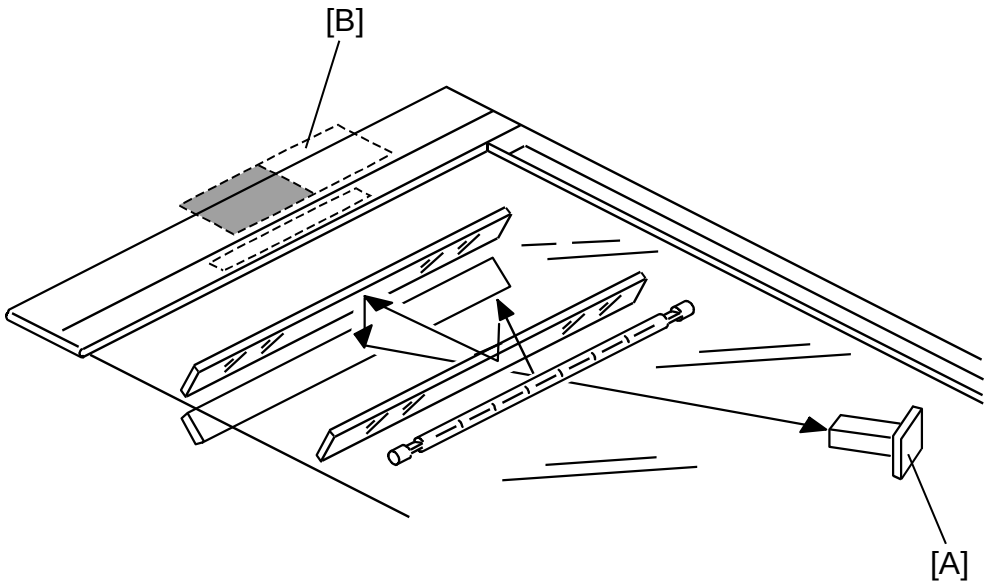
At the programmed time, the main CPU sends a scanner start signal to the optics control CPU.

The CPU generates a pulse-width modulation (PWM) signal. The PWM signal goes to a driver circuit, which sends drive pulses to the scanner drive motor.

An encoder in the scanner drive motor generates pulse signals.
A speed/direction control circuit monitors the scanner speed and the direction of the signals, and uses this data to regulate the motor speed.

The home position sensor monitors the position of the scanner. When the main switch is turned on, the main CPU confirms the position of the scanner by moving the scanner out of the home position and back again. This data is sent to the optics control CPU.

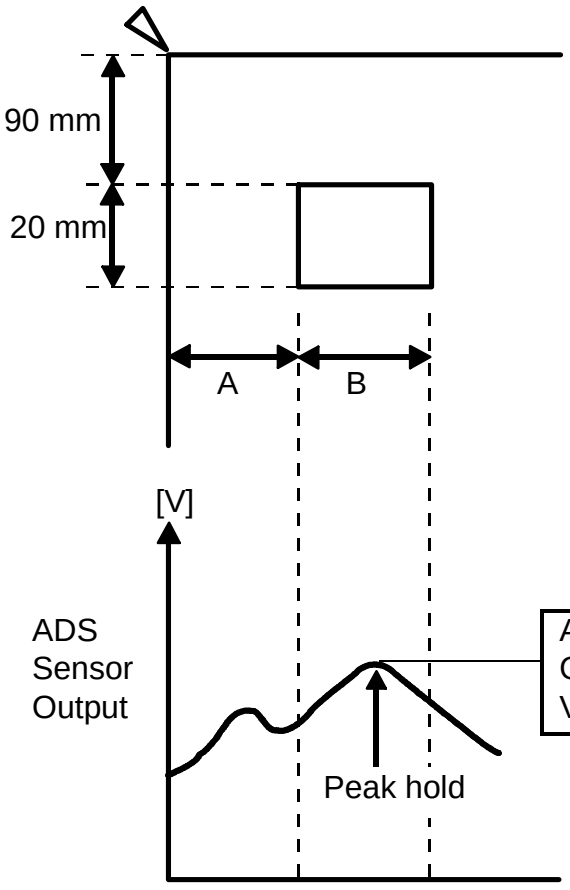
## 3.8 AUTOMATIC IMAGE DENSITY CONTROL SYSTEM (ADS)




In ADS mode the original background density is sensed by the ADS sensor [A] and the main CPU determines an appropriate development bias voltage for the original to prevent dirty backgrounds from appearing on copies.

The ADS sensor board is mounted on the rear side of the optics side plate. The sensor board is covered by the sensor housing cover which has a small hole to direct the reflected light from the original to the ADS sensor.

The ADS sensor standard voltage is adjusted to 2.7 V when process control data initial setting is performed. The exposure lamp turns on with ID level 4 at the home position and the light reflected by the ADS pattern [B] (white painted) reaches the ADS sensor. The main CPU adjusts the ADS gain data automatically to make the output 2.7 V. This gain data is stored in the RAM board.




$A = \frac{9.7}{M}$ (mm)

M = 1.0 (m = 50 ~ 100)

$M = \frac{m}{100}$ (m = 101 ~ 200)

$B = \frac{8.25}{m} \times 100$ (mm)

m: reproduction ratio
(50 ~ 200)

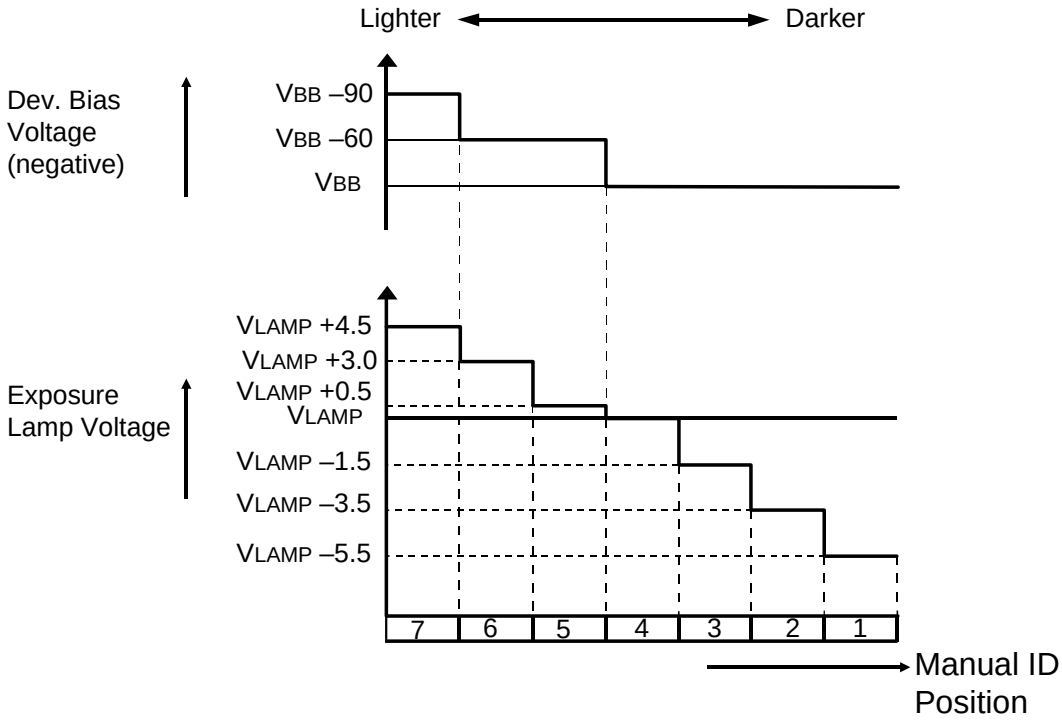
For the first scanning of an original in ADS mode, the CPU starts sampling of the ADS sensor output while exposing the ADS pattern at the scanner home position. Then the CPU stores the maximum ADS sensor output as a reference voltage. This means that every ADS check cycle, the first scanning for the original, the ADS reference voltage is renewed by the latest exposure light reflected by the ADS pattern.

In the full size mode, the CPU samples the ADS sensor output when the scanner scans the original from 9.7 mm to 18 mm from the left scale edge. The CPU takes the maximum ADS sensor output during the sampling period and compares it with the ADS reference voltage to determine the proper development bias voltage. (See development bias control section for details.)

The sampling length of ADS sensor output for the original differs depending on the reproduction ratio because the scanner speed is different.

## 3.9 MANUAL IMAGE DENSITY CONTROL

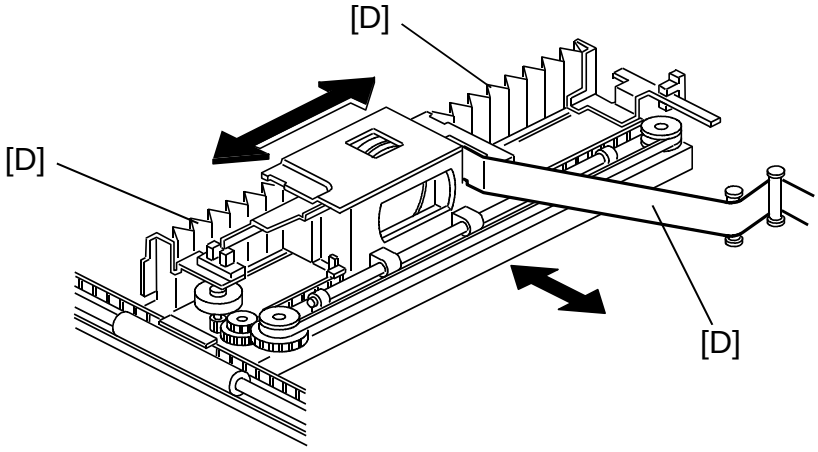
When the image density is set manually, the voltage applied to the exposure lamp changes as shown in the table below.

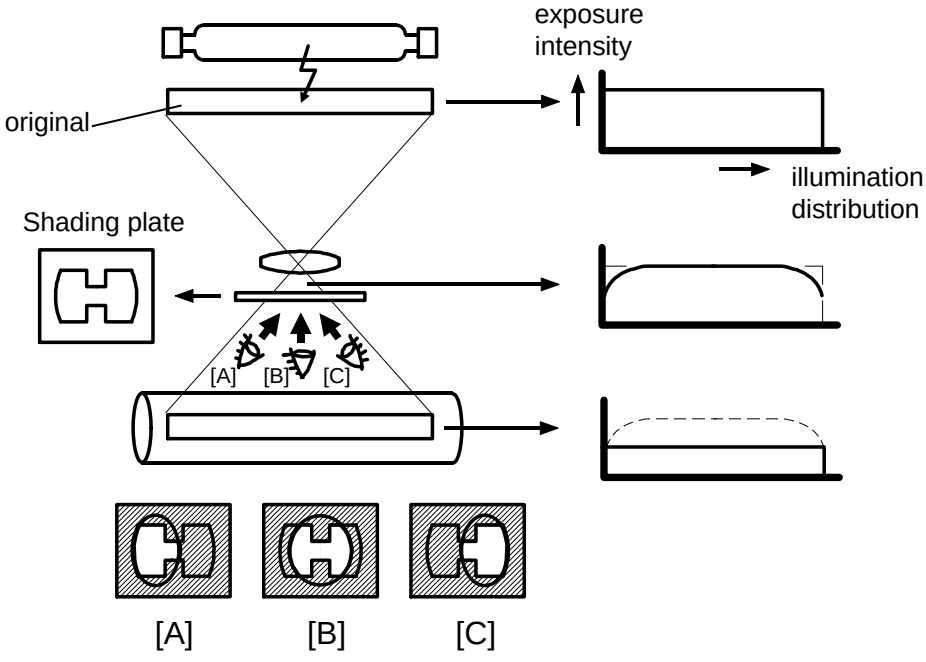



VLAMP: Exposure lamp voltage at ID level 4.
This value is determined at process control data initial setting.

VBB: Development bias (negative) voltage at ID level 4.
This value is determined at process control data initial setting.

## 3.10 UNEVEN LIGHT INTENSITY CORRECTION



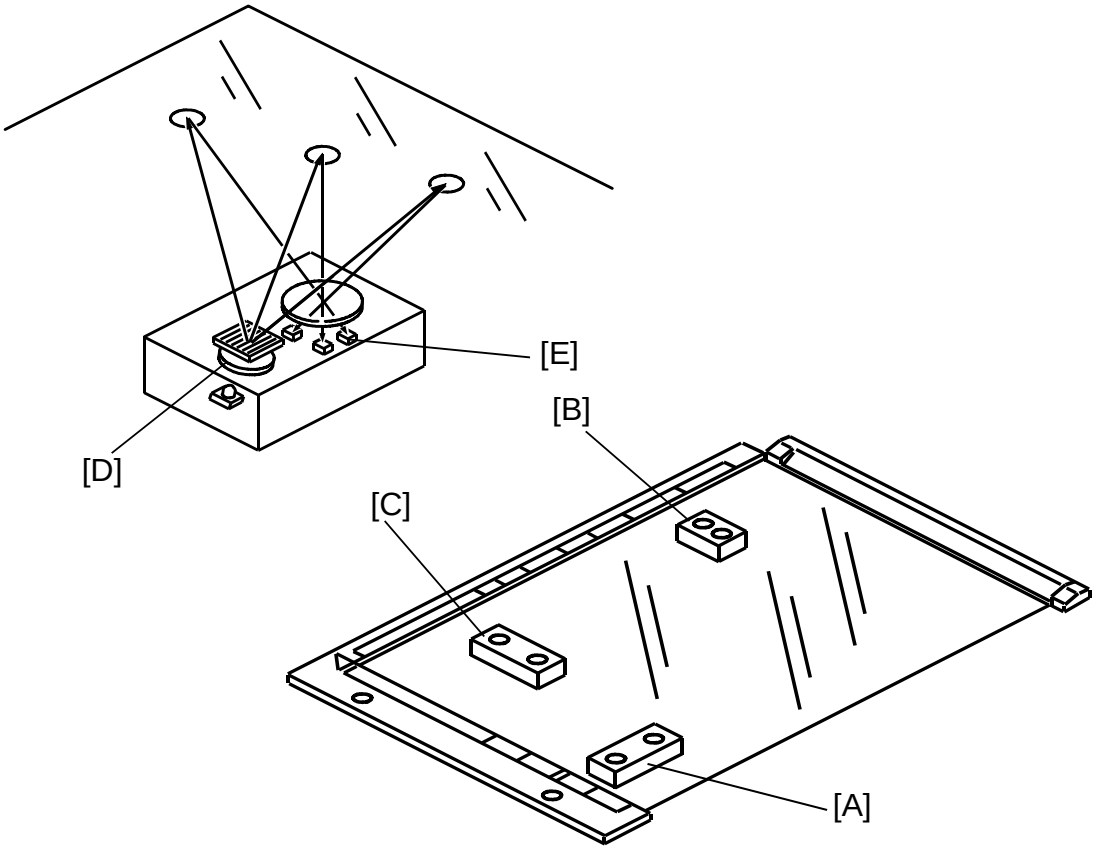




The entire exposure lamp surface is frosted to ensure even exposure.

To compensate for reduced light at the edge of the lens, a shading plate is placed in front of the lens. The shading plate is fixed to the lens unit.
The shading plate compensates the light intensity when the lens horizontal position is shifted ([A] to [C]).

Also three shading mylars [D] intercept any diffused reflected light from outside the light path.

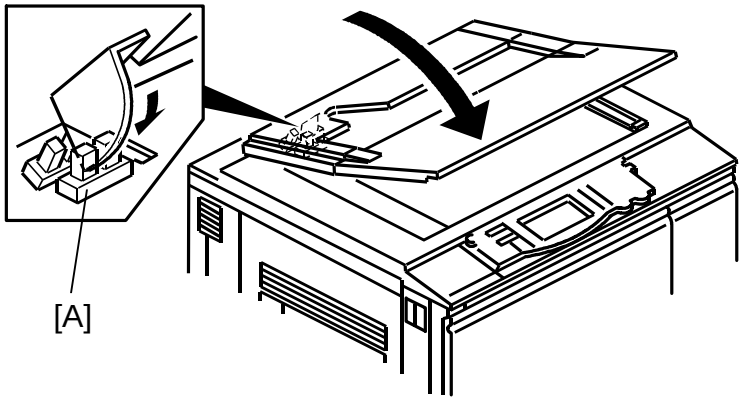
## 3.11 ORIGINAL SIZE DETECTION IN PLATEN MODE




There are three reflective sensors (APS sensors) in the optics cavity for the original size detection. Original width Sensor [A] is used for sensing the original width and Original Length Sensor-1 [B] and Original Length Sensor-2 [C] sense the original length.

Inside each APS sensor, there is an LED [D] and three photoelectric devices [E]. The light generated by the LED is broken up in three beams and each beam scans a different point of the exposure glass. If the original or platen 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 platen cover is opened.



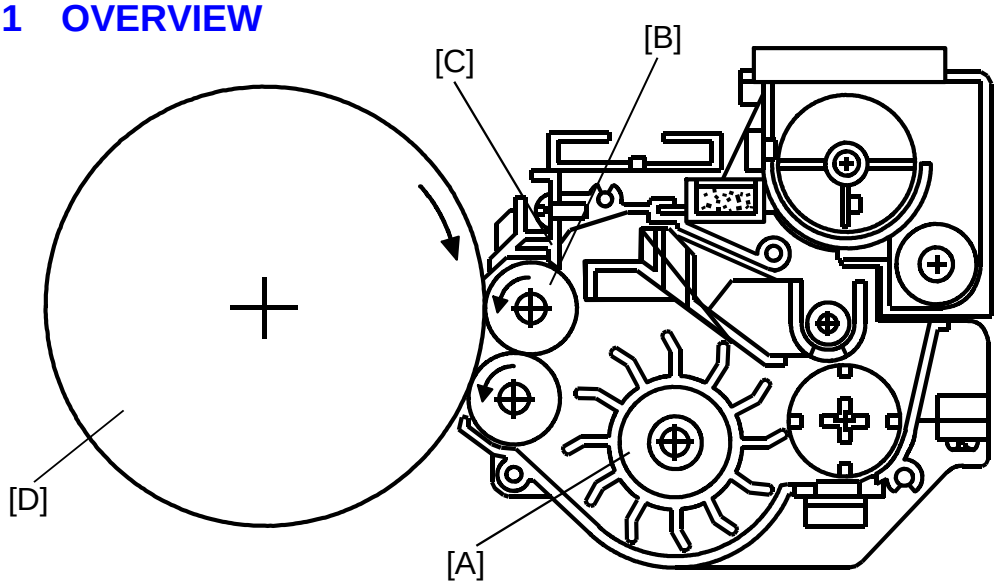

| Original Size | | Length Sensor 1 | | | Length Sensor 2 | | | Width Sensor | | |
|---|---|---|---|---|---|---|---|---|---|---|
| A4/A3 version | LT/DLT version | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| A3 | 11 x 7 | O | O | O | O | O | O | O | O | O |
| B4 | 10 x 14 | X | O | O | O | O | O | O | O | O |
| — | 8 1/2 x 14 | X | O | O | – | O | – | O | O | X |
| F4 | 8 x 13 | X | X | O | O | O | O | O | O | X |
| A4–L | 8 1/2 x 11 | X | X | X | O | O | O | O | O | X |
| B5–L | — | X | X | X | O | O | O | O | X | X |
| A5–L | 5 1/2 x 8 1/2 | X | X | X | O | O | O | X | X | X |
| B6–L | — | X | X | X | X | O | O | X | X | X |
| A6–L | — | X | X | X | X | X | O | X | X | X |
| A4–S | 11 x 8 1/2 | X | X | X | O | O | O | O | O | O |
| B5–S | — | X | X | X | X | O | O | O | O | O |
| A5–S | 8 1/2 x 5 1/2 | X | X | X | X | X | O | O | X | X |
| A6–S | — | X | X | X | X | X | X | X | X | X |

**NOTE:** –L: Lengthwise
–S: Sideways
Sensors #4 and #6 are not used for LT/DLT version machines.

The check is done when the platen position sensor [A] turns on. This is when the platen 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 are on. Other sensor(s) are off. Through the on/off data of the nine (seven for LT/DLT version machine) sensors, the main CPU can recognize the original size.
In case the copy is made with the platen open, the main CPU decides the original size only through the data when the Print key is pressed.
This original size detection method eliminates the necessity for a pre-scan and increases the machine's productivity.

# 4. DEVELOPMENT

## 4.1 OVERVIEW




This copier uses a double roller (diameter 20 mm each) development (DRD) system. 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, and (3) the relative speed of each development roller against the drum is reduced. Also, finer toner (Approx. 9 μm) and developer (Approx. 70 μm) are used. Both the DRD system and new supplies improve the image quality, especially of thin horizontal lines, the trailing edges of the half-tone areas, and black cross points.

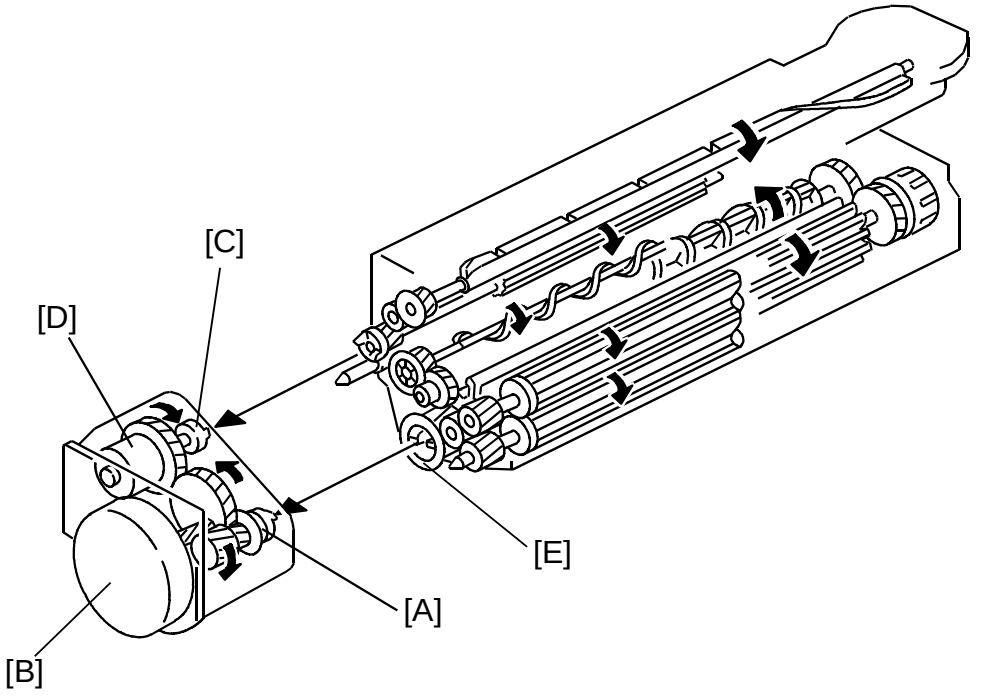
The paddle roller [A] picks up developer in its paddles and transports it to the upper development roller [B]. Internal permanent magnets in the development rollers attract the developer to the development roller sleeve. The upper development roller carries the developer past the doctor blade [C]. The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

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

The development roller is given a negative bias to prevent the toner form being attracted to the non-image areas on the drum surface that may have a slight residual negative charge.

After turning another 100 degrees, the developer is returned to the paddle roller [A].

## 4.2 DRIVE MECHANISM

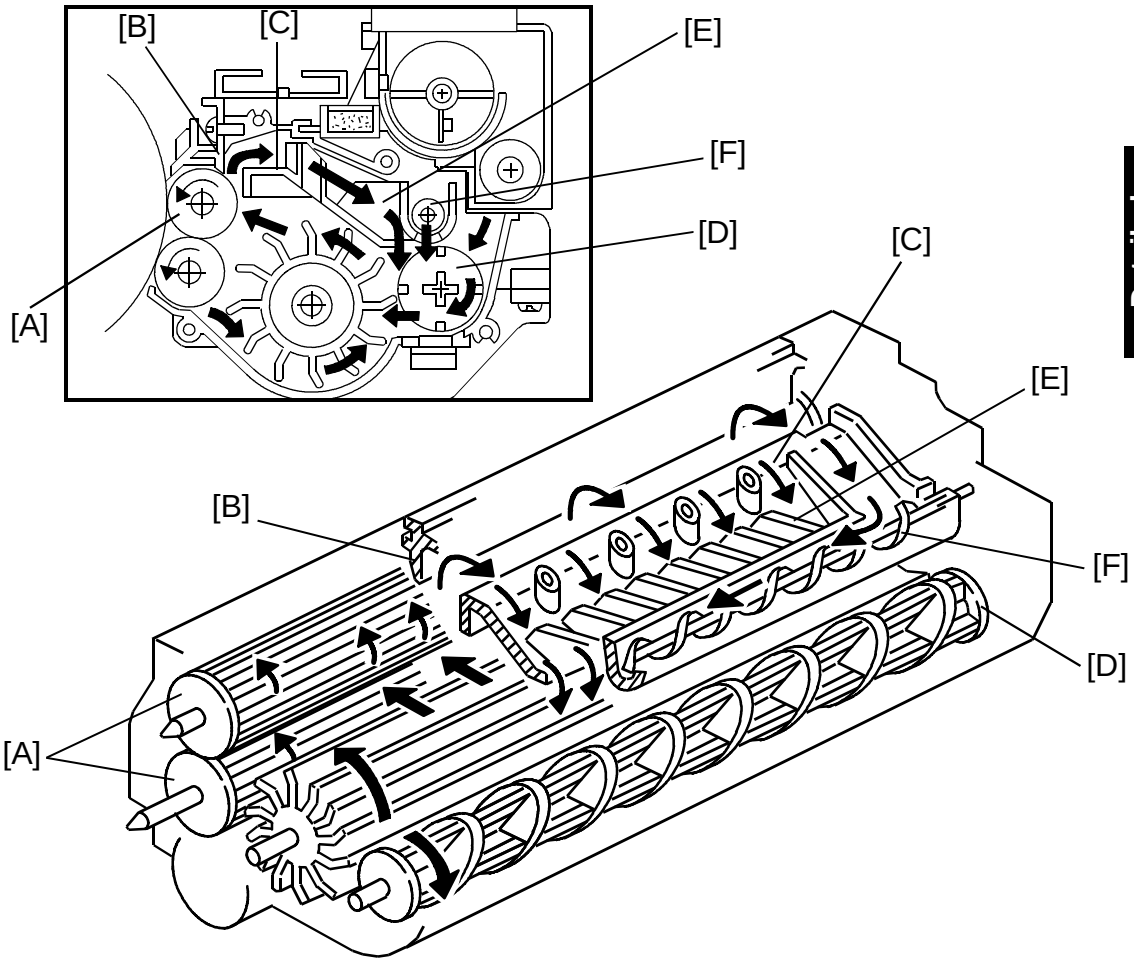



The gears of the development unit are driven by the development drive gear [A] when the development motor [B] (dc servomotor) turns.

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 with the development roller gear [E] when the unit is installed.

## 4.3 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.

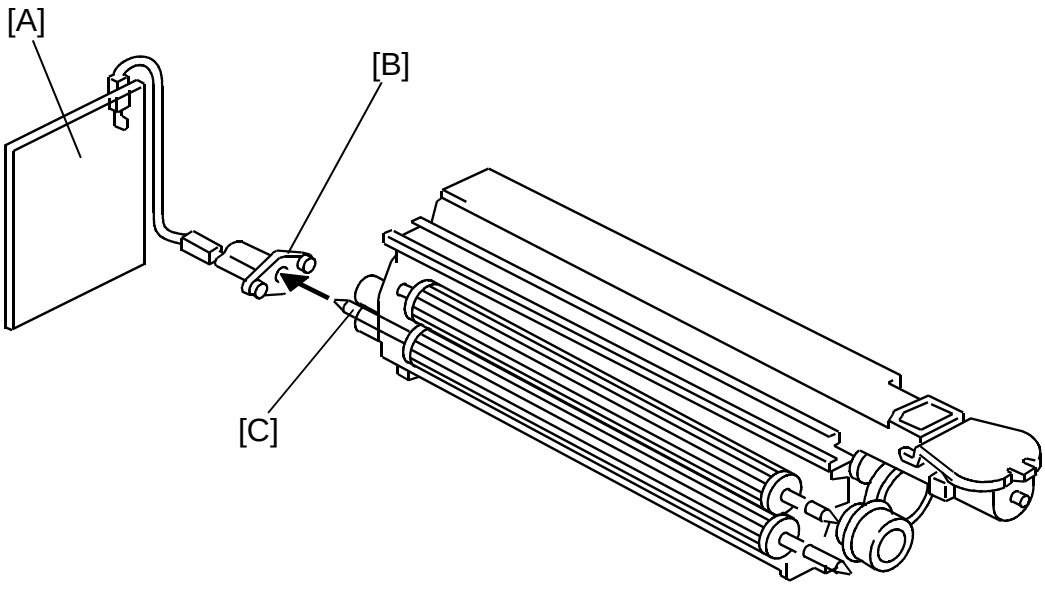
The developer on the turning development rollers [A] is split into two parts by the doctor blade [B]. The part that stays on the development rollers forms the magnetic brush and develops the latent image on the drum. The part that is trimmed off by the doctor blade goes to the backspill plate [C].

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.

# 4.4 DEVELOPMENT BIAS

## 4.4.1 Overview




The high voltage control Board [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 through the rear sleeve roller holder made of conductive resin.

The development bias prevents toner from being attracted to the background area of the non-image area on the OPC drum where there is residual voltage. Also, the development bias is used to adjust image density according to the conditions the customer selected.

### 4.4.2 Bias Control In Copy Cycle

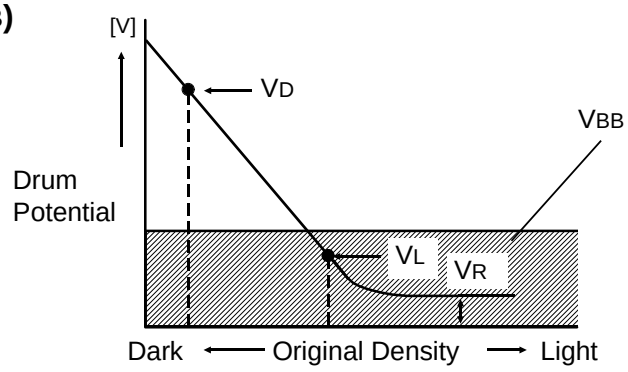
The bias output is determined by five factors.

The total bias is described as;

**ADS Mode:** $V_B = V_{BB} + V_{BU} + V_{BMG} + V_{BA}$
**Manual ID Mode:** $V_B = V_{BB} + V_{BU} + V_{BMG} + V_{BM}$

$V_B$: Total bias
$V_{BB}$: Base bias
$V_{BA}$: ADS Compensation
$V_{BU}$: User Tool mode ID Selection Compensation
$V_{BMG}$: Magnification Compensation
$V_{BM}$: Manual ID Selection Compensation

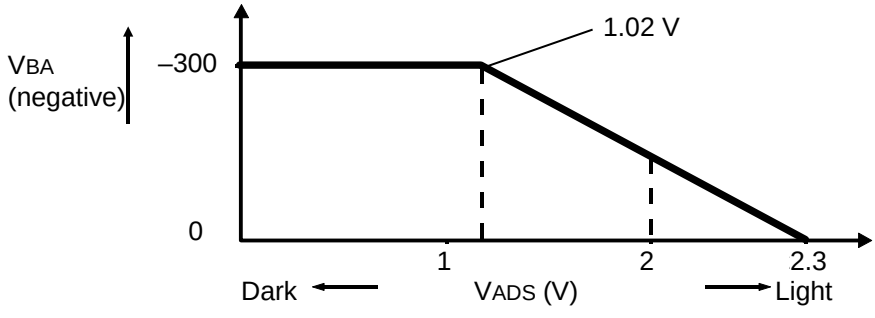
**1) Base Bias ($V_{BB}$)**




As explained in the process control section, the base bias for development is determined by the residual voltage ($V_R$) measured in process control data initial setting.

**$V_{BB} = V_R + (-220)$**

**2) ADS Compensation ($V_{BA}$)**



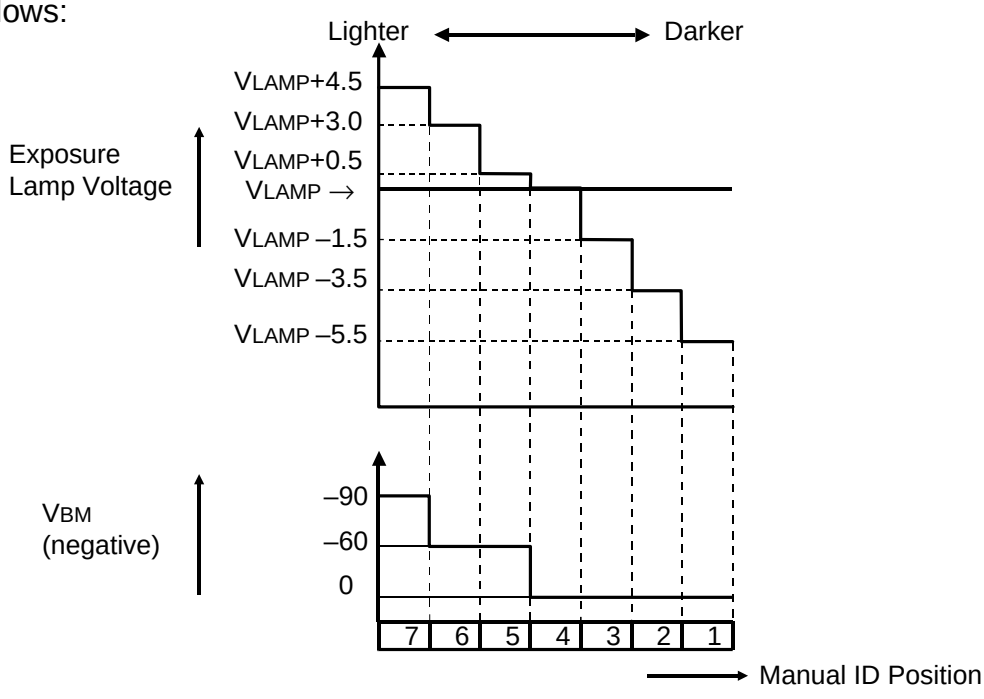

According to the original background density, the bias is compensated. The compensation value is determined with the voltage measured by the ADS sensor (ADS sensor output: $V_{ADS}$) as follows:

**$V_{BA} = 234 \times (V_{ADS} - 2.3)$**

**NOTE:** $V_{BA}$ has a limited range from 0 V to –300 V.

### 3) Manual ID Selection Position Compensation (VBM)

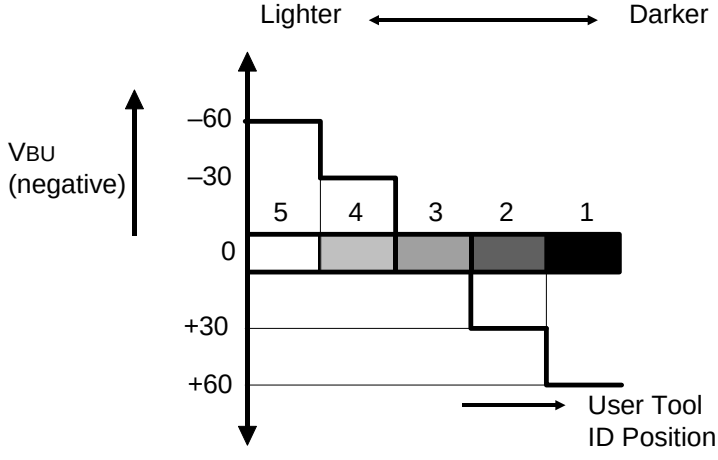
According to the manual ID selection position, the bias is compensated as follows:




VLAMP: Exposure lamp voltage at ID level 4. This value is determined at process control data initial setting.

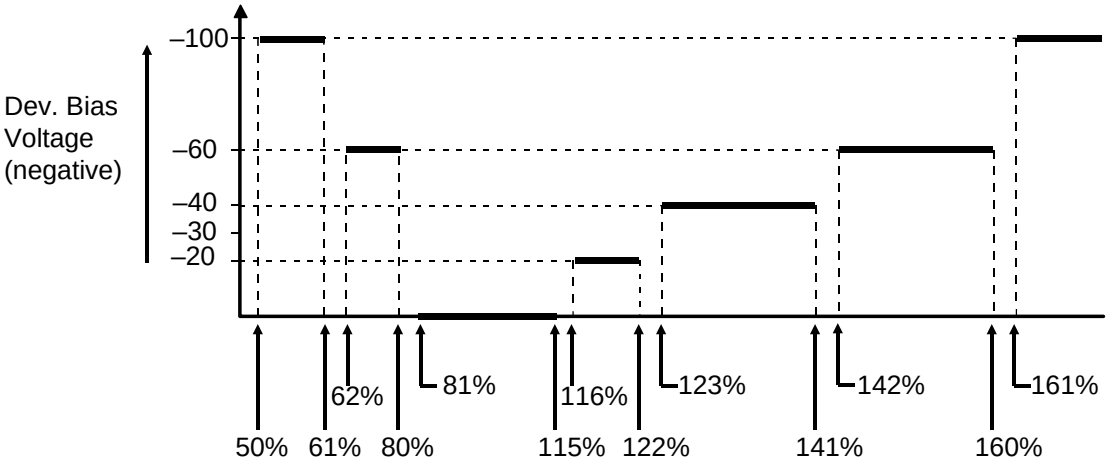
### 4) User Tool Mode ID Selection Compensation (VBU)

In the User Tool mode, the image density level can be selected from five steps. The VBU is determined by the User Tool ID position setting as follows:



### 5) Magnification Compensation ($V_{BMG}$)

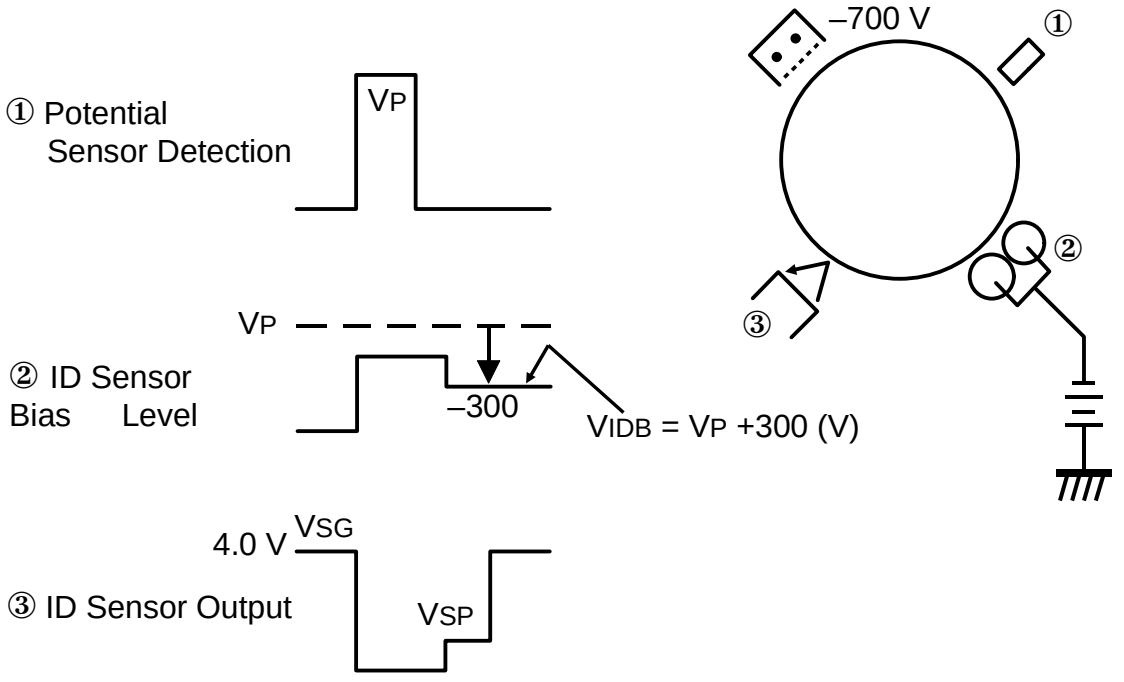
$V_{BMG}$ is determined by the selected reproduction ratio as follows:




## 4.4.3 Bias Control Out of Copy Cycle

To hold the toner on the sleeve rollers while the development sleeve rollers are rotating without image development, a constant –300 V bias is applied.

### 4.4.4 ID Sensor Pattern Bias




While developing the ID sensor pattern, ID sensor bias is applied. ID sensor bias is determined during process control initial setting as follows:

A charge is applied while grid voltage is –700 V to create the ID sensor pattern.

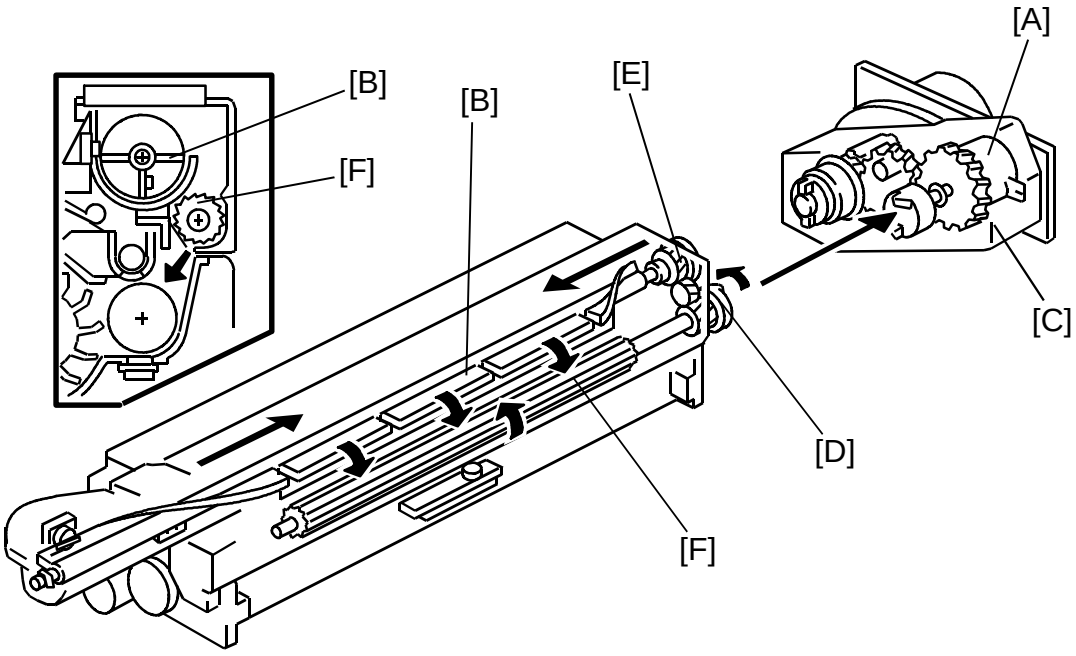
The drum potential ($V_P$) of the ID sensor pattern is checked.

The ID sensor bias ($V_{IDB}$) is adjusted so that it satisfies the following formula:

$$V_{IDB} = V_P - (-300)$$
$$= V_P + 300 \ (V)$$

# 4.5 TONER SUPPLY

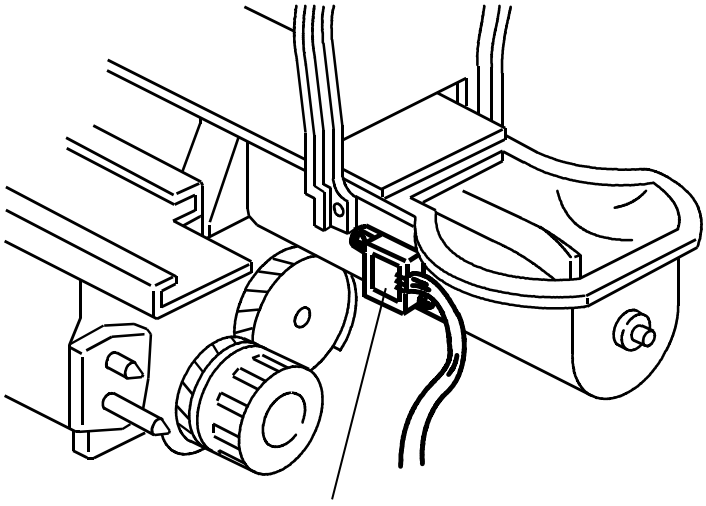
## 4.5.1 Toner Supply Mechanism




When the toner supply clutch [A] turns on, the agitator [B] moves the toner from front to rear and sends the toner to the toner supply roller.

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

### 4.5.2 Toner End Detection




The toner end sensor [A] detects if sufficient toner remains in the toner hopper or not. The toner end sensor monitors toner end condition once when the toner supply clutch turns on. When there is little toner inside the toner hopper and toner pressure on the toner end sensor becomes low, the toner end sensor outputs a pulse signal for each (one detection per one copy).

The toner near end indication is displayed on the LCD after receiving the pulse signal 150 times (If no pulse signal is output twice continually, the pulse count is canceled).

Fifty copies are allowed after entering toner near end condition. After fifty copies are made in toner near end condition, the machine enters the toner end condition and copying is prohibited.

When the main switch is turned off and on, or the front door is opened and closed, the machine drives toner supply mechanism and monitors the toner end sensor output. If the toner end sensor does not output the pulse signal twice continually, the toner end condition is canceled.

### 4.5.3 Toner Supply Control

By using an SP mode ( 1 Adjustment mode: PAGE 7), the following 3 kinds of toner supply controls can be selected.

- Auto Process Control Mode
- Detect Mode
- Fixed Mode



1) Auto Process Control Mode

Originals have various image proportions and image densities. For the best toner supply control, it is necessary to link the amount of toner supplied on each copy cycle to the amount of toner consumed for each copy.

**Fuzzy control** is used in this model to provide this kind of toner supply control.

**Fuzzy Control 1**

According to data of the ID sensor and TD sensor, the CPU checks the following at every copy cycle:

1. The results of toner supply control (TD sensor output) in the previous copy cycle.

2. How quickly the toner density is changing.

Then the CPU decides the most suitable toner supply amount (toner supply clutch on time) for the next copy cycle by using fuzzy logic.

**Fuzzy Control 2**

The image on the OPC drum changes due to variations in toner chargeability (influenced by the environment) even if toner concentration is constant.

The ID sensor directly checks the image on the OPC drum and shifts the VREF data under fuzzy control to keep the image on the OPC drum constant.

**NOTE:** The toner supply amount is changed at every copy cycle.
The target toner density sensor output is updated under the following conditions:

1. During toner density sensor initial setting
2. During process control data initial setting
3. After the copy job is completed in case that 10 or more copies have been made since the last update.

(Refer to section 2.1.4 "Image Density Control" for details.)

2) Detect Mode

In this mode, only the TD sensor is used to control the toner concentration (VREF data is fixed). The machine performs only fuzzy control 1.

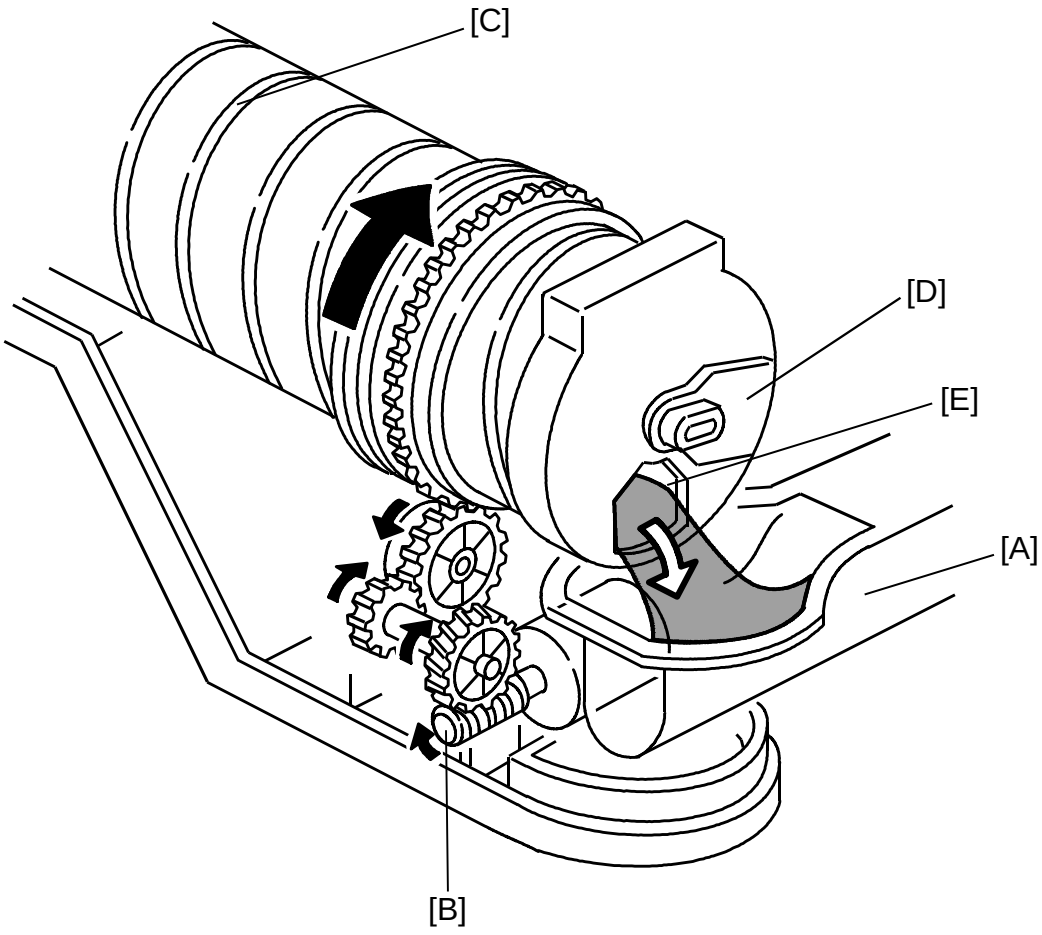
In ID sensor abnormal condition or Drum Potential sensor abnormal condition, the machine automatically enter this mode.

3) Fixed Mode

In this mode, a fixed amount of toner is supplied every copy cycle as determined (4%, 7%, 11%, 14%) by SP mode (1 Adjustment mode: PAGE 7). There is no overtoning detection mechanism.

In TD sensor abnormal condition, the machine automatically enters this mode.

### 4.5.4 Bottle Drive Mechanism




For easy access, the toner bottle is just inside the front cover. The bottle is positioned horizontally.

The bottle drive mechanism transports toner from the bottle to the toner hopper [A]. A worm gear [B] on the bottle drive motor drives this mechanism.

The toner bottle has a spiral groove [C] that helps move the toner to the toner hopper.

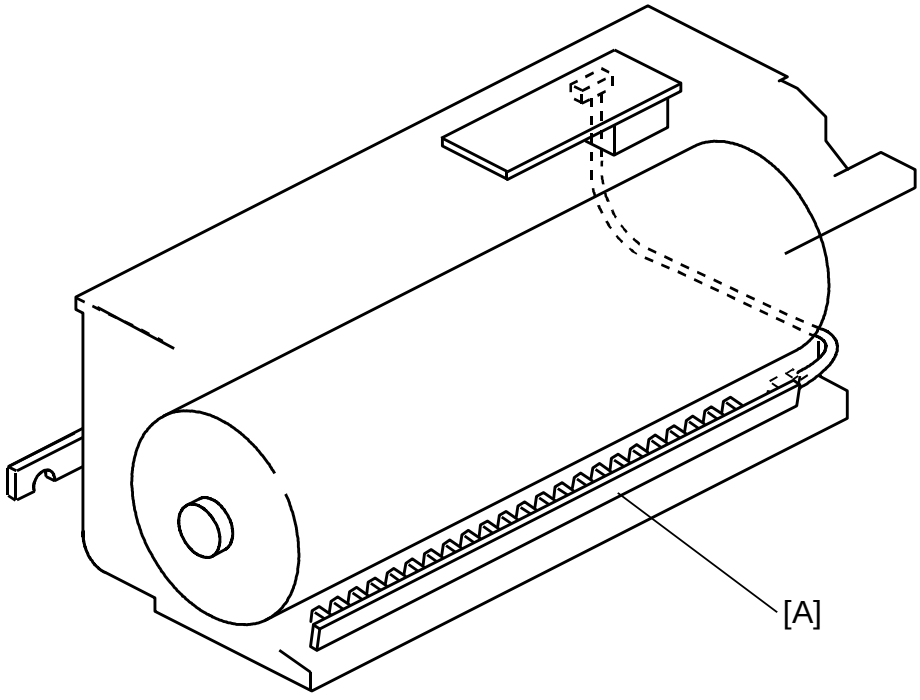
To prevent toner from scattering when the toner bottle is removed from the holder, toner shutter [D] which covers the hole [E] is installed on the toner bottle.

When the toner is set on the holder and the lever is lowered, the toner shutter [D] opens to supply toner to the toner hopper.

The bottle drive motor turns on 0.7 seconds when the toner end sensor turns on twice continually.

# 5. IMAGE TRANSFER

## 5.1 PRE-TRANSFER LAMP

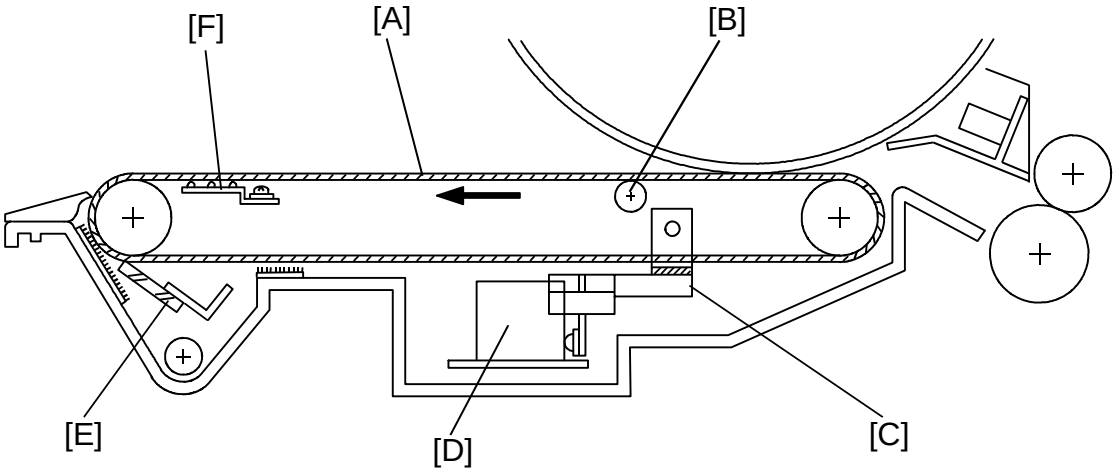



The pre-transfer lamp [A] located in the drum unit is used to prevent incomplete toner transfer.

After the latent image is developed but before the image is transferred to the copy paper, the drum surface is illuminated by the pre-transfer lamp. This illumination reduces the negative potential on the drum surface charged by the main charge corona and partially discharged by the exposure. This makes image transfer easier.

The pre-transfer lamp is turned on and off by the charge power pack at the same time as when the main motor turns on and off.

## 5.2 IMAGE TRANSFER AND PAPER SEPARATION OVERVIEW






This model uses a unique transfer belt unit instead of the transfer and separation corona unit. The transfer belt unit consists of the following parts:

[A] Transfer belt
A belt (length: 321 mm) with high electrical resistance which holds a high negative electrical potential and attracts the toner on the OPC drum onto the paper. Also the electrical potential attracts the paper itself and helps paper separation from the OPC 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 to contact the transfer belt with the OPC drum.

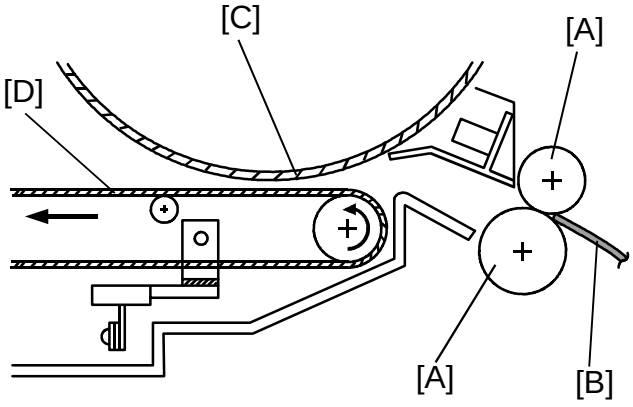
[D] Transfer power pack
Generates the constant transfer current.

[E] Transfer belt cleaning blade
Removes toner attached on the transfer belt to prevent the rear side of the paper from being stained.

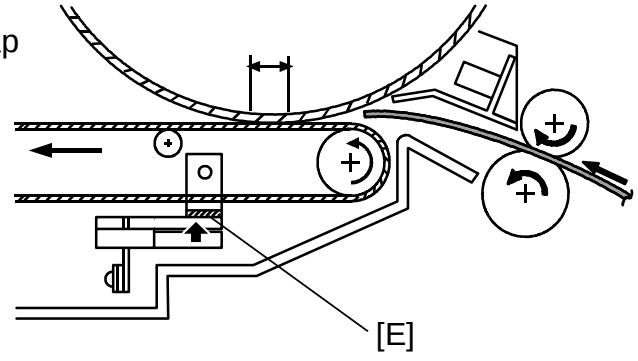
[F] Discharge plate
Helps paper separation from the transfer belt by discharging the remaining negative charge on the transfer belt.

## 5.3 IMAGE TRANSFER AND PAPER SEPARATION MECHANISM

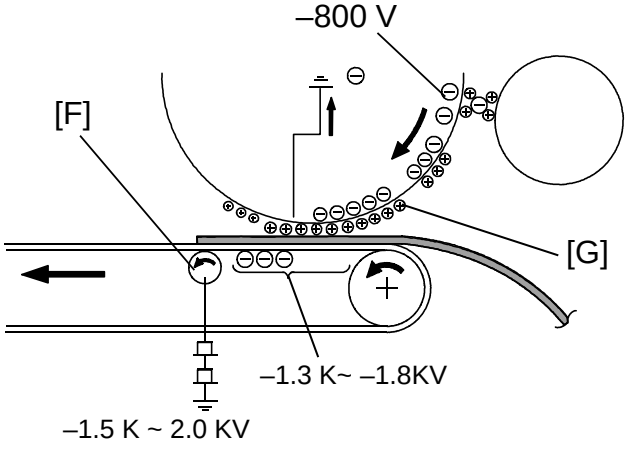
The registration rollers [A] starts feeding the paper [B] to the gap between the OPC drum [C] and the transfer belt [D] in proper timing.



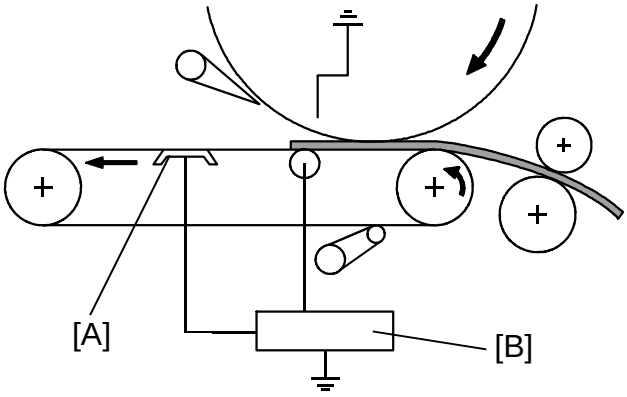

Immediately when the leading edge of the paper reaches the gap between the transfer belt and the OPC drum, the transfer belt lift lever [E] raises the transfer belt to contact the transfer belt and the OPC drum. The lift lever is driven by a solenoid




Then a negative transfer bias –1.5 K ~ –2.0 KV is applied to the transfer bias roller [F] and attracts the positively charged toner [G] on the OPC drum. It also attracts the paper and separates the paper from the OPC drum.

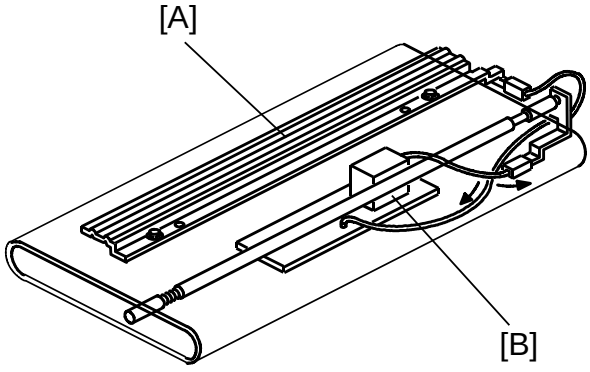


After the image transfer is completed, the charge on the transfer belt holds the paper to the transfer belt.
Before separating the paper from the transfer belt, the transfer belt is discharged by the discharge plate [A].

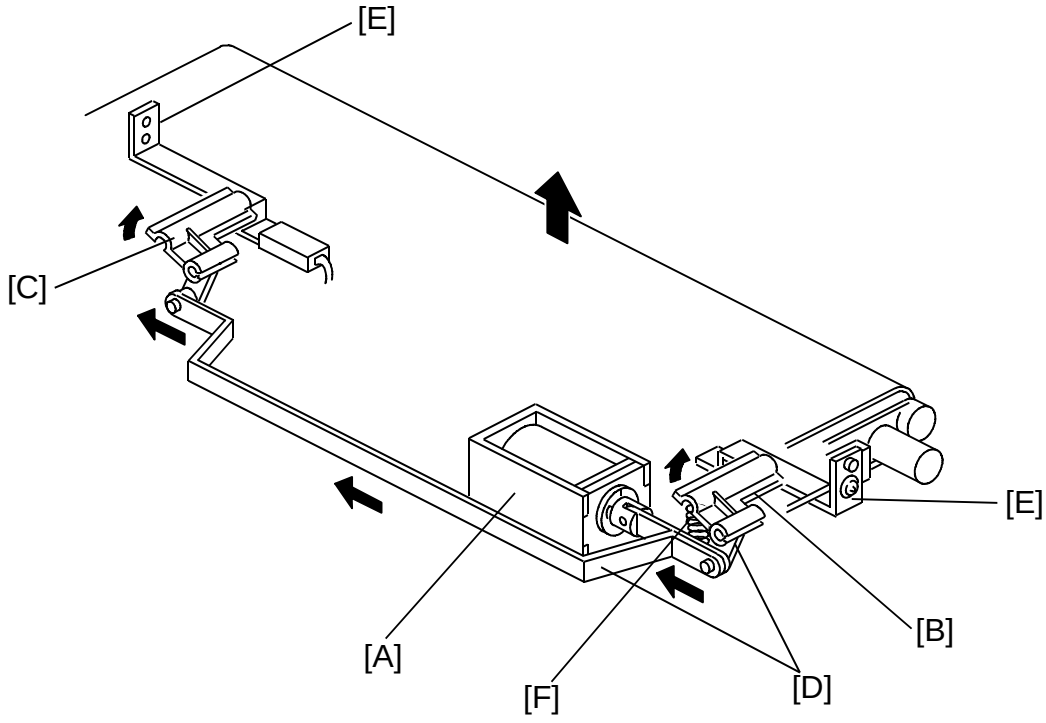





The transfer power pack [B] inside the transfer belt unit monitors the current fed back from the discharge plate to adjust the transfer current. This way, the current stays constant even if the paper, environmental conditions, and the transfer belt surface resistance are changed.



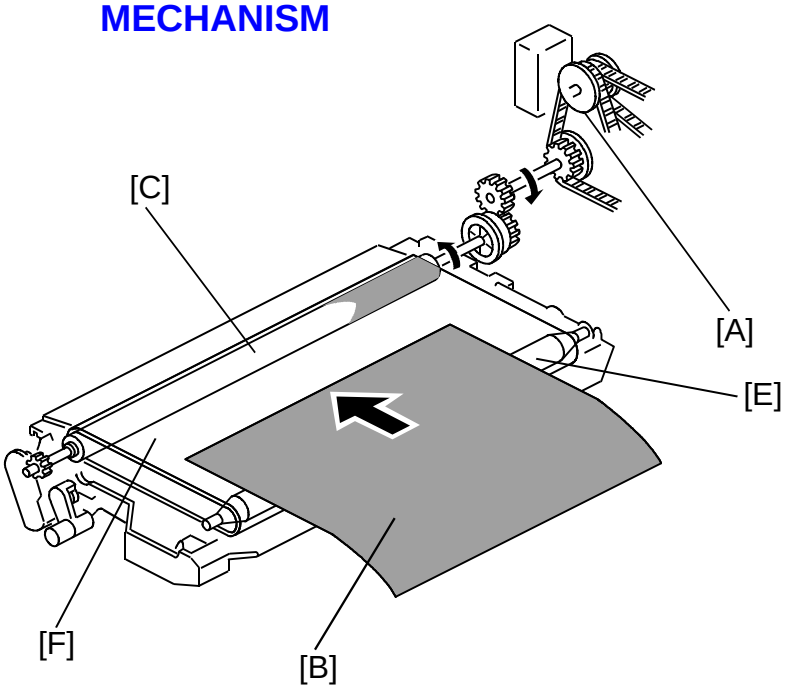
## 5.4 TRANSFER BELT UNIT LIFT MECHANISM

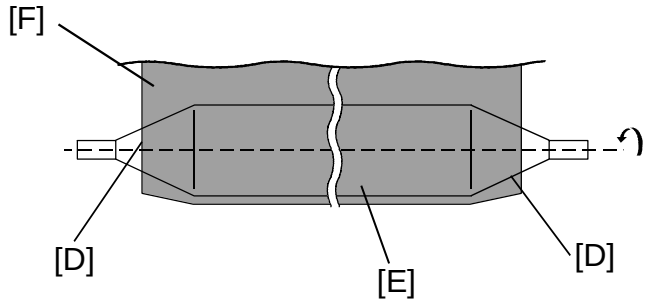



The transfer belt lift solenoid [A] located inside the transfer belt unit turns on to raise the transfer belt to contact the OPC drum at the appropriate timing.
The front lever [B] and the rear lever [C] are connected to the solenoid by links [D] and push up the stays [E] when the solenoid turns on.
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 OPC drum for the following reasons:

1. To prevent the ID sensor pattern on the OPC drum from being rubbed by the transfer belt because the transfer belt is located between the development unit and the ID sensor.
2. To decrease the load to the transfer belt cleaning blade, it is better to keep toner on the non-image area (for example VD, VL, ID sensor pattern developed during process control data initial setting) from being transferred onto the transfer belt.
3. To prevent change of OPC drum characteristics by the influence of additives inside the rubber belt.

## 5.5 PAPER TRANSPORTATION AND BELT DRIVE MECHANISM



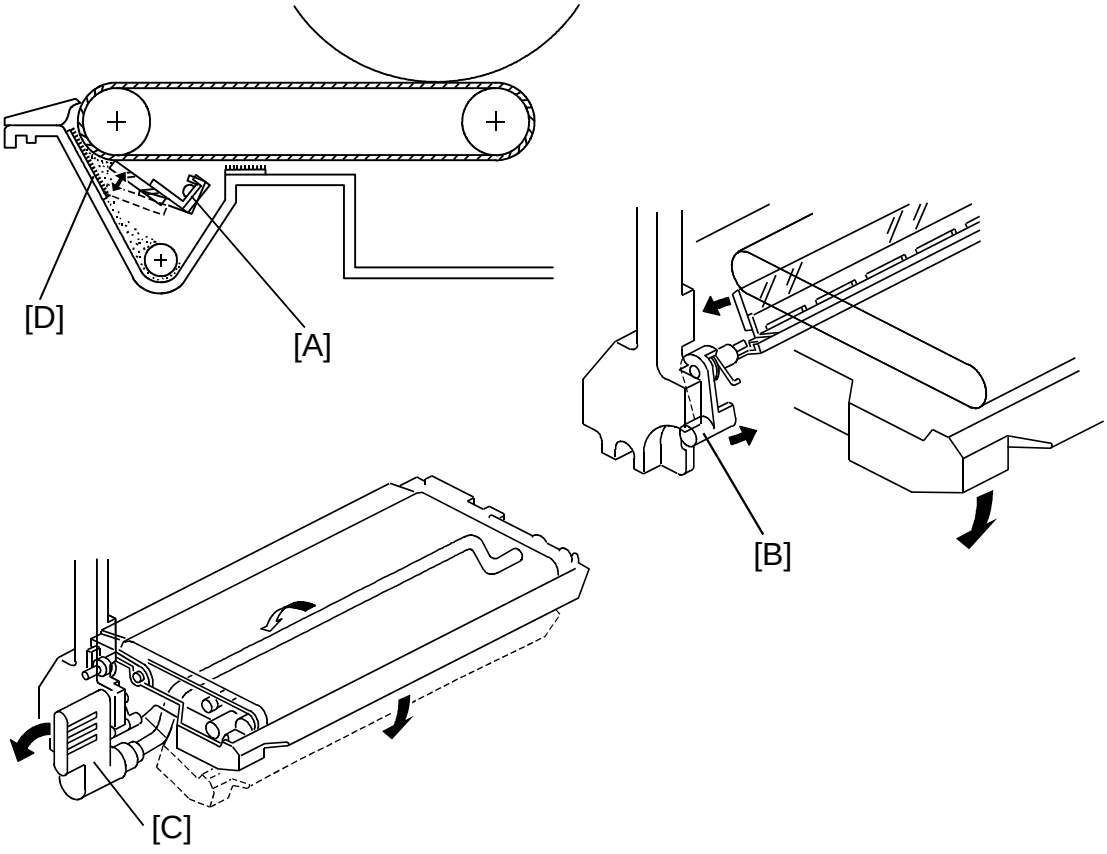




The transfer belt is driven by the main drive motor [A] through belt and gears. Since the transfer belt electrically attracts the paper [B], the transport fan is not required.

The charge on the transfer belt is discharged by the discharge plate to reduce paper attraction and paper is separated by the paper stiffness above the transfer belt drive roller [C] where the transfer belt is turning.

The tapered parts [D] at both sides of the roller [E] help keep the transfer belt [F] at the center position.

## 5.6 TRANSFER BELT CLEANING MECHANISM

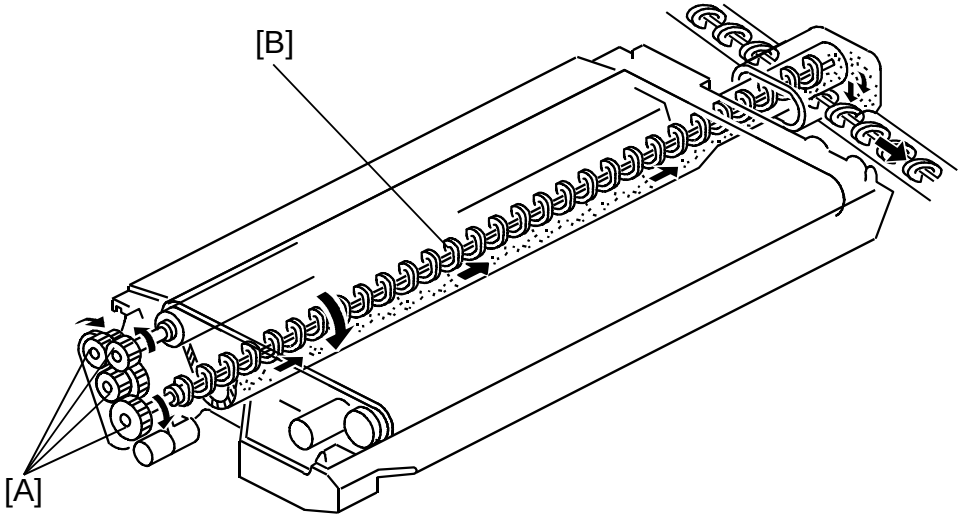



Some toner may adhere to transfer belt when paper jams occur, or when the by-pass feed table side fences are set in the wrong position causing the erase lamp to miss some toner. The adhered toner must be removed to prevent the rear side of the copy paper from being stained.
The cleaning blade [A] scrapes off any toner remaining on the transfer belt. A counter blade system is used for the transfer belt cleaning. The surface of the transfer belt is coated to make it smooth and so prevent the cleaning blade from being flipped by the transfer belt.

The lever [B] on the front end of the cleaning blade releases the cleaning blade when the transfer belt unit is lowered and the lever is pushed by the transfer belt unit support prop. (The transfer belt unit is lowered when the lever [C] is turned anti-clockwise)

When the cleaning blade is released, the edge of the cleaning blade rubs the seal so that the seal [D] removes the toner or paper dust on the cleaning blade edge.

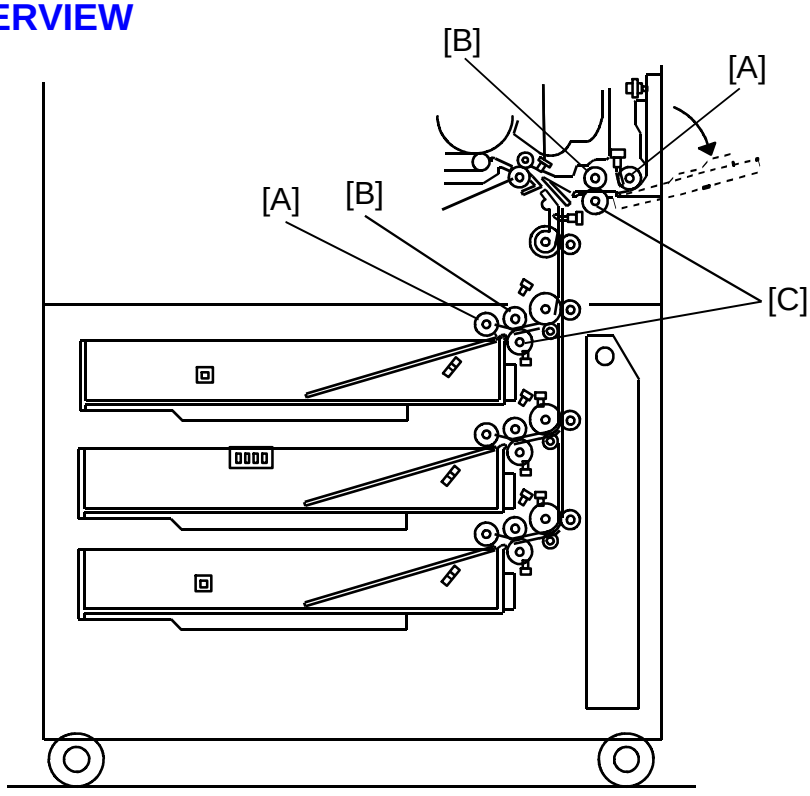
## 5.7 TONER COLLECTION MECHANISM




Through idle gears [A], transfer belt drive is transmitted to the toner collection coil [B]. The toner collection coil transports the collected toner to the toner collection bottle. See section 2.2.5 for details.

# 6. PAPER FEED

## 6.1 OVERVIEW




This model has three drawer tray paper feed stations.
The following table shows the configuration of each feed stations of the A095 and A096 copiers.

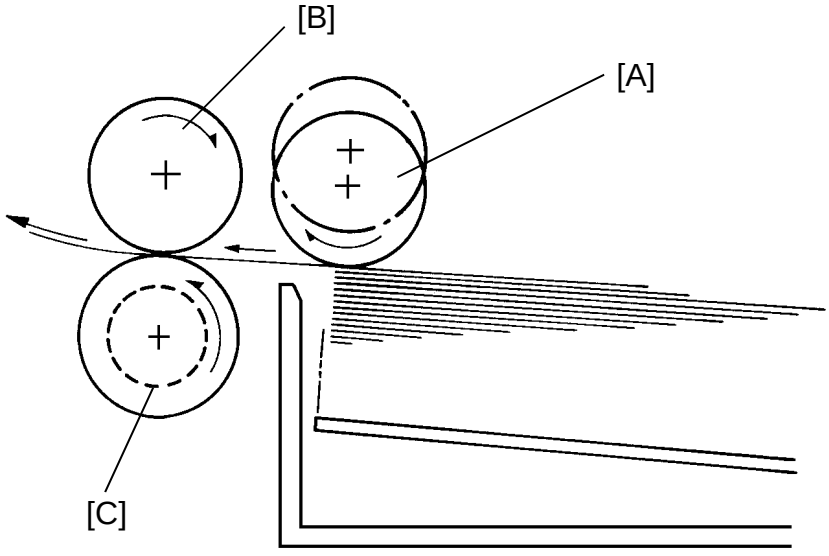
| Feed station | A095 copier | A096 copier |
|---|---|---|
| 1st | 550 sheets tray | 500 + 500 sheets tandem feed tray |
| 2nd | 550 sheets universal tray | 550 sheets universal tray |
| 3rd | 550 sheets tray | 1500 sheets built-in LCT |

Paper can also be fed using the by-pass feed table 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. Rotation of the pick-up roller [A] drives the top sheets of paper from each tray to the feed [B] and the separation [C] rollers. The feed and separation rollers then take over paper drive. If more than one sheet is fed by the pick-up roller, the separation rollers rotates in the opposite direction and prevents all but the top sheet from passing through to the registration rollers.

# 6.2 FRR FEED SYSTEM





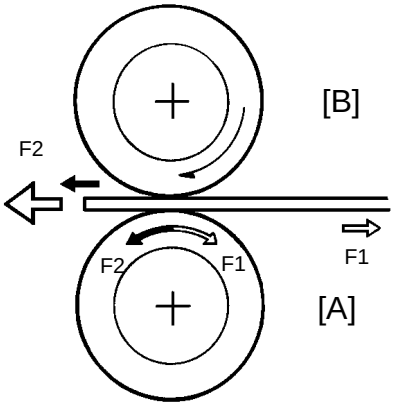

This copier uses an FRR paper feed system using three rollers.

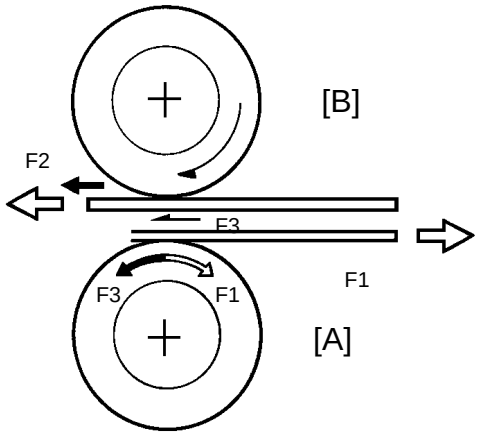
### 6.2.1 Pick-up Roller

The pick-up roller [A] is not in contact with the paper stack before it starts feeding paper. Shortly after the Start key is pressed, the pick-up roller drops down and feeds the top sheet between the feed [B] and the separation rollers [C]. At almost the same time that the paper's leading edge arrives at the feed roller, the pick-up roller lifts off the paper stack so that it does not interfere with the operation of the feed and separation rollers. The feed and separation rollers then take over the paper feed process.

### 6.2.2 Feed and Separation Rollers

There is a one-way bearing inside the feed roller so it can turn only in one direction. The separation roller is driven in the opposite direction to the feed roller. The separation roller, however, is driven through a slip clutch (torque limiter clutch) which allows it to turn in either direction depending on the friction between the rollers. The separation roller solenoid keeps the separation roller in contact with the feed roller.

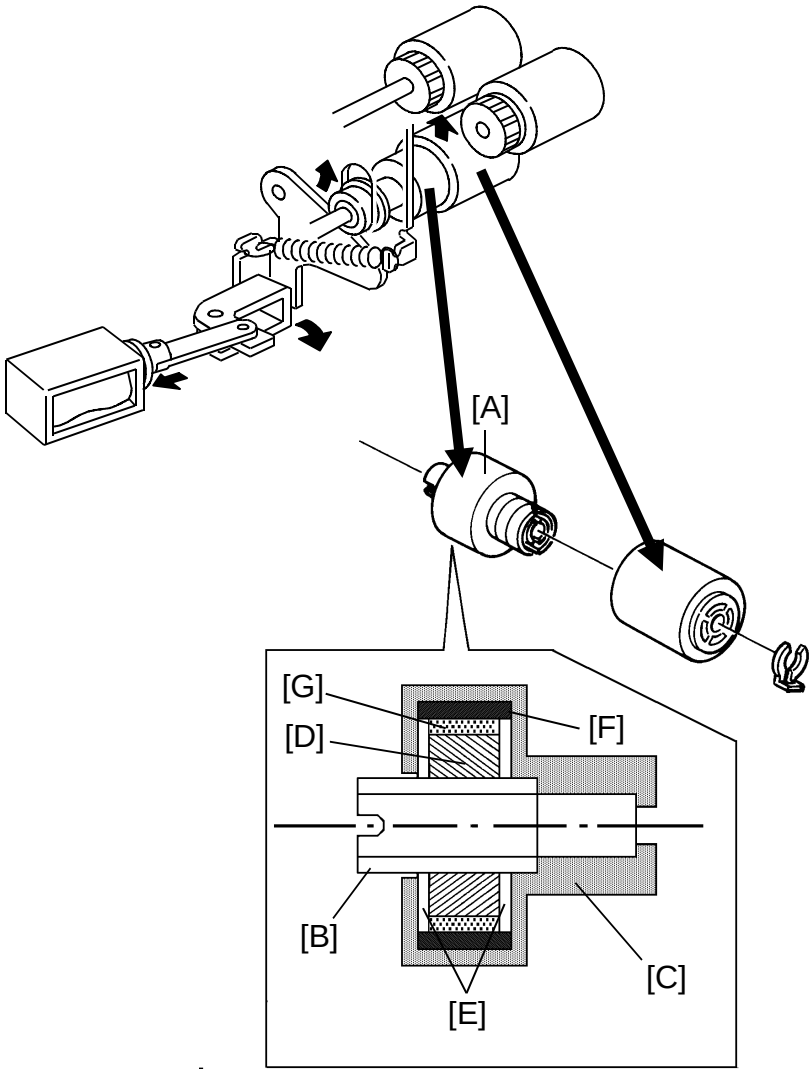



The direction in which the separation roller [A] turns depends on the frictional forces acting on it. The slip clutch applies a constant clockwise force (F1). When there is a single sheet of paper being driven between the rollers, the force of friction between the feed roller [B] and the paper (F2) is greater than F1. So, the separation roller turns counterclockwise.

If two or more sheets are fed between the rollers, the forward force on the second sheet (F3), becomes less than F1 because the friction between the two sheets is small. So, the separation roller starts turning clockwise and drives the second sheet back to the tray.

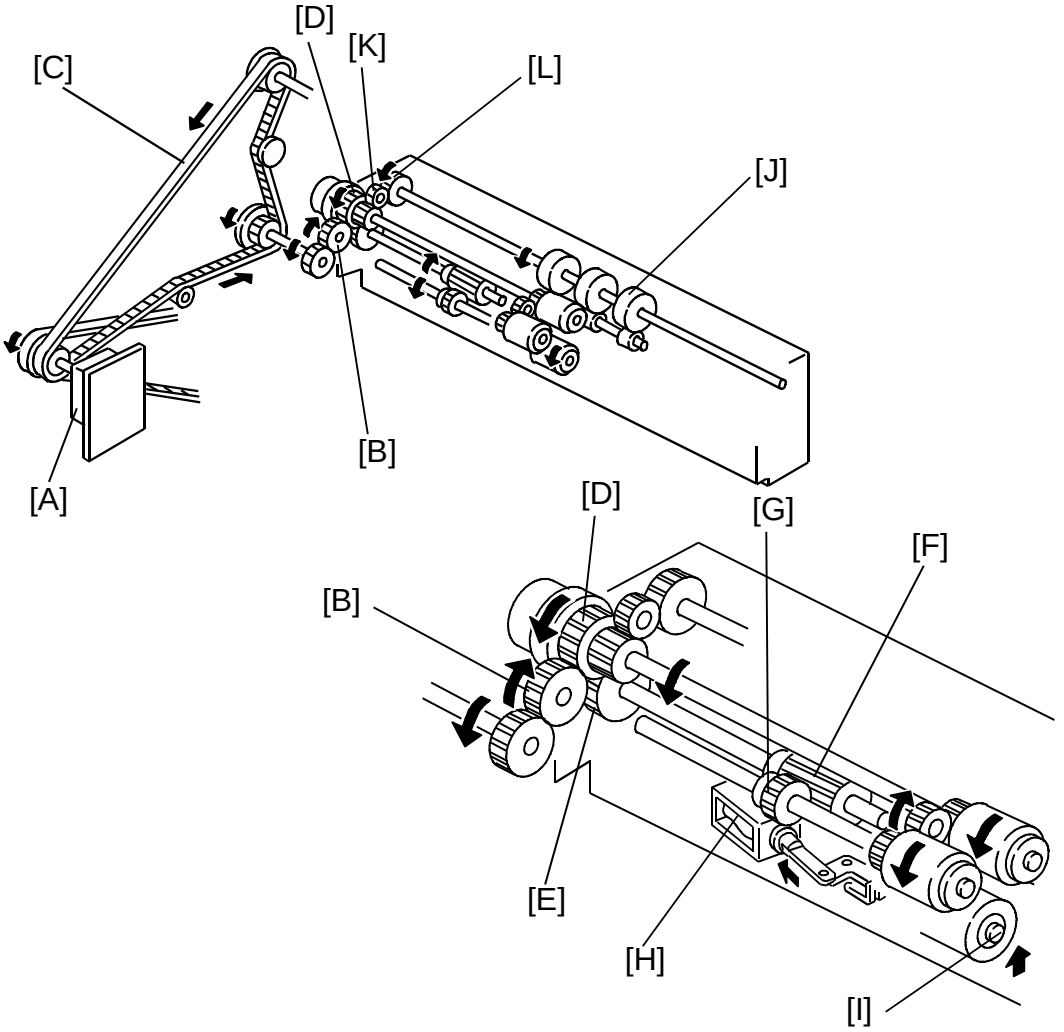
## 6.3 SLIP CLUTCH MECHANISM




The slip clutch [A] consists of the input hub [B] and the output hub [C] which is the case of the clutch as well. The magnetic ring [D] and the steel spacers [E] are fitted onto the input hub. The ferrite ring [F] is fitted into the output hub. Ferrite powder [G] packed between the magnetic ring and the ferrite ring [F] generates a constant torque due to magnetic force. The input hub and the output hub slip when the rotational force exceeds the constant torque.

This type of slip clutch does not require lubrication.

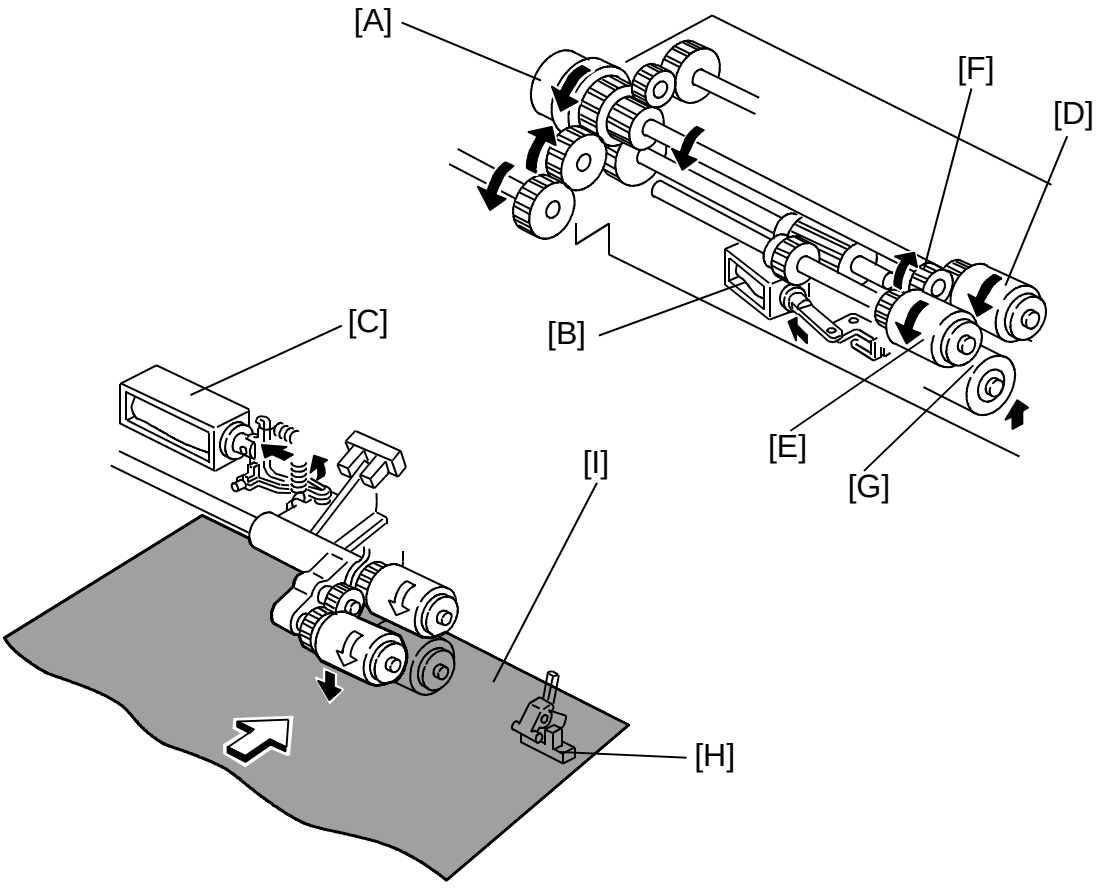
## 6.4 FRR FEED DRIVE MECHANISM




The rotation of the paper feed motor [A] is transmitted to the gear [B] via the timing belt [C], and then transmitted to the separation roller via the feed clutch gear [D], gear [E], gear [F] and gear [G].

If the paper feed station is not selected, the separation roller solenoid [H] de-activates and the separation roller [I] rotates freely in the reverse direction of paper feeding.

Gear [B] also transmits the drive to the vertical transport roller [J] via gear [D], idle gear [K] and gear [L].



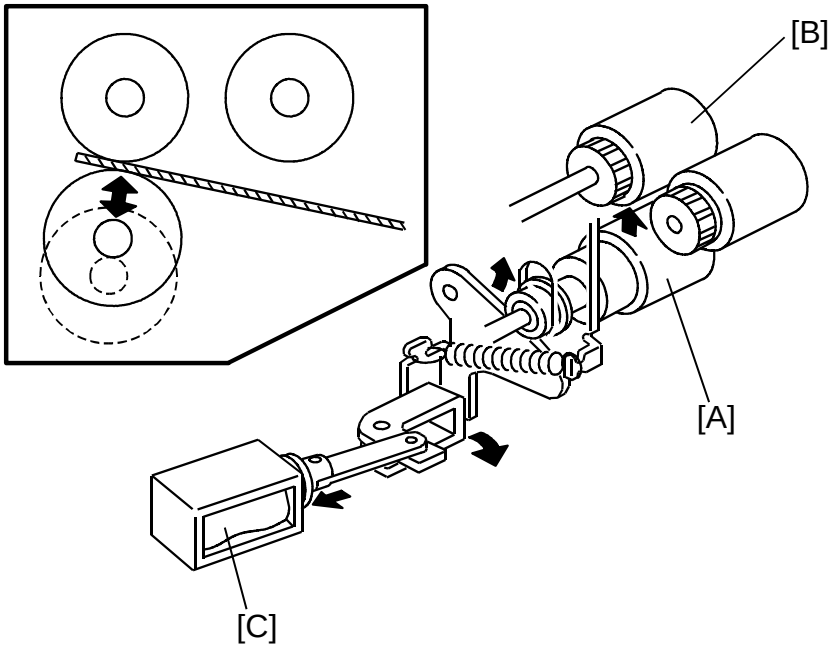

When the paper feed station is selected and the start key is pressed, the feed clutch [A], separation roller solenoid [B], and the pick-up solenoid [C] turn on at once.

When the feed clutch [A] activates to rotate the feed roller [D], the feed roller and the pick-up roller [E] turn together because they are linked by the idle gear [F].

When the separation roller solenoid [B] turns on, the separation roller [G] contacts the feed roller [D] then rotates together with the feed roller in spite of the separation roller's drive in the opposite direction due to the torque limiter function in the separation roller [G].

When the pick-up solenoid [C] activates, the pick-up roller [E] lowers to make contact with the top sheet of the paper stack and send it to the feed and separation rollers.
When the paper feed sensor [H] detects the leading edge of the paper [I], the pick-up solenoid de-energizes to lift the pick-up roller and the paper feed clutch de-energizes at a certain time to wait until it is ready to feed to the registration roller.

## 6.5 SEPARATION ROLLER RELEASE MECHANISM




In this model, 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 to the feed roller as explained in the previous two pages.

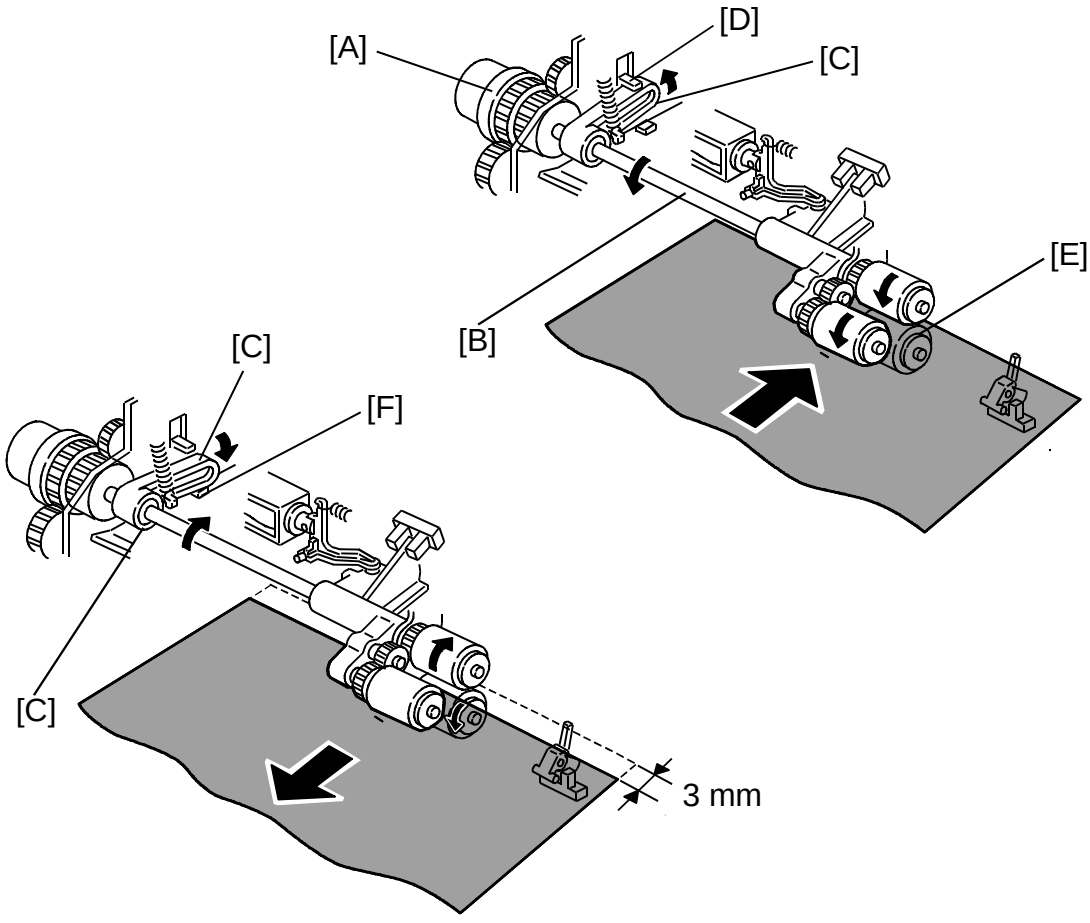
This contact/release mechanism has the following three advantages:

1. When the paper feed motor turns on, all separation rollers in each feed stations rotate. If the separation roller is away from the feed roller, it reduces the mechanical load to the paper feed motor and drive mechanism, and also reduces wear of the rubber surface of the separation roller due to the friction between the separation roller and the feed roller.

2. After paper feeding is completed, paper sometimes remains in the gap between the feed roller and the separation roller.
   If the feed tray is drawn out in this condition, it is possible for the remaining paper to be torn.
   When the separation roller is away from the feed roller, remaining paper is released from the gap between the feed and the separation rollers.

3. When paper misfeeds occur around this area, the customer can easily pull out the jammed paper between the feed and the separation rollers because the separation roller is away from the feed roller.

## 6.6 PAPER RETURN MECHANISM




When the paper feed clutch [A] activates and the feed roller drive shaft [B] rotates, the lever [C] rotates together with the shaft. However, the lever is immediately stopped by the stopper [D].

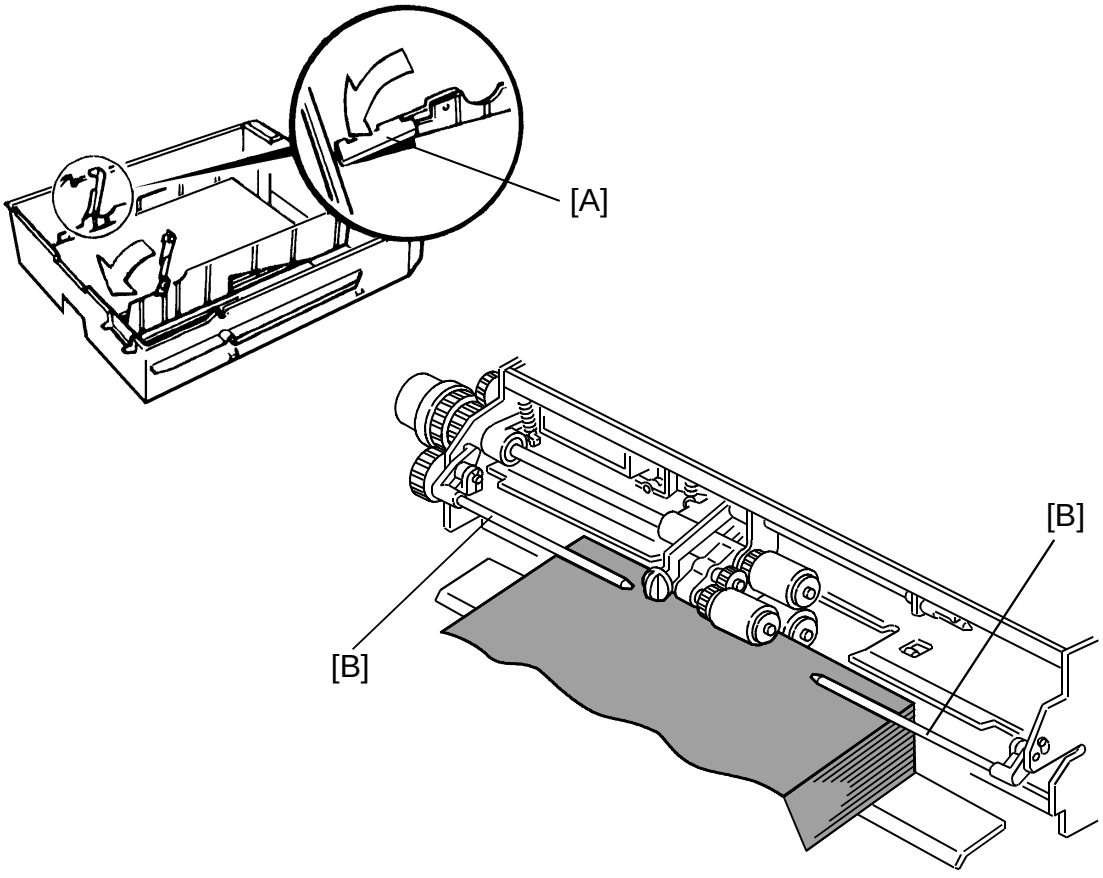
After all paper is fed and the paper feed clutch turns off, the paper feed motor still rotates to turn the separation roller [E] in the reverse direction. The separation roller, still contacting the feed roller, turns the feed roller in the reverse direction until the lever hits the rubber cushion [F].

By this feed roller reverse mechanism, the paper remaining in the gap between the feed and the separation rollers returns 3mm to the paper feed tray.

After that, the separation roller solenoid turns off to move the separation roller away from the feed roller. This releases the leading edge of the paper and drops the paper to the paper feed tray.

This prevents remaining paper from being torn when the feed tray is drawn out.

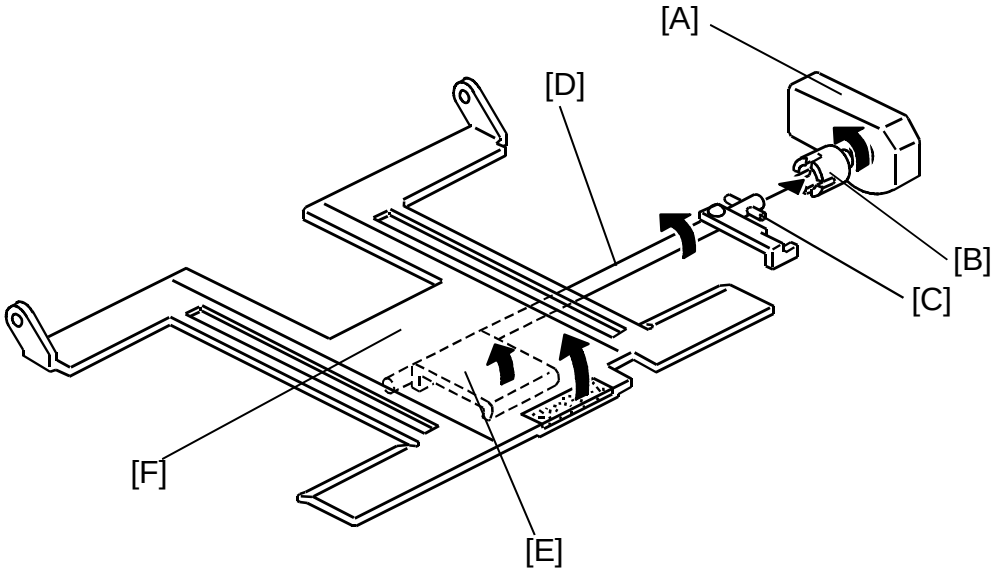
## 6.7 PAPER SKEW PREVENTION MECHANISM




In this model, paper corner holders [A] are not used to facilitate paper loading.

Instead of the corner holders, both paper press arms [B] press down both paper side edges, especially in the case of paper with a face curl. This helps to keep paper from being guided by the tray side fences to prevent paper skew or jam.

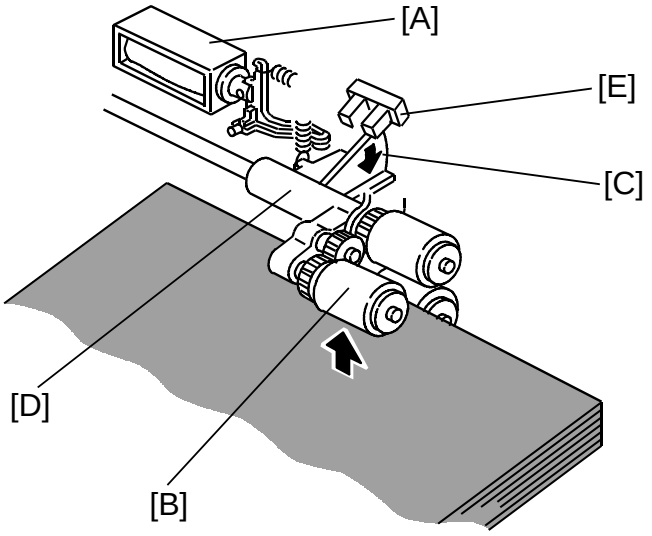
## 6.8 PAPER LIFT MECHANISM

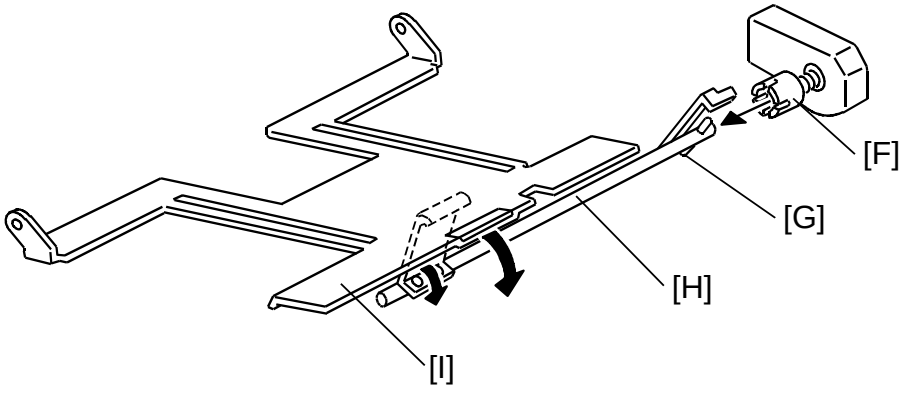



When the tray is set in the machine, the machine detects this condition by using several detection methods as shown in the table:

| Feed station | A095 copier | A096 copier |
|---|---|---|
| 1st | Tray set switch | Tray set signal through the connector |
| 2nd | Paper size switch | Paper size switch |
| 3rd | Tray set switch | LCT set signal through the connector |

When the machine detects that the paper tray is set in the machine, the lift motor [A] rotates and the coupling gear [B] on the tray lift motor engages the pin [C] of the lift arm shaft [D], then turns the tray lift arm [E] to lift the tray bottom plate [F].



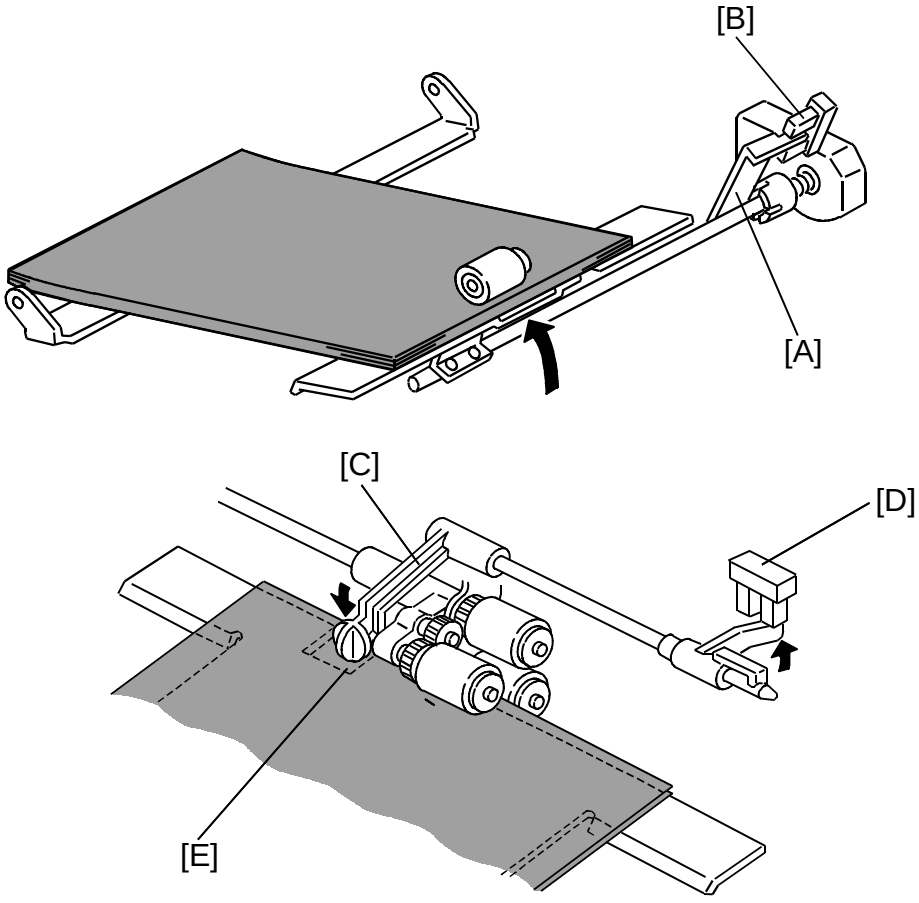




When the lift motor turns on, the pick-up solenoid [A] activates to lower the pick-up roller [B]. When the top sheet of paper reaches the proper paper feed level, the paper pushes up the pick-up roller and the actuator [C] on the pick-up roller supporter [D] activates the lift sensor [E] to stop the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

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

When the tray is drawn out of the feed unit, the lift motor coupling gear [F] disengages the pin [G] of the lift arm shaft [H], then the tray bottom plate [I] drops.

## 6.9 PAPER NEAR END / PAPER END DETECTION

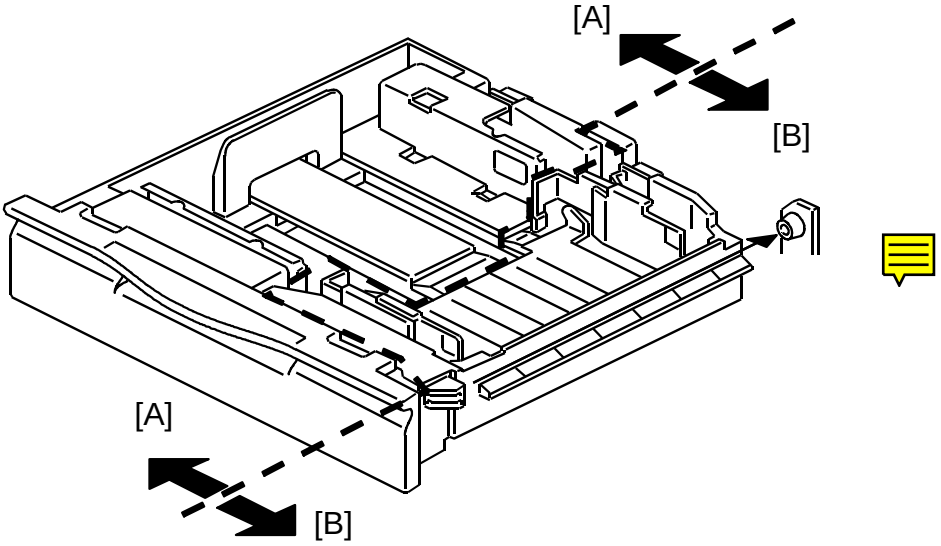


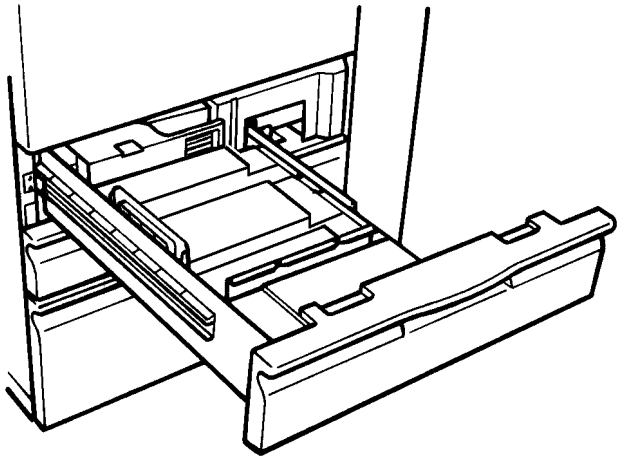

A feeler [A] on the lift arm shaft rotates counterclockwise in accordance with the change of the top paper level. When almost 50 sheets are left on the tray, the feeler activate the paper near end sensor [B] and informs the copier CPU of the paper near end condition.

If paper is loaded in the paper 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 in the cut out [E] of the tray bottom plate and the paper end sensor is activated.

# 6.10 TANDEM FEED TRAY (A096 COPIER ONLY)

## 6.10.1 OVERVIEW

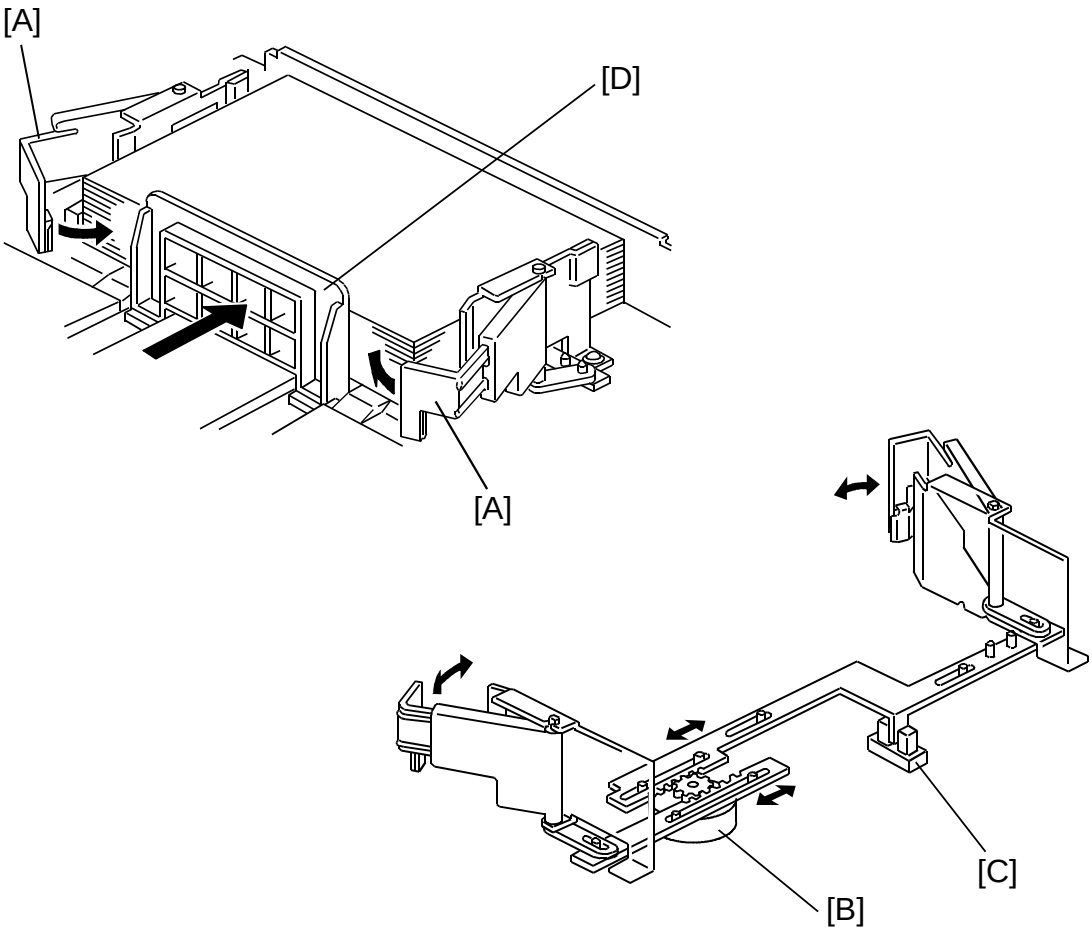


500 sheets of paper can be set in each of the left [A] and right trays [B]. Paper is fed from the right tray. When the paper in the right tray runs out, the paper in the left tray is automatically transported to the right tray. After the paper is transported to the right tray, paper feeding resumes.

Normally both the right and the left trays are joined together.
During copying, if there is no paper in the left tray, only the left tray can be pulled out to load paper, as shown. That time, paper feed continues.

### 6.10.2 Fences Drive Mechanism

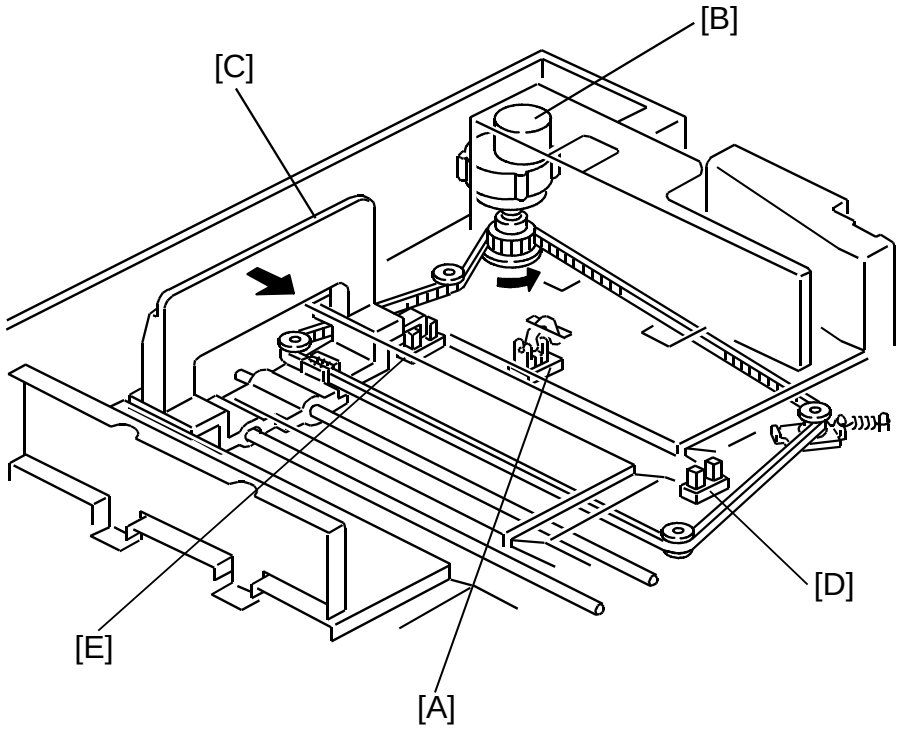



The side fences [A] of the right tray are normally closed. They open only when paper in the left tray is transported to the right tray.

The side fences are driven by the side fence drive motor [B] (stepping motor). When the paper loaded in the left tray is transported 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.

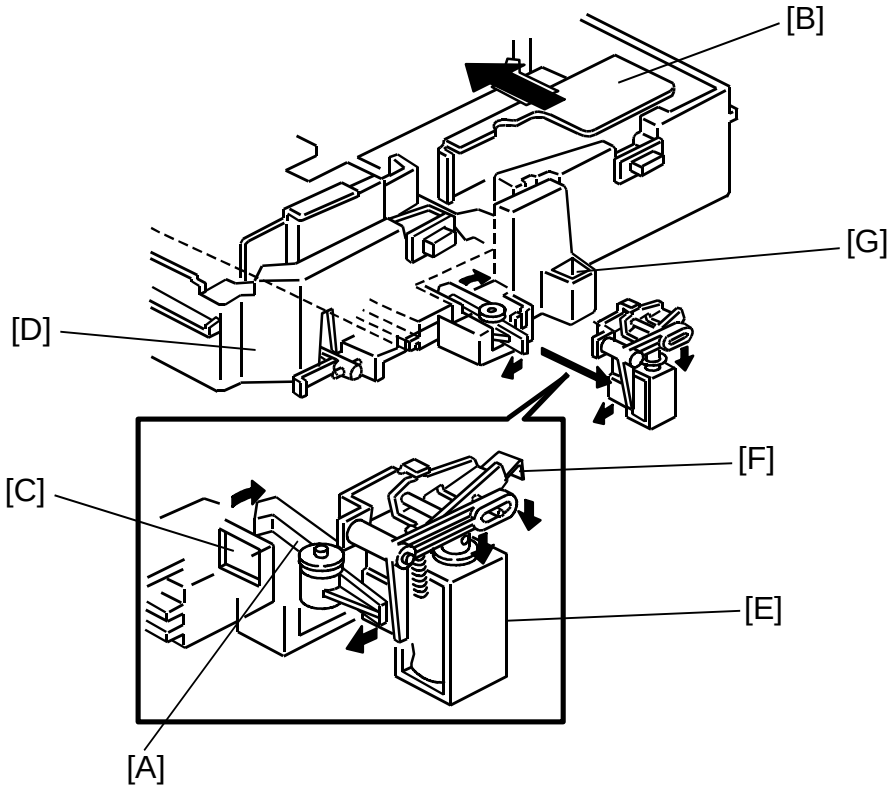
When the rear fence [D] in the left tray pushes paper into the right tray, the side fence drive motor turns clockwise to close the side fences.

### 6.10.3 Rear Fence Drive Mechanism



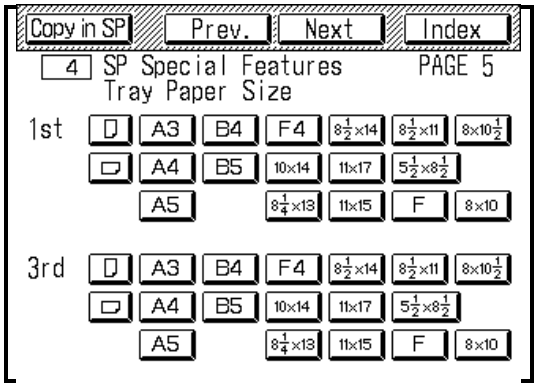

When the paper end sensor [A] in the left tray detects paper and the paper end sensor in the right tray detects the paper end condition, the rear fence drive motor [B] (dc motor) in the left tray rotates counterclockwise to drive the rear fence [C] to push the paper into the right tray.
When the actuator on the rear fence activates the return position sensor [D], the rear fence drive motor rotates clockwise until the actuator activates the rear fence home position sensor [E].

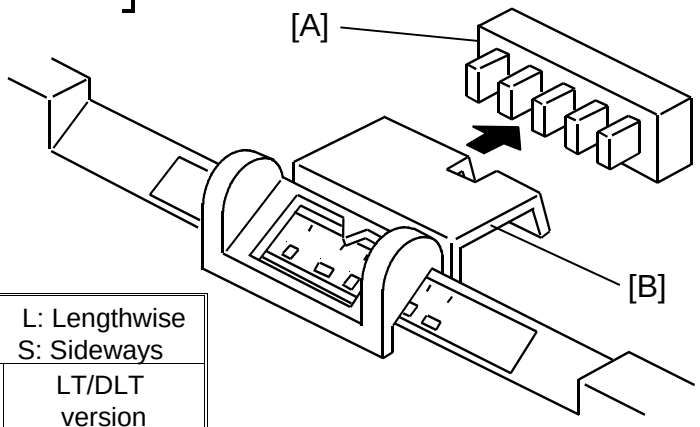
### 6.10.4 Tray Lock Mechanism




Normally the left tray lock lever [A] in the right tray [B] fits in the hole [C] in the left tray [D]. During copying, if there is no paper in the left tray, the tray lock solenoid [E] turns on to release the tray lock lever so that the left tray can be separated from the right tray. The lock lever solenoid also lowers the right tray lock lever [F] to hook itself in the hole [G] on the right tray. Therefore, only the left tray is pulled out to load paper.

## 6.11 PAPER SIZE DETECTION



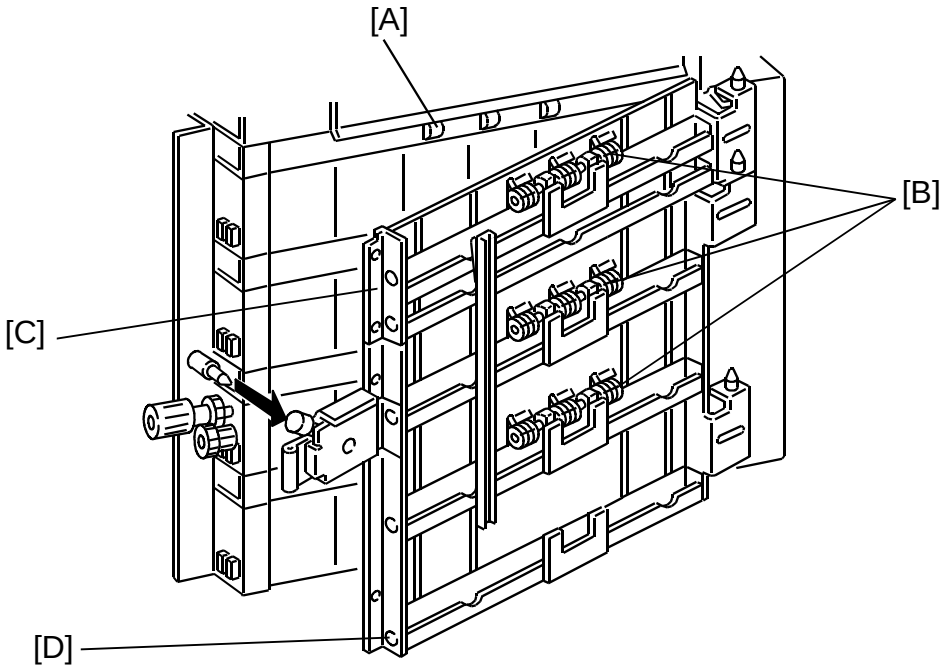




| SW Actuate....0<br>De-actuate....1<br>1 2 3 4 5 | Paper size | L: Lengthwise<br>S: Sideways |
|---|---|---|
| | A4/A3 Version | LT/DLT version |
| 01111 | A3–L | 11 x 17–L |
| 00111 | B4–L | 8 1/2 x 14–L |
| 10011 | A4–L | 8 1/2 x 11–L |
| 01001 | A4–S | 8 1/2 x 11–S |
| 00100 | 8 1/2 x 13 | 5 1/2 x 8 1/2–S |
| 00010 | – | 8 x 10–S |
| 00001 | A5–S | 8 x 10–L |
| 10000 | – | 8 x 13–L |
| 11000 | – | 10 x 14–L |
| 11100 | – | 11 x 15–L |
| 11110 | A5–L | 5 1/2 x 8 1/2–L |

For the first and the third feed trays, the paper size is stored by using the SP mode ( 4 SP Special Feature – PAGE 5).

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

## 6.12 VERTICAL TRANSPORT MECHANISM

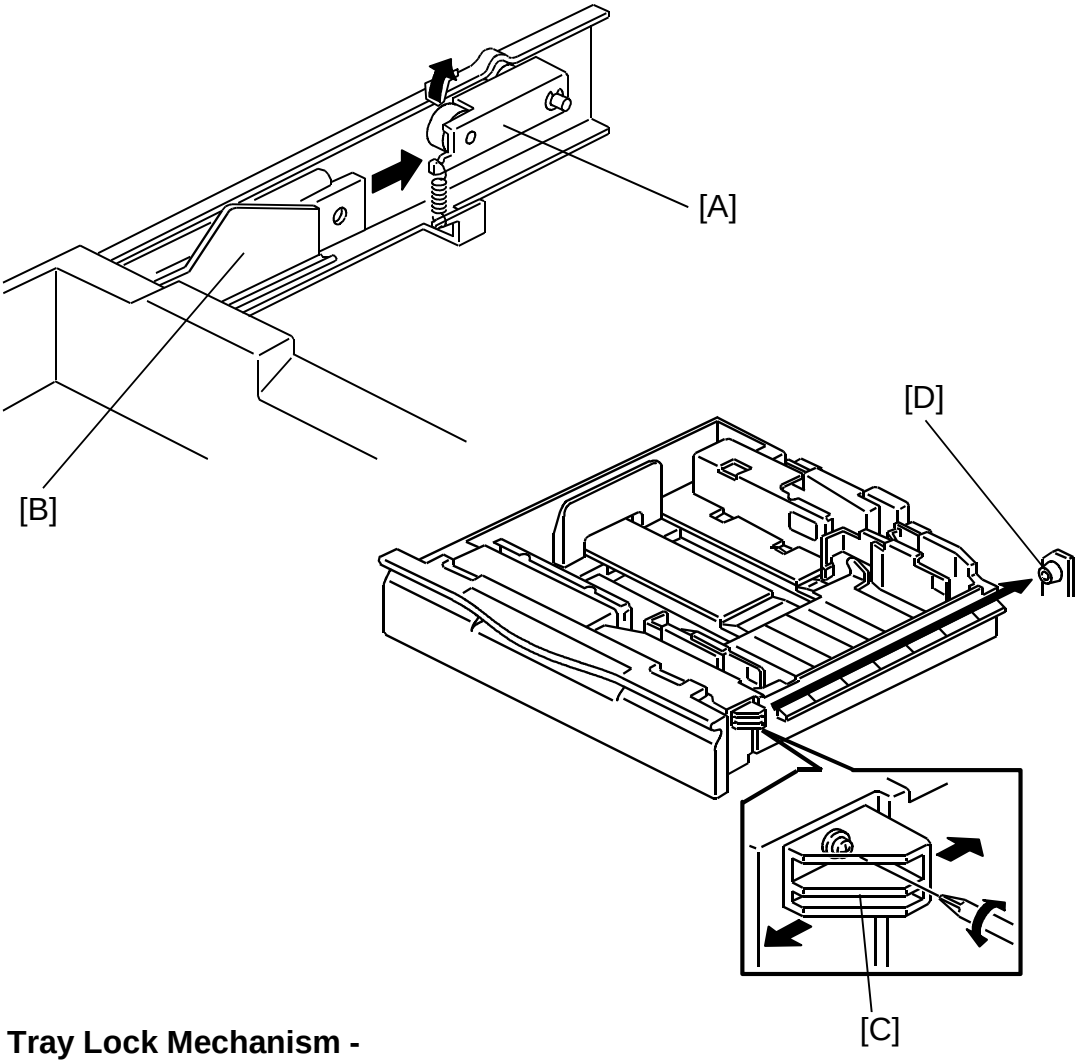



The vertical transport rollers [A] in each feed unit is driven by the paper feed motor. The vertical transport rollers and the driven vertical transport rollers [B], on the upper and the lower vertical guide plates, transport the paper from each feed unit to the registration roller.

The upper [C] and lower [D] vertical transport guides can be opened to access jammed paper in the vertical transport area.
The lower vertical transport guide separates from the upper guide to gain wider jam removal space.

To reduce the first copy time, the paper feed motor rotates at a quicker speed (430mm/sec.) than normal (330mm/sec). This quick rotation is performed only in the case of the first copy from the first feed station.

## 6.13 TRAY POSITIONING MECHANISM

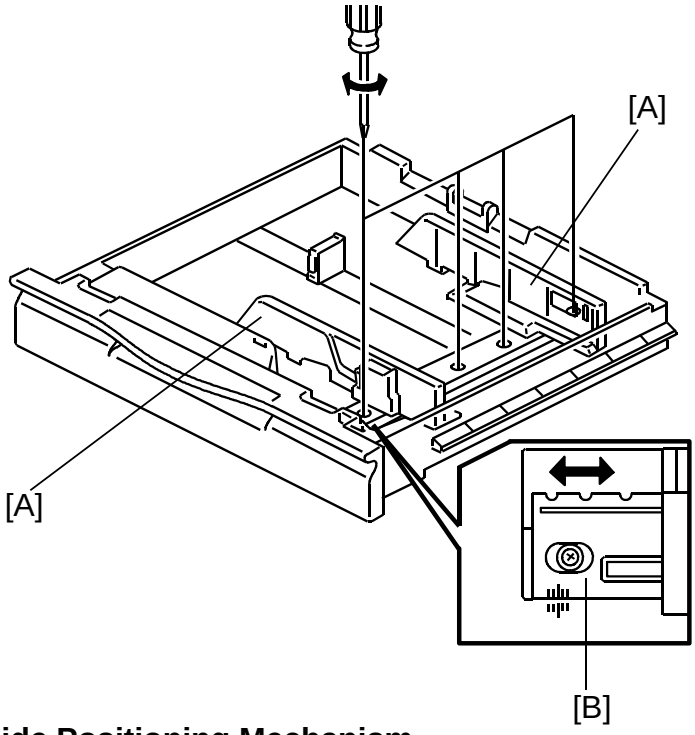



**- Tray Lock Mechanism -**

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

**- Side-to-side Positioning Mechanism (1st and 3rd feed tray for A096 copier)-**

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



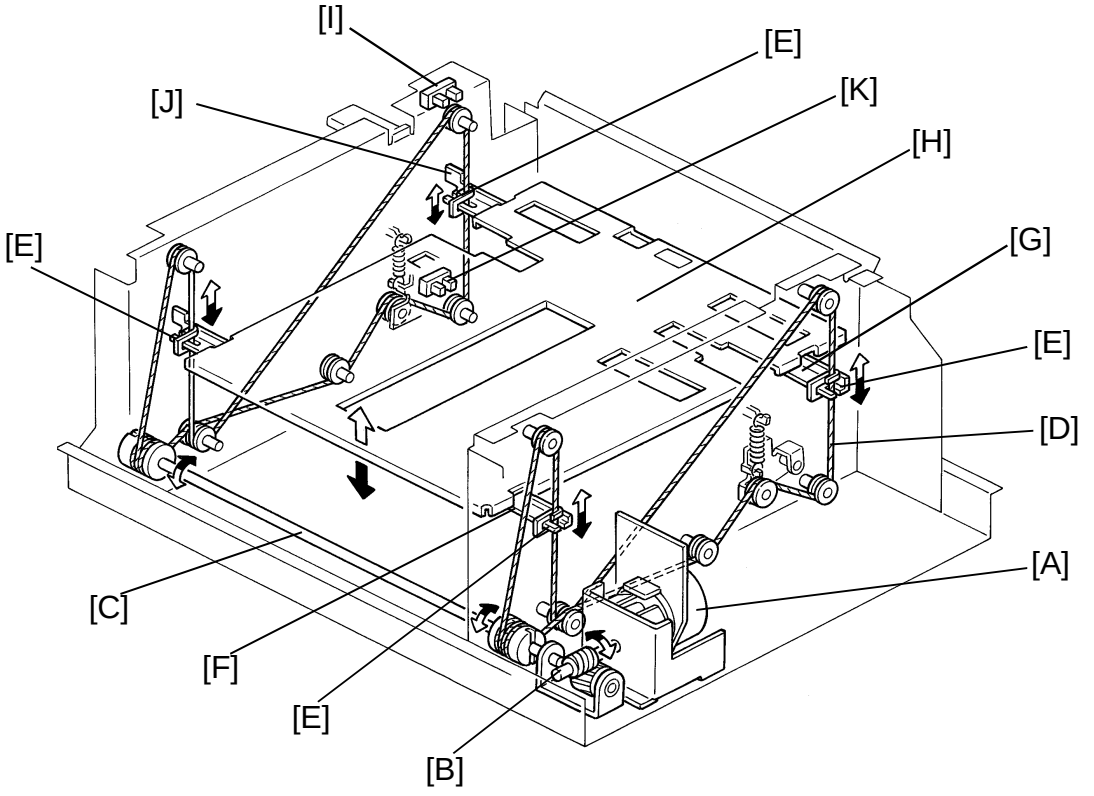

**- Side-to-side Positioning Mechanism -**

(All feed trays for the A095 copier and 2nd feed tray for the A096 copier)

Side plates [A] are fixed on the positioning plate [B]. By moving the positioning plate (fixed by four screws), the paper position can be changed to adjust the side-to-side registration.

# 6.14 BUILT IN LCT

## 6.14.1 Paper Tray Lift Mechanism



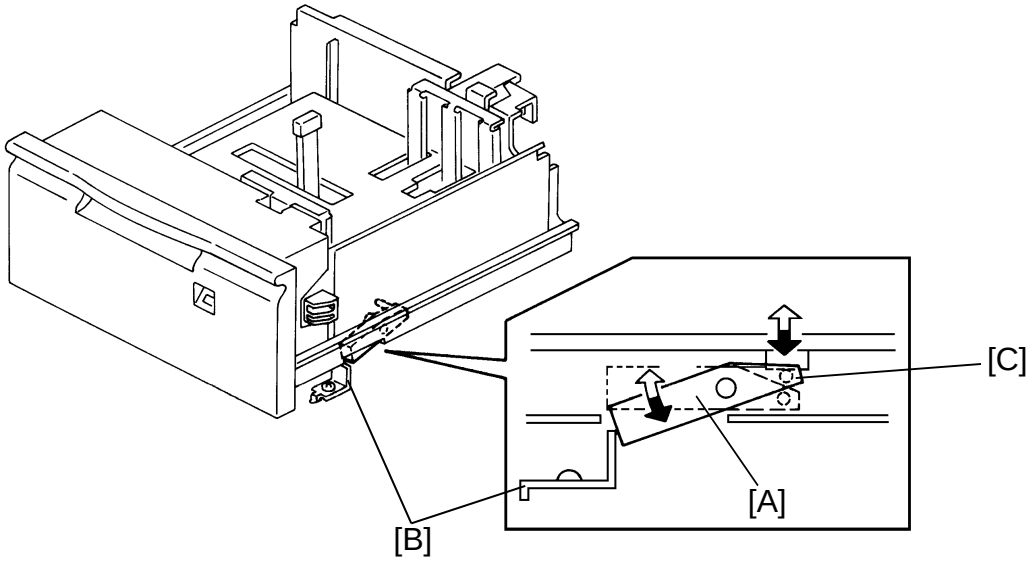

Drive from the reversible LCT motor [A] is transmitted through a worm gear [B] to the drive pulley shaft [C]. The tray wires [D] are fixed in the slots [E] at the ends of the tray support rods [F] and [G].

When the LCT motor rotates forward and the drive pulley shaft [C] turns counterclockwise, the tray support rods and the tray bottom plate [H] move upward. The tray goes up until the top paper pushes up the pick-up roller and the lift sensor in the third feed unit 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 rotates in reverse 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 [K] is activated by the actuator.

### 6.14.2 Tray Lock Mechanism

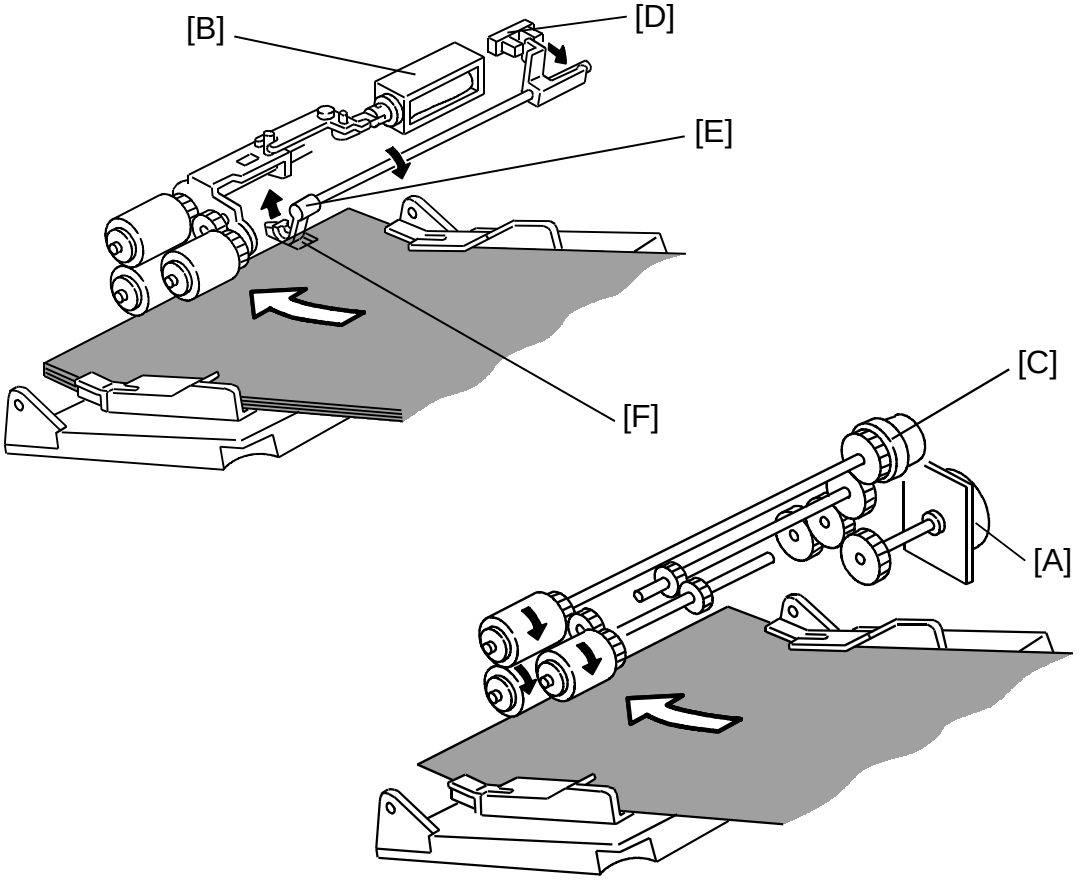



When the tray starts moving up, the tray lock lever [A] drops in the hole on the base plate to engage the stopper [B], locking the tray in position. This prevents the tray from being pulled out while in the up position.

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.

# 6.15 BY-PASS FEED TABLE

## 6.15.1 Feed Mechanism / Paper End Detection

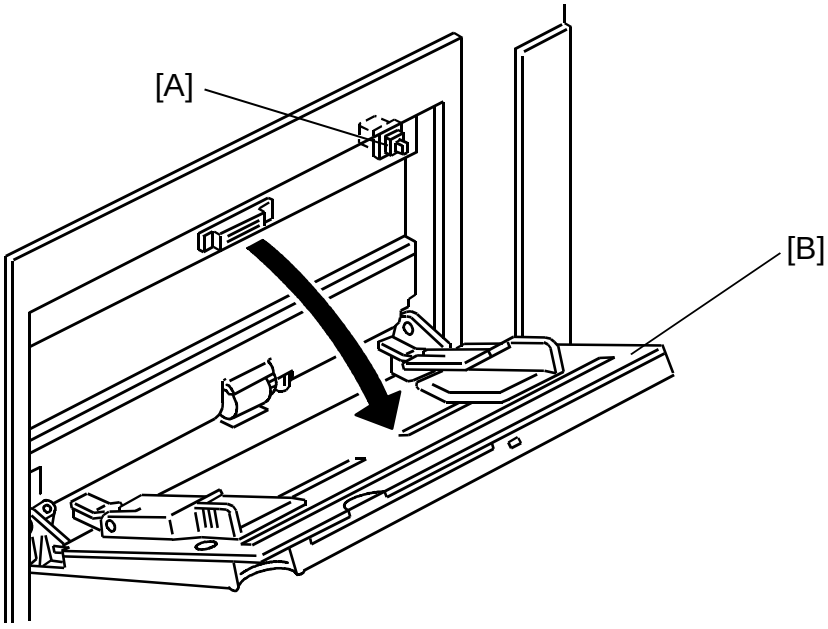



The by-pass feed table uses the FRR feed system. The by-pass feed motor [A], pick-up solenoid [B], and by-pass feed clutch [C] control paper feeding from the by-pass feed table.

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 in the cut out [F] of the lower guide plate and the paper end sensor [D] deactivates. When paper is present on the by-pass feed table, the paper pushes up the end feeler [E] to activate the paper end sensor [D]. The CPU turns off the paper end indicator on the LCD panel and turns the start key from red to green.

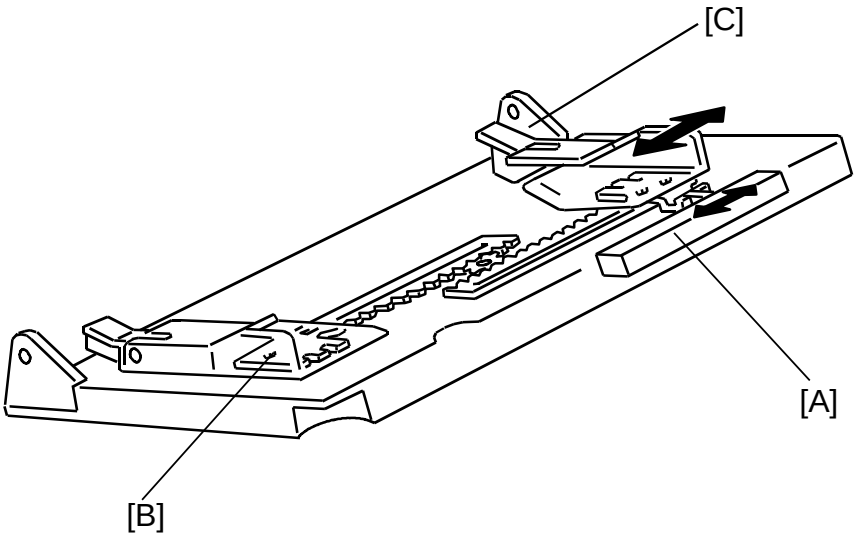
### 6.15.2 Table Open/Close Detection




When the by-pass feed table is opened, the by-pass table switch [A] is activated by part of the feed table [B]. Then the CPU turns on the by-pass feed indicator on the operation panel.

On 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.

### 6.15.3 Paper Size Detection

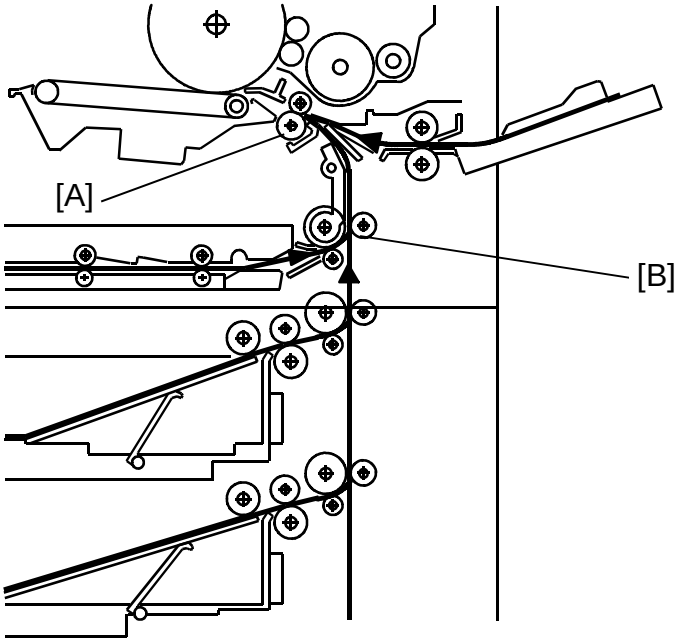



The paper width detection is necessary to decide the lens horizontal position because the standard position of the optics (rear left corner) and the paper (center) is different.

The by-pass paper size sensor [A] (variable resistor) monitors the paper width. When the paper side fences [B] and [C] are positioned according to the paper width, the rear side fence is connected to the lever of the by-pass paper size sensor. The electrical resistance of the sensor changes in accordance with the side fence position, This informs the CPU of the paper width.

At the first copy from the by-pass feed table, the scanner makes a full distance scan. The registration sensor monitors the length of this paper (between the ON timing by the leading edge and the OFF timing by the trailing edge). From the following copies, the copier is controlled according to this paper length data.

## 6.16 PAPER REGISTRATION

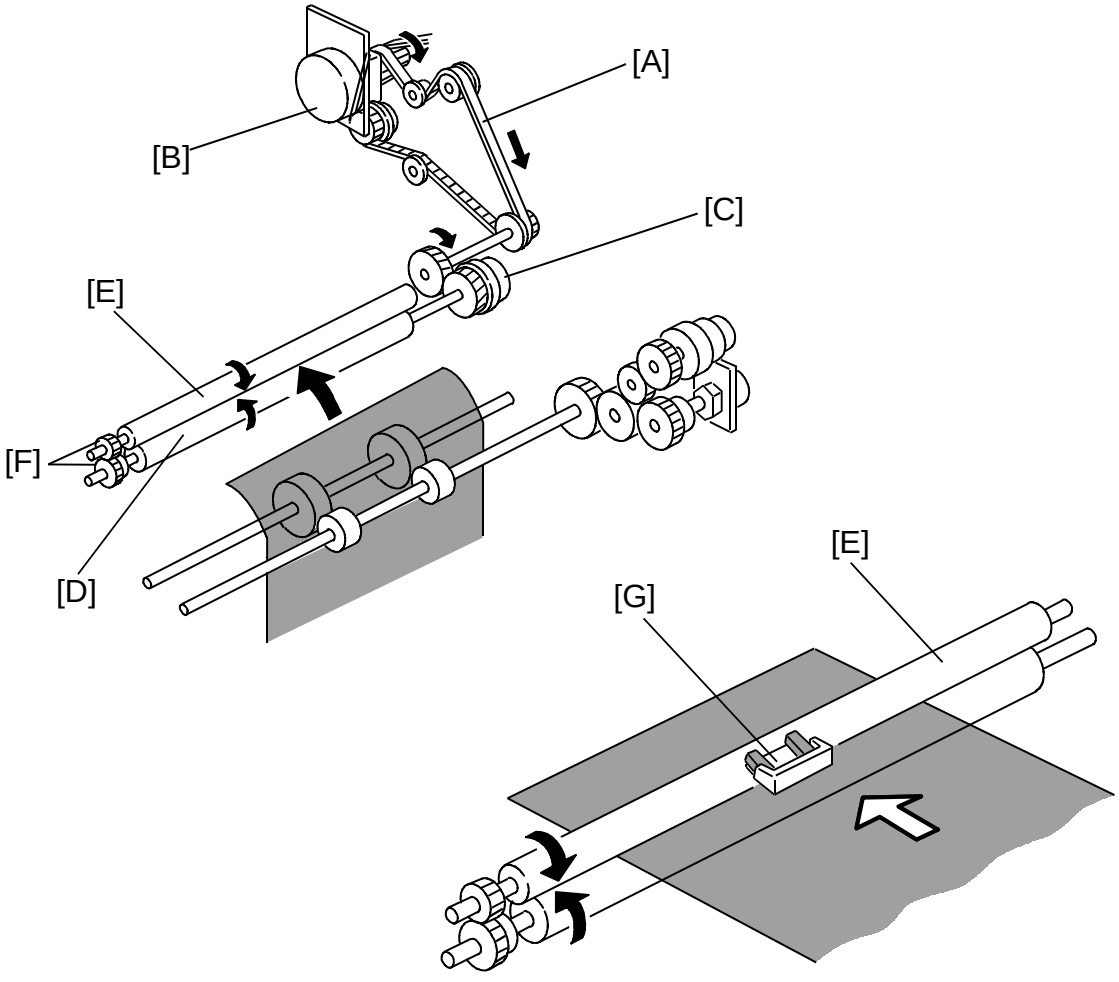



The registration rollers [A] have two functions. One is aligning the lead edge of the paper with the leading edge of the latent image on the OPC drum. When the CPU receives the signal from the registration sensor, the registration clutch turns on. It turns off 90ms after the trailing edge of the paper is detected by the registration sensor.

The other function is to correct skewing of paper fed from the trays. When the leading edge of the paper reaches the registration rollers, the vertical transport rollers [B] continuously turn to transport the paper. On the other hand, the registration roller is not turning. The leading edge of the paper is pushed against the registration roller. This makes a little buckle on the paper between the vertical transport rollers and the registration rollers to correct paper skew.

Shortly after the leading edge of the paper reaches the registration roller, the registration clutch activates to feed the paper.

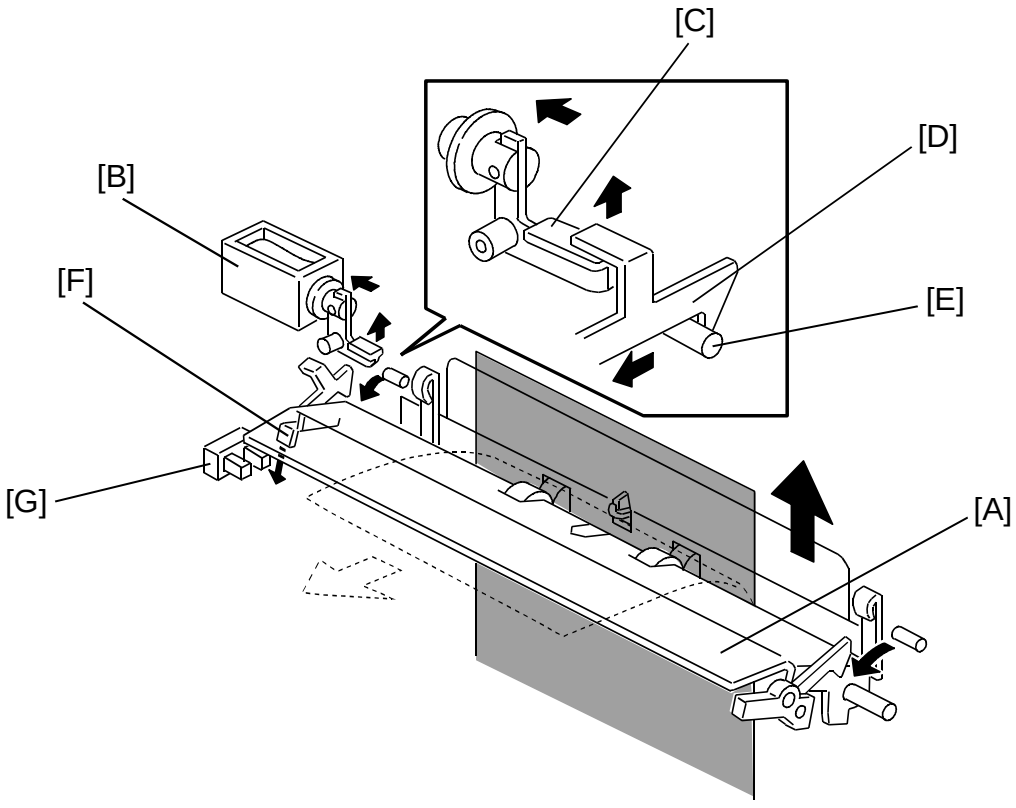
## 6.17 REGISTRATION DRIVE MECHANISM




Through the timing belt [A], main motor [B] rotation is transmitted to the registration clutch [C]. When the registration clutch activates, the main motor drive is transmitted to the lower registration roller [D], then to the upper registration roller [E] via two gears [F] at the front side.

A paper dust cleaner [G] is located at the center of the upper registration roller [E]. This is in line with the feed rollers where most paper dust is generated.

## 6.18 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.

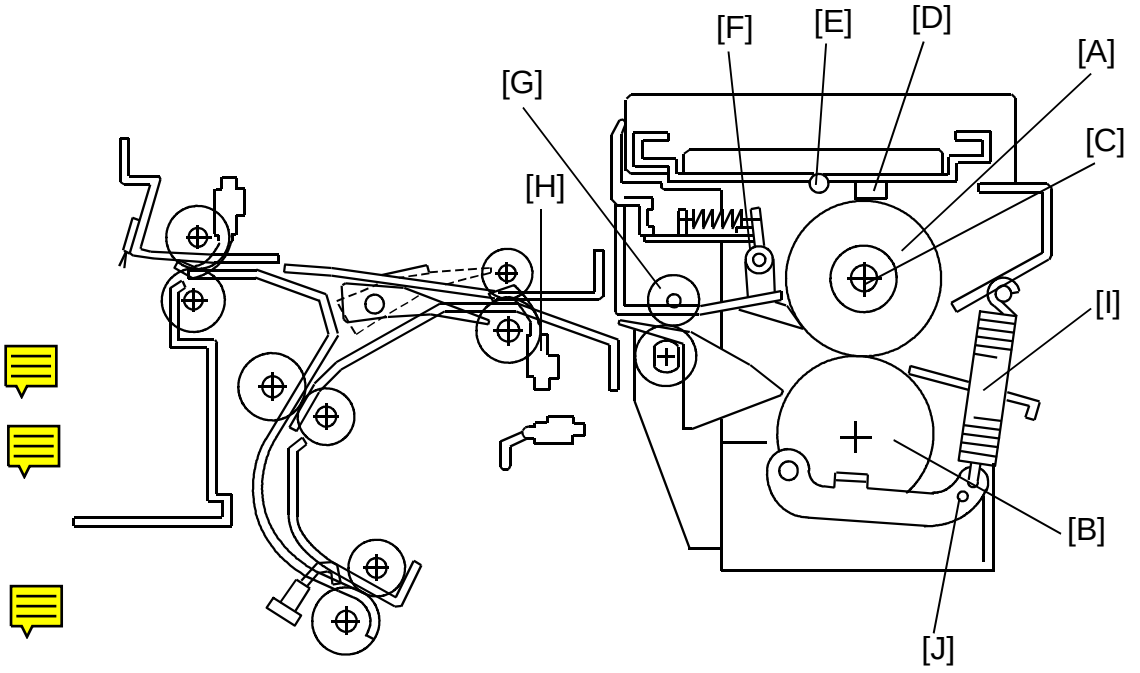
When the registration sensor is not activated at a certain jam check timing, the guide plate solenoid [B] turns on. The lever [C] raises the lock lever [D] on the guide plate to release the pin [E] on the rear side frame. Then, the guide plate falls open.

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 prohibited and a caution guidance is displayed on the LCD panel.

# 7. IMAGE FUSING

## 7.1 OVERVIEW




After the image is transferred, 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].

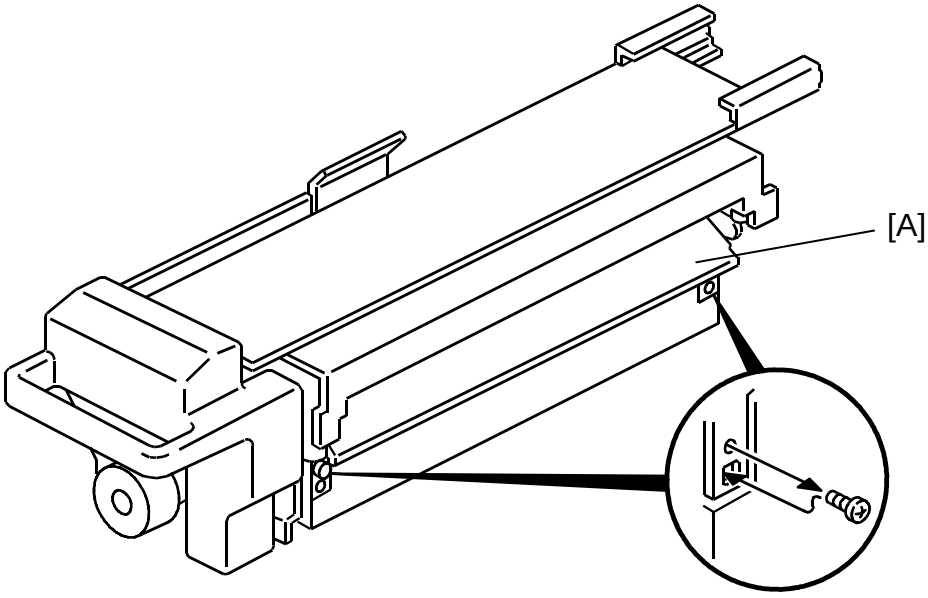
The fusing lamp [C] located inside the hot roller is turned on and off to maintain the operating temperature of 185°C. The CPU monitors the hot roller surface temperature through a thermistor [D] which is in contact with the hot roller's surface. A thermofuse [E] protects the fusing unit form overheating.

This model uses an oilless hot roller system and does not have a hot roller cleaning mechanism.

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 [H] monitors the progress of the copy paper through the fusing unit and acts as a misfeed detector while the exit rollers drive the copy paper to the inverter section.

The hook positions of the tension springs [I] on the pressure lever [J] adjusts the roller pressure.

## 7.2 FUSING ENTRANCE GUIDE




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

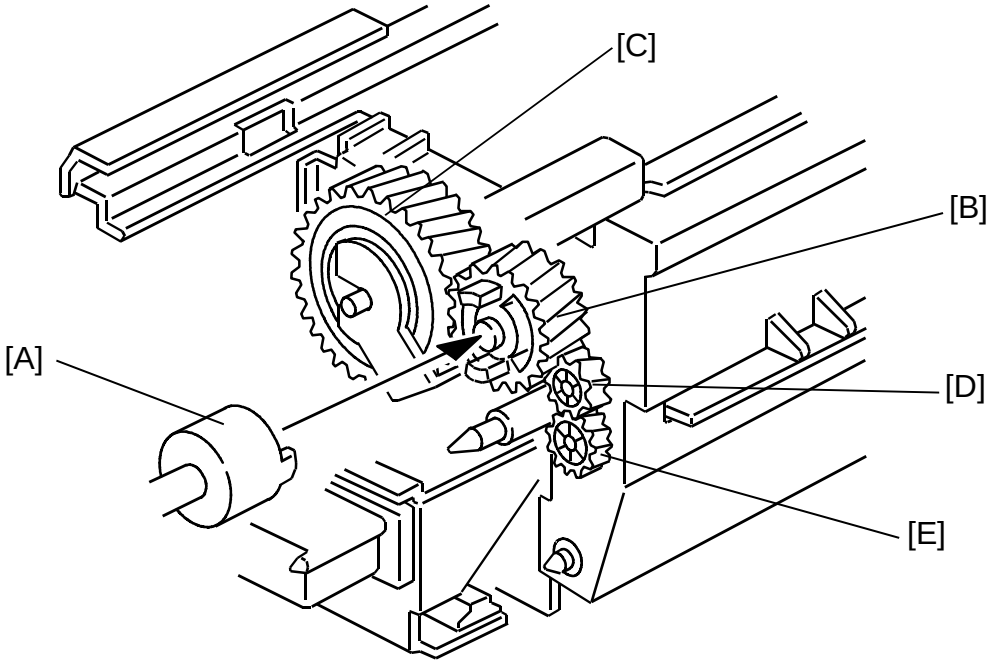
With thin paper, set the entrance guide in the upper position. This slightly lengthens the paper path which prevents the paper from creasing in the fusing unit. With thick paper, set the entrance guide in the lower position.

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 skews in the fusing unit.

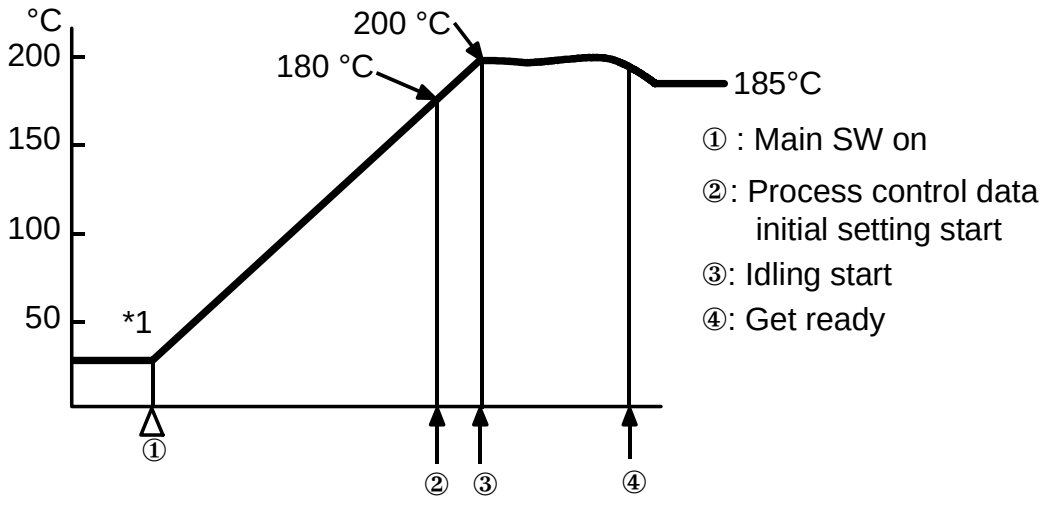
Therefore, the guide plate standard position is the lower position. (Standard position on previous models was the upper position).
Since there are very few reasons to change the guide plate position, there is no guide plate position adjustment lever for customer use.

## 7.3 FUSING DRIVE MECHANISM




The fusing drive gear [A] transmits the drive from the fusing/duplex drive motor to the gear [B] which drives the hot roller gear [C]. Rotation passes from the gear [B] through the idle gear [D] to the exit roller drive gear [E]. The pressure roller is driven by the friction between the two fusing rollers.

## 7.4 FUSING LAMP CONTROL




When the main switch is turned on the CPU starts sending a trigger pulse to the fusing control circuit to turn on the fusing lamp.

When the CPU detects a fusing temperature of 200°C through the thermistor, the copier starts fusing idling. This idling period can be adjusted by SP mode (1 SP Adjustment: PAGE 1). When the fusing idling finishes, the warm-up period is completed and the Ready indicator turns on. After this, fusing temperature is controlled at 185°C. If the fusing temperature is above 100°C when the main switch is turned on, the copier does not go into the fusing idling mode.

When the fusing temperature reaches 180°C (in the case that the main switch is turned on while the fusing temperature is less than 100°C), the machine starts the process control data initial setting.

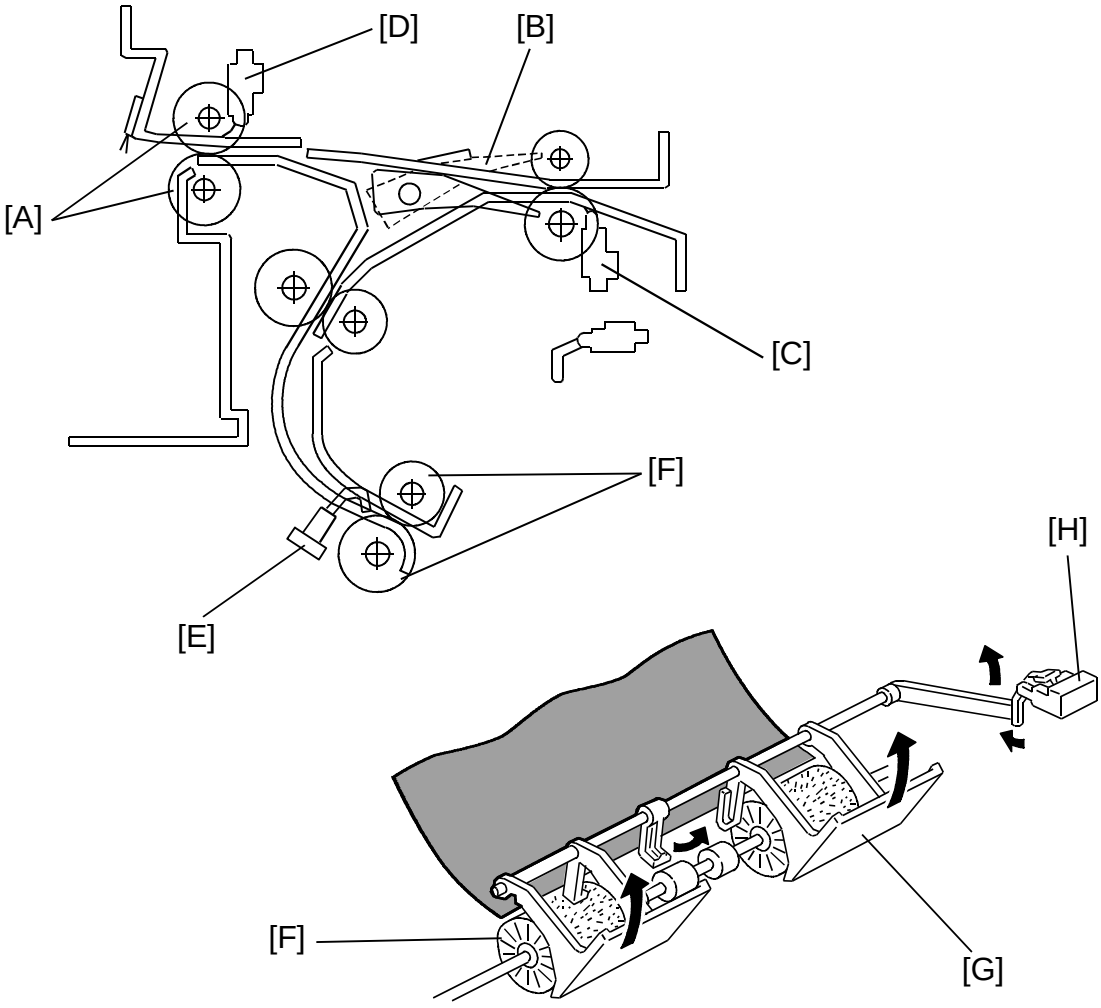
The CPU also changes the fusing lamp on period at every check cycle. The change is calculated according to the result of the previous check. This keeps the fusing temperature as close as possible to the target temperature.

If the fusing lamp (950 W) is turned on or off while the exposure lamp is on, the power supplied to the exposure lamp may fluctuate, possibly degrading the copy image. To prevent this, the fusing lamp does not change while the exposure lamp is on: it stays either on or off.

The standard fusing temperature control mode is:
On-off control.....European version
Phase control.....Other versions

By cutting the JP501 on the optics control board, the control mode become to the another mode.

## 7.5 INVERTER AND PAPER EXIT

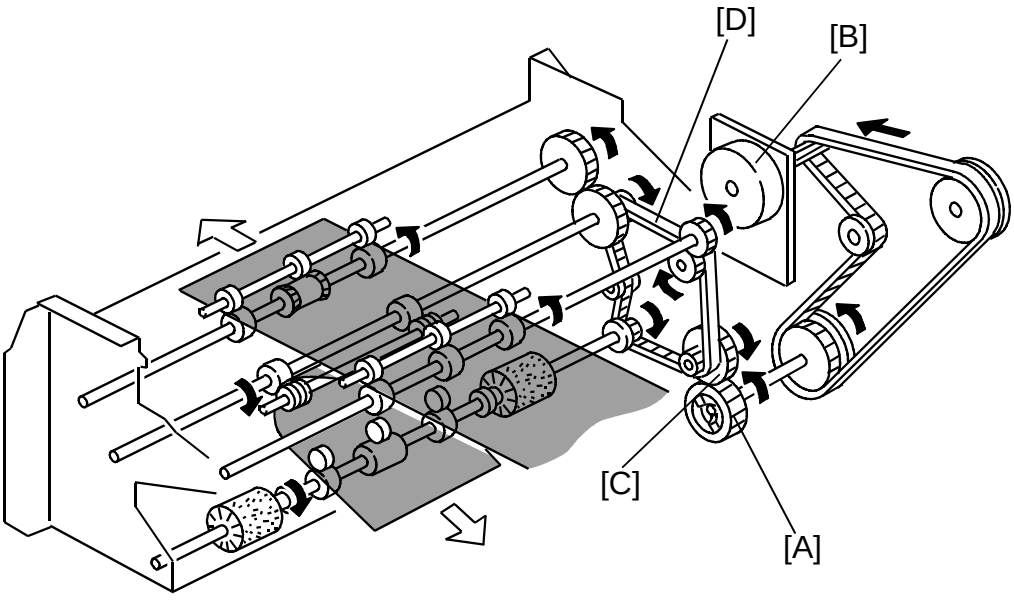



After passing the fusing unit, copies enter the inverter unit where paper is distributed to the paper exit rollers [A] or the duplex unit.
The junction gate solenoid changes the position of the junction gate [B]. In duplex mode, the junction gate solenoid turns on to raise the junction gate so that the junction gate guides the paper into the duplex unit.
The fusing exit sensor [C] and exit sensor [D] monitor paper misfeeds.

The duplex transport sensor [E] is used not only to monitor paper misfeed detection, but also to activate the duplex jogger motor.

When the paper passes the duplex transport roller [F], the paper pushes the paper guide [G] up, and the actuator on the rear end of the paper guide shaft de-activates the paper guide sensor [H]. The duplex entrance sensor monitors paper misfeeds.

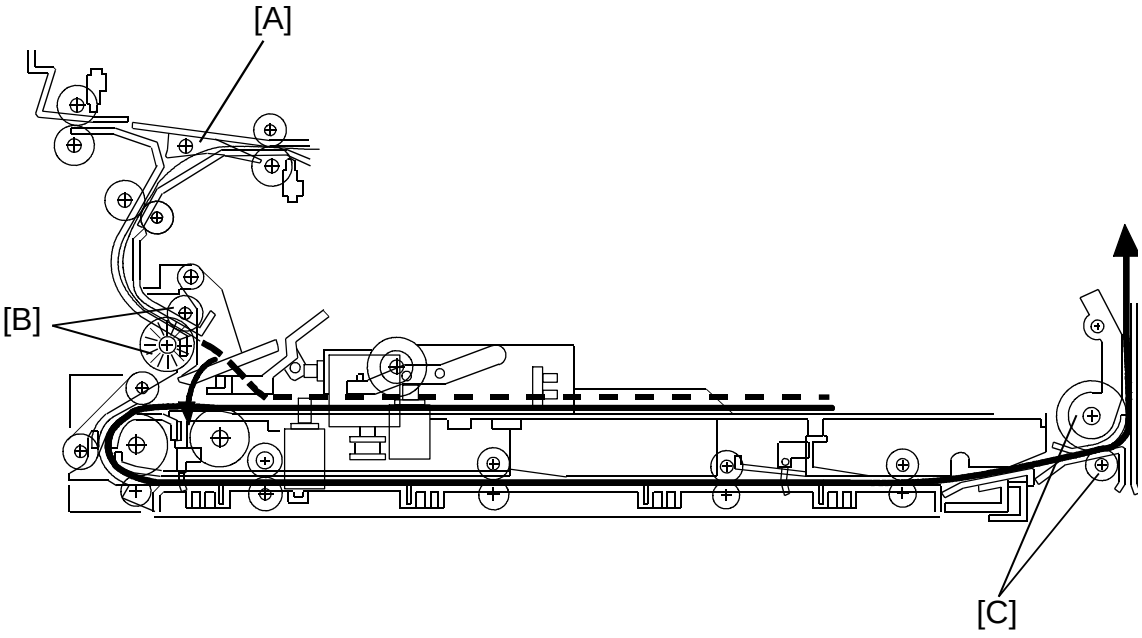
## 7.6 INVERTER AND EXIT DRIVE MECHANISM




The gear [A] transmits the drive from the fusing/duplex drive motor [B] to the next gear [C]. This gear [C] transmits the drive to the paper exit and the inverter section through the timing belt [D].

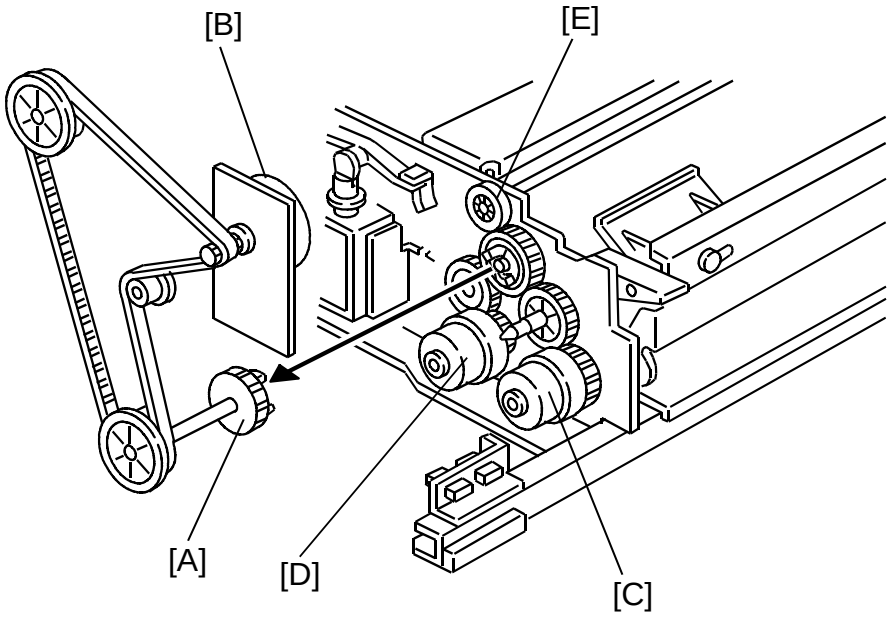
# 8. DUPLEX

## 8.1 OVERVIEW



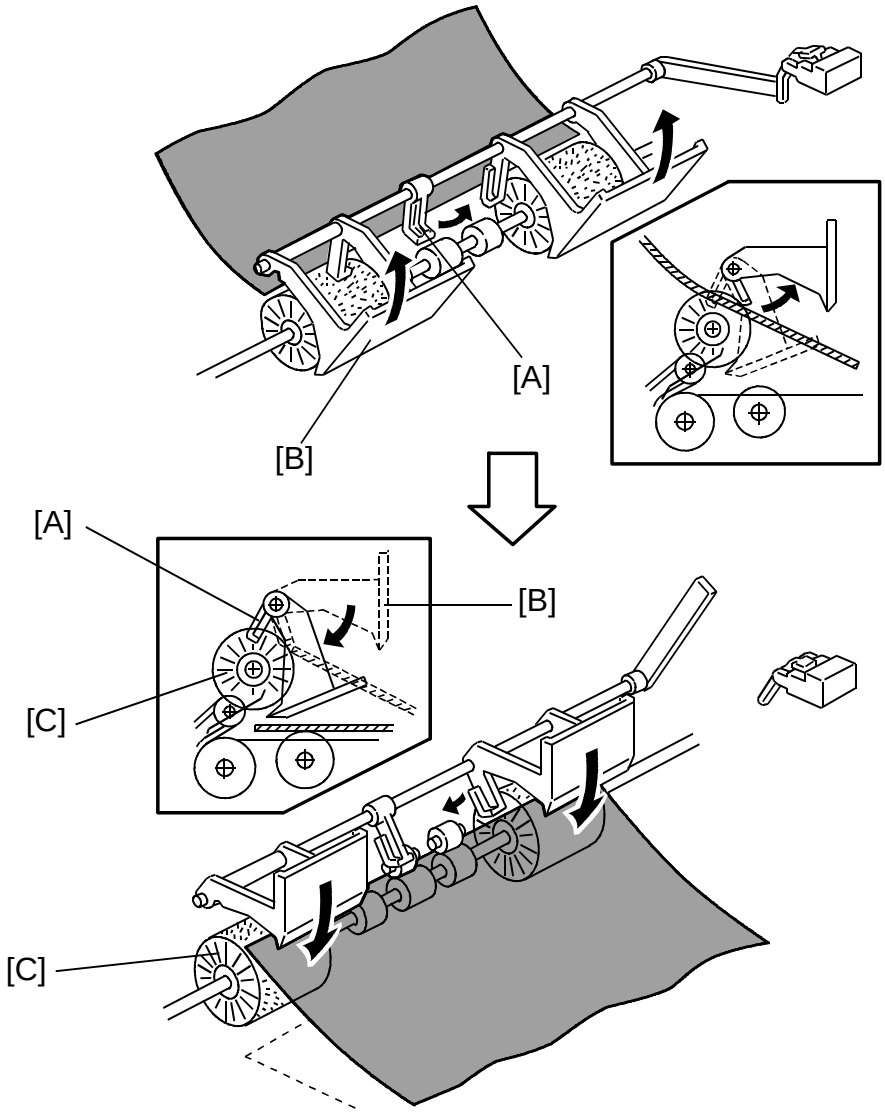

In this mode the junction gate [A] directs sheets exiting the fusing unit to the duplex tray entrance. After that, all sheets follow the path through the entrance rollers [B]. After all front side copying is completed, the sheets follow (the sheets on the duplex tray are fed in order from the bottom to the top) the path through the duplex feed mechanism and vertical transport rollers [C] to the registration rollers.

## 8.2 DRIVE MECHANISM




The duplex drive gear [A] transmits drive from the fusing/duplex drive motor [B] to the duplex unit. This drive is transmitted to the duplex paper feed section under the control of the duplex feed clutch [C] and transmitted to the duplex transport section under the control of the duplex transport clutch [D]. The duplex pick-up roller is driven by the gear [E], so this roller continuously rotates while the fusing/duplex drive motor is on.

## 8.3 DUPLEX ENTRANCE TO DUPLEX TRAY

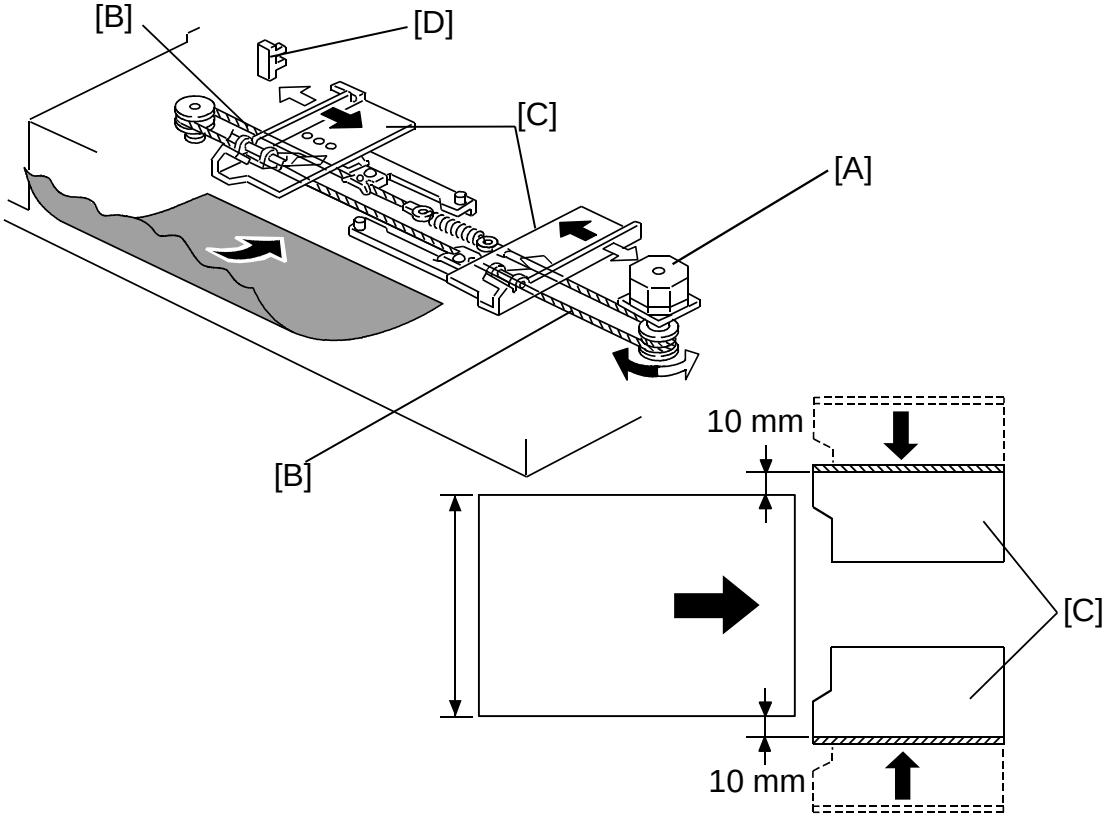



After paper passes through the junction gate, it pushes the feeler [A] up. The feeler and the paper guide [B] form one part, so that when it is pushed up, the paper guide is moved out of the paper path.

The paper then enters the duplex unit. After the paper's trailing edge passes the feeler, nothing holds it up and the paper guide falls into place and is ready to guide the paper under brush roller.

(If the paper is caught on top of the brush roller [C], the guide pushes it under as it falls.)

## 8.4 DUPLEX STACKING



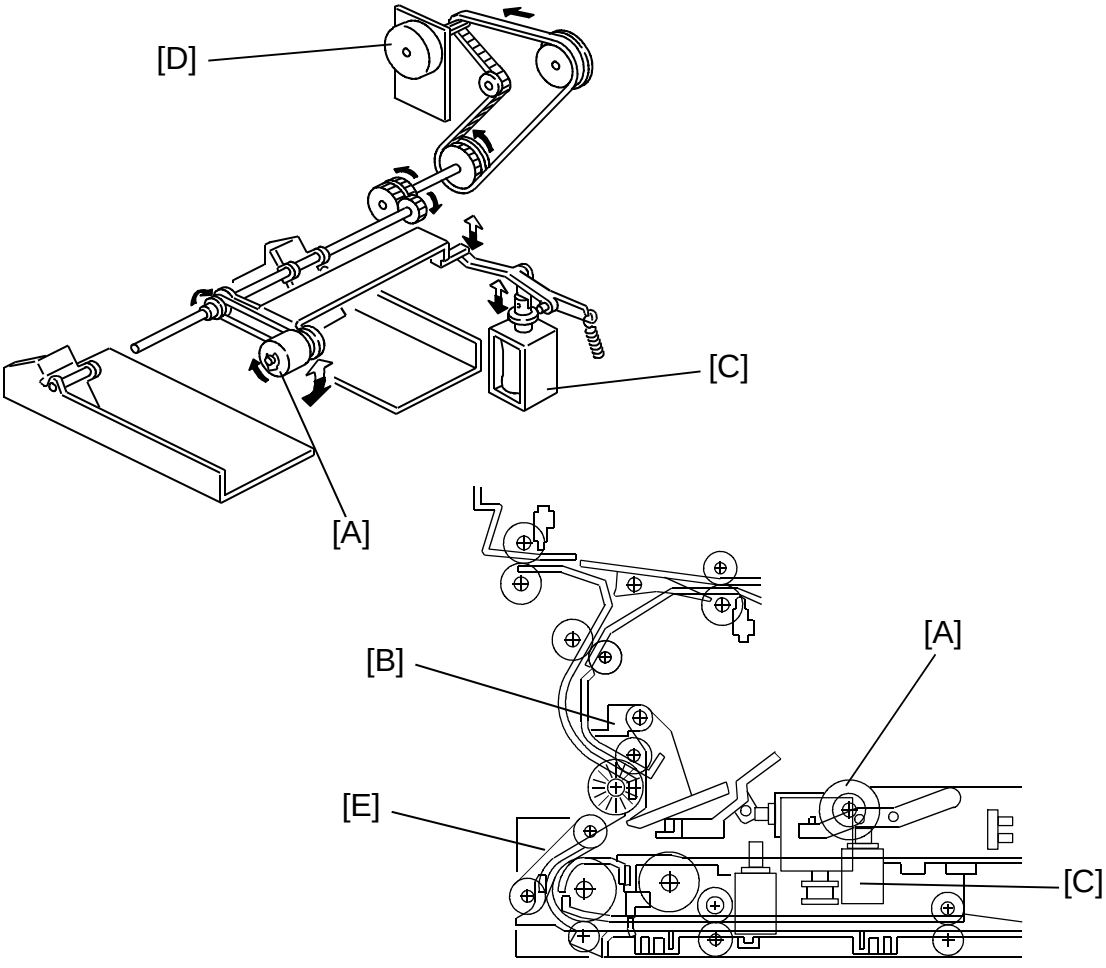

The jogger motor (stepping motor) [A] drives the side fence drive wire [B] to move the side fences [C] inward or outward.

When the main switch is turned on, the jogger motor rotates to place the jogger fences at the home position by monitoring the signal of the jogger home position sensor [D].

When the start key is pressed, the jogger motor rotates to position the side fences according to the selected paper size. 30 ms after the duplex transport sensor detects the leading edge of the paper (OFF → ON), the jogger motor rotates to position the jogger side fences 10 mm away from the selected paper size. When the copy paper is delivered in the duplex tray, actually 150 ms after the duplex transport sensor detects the trailing edge of the paper (ON → OFF), the jogger fences move inward to square the paper. 30 ms after the duplex transport sensor detects the leading edge of the next copy paper, the jogger fences move back to the previous positions (10 mm away from the paper size) again.

The jogger fences move inward to square the paper stack for every copy paper stack at the same timing as before. After the last copy of the first side copying enters the duplex tray, the jogger fences remain against the paper stack.

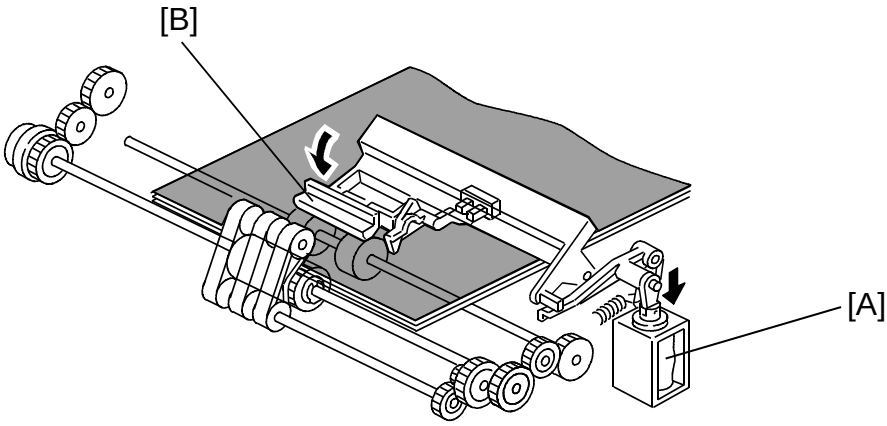
## 8.5 DUPLEX PICK-UP ROLLER MECHANISM

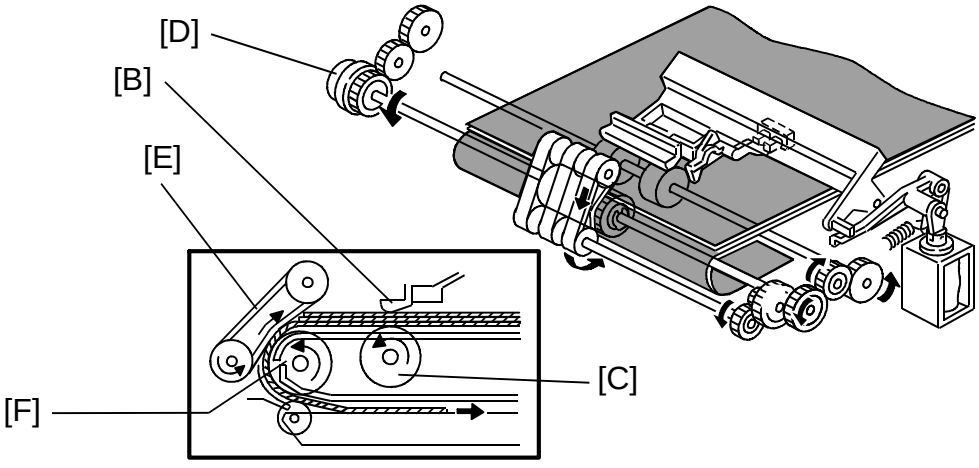



The positioning roller [A] is basically in the upper position. 150ms after the duplex transport sensor [B] detects the trailing edge of the paper (ON → OFF), the positioning solenoid [C] turns on to lower the positioning roller until it contacts the paper. The positioning roller continuously rotates clockwise while the fusing/duplex motor [D] rotates. The positioning solenoid turns on until the leading edge of the paper hits the separation belts [E].

30ms after the duplex transport sensor [B] detects the leading edge (OFF → ON) of the next paper, the positioning roller solenoid turns off to raise the positioning roller so that the positioning roller does not disturb the next paper as it enters.

## 8.6 DUPLEX PAPER FEED



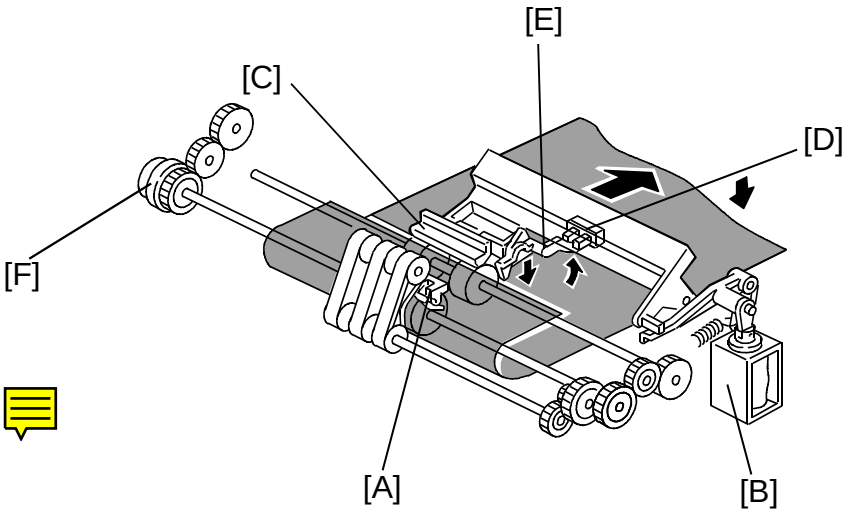



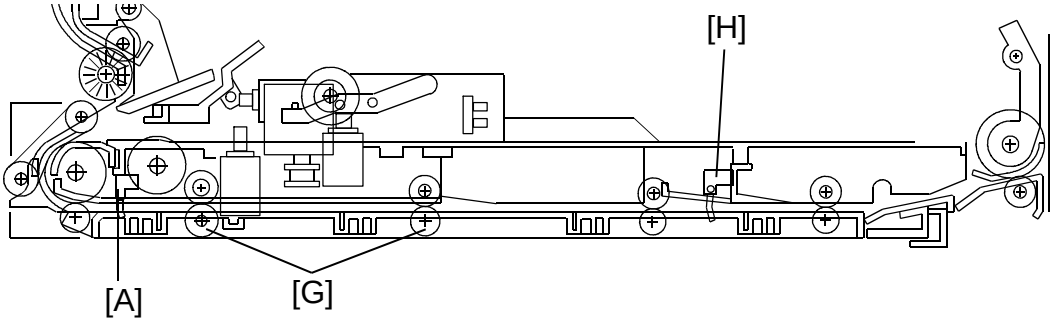

The paper on the duplex tray is fed in order from the bottom to the top sheet.

After all copies are stacked on the duplex tray, the duplex pressure solenoid [A] turns on to lower the pressure arm [B] so that the pressure arm presses the paper against the pick up roller [C].

Then, the paper feed clutch [D] turns on to rotate the pick-up roller [C], separation belts [E] and the feed roller [F].

The separation belts [E] and the feed roller [F] rotate in opposite directions. Only the bottom paper is fed because the separation belt prevents any other paper from feeding.
The feed roller advances the bottom paper past the separation belts because the force of the feed roller is greater than the resistance of the separation belts. The separation belts prevent multiple feeds because the resistance of the separation belt is greater than the friction between the papers.




When the duplex entrance sensor [A] detects the trailing edge of the last paper, the pressure solenoid [B] turns off to raise the pressure arm [C]. At this moment, the duplex paper end sensor [D] confirms that no paper remains on the duplex tray.

The paper end actuator [E] is located on the pressure arm and moves with the pressure arm.

The paper end sensor is de-activated (the actuator interrupts the photosensor) only when the pressure arm is in the lower position (solenoid [B] is on) and no paper is present on the duplex tray.

200ms after the duplex entrance sensor [A] detects the leading edge of the paper, the duplex feed clutch [F] turns off and the paper is transported by the duplex transport rollers [G].

When the paper activates the duplex exit sensor [H], the duplex transport clutch [F] turns off and the paper waits there until the feed timing is adjusted to match the registration clutch on timing of the previous paper.

# SECTION 3

# INSTALLATION

# 1. INSTALLATION REQUIREMENTS

## 1.1 ENVIRONMENT

1. Temperature Range: 10°C to 30°C (50°F to 86°F)
2. Humidity Range: 15% to 90% RH
3. Ambient Illumination: Less than 1,500 lux (Do not expose to direct sunlight.)
4. Ventilation: Room air should turn over at least 3 times/hour.)
5. Ambient Dust: Less than 0.15 mg/$m^3$ (4 x $10^3$ Oz/$yd^3$)
6. Room Size: More than 10 $m^3$ (13.4 $yd^3$)
7. If the place of installation is air-conditioned or heated, do not place the machine.
   a) where it will be subjected to sudden temperature changes.
   b) where it will be directly exposed to cool air from an air conditioner.
   c) where it will be directly exposed to heat from a heater.
8. Do not place the machine where it will be exposed to corrosive gasses.
9. Do not install the machine at any location over 2,000 m (6,500 feet) above sea level.
10. Place the copier on a strong and level base.
11. Do not place the machine where it may be subjected to strong vibrations.

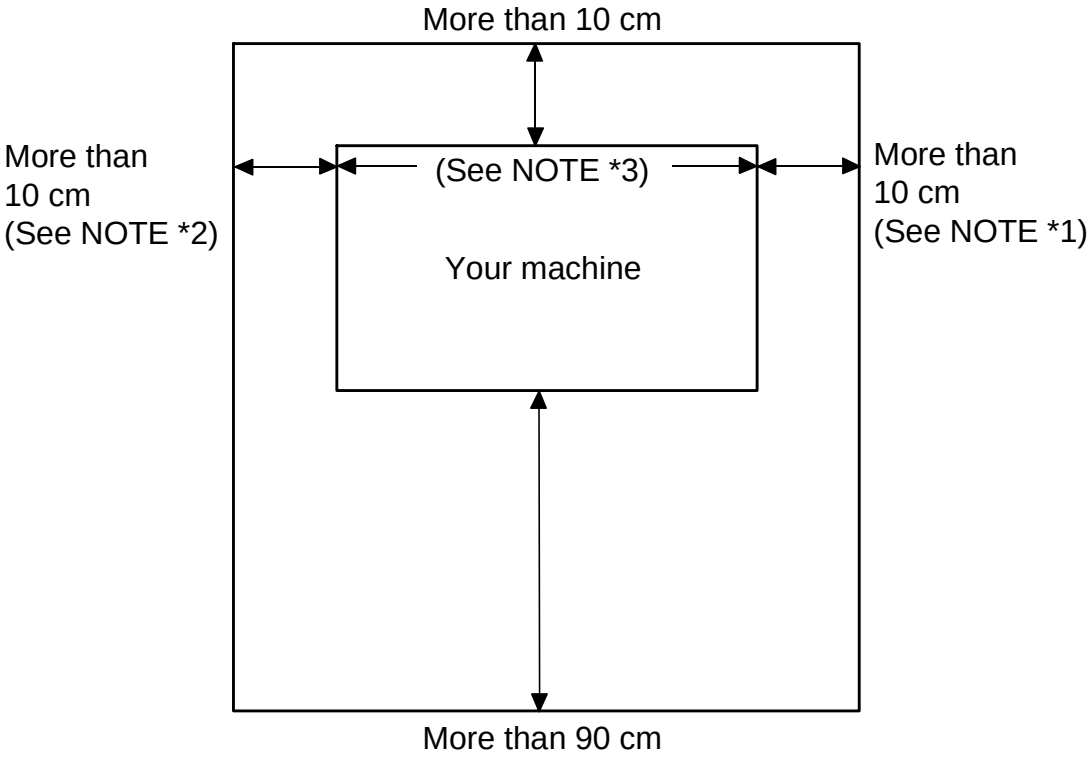
## 1.2 MACHINE LEVEL

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

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

## 1.3 MINIMUM SPACE REQUIREMENTS

Place the copier near the power source, providing clearance as shown:




**NOTE:** *1. If the LCT is not installed, the distance between the wall and the edge of the by-pass feed table must be more than 30 cm.

*2. If the A374 sorter stapler is installed, the distance must be more than 20 cm.

*3. Copier only: 128.0 cm (with LCT 134.7 cm)
Copier + A374 S/S: 110.0 cm (with LCT 142.2 cm)
Copier + A377 S/S: 125.6 cm (with LCT 156.8 cm)
Copier + Finisher: 136.1 cm (with LCT 167.3 cm)

## 1.4 POWER REQUIREMENTS

1. Input voltage level: 120 V/60 Hz: More than 20 A
   220 ~ 240 V, 50/60 Hz: More than 10 A

2. Permissible voltage fluctuation: 10%

3. Permissible extension cord:
   At least 300 V/30 A capacity and less than 5 m (16.4 feet) long.

   **NOTE:** a) be sure to ground the machine. (Do not ground it to a gas pipe.)
   b) Make sure the plug is firmly inserted in the outlet.
   c) Avoid multi-wiring.

4. Do not set anything on the power cord.

# 2. COPIER INSTALLATION

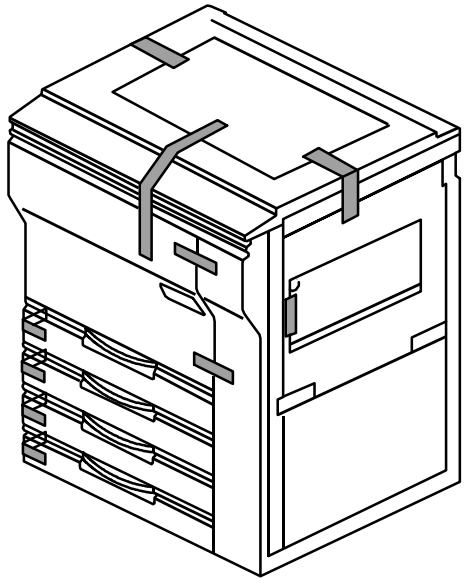
## 2.1 ACCESSORY CHECK

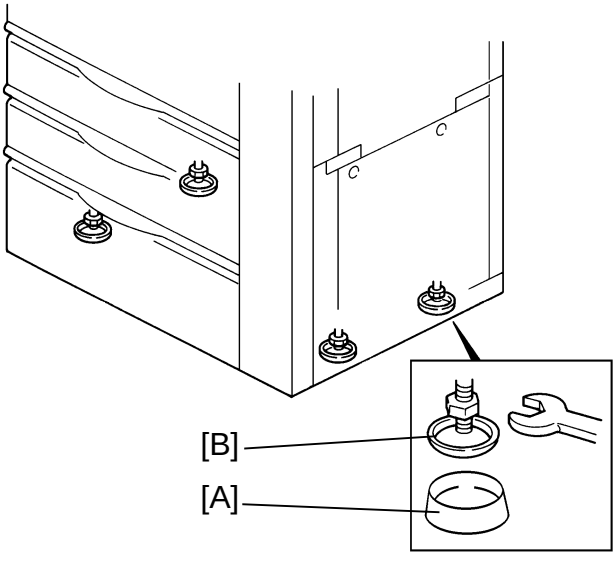
Check the quantity and condition of the accessories in the box according to the following list:

| Description | Q'ty |
|---|---|
| 1. Operating Instructions (Except –27 machine) | 1 |
| 2. User Survey Card (–17 machine only) | 1 |
| 3. Envelope-NECR (–17 machine only) | 1 |
| 4. NECR (–17, –27, –29 machines only) | 1 |
| 5. Sensor Cover | 1 |
| 6. Flat Head Screw 4 x 6 | 1 |
| 7. Leveling Foot | 4 |

## 2.2 COPIER INSTALLATION PROCEDURE

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

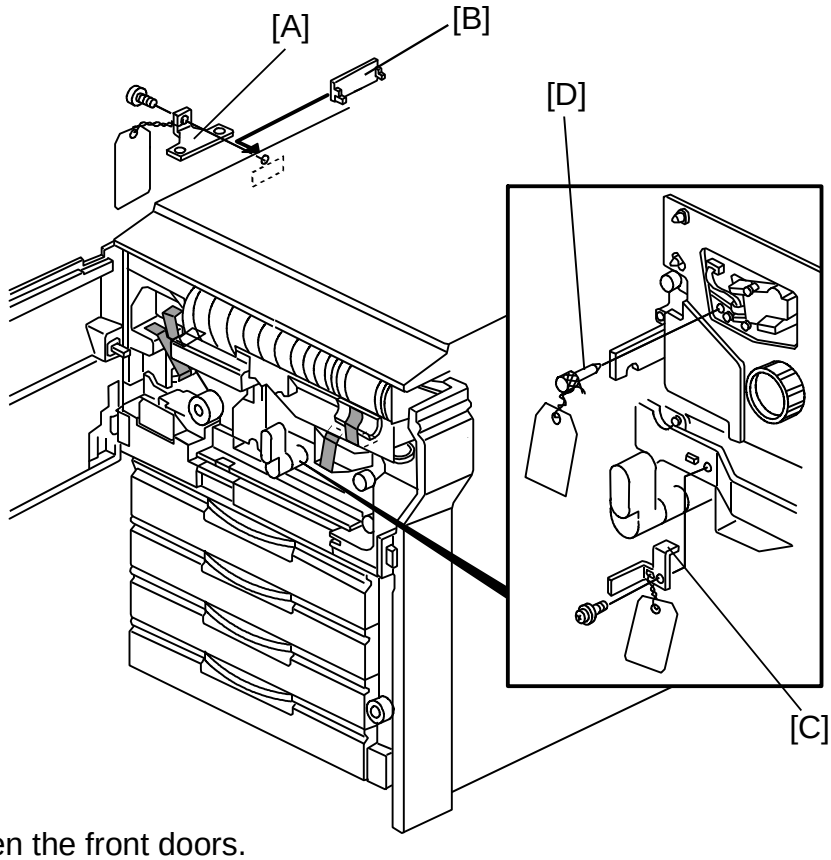




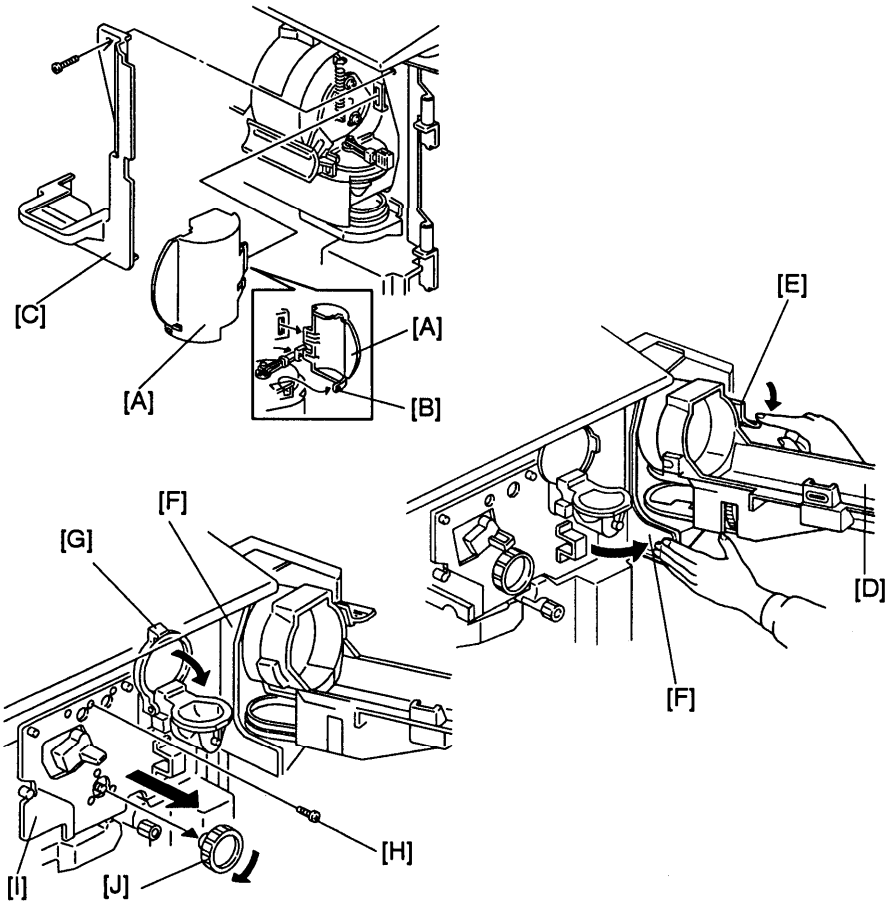

**CAUTION: When installing the copier, make sure that the copier is unplugged.**

**NOTE:** Insert the leveling shoes [A] under the leveling foots [B], and level the machine before starting the installation. (The leveling foots [B] can be screwed up or down.)

1. Remove the tape strips.




2. Open the front doors.
3. Remove the tape strips.
4. Remove the scanner clamp [A] (1 screw) and install the cap [B] stuck on the paper exit bracket with a tape.
5. Remove the transfer belt lock plate [C] (1 screw).
6. Turn about 180° then remove the cleaning unit lock pin [D].



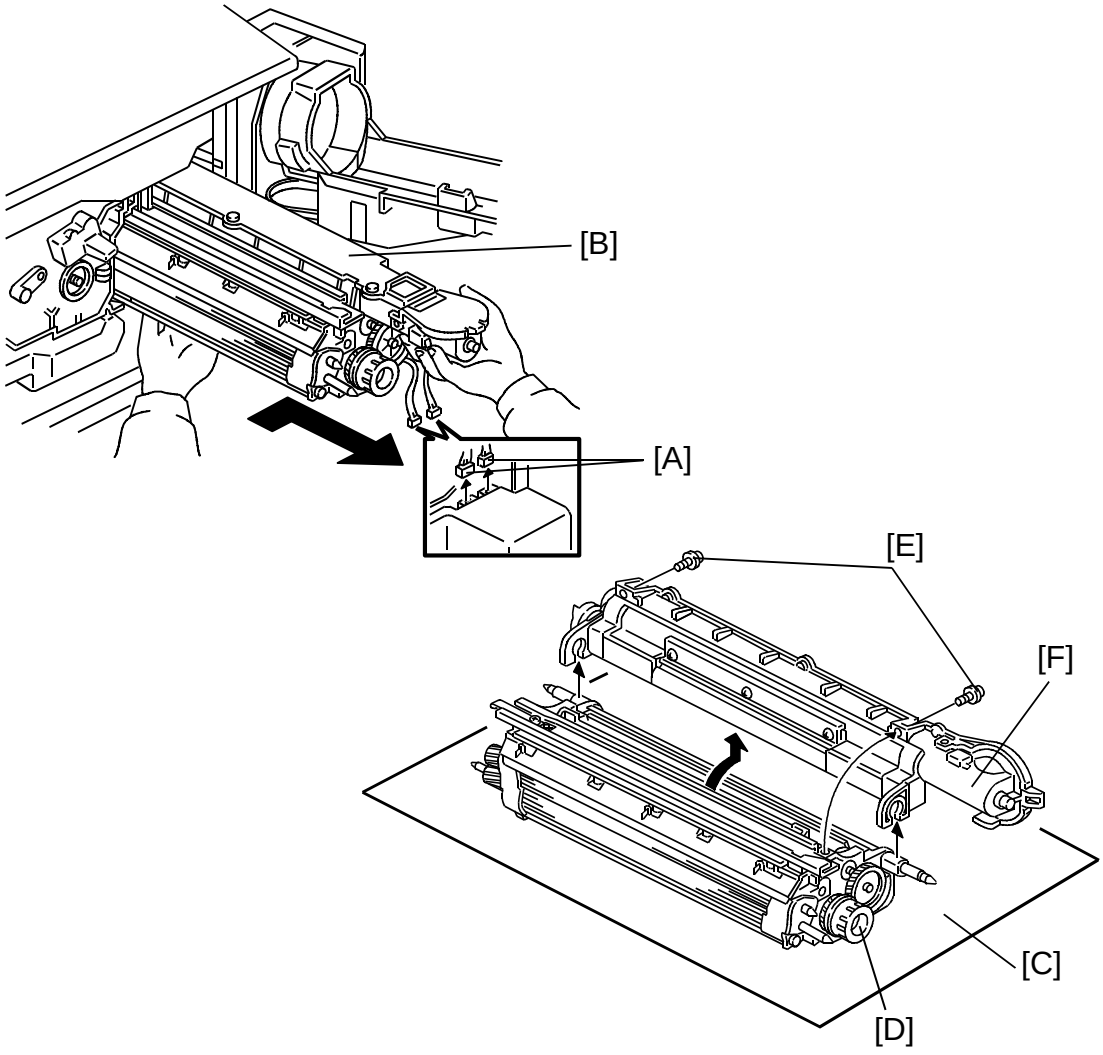



7. Remove the shutter cover [A] by releasing the hook [B].
8. Remove the shutter inner cover [C] (1 screw).
9. Open the toner bottle holder [D].

   NOTE: To open the toner bottle completely, while lowering the shutter lever [E], push the bracket [F] to the right,

10. Close the toner hopper cap [G].
11. Remove the screw [H] fixing the drum stay [1].
12. Remove the drum stay knob [J] .

then take out the drum




13. Disconnect two connectors [A].

14. Pull out the development unit [B].

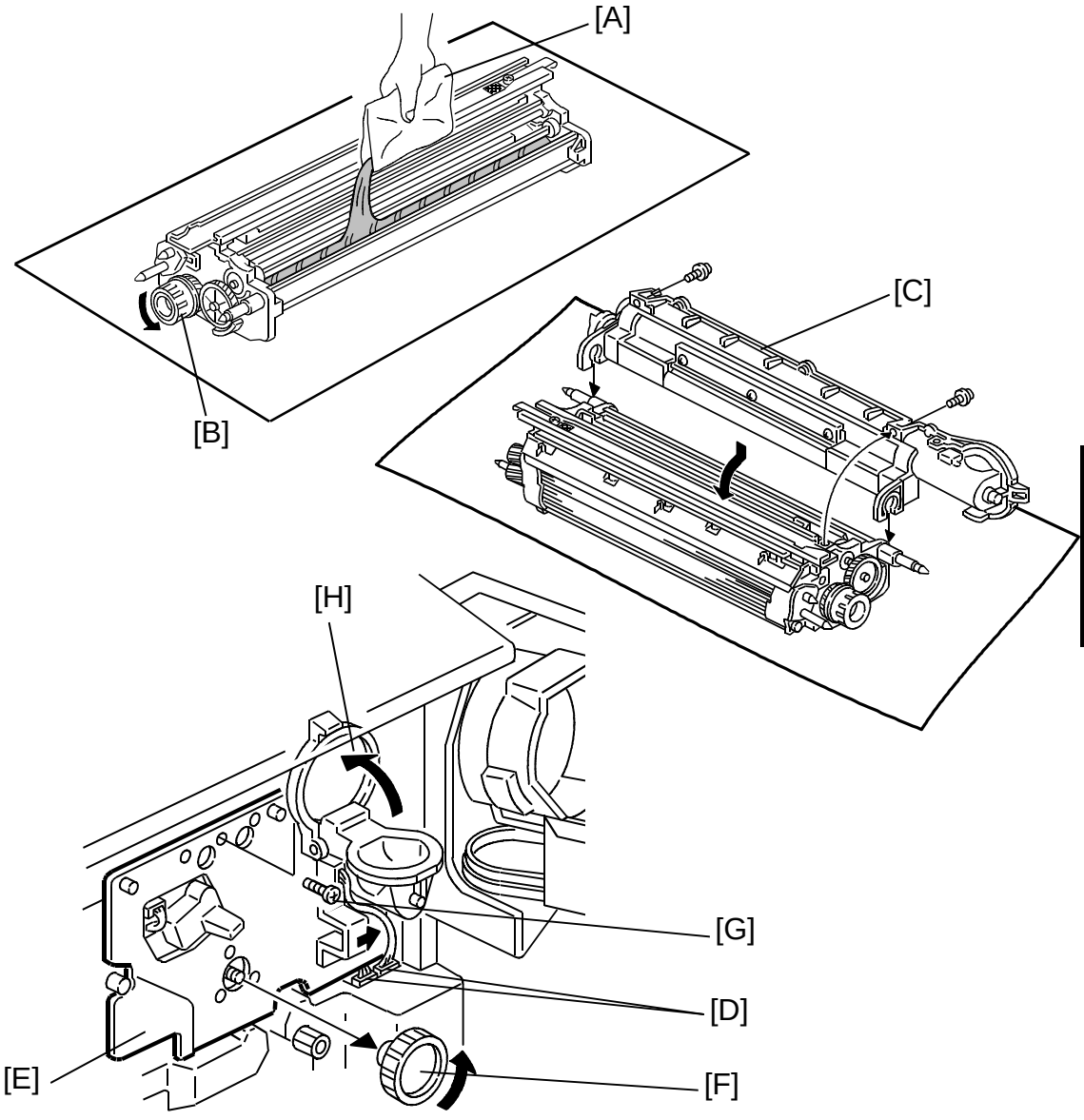
**NOTE:** 1. To prevent drum scratches, push the development unit to the right while pulling it out.

2. Place the development unit on the sheet [C] attached with the new developer to prevent foreign matter from being attracted to the sleeve rollers.

3. When pulling out the development unit, do not pull the knob [D].

15. Remove two screws [E] fixing the toner hopper [F].

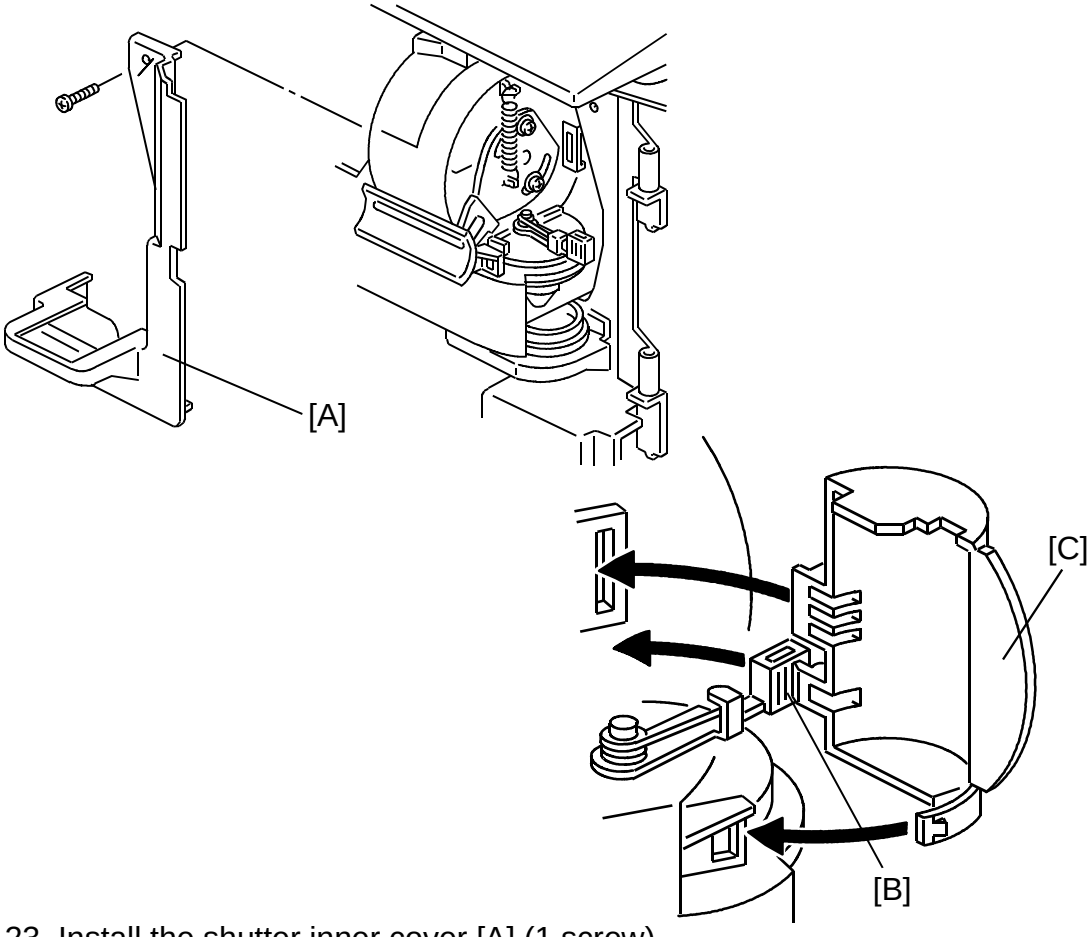
16. Turn the toner hopper 90 degree, then, move it up to remove it from the development unit.






17. Evenly pour in one pack of developer [A] while turning the knob [B].
18. Install the toner hopper [C] to the development unit (2 screws).
19. Install the development unit to the machine.
20. Connect two connectors [D].
21. Install the drum stay [E] and fix the drum stay knob [F] and one screw [G].

    **NOTE:** When installing the drum stay, be careful not to pinch the harness and keep the harness away from the gear.
22. Open the toner hopper cap [H].




23. Install the shutter inner cover [A] (1 screw).
24. While pushing the lever [B], set the shutter cover [C].
25. Set a toner bottle by following the instructions on the decal.

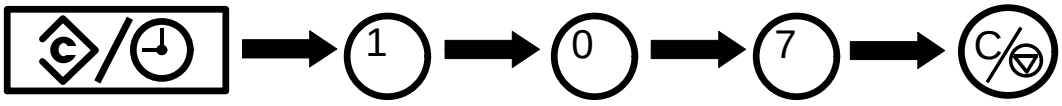
    **NOTE:** Before plugging in the power cord, install the guidance ROMs. (–26, –27 machines) (See page 3-12)

26. Plug in the power cord, then turn on the main switch. The machine automatically enter the process control data initial setting mode.

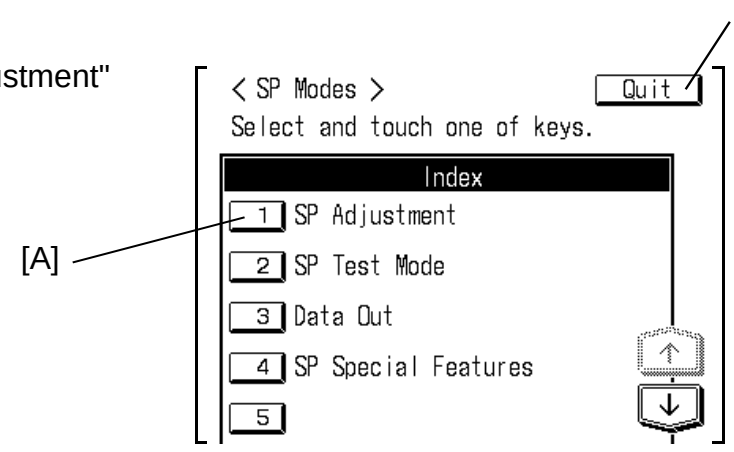
**NOTE:** Do not make any copy until completing developer initial setting. Do not turn off the main switch during the process control data initial setting mode.

27. Enter SP mode as follows:

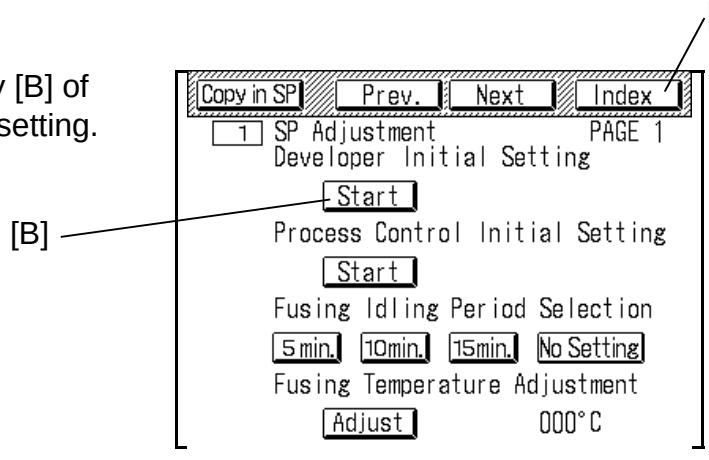
    1) Press the clear modes key.
    2) Enter "107".
    3) Press the clear/stop key for more than 3 seconds.




28. Press the "SP Adjustment" key [A].




29. Press the "Start" key [B] of the developer initial setting.




**NOTE:** Developer initial setting stops automatically.

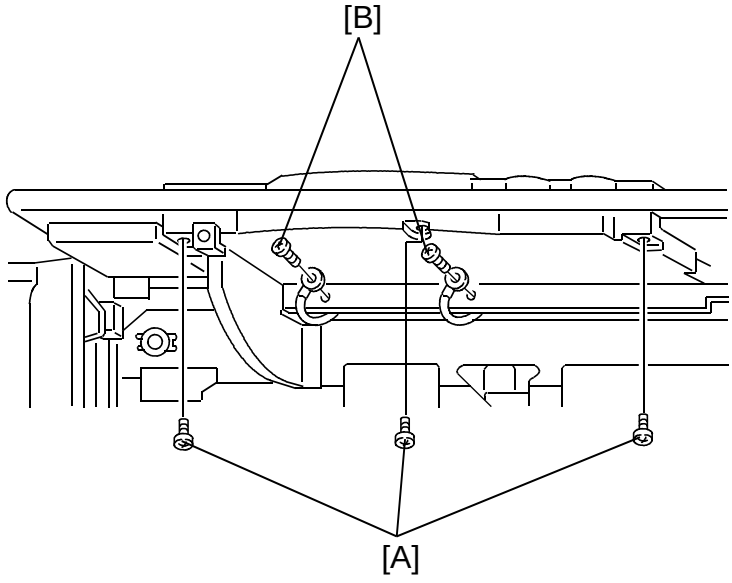
30. Press the "Index" key [C].

31. Press the "Quit" key [D] to exit SP mode.

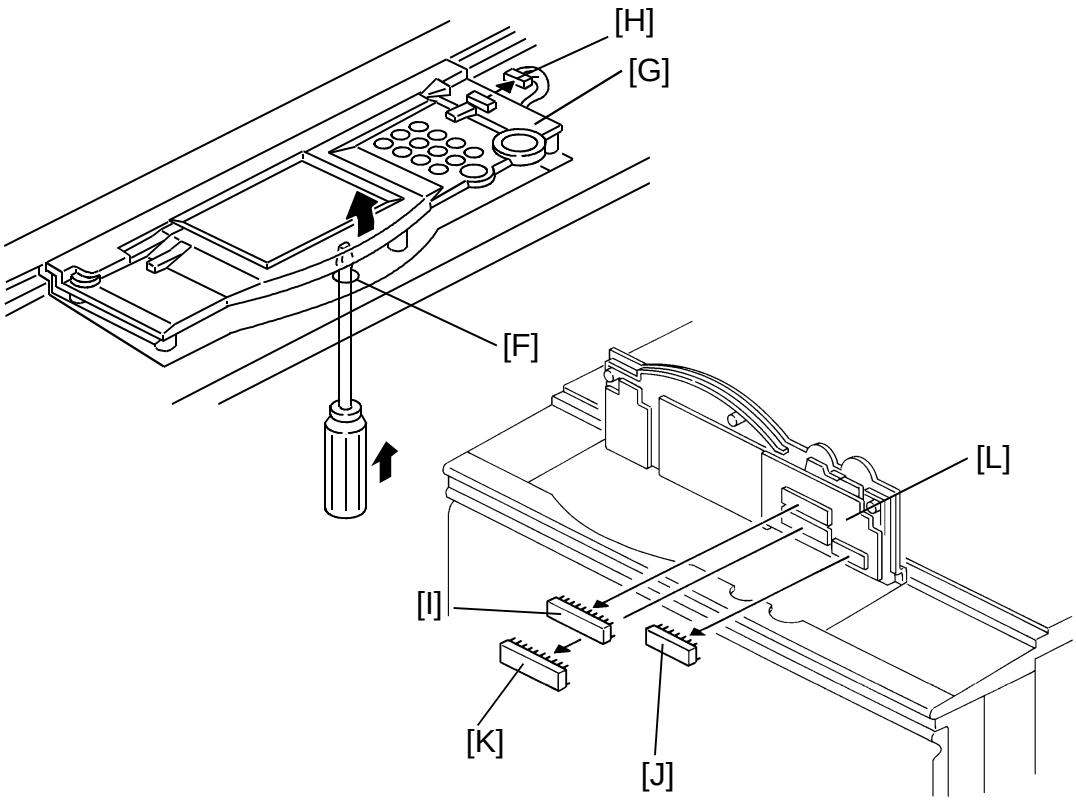
    **NOTE:** If the developer initial setting is not completed, you cannot exit the SP mode by pressing the "Quit" key. If this occur, turn off and on the main switch then repeat steps 29 to 33 again. If the result is the same, see the troubleshooting section "SC352" (Page 6- ).

32. Check copy quality and machine operation.

## 2.3 GUIDANCE ROM, INSTALLATION (OPTION: EUROPE VERSION ONLY)




1. If necessary, replace the three guidance ROMs on the operation panel PCB with the optional guidance ROMs as follows:
   1) Remove three screws [A].
   2) Remove the two screws [B] securing the protective earth wires.





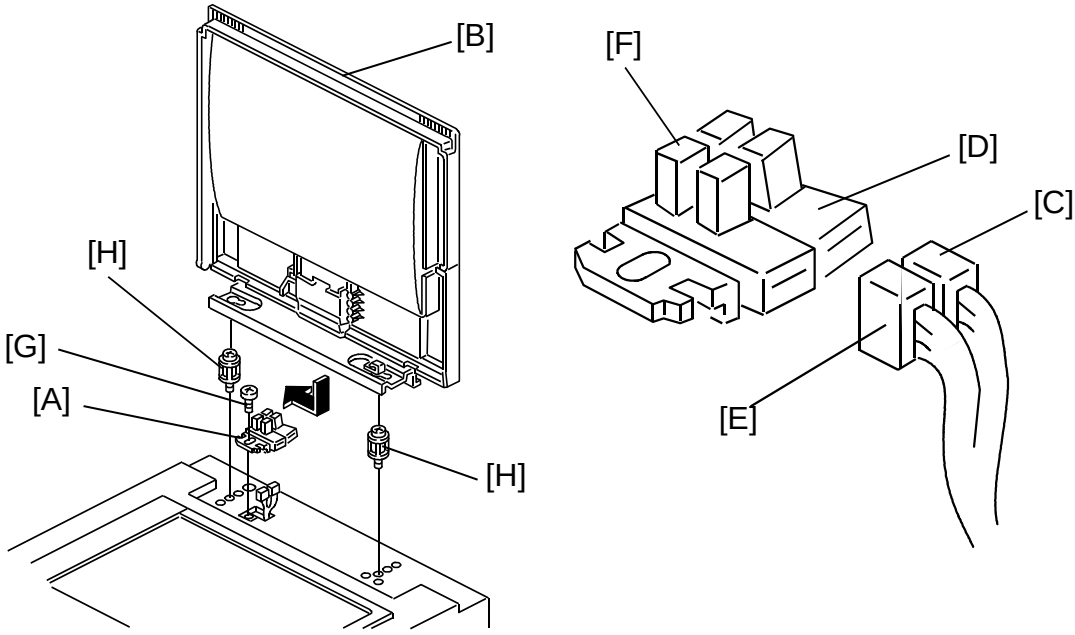

5) Insert the screw driver from the hole [F] and push the operation panel [G] up.
6) Disconnect the connector [H].
7) Replace the guidance ROMs (IC111 [I], IC112 [J], IC113 [K]) on the operation panel PCB [L].
8) Re-install the operation panel, the left inner cover and the left front door.

2. After installing the new guidance ROMs, plug in the power cord and turn on the main switch then perform the "touch panel display position adjustment" as follows.

1) Press the interrupt key then press the clear/stop key more than three seconds.

2) Follow the guidance on the LCD.

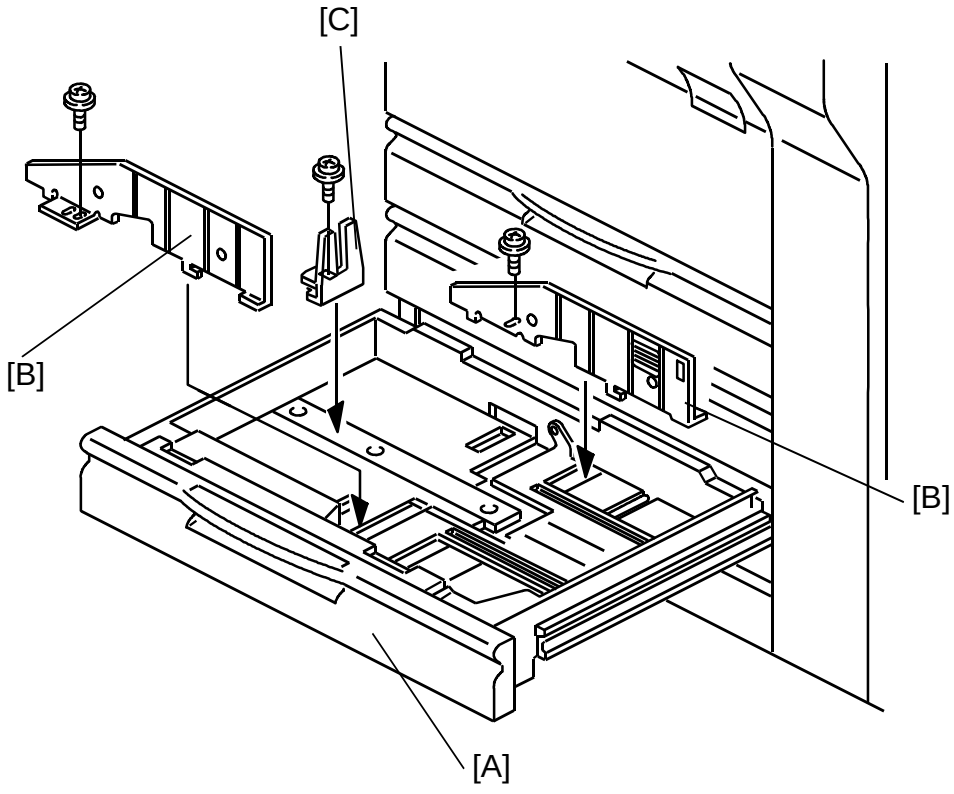
## 2.4 PLATEN COVER (OPTION) INSTALLATION




Install the optional platen cover as follows:

1. Install the sensor ass'y [A] which is an accessory of the platen cover [B] as follows:
   1) Connect the red connector [C] to the rear sensor [D].
   2) Connect the white connector [E] to the front sensor [F].
   3) Secure the sensor assembly with a screw [G].
2. Install the platen cover hooks [H].
3. Install the platen cover [B].

## 2.5 PAPER SIZE CHANGE



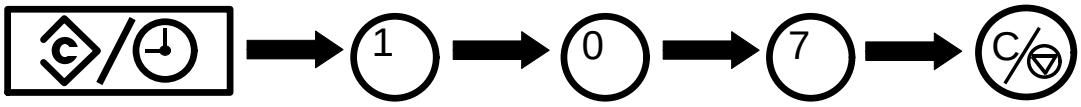

At the factory, all paper cassettes (1st, 2nd and 3rd) are set as A4 sideways. According to the customer's request, change the paper size as follows.

### 2.5.1 550 Sheets Paper Tray (1st and 3rd feed stations for A095 copier)

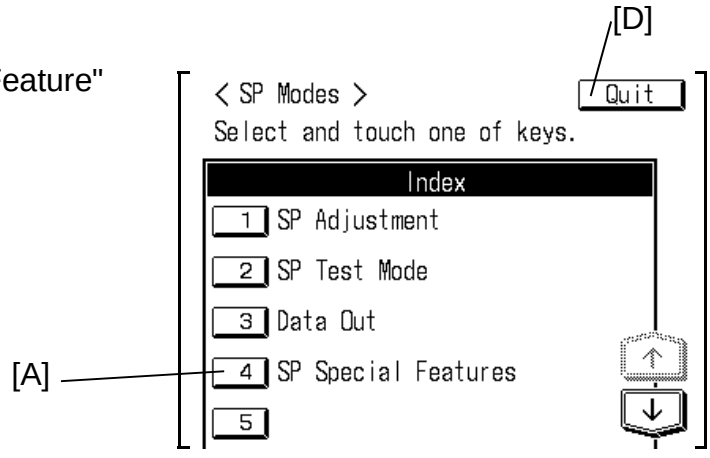
1. Draw out the paper feed tray [A].
2. Change the position of the front and the rear side fences [B] (2 screws each) and end fence [C] (one screw) according to the paper size.
3. Stick a size decal on the tray.

4. Enter SP mode as follows:

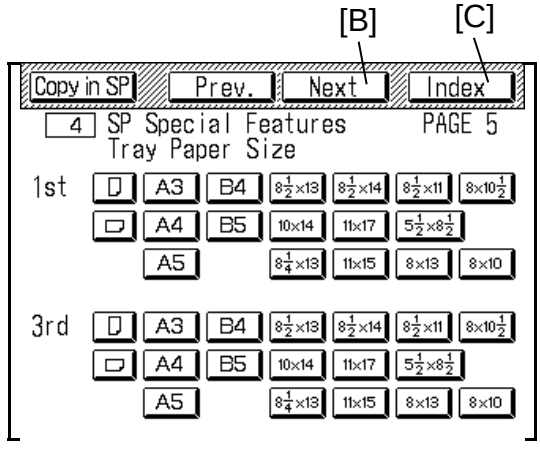
    1) Press the mode clear key.
    2) Enter "107".
    3) Press the clear/stop key more than 3 seconds.




5. Press the "SP Special Feature" key [A].




6. Press the "Next" key [B] 4 times to select the paper tray size setting mode (page 5) and press the appropriate paper size key of the 1st or the 3rd feed station.

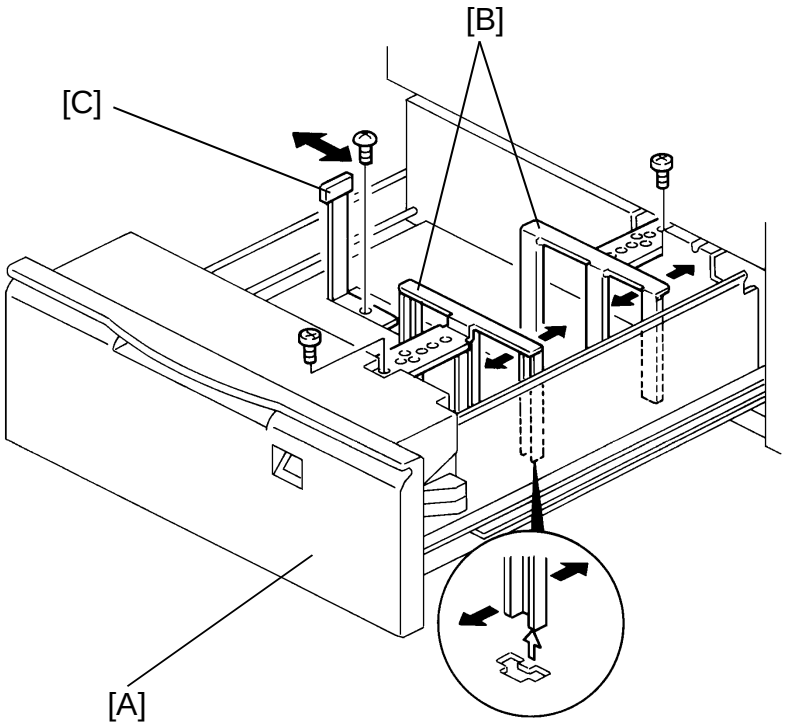



7. Press the "Index" key [C].

8. Press the "Quit" key [D] to exit SP mode.

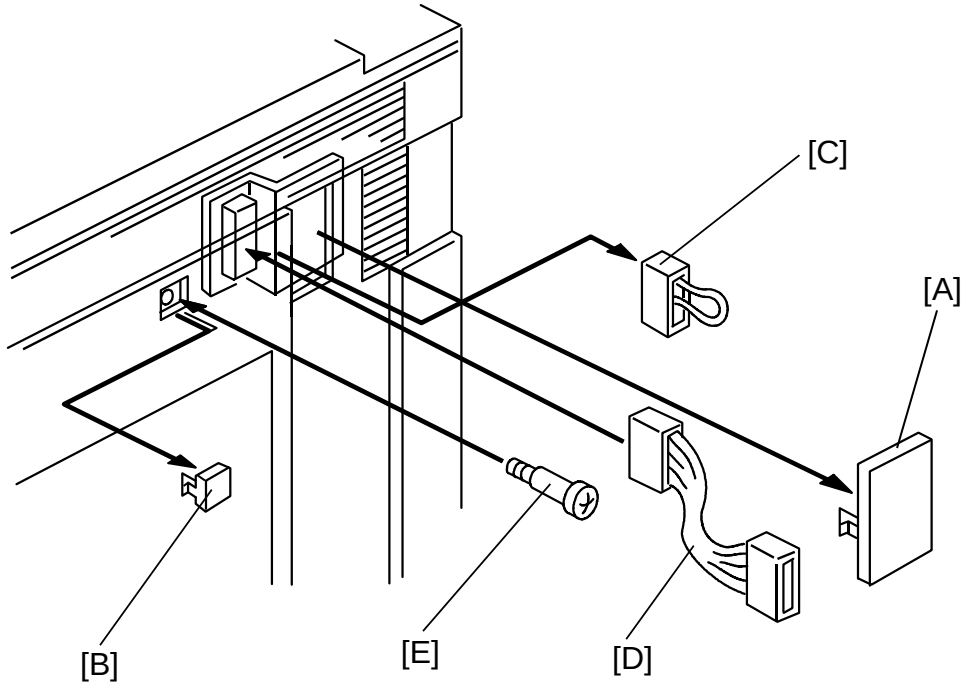
9. Check copy quality and machine operation.

## 2.5.2 1500 Sheets Paper Tray (3rd feed station for A096 copier)



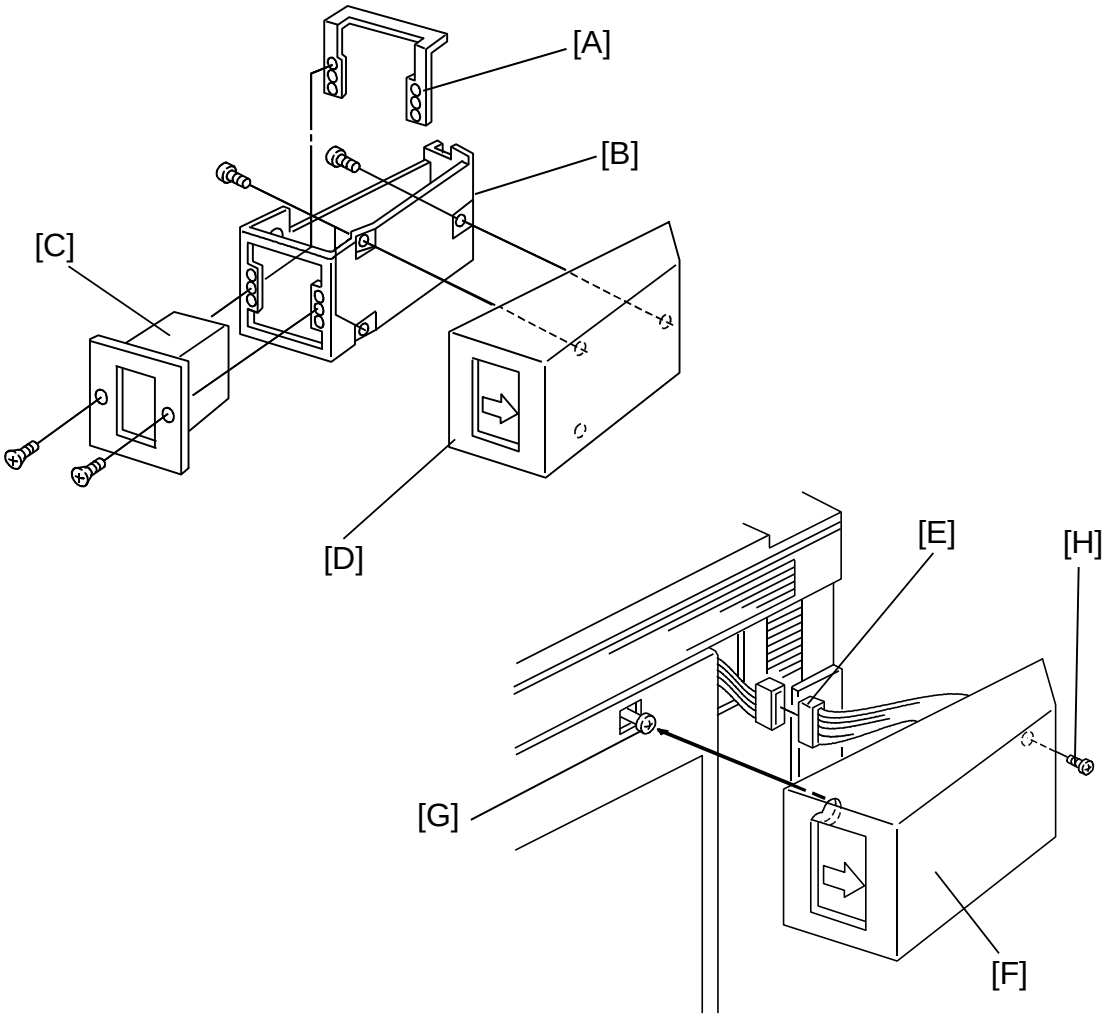

1. Draw out the third feed tray [A].
2. Change the position of the front and the rear side fences [B] (1 screw each) and the end fence [C] (one screw) according to the paper size.
3. Perform steps 3 to 8 from the previous page.

## 2.6 KEY COUNTER HOLDER INSTALLATION (OPTION)




**NOTE:** Key counter holder set is available as a service part.

1. Remove the two plastic caps [A] and [B] on the right upper cover of the copier.
2. Replace the short-circuit connector [C] with the connector of the accessory harness [D].
3. Install the stepped screw [E].



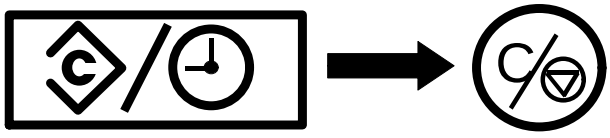



4. Hold the fixing plate [A] on the inside of the key counter bracket [B] and insert the key counter holder [C].
5. Fix the key counter holder [C] to the bracket [B] (2 screws).
6. Install the key counter cover [D] (2 screws).
7. Connect the connector [E] of the key counter holder.
8. Hook the key counter holder assembly [F] to the stepped screw [G].
9. Secure the key counter holder assembly [F] with a screw [H].

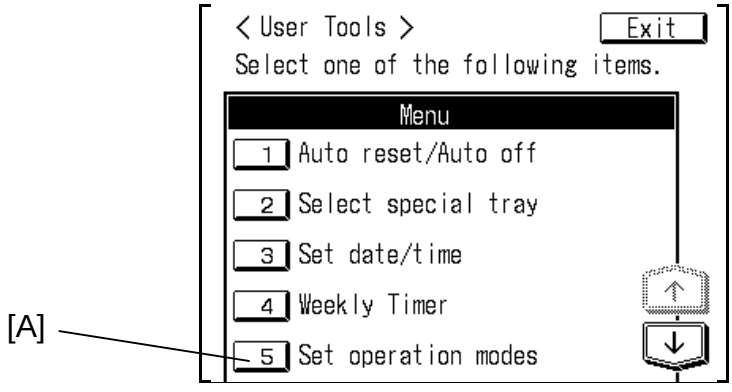
## 2.7 IMAGE DENSITY ADJUSTMENT

The copy image density is already adjusted to the standard level at the factory. If a customer requests to have the image density adjusted, it can be done through the User Tool mode.

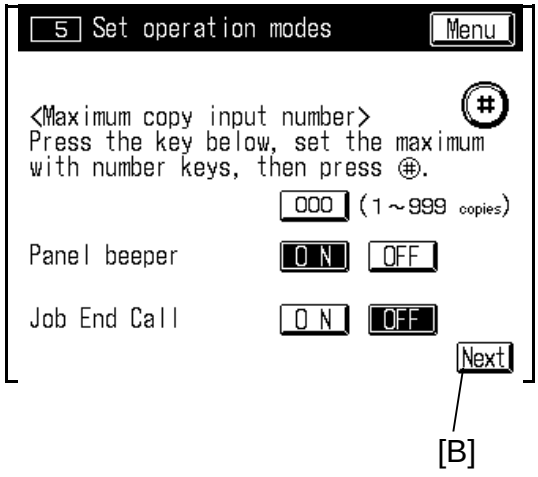
1. Enter the User Tool mode as follows:
   1) Press the clear mode key.
   2) Press the clear/stop key more than 3 seconds.



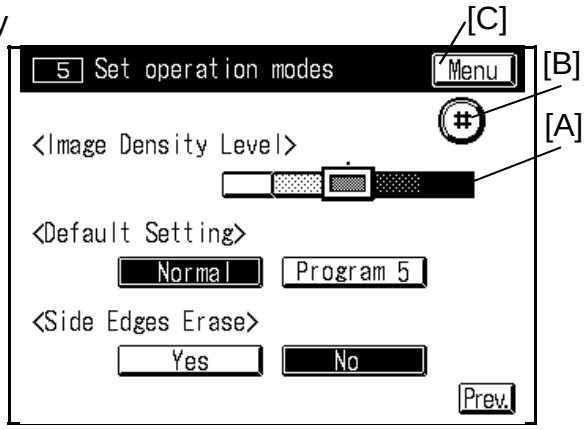
2. Press the "Set operation modes" key [A].




3. Press the "Next" key once [B].

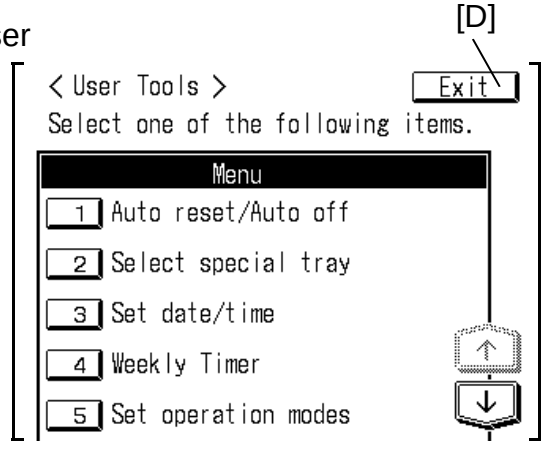


4. Select appropriate Image Density level (5 steps) adjustment:
   1) Press appropriate ID level key [A].
   2) Press the enter key [B].




5. Press the "Menu" key [C].

6. Press the "Exit" key [D] to exit User Tools mode.




7. Check copy quality.

# SECTION 4

# SERVICE TABLES

# 1. SERVICE REMARKS

## 1.1 HANDLING THE DRUM

The organic photoconductor drum is comparatively more sensitive to light and ammonia gas than a selenium drum.

1. Never expose the drum to direct sunlight.
2. Never touch the drum surface with bare hands. When the drum surface is touched with fingers or becomes dirty, wipe with a dry cloth or clean with wet cotton. Wipe with a dry cloth after cleaning with wet cotton.
3. Never use alcohol to clean the drum; alcohol dissolves the drum surface.
4. Store the drum in a cool, dry place away from heat.
5. Take care not to scratch the drum as the drum layer is thin and is easily damaged.
6. Never expose the drum to corrosive gases such as ammonia gas.
7. Always keep the drum in its protective sheet when out of the copier. Also always close the protective shutter on the drum unit when keeping the drum unit out of the copier. Doing so avoids exposing the drum to bright light or direct sunlight. This will protect the drum from light fatigue.
8. Process control data initial setting ( 1 SP Adjustment: PAGE 1) must be performed when a new drum is installed.

## 1.2 DRUM UNIT

1. Make sure that the drum unit is set in position and the drum stay is secured with a screw when 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).
2. To prevent drum scratches, remove the development unit before removing the drum unit.

## 1.3 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. Then clean it with alcohol if any toner still remains on the casing.
3. Clean the end blocks with a blower brush first to remove toner and paper dust. Then clean it with alcohol if any toner still remains on it.
4. Do not touch the corona wires with oily bare hands. Oil stains may cause white bands on copies.
5. Make sure that the corona wires are correctly positioned 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 to avoid any uneven charge. Also be sure that the corona wires are correctly positioned in the end blocks. (See charge corona wire replacement.)
7. Clean the charge grid plate with a blower bush (not with a cloth).
8. Do not touch the charge grid plate with oily bare hands. Also, do not bend the charge grid plate or make any dent on it. Doing so may cause an uneven charge.

## 1.4 OPTICS

1. When installing the exposure glass, make sure that the mark (red for the A095 and white for the A096) on the edge of the glass faces up. This side has received a special treatment to be smoother and generate less static electricity.
2. When moving the 1st or 2nd scanners, always hold them at the center. Move them slowly, carefully, and gently.
3. Do not bend or crease the exposure lamp flat cable.
4. Do not touch the following parts with bare hands:
   a) Reflectors
   b) Exposure lamp
   c) Mirrors and lens
   d) $V_D$, ADS and $V_L$ patterns
5. To clean the mirrors and lens, use only a clean soft cloth damped with alcohol or water.
6. Do not turn the vertical lamp position adjusting cam. Adjusting the vertical lamp position is very difficult because the filament cannot be seen clearly as the lamp is frosted.
7. The mirror surface with the reflective coating must face the light path. The spring plates must contact the reverse side of the mirror (the side without the reflective coating).
8. Because the toner shielding filter is coated with an anti-static solution (which is removed when wiped with water or alcohol) clean the toner shielding filter very gently to prevent generating static electricity, and wipe with dry cloth.

## 1.5 ERASE LAMP

1. A narrower lead edge erase margin increases the possibility of fusing jams. The margin should be at least 1.0 mm.
2. After cleaning the erase lamp unit, rub it lightly with your finger to discharge any static electricity on the unit surface.
3. Use only a dry cloth to clean the potential sensor.

## 1.6 DEVELOPMENT UNIT

1. Be careful not to nick or scratch the development roller sleeves.
2. Place the development unit on a sheet of paper after removing it from the copier. This prevents any small metal objects (staples, clips, E-rings, etc.) from being attracted to the development roller and getting inside the unit.
3. Be careful not to bend terminals on the rear side.
4. Clean the drive gears after removing the used developer.
5. Never load different types of developer or toner into the development unit. Doing so will cause poor copy image and toner scattering inside the copier.
6. Developer initial setting is necessary when new developer is loaded.
   Do not perform the developer initial setting with used developer.
   Do not make any copy before initial setting.
7. When removing the development unit, push it to the right to prevent the OPC drum from being scratched by part of the development unit.
8. The doctor gap and the development rollers position must not be adjusted in the field as they are precisely adjusted at the factory using special tools. Do not loosen any screws with white paint.

9. Before pulling out the development unit, disconnect two connectors.
10. When pulling out the development unit, do not pull the knob.
11. When setting the development unit in the machine, do not forget to set the two connectors.

## 1.7 TRANSFER BELT UNIT

1. Do not touch the transfer belt with oily bare hands.
2. When servicing the transfer belt cleaning unit, be careful not to damage the edge of the cleaning blade.
3. Apply setting powder or toner to the new cleaning blade.

## 1.8 CLEANING SECTION

1. When servicing the cleaning section, be careful not to damage the edge of the cleaning blade.
2. Do not touch the cleaning brush with bare hands.
3. Before disassembling the cleaning section, place a sheet of paper under it to catch any toner falling from the section.
4. Empty the used toner collection bottle at every PM.
5. Apply setting powder to the new cleaning blade.

## 1.9 PRE-TRANSFER LAMP

1. After cleaning the pre-transfer lamp filter, rub it lightly with your finger to discharge any static electricity on the filter.

## 1.10 PAPER FEED

1. Do not touch the pick-up, feed, separation rollers and the friction pads with oily bare hands.
2. The side fences and the rear fence of the paper trays should be positioned correctly to align with the actual paper size. Otherwise, paper misfeeds may occur.
3. Be careful when reinstalling the paper feed (pick-up, feed, separation) rollers in the paper tray unit. They are not interchangeable with the feed rollers of the by-pass feed tray and 3.5 K LCT because the feeding direction is different.

4. When actuating the front door safety switch to check the machine operation while the front doors are open also actuate the lower front door safety switch. Otherwise, the paper feed motor does not activate, causing SC501.

## 1.11 FUSING UNIT

1. Be careful not to damage the edges of the hot roller strippers or their tension springs.
2. Do not touch the fusing lamp with bare hands.
3. Make sure that the fusing lamp is positioned correctly (the yellow connector must be at the rear) and that it does not touch the inner surface of the hot roller.

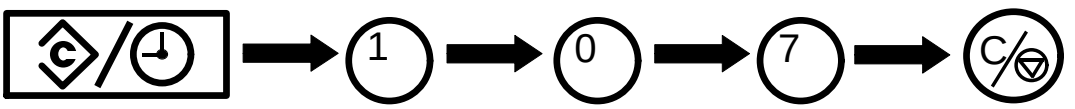
# 2. SERVICE PROGRAM MODE

## 2.1 SERVICE PROGRAM MODE OPERATION

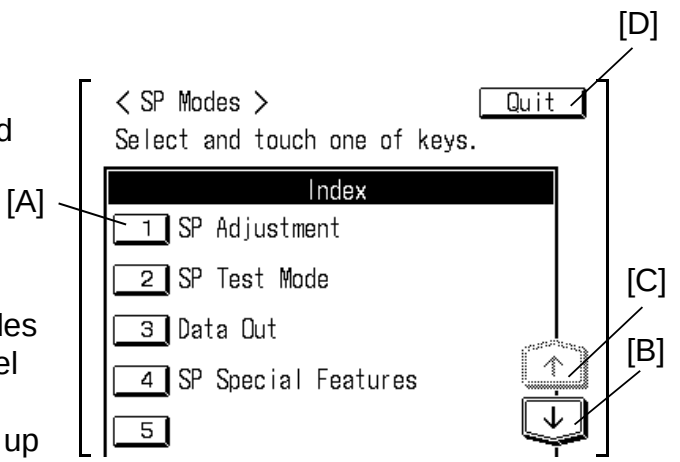
The service program (SP) mode is used to check electrical data, change modes, and adjust values.

### 2.1.1 Service Program Access Procedure

1. Press the clear modes key.
2. Enter "107".
3. Press the clear/stop key for more than 3 seconds until the service program menu appears on the touch panel display.




4. Touch a number [A] on the display to access the desired function.
   This copier has 9 service program modes (mode [5] is not used).
   Only 5 service program modes are visible on the touch panel display at one time.
   Use the down key [B] or the up key [C] to see other service program mode menus.

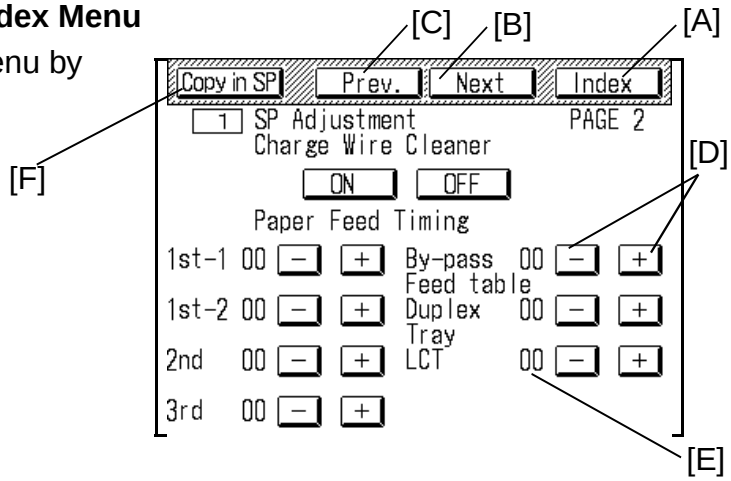



### 2.1.2 To Exit SP Mode

1. Touch the [Quit] key [D].

### 2.1.3 To Return to the Index Menu

1. Return to the index menu by touching Index [A] on the display.



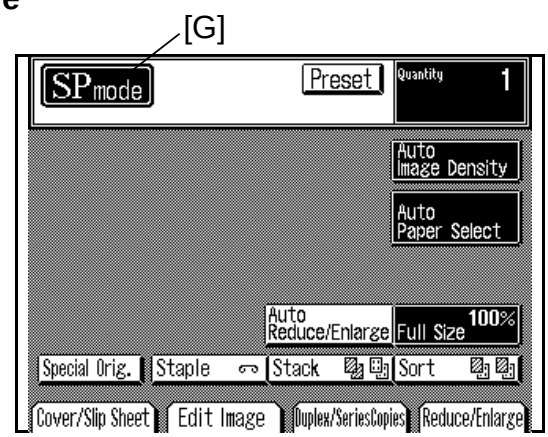

### 2.1.4 Change the Menu Screen

1. To move to the next page, touch Next [B].
2. To move to the previous page, touch Prev. [C].

**NOTE:** For the adjustments for which the data is entered by using, − + [D] the default data is "00".

### 2.1.5 Access to "Copy in SP" Mode

1. Press Copy in SP [F] to access "Copy in SP" mode. LCD displays as shown at right.
2. Select the appropriate copy mode and make trial copies.
3. Return to the SP mode by pressing SP mode [G].

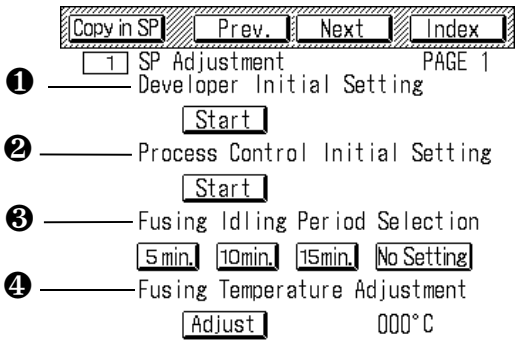



Service Tables

# 2.2 SERVICE PROGRAM MODE TABLE

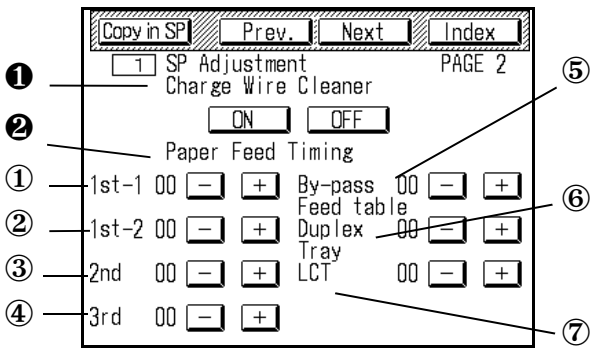
## 1 SP ADJUSTMENT

### PAGE 1




| Item | Function | Note |
|---|---|---|
| ❶ | Both the TD sensor toner supply target data (VREF) and the TD sensor gain data are set automatically by using new developer. | With new developer, do not make any copy before performing the developer initial setting.<br><br>This mode is required when new developer is set or the TD sensor is replaced. |
| ❷ | Starts the process control data initial setting. | Perform this program when the following parts are replaced (or cleaned).<br>Drum potential sensor / Exposure lamp / OPC drum /<br>Main charge wire and casing /<br>Mirrors / Lamps around the OPC drum / Charge P.P./ RAM etc. |
| ❸ | Increases the period to sufficiently heat the pressure roller at power on.<br>**Default:** 5 min | Perform this only if poor fusing occurs just after the power is turned on. |
| ❹ | Adjusts fusing temperature. (1°C/ step)<br>Procedure:<br>1) Touch [Adjust] .<br>2) Enter the appropriate number by using the number keys.<br>3) Press the enter key. | Increase only when thick paper is used and poor fusing occurs. Default: 185 °C |

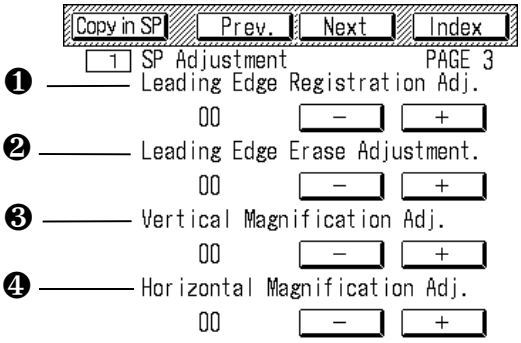
## PAGE 2



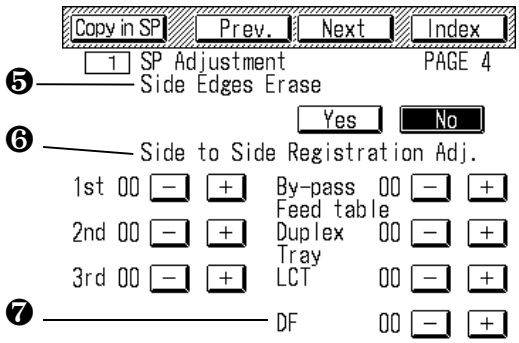

| Item | Function | Note |
|---|---|---|
| ❶ | Enables or disables automatic charge wire cleaning mechanism. **Default:** ON | Select OFF only when a cleaning mechanism malfunction occur. |
| ❷ | Changes the paper feed clutch on timing to adjust the paper buckle at the registration roller. (1 mm/step) | Refer to 6.6 Paper Feed Timing Adjustment" in section 5.<br>① First paper feed clutch ON timing at the first copy<br>② First paper feed clutch ON timing after the second copy.<br>③ 2nd paper feed clutch ON timing.<br>④ 3rd paper feed clutch ON timing.<br>⑤ By-pass feed clutch ON timing.<br>⑥ Duplex feed clutch ON timing.<br>⑦ LCT feed clutch ON timing. |

## 1 SP ADJUSTMENT

### PAGE 3



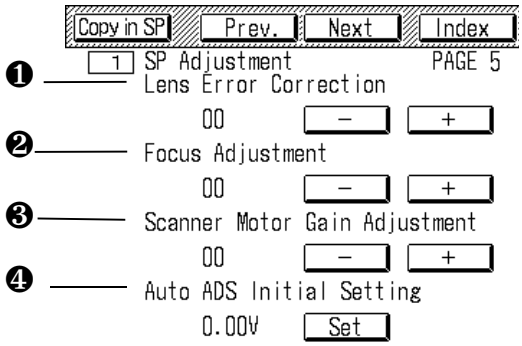

### PAGE 4



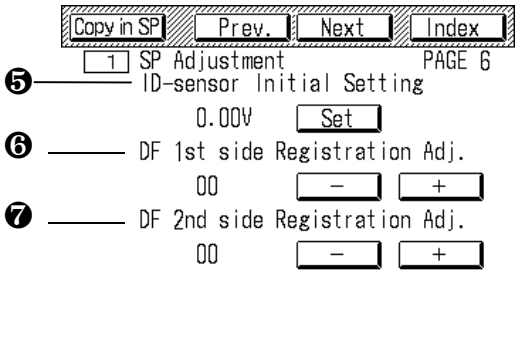

| Item | Function | Note |
|---|---|---|
| ❶ | Changes the ON timing of the registration clutch. (0.5 mm/step) | **Adjustment standard:** 0 ± 2 mm |
| ❷ | Changes the OFF timing of the erase lamp to adjust the leading edge erase margin. (0.5 mm/step) | **Adjustment standard:** 3.5 ± 2.5 mm |
| ❸ | Adjusts magnification in the paper feed direction by adjusting the scanner motor speed. (0.1%/step) | Perform this adjustment when the optic control PCB is replaced.<br>**Adjustment standard:** 100 ± 1% |
| ❹ | Adjusts magnification perpendicular to the direction of the paper feed. The lens position in the full size mode is changed. (0.1%/step) | Perform this adjustment when the optic control PCB is replaced.<br>**Adjustment standard:** 100 ± 1% |
| ❺ | Enables or disables the 5 mm width side edge erase. | **Default:** No |
| ❻ | Adjusts the lens horizontal stop position for each paper feed section.<br>(0.1 mm/step) | Refer to 8.9 Side-To-Side Registration Adjustment" in Section 5. |
| ❼ | Adjusts the lens horizontal stop position to compensate for variations of the side to side original position. | |

## 1 SP ADJUSTMENT

### PAGE 5



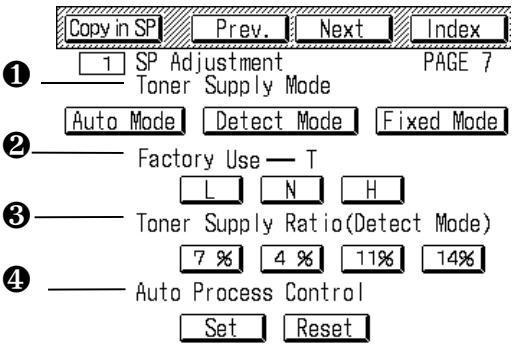

### PAGE 6



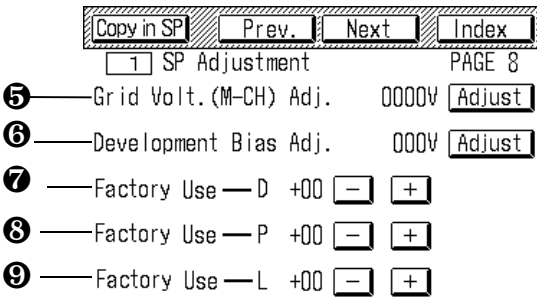

| Item | Function | Note |
|---|---|---|
| ❶ | Adjusts the lens position to correct magnification in enlarge/reduction modes. | Input only the data number marked on the lens. |
| ❷ | Adjusts the 3rd scanner home position to correct the focus. | |
| ❸ | Factory use only | Do not change the data. |
| ❹ | Adjusts the ADS sensor output while scanning the ADS pattern to 2.7 ± 0.1 V | This mode is also performed during the process control data initial setting. |
| ❺ | Adjusts the VSG to 4.0 ± 0.2 V. | This mode is also performed during the process control data initial setting. |
| ❻ | Adjusts the original stop position against the original side scale in one-sided original mode (0.5 mm/step). | Refer to page 43 of the DJF manual. |
| ❼ | Adjusts the original stop position against the original side scale in two-sided original mode (0.5 mm/step). | Refer to page 44 of the DJF manual. |

## 1 SP ADJUSTMENT

### PAGE 7



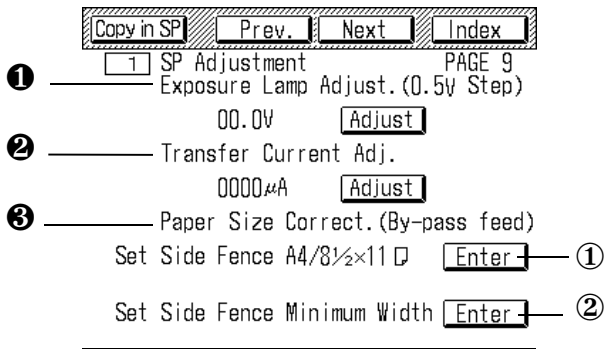

### PAGE 8




| Item | Function | Note |
|---|---|---|
| ❶ | Selects toner supply mode. (See the process control section for details of each supply mode.) **Default:** Auto Mode | Select "Auto Mode" in the field. |
| ❷ | Factory Use only | Select "N" in the field. |
| ❸ | Changes the toner supply ratio in fixed toner supply mode. **Default:** 4% | Be careful, there is no overtoning protective system. |
| ❹ | Enables and disables the auto process control ($V_R$, $V_L$, $V_D$ corrections). (See the process control section for details.) **Default:** Set | Normally select "Set". Select "Reset" only to confirm if the cause of the problem is related to process control or not. |
| ❺ | Selects the grid bias voltage when auto process control is disabled or RAM is cleared. (1 V/step) **Default:** 870 V | Enter the data by using the number keys, then touch "Enter". |
| ❻ | Selects the development bias voltage when auto process control is disabled or RAM is cleared. (1 V/step) **Default:** 220 V | Enter the data by using the number keys, then touch "Enter". |
| ❼ | Factory Use only | Do not change the data in the field. |
| ❽ | Factory Use only | Do not change the data in the field. |
| ❾ | Factory use only. | Do not change the data in the field. |

## 1 SP ADJUSTMENT

### PAGE 9

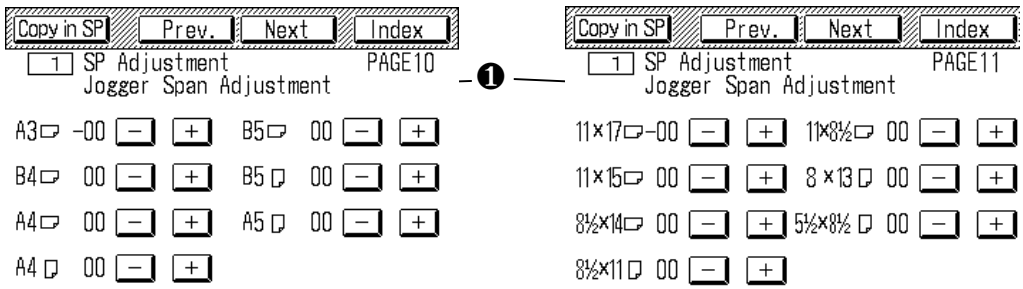



| Item | Function | Note |
|---|---|---|
| ❶ | Selects the exposure lamp voltage when auto process control is disabled or RAM is cleared. (0.5 V/step)<br>**Default:** 65.0 V | Enter the data by using the number keys, then touch [Adjust]. |
| ❷ | Adjusts the transfer current. (1μA/step)<br>**Default:** 40 μA | **Standard Data:** 40 mA<br>Enter the data by using the number keys, then touch [Adjust]. |
| ❸ | Initializes the by-pass paper size sensor. | **Procedure:**<br>1. Set the by-pass table side fence to the A4/81/2 x 11 position, then touch the [Enter] key ①.<br>2. Set the by-pass table side fence to the A6/41/4 x 51/2 position, then touch the [Enter] key ②.<br>Perform this mode when the by-pass paper size sensor is replaced. |

Service Tables

## 1 SP ADJUSTMENT

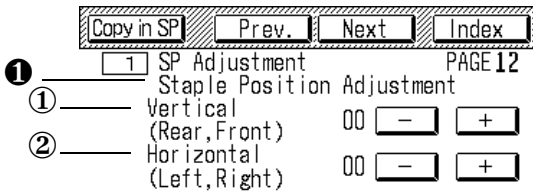
**PAGE 10** A4/A3 VERSION **PAGE 11** LT/DLT VERSION




| Item | Function | Note |
|---|---|---|
| ❶ | Adjusts the duplex jogger fence position for each paper size. (0.3 mm/step) | Press [+] to increase the distance in-between the side fences.<br>Press [−] to decrease the distance in-between the side fences.<br>**Procedure:**<br>1. Feed a sheet of paper to the duplex tray.<br>2. Take out the duplex unit.<br>3. Adjust the jogger fence position so that the distance between the fences becomes 1 mm wider than the paper width. |

## 1 SP ADJUSTMENT

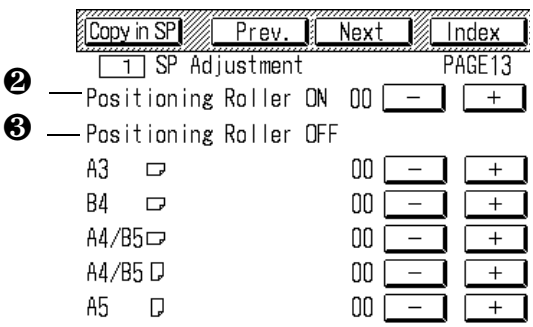
### PAGE 12




**NOTE:** PAGE 15 is for factory use only. PAGE 16 is an extra page, it is not used.

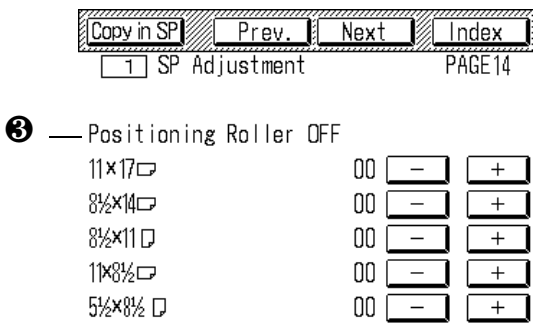
### PAGE 13

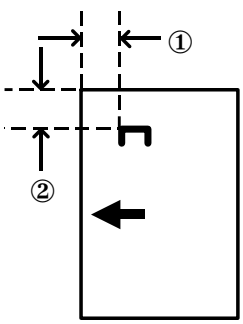
A4/A3 VERSION




### PAGE 14

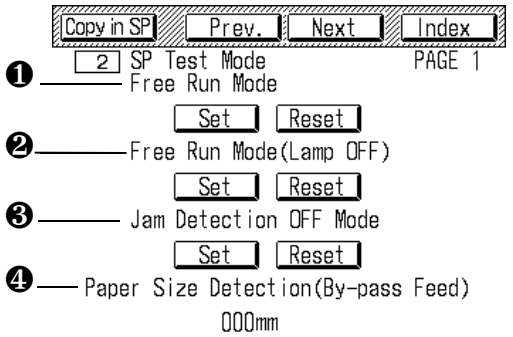
T/DLT VERSION



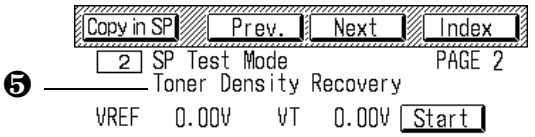

| Item | Function | Note |
|---|---|---|
| ❶ | Adjusts the staple position.<br>① Adjusts the vertical staple position.<br>② Adjusts the horizontal staple position. (0.5 mm/step)<br>  | This mode affects only the A377 Sorter Stapler (horizontal and vertical) and the A379 Finisher (horizontal only). |
| ❷ | Changes the duplex positioning roller down timing for both A4/A3 and LT/DLT version machines. | |
| ❸ | Changes the duplex positioning roller up timing to adjust the paper buckle at the separation roller. (5 ms/step) | Adjusts the timing so that the paper leading edge just touches the separation belt without any buckle. |

## 2 SP TEST MODE

### PAGE 1



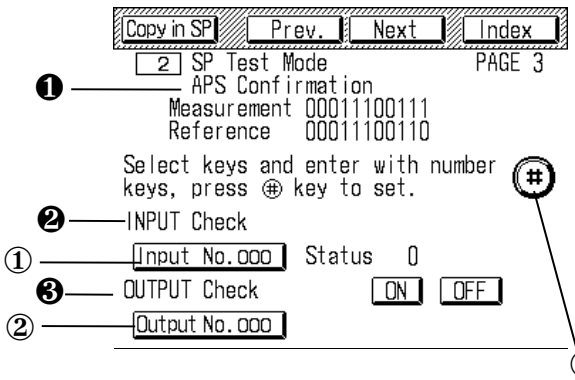

### PAGE 2



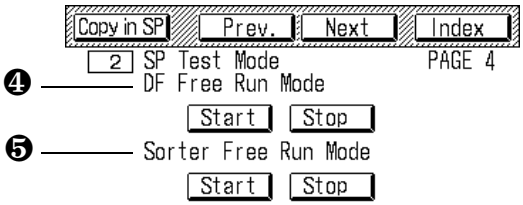

| Item | Function | Note |
|---|---|---|
| ❶ | Operates the copier without feeding paper. | Place sheets of white paper (A3 or 11" x 17") on the exposure glass. |
| ❷ | Operates the copier without feeding paper or turning on the exposure lamp. | Do not operate the machine in this mode for a long time because a lot of toner is spent. |
| ❸ | Disables jam detection.<br>(Not effective for peripherals) | This mode is only effective in the "Copy in SP" mode. |
| ❹ | Indicates the paper width detected by the by-pass paper size sensor. | |
| ❺ | Rotates the main and development motors and turns on the toner supply clutch to supply toner in the development unit.<br>T.D. sensor toner supply target data ($V_{REF}$) and detected data ($V_T$) is indicated. | Toner is supplied under the following conditions.<br>1. Toner supply ratio: 25%<br>2. Repeats 0.5 sec ON and 1.5 sec, OFF.<br>3. Continues 30 sec.<br>Check the image after this SP mode is completed. |

## 2 SP TEST MODE

### PAGE 3



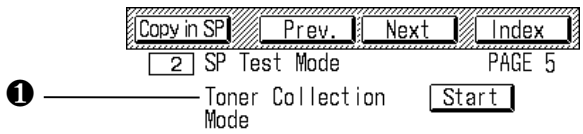

### PAGE 4




| Item | Function | Note |
|---|---|---|
| ❶ | Use to check if the original size sensors are correctly activated and de-activated. | Status 0 ----- de-activated<br>Status 1 ----- activated |
| ❷ | Use to check if the sensors or switches are correctly activated and de-activated.<br>**Access this mode as follows:**<br>1. Touch the input mode key ①.<br>2. Enter the sensor/switch/signal number by using the number keys on the operation panel. (Refer to the input check mode on page 4-35)<br>3. Touch the enter key ③. | Status 0 ----- de-activated<br>Status 1 ----- activated<br><br>This mode cannot be used with the MATT20 |
| ❸ | Use to confirm the proper function of the copier electrical components<br>**Access this mode as follows:**<br>1. Touch the Output mode key ②.<br>2. Enter the electrical component number by using the number keys on the operation panel (Refer to the output check mode on page 4-41).<br>3. Press the enter key ③. | Touch [ON] to activate and touch [OFF] to de-activate the electrical component<br><br>This mode cannot be used with the MATT20 |
| ❹ | Operates the DF without the copier operation. | **Procedure:**<br>1. Set originals on the table.<br>2. Touch [Start] . |
| ❺ | Operates the sorter stapler (A374 and A377) or A379 finisher without copier operation. | The sorter operates as if 3 copies are made from five originals in sort and staple mode. No stapling is actually made. |

## 2 SP TEST MODE

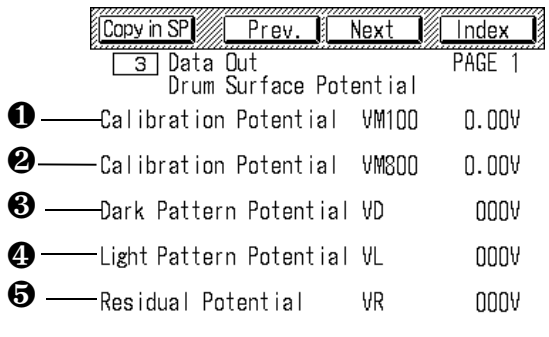
### PAGE 5



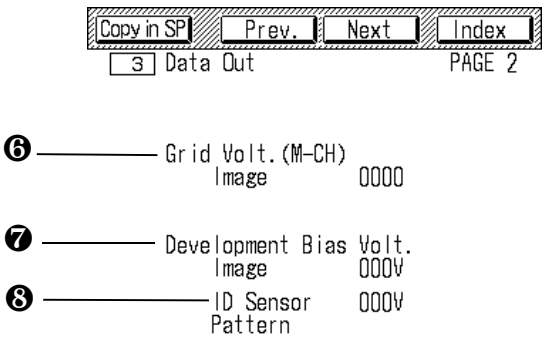

| Item | Function | Note |
|---|---|---|
| ❶ | Operates the toner collection drive mechanism. | After touching the Start key, the toner collection motor turns on for 1 minute. |

## 3 DATA OUT MODE

**PAGE 1**




**PAGE 2**

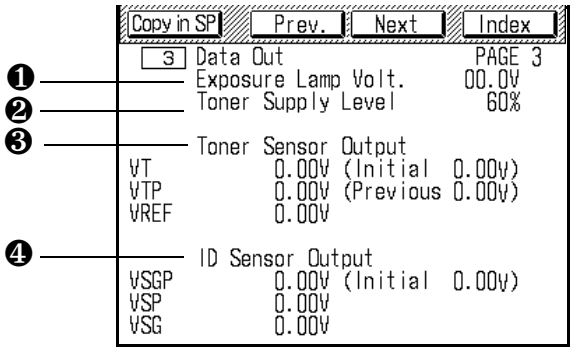



| Item | Function | Note |
|---|---|---|
| ❶ | Indicates the drum potential sensor output when –100 V is applied to the OPC drum. | **Standard data:** 0.1 ~ 0.7 V |
| ❷ | Indicates the drum potential sensor output when –800 V is applied to the OPC drum. | **Standard data:** 2.7 V ~ 4.2 V |
| ❸ | Indicates the drum potential when detecting the $V_D$ pattern. | **Standard data:** $V_R$ +770 ± 20 V |
| ❹ | Indicates the drum potential when detecting the $V_L$ pattern. | **Standard data:** $V_R$ +140 ± 20V |
| ❺ | Indicates the drum potential when detecting the bare drum surface. | **Standard data:** 0 ~ 200 V |
| ❻ | Indicates the charge grid bias voltage decided during process control data initial setting. | Works only when auto process control is enabled. ( 1 SP Adjustment – PAGE 7)<br>**Standard data:** 870 ~ 1,200 V |
| ❼ | Indicates the development bias voltage decided during process control data initial setting. | Works only when auto process control is enabled. ( 1 SP Adjustment – PAGE 7)<br>**Standard data:** VR -220 V |
| ❽ | Indicates the ID sensor bias voltage decided during process control data initial setting. | Works only when auto process control is enabled. ( 1 SP Adjustment – PAGE 7)<br>**Standard data:** 300 V ~ 400 V |

**NOTE:** ❸ ~ ❺ are absolute value.

## 3 DATA OUT MODE

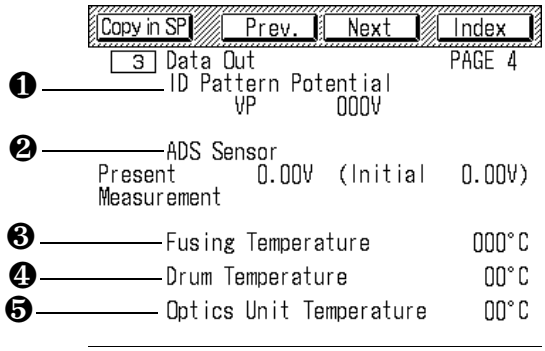
### PAGE 3




| Item | Function | Note |
|---|---|---|
| ❶ | Indicates the exposure lamp voltage (ID Level 4) decided during process control data initial setting. | Works only when the auto process control is enabled ( 1 SP Adjustment - PAGE 7.)<br>**Standard data:** 50 ~ 80 V |
| ❷ | Indicates the toner supply level by image area ratio on an original surface. This data changes at every copy through fuzzy control. | |
| ❸ | Indicates the TD sensor output:<br>VT: Current detected data<br>Initial: TD sensor output at last process control data initial setting.<br>Previous: Previous detected data during ID sensor compensation.<br>VTP: Last detected data during ID sensor compensation.<br>VREF: Toner supply level target data. | **Standard data:** 0.5 ~ 4.0 V |
| ❹ | Indicates the ID sensor output<br>VSGP: ID sensor output while detecting the bare drum surface (with dev. bias and development roller rotation)<br>VSP: ID sensor output while detecting the ID sensor pattern image<br>VSG: ID sensor output while detecting the bare drum surface (without development bias and without development roller rotation) | VSGP is not used for auto image density control.<br><br>**Abnormal condition:**<br>$V_{SGP}$ < 2.5 V<br>$V_{SP}$ > 2.5 V<br>$V_{SG}$ < 2.5 V |

## 3 DATA OUT MODE

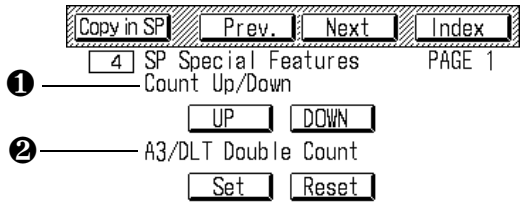
### PAGE 4




| Item | Function | Note |
|---|---|---|
| ❶ | Indicates the drum potential while detecting ID sensor pattern (grid voltage = – 700 V) | **Standard data:** 600 ~ 700 V |
| ❷ | Indicates the ADS sensor output at every scan. | **Standard data:** 2.7 ± 0.1 V<br>Present: Output at last detection.<br>Initial: Output at ID sensor initial setting. |
| ❸ | Indicates the fusing temperature based on the fusing thermistor output. | **Standard data:** Around 185°C |
| ❹ | Indicates the drum temperature based on the drum thermistor output. | |
| ❺ | Indicates the optics temperature based on the optics thermistor output. | |

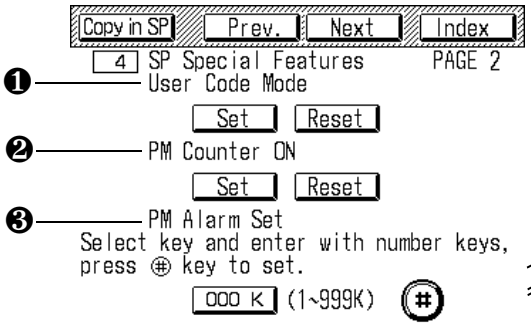
## 4 SP SPECIAL FEATURES

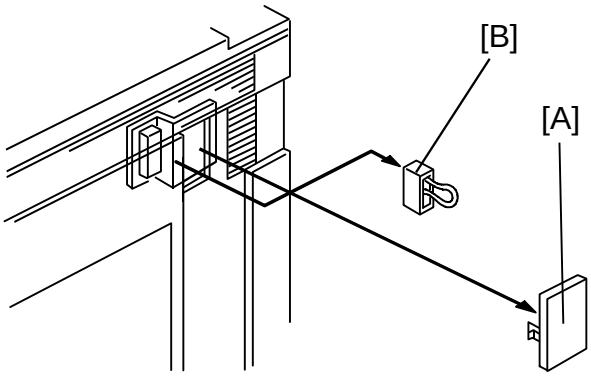
### PAGE 1




| Item | Function | Setting | | Default |
|---|---|---|---|---|
| ❶ | Selects copy count up or down. | Set<br>Reset | Count up<br>Count down | Reset |
| ❷ | Counts twice when an A3 or 11" x 17" copy is made. | Set<br>Reset | Count twice<br>Count once | Reset |

**PAGE 2**




| Item | Function | Setting | | Default |
|---|---|---|---|---|
| ❶ | Enables user code mode.<br>* See the NOTE below. | Set<br>Reset | Enable<br>Disable | Reset |
| ❷ | Enables the PM alarm. | Set<br>Reset | Enable<br>Disable | Reset |
| ❸ | Selects the PM alarm interval after counter clear ( 9 PM Counter Clear - PAGE 1) | | | 120 K |

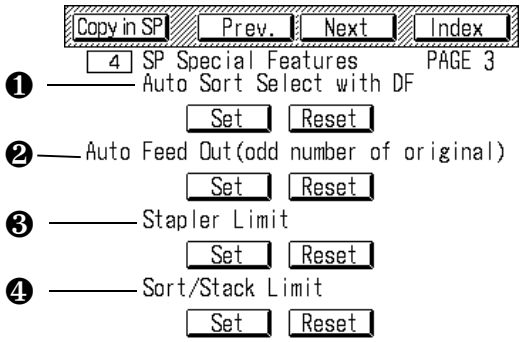
**NOTE:** To enable user code mode, perform the following procedure.

**CAUTION: When Set is selected, at least one user code should be entered.**

1. Register the user code by using user tool No.6.
2. Enter SP mode then enable the user code mode by selecting Set .
3. Turn off the main switch.
4. Remove the plastic cap [A] on the right upper cover.
5. Disconnect the key counter short-circuit connector [B].
6. Return the plastic cap [A].
7. Turn on the main switch and check the operation.

## 4 SP SPECIAL FEATURES

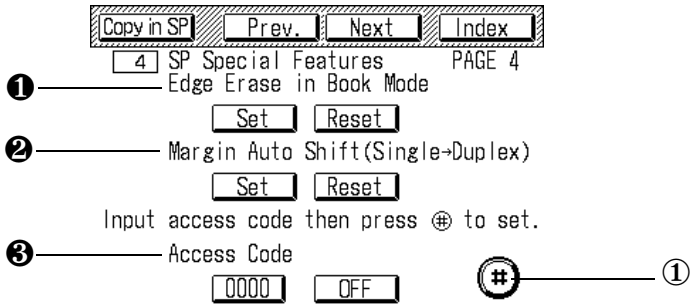
### PAGE 3




| Item | Function | Setting | | Default |
|---|---|---|---|---|
| ❶ | Enables automatic sort mode selection when 2 or more is entered in the copy counter and an original is set on the DJF feed tray. | Set<br>Reset | Enable<br>Disable | Set |
| ❷ | Enables automatic feed-out of the last copy on the duplex tray without copying when an odd number of originals is set on the DJF feed tray. | Set<br>Reset | Enable<br>Disable | Set |
| ❸ | Cancels the maximum copy quantity limit (50) in staple mode. | Set<br>Reset | Limit<br>No limit | Set |
| ❹ | Cancels the maximum copy quantity limit in sort mode (50) and in stack mode (40). | Set<br>Reset | Limit<br>No limit | Reset |

## 4 SP SPECIAL FEATURES

### PAGE 4



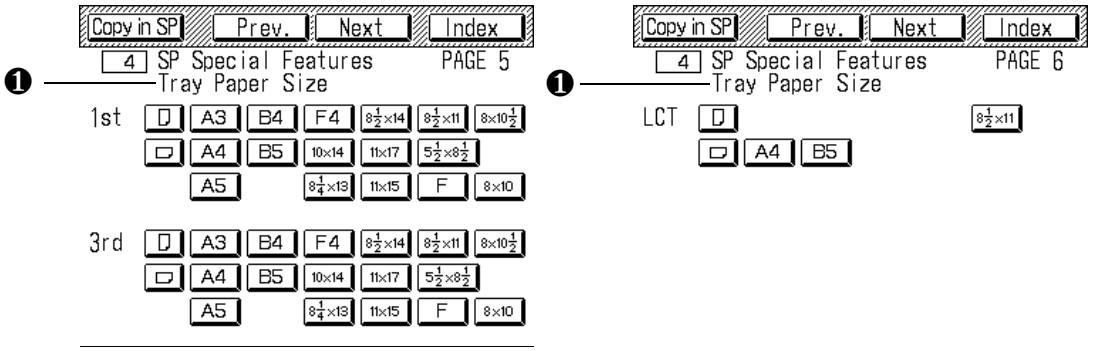

| Item | Function | Setting | | Default |
|---|---|---|---|---|
| ❶ | Enables automatic access to the border/center erase mode in platen cover mode. | Set | Enable | Reset |
| | | Reset | Disable | |
| ❷ | Enables automatic selection of a right margin (5 mm, 0.2") for the duplex back side when making 2 sided copies from 1 sided originals. | Set | Enable | Reset |
| | | Reset | Disable | |
| ❸ | Limits user access to User Tools No. 10 and 11 to only those who know the access code.<br>Procedure:<br>1. Touch the 0000 Key.<br>2. Input the access code with the number keys.<br>3. Touch the enter key ①. *See the caution below. | Set | Limit | Reset |
| | | Reset | No limit | |

**CAUTION: After enabling this mode, be sure to instruct the key operator not to forget the access code.**

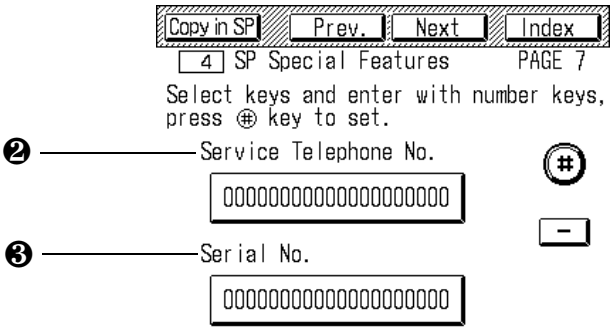
Service Tables

# 4 SP SPECIAL FEATURES

## PAGE 5, 6



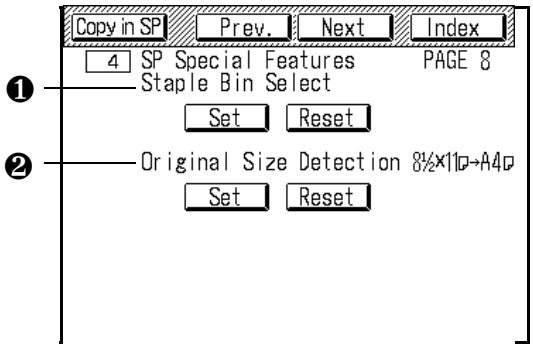

## PAGE 7



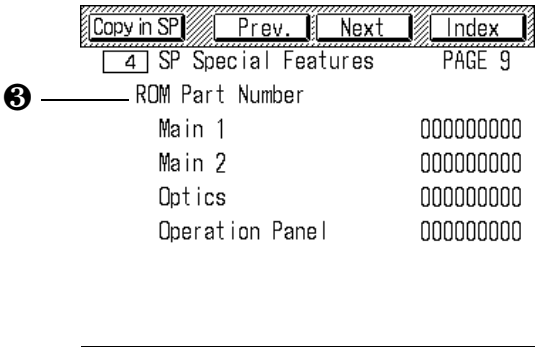

| Item | Function | Note |
|---|---|---|
| ❶ | Selects the paper size of each paper feed station.<br>Refer to section 3 for details of the paper size change procedure. | 1. Default is A4 or 8 1/2 x 11 sideways. |
| ❷ | Holds the service center telephone number. This telephone number is indicated on the LCD with the SC number when a problem occurs. | **Entering procedure:**<br>1. Touch the [00000000000000000]<br>2. Enter the phone number by pressing the number keys. (Touch [-] to enter the hyphen)<br>3. Touch (#) . |
| ❸ | Holds the copier's serial number. | |

## 4 SP SPECIAL FEATURES

### PAGE 8




### PAGE 9

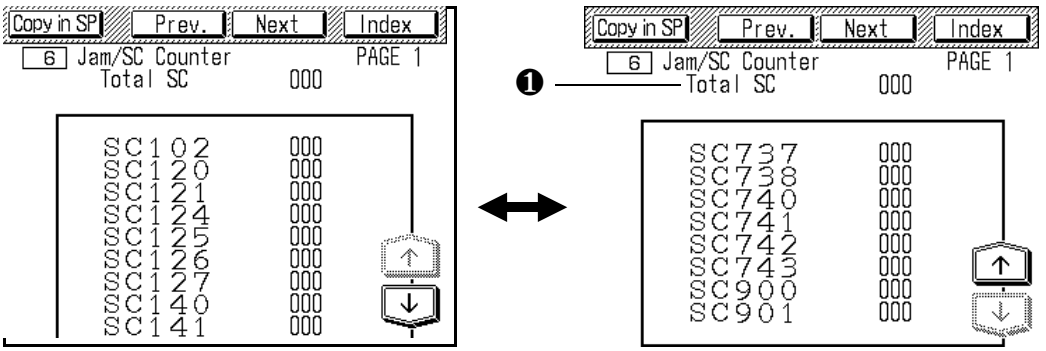



| Item | Function | Setting | | Default |
|---|---|---|---|---|
| ❶ | Selects the staple mode for the 1st job when the staple mode is selected for the 2nd job in the pre-set mode. | Set<br>Reset | Enable<br>Disable | Reset |
| ❷ | The original size detection system for this model cannot distinguish between A4 and 8 1/2 x 11. This mode enables recognition of A4 and 8 1/2 x 11originals as A4 size for the A4/A3 version as 8 1/2 x 11 for the LT/DLT version. | Set<br>Reset | Enable<br>Disable | Reset |
| ❸ | Indicates the part number, with ROM suffixes, on each PCB. *See NOTE below. | | | |

**NOTE:** Only the produced date is indicated for the operation panel (guidance) ROMs.

## 6 JAM/SC COUNTER

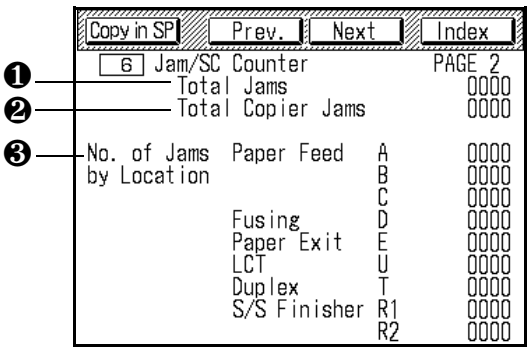
### PAGE 1



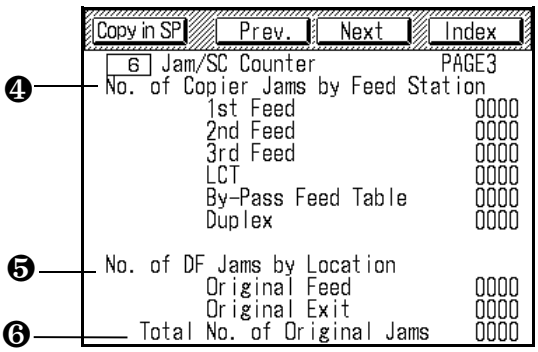

| Item | Function | Note |
|---|---|---|
| ❶ | Indicates the total number of occurrences of each SC code. | Press ↑ to scroll up.<br>Press ↓ to scroll down.<br>See Section 6 for details of each SC code.<br>The counters for SCs that have not occurred are not displayed. |

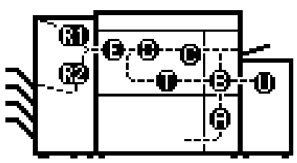
## 6 JAM/SC COUNTER

### PAGE 2




### PAGE 3

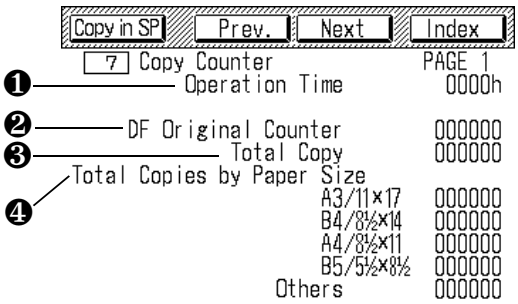



| Item | Function | Note |
|---|---|---|
| ❶ | Indicates the total number of jams in the copier and all peripherals. | |
| ❷ | Indicates the total number of jams in the copier only. | |
| ❸ | Indicates the total number of jams at each location. | **Locations:**  |
| ❹ | Indicates the total number of jams for each feed station. | |
| ❺ | Indicates the total number of jams at each location in the DF. | |
| ❻ | Indicates the total number of jams in the DF. | |

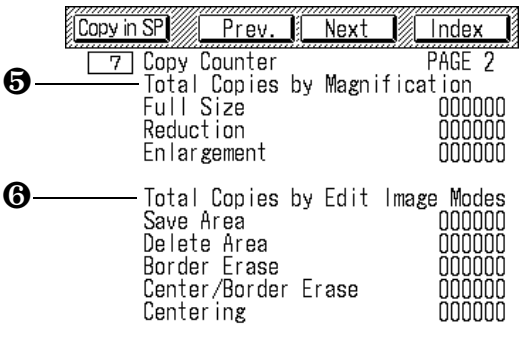
Service Tables

## 7 COPY COUNTER

### PAGE 1



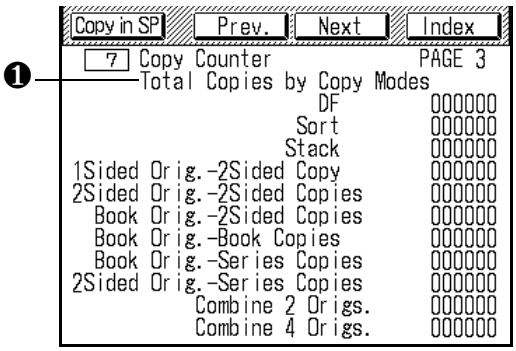

### PAGE 2

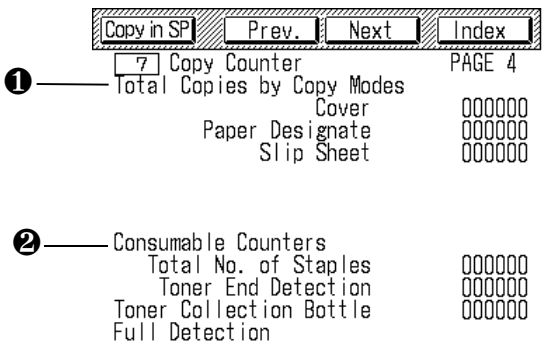



| Item | Function | Note |
|---|---|---|
| ❶ | Indicates the total main motor rotation time. | |
| ❷ | Indicates the total number of originals fed by the DF. | |
| ❸ | Indicates the total number of copies. | |
| ❹ | Indicates the total number of copies for each paper size. | |
| ❺ | Indicates the total number of copies for each magnification. | |
| ❻ | Indicates the total number of copies for each edit image mode. | |

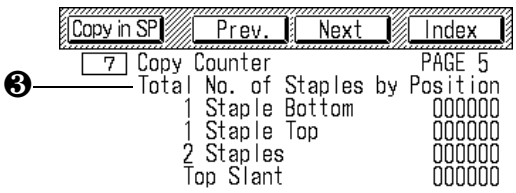
## 7 COPY COUNTER

### PAGE 3, 4

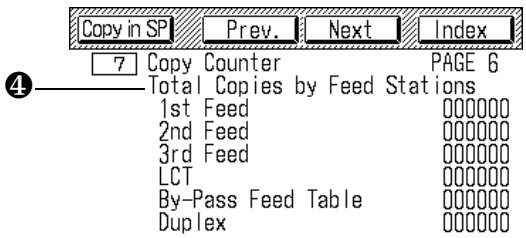



### PAGE 5




### PAGE 6

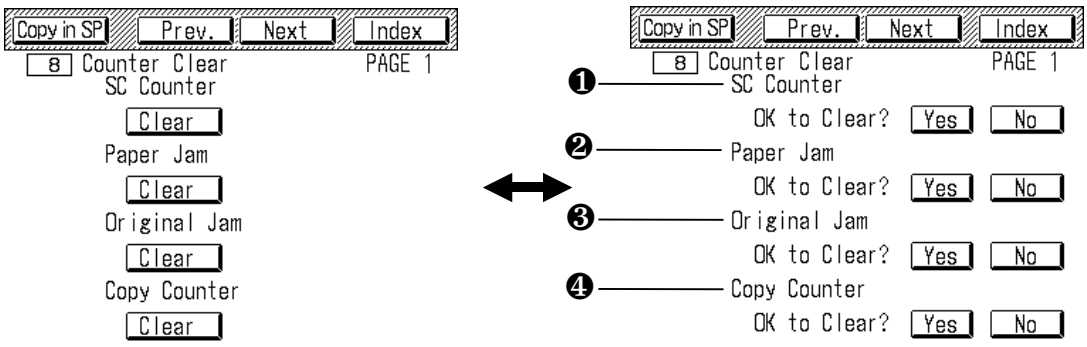




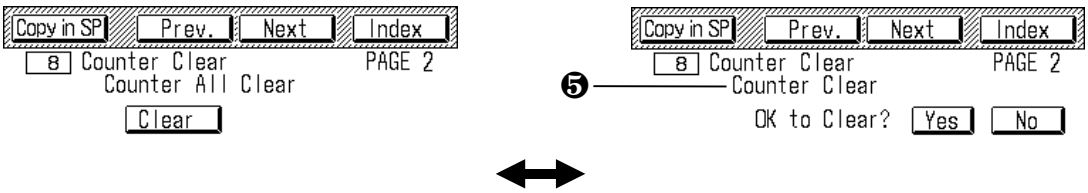

| Item | Function | Note |
|---|---|---|
| ❶ | Indicates the total number of the copies for each copy mode. | |
| ❷ | Indicates the total number related to consumables. | |
| ❸ | Indicates the total number of staples for each staple position. | |
| ❹ | Indicates the total number of copies broken down by paper feed station. | |

## 8 COUNTER CLEAR

### PAGE 1



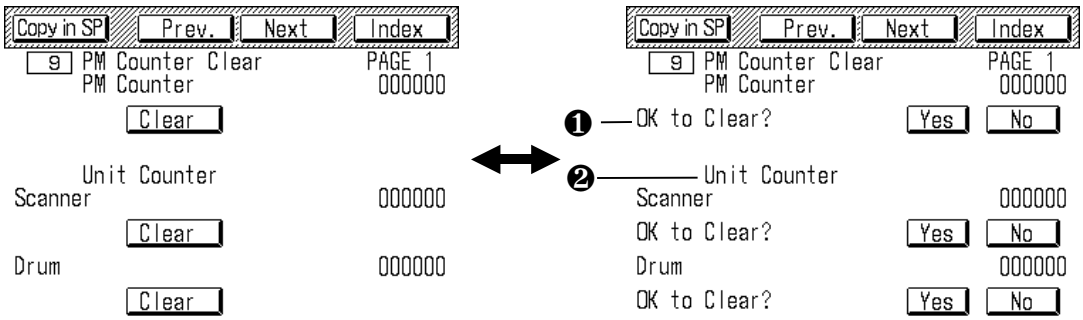

### PAGE 2



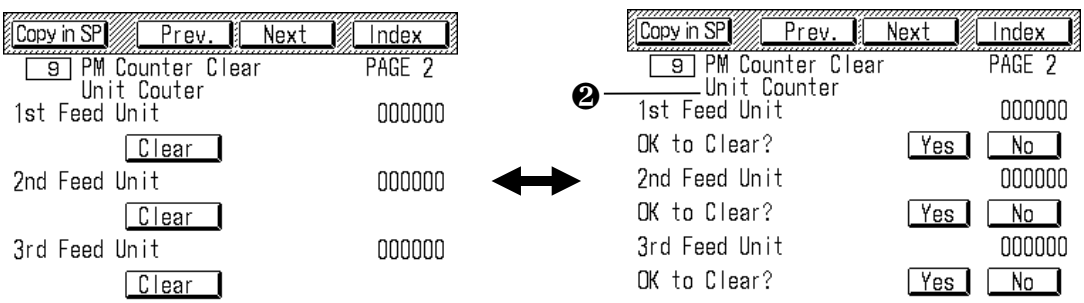

| Item | Function | Note |
|---|---|---|
| ❶ | Clears all SC counters. | **Procedure to clear:**<br>1. Touch [Clear] .<br>The display changes as shown at right.<br>2. Touch [Yes].<br>(Touch [No] to cancel.)<br>The display returns to the one shown at left and the beeper sounds four times. |
| ❷ | Clears all paper jam counters. | |
| ❸ | Clears all original jam counters. | |
| ❹ | Clears all copy counters. | |
| ❺ | Clears all counters (❶ ~ ❹). | |

## 9 PM COUNTER CLEAR

### PAGE 1




### PAGE 2

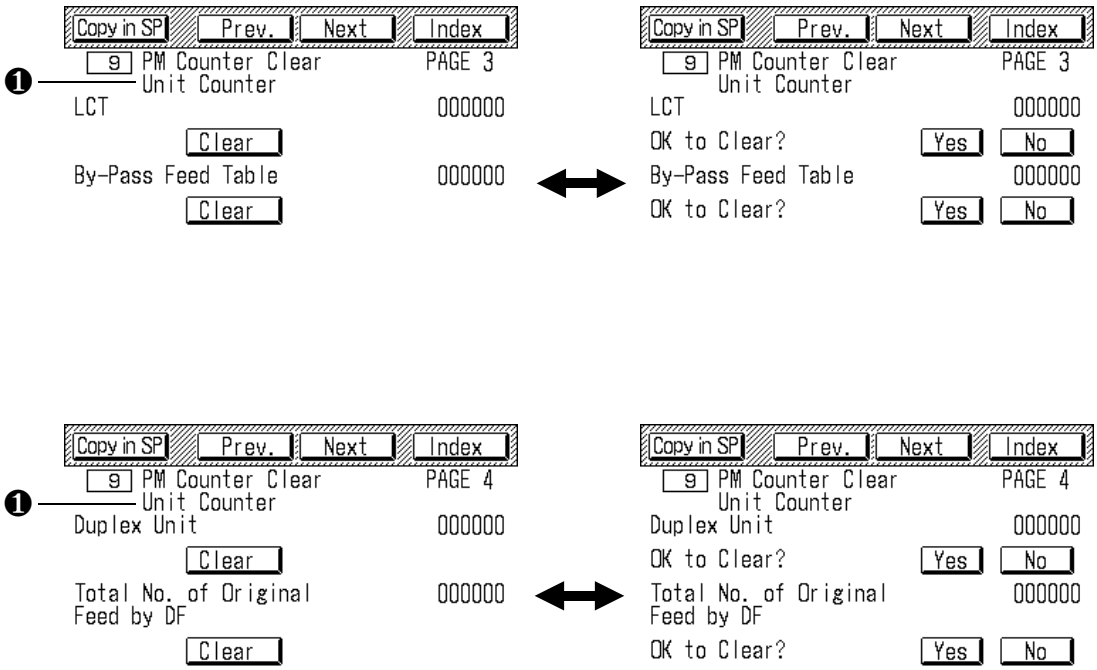



| Item | Function | Note |
|---|---|---|
| ❶ | 1. Indicates the total number of copies since the last PM (PM counter).<br>2. Clears the PM counter. | **Procedure to clear:**<br>1. Touch [Clear] .<br>The display changes as shown at right.<br>2. Touch [Yes].<br>(Touch [No] to cancel.)<br>The display returns to the one shown at left. |
| ❷ | 1. Indicates the total number of copies since the last PM for each unit (unit counter).<br>2. Clears each unit counter. | |

Service Tables

## 9 PM COUNTER CLEAR

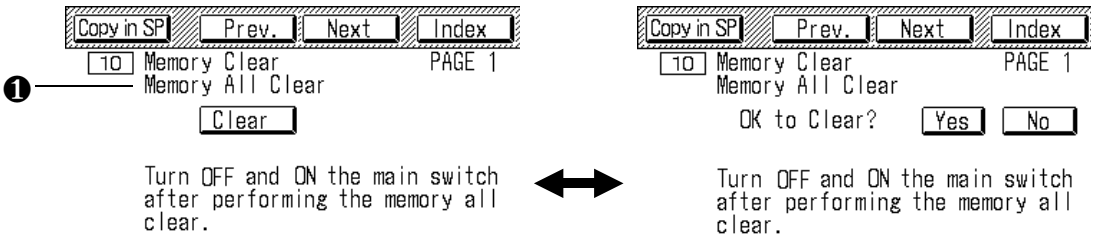
### PAGE 3, 4




| Item | Function | Note |
|---|---|---|
| ❶ | 1. Indicates the total number of copies since the last PM for each unit. (unit counter)<br>2. Clears each unit counter. | **Procedure to clear:**<br>1. Touch [Clear] .<br>The display changes as shown at right.<br>2. Touch [Yes].<br>(Touch [No] to cancel.)<br>The display returns to the one shown at left. |

## 10 MEMORY CLEAR

### PAGE 1

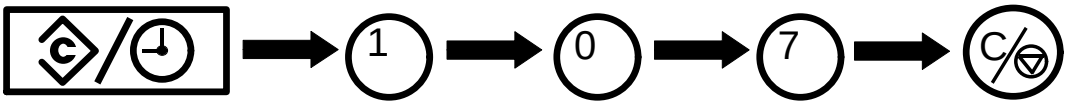



| Item | Function | Note |
|---|---|---|
| ❶ | Returns all data to the default data. | **Procedure to clear:**<br>1. Touch [Clear] .<br>The display changes as shown at right.<br>2. Touch [Yes].<br>(Touch [No] to cancel.)<br>The display returns to the one shown at left and the beeper sounds twice.<br>3. Turn the main switch off and on. |

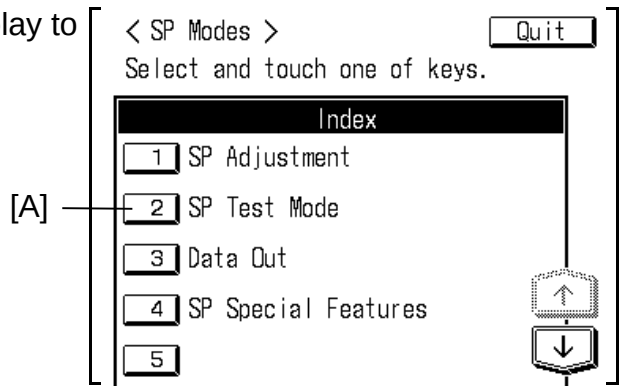
## 2.3 SENSOR/SWITCH/SIGNAL DATA CHECK (INPUT MODE)

– How to check the sensor/switch/signal –

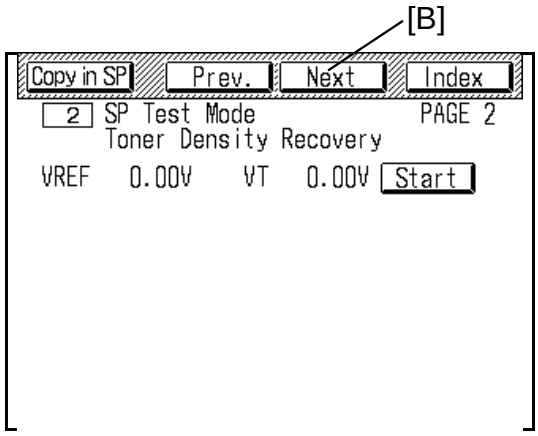
1. Enter SP mode as follows:
   1) Press the mode clear key.
   2) Enter "107"
   3) Press the clear/stop key for more than 3 seconds.



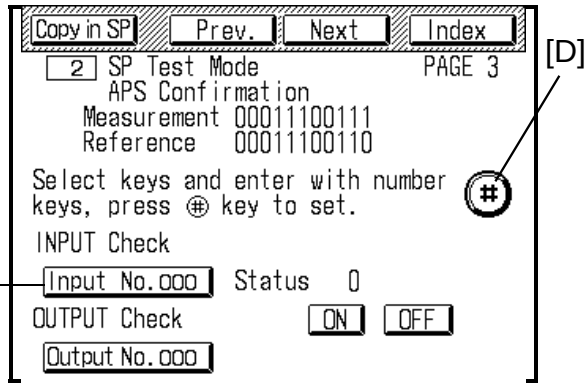

2. Touch [ 2 ] [A] on the display to access SP test mode.




3. Touch [Next] [B] on the display twice.




4. 1) Touch [Input No. 00] [C].
   2) Enter the input sensor/switch/signal number by using the number keys (Refer to the table in the following pages).
   3) Press the Enter key [D].



| Input No | Sensor/Switch/\|Signal | Status | |
|---|---|---|---|
| | | 0 | 1 |
| 1 | Registration Sensor | Paper not detected | Paper detected |
| 2 | Fusing Exit Sensor | Paper not detected | Paper detected |
| 3 | Exit Sensor | Paper not detected | Paper detected |
| 4 | Vertical Transport Sensor | Paper not detected | Paper detected |
| 5 | 1st Tray Set Switch (A095 only) | Not set | Set |
| 6 | By-Pass Paper End Sensor | Paper detected | Paper not detected |
| 7 | 2nd Paper End | Paper detected | Paper not detected |
| 8 | 3rd Paper End | Paper detected | Paper not detected |
| 9 | Built-in LCT Tray Down Key | Pressed | Not pressed |
| 10 | 2nd Paper Near End Sensor | Not near end | Near end |
| 11 | 3rd Paper Near End Sensor | Not near end | Near end |
| 12 | Built-in LCT Paper Set | Paper not detected | Paper detected |
| 13 | 2nd Paper Size Switch (All SW) | Set | Not Set |
| 14 | 2nd Tray Set Detection | Not set | Set |
| 15 | 3rd Tray Set Switch (A095 only) | Not set | Set |
| 16 | Built-in LCT Set Detection | Not set | Set |
| 17 | 1st Paper Feed Sensor | Paper not detected | Paper detected |
| 18 | 2nd Paper Feed Sensor | Paper not detected | Paper detected |
| 19 | 3rd Paper Feed Sensor | Paper not detected | Paper detected |
| 20 | Not Used | — | — |
| 21 | 2nd Lift Sensor | Not lifted | Lifted |
| 22 | 3rd Lift Sensor | Not lifted | Lifted |
| 23 | Built-in LCT Tray Down Sensor | Tray at down | Tray not down |
| 24 | Fusing Set Detection. | Not set | Set |
| 25 | Drum Unit Set Detection | Not set | Set |
| 26 | Right Tandem Paper End Sensor | Paper detected | Paper not detected |
| 27 | Left Tandem Paper End Sensor | Paper detected | Paper not detected |
| 28 | Right Tandem Tray Set Detection | Not set | Set |
| 29 | Left Tandem Tray Set Detection | Not set | Set |
| 30 | Rear Fence Return Sensor | Not at return position | At return position |
| 31 | Rear Fence HP. Sensor | Not at HP | At HP |
| 32 | Base Plate Down Sensor (Tandem) | Not down | Down |
| 33 | 1st Paper Near End Sensor | Not at near end | Near end |
| 34 | 1st Lift Sensor | Not lifted | Lifted |
| 35 | Side Fence HP. Sensor | At HP | Not at HP |
| 36 | 3.5 K LCT Paper End Sensor | Paper detected | Paper not detected |
| 37 | 3.5 K LCT Set Detection | Not set | Set |

| Input No | Sensor/Switch/\|Signal | Status | |
|---|---|---|---|
| | | 0 | 1 |
| 38 | 3.5 K LCT Lift Sensor | Not lifted | Lifted |
| 39 | 3.5 K LCT Tray Down Key | Not pressed | Pressed |
| 40 | 3.5 K LCT Feed Sensor | Paper not detected | Paper detected |
| 41 | 3.5 K LCT Tray Down Sensor | Tray not down | Tray down |
| 42 | 3.5 K LCT Door Switches | Closed | Open |
| 43 | 3.5 K LCT Paper Position Sensor | Paper not detected | Paper detected |
| 44 | Duplex Jogger HP Sensor | Not at HP | At HP |
| 45 | Duplex Entrance Sensor | Paper not detected | Paper detected |
| 46 | Duplex Transport Sensor | Paper not detected | Paper detected |
| 47 | Duplex Exit Sensor | Paper not detected | Paper detected |
| 48 | Duplex Unit Set Detection | Not set | Set |
| 49 | Duplex Paper End Sensor | Paper not detected | Paper detected |
| 50 | Toner End Sensor | Toner present | No toner |
| 51 | Toner Overflow Switch | No overflow | Overflow |
| 52 | By-Pass Table Switch | Closed | Open |
| 53 | Front Door Safety Switch | Closed | Open |
| 54 | Toner Collection Bottle Set Switch | Set | Not set |
| 55 | By-Pass Feed Motor Lock Detection | Not detected | Detected |
| 56 | Development Motor Lock Detection | Not detected | Detected |
| 57 | Main Motor Lock Detection | Not detected | Detected |
| 58 | Not used | — | — |
| 59 | Paper Feed motor Lock Detection | Not detected | Detected |
| 60 | Fusing/Duplex Drive Motor Lock Detection | Not detected | Detected |
| 61 | By-pass Paper Feed Motor Lock Detection | Not detected | Detected |
| 62 | Duplex Paper Guide Sensor | Paper not detected | Paper detected |
| 63 | Not used | — | — |
| 64 | Not used | — | — |
| 65 | 3.5 K LCT Paper Near End Sensor | Paper detected | Paper not detected (Near end) |
| 66 | Guide Plate Position Sensor | Closed | Open |
| 67 | 3.5 K LCT Motor Lock | Not detected | Detected |
| Input No 68 ~ 90 are not used. | | | |
| 91 | Auto Response Sensor | Not detected | Detected |
| 92 | Key Counter Connector | Open | Short |
| Input No 93 ~ 100 are not used. | | | |

| Input No | Sensor/Switch/\|Signal | Status | |
|---|---|---|---|
| | | 0 | 1 |
| 101 | Entrance Sensor (A377 S/S) | Paper detected | Paper not detected |
| | Entrance Sensor (Finisher) | Paper detected | Paper not detected |
| 102 | Proof Exit Sensor (A377 S/S) | Paper detected | Paper not detected |
| | Exit Sensor (Finisher) | Paper detected | Paper not detected |
| 103 | Jam Sensor (Photo transistor) (A377 S/S) | Paper detected | Paper not detected |
| | Shift Tray Half Turn Sensor (Finisher) | At HP | Not at HP |
| 104 | Bin Sensor (Photo transistor) (A377 S/S) | Paper detected | Paper not detected |
| | Stack Height Sensor 2 (Finisher) | At HP | Not at HP |
| 105 | Bin HP. Sensor (A377 S/S) | Not at HP | At HP |
| | Stack Height Sensor 1 (Finisher) | Not at HP | At HP |
| 106 | Wheel Sensor (A377 S/S) | Not interrupted | Interrupted |
| | Shift Tray Lower Limit Sensor (Finisher) | At lowest position | Not at lowest position |
| 107 | Bin Rear Plate Release Sensor (A377 S/S) | Not at release position | At release position |
| | Jogger Unit Entrance Sensor (Finisher) | Paper detected | Paper not detected |
| 108 | Bin Rear Plate HP. Sensor (A377 S/S) | Not at HP | At HP |
| | Jogger Unit Paper Sensor (Finisher) | Paper not detected | Paper detected |
| 109 | Jogger HP. Sensor (A377 S/S) | Not at HP | At HP |
| | Jogger HP. Sensor (Finisher) | Not at HP | At HP |
| 110 | Grip HP. Sensor (A377 S/S) | Not at HP | At HP |
| | Staple Unit HP. Sensor (Finisher) | Not at HP | At HP |
| 111 | Staple Unit HP. Sensor (A377 S/S) | Not at HP | At HP |
| | Stack Feed-out Belt HP. Sensor (Finisher) | At HP | Not at HP |
| 112 | Staple HP. Sensor | At HP | Not at HP |
| | Staple Hammer HP Sensor (Finisher) | At HP | Not at HP |
| 113 | Staple End Sensor (A377 S/S) | Present | Empty |
| | Staple End Sensor (Finisher) | At HP | Not at HP |
| 114 | Paper Sensor (A377 S/S) | Paper detected | Paper not detected |
| | Not Used | — | — |
| 115 | Door Safety Switch (A377 S/S) | Closed | Open |
| | Front Door Safety Switch | Closed | Open |
| 116 | Sorter Main Motor Encoder (A377 S/S) | — | — |

| Input No | Sensor/Switch/\|Signal | Status | |
|---|---|---|---|
| | | 0 | 1 |
| Input No 117 ~ 130 are not used. | | | |
| 131 | Scanner HP. Sensor | Not at HP | At HP |
| 132 | Lens vertical HP. Sensor | At HP | Not at HP |
| 133 | Lens Horizontal HP. Sensor | At HP | Not at HP |
| 134 | 3rd Scanner HP. Sensor | Not at HP | At HP |
| 135 | Platen Cover Position Sensor 1 | Not interrupted | Interrupted |
| 136 | Platen Cover Position Sensor 2 | Not interrupted | Interrupted |
| 137 | Optics Thermistor | Low Temp. | High Temp. |
| Input No 138 ~ 150 are not used. | | | |
| 151 | Not Used (DJF) | – | – |
| | One Turn Sensor (RDH) | At HP | Not at HP |
| 152 | Original Set SN(DJF) | Original not detected | Original detected |
| | Pulse Generator Sensor (RDH) | Interrupted | Not interrupted |
| 153 | Original Feed SN (DJF) | Original not detected | Original detected |
| | Original Set Sensor (RDH) | Original not detected | Original detected |
| 154 | Not Used (DJF) | – | – |
| | Recycle Sensor (RDH) | Original not detected | Original detected |
| 155 | Lift Switch (DJF) | Down | Sifted |
| | Original Width Sensor (RDH) | Original not detected | Original detected |
| 156 | Feed-out Motor Encoder Pulse (DJF) | – | – |
| | Registration Sensor (RDH) | Original not detected | Original detected |
| 157 | Belt Drive Motor Encoder Pulse (DJF) | – | – |
| | Inverter Sensor (RDH) | Original not detected | Original detected |
| 158 | Feed-in Motor Encoder Pulse (DJF) | – | – |
| | Feed-out Sensor (RDH) | Original not detected | Original detected |
| 159 | Registration SN 2 (DJF) | Original not detected | Original detected |
| | Not used | – | – |
| 160 | Original Width SN 1 (DJF) | Original not detected | Original detected |
| | Transport Belt Motor Encoder Pulse (RDH) | – | – |
| 161 | Original Width SN 2 (DJF) | Original not detected | Original detected |
| | Feed-in Motor Encoder Pulse (RDH) | – | – |
| 162 | Original Width SN 3 (DJF) | Original not detected | Original detected |
| | Inverter Motor Encoder Pulse (RDH) | – | – |

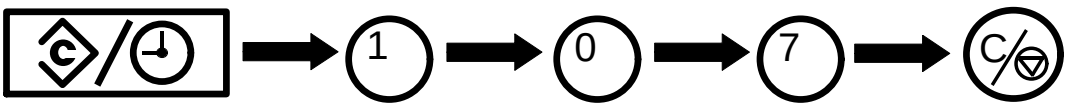
| Input No | Sensor/Switch/\|Signal | Status | |
|---|---|---|---|
| | | 0 | 1 |
| 163 | Registration SN 1 (DJF) | Original not detected | Original detected |
| | Feed-out Motor Encoder Pulse (RDH) | – | – |
| 164 | Feed-out SN (DJF) | Original not detected | Original detected |
| | Lift Switch (RDH) | Down | Lifted |
| 165 | Not used (DJF) | – | – |
| | RDH Position Sensor (RDH) | Lifted | Down |
| 166 | DF Position SN (DJF) | Open | Closed |
| | Not used (RDH) | – | – |
| 167 | Feed Cover Switch (DJF) | Closed | Open |
| | Not used (RDH) | – | – |
| 168 | Not Used (DJF) | – | – |
| | Not used (RDH) | – | – |
| 169 | Original Length SN (DJF) | Interrupted | Not interrupted |
| | Not used (RDH) | – | – |

## 2.4 ELECTRICAL COMPONENT CHECK (OUTPUT MODE)

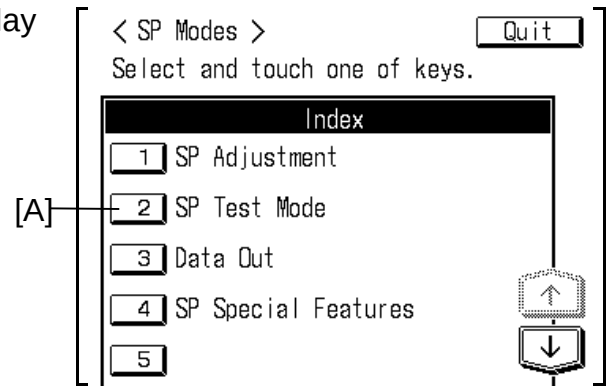
**CAUTION: The motors keep turning in this mode regardless of the upper or lower limit sensor signal. Do not keep the electrical component on for a long time to prevent mechanical or electrical damage.**

**– How to check the sensor/switch/signal –**

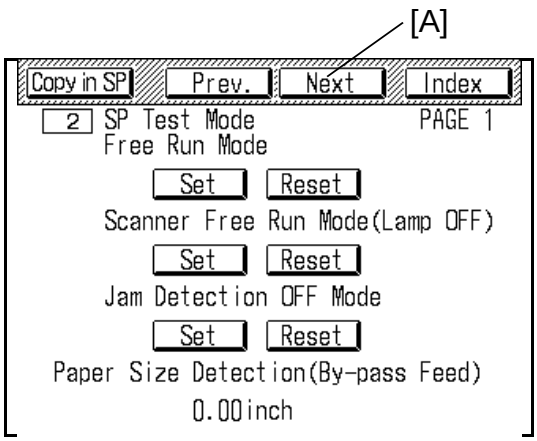
1. Enter SP mode as follows:
   1) Press the mode clear key.
   2) Enter "107".
   3) Press the clear/stop key for more than 3 seconds.




2. Touch [ 2 ] [ A] on the display to access SP Test mode.



3. Touch Next [A] on the display twice.

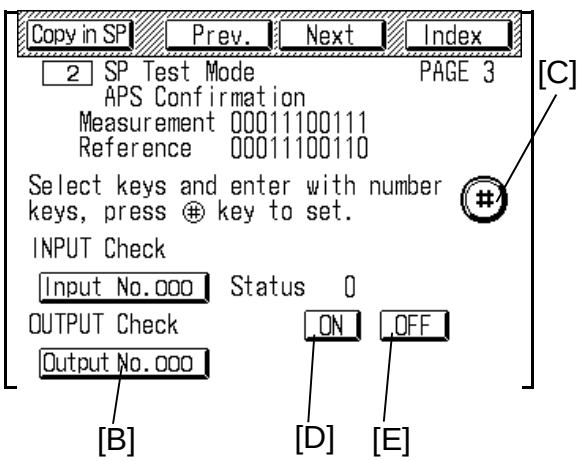



4. 1) Touch Output No. 00 [B].

2) Enter the electrical component number by using the number keys on the operation panel. (Refer to the table in the following pages.)

3) Press the Enter key [C].

4) Press ON [D] to activate and press OFF [E] to de-activate the electrical component.




**NOTE:** When confirming the activating sound, keep the front door open.

If the front door is closed, when OFF is touched, a mechanical noise caused by home positioning disturbs actual de-activating sound.

Service Tables

## Output Check Mode Table – 1

| Output No. | Electrical Component |
|---|---|
| 1 | Not used |
| 2 | Junction Solenoid |
| 3 | LCT Feed Clutch |
| 4 | By-pass Feed Clutch |
| 5 | Duplex Transport Clutch |
| 6 | Toner Supply Clutch |
| 7 | By-pass Pick-up Solenoid |
| 8 | Guide Plate Solenoid |
| 9 | LCT Pick-up Solenoid |
| 10 | Toner Bottle Motor |
| 11 | Duplex Transport Clutch |
| 12 | Pressure Arm Solenoid |
| 13 | Duplex Positioning Solenoid |
| 14 | LCT Down Key LED |
| 15 | Not used |
| 16 | Main Motor Forward |
| 17 | Main Motor Reverse |
| 18 | Fusing/Duplex Drive Motor |
| 19 | Development Motor |
| 20 | Paper Feed Motor - Low Speed |
| 21 | Paper Feed Motor - High Speed |
| 22 | LCT Motor - Up |
| 23 | LCT Motor - Down |
| 24 | By-pass Feed Motor - Low |
| 25 | By-pass Feed Motor - High (First Copy) |
| 26 | Anti-condensation Heater Relay |
| 27 | 1st Pick-up Solenoid |
| 28 | 2nd Pick-up Solenoid |
| 29 | 3rd Pick-up Solenoid |
| 30 | Not used |
| 31 | 1st Pressure Solenoid |
| 32 | 2nd Pressure Solenoid |
| 33 | 3rd Pressure Solenoid |
| 34 | Not used |
| 35 | Toner Collection Motor - High |
| 36 | Toner Collection Motor - Low |
| 37 | Tandem Lock Solenoid |

| Output No. | Electrical Component |
|---|---|
| 38 | 1st Lift Motor (Up) |
| 39 | 1st Lift Motor (Down) |
| 40 | 2nd Lift Motor (Up) |
| 41 | 2nd Lift Motor (Down) |
| 42 | 3rd Lift Motor (Up) |
| 43 | 3rd Lift Motor (Down) |
| 44 | Not used |
| 45 | Not used |
| 46 | Rear Fence Drive Motor (Counterclockwise) |
| 47 | Rear Fence Drive Motor (Clockwise) |
| 48 | 1st Paper Feed Clutch |
| 49 | 2nd Paper Feed Clutch |
| 50 | 3rd Paper Feed Clutch |
| 51 | Not used |
| 52 | Registration Clutch |
| 53 | Main Power Relay |
| 54 | Erase Lamp |
| 55 | Charge Wire Cleaner Motor |
| 56 | Transfer Belt Positioning Solenoid |
| 57 | Potential Calibration Mode (–100 V) |
| 58 | Potential Calibration Mode (–800 V) |
| 59 | QL/PTL |
| 60 | Charge Corona/Grid (Copying) |
| 61 | Charge Corona/Grid (ID Sensor Pattern) |
| 62 | Development Bias (Copying) |
| 63 | Development Bias (Non-image Area) |
| 64 | Development Bias (ID Sensor Pattern) |
| 65 | Transfer Current |
| 66 | Exhaust Fan - Low |
| 67 | Exhaust Fan - High |
| Output No68 ~ 100 are not used | |
| 101 | Main Motor: Proof mode (A377 S/S) / Not used (Finisher) |
| 102 | Main Motor: Sort mode (A377 S/S) |
| | Transport Drive Motor (Finisher) |
| 103 | Exit Motor (A377 S/S) / Not used (Finisher) |
| 104 | Turn Gate Solenoid (A377 S/S) |
| | Exit Drive Motor (Finisher) |

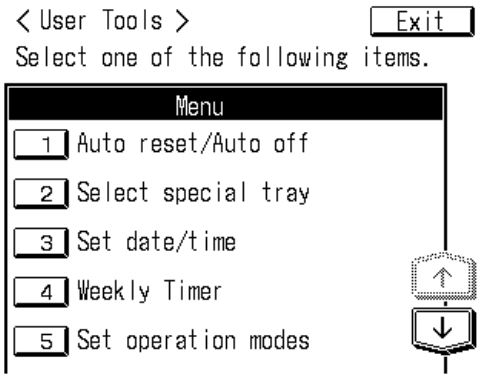


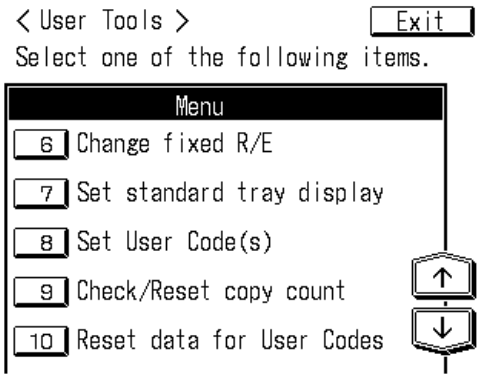
| Output No. | Electrical Component |
|---|---|
| 105 | Bin Drive Motor (A377 S/S) |
| | Junction Gate Solenoid (Finisher) |
| 106 | Jogger Motor (A377 S/S) |
| | Positioning Roller Solenoid (Finisher) |
| 107 | Bin Rear Plate Drive Motor (A377 S/S) |
| | Jogger Motor (Finisher) |
| 108 | Grip Motor (A377 S/S) |
| | Sift Motor (Finisher) |
| 109 | Grip Positioning Solenoid (A377 S/S) |
| | Stack Feed-out Motor (Finisher) |
| 110 | Grip Solenoid |
| | Shift Tray Lift Motor (Finisher) |
| 111 | Staple Unit Drive Motor (A377 S/S) |
| | Not used (Finisher) |
| 112 | Staple Motor (A377 S/S) |
| | Stapler Drive Motor (Finisher) |
| 113 | Not used (A377 S/S) |
| | Staple Motor (Finisher) |
| Output No 114 ~130 are not used | |
| 131 | Optics Cooling Fan |
| Output No132 ~ 151 are not used | |
| 152 | Not used (DJF) / Original Gate Solenoid (RDH) |
| 153 | Not used (DJF) / Inverter Solenoid (RDH) |
| 154 | LED "READY" (DJF) / Push Plate Solenoid (RDH) |
| 155 | LED "AUTO" (DJF) / Feed-in Clutch (RDH) |
| 156 | Not used (DJF) /Feed-in Motor (Clockwise) (RDH) |
| 157 | Feed-in motor (DJF) / Feed-in Motor (Counterclockwise) (RDH) |
| 158 | Feed-out Motor (DJF) / Feed-in Motor (Clockwise) (RDH) |
| 159 | Not used (DJF) / Feed-in Motor (Counterclockwise) (RDH) |
| 160 | Belt Drive Motor (DJF) / Transport Belt Motor (Forward) (RDH) |
| 161 | Not used (DJF) / Transport Belt Motor (reverse) (RDH) |
| 162 | Separation Solenoid - SADF (DJF) / Inverter Motor (RDH) |
| 163 | Not used (DJF) / Feed-out Motor (Low) (RDH) |
| 164 | Not used (DJF) / Feed-out Motor (High) (RDH) |
| 165 | Stopper Solenoid (DJF) / Friction Belt Motor (RDH) |
| 166 | Inverter Solenoid (DJF) / Not Used (RDH) |
| 167 | Feed-In Clutch (DJF) / LED "READY" ON (RDH) |
| 168 | Not Used (DJF) / LED "READY" OFF (RDH) |

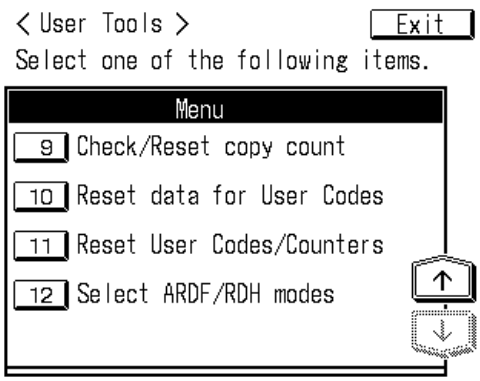
## 2.5 USER TOOLS

This mode is for the key operators in charge of this copier. The operator can change or set the copier's default settings using the following user tools.

### 2.5.1 User Tools Menu

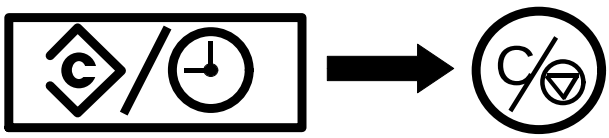


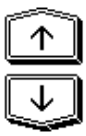



### 2.5.2 How To Access The User Tools

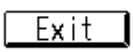
1. Press the Clear Modes key.
2. Press the Clear/Stop key more than 3 seconds until the User Tool Menu appears on the touch panel display.



3. Select the menu number to use by touching the touch panel display.



This copier has 12 user tools. You can see 5 user tools on the touch panel display at the same time. Use these keys to see the rest of the user tool menu.




Use to exit the user tool.


Use to return to the user tool menu display.

## 1 Auto reset/Auto off

| | |
|---|---|
| **Auto reset** | The copier returns to its initial condition automatically after your job is finished. The automatic reset time can be set from 1 second to 999 seconds, or the function can be turned off.<br>**Default:** 60 sec. |
| **Screen Saver** | When the machine does not detect anyone operating it for the selected time, the touch panel display turns off automatically. This time can be set from 1 second to 999 seconds, or the function can be turned off.<br>**Default:** 60 sec. |
| **Auto off** | When the copier is used after the weekly timer has turned it off, the copier will turn itself back off after the selected time. The auto off time can be set from 1 minute to 999 minutes, or the function can be turned off.<br>**Default:** OFF |
| **SADF Auto reset**<br>(for machines with dual job feeder only)<br>(system A or B) | In the SADF mode (Semi-Automatic Document Feed, see page 23), if the next original is not set within the selected time, the machine will cancel the SADF mode automatically. The SADF Auto reset time can be set from 1 second to 60 seconds, or the function can be turned off.<br>**Default:** 5 sec. |

## 2 Select special tray

| | |
|---|---|
| **Tray for Cover Sheet** | Select the tray for the Cover function. Paper for cover sheets will be fed from the selected tray.<br>**Default:** No select |
| **Tray Display for Cover Sheet** | You can see which tray is set for cover sheets. If you want to see the tray display only in the Cover mode, select "Mode selected". If you want to always see the tray display, select "Full time".<br>**Default:** Full time |
| **Tray for Slip Sheet** | Select the tray for the Slip Sheet functions (Paper Designate and OHP Slip Sheet). Paper for slip sheets will be fed from the selected tray.<br>**Default:** No select |
| **Tray Display for Slip Sheet** | You can see which tray is set for the slip sheets. If you want to see the tray display only in the Slip Sheet mode, select "Mode selected". If you want to always see the tray display, select "Full time".<br>**Default:** Full time |

- The trays set for cover sheets or slip sheets cannot be used for the Auto Paper Select, Auto Tray Switching, and Duplex copying modes.

### 3 Set date/time

Use to set the copier's internal clock before setting the weekly timer. Set the clock following the touch panel display instructions.

- If necessary, remember to adjust the clock for daylight saving time (summer time), or return it to standard time.

### 4 Weekly Timer

Use to set the weekly timer. If you set the timer, the copier turns on and off automatically at the selected time each day.

- **Default:** No weekly timer setting
- If you want to turn on the machine for an entire day, input "000" for the ON time and do not input the OFF time.
- If you want to turn off the machine for an entire day (ex.: Saturday, Sunday), do not input the ON time and input "000" for the OFF time.

## 5 Set operation modes

| | |
|---|---|
| **Maximum copy input number** | The maximum copy quantity can be set from 1 to 999.<br>**Default**: 999 |
| **Panel beeper** | The beeper (key tone) can be set to on or off.<br>❒ default: ON |
| **Job End Call** | The beeper (job end call) sounds when your copying job is finished, supplies (toner, paper) run out, or if a problem occurs in the machine. The Job End Call can be set to on or off<br>Default: ON |
| Next ↓ | ↑ Prev. |
| **Image Density Level** | Auto and Manual Image Density levels can be adjusted to be lighter or darker.<br>**Default:**  **(center)** |
| **Default Setting** | You can select Program No. 5 (see page 42) as a default mode. Use it to store job settings you frequently use.<br>**Default:** Normal |
| **Touch Panel in Waiting Mode** | You can select the animation display during the warm-up period and copying run. During the warm-up period, the remaining warm-up time is displayed. During copying, you can see how long it takes to finish copying by entering the number of originals with the Number keys and Enter key. To exit the animation display, touch the Exit key of the touch panel display.<br>**Default:** Reset (no animation display) |

## 6 Change fixed R/E

This copier has 10 fixed ratios (4 enlargements and 6 reductions). You can change these fixed reproduction ratios to different ratios.

## 7 Set standard tray display

| | |
|---|---|
| **Paper Tray Priority** | When Auto Paper Select is canceled, the 1st tray is selected as a default setting. You can cancel this setting and select the other tray as a default setting.<br>**Default:** OFF |
| **Auto Paper Select Priority** | As a default setting, the Auto Paper Select is selected. You can cancel this setting.<br>**Default:** Yes |
| **Paper Tray Display in APS mode** | In the default setting, the tray display is shown only when the Auto Paper Select mode is canceled. You can cancel this setting and have the tray display shown always.<br>**Default:** No |
| **Auto Tray Switching** | If you load paper of the same size and in the same direction in two or more paper trays, the machine automatically shifts to the other tray when the tray in use runs out of paper.<br>**Default:** Yes<br>Bypass feed tray, and trays for cover sheet and slip sheet cannot be used for Auto Tray Switching. |

## 12 Select ARDF/RDH modes

This user tool can be used only when your machine is equipped with the dual job feeder (system A and B) or the recirculating document handler (system C).

| | |
|---|---|
| **Original Count Display** | In the default setting, you can see the entered copy quantity on the upper part of the copy counter and the number of copies made on the lower part. You can cancel this setting and see the number of originals to be fed on the lower part of the copy counter. On the upper part, you can see the number of copies made. To cancel the default setting, select "Yes".<br>**Default:** No |
| **Auto Paper Select** | In the default setting, the Auto Paper Select is not selected when you set originals in the dual job feeder or recirculating document handler. You can cancel this setting.<br>**Default:** No |
| **Thin Paper mode**<br>(for machines with dual job feeder only)<br>(system A or B) | Use when changing the type of originals to be fed. Select this function when you use thin originals (lighter than 53 g/m$^2$, 14 lb).<br>**Default:** No |

☞ Regarding User Tools No. 8, 9, 10, and 11, see the next page.

**User Tools for User Code Mode**

**If the copier is set to use the User Code function, operators must input their user codes before the machine can operate. The copier keeps count of the number of copies made under each user code.**

**User tools 8, 9, 10 and 11 are for the User Code mode. When you want to use these user tools, you should enter the key operator access code first.**

## 8 Set User Code(s)

| | |
|---|---|
| **Register** | Use to register your user code (maximum: 6 digits)<br>❒ Up to 500 user codes can be registered.<br>❒ Registered user codes will be sorted in numerical order. |
| **Change** | Use to change your present code to a new one.<br>❒ The number of copies made under the old code is added to that made under the new user code. |
| **Delete** | Use to delete your user code.<br>❒ The number of copies made under the code is deleted. |

## 9 Check/Reset copy count

You can check the number of copies made using each user code. Also, you can clear each code's counter.

## 10 Reset data for User Codes

Use to reset counter data for all user codes.

## 11 Reset User Codes/Counters

Use to reset all user codes and counters.

# 3. TEST POINTS / CHECK POINTS

## 3.1 MAIN CONTROL BOARD

| TP Number | Label | Monitoring Signal |
|---|---|---|
| TP101 | (PSN) | ID Sensor Output |
| TP102 | (TSN) | TD Sensor Output |
| TP103 | (VLT) | Drum Potential Sensor Output |
| TP104 | (D.TH) | Drum Thermistor Output |
| TP105 | (SIZE) | By-pass Size Signal |
| TP106 | (LAMP) | Exposure Lamp Voltage Monitor Signal |
| TP107 | (FUSER) | Fusing Thermistor Output |
| TP108 | (+5V) | VCC |
| TP109 | (GND) | GND |
| TP110 | (+24V) | VAA |
| CP101 | — | CPU2 → CPU1 |
| CP102 | — | CPU1 → CPU2 |
| CP103 | — | RXD SS |
| CP104 | — | TXD SS |
| CP105 | — | RXD |
| CP106 | — | TXD |
| CP107 | — | RXD |
| CP108 | — | TXD |
| CP109 | — | RXD |
| CP110 | — | TXD |
| CP111 | — | RXD |
| CP112 | — | TXD |
| CP113 | — | RXD ADF |
| CP114 | — | TXD ADF |
| CP115 | — | Not Used |
| CP116 | — | Not Used |
| CP117 | — | PRT CTS |
| CP118 | — | PRT SOUT |

**NOTE:** TP101 ~ 110 have test pins.

## 3.2 OPTICS CONTROL BOARD

| TP Number | Label | Monitoring Signal |
|---|---|---|
| TP501 | (ADS) | ADS Sensor Output |
| TP502 | (UNIT-TEMP) | Optics Thermistor Output |
| TP503 | (MOTOR-TEMP) | Scanner Motor Thermistor Output |
| TP504 | (GND) | CGND |
| TP505 | (+5V) | VCC |
| TP506 | (SC-START) | Scanner Start Signal |
| TP507 | (ENCODER-OUT) | Scanner Encoder Signal |
| TP508 | (LP-PWM) | Exp. Lamp PWM |
| TP509 | (HT-PWM) | Fus. Lam PWM |
| TP510 | (SC-PWM) | Scanner PWM |
| TP511 | (SC-DIR) | Scanner DIR |
| TP512 | (FREE-RUN) | Scanner Free Run |
| TP513 | (+24V) | VAA |
| TP514 | (UNIT-ADJ-MODE) | Adjustment Mode |
| TP515 | (ZERO-CROSS) | Zero Cross |
| TP516 | (+38V) | VMM |
| TP517 | (RXD) | RXD |
| TP518 | (THRMST) | Fusing Thermistor Output |
| TP519 | (LAMP) | Exposure Lamp Voltage |
| TP520 | (LE) | Lead Edge |
| TP521 | (TXD) | TXD |
| TP522 | (SUB-IN) | SUB IN |

**NOTE:** TP504, 512, 514 have test pins.

## 3.3 OPERATION PANEL BOARD

| TP Number | Label | Monitoring Signal |
|---|---|---|
| TP101 | (CPUCK) | CPU Check |
| TP102 | (CLK) | Clock |
| TP103 | (FLM) | Fluorescent Lamp Monitor |
| TP104 | (GND) | GND |

# 4. PREVENTIVE MAINTENANCE SCHEDULE

## 4.1 PM TABLE

**NOTE:** The numbers mentioned for PM intervals indicate the number of copies.
Symbol key: C: Clean R: Replace L: Lubricate I: Inspect

| | EM | 120 K | 240 K | 360 K | NOTE |
|---|---|---|---|---|---|
| **OPTICS** | | | | | |
| Mirrors, Lens, Reflectors | | C | C | C | Cotton pad with water, or blower brush. |
| Exposure Glass | C | C | C | C | Alcohol or glass cleaner. |
| Platen Cover Sheet | C | R | R | R | Alcohol or water (replace if necessary). |
| Scanner Guide Rail | | C | C | C | Dry cloth. |
| ADS, Original Size sensor | C | C | C | C | Blower brush. |
| Toner Shield Filter | C | C | C | C | Dry cloth, Discharge any static before installation. |
| Scanner/Lens Guide Rods | | L | L | L | Refer to NOTE 1 |
| | | | | | |
| **PAPER FEED (for each paper feed station)** | | | | | |
| Paper Feed Rollers (Paper Trays) | C | R | R | R | Water. Replace pick-up, feed, and separation rollers as a set. |
| Paper Feed Rollers (By-pass/LCT) | C | R | R | R | Water, replace pick-up, feed, and separation rollers as a set. |
| Paper Feed Guide Plate | | C | C | C | Alcohol. |
| Registration Sensor | | C | C | C | Blower brush. |
| Vertical Transport Rollers | | C | C | C | Water |
| Paper Dust Cleaner | | C | C | C | Dry cloth or blower brush |
| Registration Rollers | | C | C | C | Water or alcohol. |
| Vertical Transport Guide Pin | | | L | | Refer to NOTE 2 |
| | | | | | |
| **AROUND THE DRUM** | | | | | |
| Corona Wires | C | R | R | R | Dry cloth or water. |
| Wire Cleaner | | | R | | |
| Cleaner Drive Gear | | | L | | Refer to NOTE 3 |
| Charge Grid | | R | R | R | |
| VD, VL, ADS Pattern | C | C | C | C | Dry cloth. |
| Drum Grounding Terminal | | I | I | R | |
| End Blocks and Casing | C | C | C | C | Water. |

| | EM | 120 K | 240 K | 360 K | NOTE |
|---|---|---|---|---|---|
| Pre-Transfer Lamp Filter | C | C | C | C | Dry cloth and blower brush. Discharge any static before installation. |
| Quenching Lamp | C | C | C | C | Dry cloth and blower brush. |
| ID Sensor | C | C | C | C | Blower brush. |
| Erase Lamp Unit | C | C | C | C | Dry cloth. |
| Pick-off Pawls | C | C | C | C | Replace if necessary. |
| Drum Potential Sensor | C | C | C | C | Dry cloth or blower brush. |
| Cleaning Blade | | R | R | R | |
| Cleaning Seal | | C | C | C | Replace if necessary. |
| Cleaning Brush | | | R | | |
| Toner Collection Bottle | C | C | C | C | Empty used toner. |
| Cleaning Drive Section | | | L | | Refer to NOTE 4 |
| | | | | | |
| **DEVELOPMENT UNIT** | | | | | |
| Developer | | R | R | R | |
| Upper Seal | | C | C | C | |
| Side Seals | | C | C | C | |
| Air Filter | | R | R | R | Vacuum cleaner |
| Toner Bottle Holder | C | C | C | C | Dry cloth. |
| Toner Receiver | C | C | C | C | Dry cloth. |
| Toner Bottle Holder | | L | L | L | Refer to NOTE 5 |
| | | | | | |
| **TRANSFER BELT UNIT** | | | | | |
| Transfer Belt | C | C | R | C | Dry cloth, clean both sides. |
| Cleaning Blade | | R | R | R | |
| Belt Drive/Guide/ Bias Rollers | | C | C | C | Dry cloth |
| | | | | | |
| **FUSING/PAPER EXIT UNIT** | | | | | |
| Hot Roller | | C | R | C | Replace if necessary. |
| Pressure Roller and Pressure Roller Bearings | | C | R | C | Replace if necessary. |
| Stripper Pawls | C | C | R | C | Replace. |
| Fusing Entrance and Exit Guides | | C | C | C | Suitable solvent. |
| Fusing Thermistor | | C/L | C/L | C/L | Suitable solvent. Refer to NOTE 6 |
| Transport/Exit Rollers | | | C | | Water. |

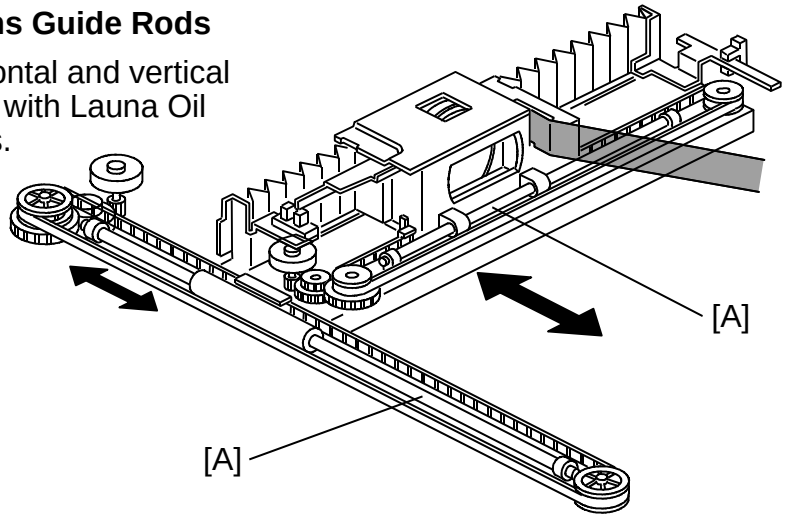
| | EM | 120 K | 240 K | 360 K | NOTE |
|---|---|---|---|---|---|
| Hot Roller Isolating Bushing | | | L | | Refer to NOTE 6 |
| | | | | | |
| **DUPLEX (for duplex copies)** | | | | | |
| Feed Roller | | R | R | R | |
| Separation Belts | | R | R | R | |
| Pick-up/Transport Rollers | | C | C | C | |
| Positioning Pins/Holes | | L | L | L | Refer to NOTE 7 |
| | | | | | |
| **OTHERS** | | | | | |
| Ozone Filter | | | | R | |
| Drive Belts | | I | I | I | Replace if necessary. |
| Exit Sensor | | C | C | C | Blower brush. |
| Bushings | | | L | | Spindle oil. |
| Development Drive Gear | | | | C | |
| | | | | | |
| **DUAL JOB FEEDER (for originals)** | | | | | |
| Transport Belt | C | R | R | R | Belt cleaner. Replace if necessary. |
| Pick-up Roller | C | C | C | C | Alcohol. Replace if necessary. |
| Feed Roller | C | R | R | R | Alcohol. Replace if necessary. |
| Separation Belts | C | R | R | R | Alcohol. Replace if necessary. |
| | | | | | |
| **SORTER STAPLER (A377)** | | | | | |
| Rollers | C | C | C | C | Water. |
| Bins | | C | C | C | Water. |
| Bushings | | L | L | L | Use Launa oil or equivalent. |
| Gears | | L | L | L | Use Grease–501. |
| | | | | | |
| **SORTER STAPLER (A374)** | | | | | |
| Bins | | C | C | C | Water. |
| Rollers | | C | C | C | Water. |
| Bushings | | L | L | L | Use Launa oil or equivalent. |
| Gears | | L | L | L | Use Grease–501. |
| | | | | | |

| | EM | 120 K | 240 K | 360 K | NOTE |
|---|---|---|---|---|---|
| **RECIRCULATING DOCUMENT HANDLER** | | | | | |
| Transport Belts | C | C | R | C | Belt cleaner. Replace if necessary. |
| Feed Roller | C | R | R | R | Alcohol. Replace if necessary. |
| Separation Belt | C | R | R | R | Alcohol. Replace if necessary. |
| | | | | | |
| **FINISHER** | | | | | |
| Rollers | | C | C | C | Water. |
| Bushings | | L | L | L | Use Launa oil or equivalent. |
| Gears | | L | L | L | Use Grease–501. |

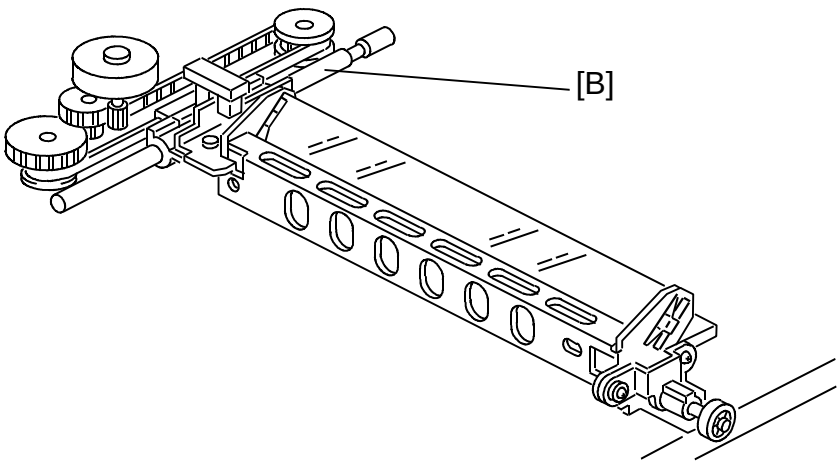
The location of the parts which should be lubricated at PM, are shown in the following figures:

**NOTE 1: Scanner/Lens Guide Rods**

(1) Lubricate the horizontal and vertical lens guide rods [A] with Launa Oil every 120 K copies.

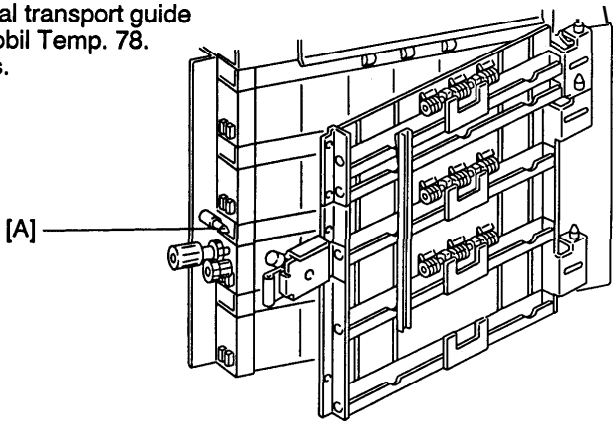



(2) Lubricate the third scanner guide rod [B] with Launa oil every 120 K copies.



**NOTE 2: Vertical Transport Guide Lock Pin**

(1) Lubricate the vertical transport guide lock pin [A] with Mobil Temp. 78. every 240 K copies.

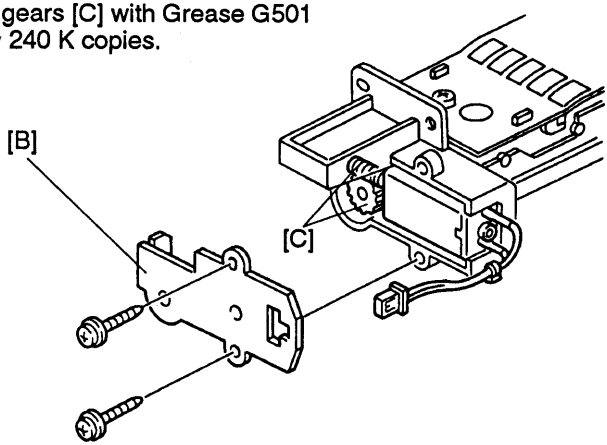



**NOTE 3: Charge Wire Cleaner Drive Gears**

1. Open the drive motor cover [B] (2 screws).

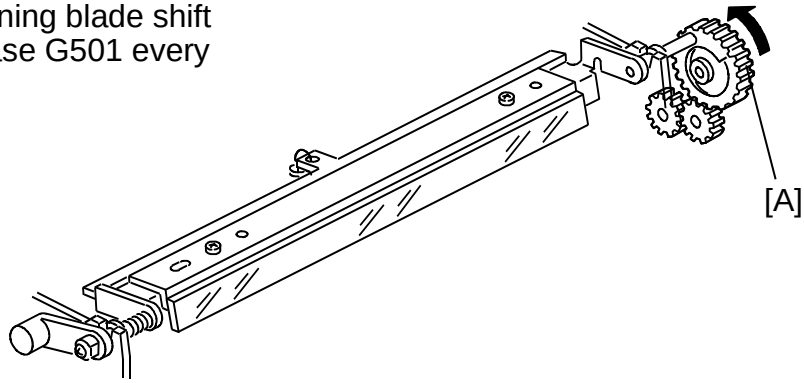
   NOTE: When re-installing the cover, do not tighten the screws too much.

2. Lubricate the charge wire cleaner drive gears [C] with Grease G501 every 240 K copies.

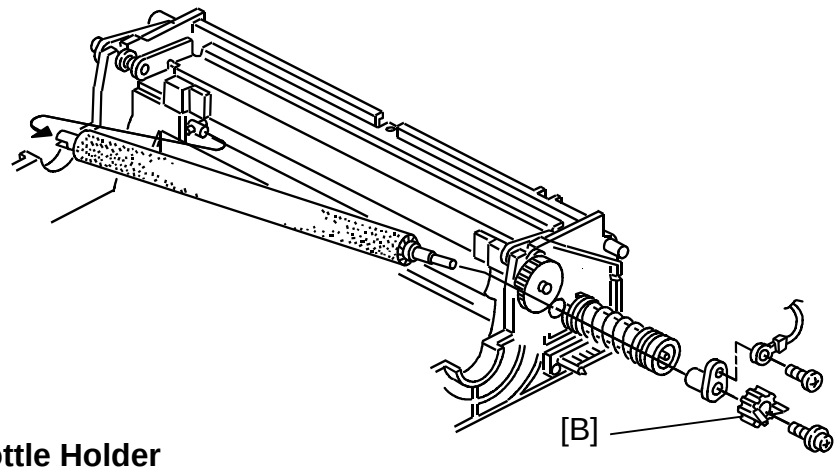


**NOTE 4: Cleaning Drive Section**

(1) Lubricate the cleaning blade shift cam [A] with Grease G501 every 240 K copies.



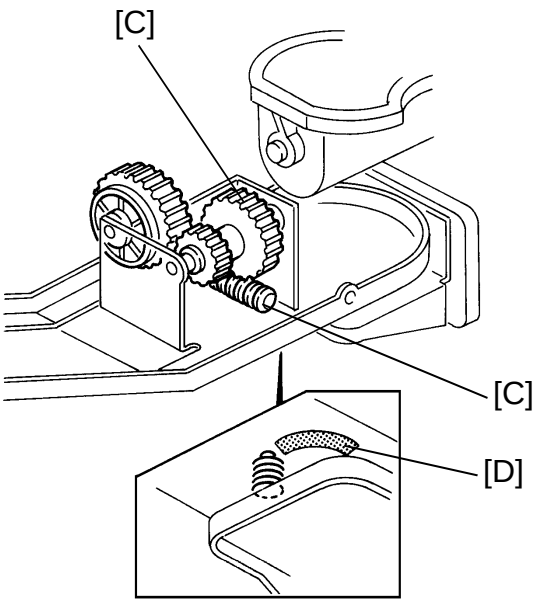

(2) Lubricate the cleaning section drive gear [B] with Grease G501 every 240 K copies.




**NOTE 5: Toner Bottle Holder**

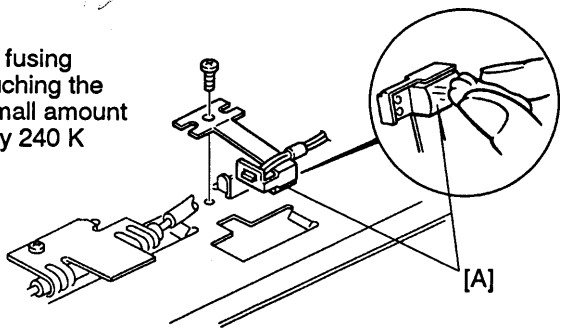
(1) Lubricate the toner bottle drive gears [C] with Grease G501 every 120 K copies.

(2) Lubricate the toner bottle holder [D] with Mobil Temp. 78 every 120 K copies.

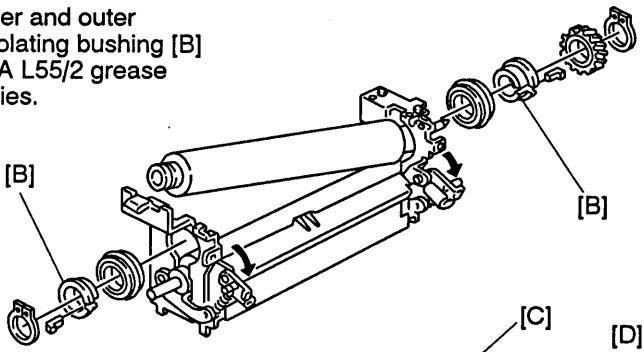


**NOTE 6: Fusing Section**

(1) Clean the surface of the fusing thermistor [A] where touching the hot roller. Then apply small amount of silicone oil there every 240 K copies.

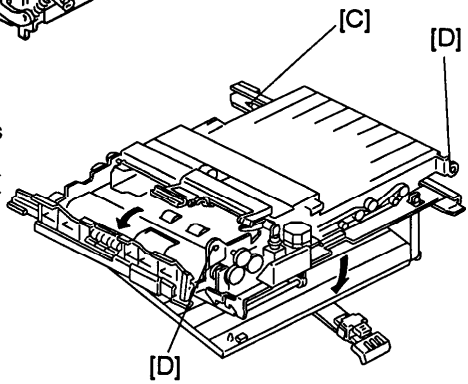


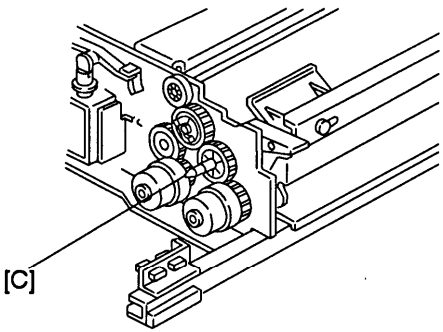

(2) Lubricate the inner and outer surface of the isolating bushing [B] with BARRIERTA L55/2 grease every 240 K copies.




**NOTE 7: Duplex Unit**

(1) Lubricate the two positioning pins [C] and two positioning Holes [D] with Mobil Temp. 78 every 120 K copies.



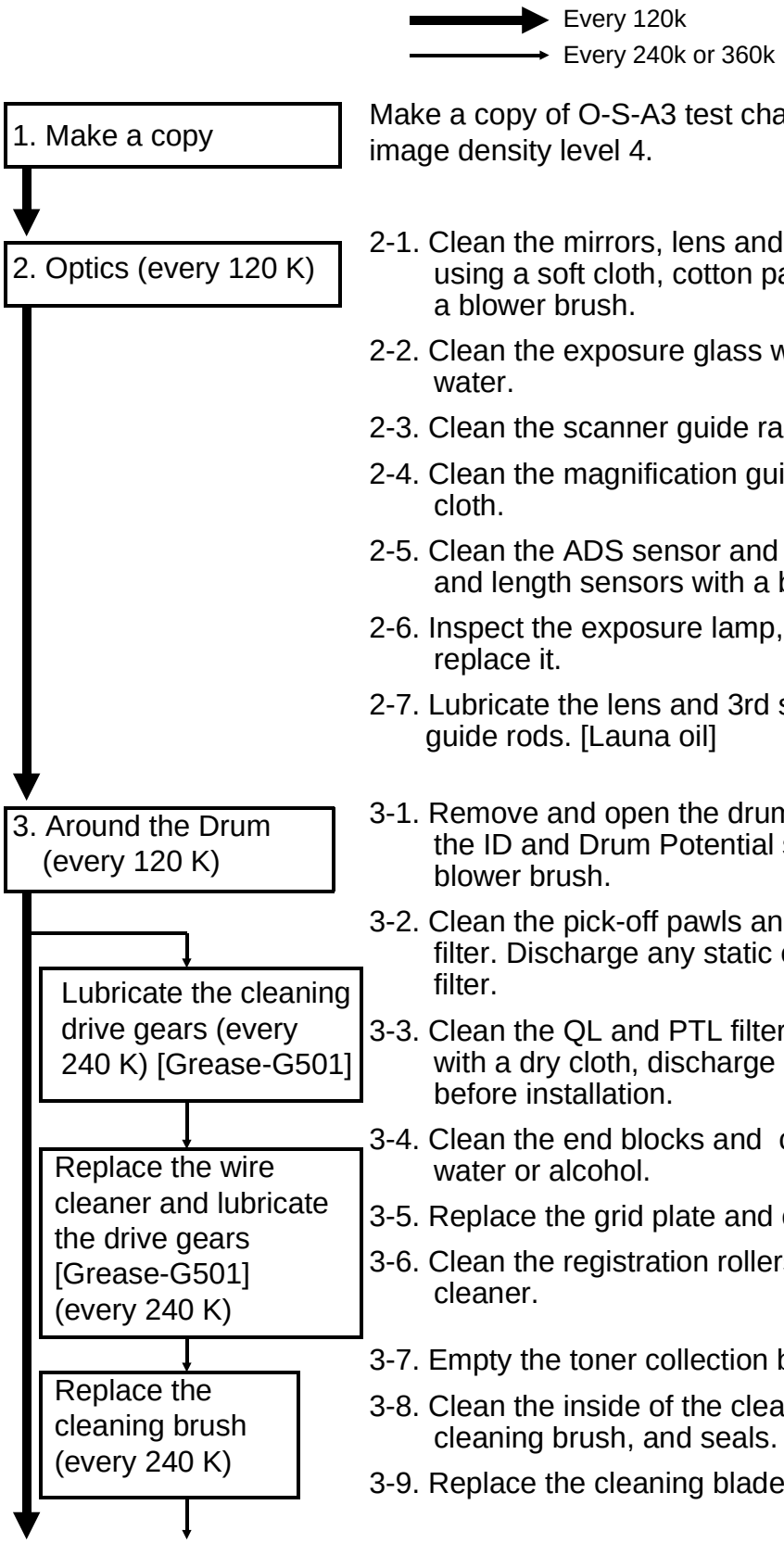
## 4.2 EXPLANATION OF REGULAR PM

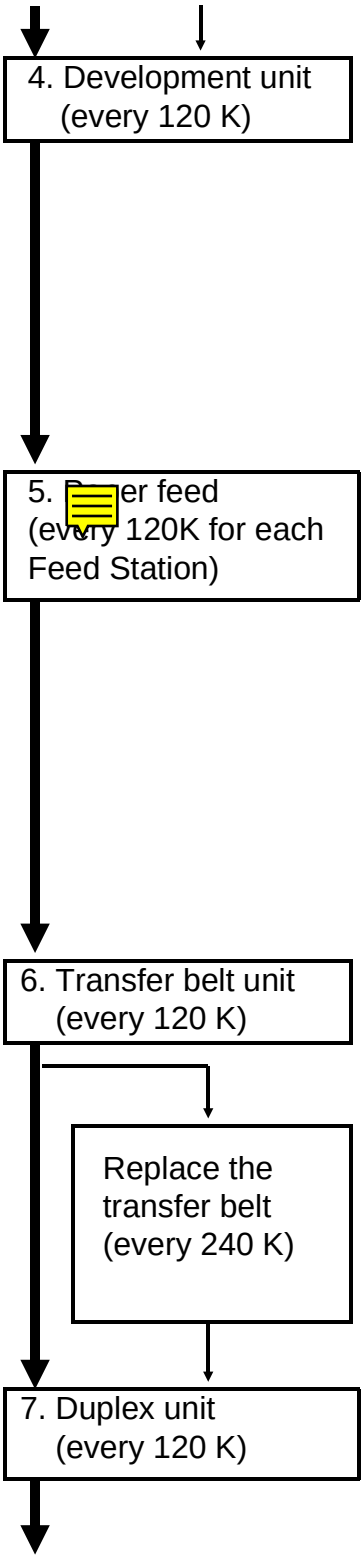
| Item | | Explanation |
|---|---|---|
| Optics Unit | Mirrors, Lens, Reflector, Exposure Glass, Platen Cover, Toner Shield Filter | Stains on any part of the optics unit result in black lines or areas of decreased sharpness on the copy image. Periodic cleaning is required. The exposure glass and the platen cover sheet must also be cleaned. If stains on the platen cover sheet cannot be removed, it must be replaced. |
| | Exposure Lamp | Deterioration of the exposure lamp affects the copy image. Check the lamp at regular intervals and replace if discolored. |
| | $V_D$, $V_L$, ADS Patterns | If paper dust or toner accumulates on the $V_D$, $V_L$, ADS Patterns, the image density cannot be controlled correctly. This results in light or dark copies. Clean these patterns at regular intervals. |
| Transfer Belt Unit | Transfer Belt | A dirty or old transfer belt causes poor image transfer due to its weak chargeability. Clean (both front and rear sides) or replace the transfer belt at regular intervals. |
| | Belt Drive/ Guide/Bias Rollers | Dirty rollers shift the transfer belt to the front or rear. |
| | Cleaning Blade | A dirty or worn out cleaning blade will cause toner to adhere on the rear side of the copy. The blade must be replaced at regular intervals. |
| Paper Feed, Registration | Paper Feed Roller, Pick-up Roller, Separation Roller | This machine uses paper trays, a by-pass feed table, and an LCT for paper feeding. If paper dust adheres to the paper feed rollers or if these rollers are worn out, paper may not feed correctly, or skewing may result. Replacing is required at regular intervals. |
| | Registration Roller | A dirty registration roller can cause paper to register incorrectly, skew, or jam. Cleaning is required at regular intervals. |
| | Paper Dust Cleaner | Too much paper dust caught in the cleaner causes paper dust overflow. This results in early deterioration of the cleaning blade, fusing rollers, etc. Clean at regular intervals. |
| | Registration Sensor | A dirty registration sensor causes paper jams. Clean at regular intervals. |

| Item | | Explanation |
|---|---|---|
| Around the Drum | Charge Wires/ Wire Cleaner/ Charge Grid | Dirty charge wires may cause uneven image density. They should be replaced at regular intervals. |
| | End Blocks | Toner tends to accumulate on the corona end blocks, this can result in a high voltage leak. Clean end blocks at regular intervals. |
| | Drum Grounding Terminal | Too much drum grounding terminal deterioration causes poor drum grounding. This results in dirty backgrounds and drum potential sensor calibration errors. |
| | QL | If toner accumulates on the QL, a dirty background or a repeating negative image may result. Clean the QL at regular intervals. |
| | PTL | If paper dust or toner accumulates on the PTL filter, its efficiency may be reduced. This can cause toner to be reattracted to the drum during transfer, reducing image density. Clean the PTL filter at regular intervals. |
| | ID Sensor | If too much paper dust or toner accumulates on the ID sensor, the toner density cannot be controlled correctly. This results in light copy or over toning. Clean this sensor at regular intervals. |
| | Erase Lamp | If toner accumulates on the erase lamp, a dirty background may occur in the erased area that becomes progressively worse in long copy runs. Also this affects sensor pattern detection, causing incorrect toner density and exposure lamp control. Clean this lamp at regular intervals. |
| | Cleaning Blade | A dirty or worn out cleaning blade will cause black lines on copies or scratches on the drum. The blade must be replaced at regular intervals. |
| | Cleaning Brush | A worn out cleaning brush will not clean the drum surface effectively, resulting in a dirty background and damage to the cleaning blade. Replace at regular intervals. |
| | Toner Collection Bottle | If the toner collection bottle becomes full, a service call condition occurs and copying is prohibited. Empty the toner collection bottle at regular intervals. |
| Developme-nt Unit | Developer | The tribo-chargeability of overused developer decreases. This results in toner scattering. Developer must be replaced at regular intervals. |

| Item | | Explanation |
|---|---|---|
| Fusing Unit | Thermistor | If toner accumulates on the thermistor, fusing temperature control may not be accurate. Clean the thermistor at regular intervals. |
| | Stripper Pawls | Toner or dust adhering to the stripper pawls can cause a paper jam. Clean or replace the pawls at regular intervals. |
| | Fusing Entrance and Exit Guides | Toner piling up on the guide plate will cause a dirty background on the copy or paper jam. Clean the guide plate at regular intervals. |
| Duplex Unit | Separation/Feed/ Transport Rollers and Separation Belts | If paper dust adheres to the separation/feed/transport rollers and the separation belts, paper may not feed correctly, or skewing may result. Replacement is required at regular intervals. |
| Others | Ozone Filter | When an ozone filter deteriorates, ozone produced in the copier will not be absorbed, causing headaches, irritations, or other discomforts. Replace at regular intervals. |
| DJF | Transport Belt | A dirty transport belt can leave stains on copies. Replace the belt at regular intervals. |
| | Pick-up Roller, Feed Roller, Separation Belt | When dirty, these rollers and this belt can leave stains on the copy paper. Also, original misfeeds or multi-feeds may occur. Replace these parts at regular intervals. |
| RDH | Transport Belt | A dirty transport belt can leave stains on copies. Clean or replace the belt at regular intervals. |
| | Feed Roller Separation Belts | When dirty, these rollers and these belts can leave stains on the copier. Also, original misfeeds or multi-feeds may occur. Replace these parts at regular intervals. |

## 4.3 REGULAR PM PROCEDURE






4-1. Remove the developer.

4-2. Clean the development unit and gears.

4-3. Pour a pack of new developer.

4-4. Replace the air filter.

4-5. Clean the toner bottle holder and toner receiver.

4-6. Lubricate the bottle drive mechanism. [Grease G-501]

5-1. Clean the paper guide plates and vertical transport/relay rollers.

5-2. Replace the paper feed, pick-up, and separation rollers.

**Note:**
The feed (pick-up, feed, separation) rollers for the 1st ~ 3rd feed trays are different from the feed rollers for the by-pass feed table and 3.5 K LCT.
There is no interchangeability.

5-3. Clean the registration sensor.

5-4. Lubricate the transport guide lock pin.

6-1. Clean the transfer belt.

6-2. Replace the transfer unit cleaning blade.

6-3. Clean the belt drive/guide rollers and bias Surlier.

7-1. Replace the separation roller and separation belts.

7-2. Clean the feed and transport rollers.

7-3. Lubricate the duplex positioning pins.

8. Fusing unit (every 120 K)

8-1. Clean the entrance and exit guide plates.

8-2. Clean the thermistor and apply silicone oil.

8-3. Clean the stripper pawls.

Replace stripper pawls, hot roller, pressure roller, and pressure roller bearings. Lubricate the isolating busing. (every 240 K)

9. Exit unit (every 80 K)

9-1. Clean the exit rollers.

9-2. Inspect the antistatic brush.

9-3. Clean the exit sensor.

Replace the ozone filter (every 360 K)

10. Rear side (every 80 K)

10-1. Lubricate the gears.

10-2. Inspect the timing belts.

Replace the drum grounding plate (every 360 K)

11. Exterior (every 80 K)

11-1. Clean the covers.

12. Copy Quality

12-1. Perform the developer initial setting. ([1] SP Adjustment – PAGE 1).

12-2. Perform the process control data initial setting. ([1] SP Adjustment – PAGE 1).

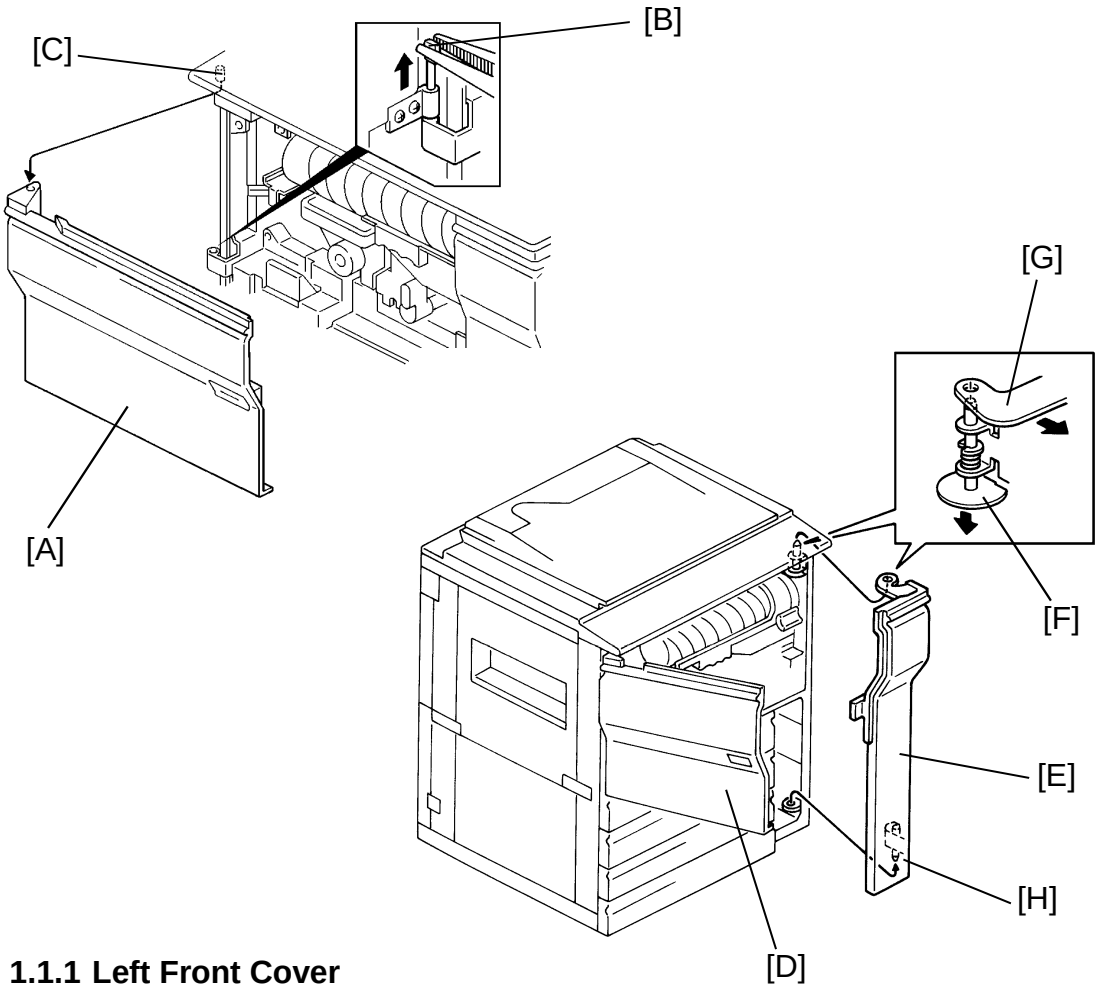
**CAUTION: Perform the developer initial setting only when the new developer is installed.**
**Never make any copies before the developer initial setting.**

# SECTION 5

# REPLACEMENTS AND ADJUSTMENTS

# 1. EXTERIOR AND INNER COVER REMOVAL

## 1.1 FRONT SIDE



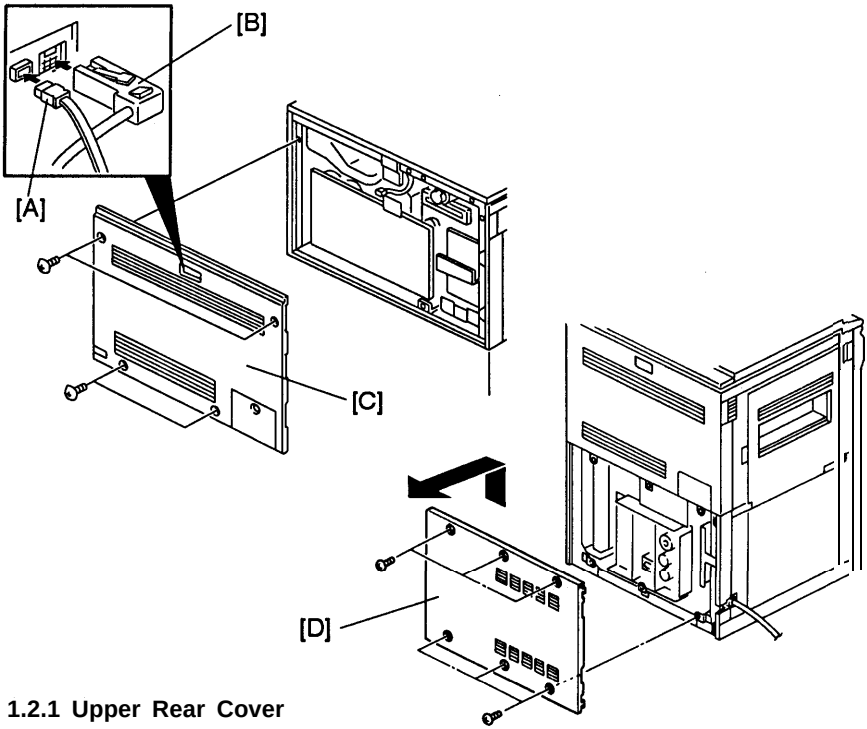

### 1.1.1 Left Front Cover

1. Open the left front door [A] then unhook the chain (1 screw).
2. Pull out the pin [B].
3. Unhook the upper pin [C].

### 1.1.2 Right Front Door

1. Open the left front door [D].
2. Open the right front door [E].
3. Lower the pin [F] to unhook the upper hinge bracket [G].
4. Unhook the lower pin [H].

## 1.2 REAR SIDE




### 1.2.1 Upper Rear Cover

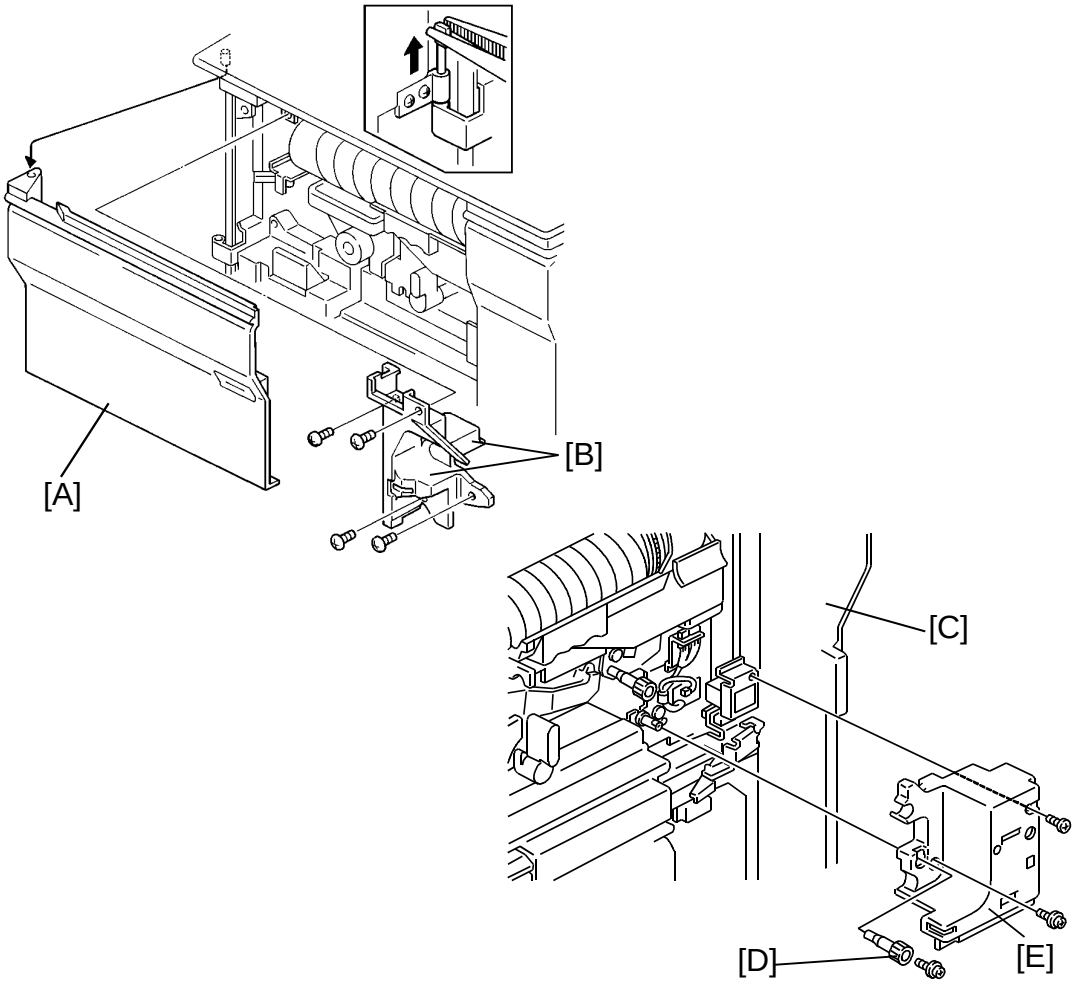
1. Turn off the main switch.
2. If the DJF or RDH is installed, disconnect the fiber optics connectors [A] and [B].

   NOTE: After the upper rear cover is re-installed, set the fiber optics connectors [A] and [B] so that the fiber optic cable [A] is located over the electrical cable [B]. Also, the fiber optic cable [A] should not bend while opening and closing the DJF or RDH.
3. Remove the upper rear cover [C]. (4 screws)

### 1.2.2 Lower Rear Cover

1. Remove the lower rear cover [D], (6 screws)

   NOTE: When installing the lower rear cover, set the hooks in the holes on the right and left side covers.



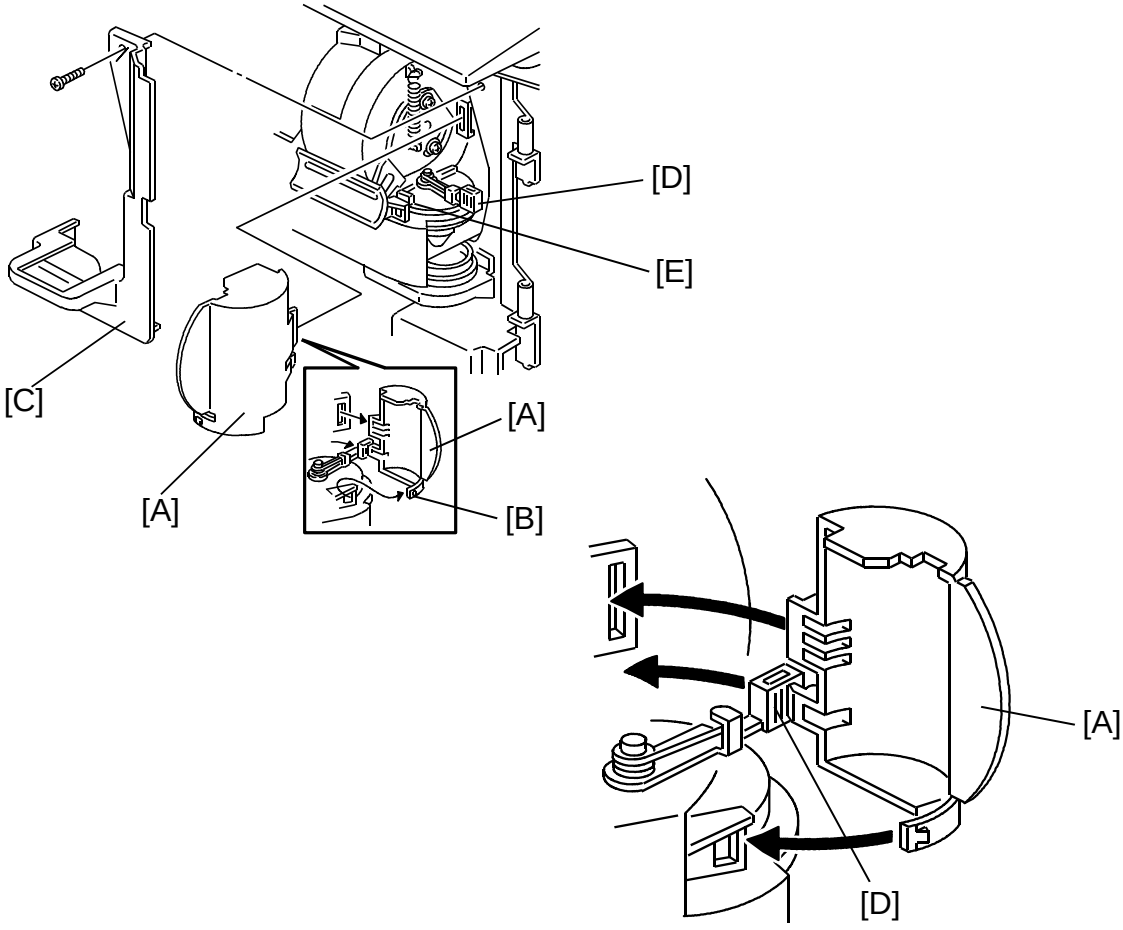

### 1.2.3 Left Inner Cover

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

### 1.2.4 Right Inner Cover

1. Open the right door [C].
2. Remove knob (B1) [D] (1 screw).
3. Remove the right inner cover [E] (2 screws).

### 1.2.5 Shutter Inner Cover

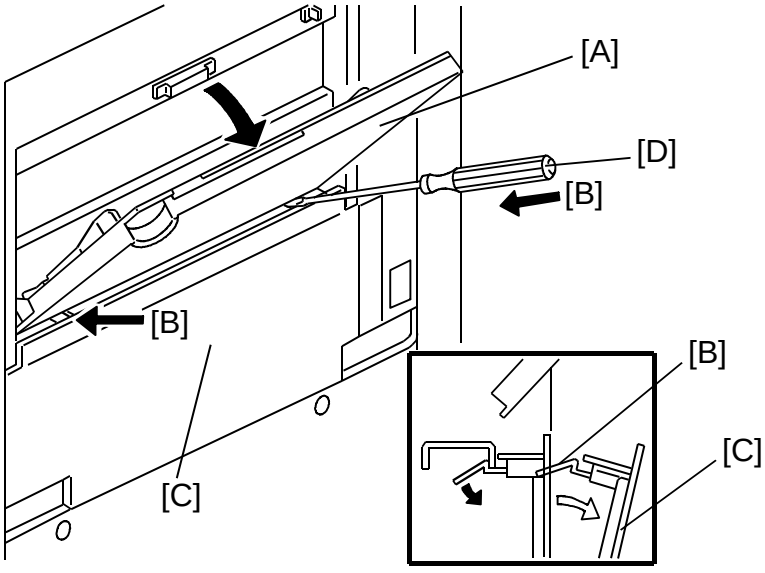



1. Open the right door.
2. Remove the shutter cover [A] by releasing the hook [B].
3. Remove the shutter inner cover [C] (1 screw).

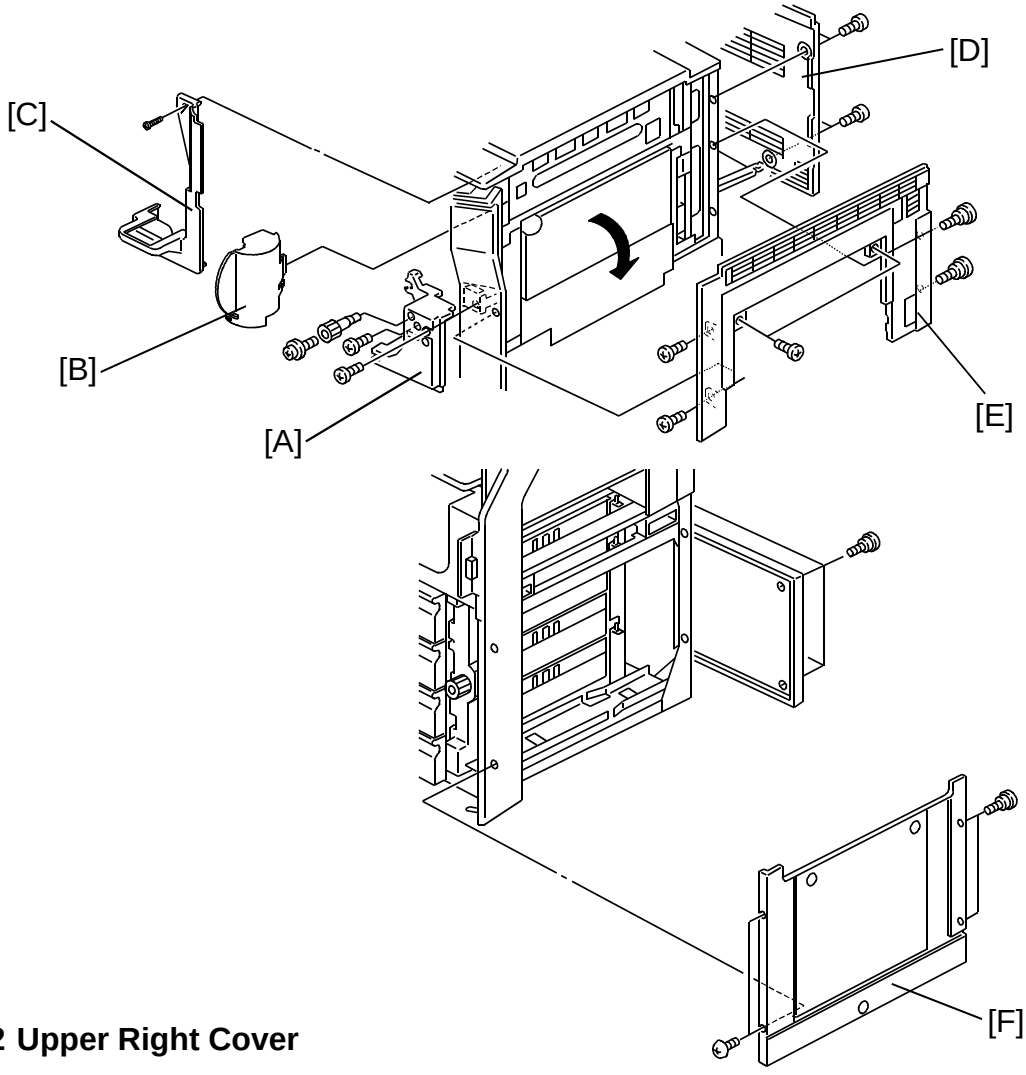
**NOTE:** 1. Be sure to move the lever [D] until it contact the part [E].
2. While installing the shutter cover [A], the lever [D] must be pushed as shown.

# 1.3 RIGHT SIDE

## 1.3.1 Feed Unit Cover




1. Open the by-pass table [A] approximately 45 degrees and push the stoppers [B] of the feed unit cover [C] by using a small flat head screw driver [D], then remove the feed unit cover.




### 1.3.2 Upper Right Cover

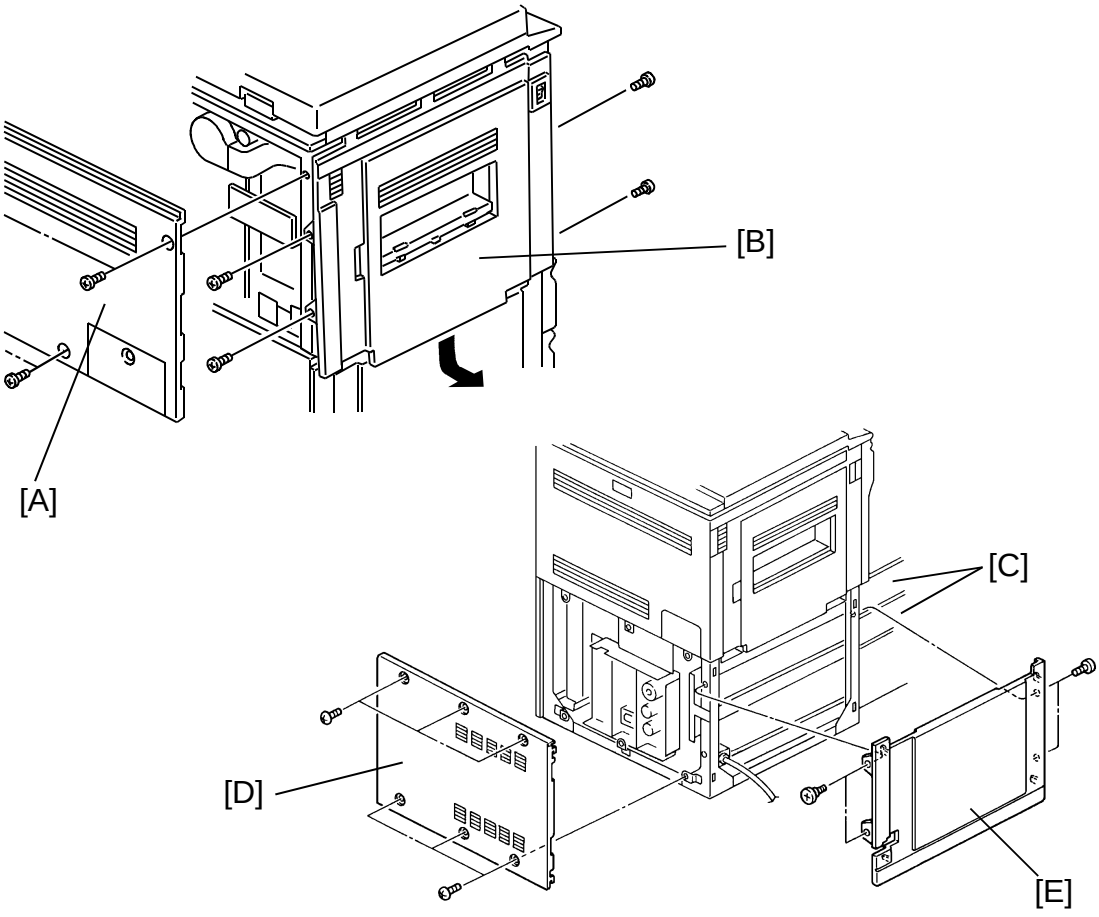
1. Remove the right inner cover [A], shutter cover [B] and the shutter inner cover [C]. (Refer to Shutter Inner Cover Removal.)
2. Remove the upper rear cover [D]. (Refer to Upper Rear Cover Removal.)
3. Open the manual feed table and remove the upper right cover [E] (6 screws).

### 1.3.3 Lower Right Cover

1. Remove the lower rear cover. (Refer to Lower Rear Cover Removal.)
2. Open the right door.

   **NOTE:** When installing the lower right cover, set the hooks in the holes on the right and left side covers.
3. Remove the lower right cover [F] (4 screws).

## 1.4 LEFT SIDE




### 1.4.1 Upper Left Cover

1. Remove the left inner cover. (Refer to Left Inner Cover Removal.)
2. Remove the upper rear cover [A]. (Refer to Upper Rear Cover Removal.)
3. Remove the upper left cover [B] (4 screws).

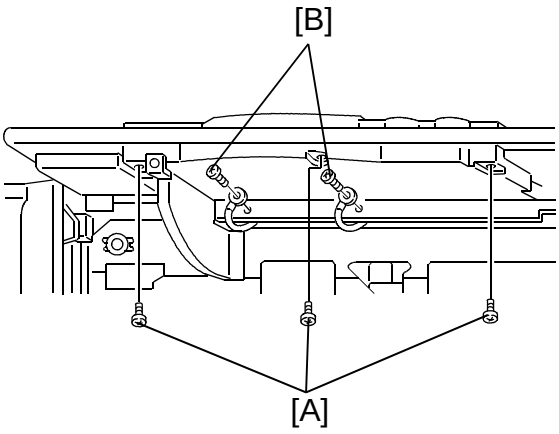
   **NOTE:** When installing the upper left cover, set the hooks in the holes on the right and left side covers.

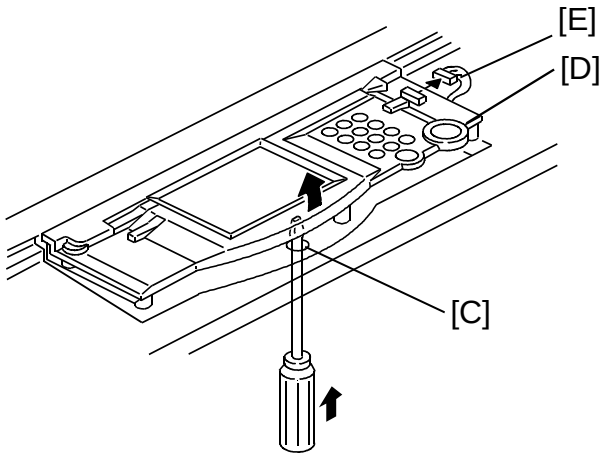
### 1.4.2 Lower Left Cover

1. Pull out the second and the third feed trays [C].
2. Remove the lower rear cover [D].
3. Remove the lower left cover [E] (4 screws).

   **NOTE:** When installing the lower left cover, set the hooks in the holes on the right and left side covers.

## 1.5 OPERATION PANEL

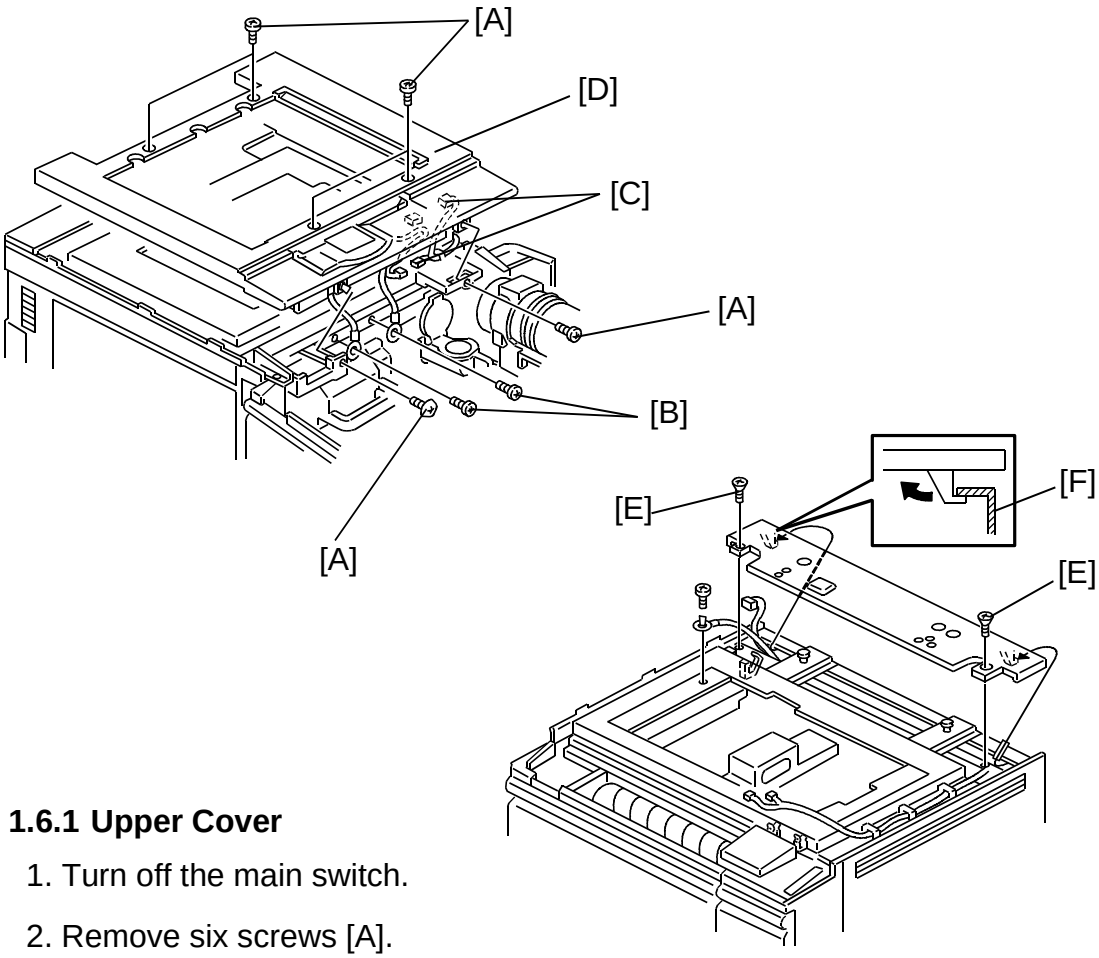



1. Turn off the main switch.
2. Remove the left door. (Refer to Left Door Removal.)
3. Remove the left inner cover. (Refer to Left Inner Cover Removal.)
4. Open the right door.
5. Open the toner bottle.
6. Remove three screws [A].
7. Remove two screws [B] securing the protective earth wires.
8. Insert the screw driver through the hole [C] and push the operation panel [D] up.
9. Disconnect the connector [E].

   **NOTE:** Be sure not to damage the harness by pulling the connector too strongly.

## 1.6 UPPER SIDE




### 1.6.1 Upper Cover

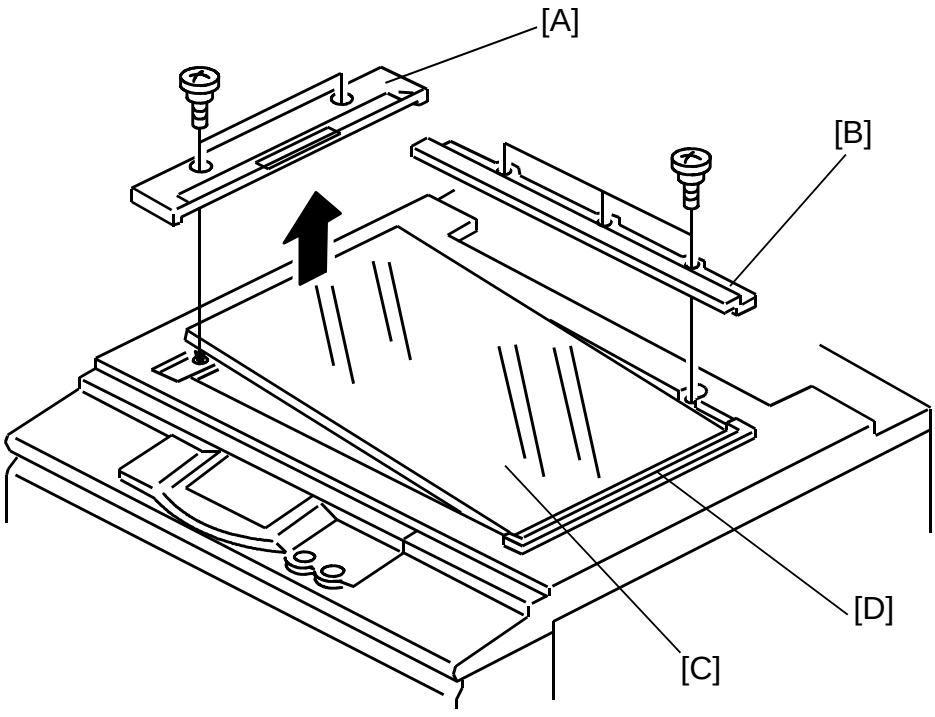
1. Turn off the main switch.
2. Remove six screws [A].
3. Remove two screws [B] securing the grounding wires.
4. Disconnect two connectors [C].
5. Remove the upper cover [D].

### 1.6.2 Rear Upper Cover

1. Turn off the main switch.
2. Remove the platen cover or document feeder (DJF or RDH) from the copier.
3. Remove the upper cover.
4. Remove the 2 screws securing the rear upper cover [E].
5. Disengage the hooks [F] by sliding the rear upper cover to the front and remove it.

# 2. OPTICS

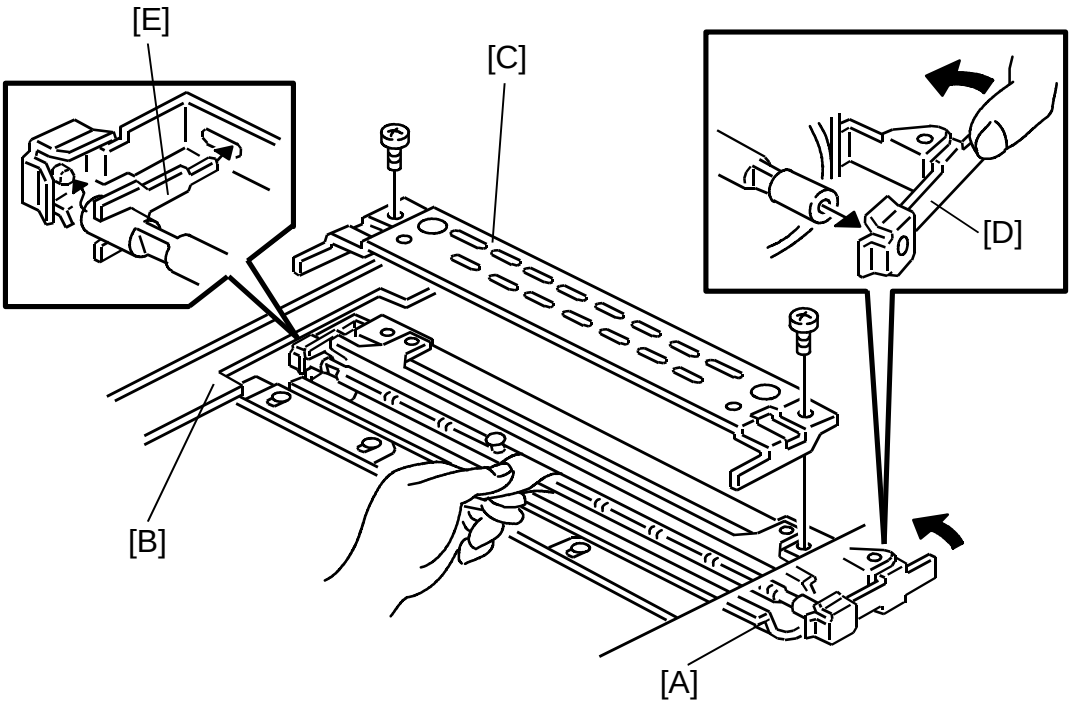
## 2.1 EXPOSURE GLASS REMOVAL




1. Turn off the main switch.
2. Remove the left scale [A] (2 shoulder screws).
3. Remove the rear scale [B] (3 screws).
4. Grasp the left edge of the exposure glass [C] and lift slightly. Slide the other edge out from under the right glass holder [D]. Remove the exposure glass.

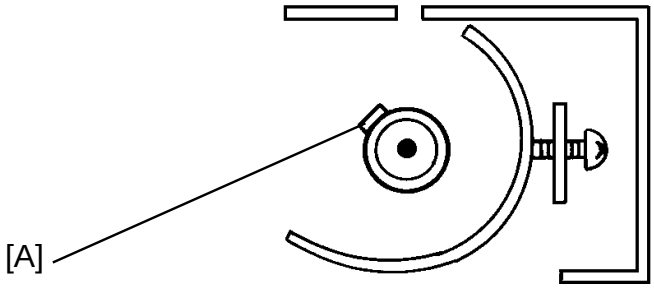
   **NOTE:** When reinstalling the exposure glass, make sure that the mark (white: A095 copier/red: A096 copier) on the edge of the glass is located at the rear right corner. This side is smoother and it generates less static electricity when the RDH is used.

## 2.2 EXPOSURE LAMP REPLACEMENT




**NOTE:** Do not touch the reflector or the new exposure lamp with your bare hands. Use a strip of paper as shown. (Oil marks from fingers on the lamp or reflectors will be affected by heat from the lamp.)

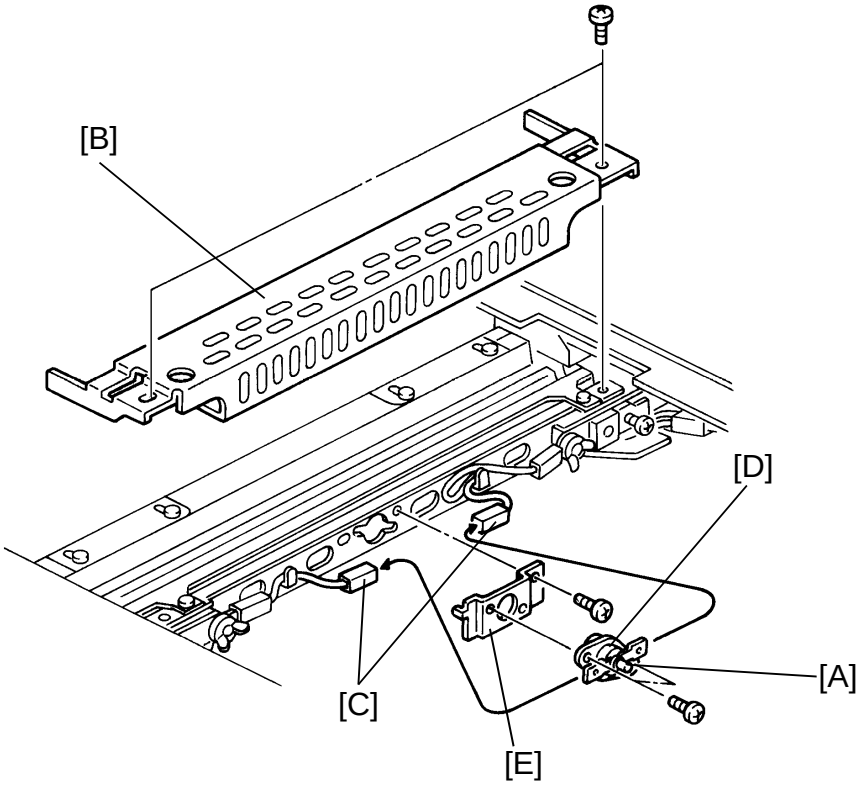
1. Remove the exposure glass. (Refer to Exposure Glass Removal.)
2. Move the first scanner [A] to the cutout position at the rear frame [B]. (See illustration.)
3. Remove the reflector cover [C] (2 screws).
4. While holding the lamp with the paper strip, release the lamp terminal [D] as shown; then, take out the lamp.
5. Install a new lamp. Use a strip of paper as shown to hold the lamp. Confirm that the lamp is properly set by both terminals and that the clip [E] is set properly.




**NOTE:** Make sure that the blister [A] on the lamp points towards the reflector opening (left side of the copier) as shown.

6. Reassemble the copier.
7. Turn on the main switch and enter SP mode, then perform the process control data initial setting ([1] SP Adjustment – PAGE 1).

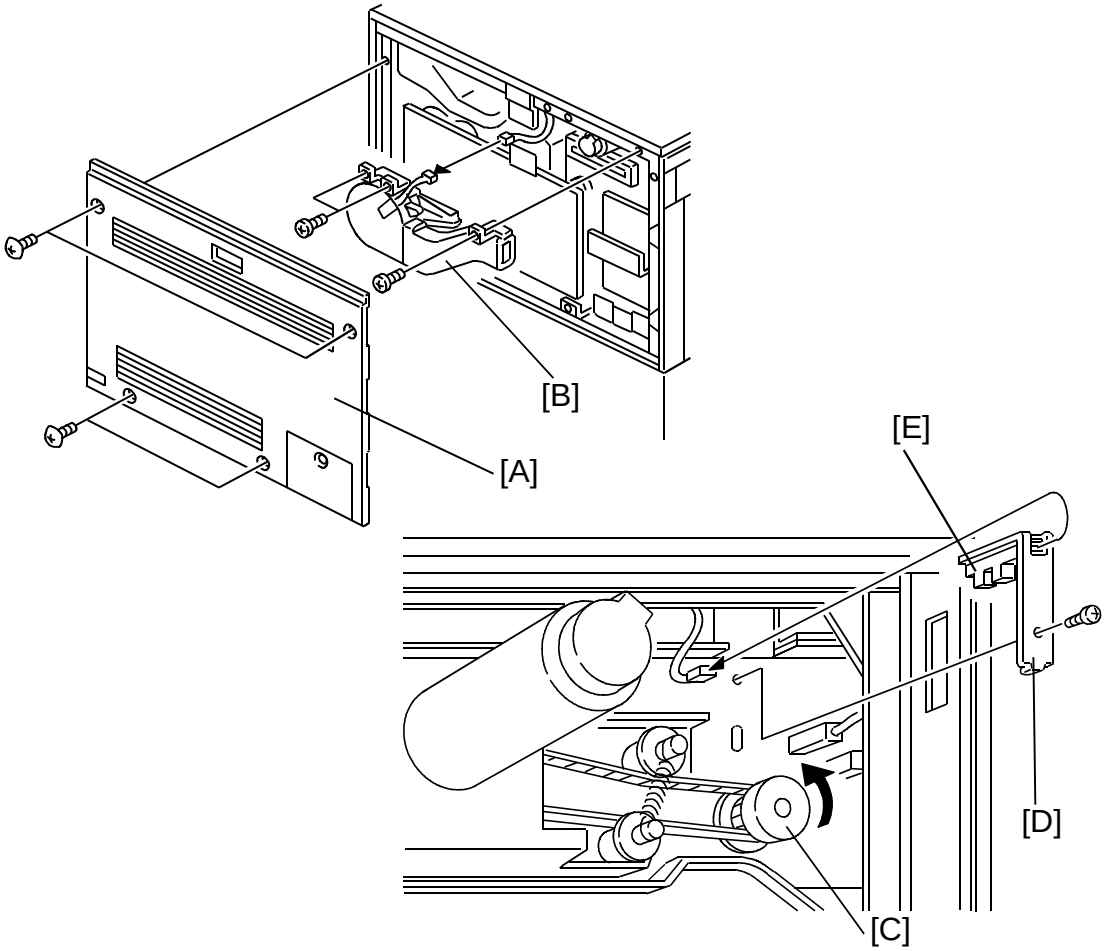
## 2.3 OPTICS THERMOSWITCH REPLACEMENT




**NOTE:** The thermoswitch can be reset manually by pushing the red button [A] when the exposure lamp area cools.

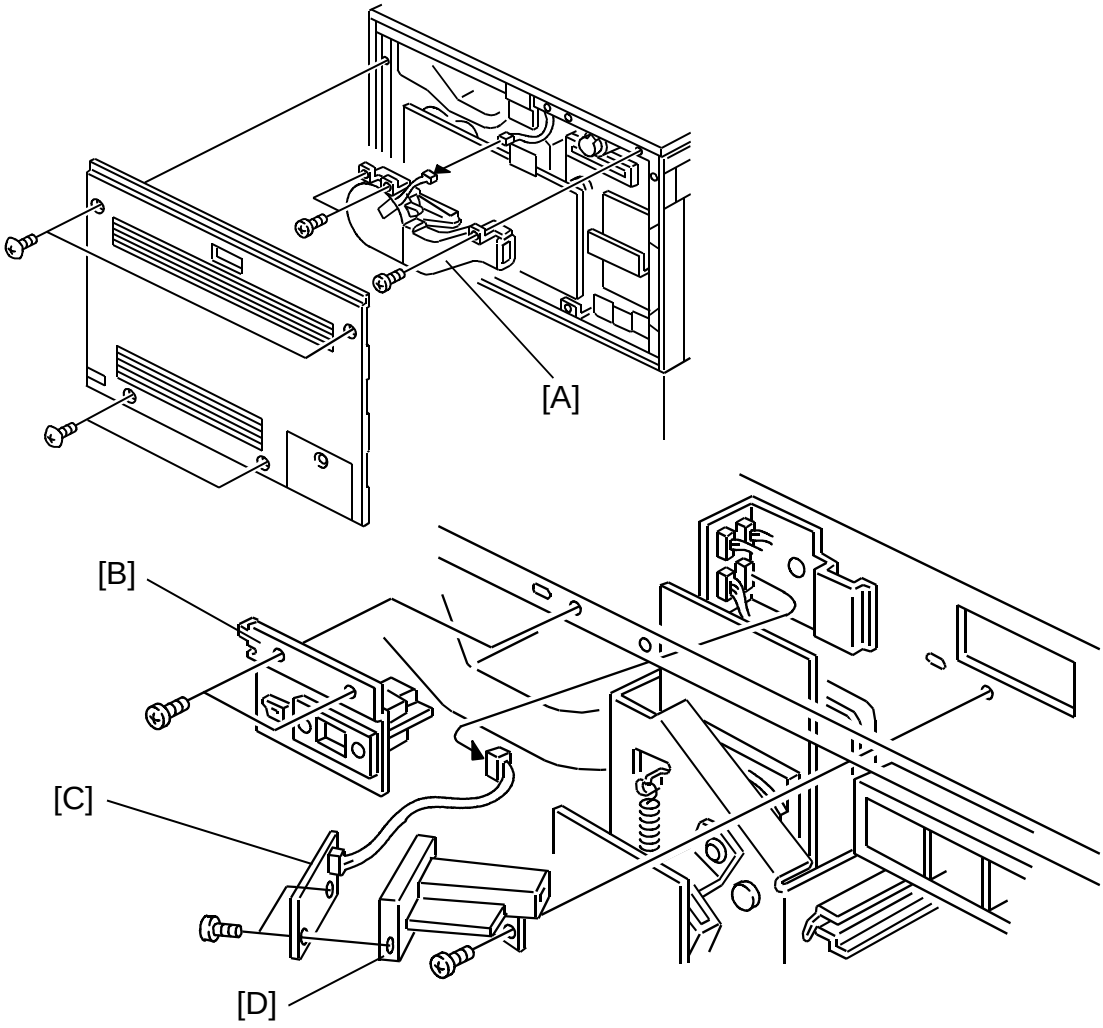
1. Remove the exposure glass. (Refer to Exposure Glass Removal.)
2. Move the first scanner to the cutout position at the rear frame.
3. Remove the reflector cover [B] (2 screws).
4. Remove the exposure lamp leads [C] from the terminals on both sides of the thermoswitch [D].
5. Remove the thermoswitch bracket [E] (1 screw).
6. Remove the thermoswitch from the bracket (2 screws), and replace it.

## 2.4 SCANNER HP SENSOR REPLACEMENT



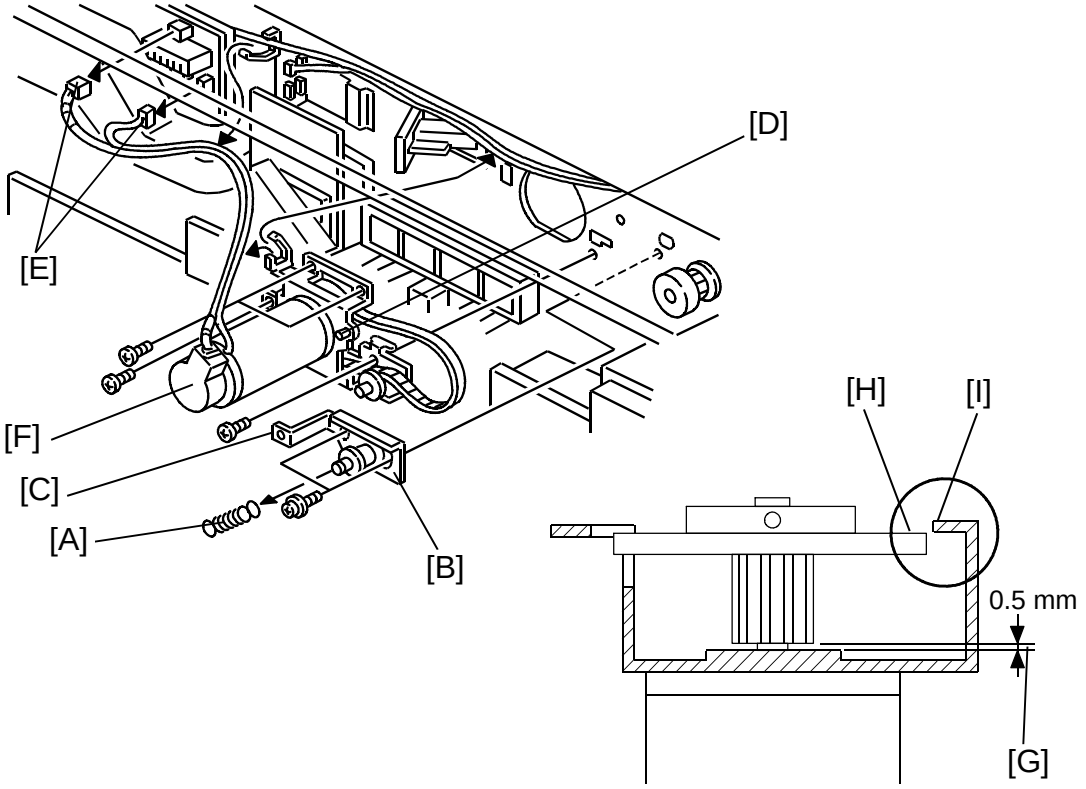

1. Remove the upper rear cover [A]. (Refer to Upper Rear Cover Removal.)
2. Remove the exhaust fan [B] (3 screws).
3. Manually turn the scanner drive pulley [C] counterclockwise to move the scanners about 10mm to the left (rear view).
4. Remove the scanner HP sensor bracket [D] (1 screw).
5. Disconnect the connector.
6. Replace the scanner HP sensor [E] (1 screw).

## 2.5 ADS SENSOR REMOVAL




1. Remove the exhaust fan [A]. (Refer to Scanner HP Sensor Replacement.)
2. Remove the DJF/RDH connector bracket [B] (2screws).
3. Remove the ADS Sensor [C] with the cover [D] (1screw).
4. Replace the ADS Sensor [C] (2 screws).
5. Assemble the copier.
6. Turn on the main switch and enter SP mode, then perform the Auto ADS initial setting (1 SP Adjustment-PAGE 5).

## 2.6 SCANNER DRIVE MOTOR




1. Remove the exhaust fan. (Refer to Scanner HP Sensor Replacement.)
2. Remove the tension spring [A].
3. Remove the tension tightener [B].

   **NOTE:** Re-install the tightener as follows;

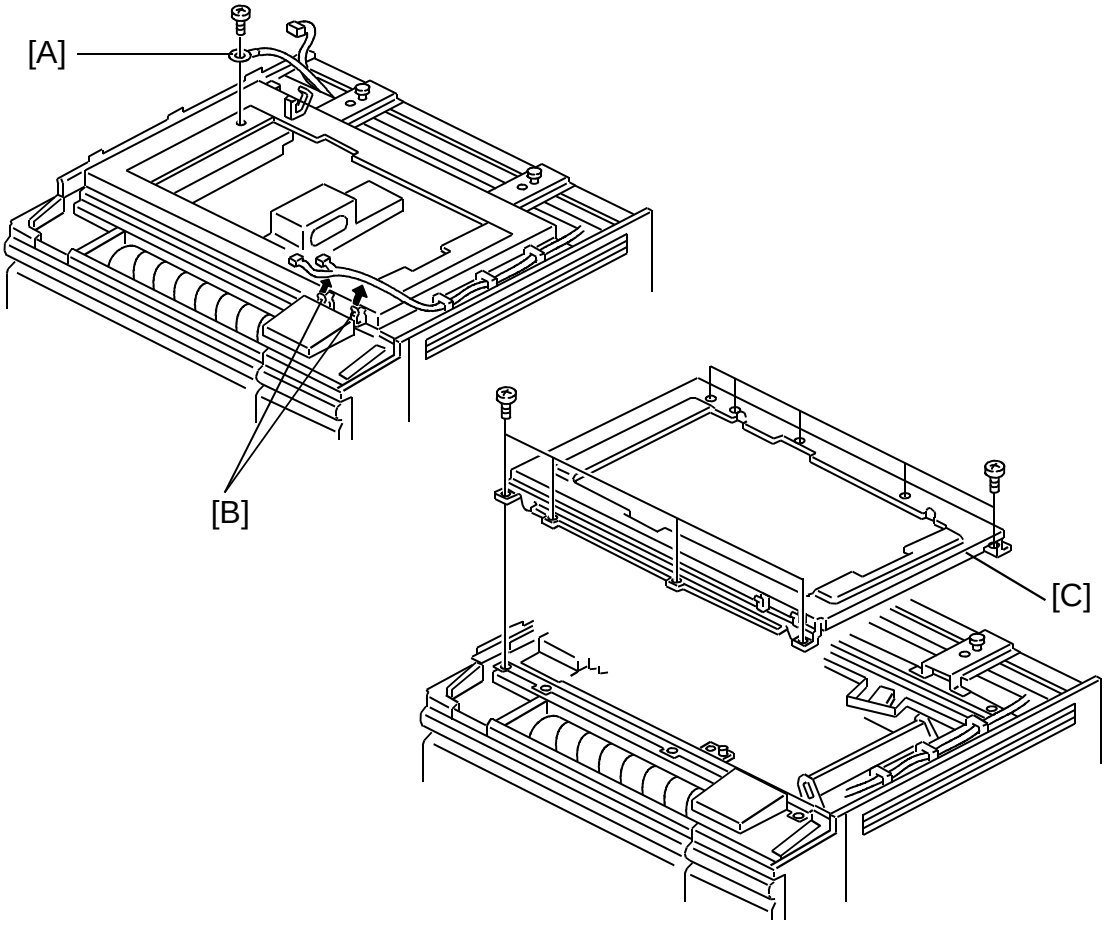
   1) Hook part [C] of the bracket on the screw [D] installed on the scanner drive motor bracket.
   2) Hook the tension spring [A].
   3) Install two screws.

4. Remove the two connectors [E] from the Optic Control Board.
5. Remove the scanner motor [F] (4 screws).

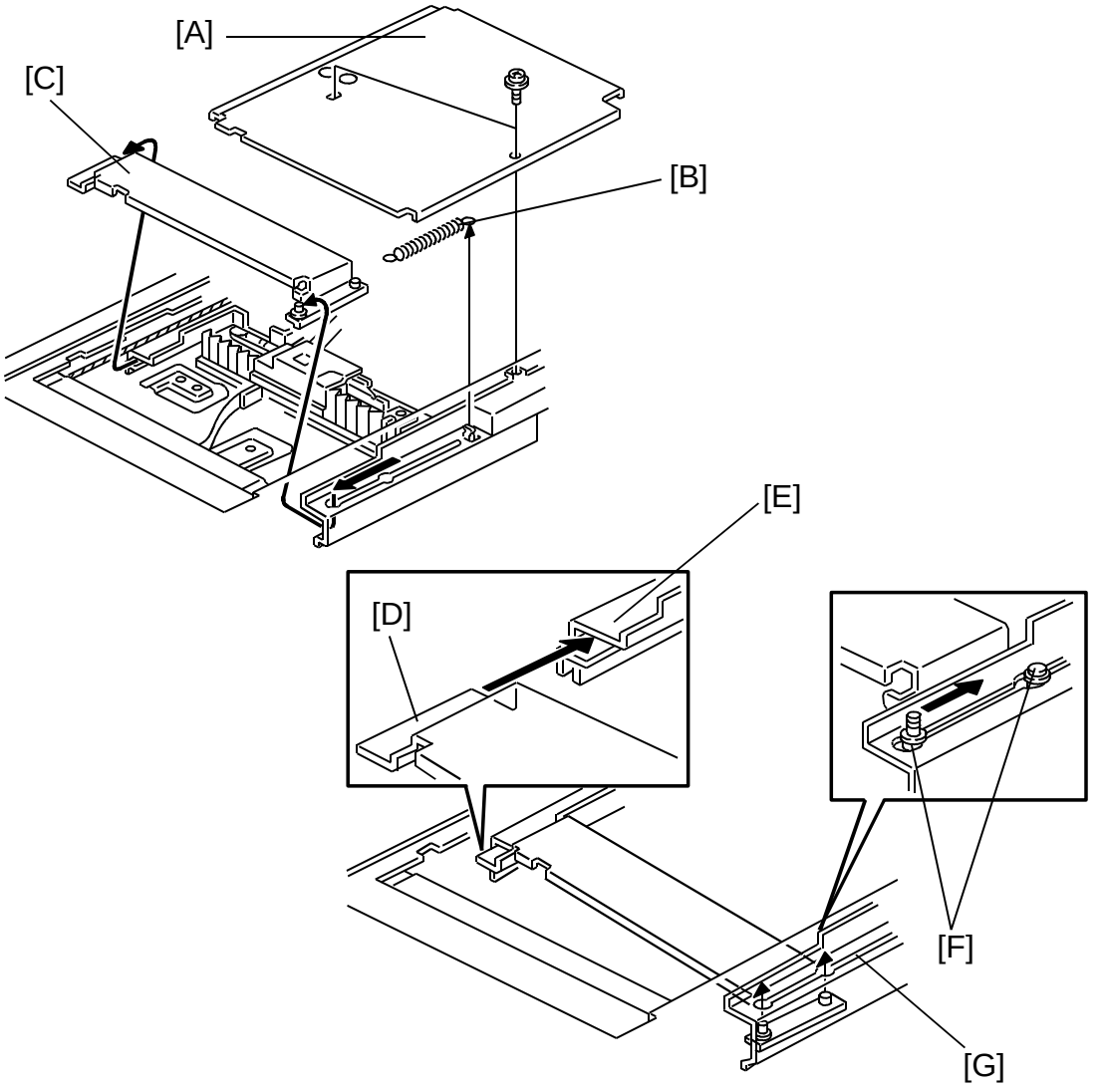
   **NOTE:** While replacing the drive pulley, the gap [G] should be 0.5mm so that the upper edge [H] of the pulley is lower than the upper surface [I] of the bracket, as shown. After installing the scanner motor, perform the scanner control adjustment. (Refer to Scanner Control Adjustment.)

## 2.7 SCANNER DRIVE WIRES REPLACEMENT

**- Removal -**

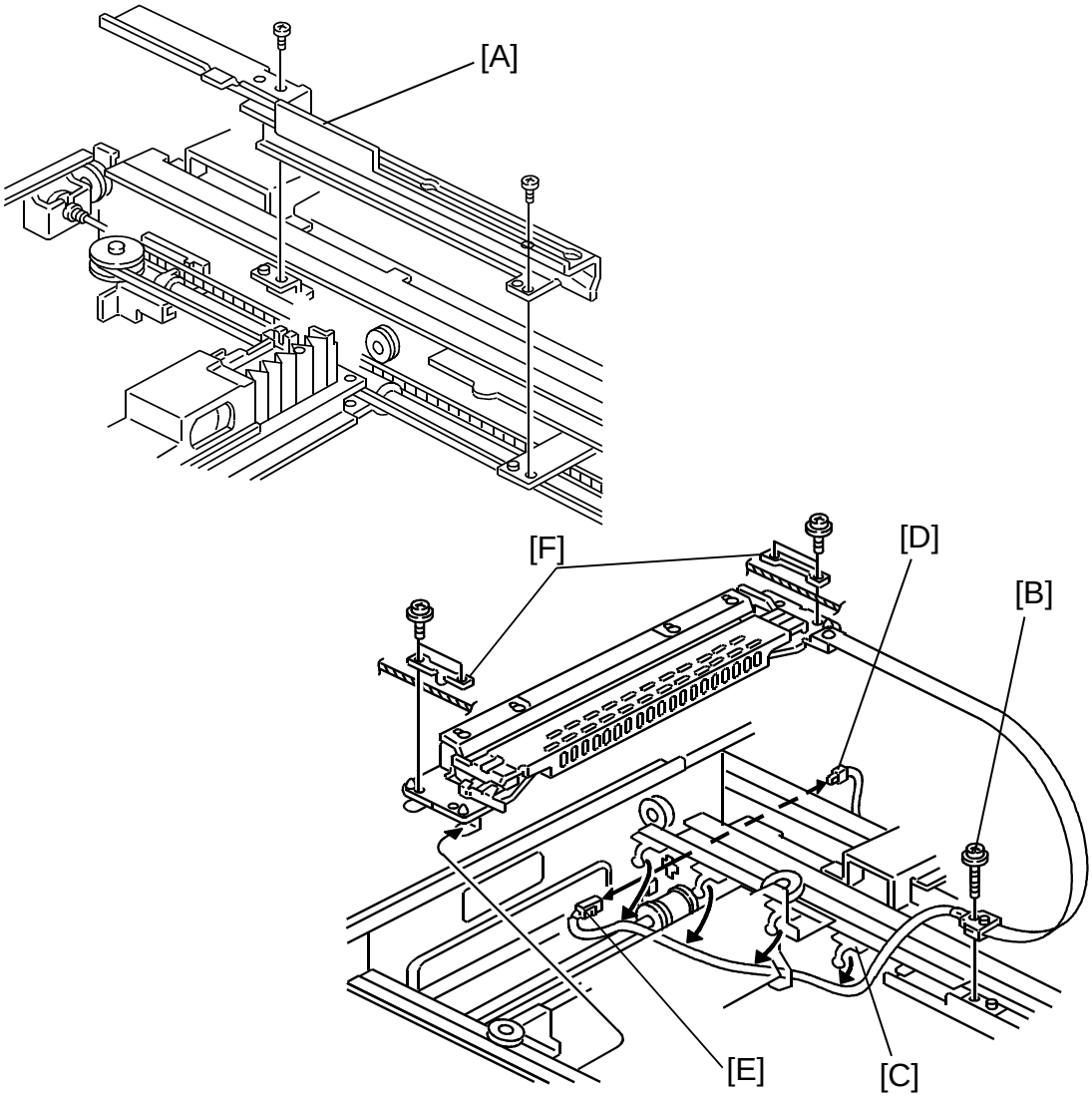



1. Turn off the main switch.
2. Remove the exposure glass.
3. Remove the upper cover and the rear upper cover.
4. Remove the optics thermistor [A] (1 screw, 1 harness clamp).
5. Remove the scanner HP sensor with bracket . (Refer to Scanner HP Sensor Replacement.)
6. Remove the scanner drive motor. (Refer to Scanner Drive Motor Replacement)
7. Unhook the harness from the two harness clamps [B].
8. Remove the upper optics frame [C] (9 screws).

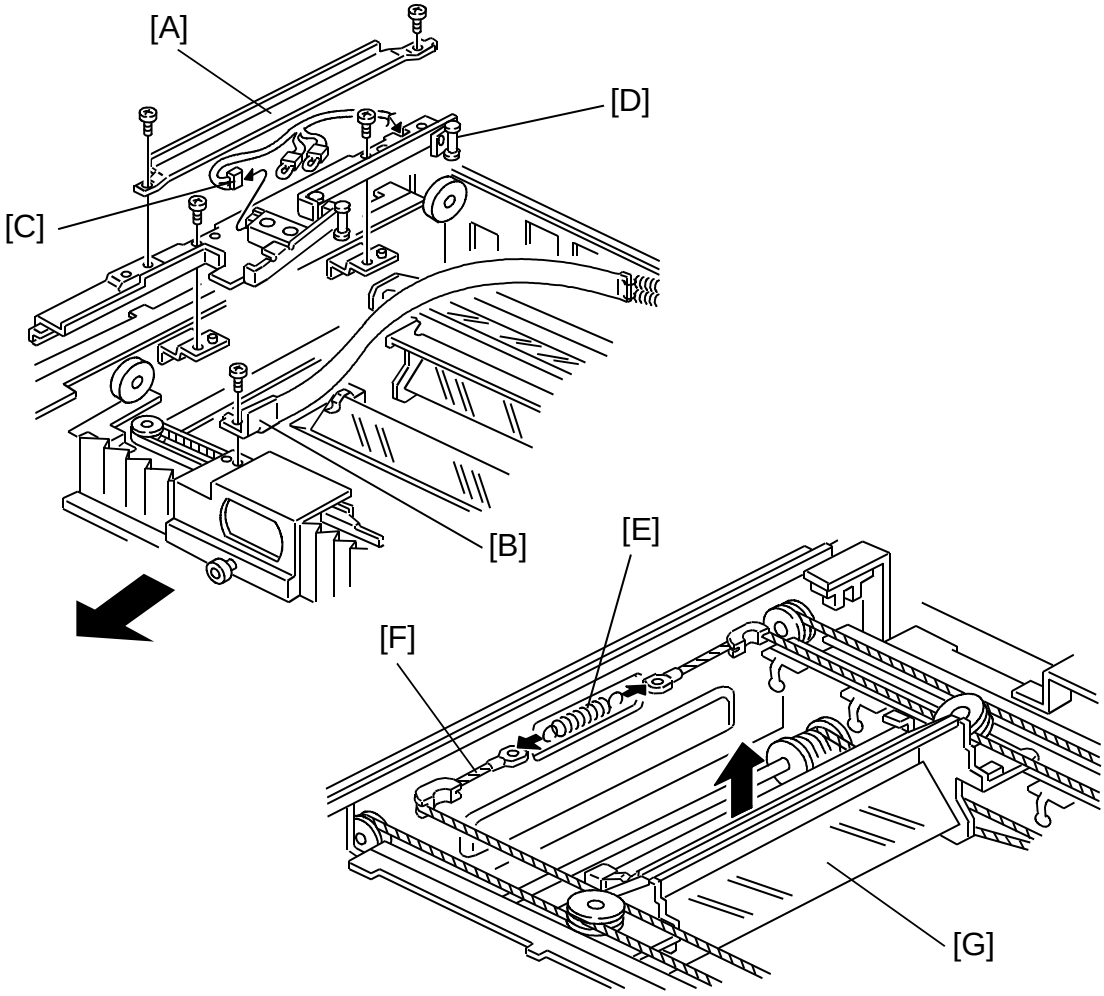



9. Remove the lens unit cover [A] (2 screws).
10. Unhook the tension spring [B].
11. Remove the lens shield plate [C].

**NOTE:** When installing the lens shield plate, set the rear part [D] of the lens shield plate between the guides [E] as shown. Then set the grooves on the guide pins [F] in the rail [G].
After reinstalling the tension spring, confirm that movement of the lens shield plate is smooth.

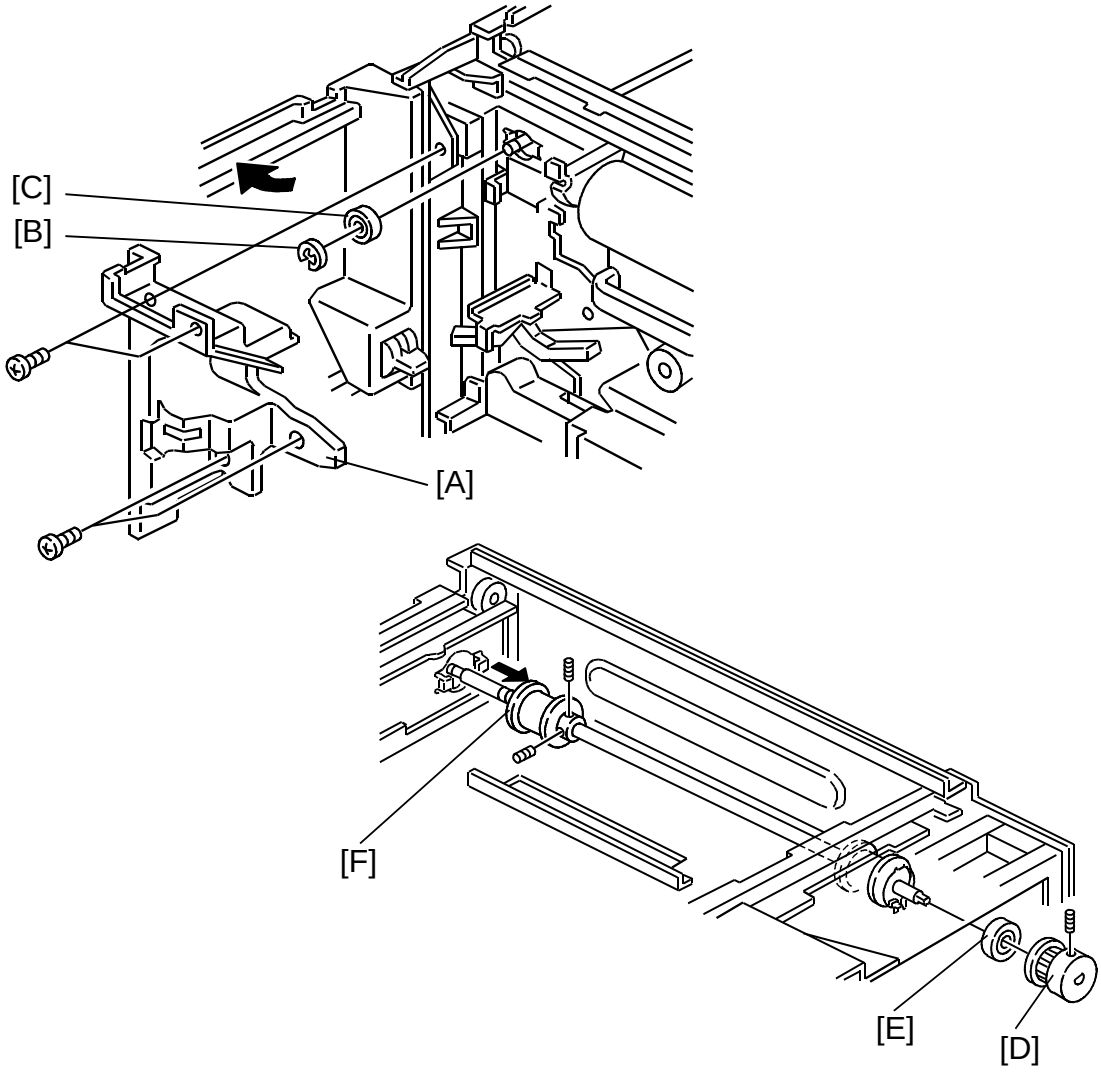



12. Remove the front bracket [A] (2 screws).
13. Remove the screw [B] securing the scanner flat cable.
14. Unhook the four harness clamps [C].
15. Disconnect the connector [D] outside the optic side frame.
16. Remove the connector [E] from the optic side frame.
17. Remove the scanner clamps [F] securing both sides of the first scanner unit to the scanner wires (4 screws).




18. Remove the harness cover [A] (2 screws).
19. Remove the light shield mylar bracket [B] (1 screw).
20. Disconnect the paper length size sensor connector [C] and move the lens unit to the left, then remove the rear bracket [D] (2 screws).
21. Unhook the tension spring [E] and remove the scanner wire [F].
22. Remove the second scanner [G].

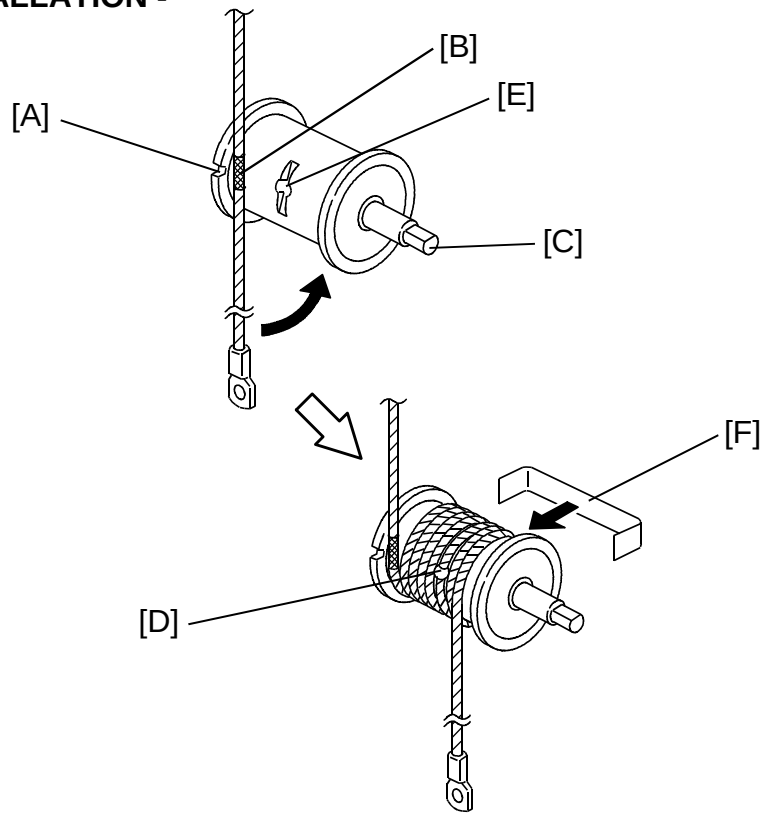
**NOTE:** When re-installing the mylar bracket [B], be sure not to create any gap between the bracket and the lens cover.





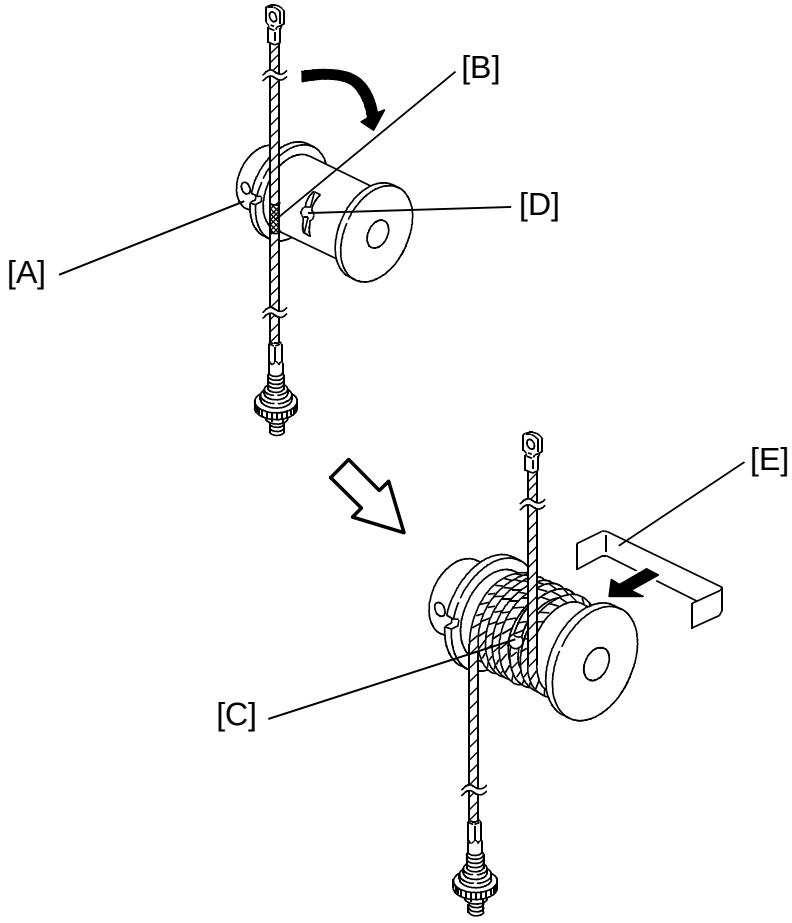

23. Remove the left inner cover [A] (4 screws).
24. Remove the E-ring [B] of the scanner drive shaft and remove the front ball bearing [C].
25. Remove the rear drive pulley [D] (1 Allen screw) and remove the rear ball bearing [E].
26. Loosen the two Allen screws of the front drive pulley [F] and slide the pulley about 10 cm to the rear then take out the drive shaft.

**- INSTALLATION -**



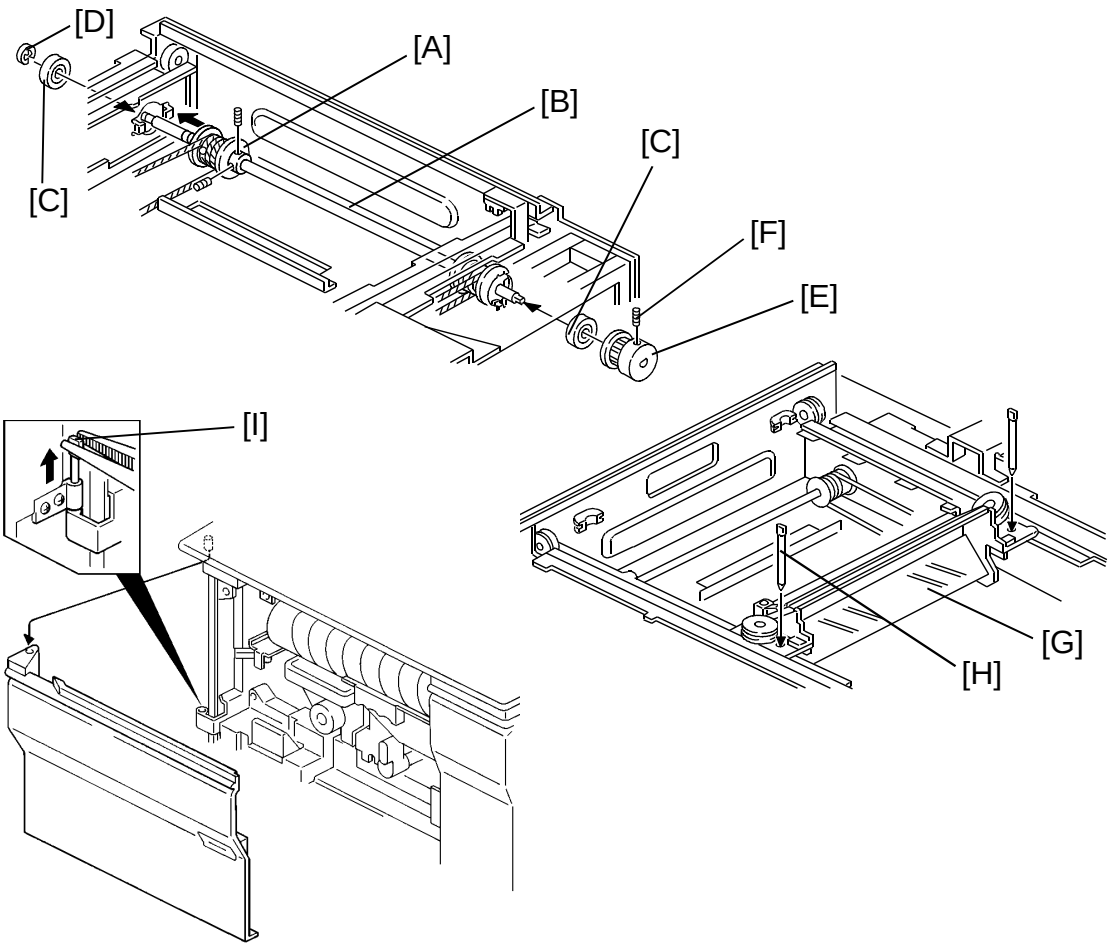

1. Round the rear scanner drive wire on the rear pulley as follows:

   1) Align the cut out [A] on the edge of the rear drive pulley and the blue mark [B] on the wire as shown.
   2) Round the wire counterclockwise 5 times as shown (in the illustration, the D-cut [C] on the shaft is at the front side) then set the bead [D] on the wire in the hole [E] on the pulley.
      (In this condition, the bead just reaches the hole on the pulley.)
   3) After setting the bead in the hole, round the wire two more times (in total 7 times).
   4) Fix the wire with tape [F] as shown.



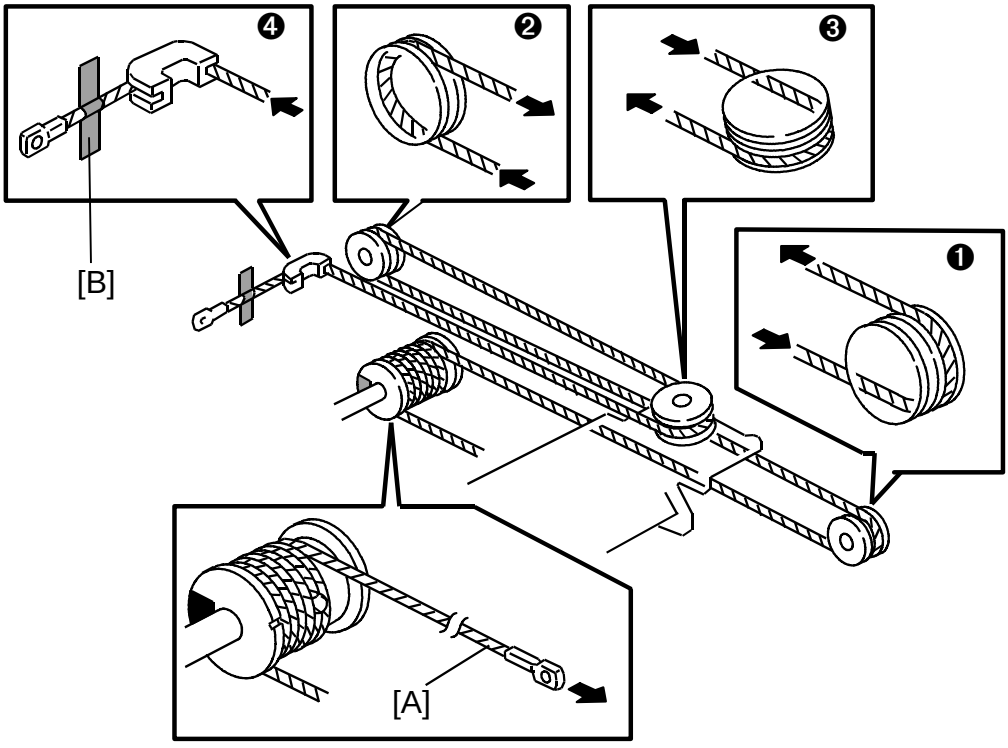

2. Round the front scanner drive wire on the front pulley as shown:

   1) Align the cut out [A] on the edge of the front drive pulley and the red mark [B] on the wire.
   2) Round the wire clockwise 5 times as shown (in the illustration, the Allen screw holes are at the rear side) then set the bead [C] on the wire in the hole [D] on the pulley.
      (In this condition, the bead just reaches to the hole on the pulley.)
   3) After setting the small ball in the hole, round the wire twice more (in total 7 times).
   4) Fix the wire with tape [E] as shown.




3. Set the front drive pulley [A] on the drive shaft. (Leave the Allen screws loosened.)
4. Place the scanner drive shaft [B] in the holes on the optics front and rear side frames.
5. Set ball bearings [C] on both sides of the scanner drive shaft.
6. Set the E-ring [D] on the front end of the scanner drive shaft.
7. Set, and fully push in, the scanner drive pulley [E] on the front end of the scanner drive shaft, then tighten the Allen screw [F].
8. Install the scanner drive motor. (Refer to Scanner Drive Motor Replacement.)
9. Place the second scanner [G] on the guide rail and fix it there by using two jig pins [H].

   **NOTE:** This jig pin is used as the left door hinge pin [I]. However, only one pin is used on the copier, so it is necessary to prepare another one.



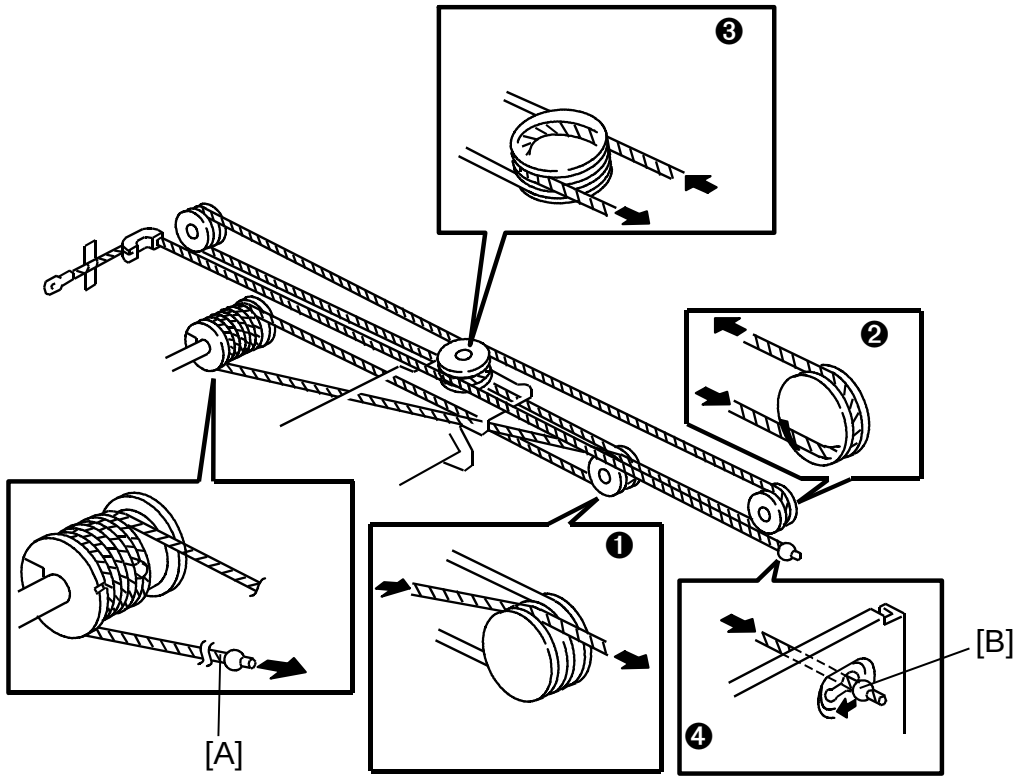

10. Route the shorter end [A] of the rear scanner drive wire in the following order.

    ❶ Rear track counterclockwise

    ❷ Clockwise

    ❸ Lower track clockwise.

    ❹ Fix the end of the wire on the frame with tape [B].



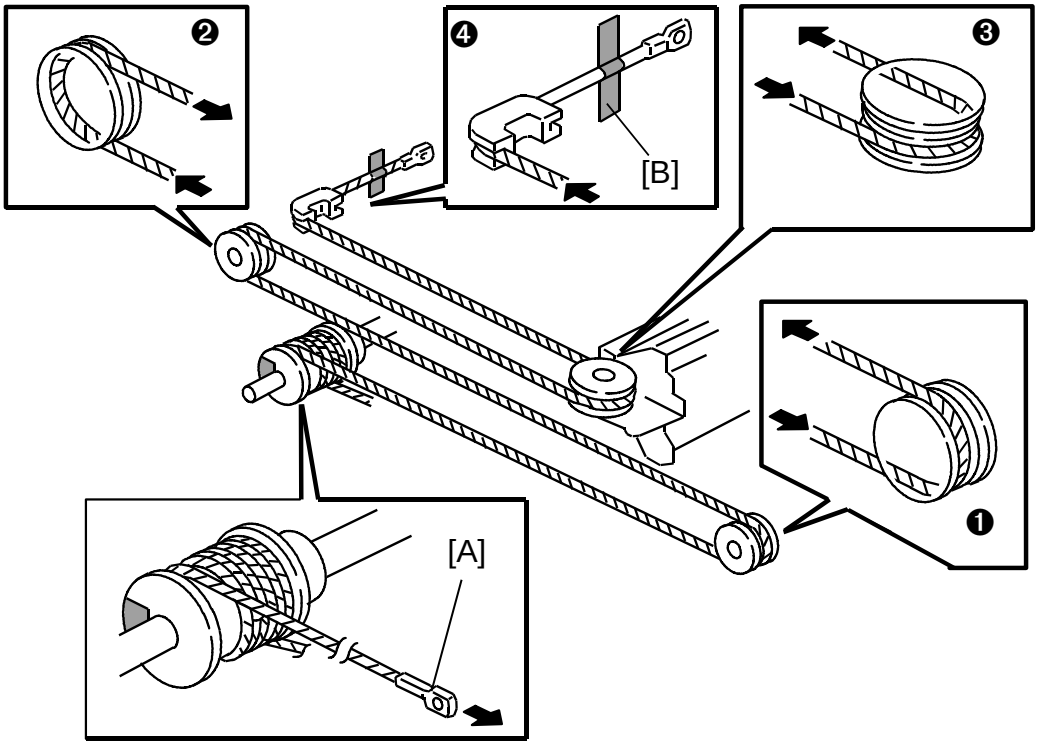

11. Route the longer end [A] of the rear scanner drive wire in the following order.

❶ Through front track, upper side.

❷ Counterclockwise.

❸ Upper track counterclockwise.

❹ Hook the end [B] of the wire on the cutout on the right optics side frame.



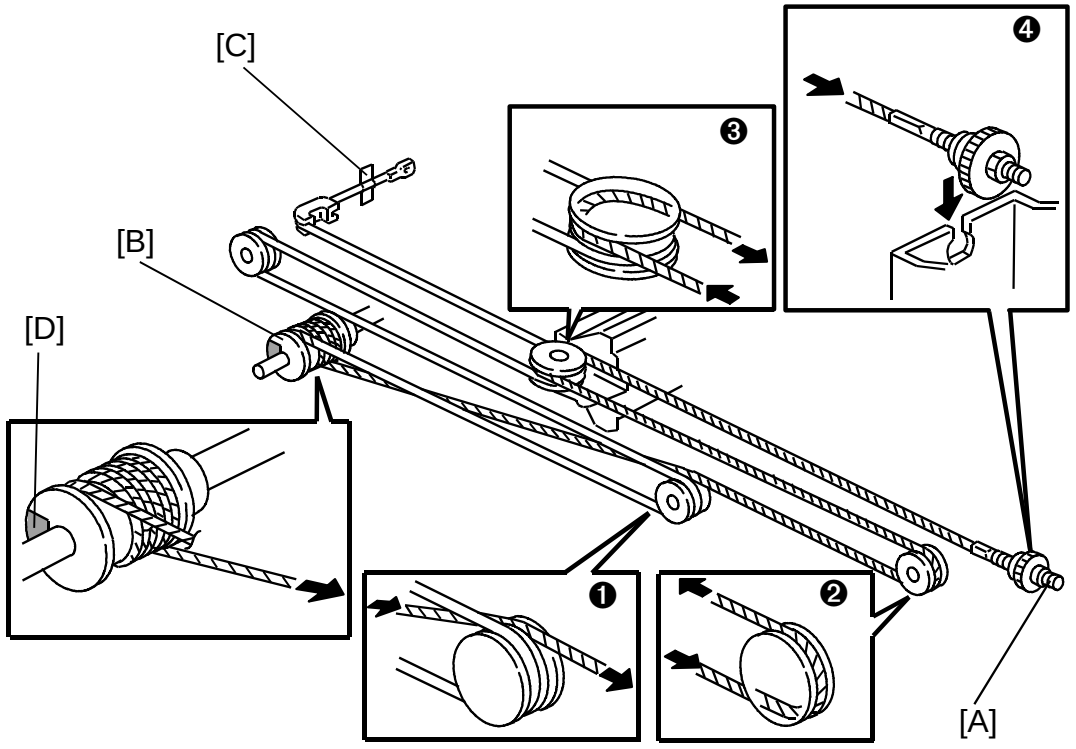

12. Route the shorter end [A] of the front scanner drive wire in the following order.

    ❶ Front track counterclockwise

    ❷ Clockwise

    ❸ Lower track clockwise.

    ❹ Fix the end of the wire on the frame with tape [B].




13. Route the longer end [A] of the front scanner drive wire in the following order.

    ❶ Through rear track, upper side.

    ❷ Counterclockwise.

    ❸ Upper track clockwise.

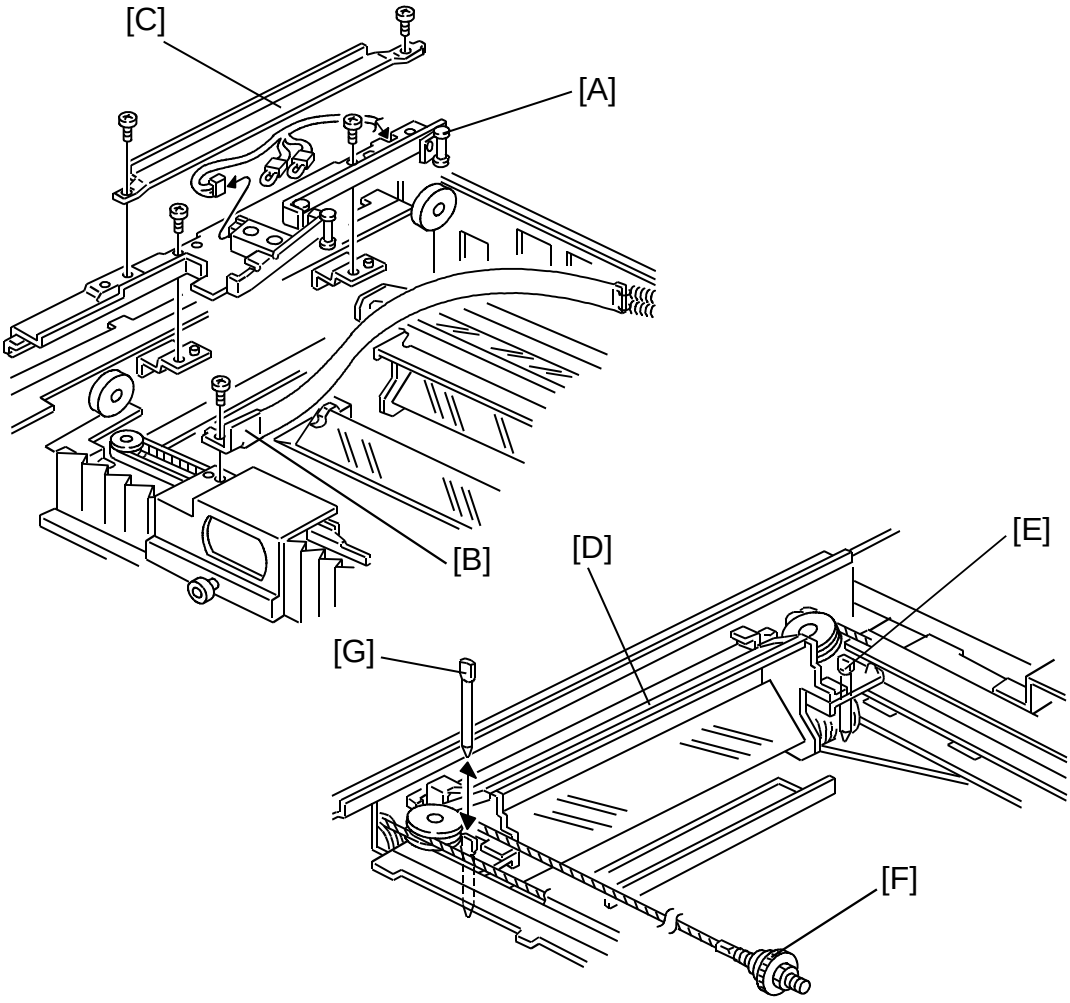
    ❹ Hook the end of the wire [A] on the cut out on the right optics side frame.

14. Slightly push the front drive pulley [B] against the front optics side frame and tighten the two Allen screws.

15. Remove the jig pins securing the second scanner.

16. Remove the tapes [C] fixing the ends of the scanner drive wires and hook the ends of the scanner drive wires with the tension springs.

17. Remove the tapes [D] fixing the wire to the front and rear drive pulleys.

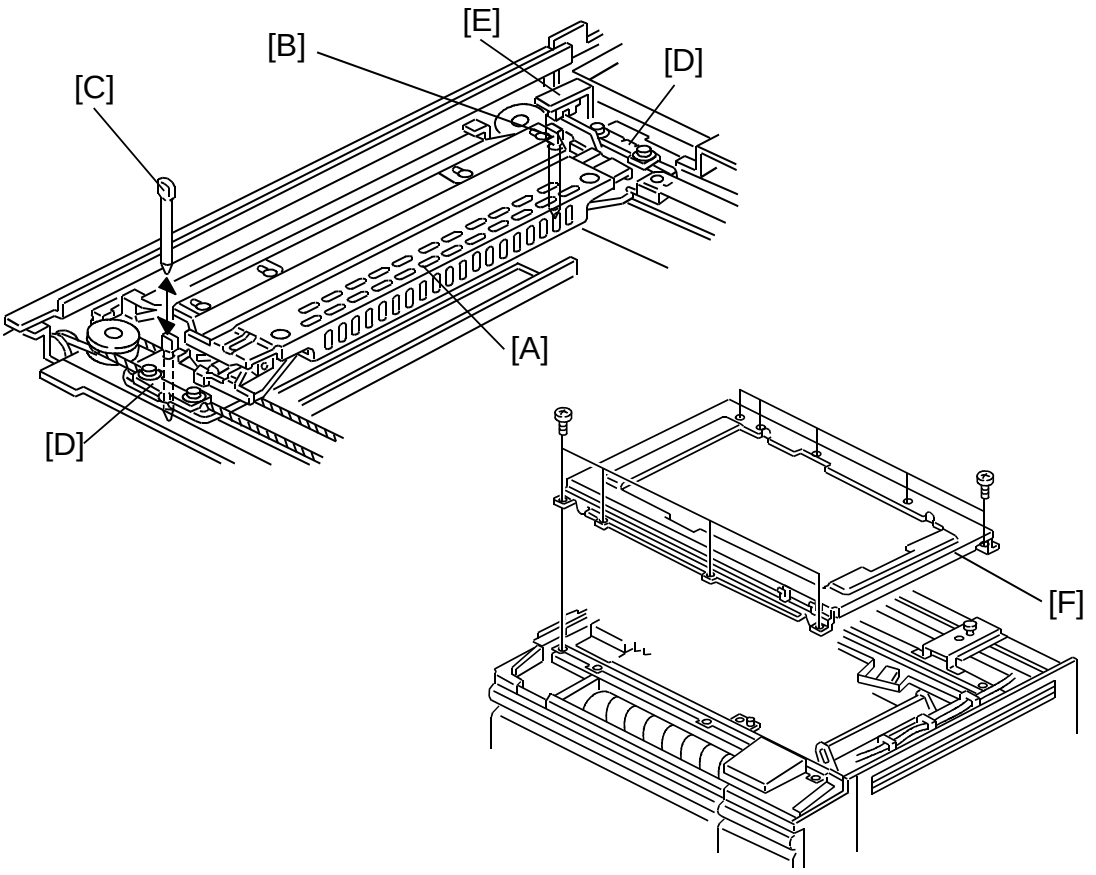



18. Install the rear bracket [A] (2 screws, 1 connector), shielding mylar bracket [B] (1 screw) and harness cover [C] (2 screws).

19. Adjust the second scanner alignment as follows:

**- Second Scanner Alignment -**

1) Move the second scanner [D] to the left end position. Fix the rear side of the second scanner by inserting the jig pin [E] in the holes on the rear side of the second scanner and the rear guide rail.
2) Turn the adjusting nut [F] to adjust the second scanner alignment so that the jig pins [G] can be smoothly set in the holes on the front side of the second scanner and the front guide rail.




20. Place the first scanner unit on the guide rail then adjust the first scanner alignment as follows:

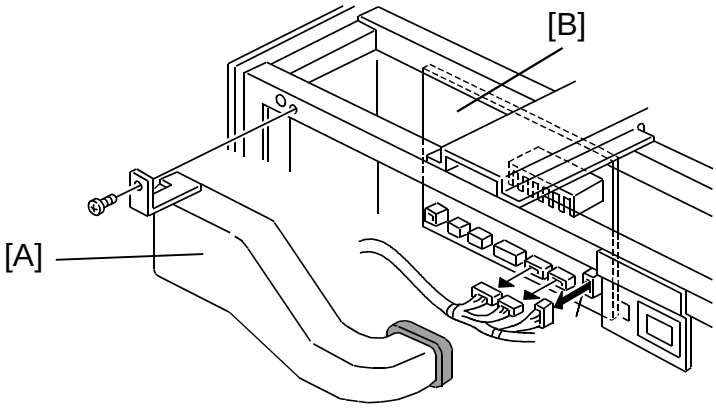
**- First Scanner Alignment -**

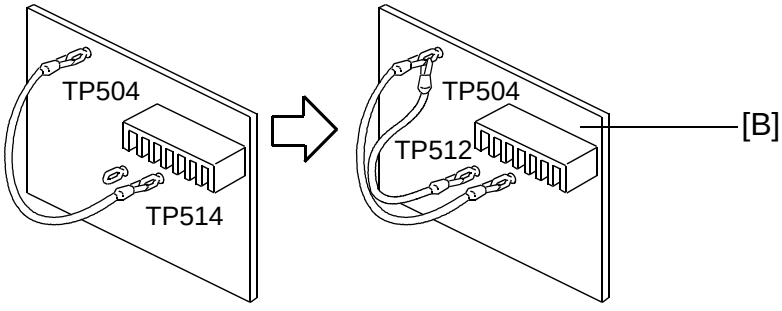
1) Move the first scanner [A] to the left end position. Fix the rear end of the first scanner by inserting the jig pin [B] in the holes on the first scanner and the guide rail.
2) Position the first scanner so that the jig pin [C] can be smoothly set in the holes on the first scanner and the guide rail, then tighten the wire clamp brackets [D] (4 screws).

21. Install the scanner HP sensor [E] (1 screw).

22. Secure the scanner flat cable (1 screw).

23. Install the upper optics frame [F] (9 screws).




24. Turn on the main switch and perform the scanner free run for about 5 minutes to break in the wires and to confirm correct scanner movement as follows:

**- Scanner Free Run -**

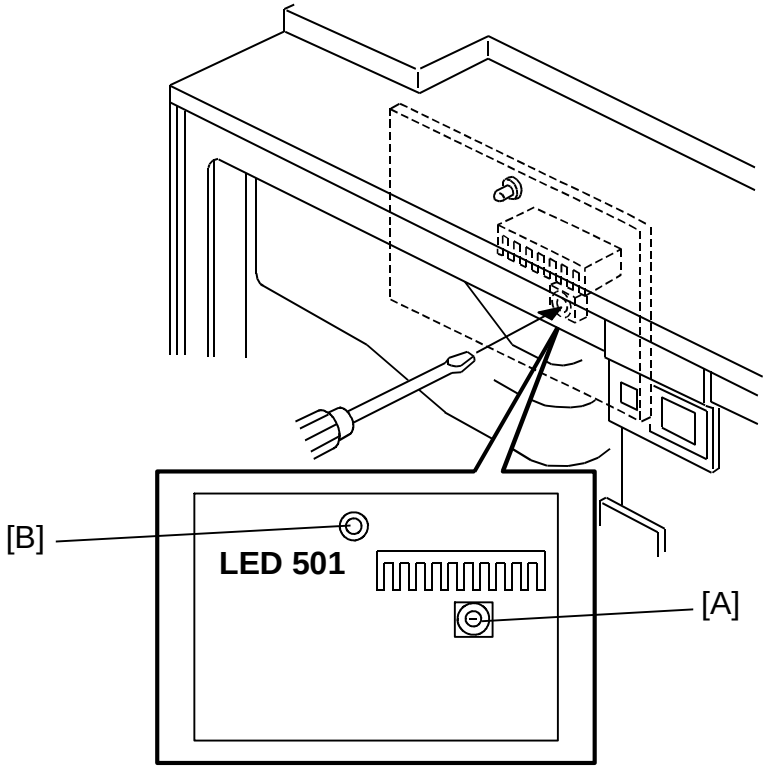
1. Remove the air inlet duct [A] (1 screw).
2. Remove CN502, CN503, CN504 from the optic control Board [B].
3. Short-circuit TP514 and TP504(GND) on the optics control Board.
4. Turn on the main switch.
5. Short-circuit TP512 and TP504(GND), then the machine automatically starts the scanner free run.
6. Turn off the main switch.

25. After performing the scanner free run, check the second scanner alignment, then the first scanner alignment.

26. Perform the scanner control adjustment. (Refer to Scanner Control Adjustment.)

27. Check the copy image.

## 2.8 SCANNER CONTROL ADJUSTMENT



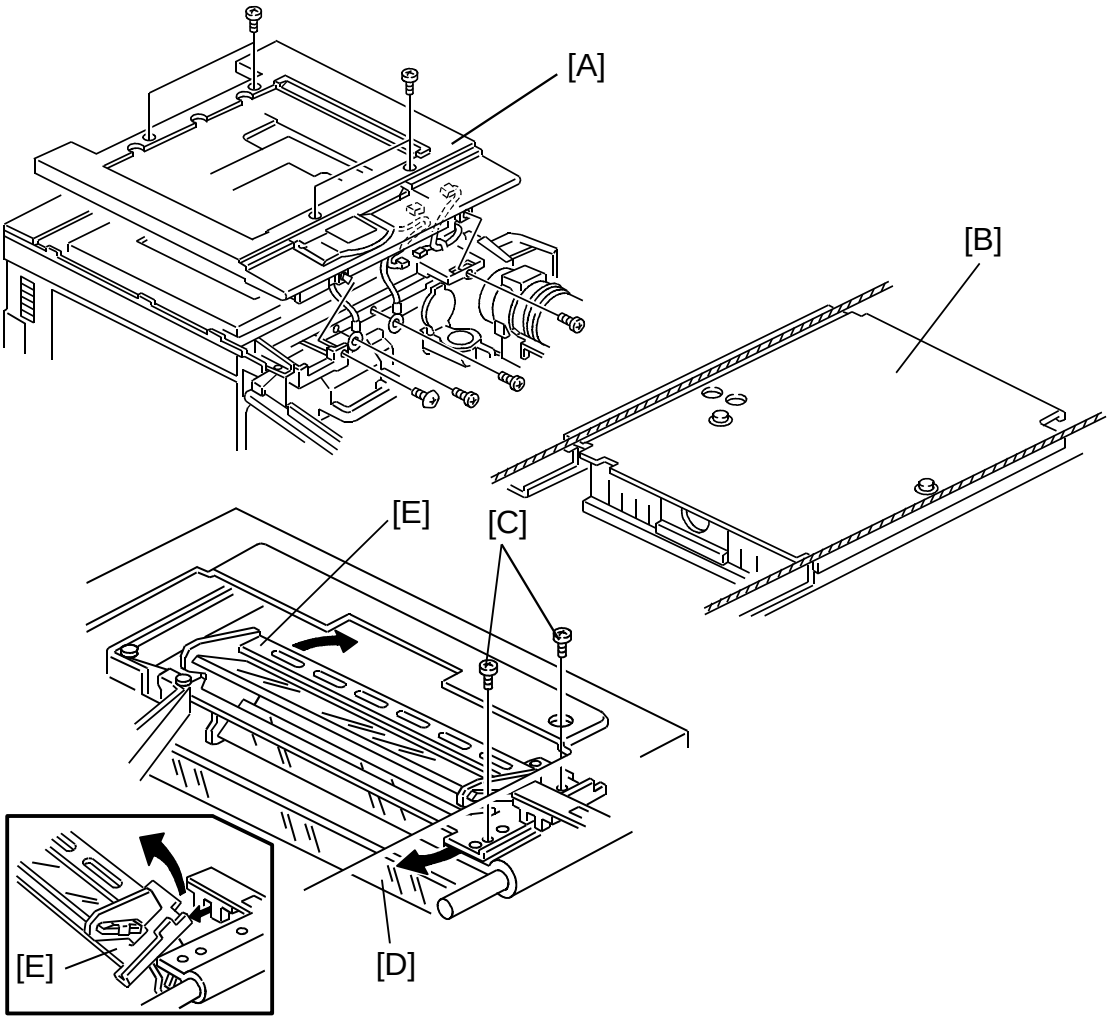

Perform this adjustment under any one of the following conditions:

After the scanner motor replacement
After the scanner wire replacement
After the scanner timing belt replacement
After replacing the optics control Board

1. Perform the free run ( 2 Test Mode – PAGE 1) 30 times.
2. After the free run is completed, turn the rotary dip switch [A] until LED 501 [B] turns on.

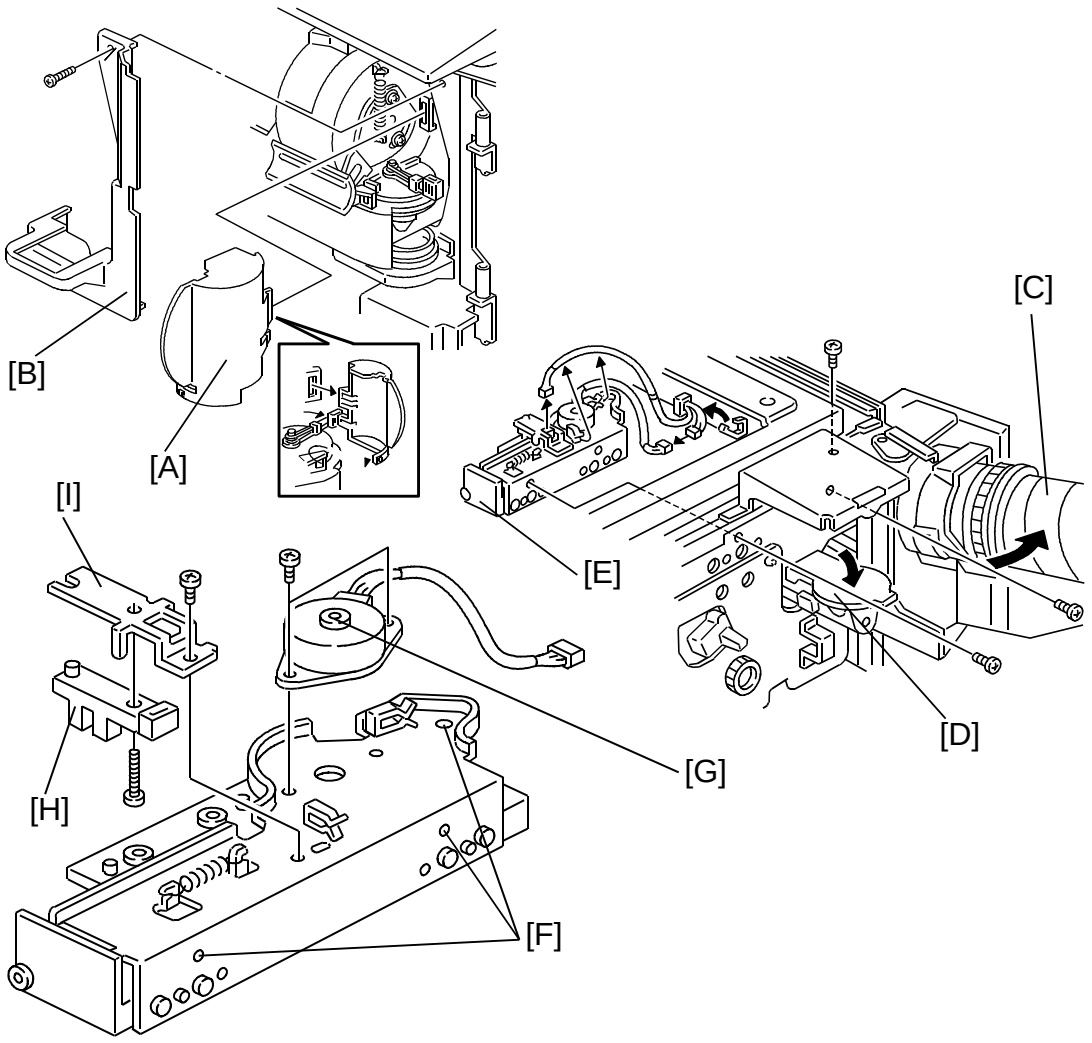
   **NOTE:** If this adjustment is improper, the timing between the scanner and the paper feed will be also improper, causing paper jams at the registration roller, or causing scanner noise due to wire vibration.

## 2.9 THIRD SCANNER REMOVAL



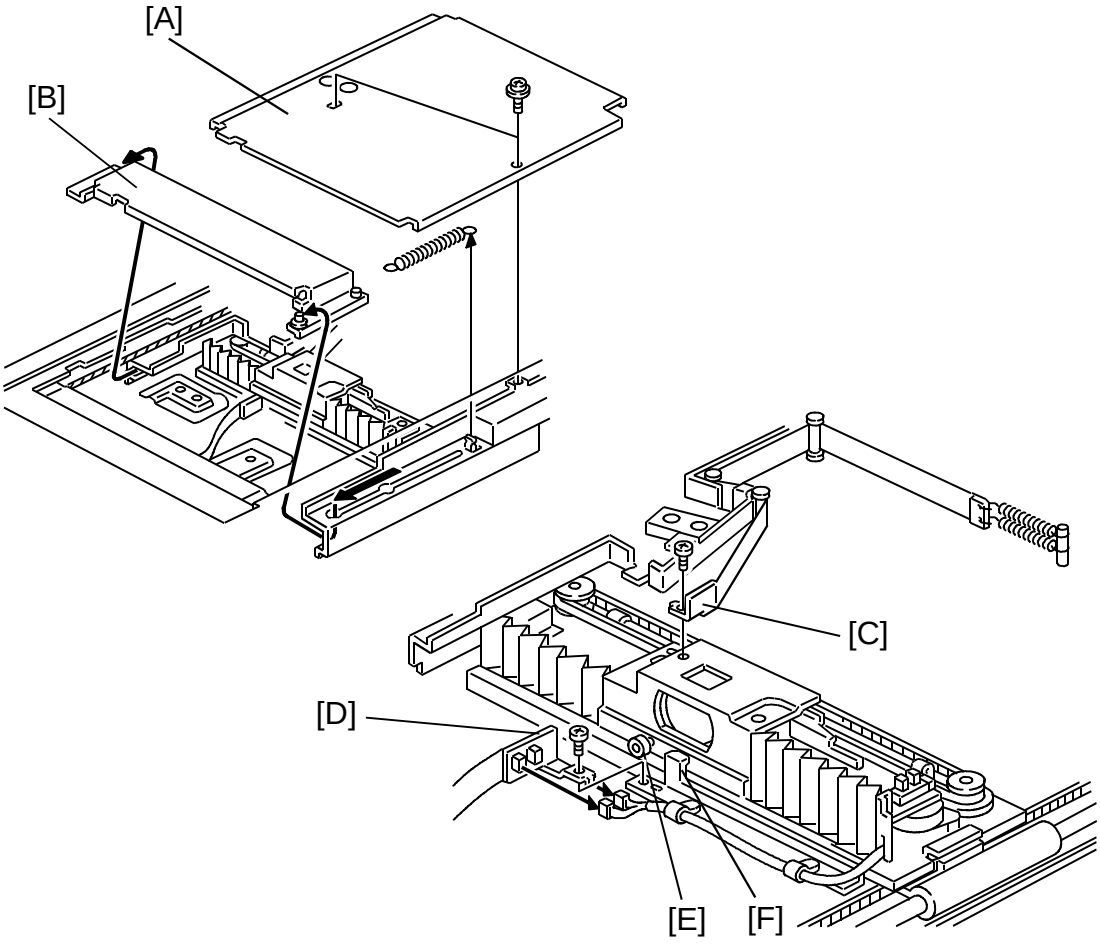

1. Remove the exposure glass. (Refer to Exposure Glass Removal.)
2. Remove the upper cover [A]. (Refer to Upper Cover Removal.)
3. Remove the lens unit cover [B] (2 screws).
4. Remove the two screws [C] fixing the front third scanner bracket.
5. Remove the sixth mirror [D].
6. Remove the third scanner [E] as shown.

## 2.10 THIRD SCANNER DRIVE MOTOR / HP SENSOR REPLACEMENT



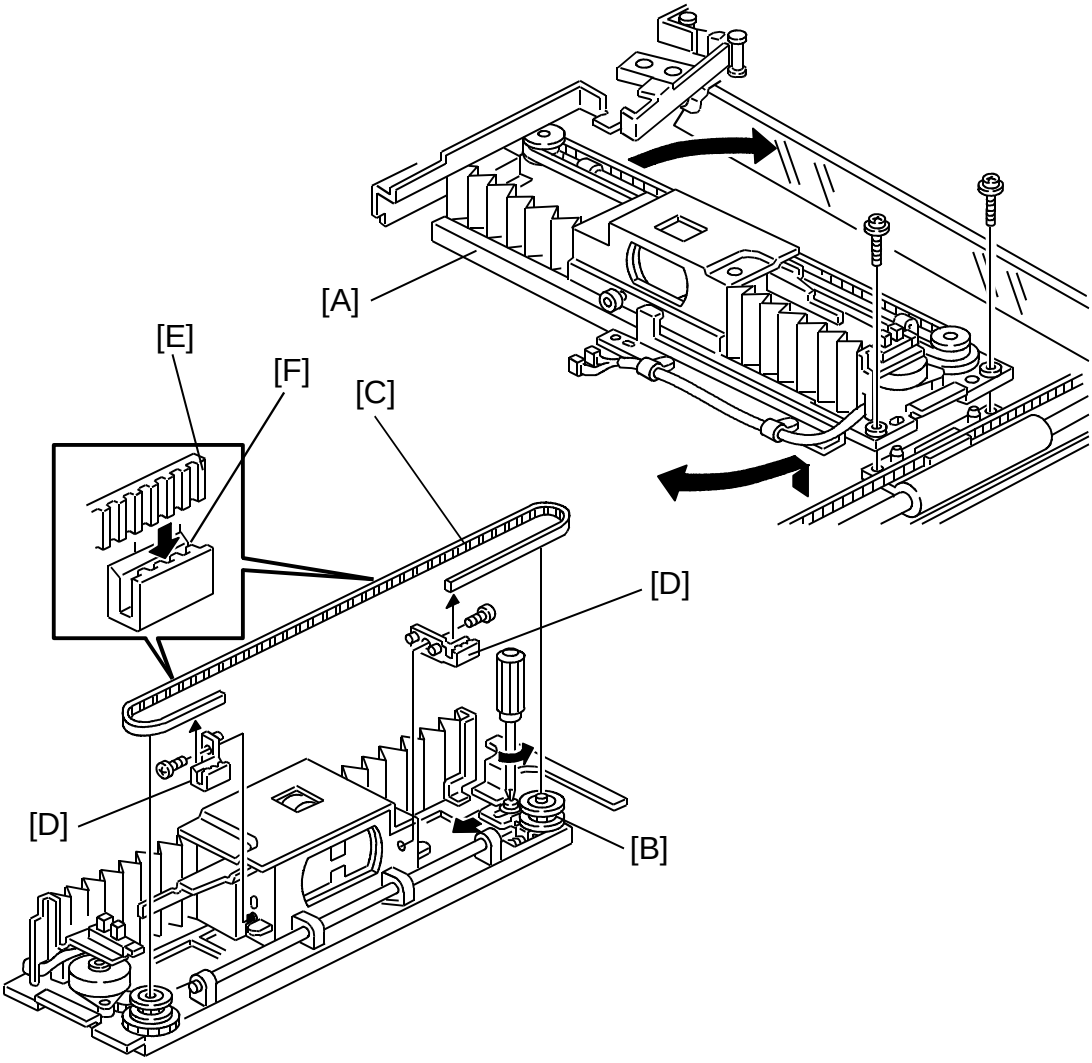

1. Remove the third scanner unit. (Refer to the Third Scanner Removal.)
2. Open the right front cover then remove the shutter cover [A].
3. Remove the shutter inner cover [B] (1 screw).
4. Open the toner bottle [C] and close the toner hopper cover [D].
5. Remove the third scanner drive unit [E] (3 screws [F]).
6. Replace the third scanner drive motor [G] (1 connector, 2 screws).
7. Remove the third scanner HP sensor [H] with the bracket [I] (1 screw).
8. Replace the third scanner HP sensor (1 screw).

## 2.11 LENS HORIZONTAL DRIVE BELT REMOVAL




1. Remove the lens unit cover [A] and light shielding plate [B]. (Refer to Scanner Drive Wires Replacement.)
2. Remove the light shielding mylar bracket [C] (1 screw).

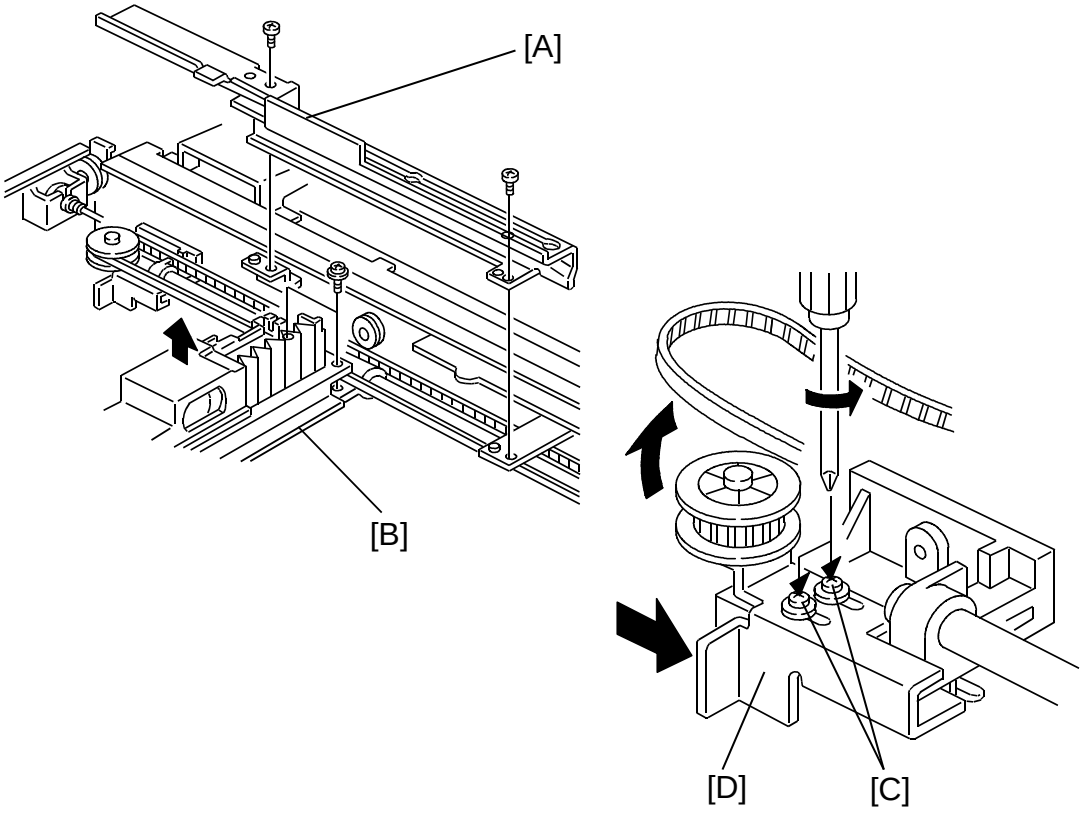
   **NOTE:** When re-installing the mylar bracket [C], be sure not to create any gap between the bracket and the lens cover.
3. Remove the flat cable bracket [D] (1 screw, 2 connectors).
4. Position the roller [E] underneath the bracket [F].




5. Remove the lens unit [A] (2 screws).
6. Loosen the tension pulley bracket [B] (1 screw).
7. Push the pulley bracket to the front then unhook the timing belt [C].
8. Remove the two timing belt holders [D] (1 screw each).

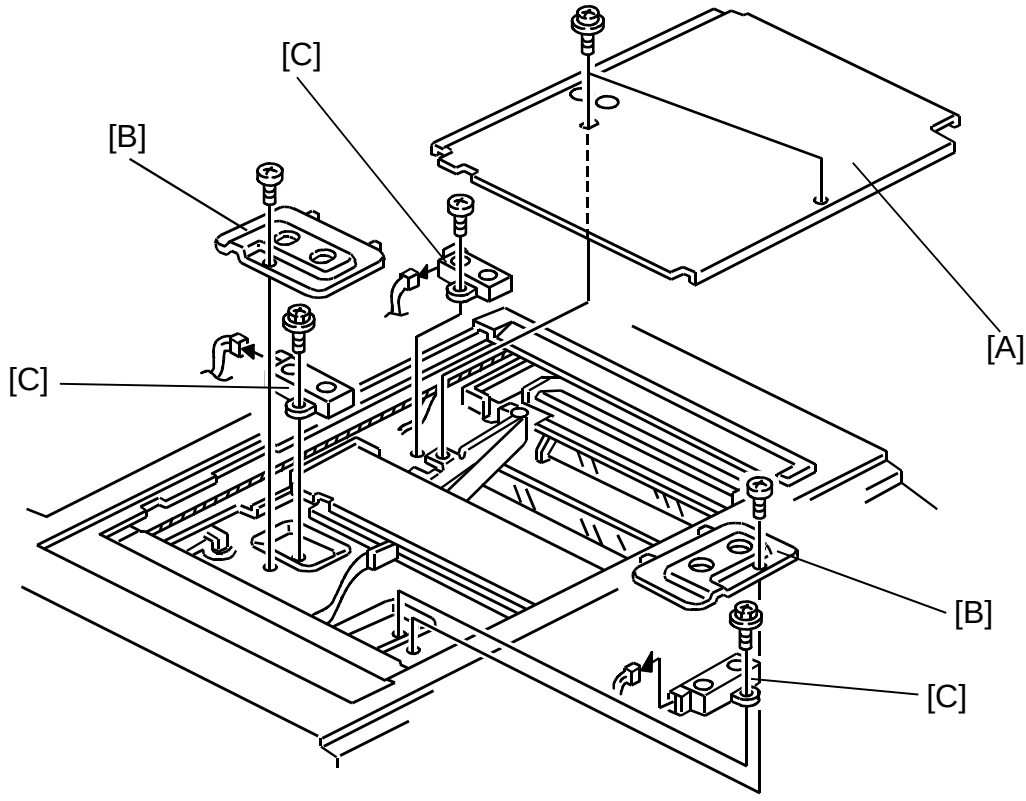
**NOTE:** When setting the timing belt, align the end [E] of the timing belt to the edge [F] of the belt holder.

## 2.12 LENS VERTICAL DRIVE BELT REMOVAL




1. Remove the third scanner drive unit. (Refer to Third Scanner Drive Motor Replacement.)
2. Remove the front bracket [A]. (Refer to Scanner Drive Wires Replacement.)
3. Remove the lens unit [B]. (Refer to Lens Horizontal Drive Belt Replacement.)
4. Loosen the two screws [C] fixing the tension pulley bracket [D].
5. Push the tension pulley bracket to the left (front view) then unhook the timing belt.

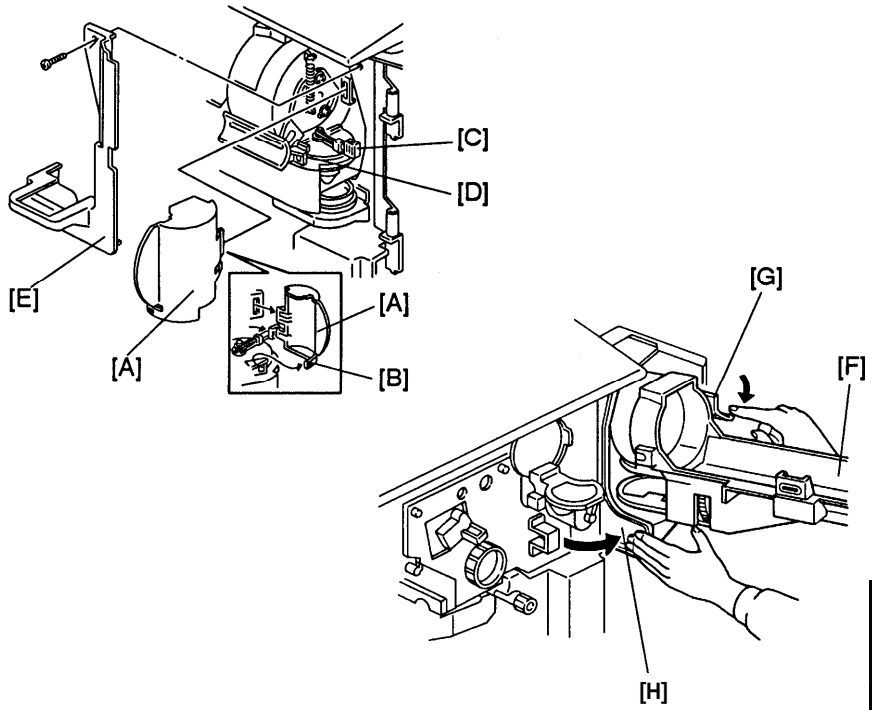
## 2.13 ORIGINAL SIZE SENSORS (2 LENGTH SENSORS, 1 WIDTH SENSOR)




1. Remove the exposure glass. (Refer to Exposure Glass Removal.)
2. Remove the lens unit cover [A] (2 screws).
3. Remove the original size sensor covers [B] (1 screw each).
4. Replace each original size sensor [C] (1 screw, 1 connector each).

# 3. DEVELOPMENT AND TONER SUPPLY

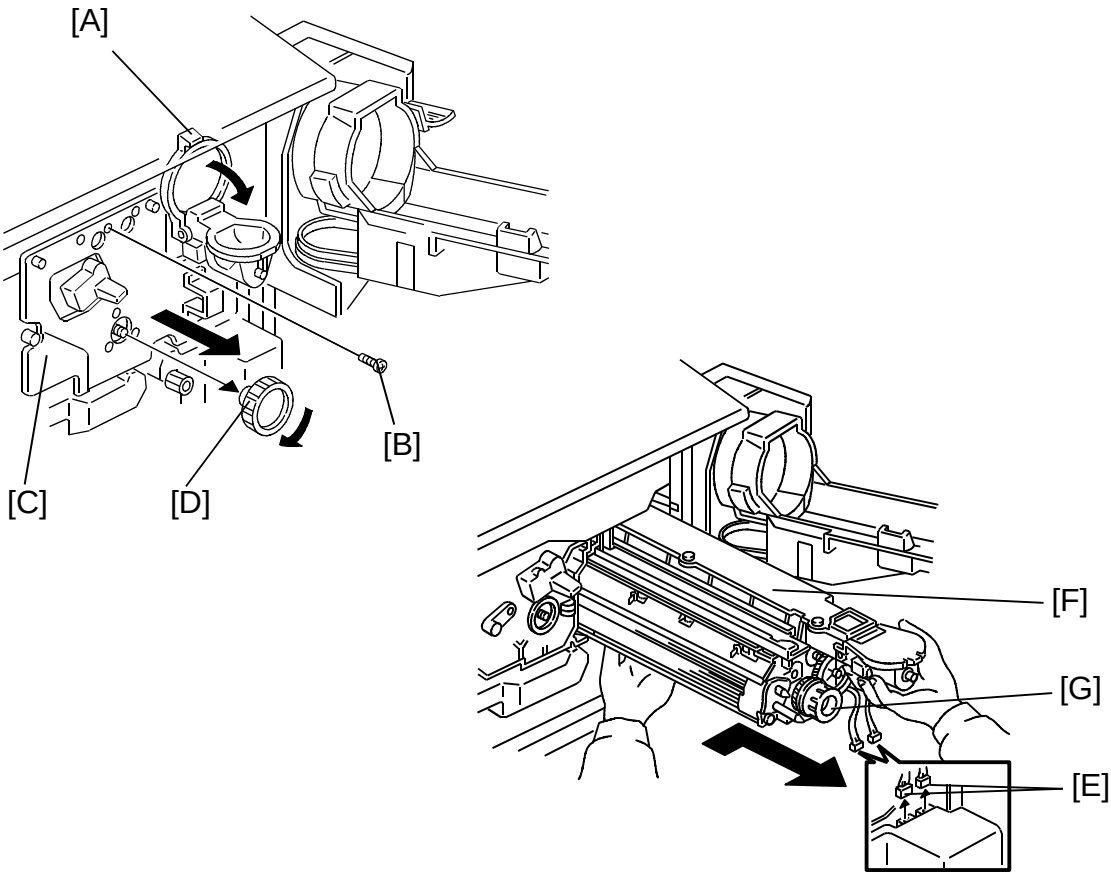
## 3.1 DEVELOPMENT UNIT REMOVAL




1. Turn off the main switch.
2. Open the front doors.
3. Removetheshutter cover [A] by releasing the hook [B].

   NOTE: Be sure to move the lever [C] until it contacts part [D] (fully to the front).
4. Remove the shutter inner cover [E] (1 screw),
5. Open the toner bottle holder [F].

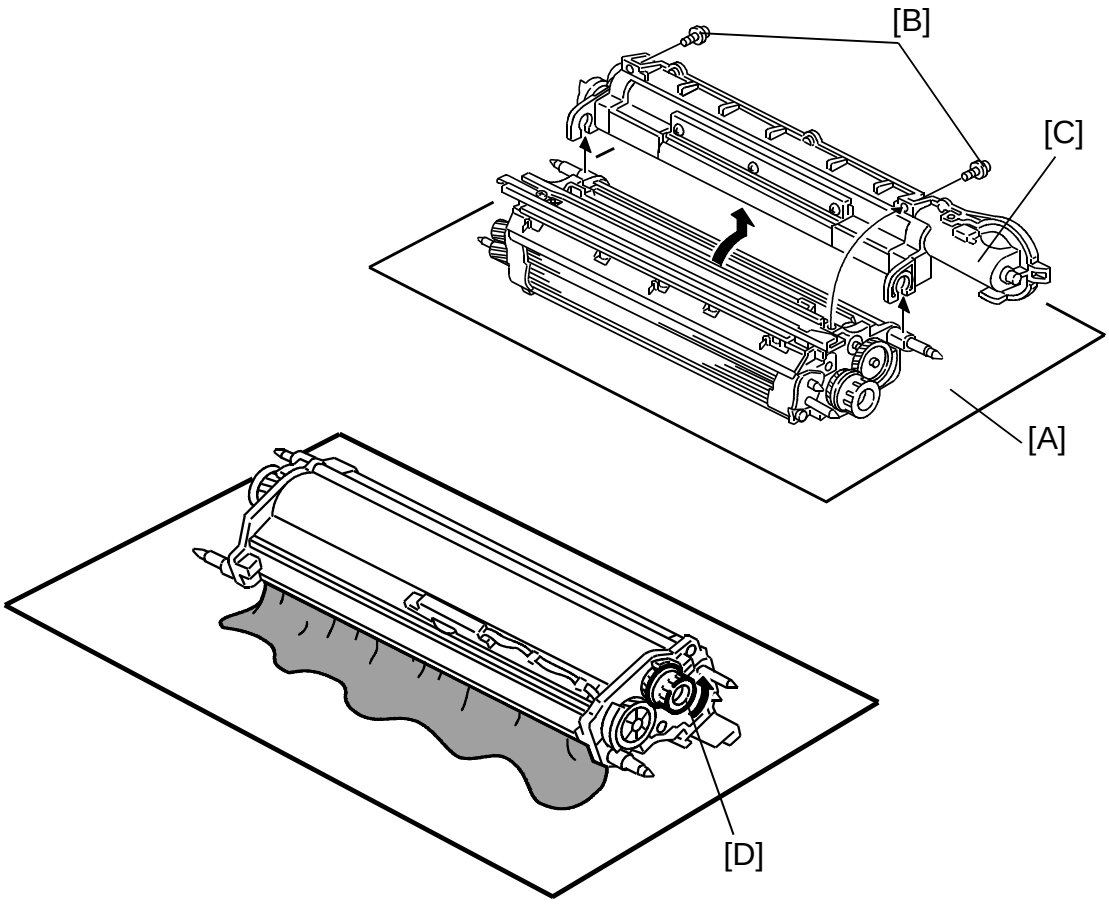
   NOTE: To open the toner bottle holder completely, while lowering the shutter lever [G], push the bracket [H] to the right,




6. Close the toner hopper cap [A].
7. Remove the screw [B] fixing the drum stay [C].
8. Remove the drum stay knob [D] then take out the drum stay.
9. Disconnect the two connectors [E].
10. Pull out the development unit [F].

**NOTE:**
1. To prevent drum scratches, push the development unit to the right while pulling it out.
2. When installing the development unit, do not forget to set the two connectors [E].
3. When installing the drum stay, be careful not to pinch the harness. Also, keep the harness away from gears.
4. When pulling out the development unit, do not hold the knob [G].

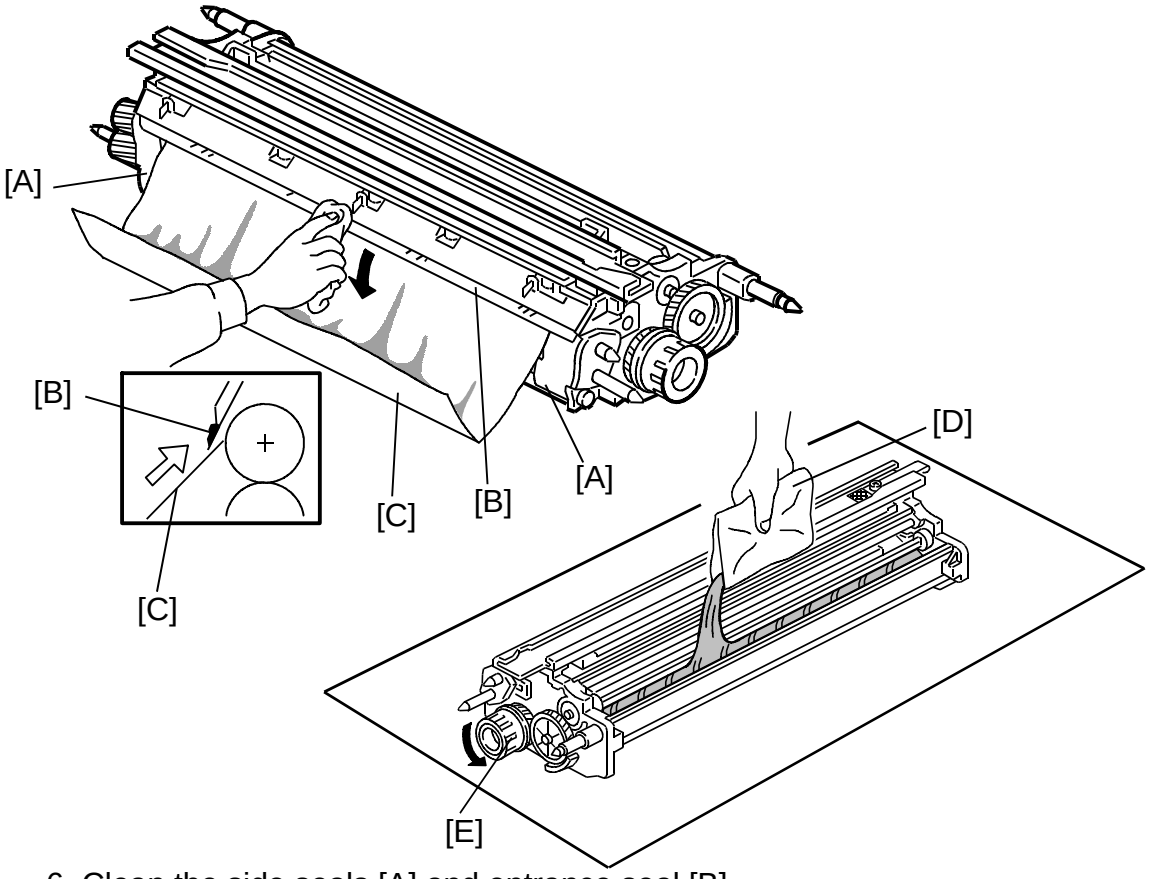
## 3.2 DEVELOPER REPLACEMENT




1. Take out the development unit. (Refer to Development Unit Removal.)
2. Place the development unit on the sheet [A] included with new developer.
3. Remove the two screws [B] fixing the toner hopper [C].
4. Turn the toner hopper 90 degree, then move it up to remove it from the development unit.
5. Turn over the development unit then turn the paddle roller knob [D] to empty developer onto the sheet. (The one way clutch in the knob [D] allows turning the paddle roller counterclockwise only.)

   **NOTE:** Dispose of used developer according to 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 being attracted to the sleeve rollers.

7. Evenly pour in one pack of developer [D] while turning the knob [E].

8. Re-install the toner hopper, then re-assemble the machine.

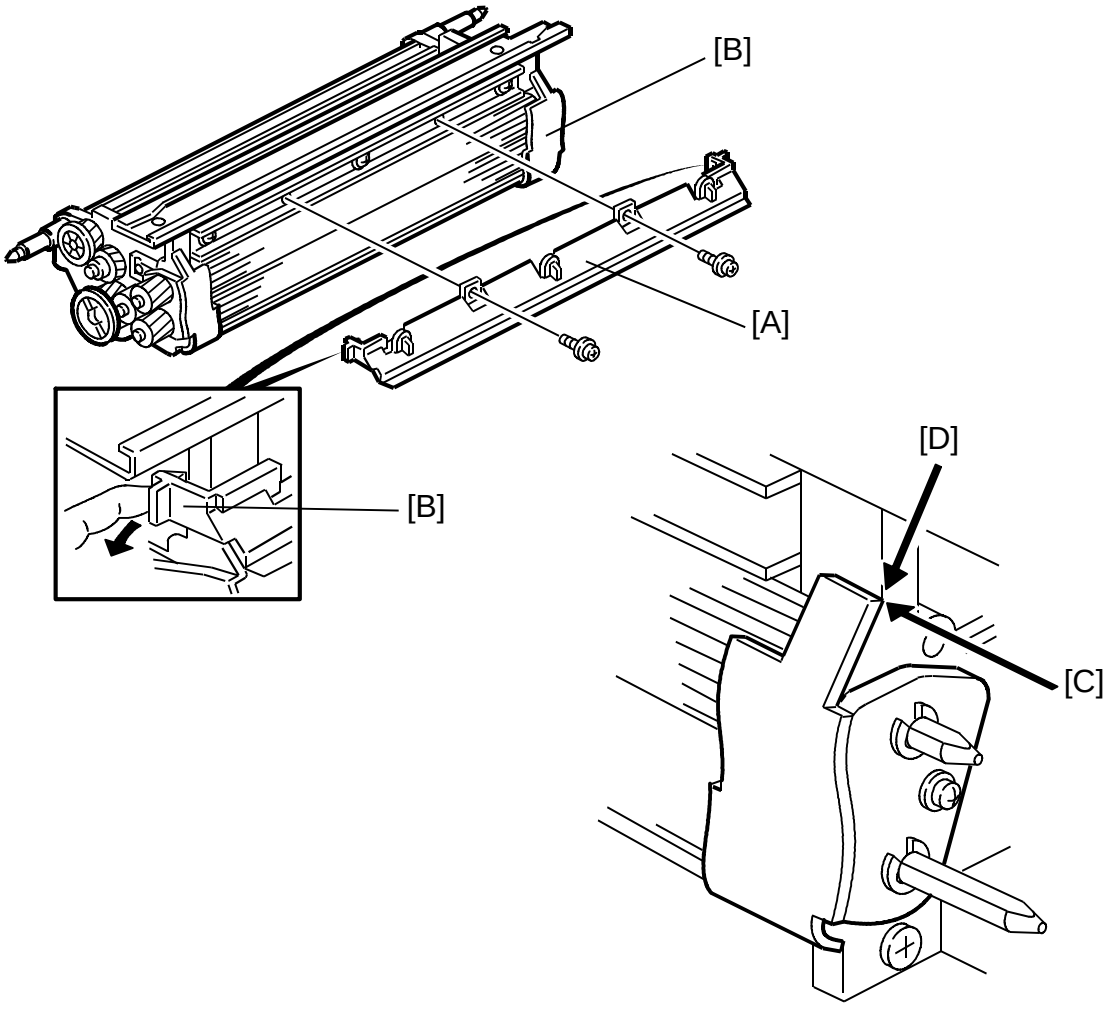
   **NOTE:** Be sure to set to connectors after installing the development unit in the machine.

9. Turn on the main switch, then perform developer initial setting (1 SP Adjustment – PAGE.1).

**CAUTION: Never make any copy with the new developer before completing the developer initial setting, otherwise toner density control will be abnormal.**

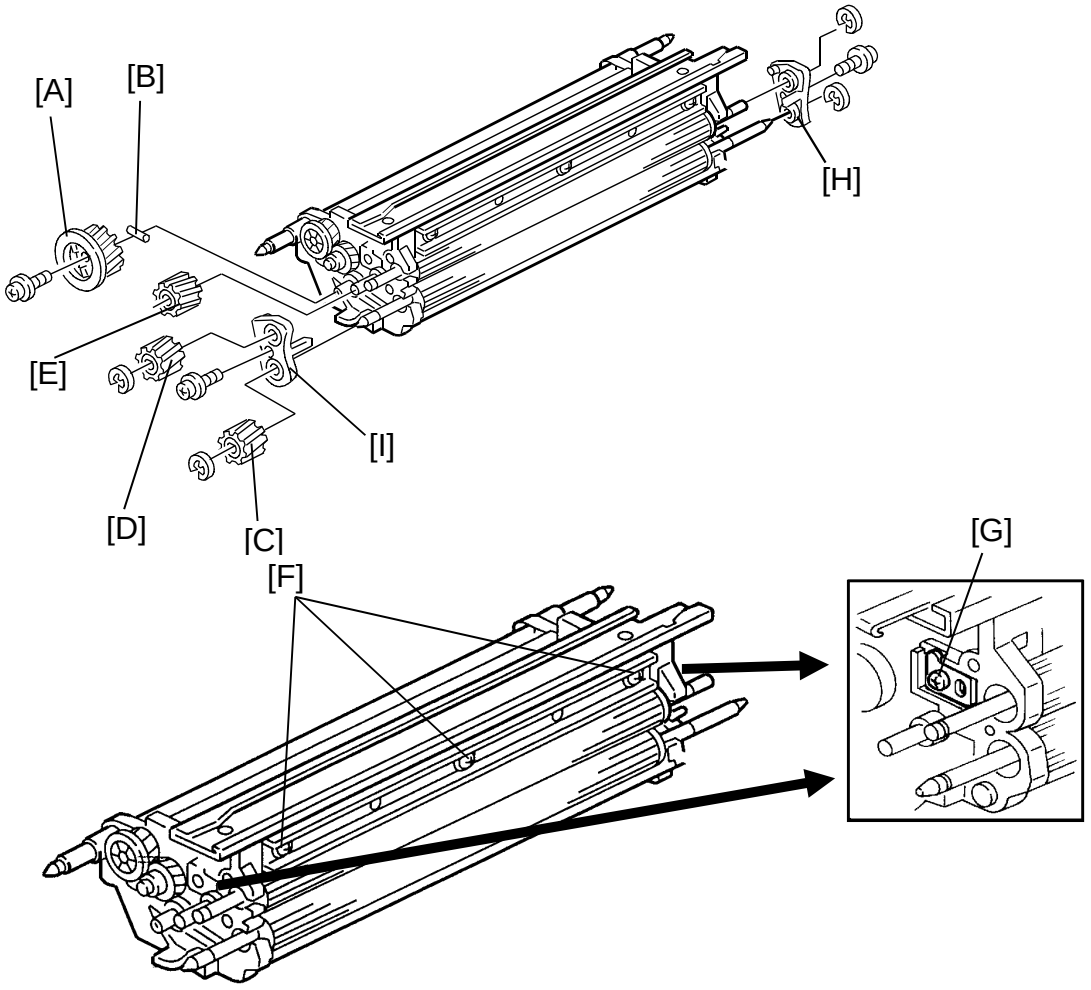
**NOTE:** If the developer initial setting is not completed, you cannot exit the SP mode by pressing the "Quit" key. If this occur turn the main switch off and on, then perform the initial setting again. If the result is the same, see the troubleshooting section "SC352" (Page 6-9).

## 3.3 DEVELOPMENT ROLLERS REPLACEMENT




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

**NOTE:** When re-assembling the development unit, use new side seals and align the edge of the side seals to the corner [C] and the edge [D] as shown.




4. Remove the coupling gear [A] (1 screw).

   **NOTE:** Be careful not to lose the pin [B].

5. Remove the gear [C] (1 E-ring), gear [D] (1 E-ring) and gear [E].

**CAUTION: Do not touch the screws at [F] and [G].**
**If the screws at [F] are loosened, the doctor gap will be improper.**
**If the screws at [G] are loosened, the photoconductor gap and magnetic field angle will be improper.**
**If either of them become abnormal, toner density control will be abnormal.**

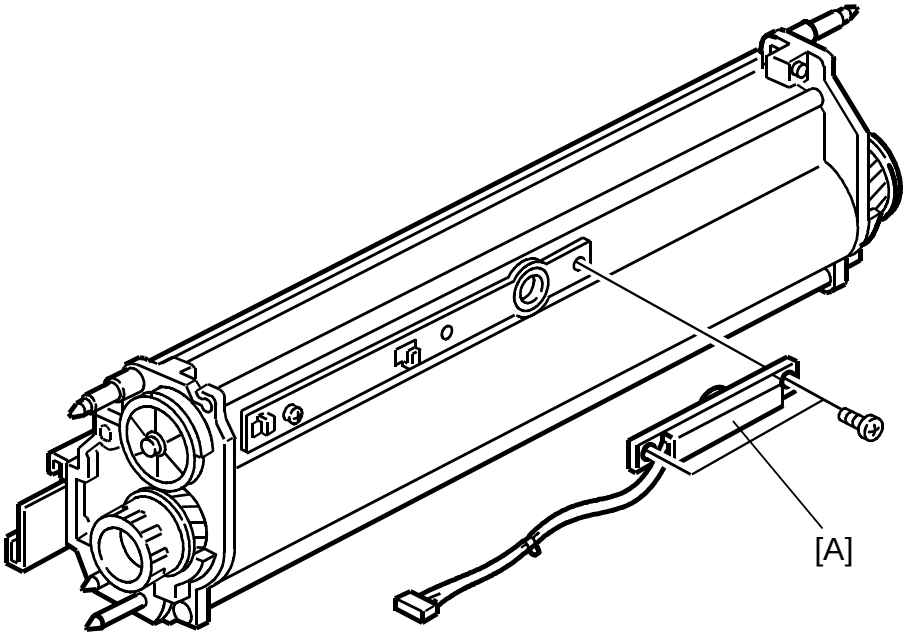
6. Remove the front roller holder [H] (1 screw and 2 E-rings) and rear roller holder [I] (1 screw).

7. Replace the sleeve rollers.
8. Re-assemble the development unit and set the developer, then re-assemble the copier.

**CAUTION: If the original developer (already used) is returned to the development unit, do not perform the developer initial setting.**

If the new developer is set, never make any copy before completing the developer initial setting (1 SP Adjustment – PAGE.1).

## 3.4 TONER DENSITY SENSOR REPLACEMENT



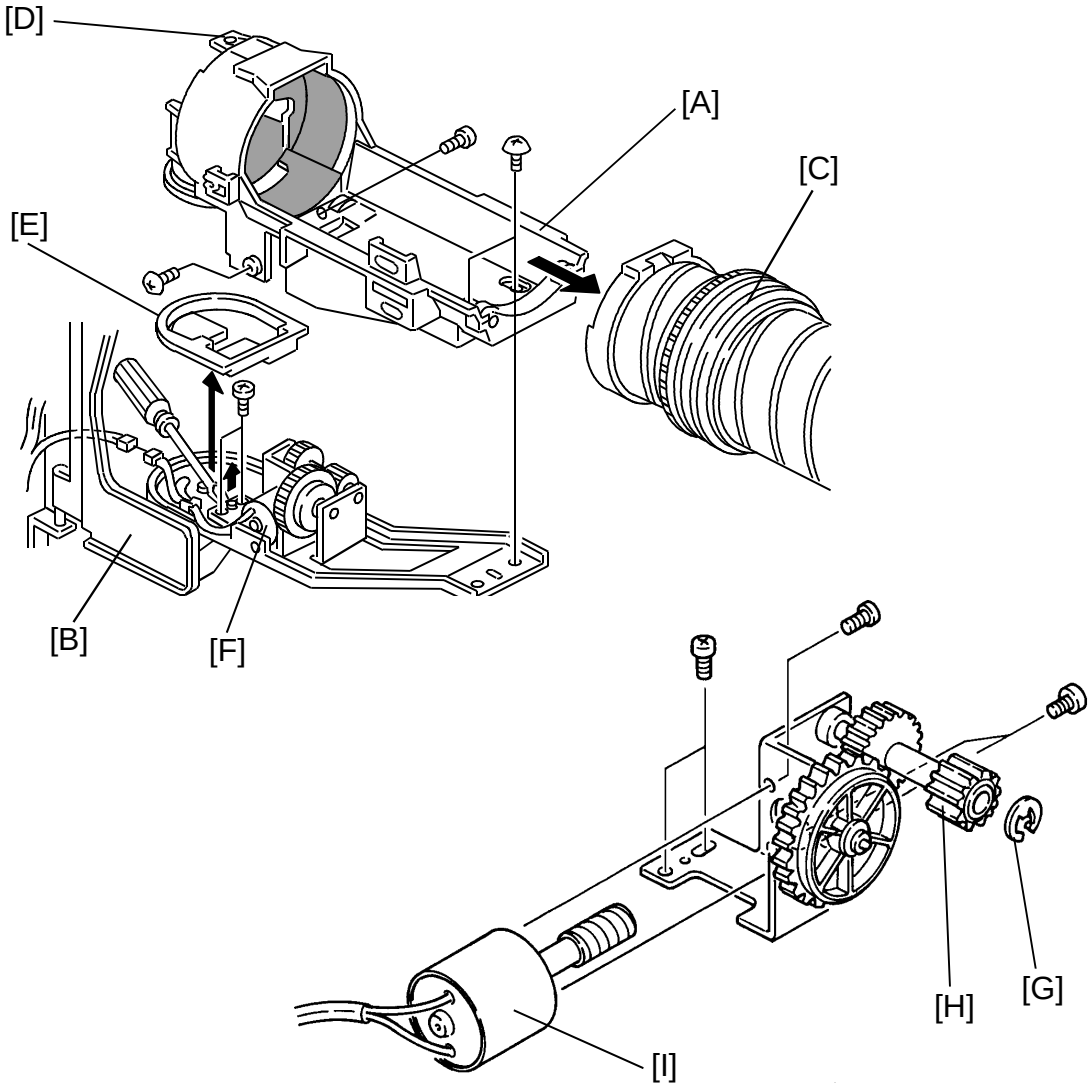

1. Remove the developer. (Refer to Developer Replacement.)
2. Replace the TD sensor [A] (2 screws).

   **NOTE:** Before installing the TD (Toner Density) sensor, clean the development unit well so that no carrier particle remains in the gap between the TD sensor and the development unit casing.

3. Install the new developer and perform the developer initial setting.

**CAUTION: Never make any copy before completing the developer initial setting.**

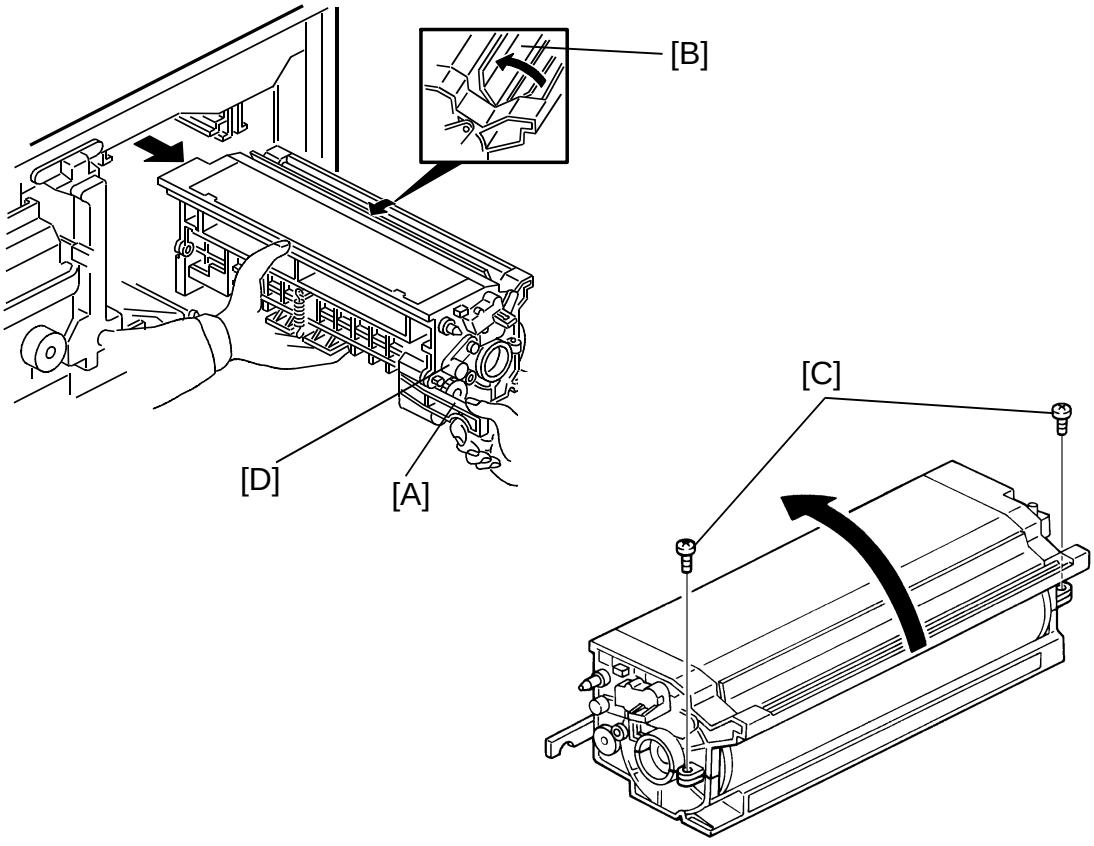
## 3.5 TONER BOTTLE DRIVE MOTOR REPLACEMENT




1. Open the toner bottle holder [A] with the bracket [B]. (Refer to Development Unit Removal.)
2. Remove the toner bottle [C].
3. Remove four screws then remove the toner bottle holder by unhooking the hole [D] from the pin on the hinge.
4. Remove the toner receiver [E].
5. Remove the toner bottle drive motor assembly [F] (1 connector, 2 screws).
6. Remove an E-ring [G] and slide the gear [H] to access a screw.
7. Replace the toner bottle drive motor [I] (3 screws – M3 x 4).

# 4. DRUM UNIT

## 4.1 DRUM UNIT REMOVAL AND OPC DRUM REPLACEMENT



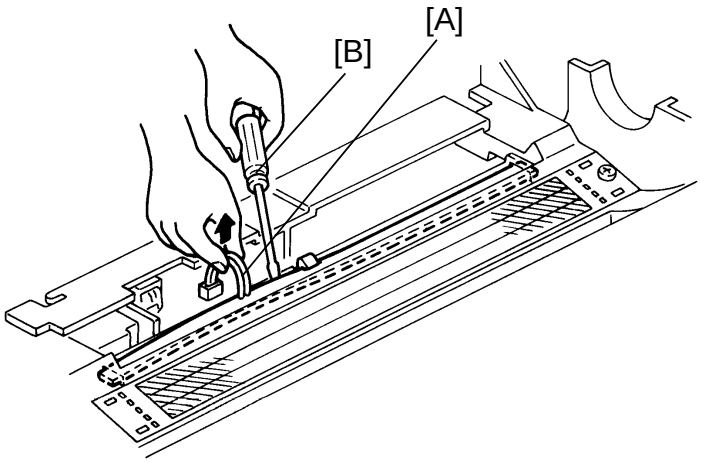

1. Take out the development unit. (Refer to Development Unit Removal.)
2. Lower the transfer belt unit.
3. Take out the drum unit by holding the knob [A].

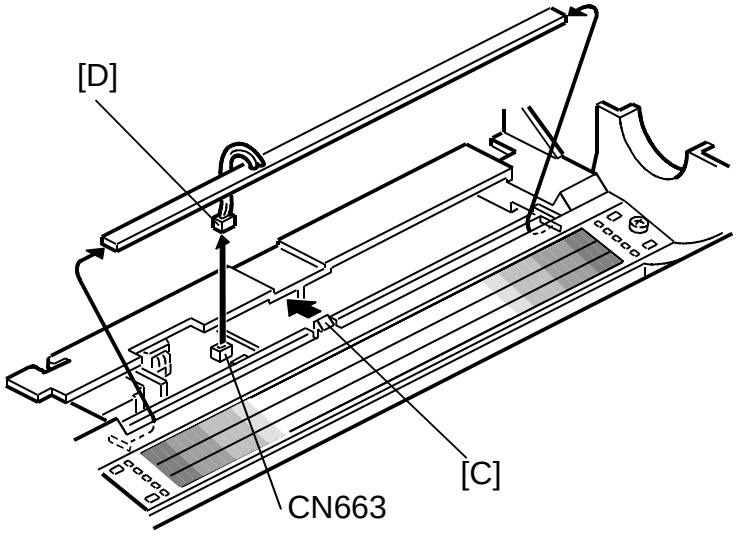
   **NOTE:** Close the protective shutter [B] to protect the OPC drum from light when the drum unit is left outside the machine for servicing.

4. Open the upper drum unit (2 screws [C]).
5. Replace the OPC drum. Then remove the drum protective sheet from the new drum.

   **NOTE:** When returning the drum unit to the copier, do not forget to open the protective shutter [B].
   If it is hard to completely set the drum unit in the machine because the gear is disengaged, then push in the drum unit while holding down the cleaning blade release knob [D].

## 4.2 QUENCHING LAMP REPLACEMENT




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

   **NOTE:** Wrap a protective sheet or a few sheets of paper around the drum to protect it from light.

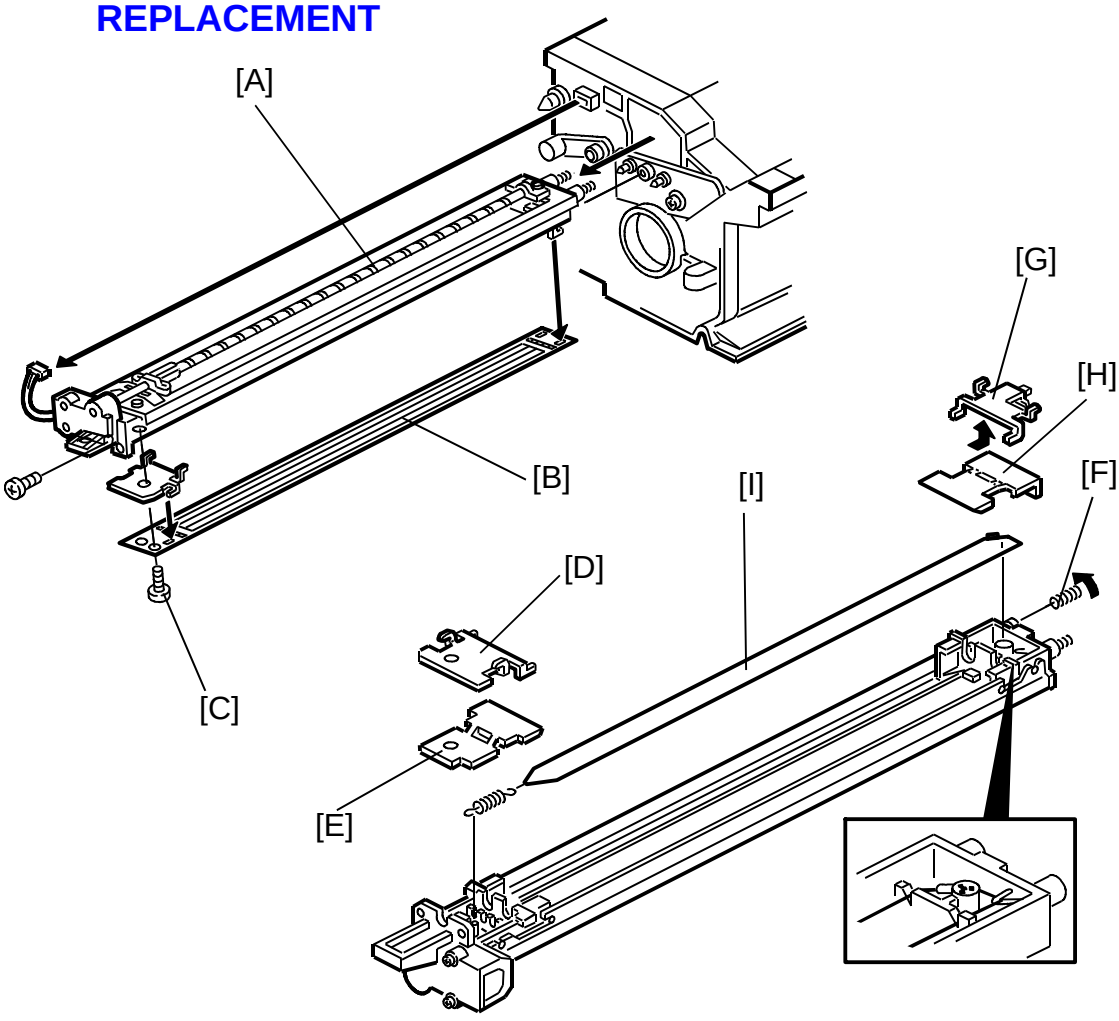
2. Slightly pull up the wires [A] on the quenching lamp, then insert the head of the small flat head screw driver [B] between the quenching lamp and the drum unit casing to release the hook [C] at the center of the quenching lamp.

   **NOTE:** Do not pull the wire too strongly.

3. Disconnect the connector [D].

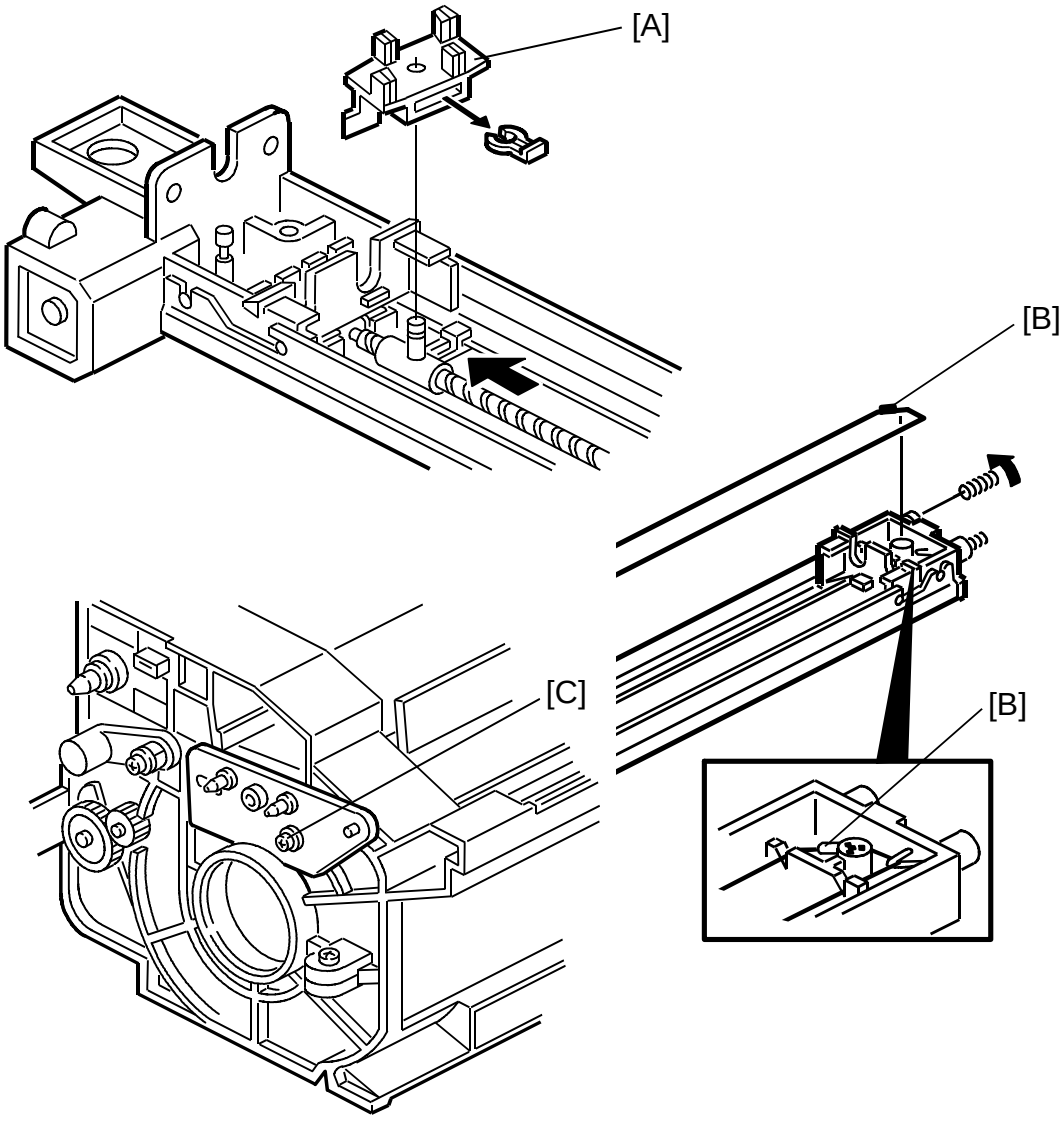
4. Replace the quenching lamp.

## 4.3 GRID PLATE / CHARGE WIRE / WIRE CLEANER REPLACEMENT




1. Take out the main charge corona [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].



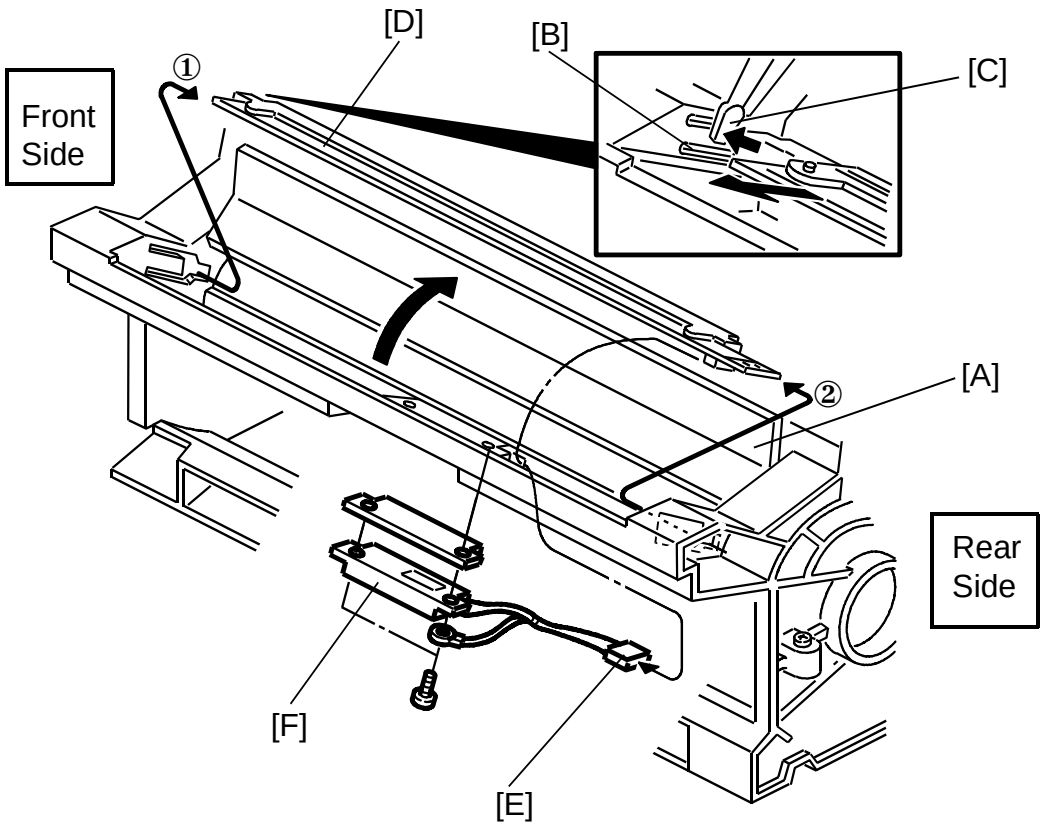



7. Remove the wire cleaner [A] (1 snap ring).

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.
   Correctly set the wire between the wire cleaner pads.
   Do not loosen the screw [C], otherwise the charge corona height will change.

## 4.4 ERASE LAMP AND DRUM POTENTIAL SENSOR REPLACEMENT

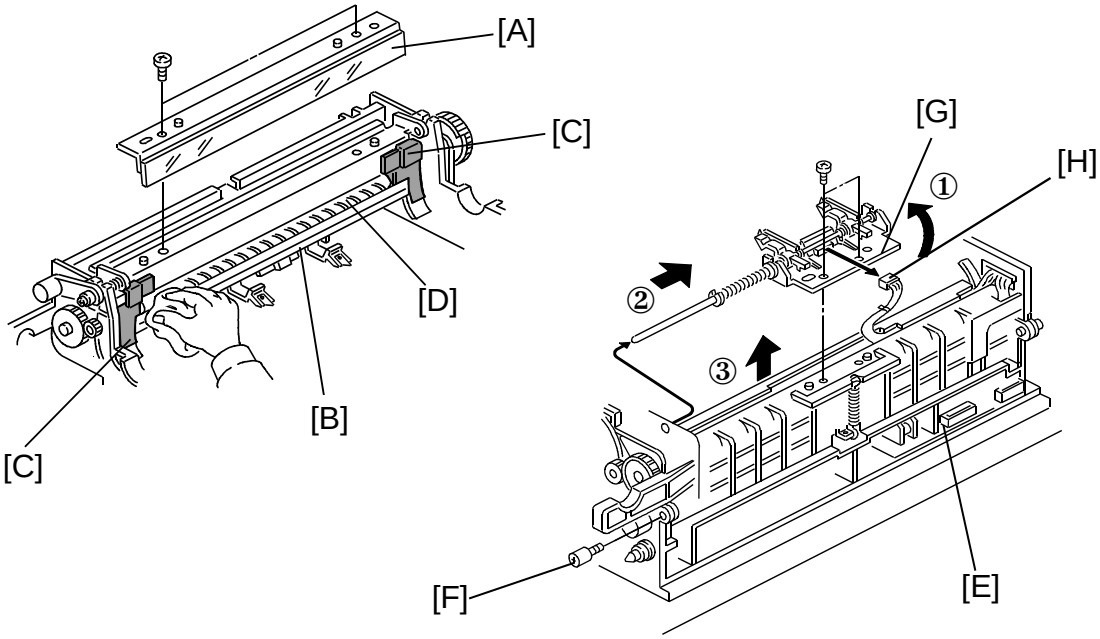



1. Open the drum shutter [A].
2. While pushing the hook [B] to the front by using a small flat head screw driver [C], move up the front side of the erase lamp [D] as shown.
3. Slide the erase lamp to the front to release the rear side of the erase lamp from the drum unit casing.
4. Disconnect the connector [E].

   **NOTE:** Before removing the drum potential sensor, set a few sheets of paper between the sensor and the OPC drum to protect the drum surface.
5. Replace the drum potential sensor [F].

**CAUTION: After replacing the drum potential sensor, perform the process control data initial setting.**
**(1 SP Adjustment – PAGE.1)**

## 4.5 CLEANING BLADE REPLACEMENT




1. Remove the OPC drum. (Refer to Drum Unit Removal and OPC 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:

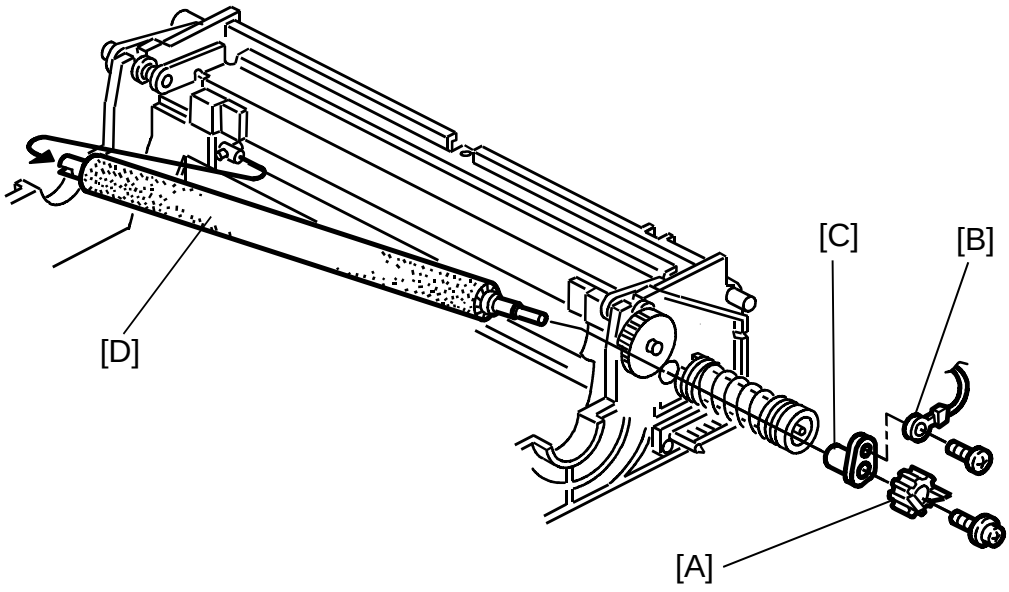
   1) Disconnect the 12P connector on the charge power pack [E].
   2) Remove the screw [F] and separate the upper and the lower drum units.
   3) Remove the pick-off pawl bracket [G] (2 screws).
   4) Disconnect the connector [H].
   5) While turning the bracket counterclockwise (front view), slide the pick-off pawl bracket to the rear.

4. Install the new cleaning blade.

   **NOTE:** Do not clean the edge of the cleaning blade with cloth, otherwise it damages the edge and causes black lines on copy images.
   Do not touch the edge of the new cleaning blade, if some setting powder or toner on the blade edge is removed, apply toner there.
   When installing the cleaning blade, do not pinch the side seals.



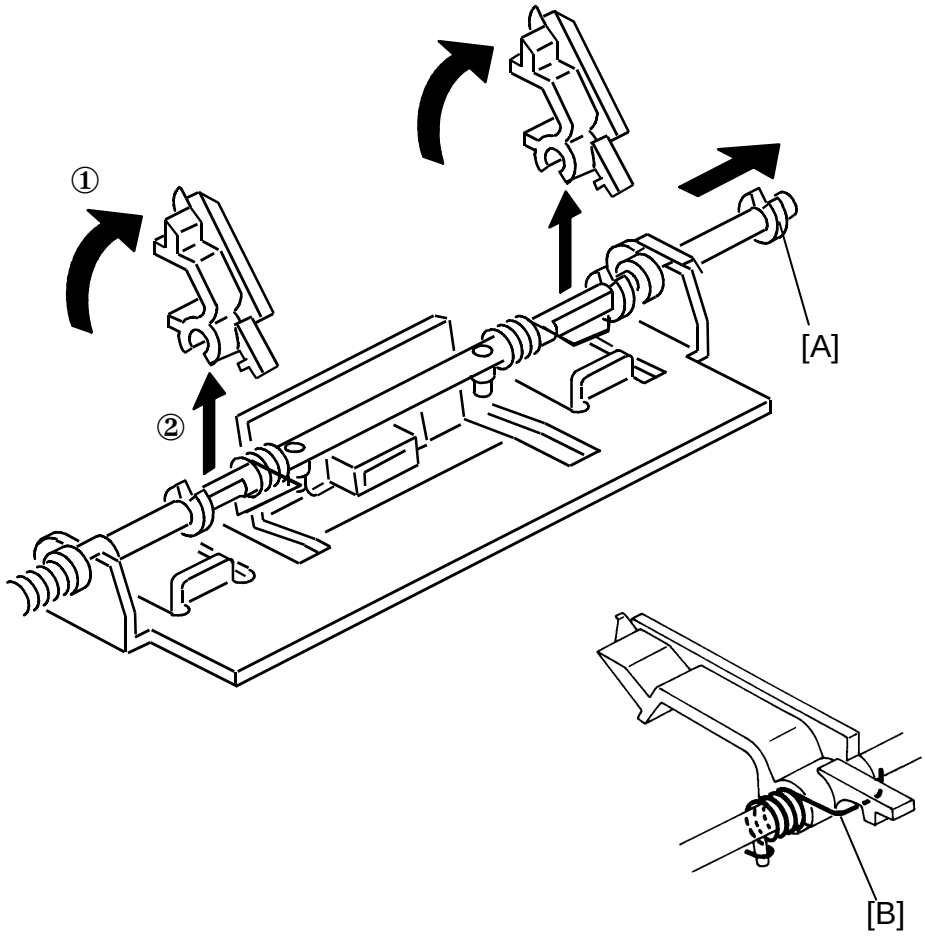
## 4.6 CLEANING BRUSH REPLACEMENT




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

   **NOTE:** Do not touch the cleaning brush with oily hands.
   After replacement, clean the ID sensor surface.

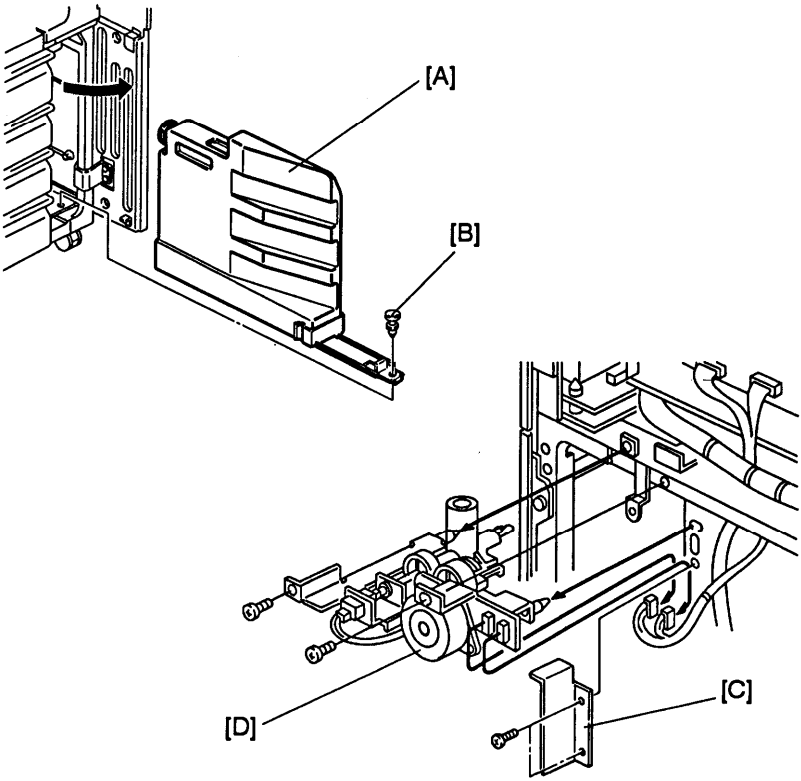
## 4.7 PICK-OFF PAWL REPLACEMENT




1. While pulling the shaft [A] to the rear, turn the pick-off pawl about 45 degree clockwise (front view) and move up the pick-off pawl.
2. Replace the pick-off pawl.

   **NOTE:** Do not forget to hook the tension spring [B].
   After replacement, check the smooth movement of the pick-off pawl.

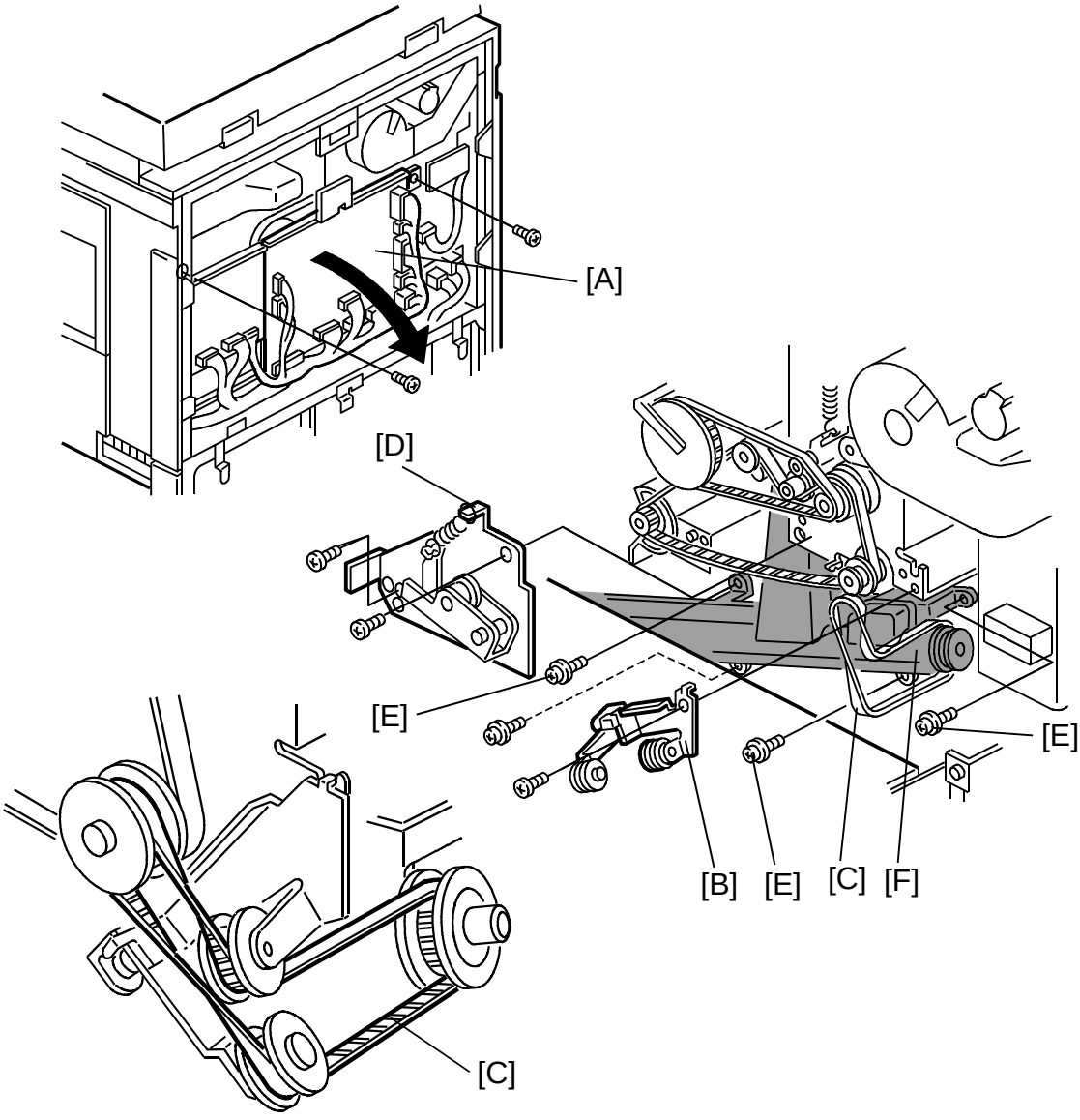
## 4.8 TONER COLLECTION COIL REPLACEMENT




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

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 Covers Removal.)**
3. **Remove the tank cover bracket [C] (2 screws).**
4. **Remove the toner collection motor [D] (2 connectors, 2 screws),**

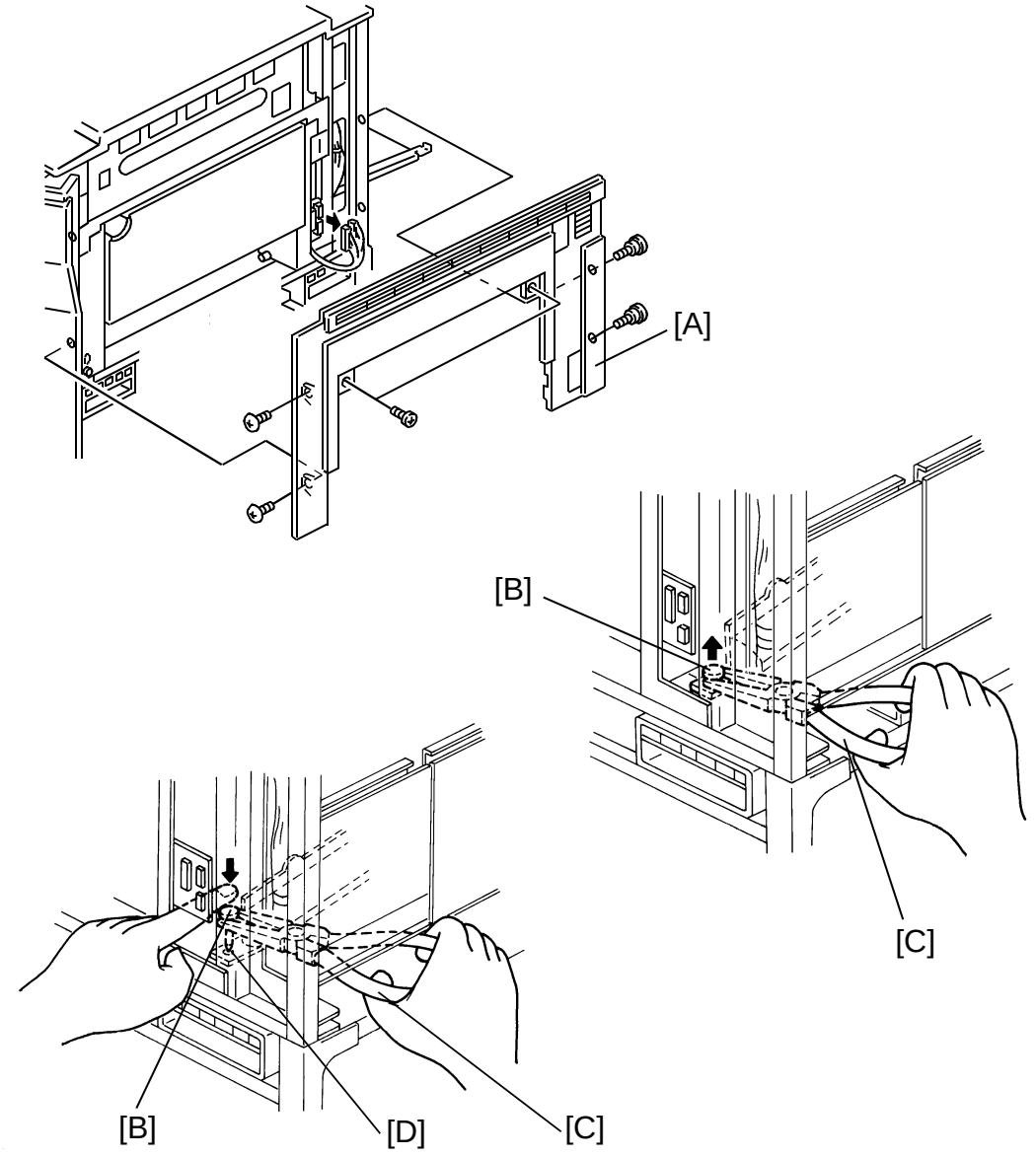
   **NOTE: When re-installing the toner collection motor, be sure to set the 2 positioning pins in the holes on the machine rear frame.**






5. Open the main control board [A] (2 screws).
6. Remove the pulley bracket [B] and the timing belt [C] (1 screw).

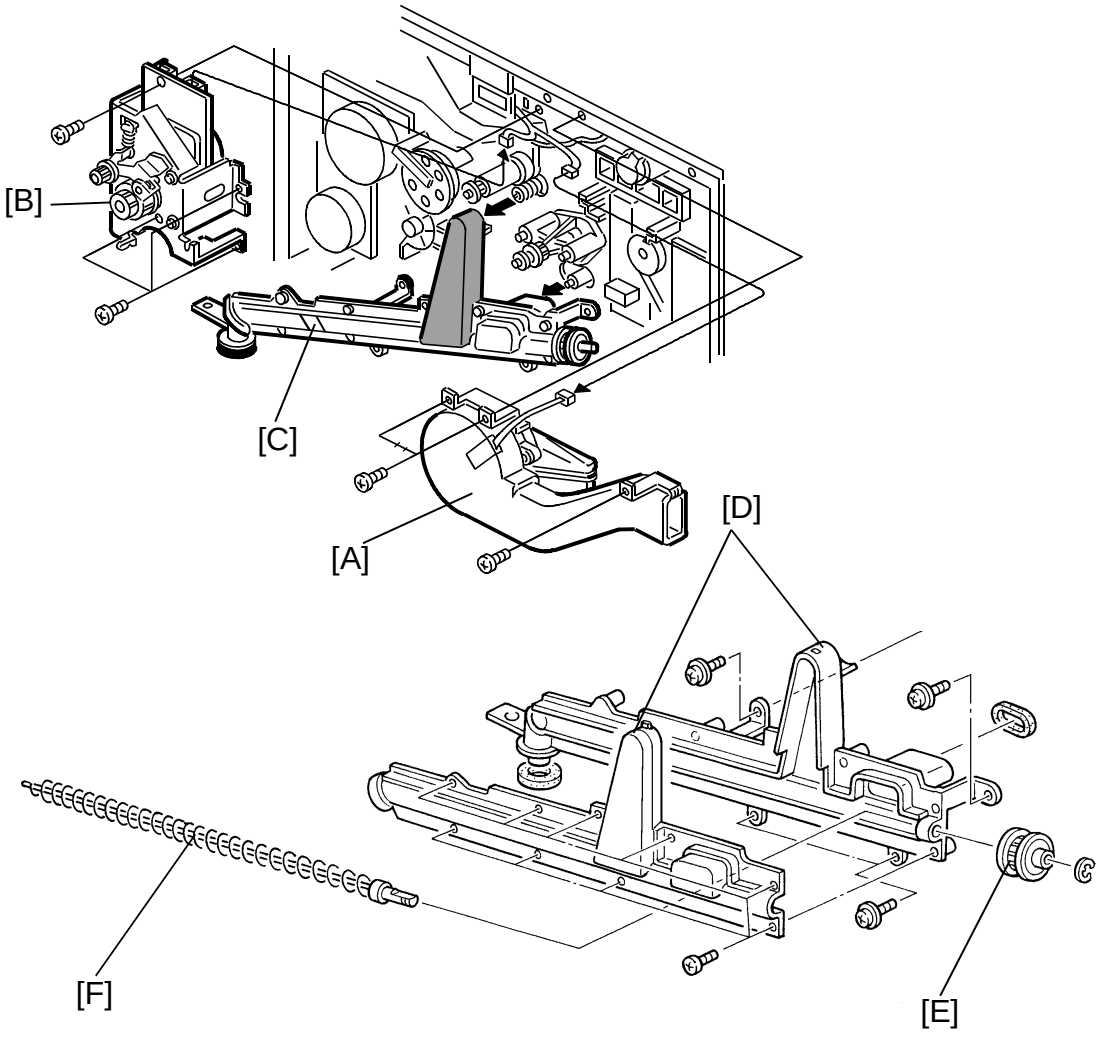
   **NOTE:** When re-installing the timing belt [C], be sure that the belt is correctly hooked on the four pulleys as shown.
7. Remove the belt tightener unit [D] (2 screws).
8. Remove the four screws [E] fixing the toner collection coil casing [F] to the machine rear frame.




9. Remove the upper right cover [A]. (Refer to Upper Right Cover Removal.)

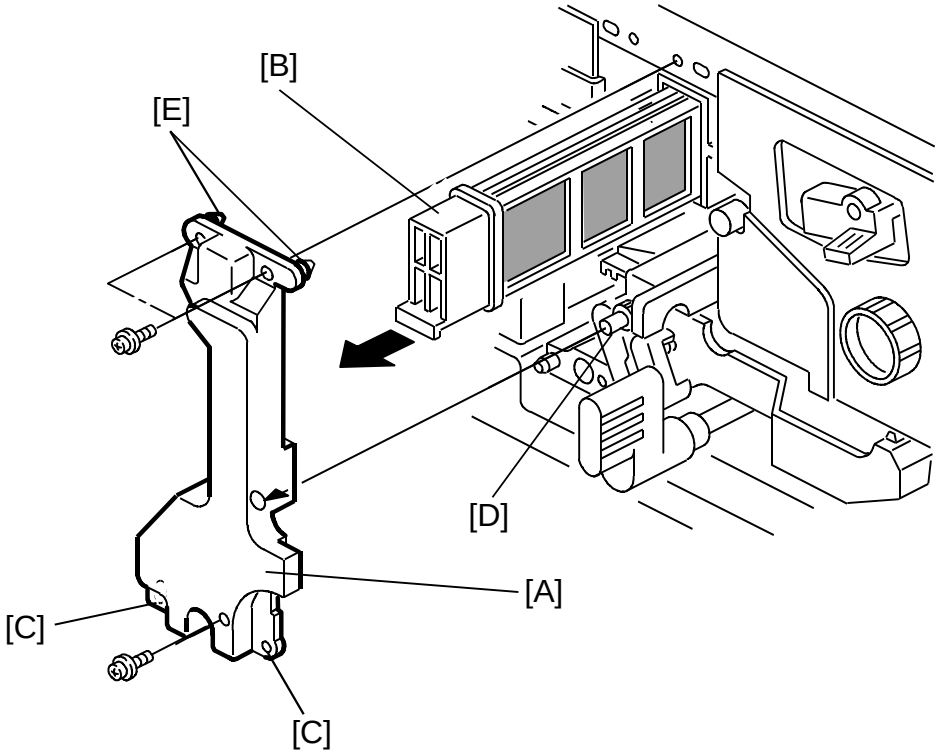
10. Remove the pin [B] of the push-lock fixing the toner collection coil casing.

**NOTE:** When removing the push-lock pin [B], catch the pin with needle-nose pliers [C] (accessing from the hole under the main control board, as shown).
When re-setting the push-lock pin [B], hold the pin with needle-nose pliers. Then, while holding the pin above the push-lock holder [D], push the pin head down with you finger. Insert your finger from the space below the LCT connector bracket, as shown.




11. Remove the exhaust fan [A] (1 connector, 3 screws).
12. Remove the main motor [B] (1 connector, 4 screws).
13. Remove the toner collection coil casing [C] and put it on the sheet of paper.
14. Disassemble the toner collection coil casing [D] (8 screws).
15. Remove the drive pulley [E] (1 E-ring).
16. Replace the toner collection coil [F].

## 4.9 OZONE FILTER REPLACEMENT

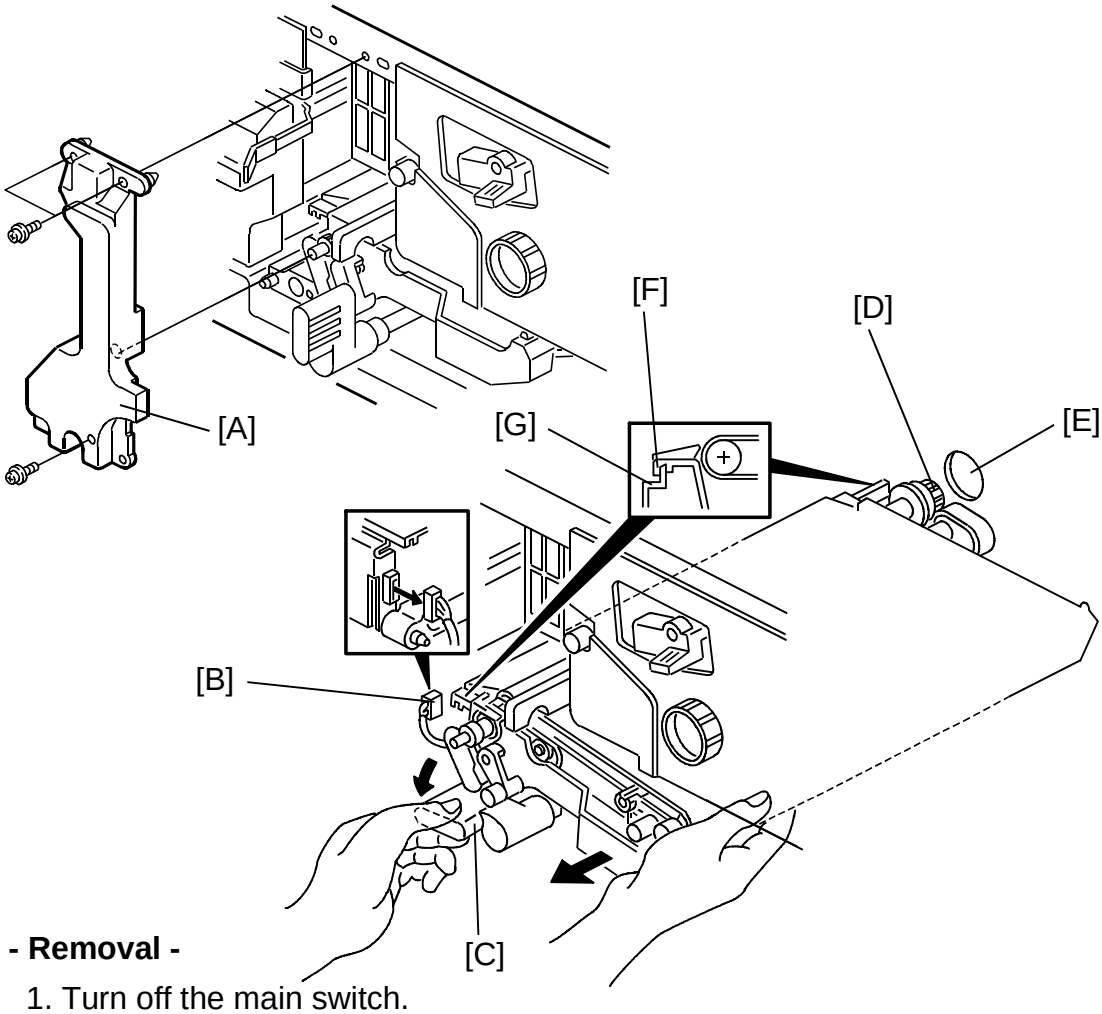



1. Open the front doors and open the toner bottle holder.
2. Remove the transfer belt unit prop [A] (3 screws).
3. Replace the ozone filter [B].

**NOTE:** To install the transfer belt unit prop smoothly, set in order the lower pins [C], drive roller shaft [D], and the upper pins [E].

# 5. TRANSFER BELT UNIT

## 5.1 TRANSFER BELT UNIT REMOVAL/INSTALLATION




**- Removal -**

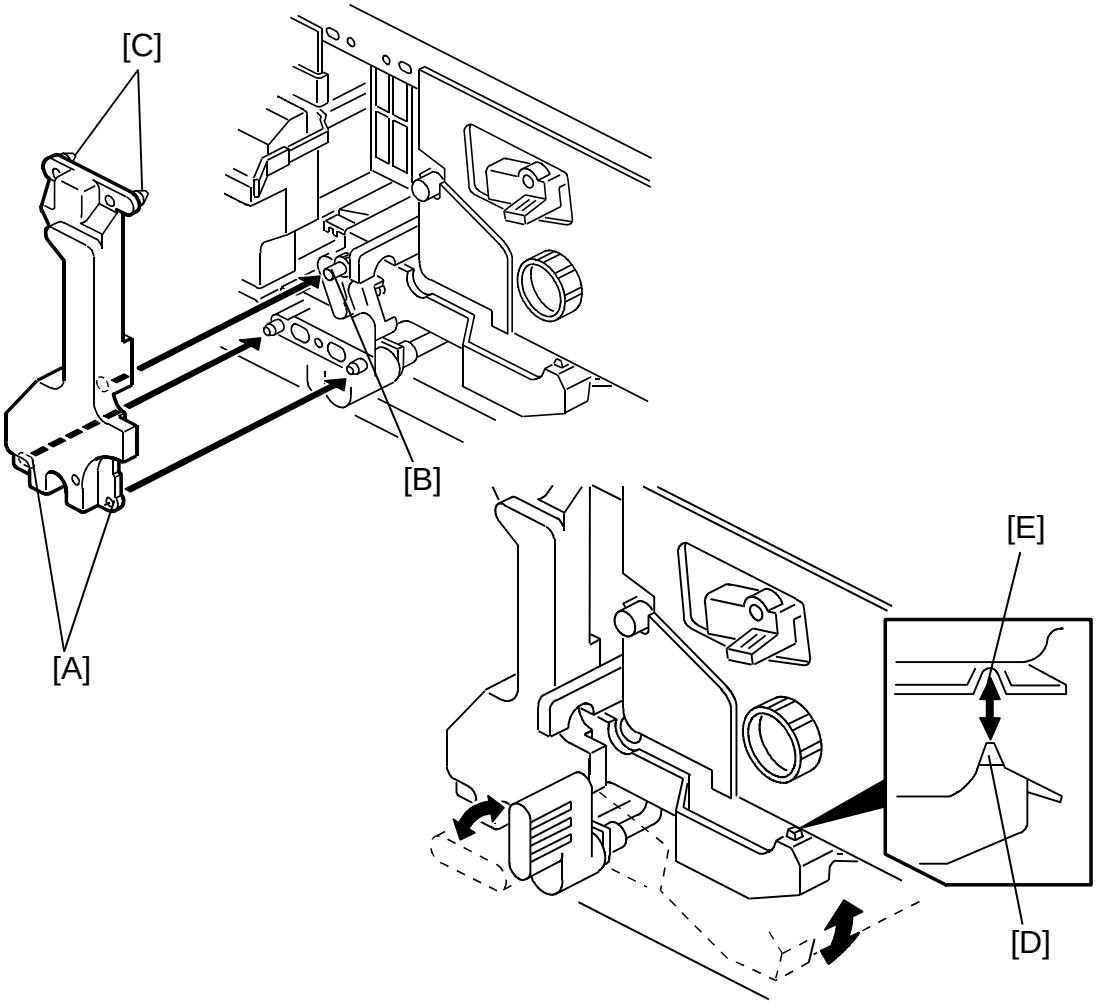
1. Turn off the main switch.
2. Remove the transfer belt unit prop [A] (3 screws).
3. Disconnect the connector [B].
4. While turning the lever [C] counterclockwise, take out the transfer belt unit.

   **NOTE:** 1) Do not touch the transfer belt with oily hands.
   2) Take care not to scratch the OPC drum with part of 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] in the hole [E] on the rear frame.
   2) Place the slot [F] of the transfer belt unit on the rail [G].

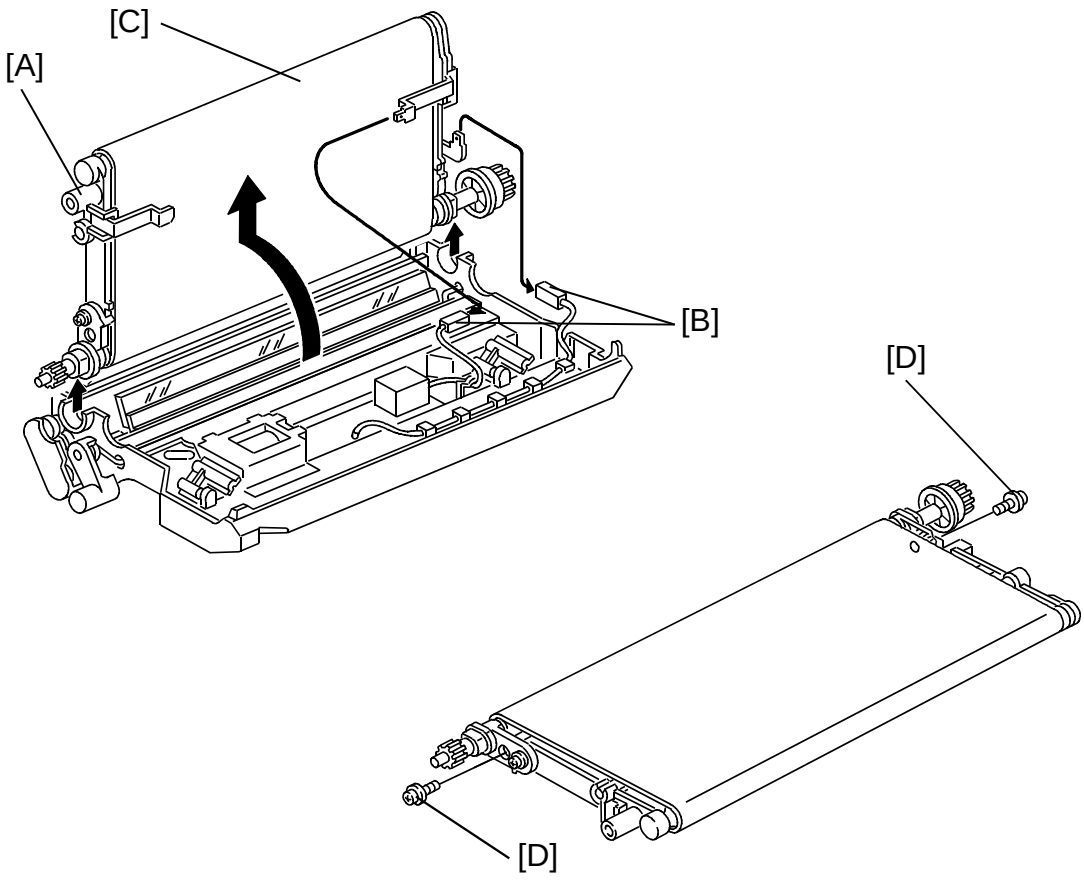



2. Install the transfer belt unit prop (3 screws).

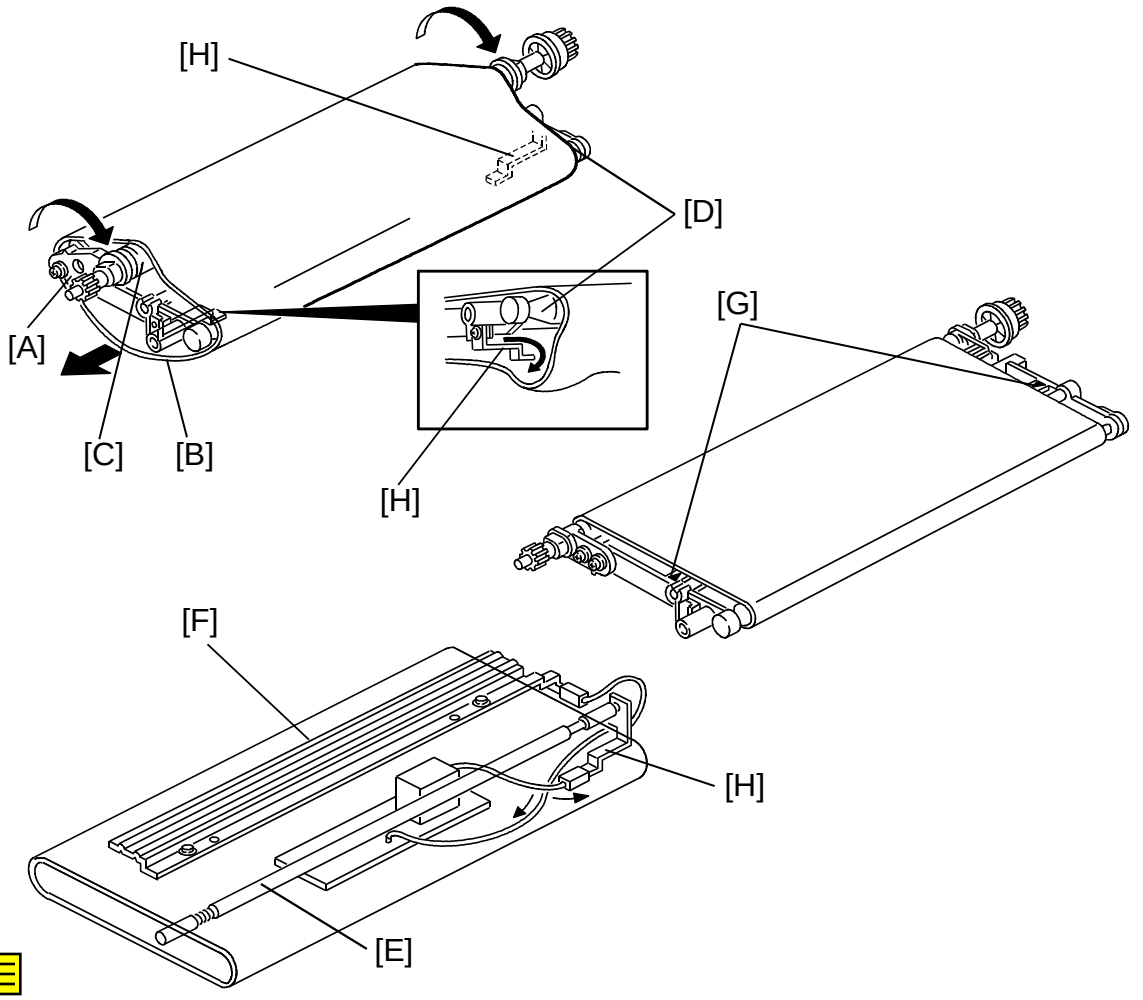
   **NOTE:** To install the transfer belt unit prop smoothly, set in order the lower pins [A], drive roller shaft [B], and the upper pins [C].

3. After installation, confirm the following points:
   1) Smooth up-down movement of the transfer belt unit,
   2) Part [D] of the transfer belt unit is inside the drum stay,
   3) Part [D] of the transfer belt unit is set in the dent [E] on the drum unit casing.

## 5.2 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).

6. Replace the transfer belt [B].

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

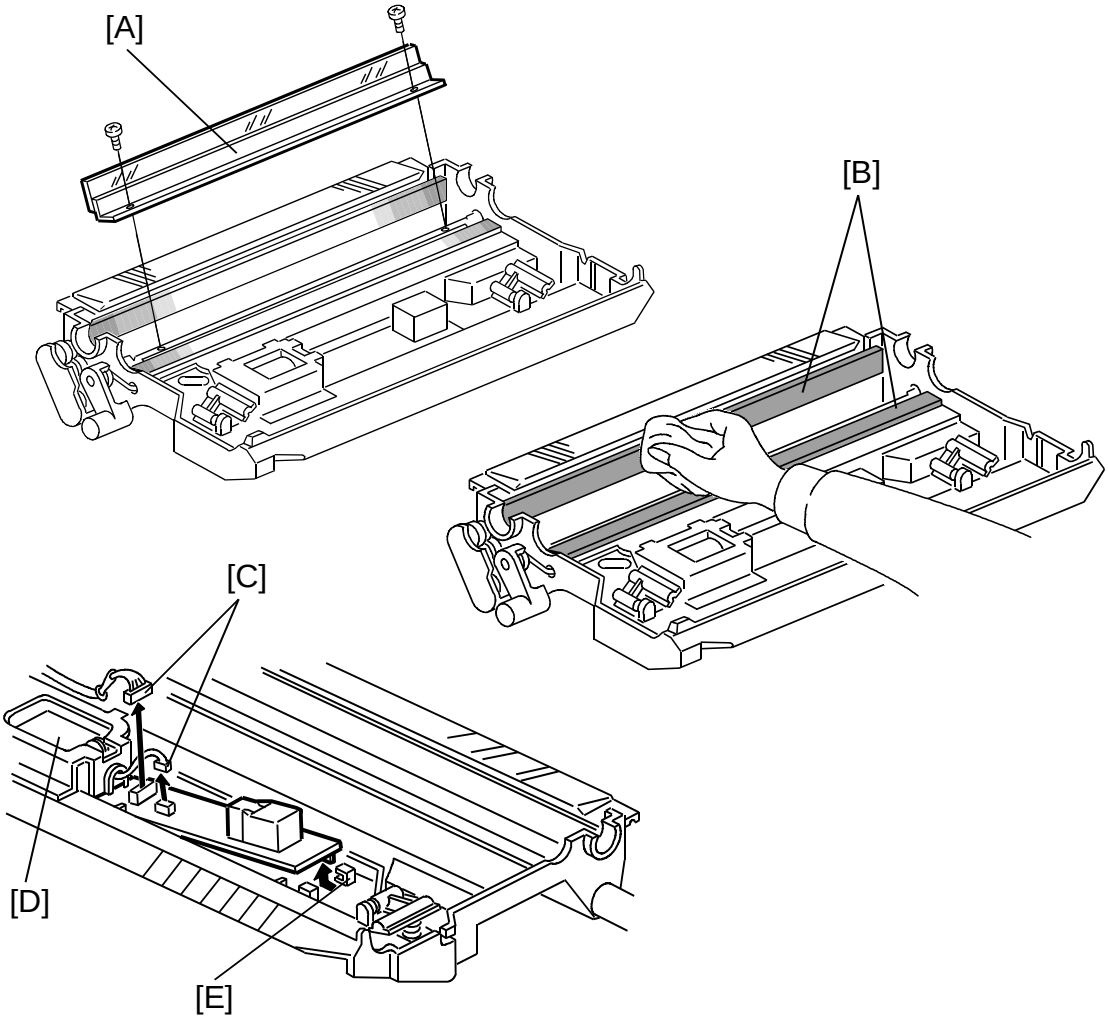
2) Before installing the transfer belt, clean the following items with alcohol.

- Belt drive roller [C]
- Belt roller [D]
- Bias roller [E]
- Discharge terminal [F]

3) Position the transfer belt at the center of the belt roller [D]. (Both marks [G] should be visible.)

4) Set the transfer belts inside the bias terminals [H].

## 5.3 CLEANING BLADE REPLACEMENT




1. Remove the transfer belt. (Refer to Transfer Belt Replacement.)
2. Remove the cleaning blade [A] (2 screws).
3. Clean the seals [B].

   **NOTE:** When using a vacuum cleaner, to protect the transfer power pack from static electricity, remove the power pack as follows:

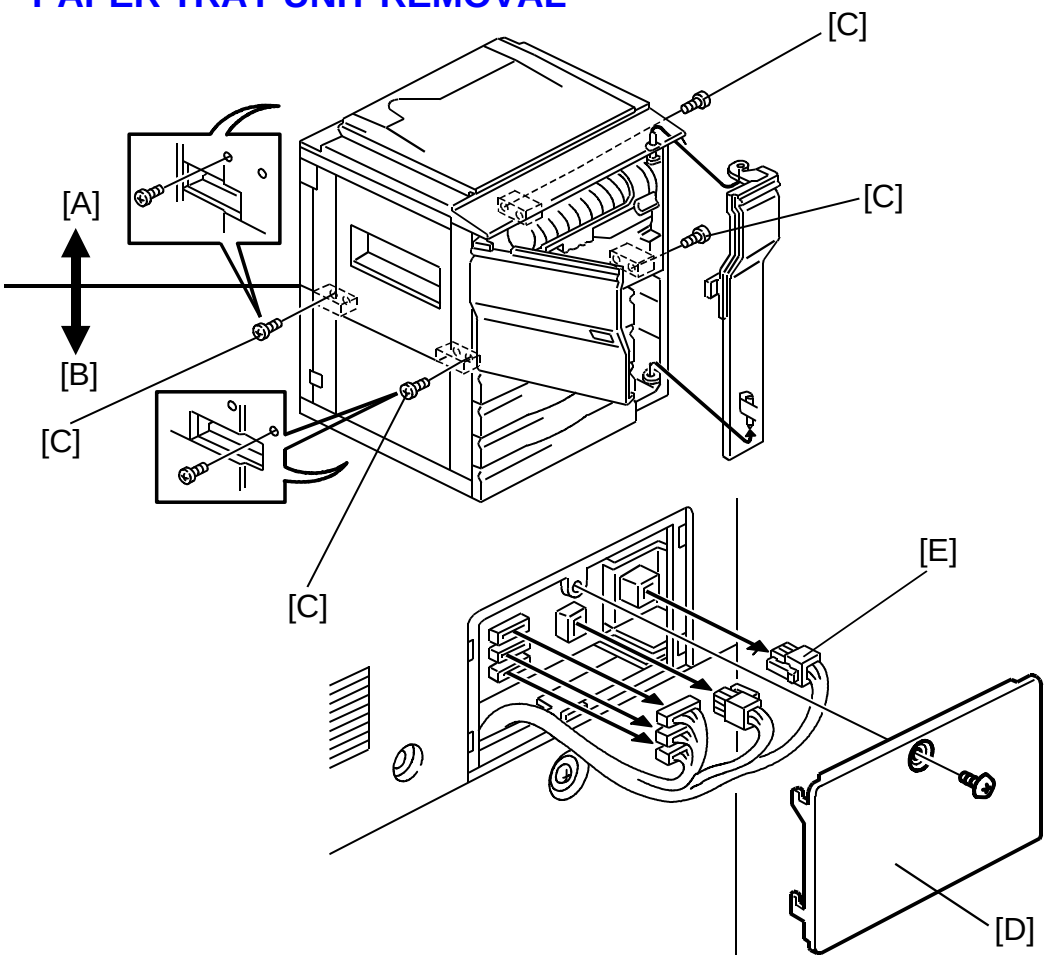
   1) Disconnect two connectors [C].
   2) While pushing the power pack toward the solenoid [D], release the power pack from the hook [E].

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 there.

# 6. PAPER FEED

## 6.1 PAPER TRAY UNIT REMOVAL



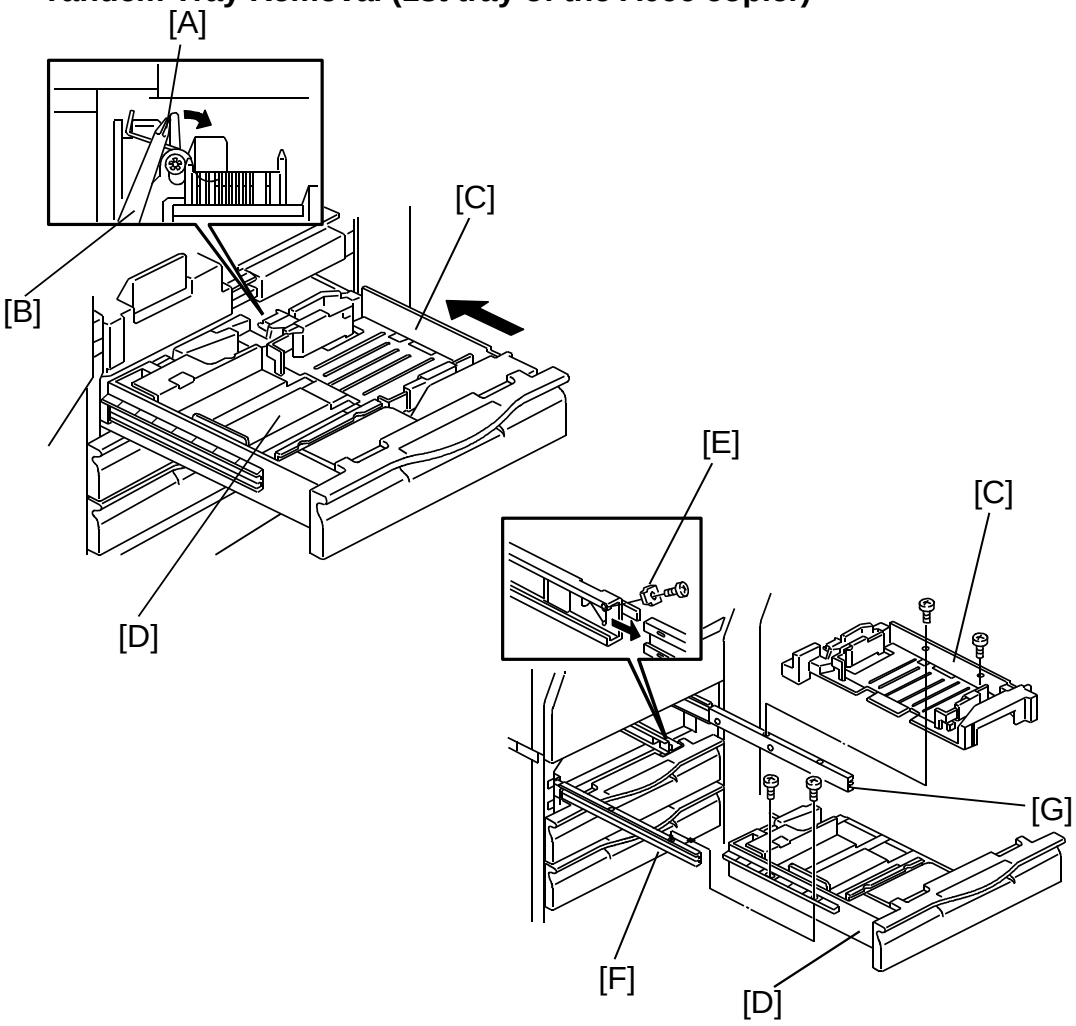

To facilitate transportation, the upper part of the copier (copier main frame) [A] and the lower part of the copier (paper tray unit) [B] can be separated as follows:

1. Turn off the main switch.
2. Remove the front covers. (Refer to Front Cover Removal.)
3. Remove the four screws [C].
4. Open the small rear cover [D] (1 screw).
5. Remove the five connectors [E].
6. Remove the copier main frame [A] from the paper tray unit [B].

**NOTE:** When re-installing the copier main frame on the paper tray unit, do not pinch the harness between the copier main frame and the paper feed unit.

## 6.2 PAPER TRAY REMOVAL

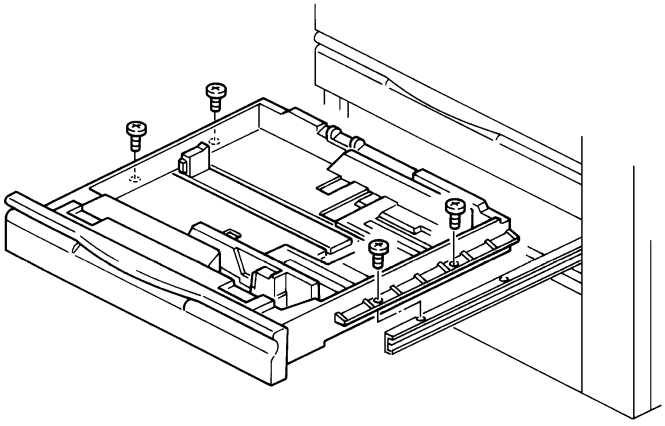
**- Tandem Tray Removal (1st tray of the A096 copier) -**

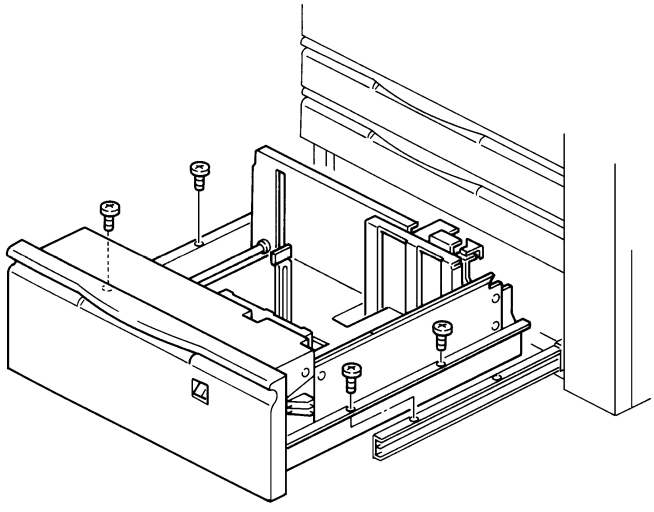



1. Open the left door and draw out the tandem tray.
2. While pushing the release lever [A] to the right with the head of the screw driver [B], slightly push the right tandem tray [C] to separate it from the left tandem tray [D].
3. Remove the stopper [E] (1 screw).
4. Remove the left tandem tray [D] from the left guide Accuride [F] (2 screws).
5. While holding the right tandem tray [C] from the bottom, remove the right tandem tray from the right guide Accuride [G] (2 screws).

   **NOTE:** If two screws are removed without holding the right tandem tray, it will drop.

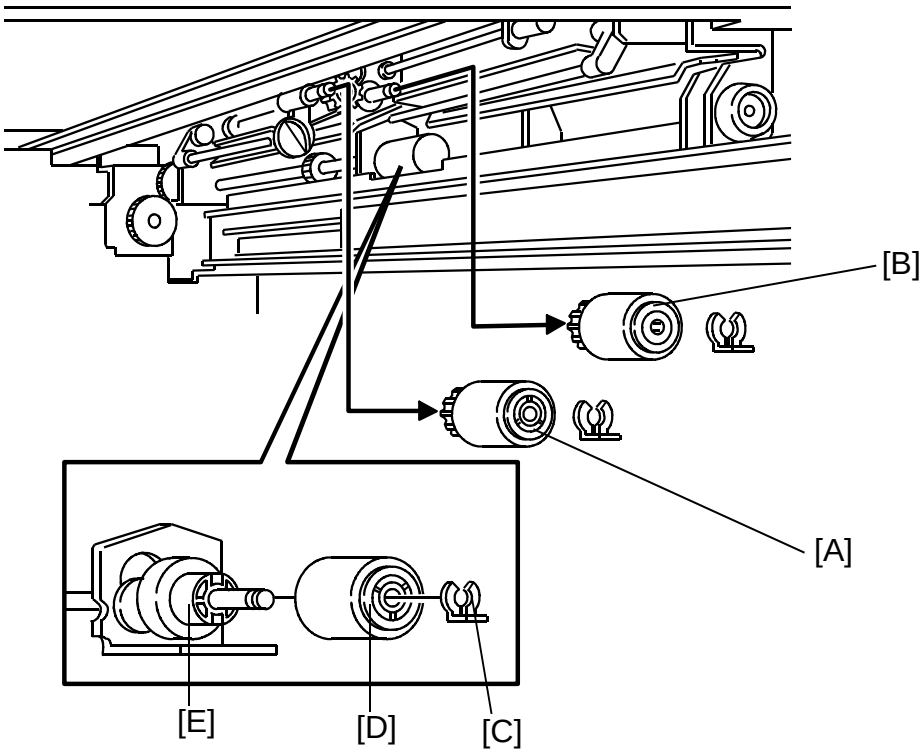
**- Universal Tray / 550 sheet tray/ Built-in LCT Removal**
**(all trays of the A095 copier / 2nd, 3rd trays of the A096 copier) -**





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

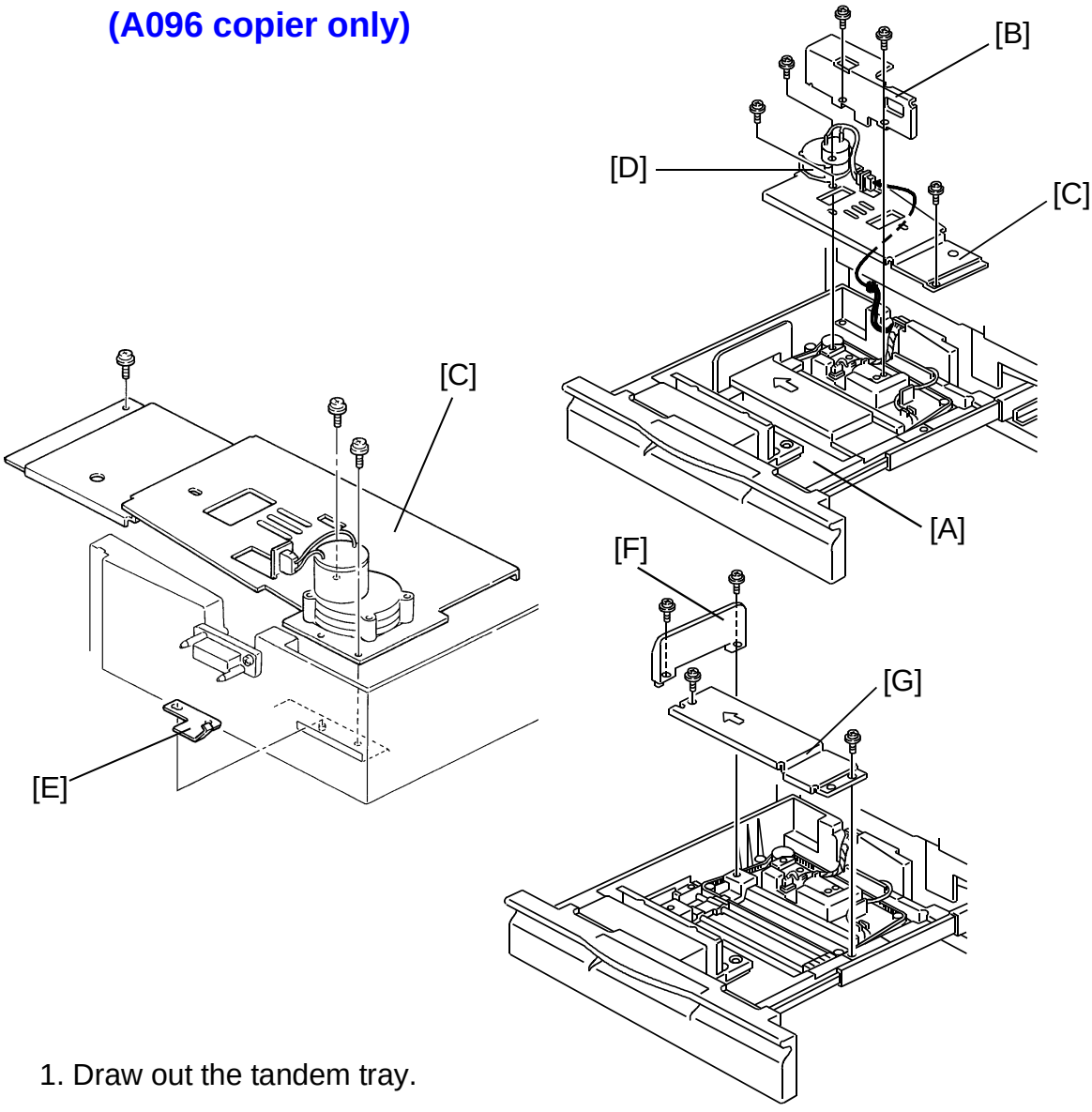
## 6.3 PAPER FEED ROLLERS REPLACEMENT




1. Turn off the main switch.
2. Remove the paper tray where the feed rollers belong to. (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] fixing the separation roller [D] then separate the separation roller [D] from the torque limiter [E].

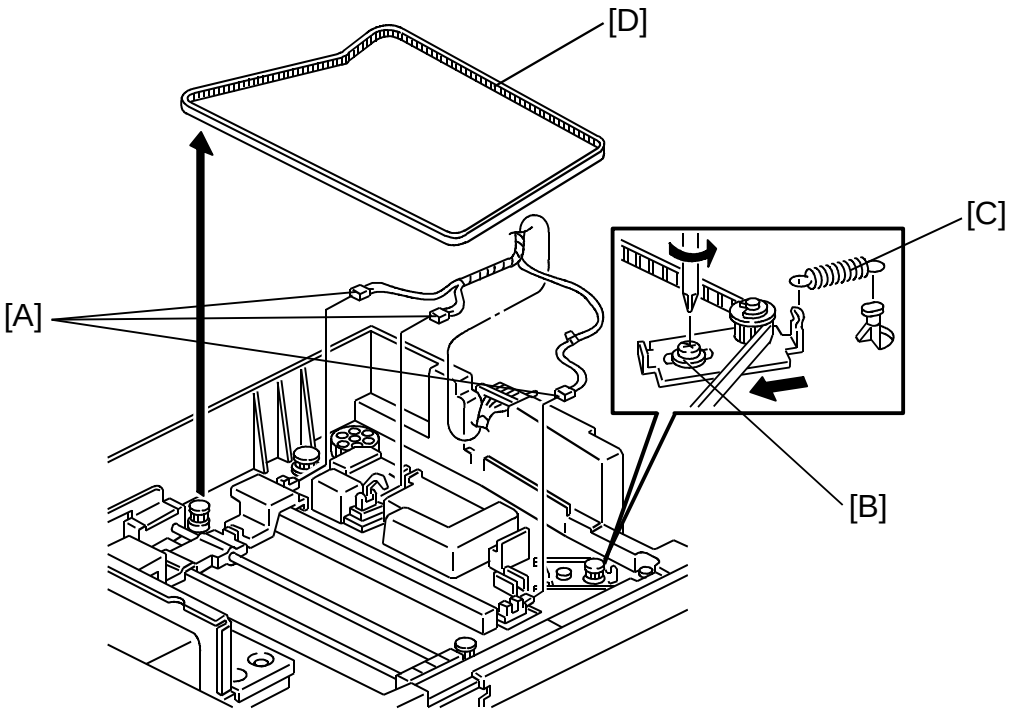
**NOTE:** 1) The paper feed (pick-up, feed, separation) rollers used in the 1st ~ 3rd feed units in the paper tray unit are different from the feed rollers used in the by-pass feed table and 3.5K LCT.
2) Do not touch the surface of the rollers with oily hand.

## 6.4 TANDEM REAR FENCE DRIVE BELT REMOVAL (A096 copier only)




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).

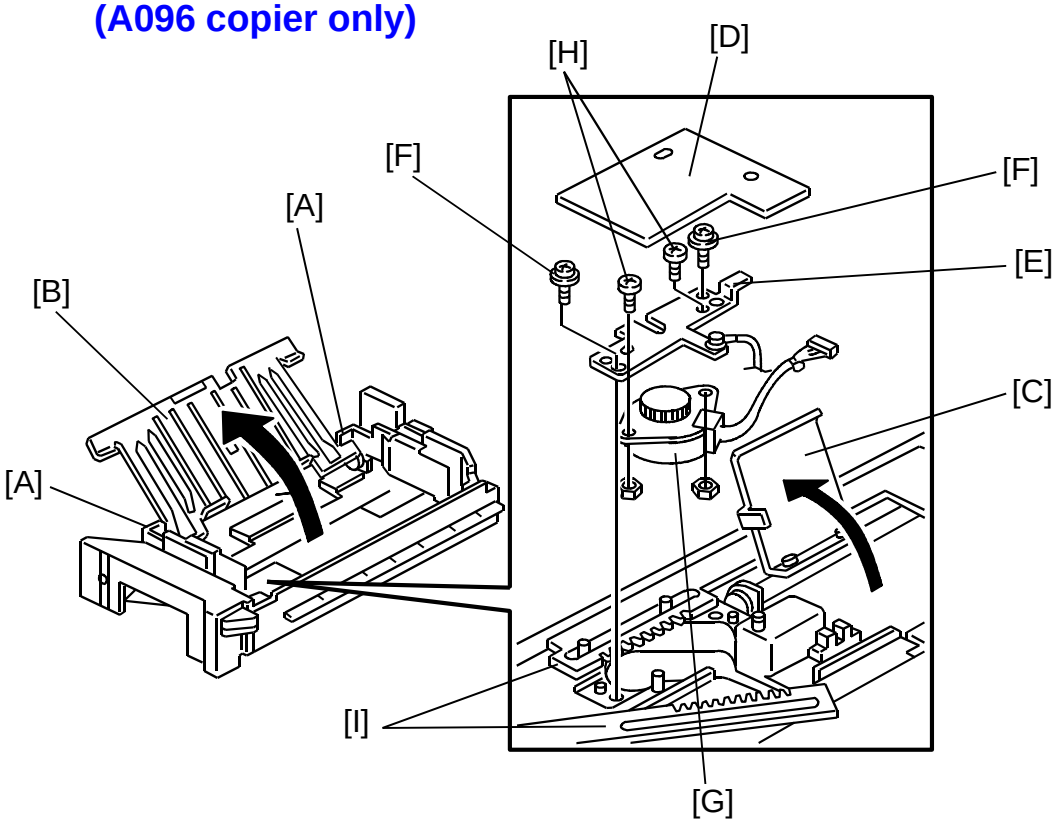
   **NOTE:** When re-installing the rear base plate, make sure that the grounding plate [E] is attacked to the rear base plate.
5. Remove the end fence [F] (2 screws).
6. Remove the center bottom plate [G] (2 screws).




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

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

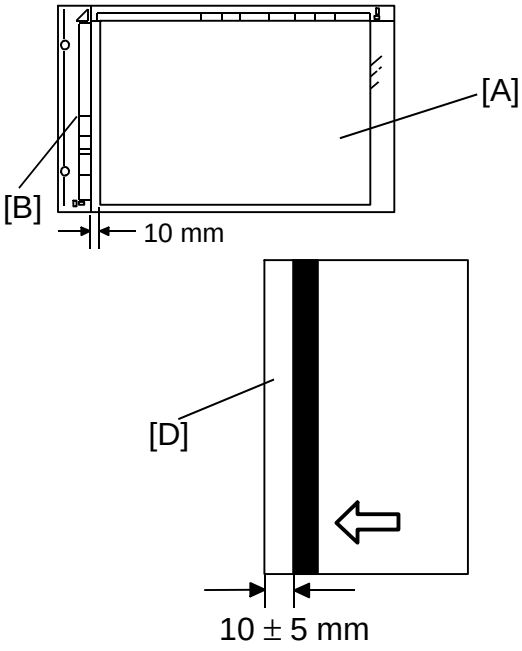
## 6.5 TANDEM SIDE FENCE MOTOR REMOVAL (A096 copier only)

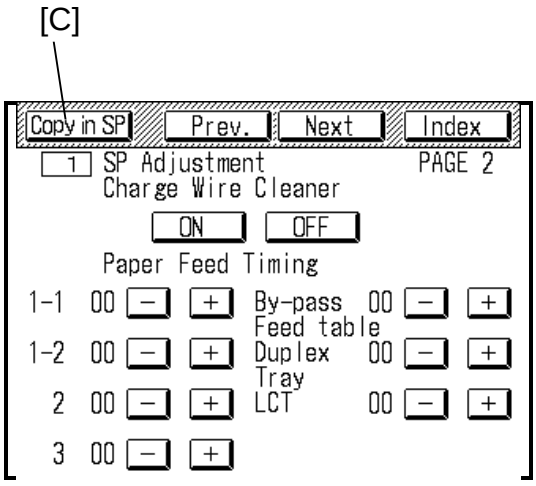



1. Open the side fences [A] and raise the bottom plate [B] of the right tandem tray.
2. Remove the lift arm [C] (2 screws).
3. Remove the cover [D] (1 screw).
4. Remove the bracket [E] (2 screws [F]).
5. Remove the side fence drive motor [G] (2 screws [H] and 2 nuts).

   **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].

## 6.6 PAPER FEED TIMING ADJUSTMENT

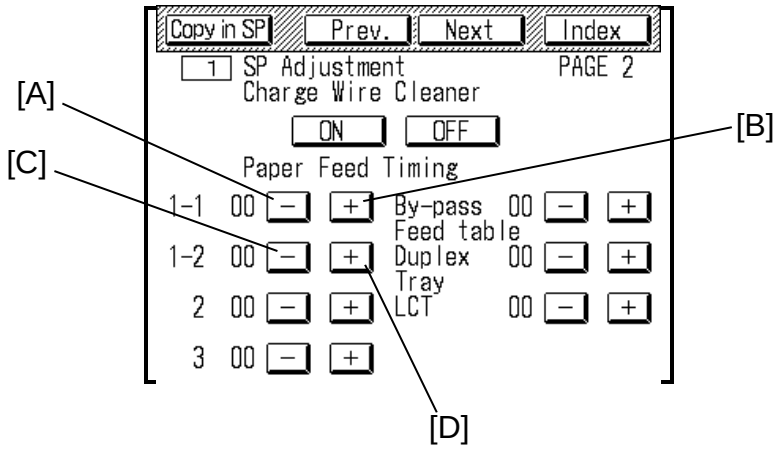



**1) Paper feed timing adjustment for the 1st feed station**

1. Place a white paper on the exposure glass so that there is a gap of 10 mm between the white paper [A] and the left scale [B].
2. Enter SP mode (refer to Service Program Access Procedure) and access the 1 SP Adjustment – PAGE 2.
3. Touch the **"Copy in SP"** key [C] then select the 1st feed station.
4. Enter a copy quantity of "2" using the number keys.
5. Touch the **"SP Mode"** key.
6. Press the **Start** key and evaluate the width of the white area [D] on the copy. The adjustment standard is 10 ± 5 mm.

   **NOTE:** In this mode, the registration roller does not stop for registration. Do not make copies in "Copy in SP" mode for this adjustment. In "Copy in SP" mode, the registration clutch stops normally.



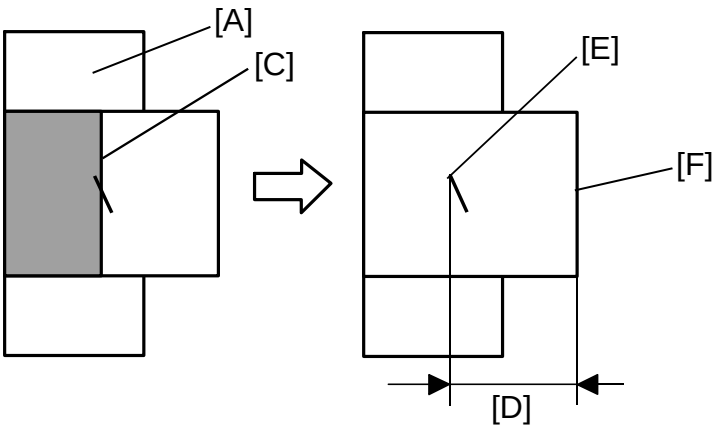

7. For the first copy, touch the – key [A] or the + key [B] to adjust the white area width.
8. For the second copy, touch the – key [C] or the + key [D] to adjust the white area width.
9. Repeat steps 6 to 8.

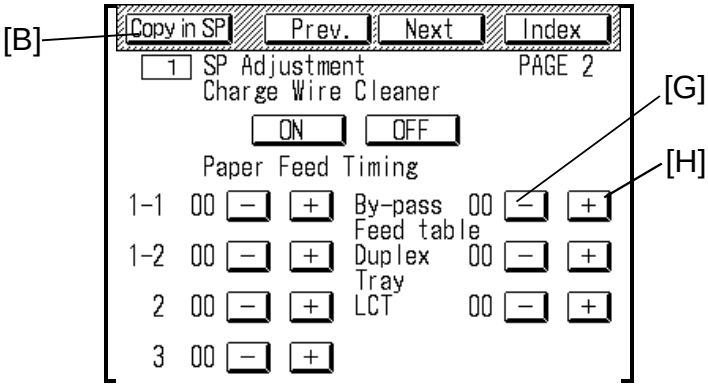
**2) Paper feed timing adjustment for the 2nd, 3rd feed stations, the LCT and duplex unit.**

Refer to Paper Feed Timing Adjustment for the 1st feed station.

**NOTE:** Concerning the adjustment for the 1st feed station, it is necessary to adjust the feed timing for the 1st and 2nd papers individually. However, for the other feed stations, it is necessary to adjust the feed timing only for the 1st paper fed.

Therefore, you can skip steps 4 and 7 of the paper feed timing adjustment for the 1st feed station.

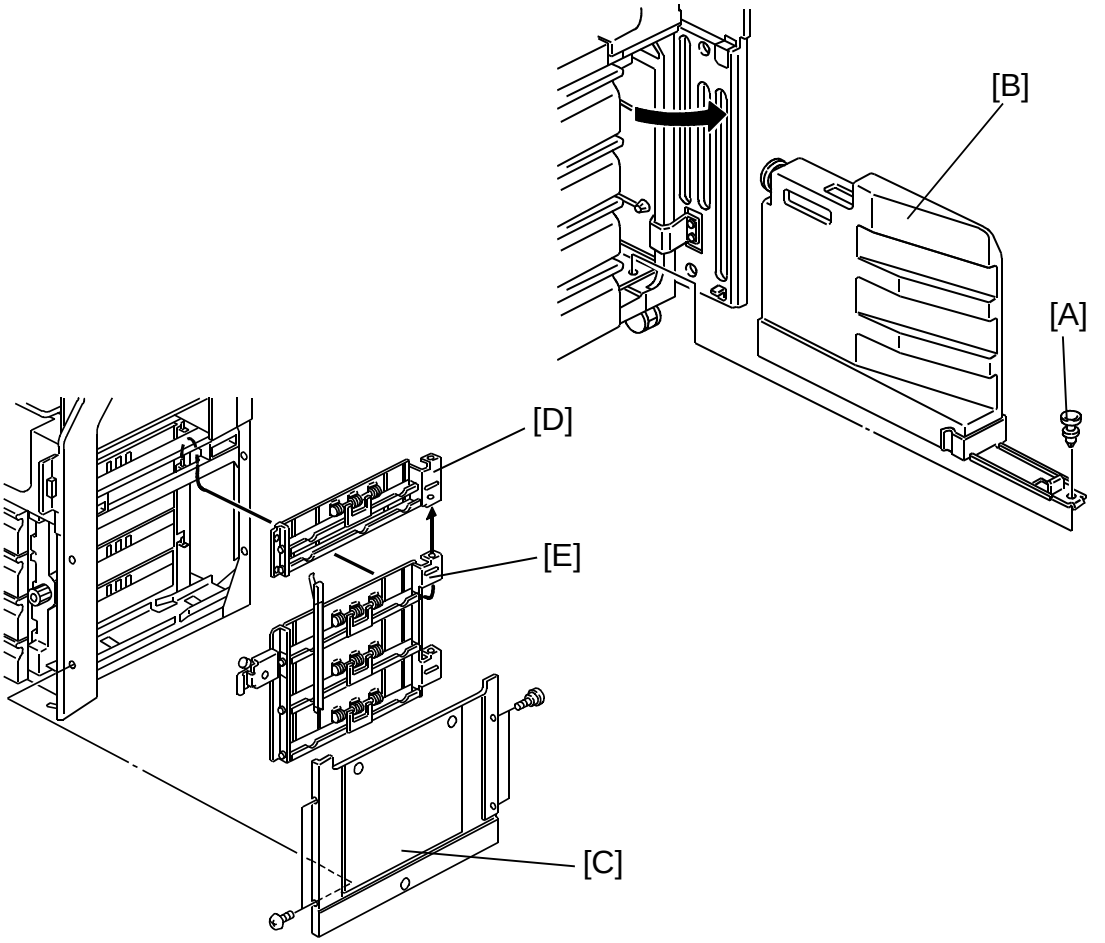



**3) Paper feed timing adjustment for the by-pass feed station**

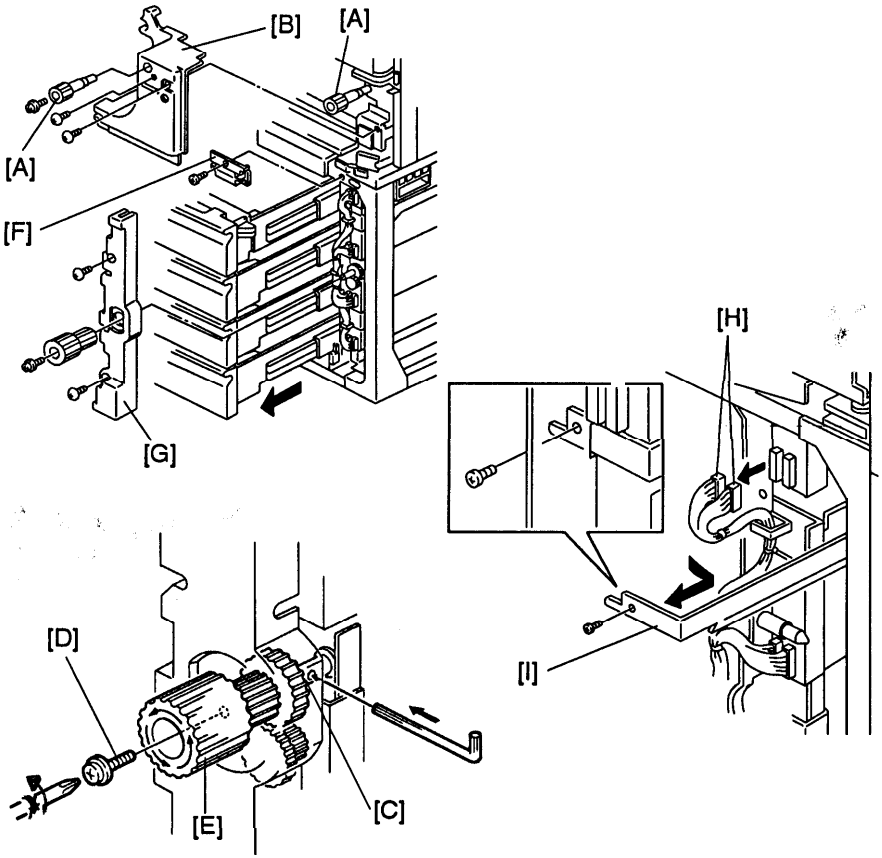
1. Set two sheets of paper on the by-pass feed table [A].
2. Enter SP mode (refer to Service Program Access Procedure) and access 1 SP Adjustment – PAGE 2.
3. Touch the **"Copy in SP"** key [B].
4. Select the by-pass feed station.
5. Press the **start** key then when the paper stops for registration, mark the trailing edge [C] of the paper on the next paper as shown.
6. Measure the distance [D] between the leading edge of the mark [E] and the trailing edge of the paper [F] as shown. The adjustment standard is 106 ~ 115 mm.
7. Touch the **"SP Mode"** key.
8. Touch the – key [G] or the + key [H] to adjust the distance [D].
9. Touch the **"Copy in SP"** [B].
10. Repeat steps 5 to 9.

## 6.7 PAPER FEED CLUTCH REMOVAL



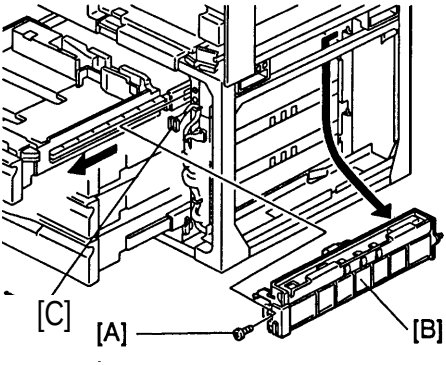

1. Turn off the main switch then open the right front door and remove the push-lock [A].
2. Remove the toner collection bottle [B].

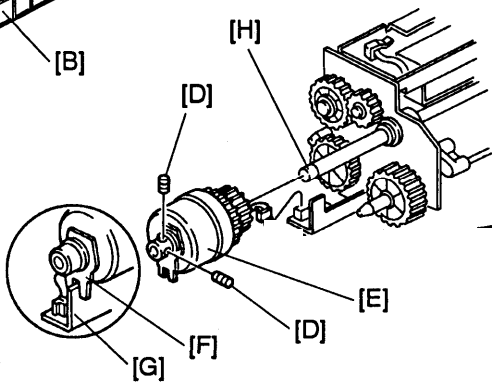
   **NOTE:** If the LCT is installed, remove it from the copier.
3. Remove the lower right cover [C]. (Refer to Lower Right Cover Removal.)
4. Remove the upper then the lower vertical transport guides [D] and [E].




5. Remove the knobs [A] (1 screw each) then remove the right inner cover [B] (2 screws).
6. While holding the shaft [C] with an Allen key, remove the fixing screw [D], then remove the knob [E],
7. Remove the magnet [F].
8. Pull out all paper trays then remove the paper tray unit inner cover [G] (2 screws).
9. Remove the two connectors [H].
10. Remove the support bracket [1] (1 screw).

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

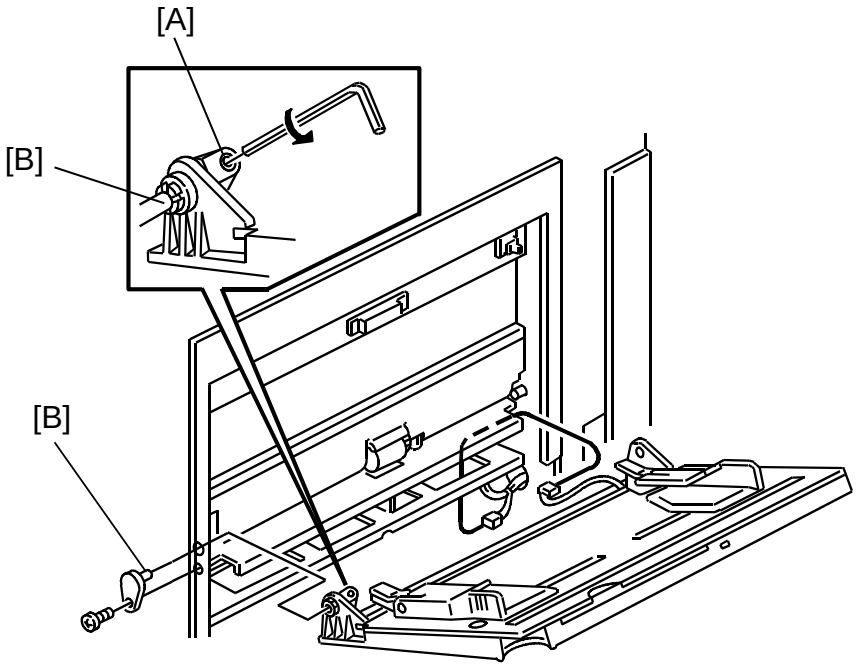



11. Fully draw out the paper tray
12. Remove the two screws [A] fixing the tray feed unit [B].
13. Remove the tray feed unit.
14. Disconnect the connectors [C].
15. Loosen the two Allen screws [D].
16. Remove the tray feed clutch [E] (1 connector).

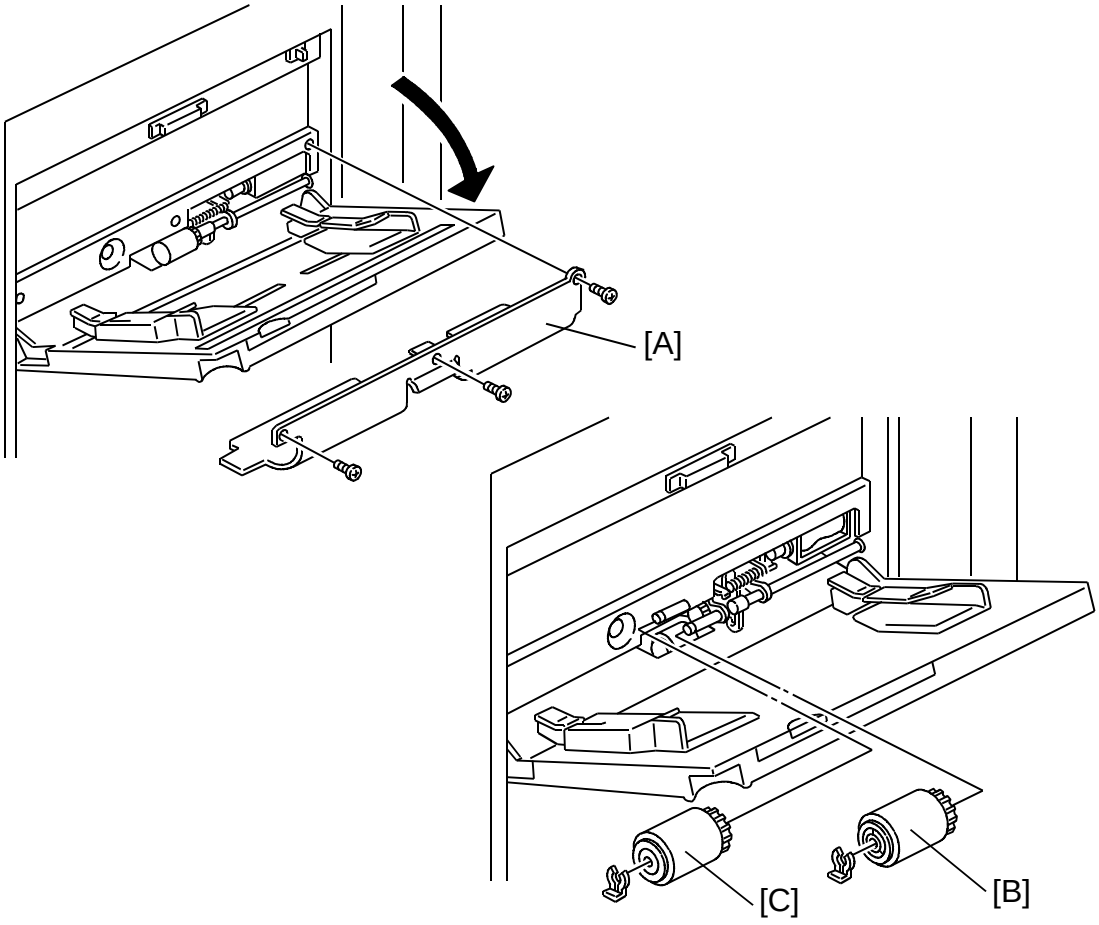
NOTE: When re-installing the tray feed clutch, set the stopper [F] of the clutch on the edge of the bracket [G] then fully push in the clutch on the feed roller shaft [H] and secure the Allen screws [D].

## 6.8 BY-PASS FEED TABLE REMOVAL



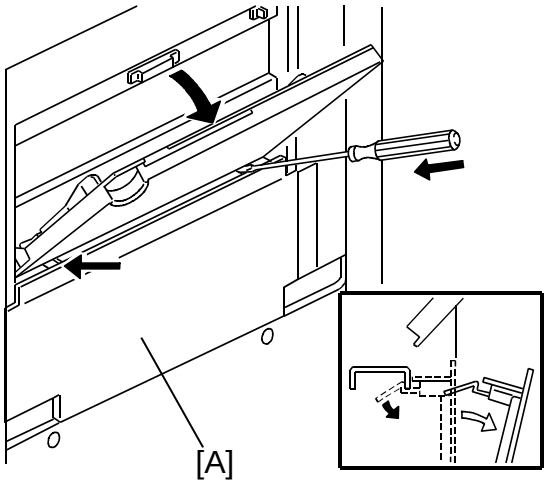

1. Remove the right inner cover. (Refer to Right Inner Cover Removal.)
2. Remove the total counter with bracket (1 screw, 1 connector).
3. Loosen the Allen screw [A] on the hinge.
4. Remove the hinge pin [B] (1 screw).
5. Remove the by-pass feed table (1 connector).

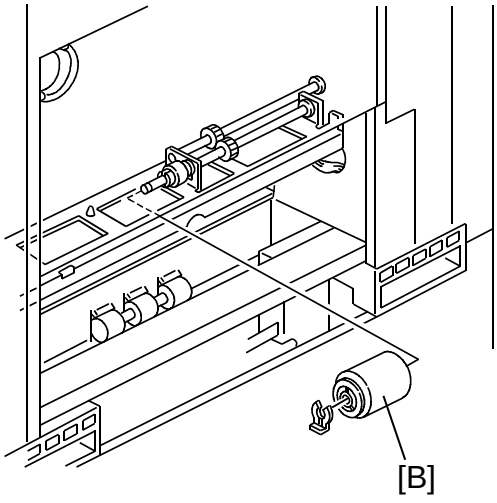
## 6.9 BY-PASS FEED ROLLERS REPLACEMENT




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 1st ~ 3rd feed units in the paper tray unit. They are not interchangeable.

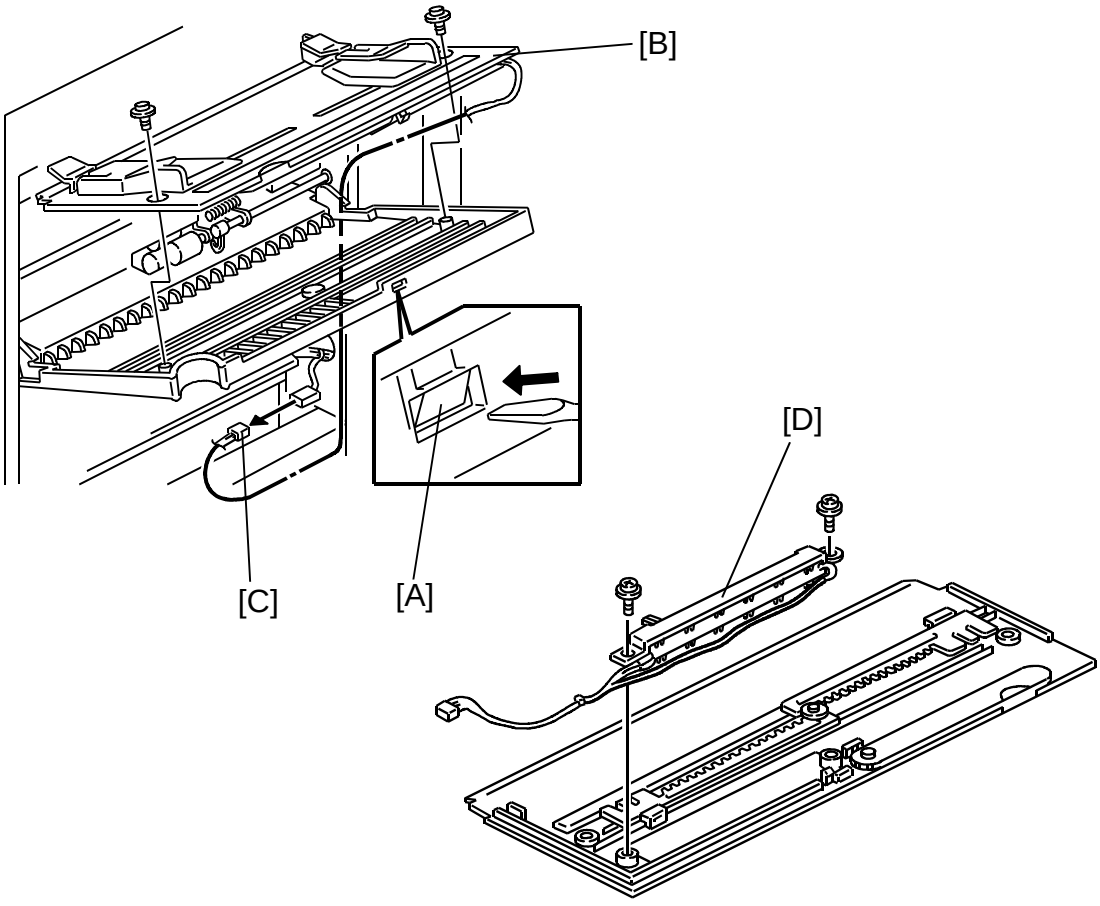


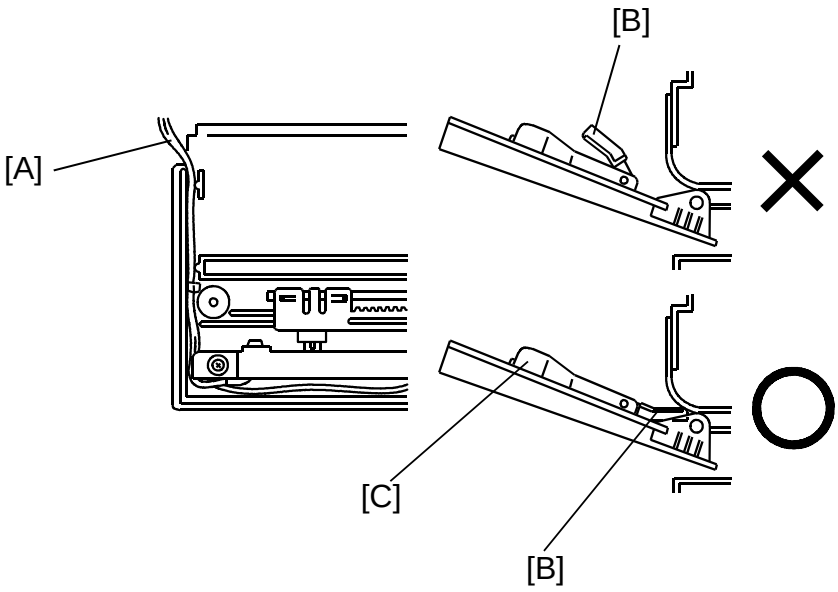

3. Remove the feed unit cover [A] as shown.

4. Replace the separation roller [B] (1 snap ring).

## 6.10 BY-PASS PAPER SIZE SENSOR REPLACEMENT




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

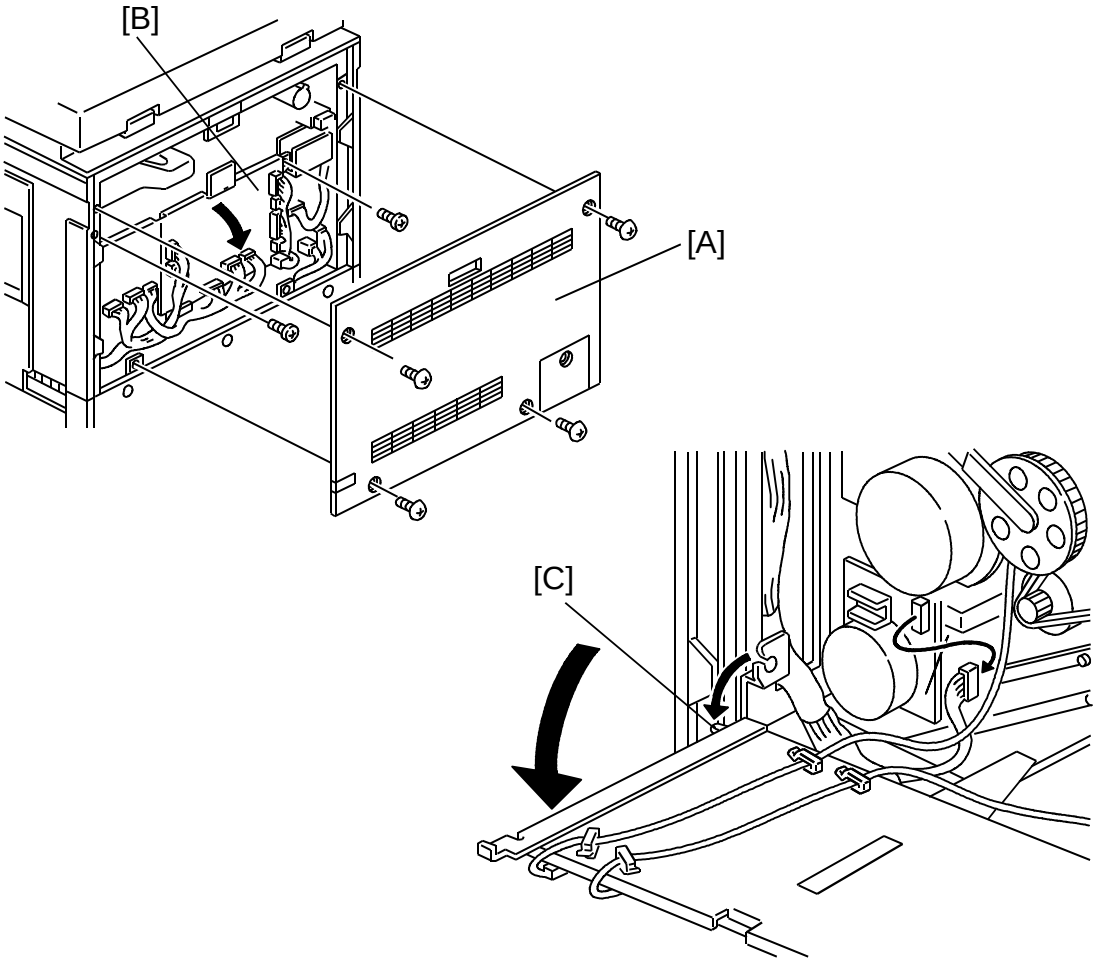



5. Re-install the by-pass paper size sensor then reassemble the by-pass feed table.

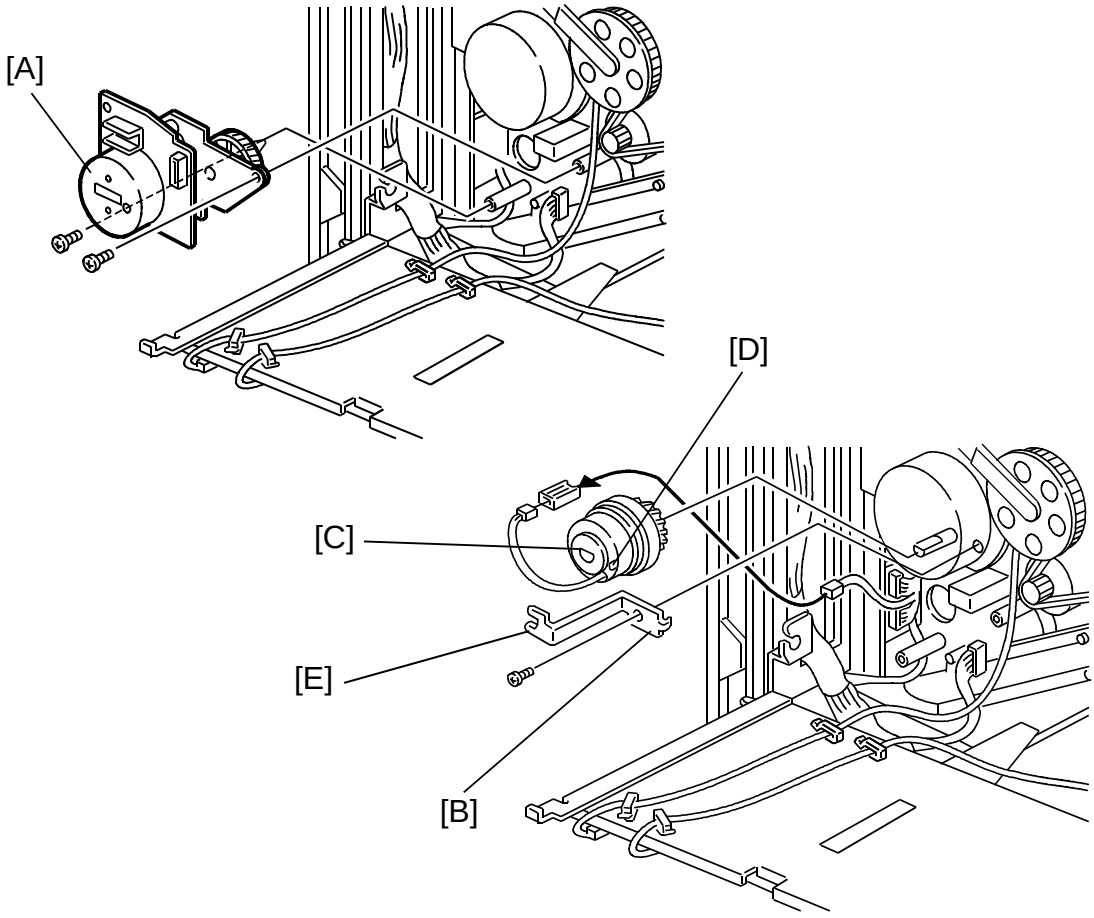
   **NOTE:** When installing the table assembly, route the wires [A] correctly as shown.
   The paper guides [B] must be in the lower position as shown.

6. Perform the by-pass feed sensor paper size correction ([1] SP Adjustment mode – PAGE 9) as follows:
   1) Enter SP mode (refer to Service Program Access Procedure) then access [1] SP Adjustment mode – PAGE 9.
   2) Place the side fence [C] at the A4 or 8 1/2 x 11 sideways position according to the paper size decal on the table.
   3) Place the side fence [C] at the A6 or 4 1/2 x 5 1/2 lengthwise position according to the paper size decal on the table.

## 6.11 BY-PASS FEED CLUTCH REMOVAL



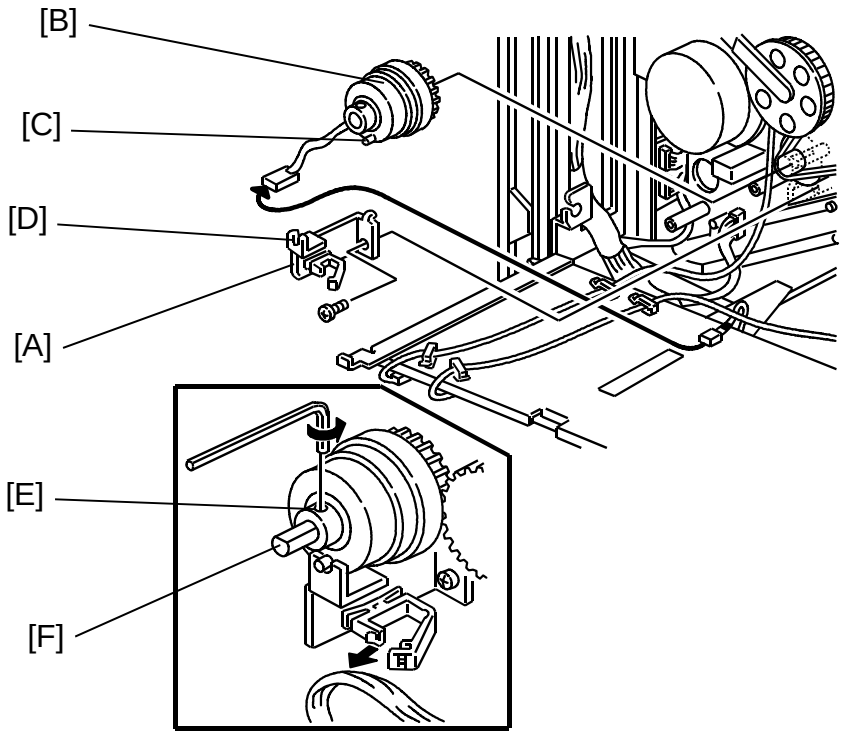

1. Remove the upper rear cover [A]. (Refer to Upper Rear Cover Removal.)
2. Lower the main control board [B] (2 screws).
3. Unhook the main control board bracket hinge [C].




4. Remove the by-pass feed motor [A] (2 screws).
5. Remove the clutch stopper [B] (1 screw).

   **NOTE:** When re-installing the by-pass feed clutch [C], set the pin [D] of the clutch in the cutout [E] of the stopper.
6. Remove the by-pass feed clutch (1 connector).

## 6.12 REGISTRATION CLUTCH REMOVAL

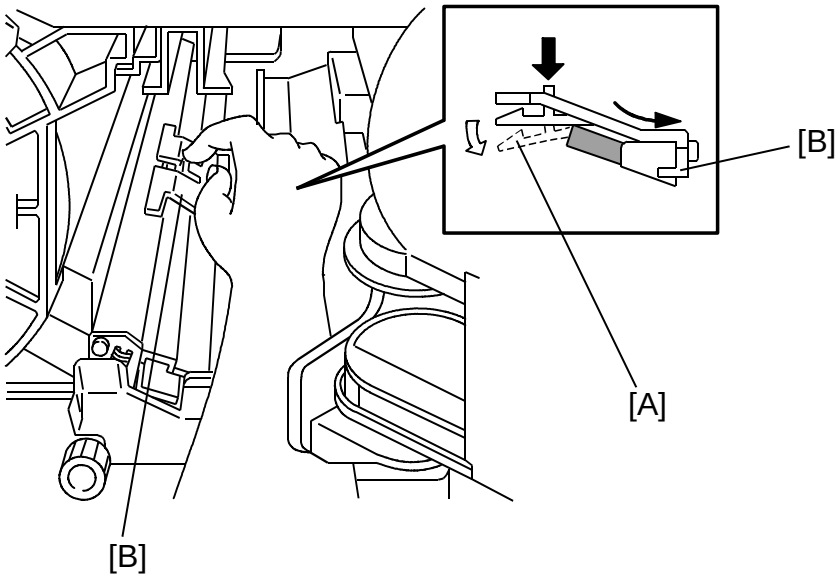



1. Lower then unhook the main control board bracket hinge. (Refer to By-Pass Feed Clutch Removal.)
2. Remove the clutch stopper [A] (1 screw).

   **NOTE:** When re-installing the registration clutch [B], set the pin [C] of the clutch in the cutout of the stopper [D].
3. Loosen the Allen screw [E].
4. Remove the registration clutch (1 connector).

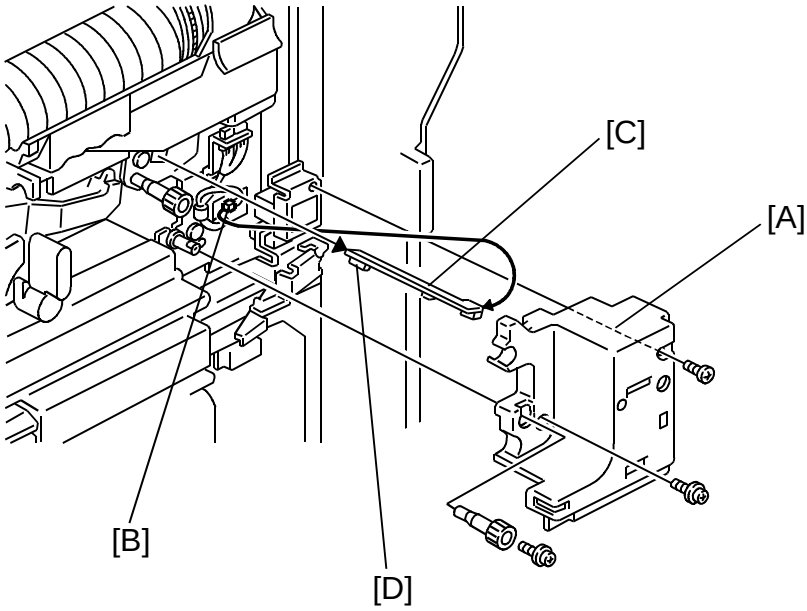
   **NOTE:** When re-installing the registration clutch, fully push in the clutch on the registration roller shaft [F] and secure the Allen screw.

## 6.13 PAPER DUST CLEANER REMOVAL



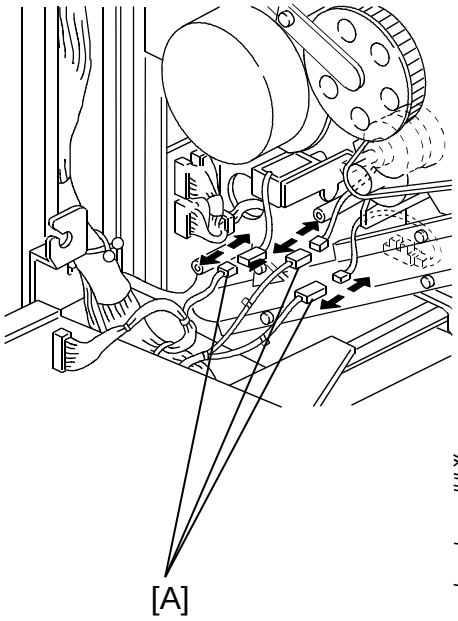

1. Remove the development unit. (Refer to Development Unit Removal.)
2. While pushing down the hook lever [A], remove the paper dust cleaner [B].
3. Remove paper dust inside the paper dust cleaner and clean the inside of the cleaner with a dry cloth or a blower-brush.

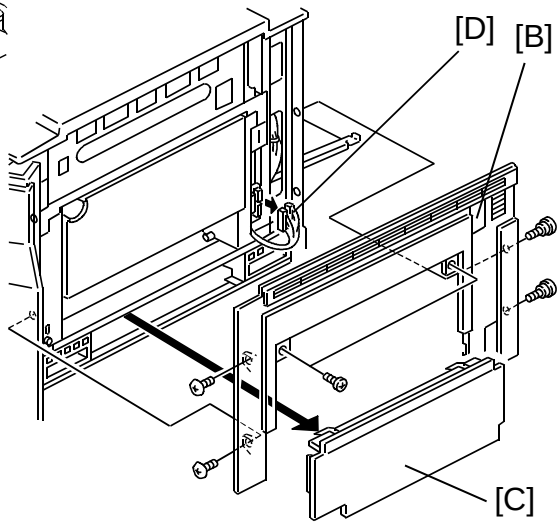
## 6.14 REGISTRATION SENSOR REMOVAL




1. Remove the right inner cover [A]. (Refer to Right Inner Cover Removal.)
2. Disconnect the connector [B].
3. Pull out the registration sensor assembly [C].
4. Clean the photo sensor [D] with a blower-brush.

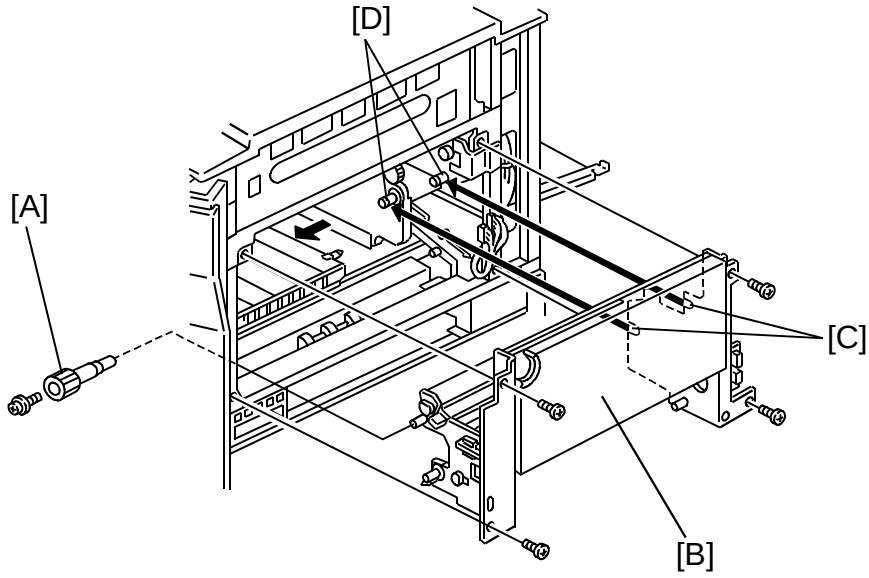
## 6.15 COPIER FEED UNIT REMOVAL




1. Remove the development unit. (Refer to Development Unit Removal.)
2. Remove the right inner cover. (Refer to Right Inner Cover Removal.)
3. Remove the by-pass feed motor. (Refer to By-pass Feed Clutch Removal.)
4. Remove the three connectors [A] for the guide plate positioning solenoid, registration clutch, and the pick-up solenoid.

   **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 positioning solenoid and registration clutch connectors.
5. Remove the upper right cover [B] and the paper feed unit cover [C].
6. Disconnect the three connectors [D].
7. Draw out the duplex unit about 10 cm.




8. Remove the registration roller knob [A] (1 screw).
9. Remove the copier feed unit [B] (4 screws).

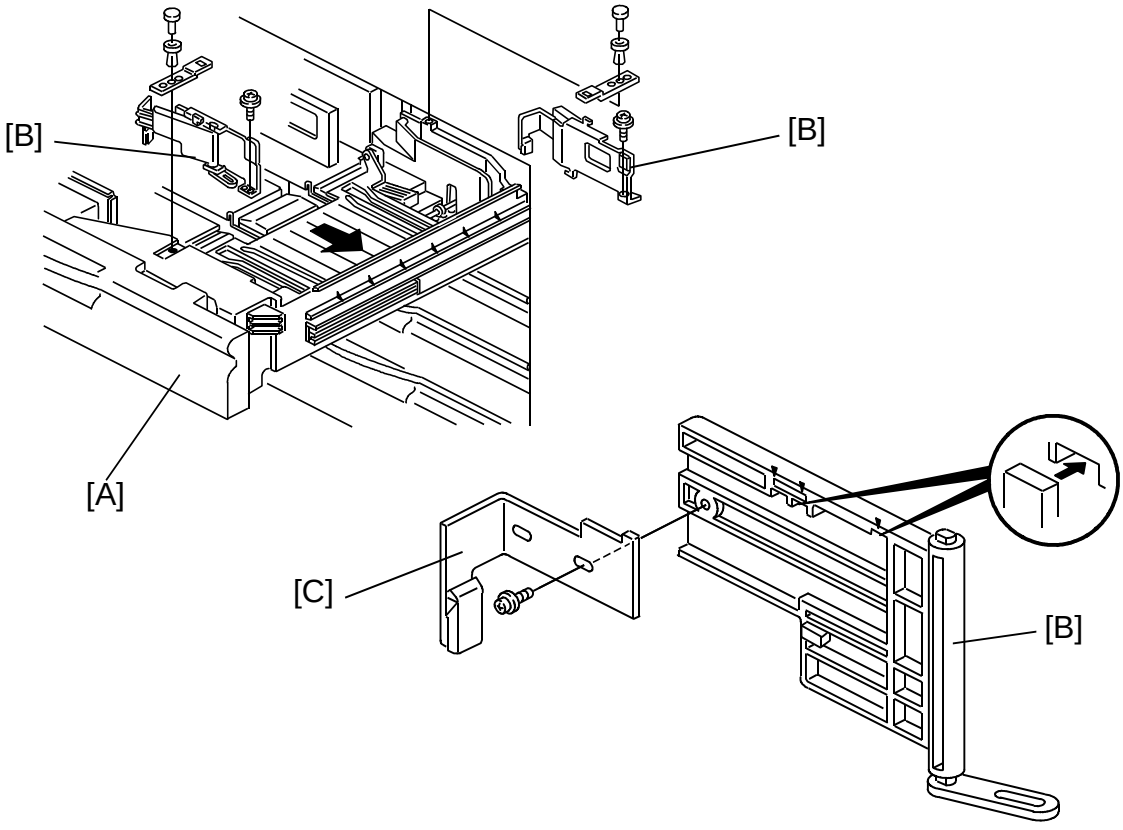
**NOTE:** When installing the copier feed unit to the copier:

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

## 6.16 TANDEM FEED TRAY PAPER SIZE CHANGE

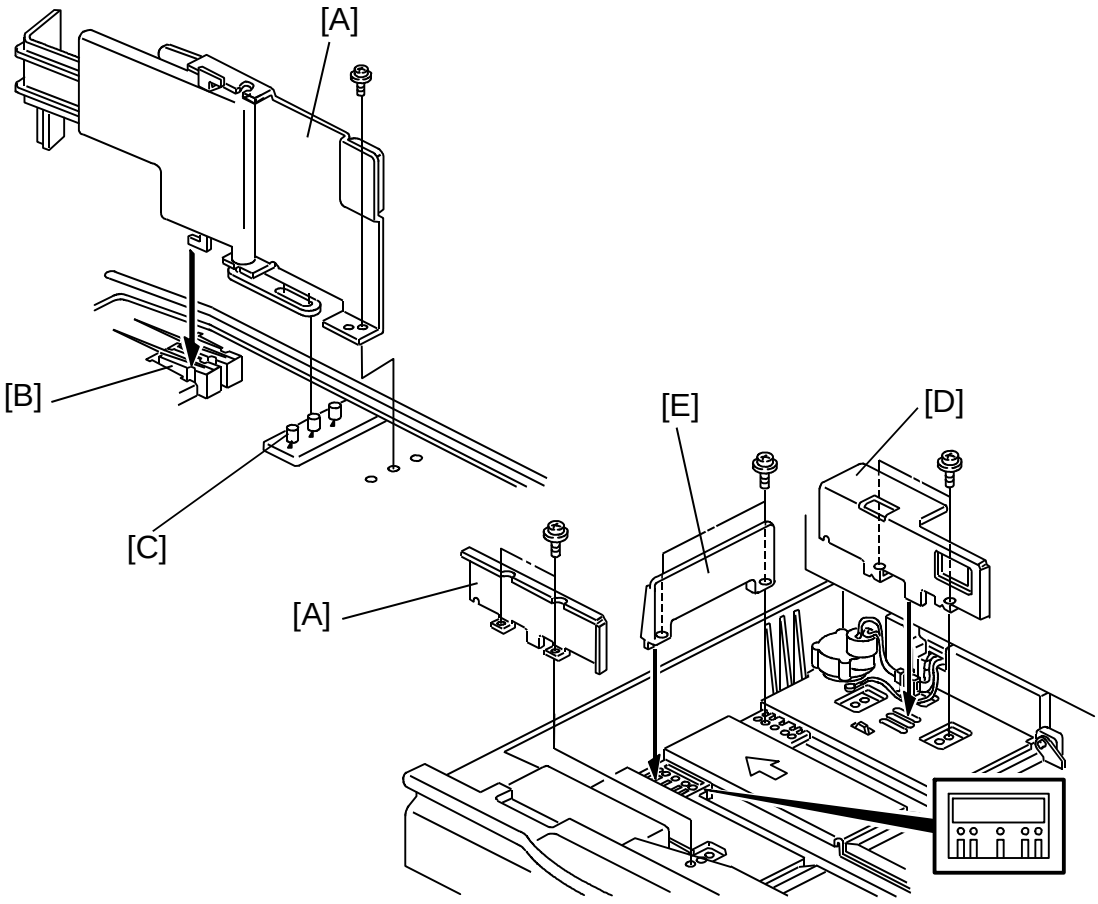
**NOTE:** 1. At the factory, all paper trays (1st, 2nd and 3rd) are set as A4 sideways. At the customer's request, change the paper size as follows.

2. For the 550 sheet fixed paper tray and the 1500 sheet built-in LCT, refer to the installation procedure section.




**- Used as tandem tray for A4 sideways or smaller size paper -**

1. Draw out the tandem 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) according to the paper size.



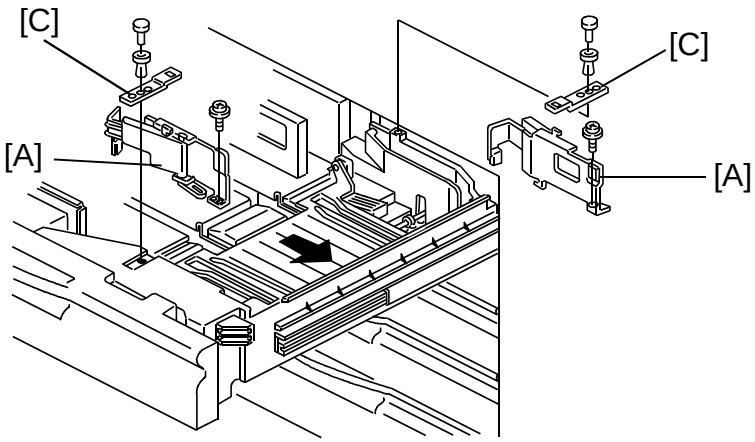

4. Re-install both side fences [A] to the appropriate position according to the paper size, as shown.

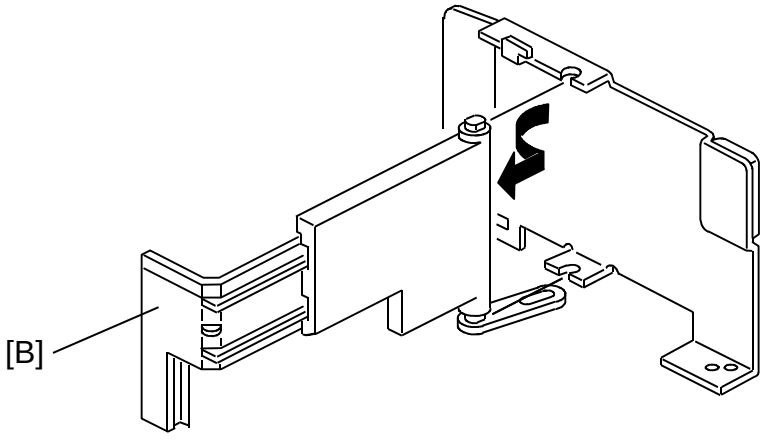
   **NOTE:** The position of the side fence holders [B] and the pins [C] on the lack gear differs according the paper size (from the outside pin: A4, 11", B5).

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 according to the paper size.

6. Enter SP mode (refer to Service Program Access Procedure) and access 4 SP Special Features – PAGE 5.

7. Select the appropriate paper size according to position of the side and end fences.



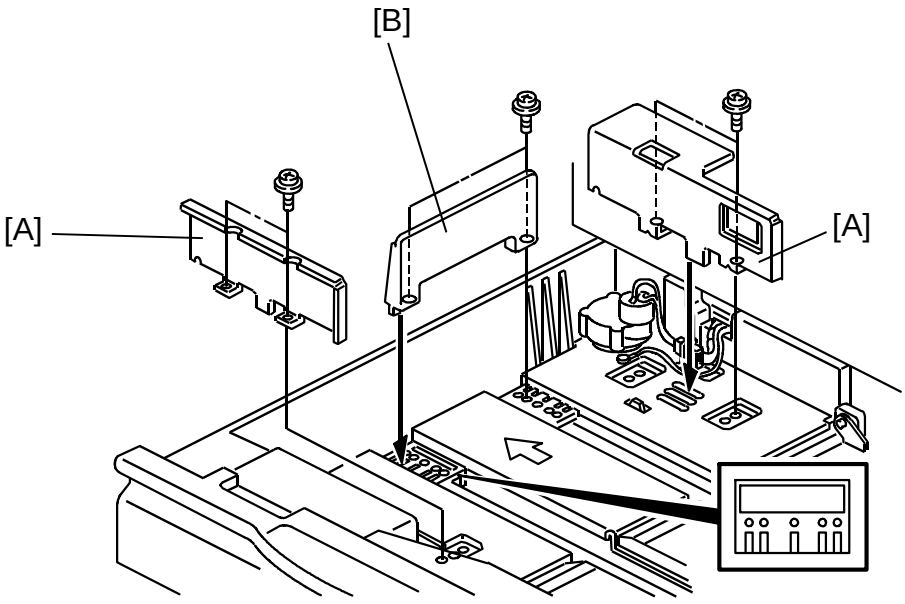



**- Used as fixed tray for paper longer than A4/Letter sideways -**

1. Draw out the tandem 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] on 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 to the appropriate position according to the paper size (one screw and one lock pin for each side fence).

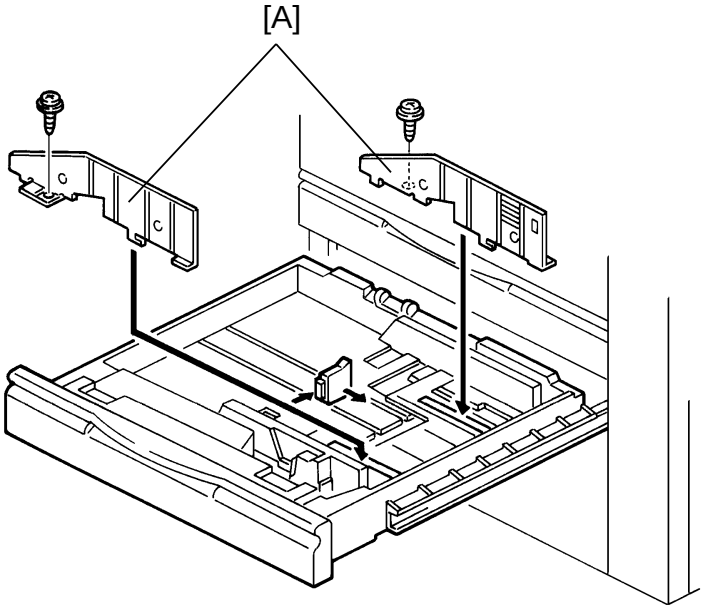
   **NOTE:** Support plates [C] are used only for A4, B5, and letter lengthwise sizes.
   Keep the end fences and support plates for future use.




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 according to the paper size.
6. Enter SP mode (refer to Service Program Access Procedure) and access 4 SP Special Features – PAGE 5.
7. Select the appropriate paper size according to the side and end fences position.

## 6.17 UNIVERSAL TRAY PAPER SIZE CHANGE

At the factory, the universal paper tray is set as A4/8 1/2" x 11" sideways. Normally, paper size is changed by the customer by following the operating instructions.
Only when the customer needs the A5/5 1/2" x 8 1/2" lengthwise paper size does a service representative need to change the paper size. In this case, proceed as follows:

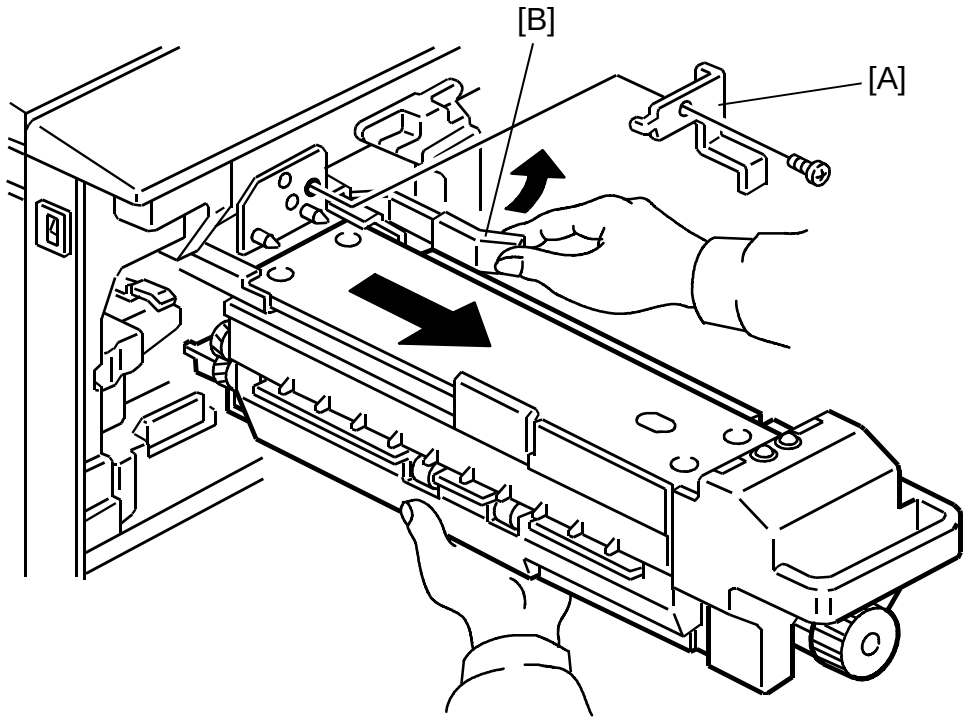



1. Install the front and rear side fences [A] (2 screws).

**NOTE:** These side fences are the same as the side fences used in the 550 sheet fixed paper tray.
These side fences are options, order them as service parts.

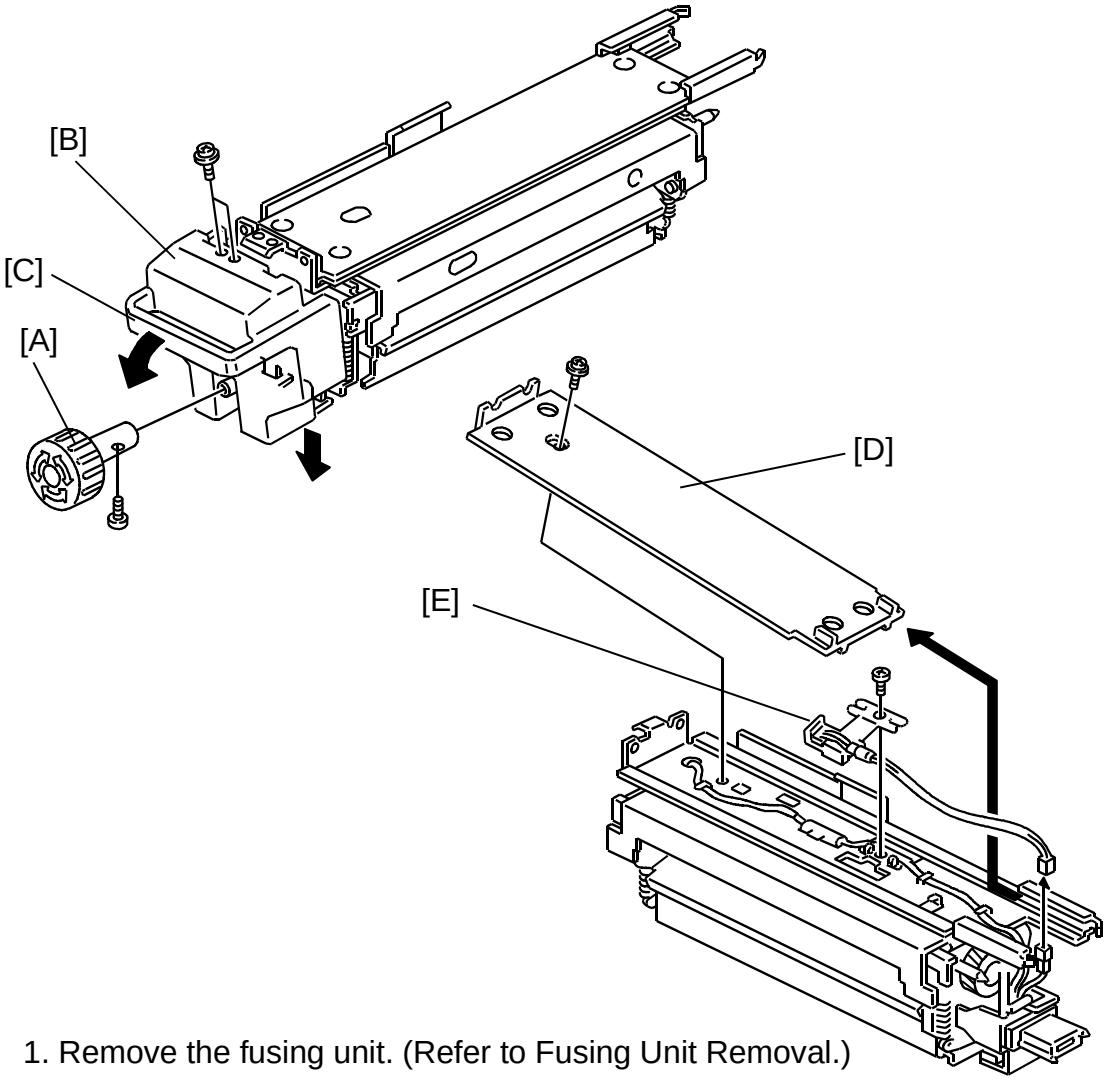
# 7. FUSING UNIT

## 7.1 FUSING UNIT REMOVAL




1. Turn off the main switch.
2. Open the left 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.

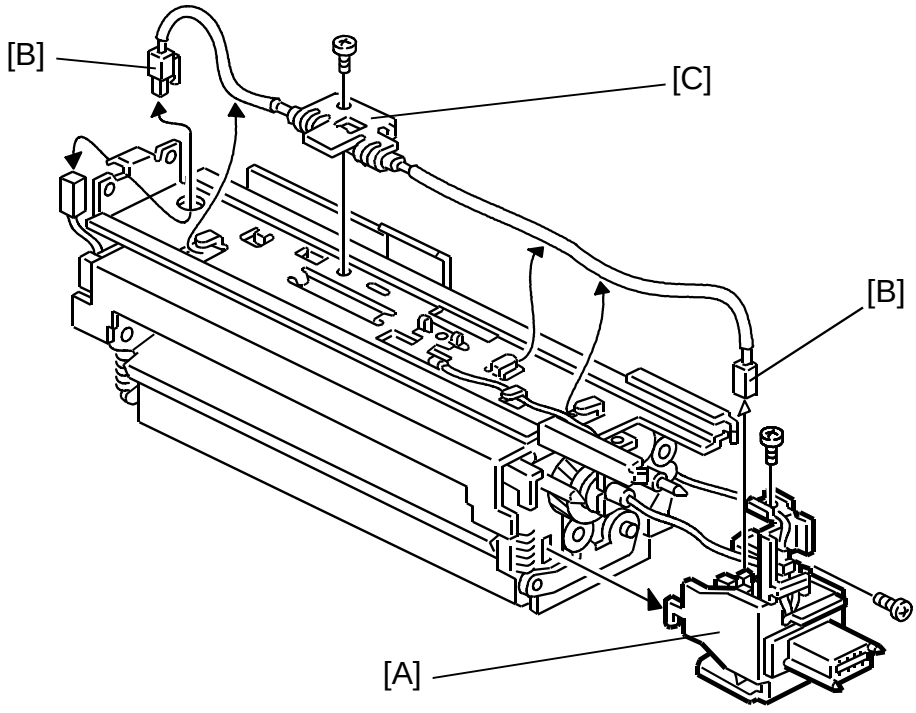
## 7.2 FUSING THERMISTOR REPLACEMENT




1. Remove the fusing unit. (Refer to Fusing Unit Removal.)
2. Remove the knob [A] (1 screw).
3. Remove the two screws fixing 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 at the thermistor's point of contact with the hot roller.

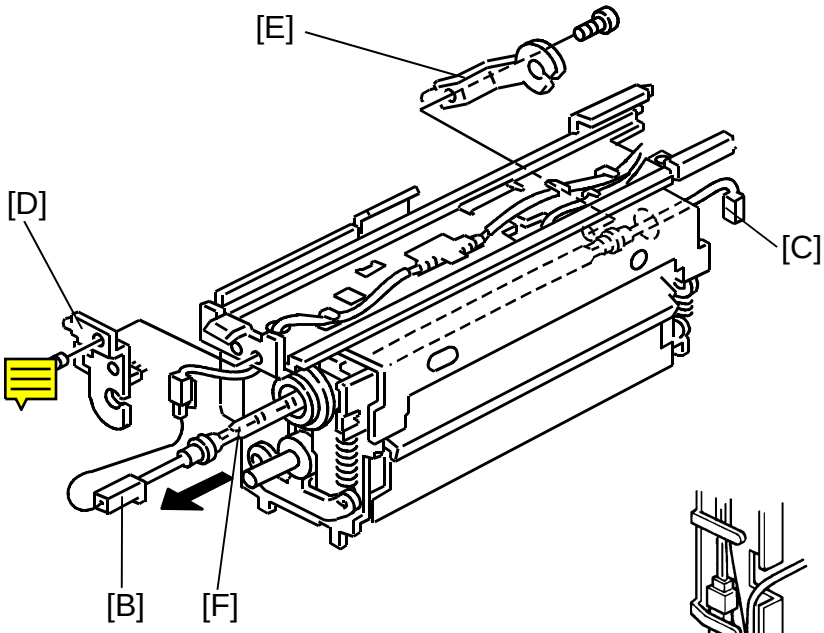
## 7.3 FUSING THERMOFUSE REPLACEMENT

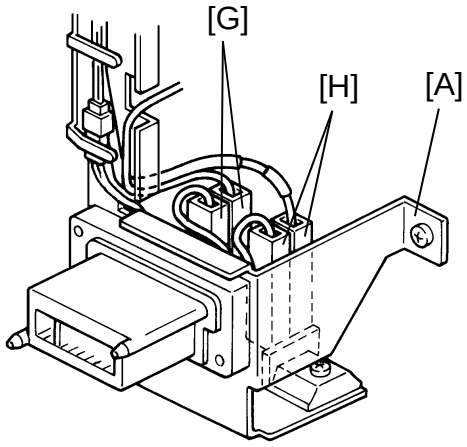



1. Remove the fusing unit upper cover. (Refer to Fusing Thermistor Replacement.)
2. Remove the terminal bracket [A] (2 screws, 1 hook).
3. Disconnect the two connectors [B].
4. Replace the fusing thermofuse [C] (1 screw).

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

## 7.4 FUSING LAMP REPLACEMENT

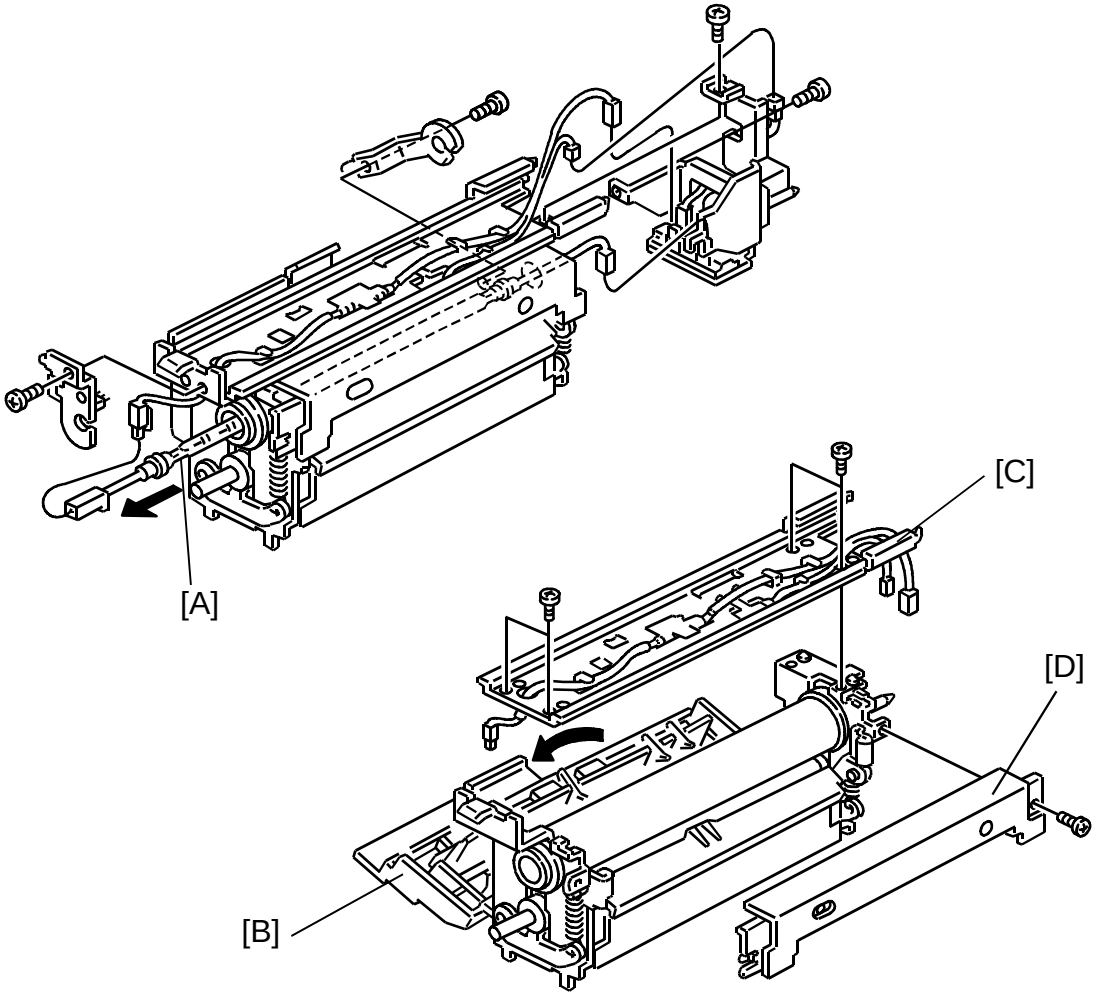


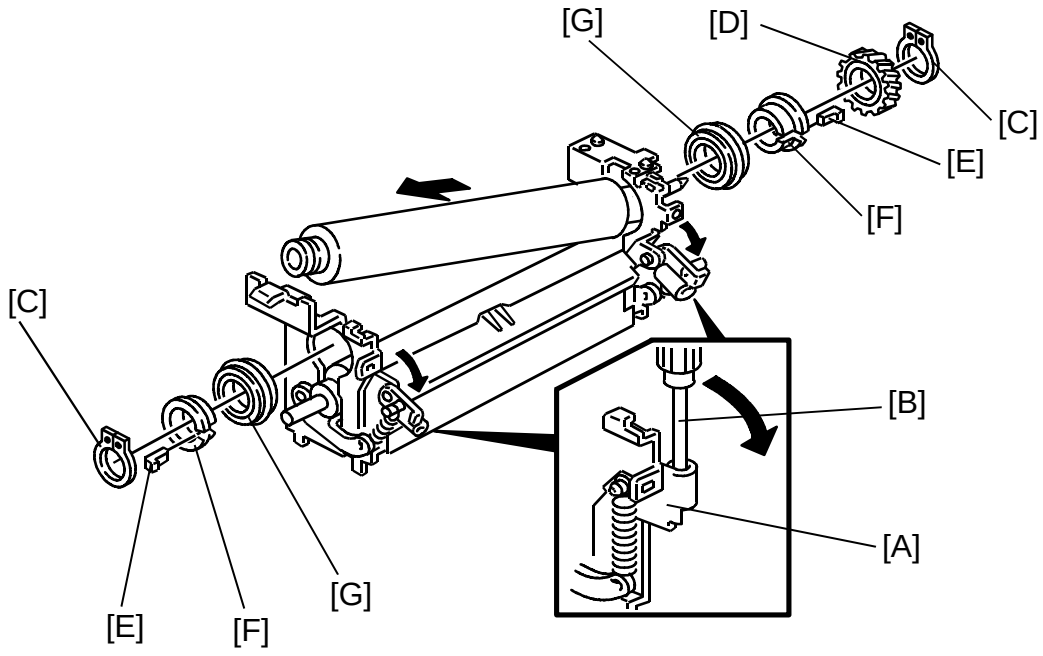

1. Remove the fusing unit. (Refer to Fusing
2. Remove the terminal bracket [A] (2 screws).
3. Disconnect the front connector [B] and the rear connector [C].
4. Remove the front fusing lamp holder [D] and the rear fusing lamp holder [E] (1 screw each).
5. Replace the fusing lamp [F].

**NOTE:** Locate the yellow connector [C] of the fusing lamp to the rear side.
Set the connectors from the fusing lamp (yellow) [G] and from the thermofuse (white) [H] in the correct position on the terminal.

## 7.5 HOT ROLLER REPLACEMENT




1. Remove the fusing lamp [A]. (Refer to Fusing Lamp Replacement.)
2. Lower the fusing exit assembly [B].
3. Remove the upper stay [C] (4 screws).
4. Remove the upper entrance guide [D] (1 screw).



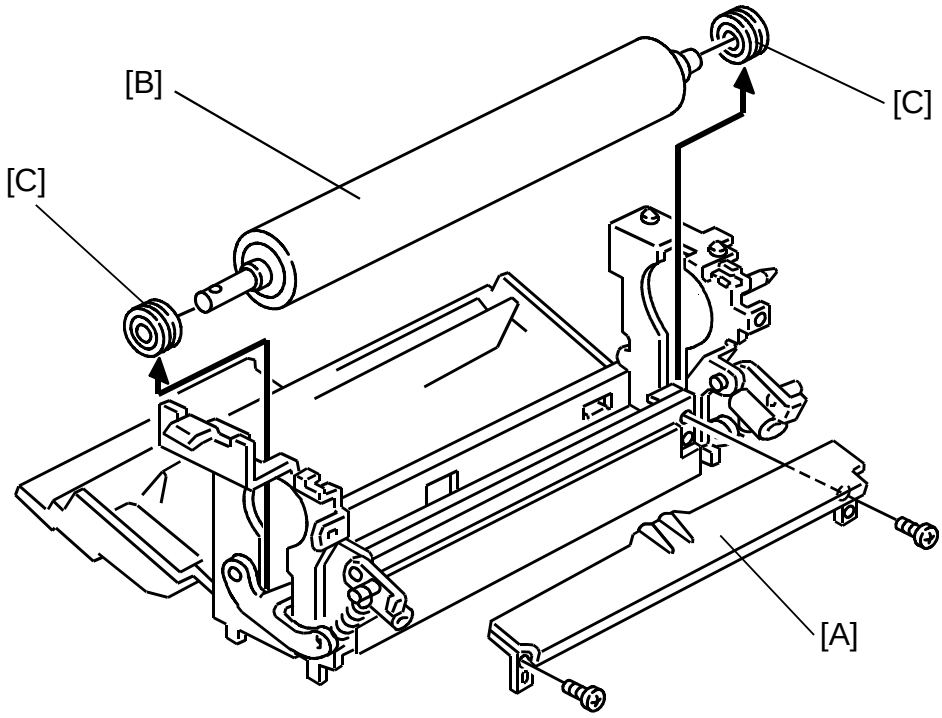

5. Lower both side pressure spring holders [A] by using the screw driver [B] as a lever.

6. Remove the front and rear C-rings [C], gear [D], antistatic spacers [E] isolating bushings [F] and bearings [G].

   **NOTE:** When installing a new fusing roller:

   1) Lubricate the inner and the outer surface of the isolating bushings [F] with BARRIERTA L55/2 grease.
   2) Lubricate the fusing drive gears and their shafts with grease G501.
   3) Peel off 3 cm (1 inch) form both ends of the protective sheet, and install the hot roller.
      Before applying fusing pressure, remove the rest of the protective sheet.

## 7.6 PRESSURE AND BEARING ROLLER REPLACEMENT

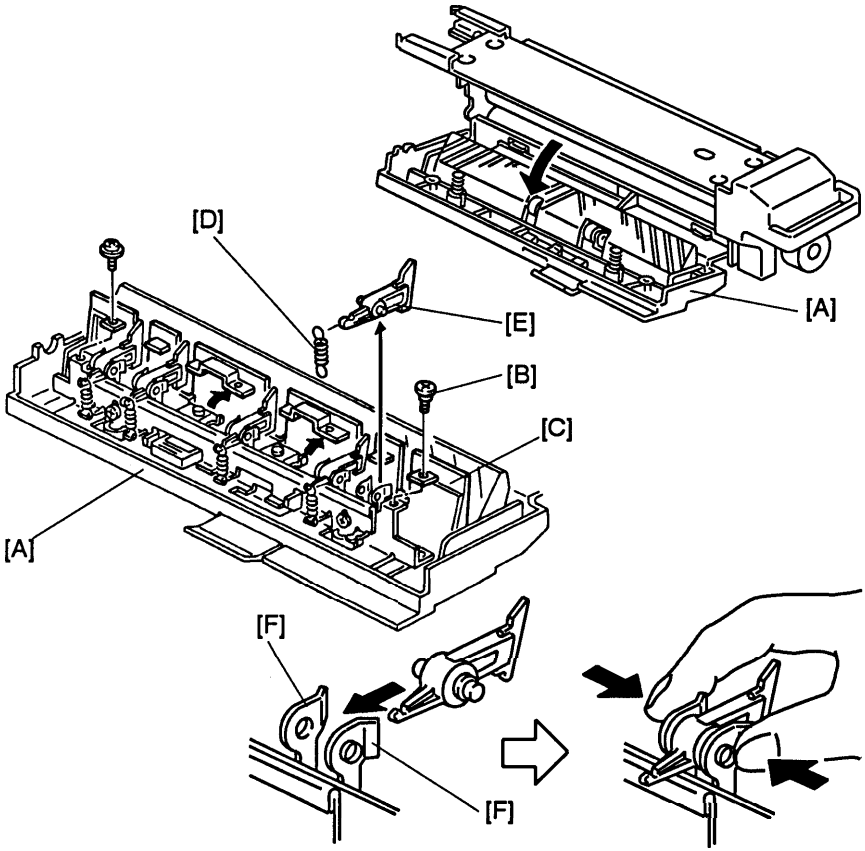



1. Remove the hot roller. (Refer to Hot Roller Replacement.)
2. Remove the lower fusing entrance guide [A] (2 screws).
3. Lift the pressure roller [B] and remove it.
4. Replace pressure roller and bearings [C].

   **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.

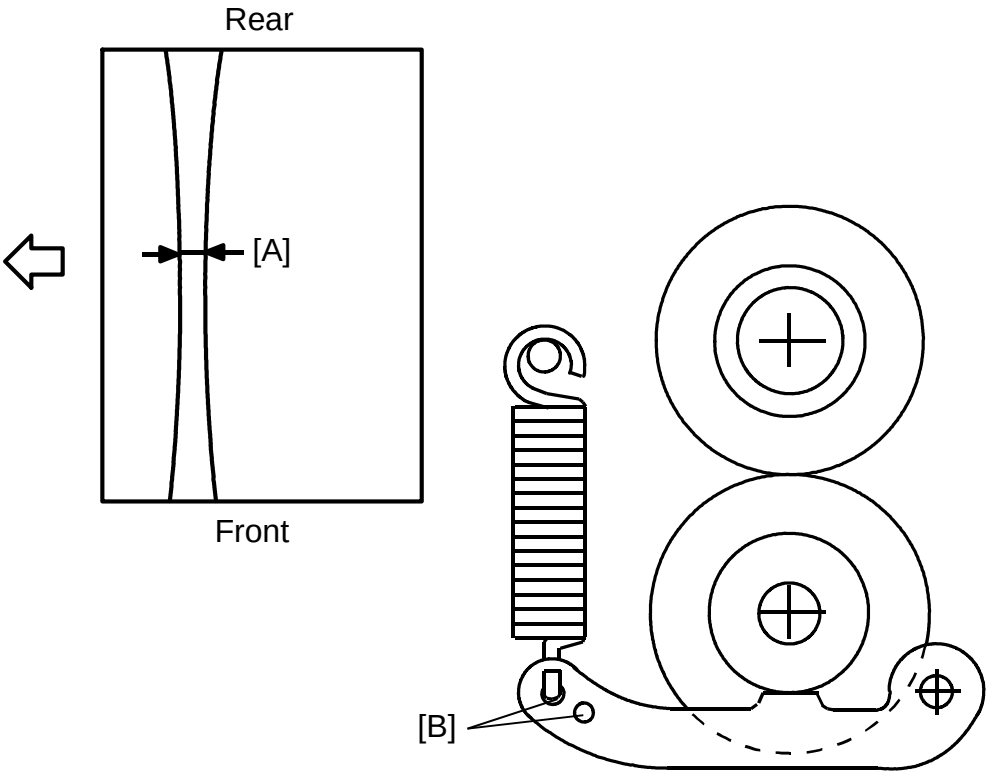
## 7.7 FUSING STRIPPER PAWL REPLACEMENT




1. Turn off the main switch and pull out the fusing unit.
2. Lower the fusing exit assembly [A].
3. Remove the two screws (the front screw [B] is a stepped screw) fixing the upper exit guide [C].
4. Unhook the spring [D] then replace the strippers [E].

   NOTE: After setting the fusing stripper pawl, confirm that the strippers are correctly held by the stripper holders [F] as shown, If not, remove the stripper and bend the holders [F] inward. Apply the grease-Barrierta L55/2 on the inner surface of the holder [F].

## 7.8 FUSING PRESSURE ADJUSTMENT

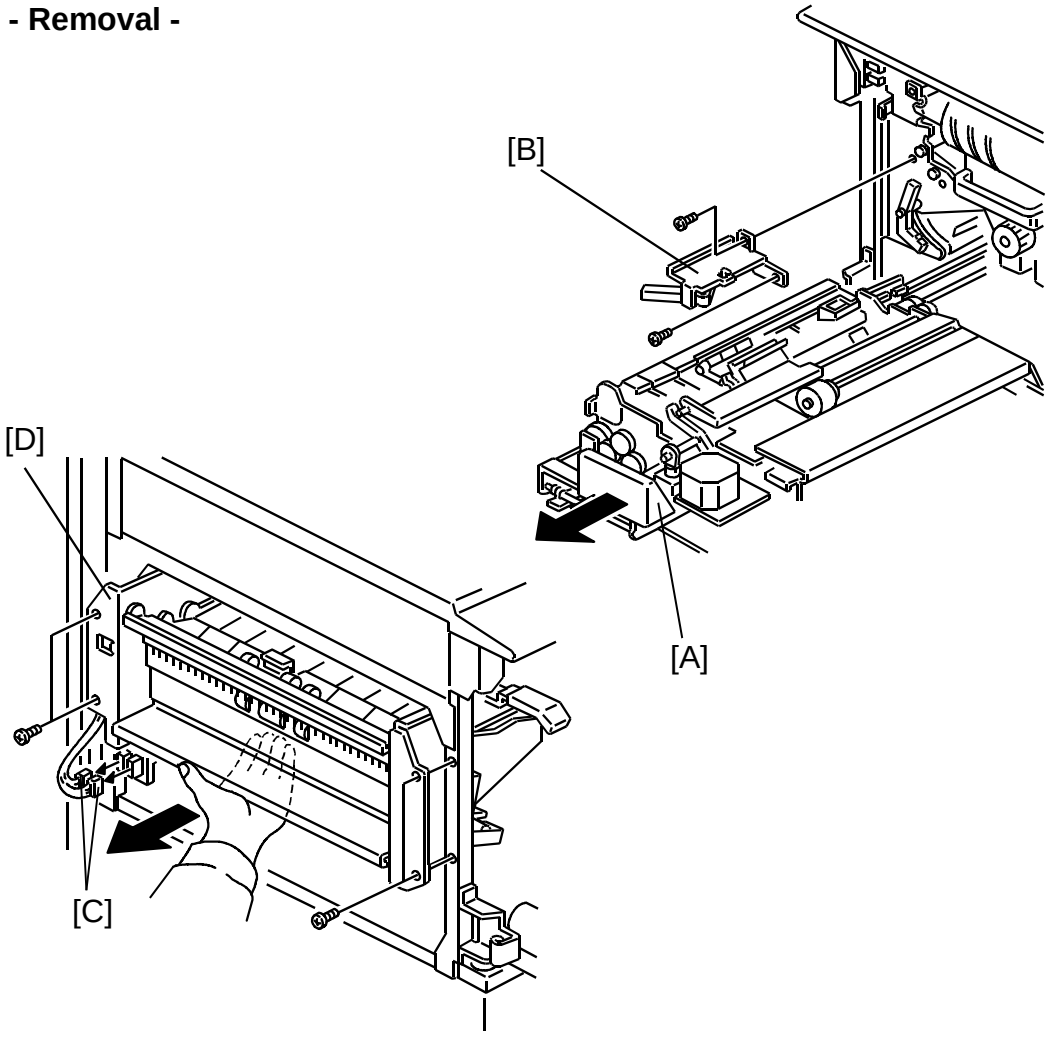



**NIP BAND WIDTH ADJUSTMENT STANDARD: 8.1 ± 0.8 mm**

1. Make a black copy (sky shot, A3 / Double Letter paper).
2. As soon as the paper starts to exit, open the left 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 8.1 ± 0.8 mm, change the spring hook position [B].

## 7.9 PAPER EXIT UNIT REPLACEMENT

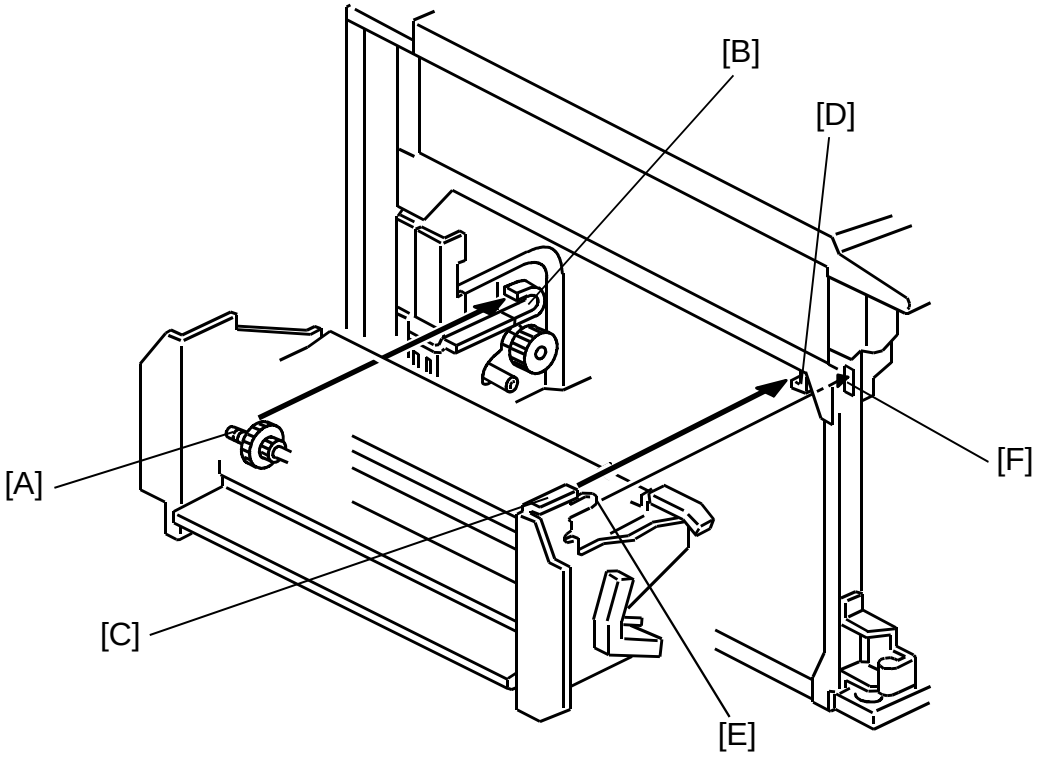
**- Removal -**




1. Remove the upper left cover. (Refer to Upper Left Cover Removal.)
2. Draw out the duplex unit [A].
3. Remove the lever bracket [B] (2 screws).
4. Disconnect the two connectors [C].
5. Take out the paper exit unit [D] (4 screws).

   **NOTE:** Place the paper exit unit so that the paper exit roller comes to the bottom to prevent the brush roller from being pressed and damaged.

**- Installation -**



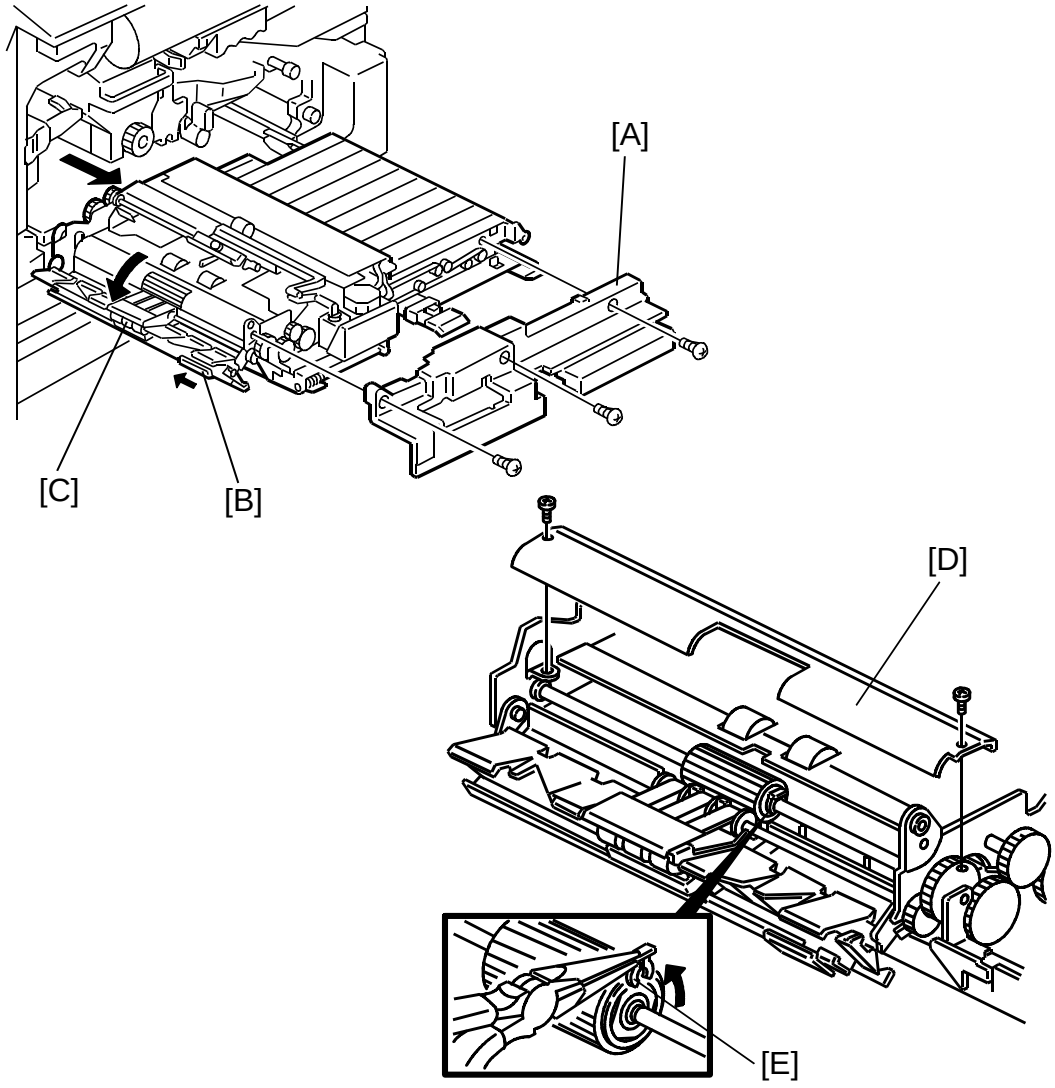

1. Set the paper exit unit in the following order:
   1) Set the drive shaft [A] on the left rail [B].
   2) Set the plate [C] on the right rail [D].
   3) Set the positioning pin [E] in the hole [F].

2. Install the paper exit unit (2 connectors, 4 screws).

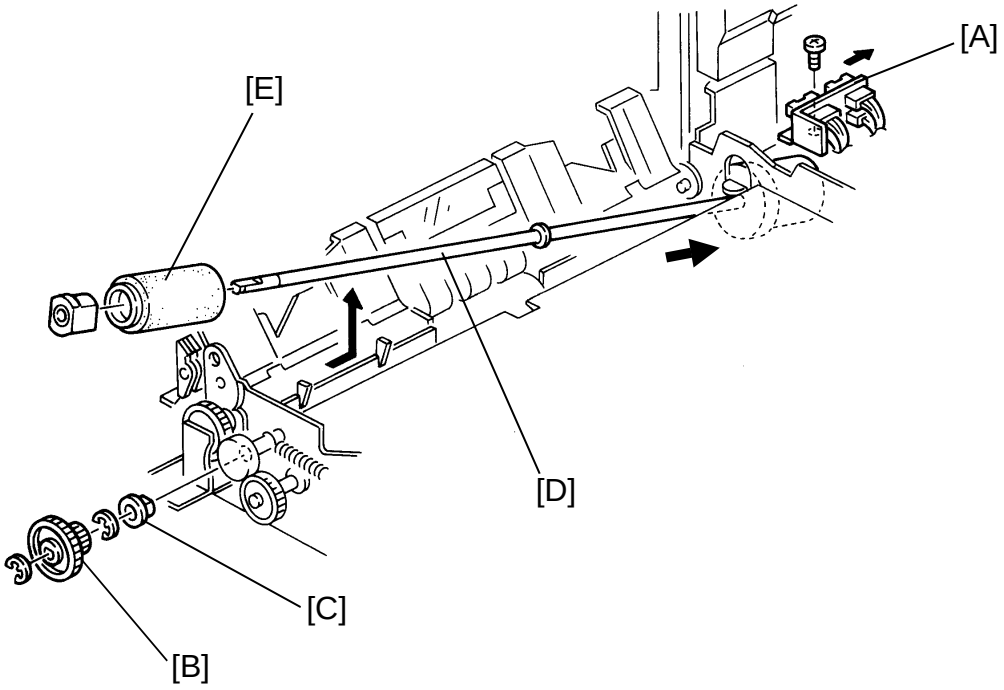
3. Re-assemble the copier.

# 8. DUPLEX UNIT

## 8.1 FEED ROLLER REPLACEMENT

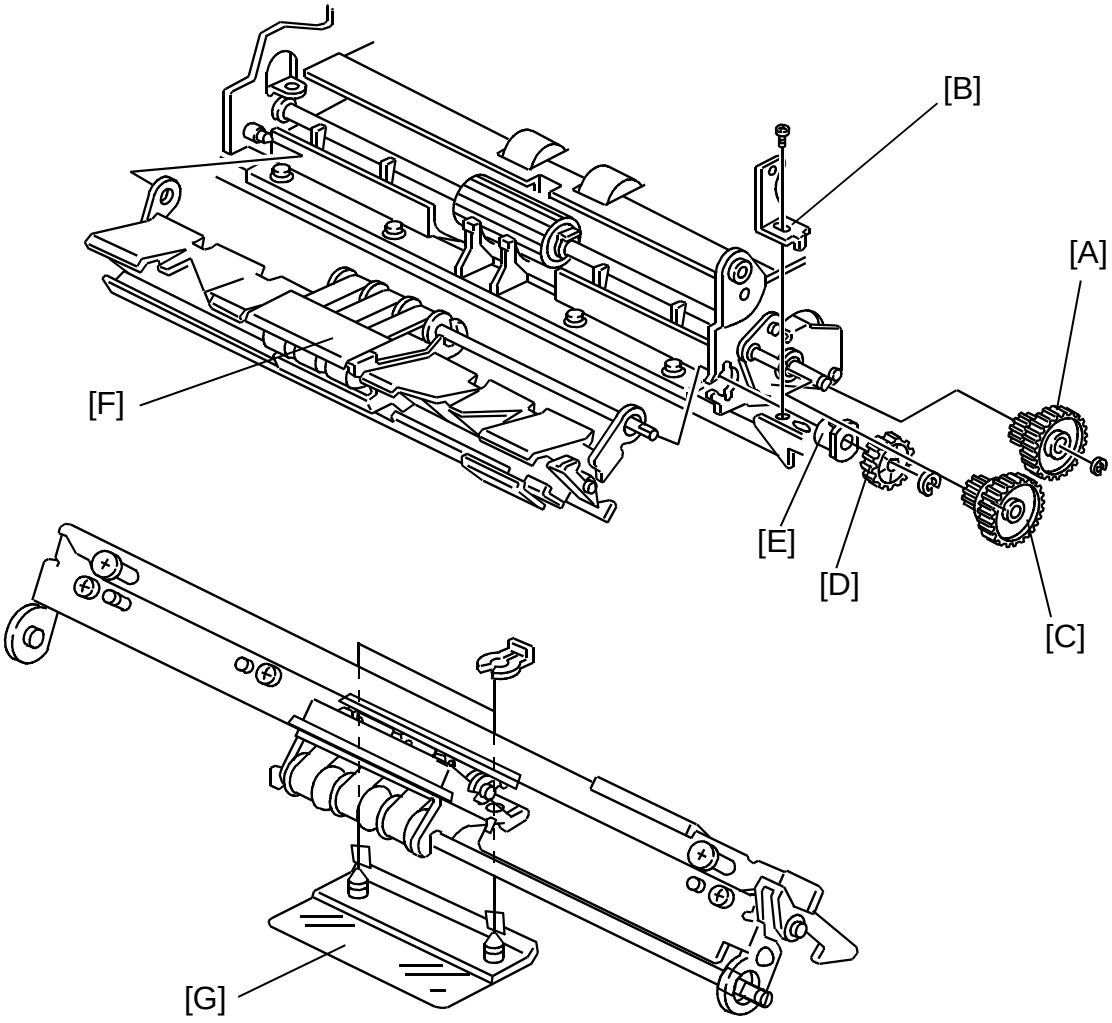



1. Open the front doors and draw out the duplex unit.
2. Remove the duplex front cover [A] (3 screws).
3. Slide the lever [B] to the rear then open the duplex reverse assembly [C].
4. Remove the lower separation guide plate [D] (2 screws).
5. Remove the snap ring [E].

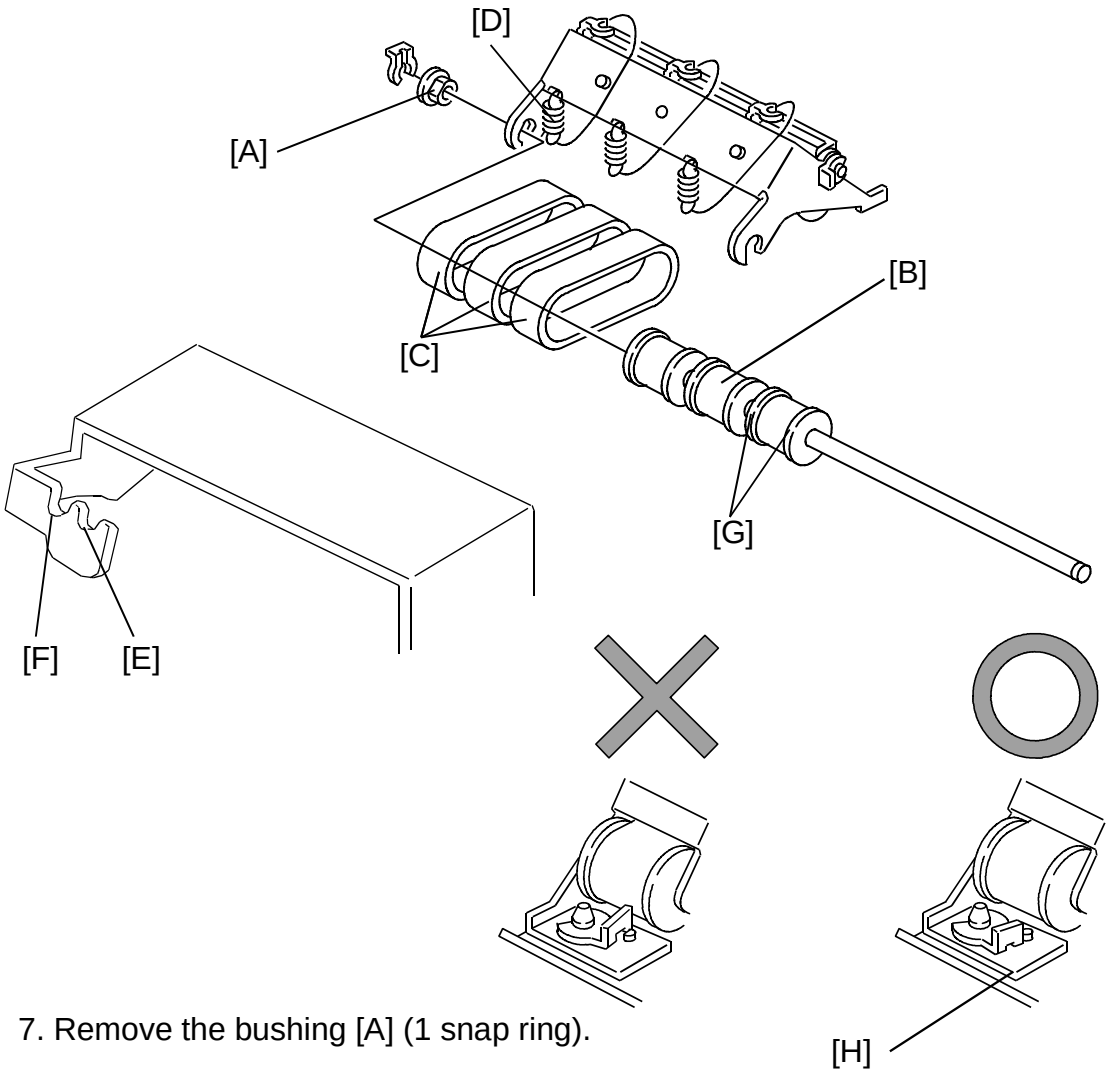



6. Remove the harness bracket [A] (1 screw).
7. Remove the gear [B] (1 E-ring).
8. Remove the bushing [C] (1 E-ring).
9. Slide the feed roller shaft [D] to the rear then slide the feed roller [E] to the front and replace it as shown.

## 8.2 SEPARATION BELTS REPLACEMENT



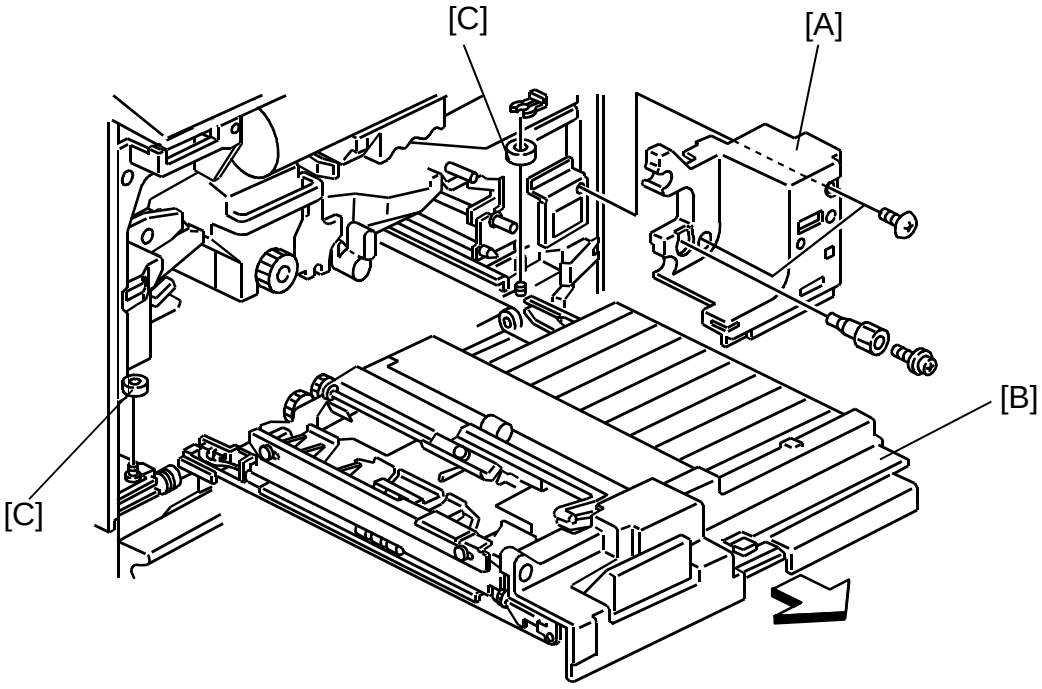

1. Open the front doors and draw out the duplex unit.
2. Remove the gear [A] (1 E-ring).
3. Remove the bracket [B] (1 screw) then remove the gear [C].
4. Remove the gear [D] and the bushing [E] (1 E-ring).
5. Remove the separation belt unit [F].
6. Remove the guide mylar [G] (2 snap rings).




7. Remove the bushing [A] (1 snap ring).
8. Remove the drive roller [B].
9. Replace the three separation belts [C] as a set.

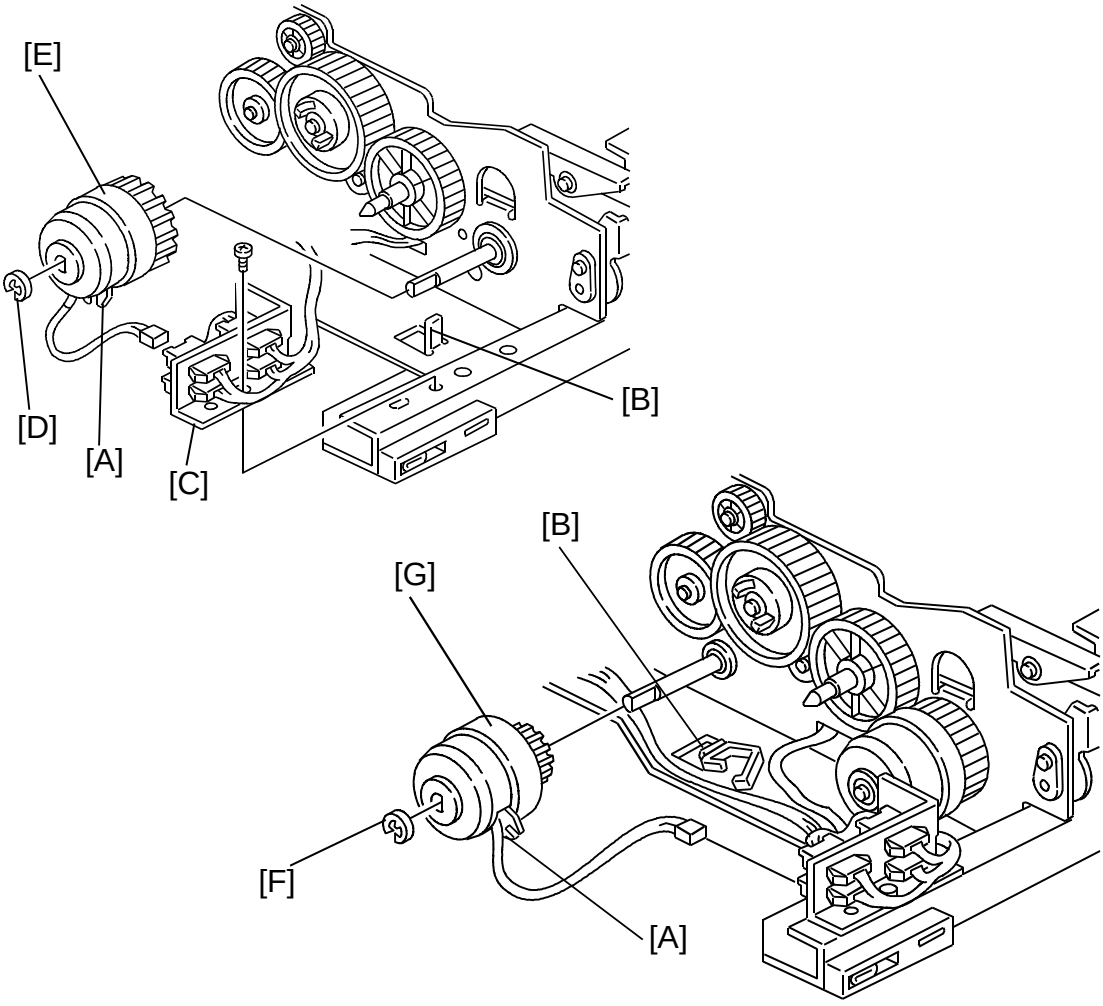
**NOTE:** When setting the tension spring [D], set it on the hook [E] normally. The hook [F] applies higher separation pressure.
Confirm that the separation belt is correctly set between the guides [G].
Confirm that the snap rings [H] do not touch the separation belts.

## 8.3 DUPLEX UNIT REMOVAL




1. Open the front doors and remove the left door.
2. Remove the right inner cover [A]. (Refer to the right inner cover removal.)
3. Draw out the duplex unit [B] until the stop position.
4. Take out the right and left stopper pulleys [C] (1 snap ring each).
5. Take out the duplex unit.

## 8.4 SEPARATION CLUTCH/TRANSPORT CLUTCH REMOVAL




Before replacing both clutches, take out the duplex unit. (Refer to Duplex Unit Removal.)

**NOTE:** When installing both clutches, be sure to set the stopper [A] to the projection [B].

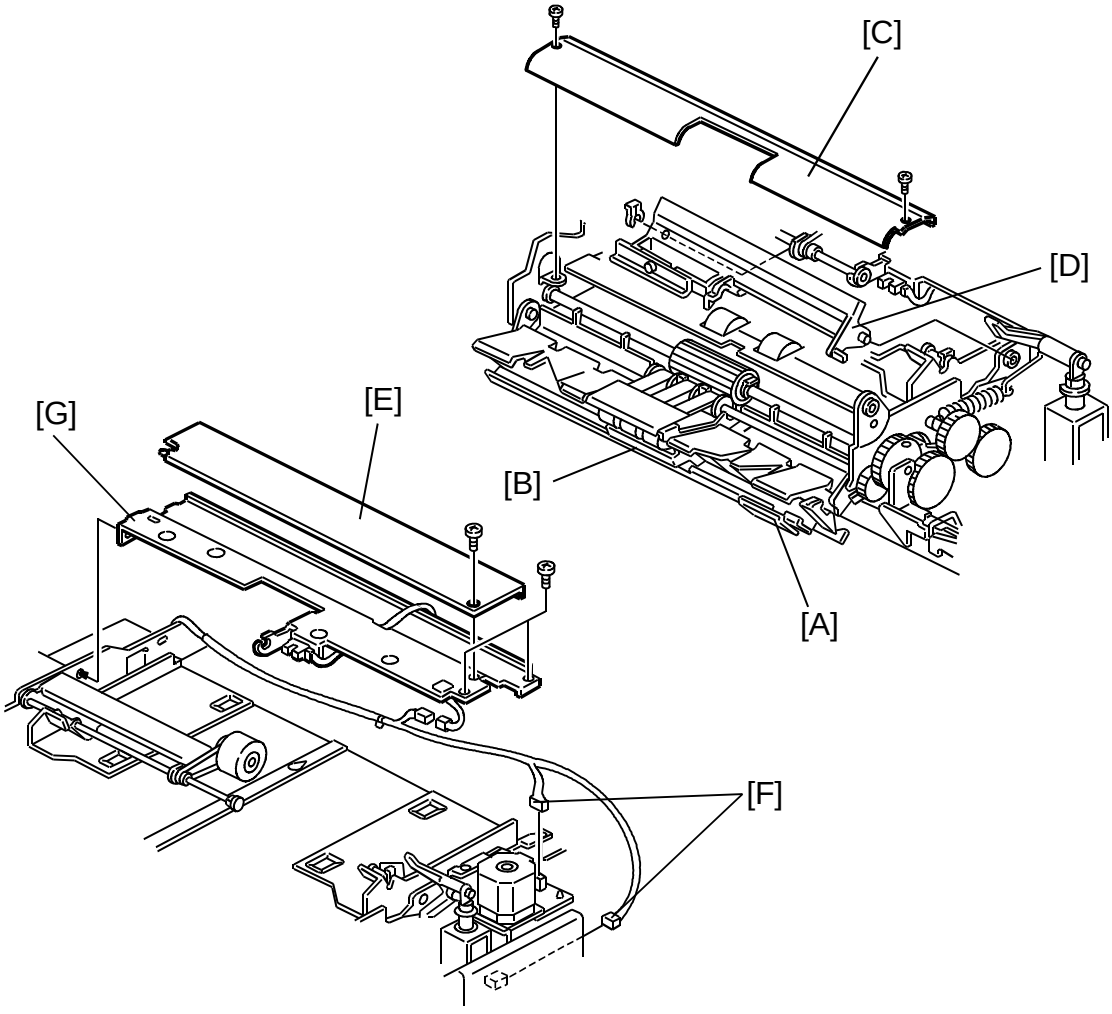
**- Separation Clutch -**

1. Remove the harness bracket [C] (1screw).
2. Remove the E-ring [D].
3. Replace the separation clutch [E].

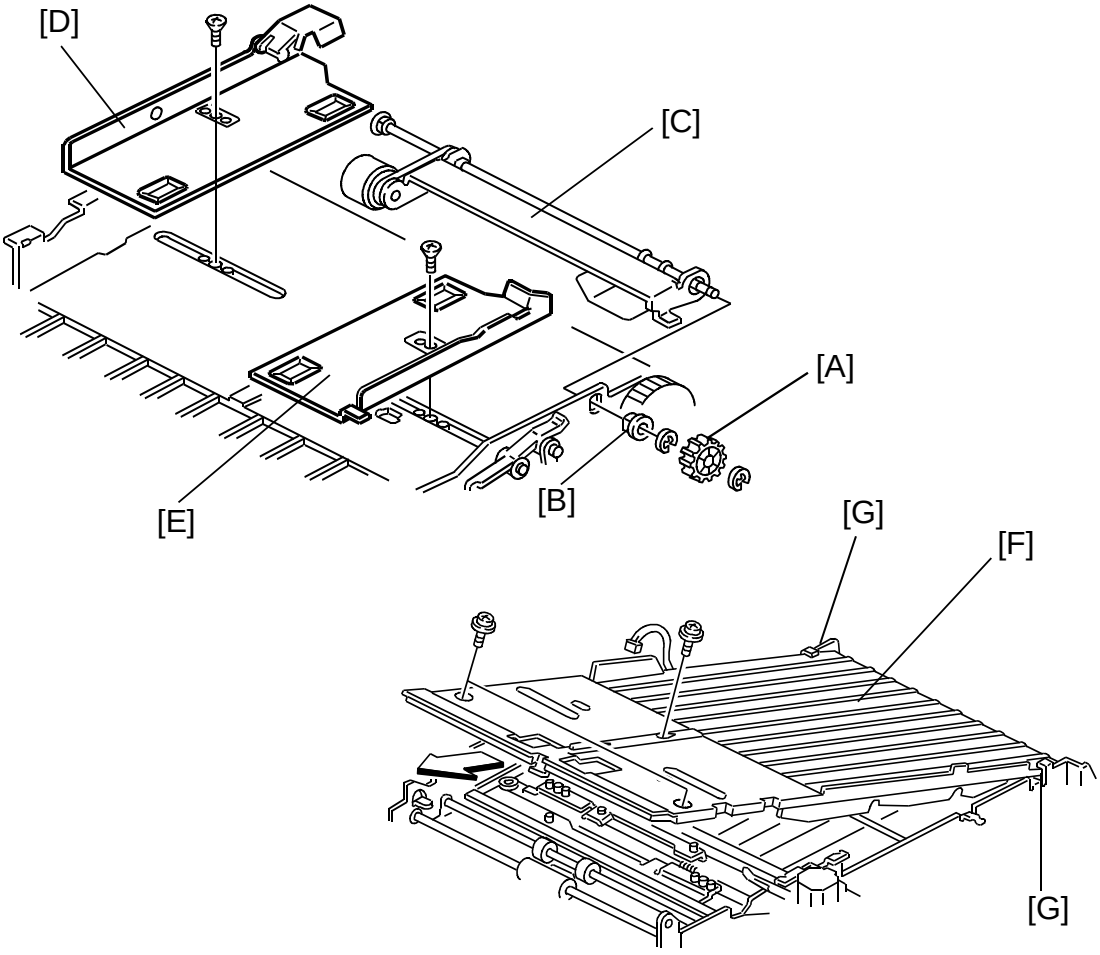
**- Transport Clutch -**

1. Remove the E-ring [F].
2. Replace the separation clutch [G].

## 8.5 JOGGER MOTOR REPLACEMENT

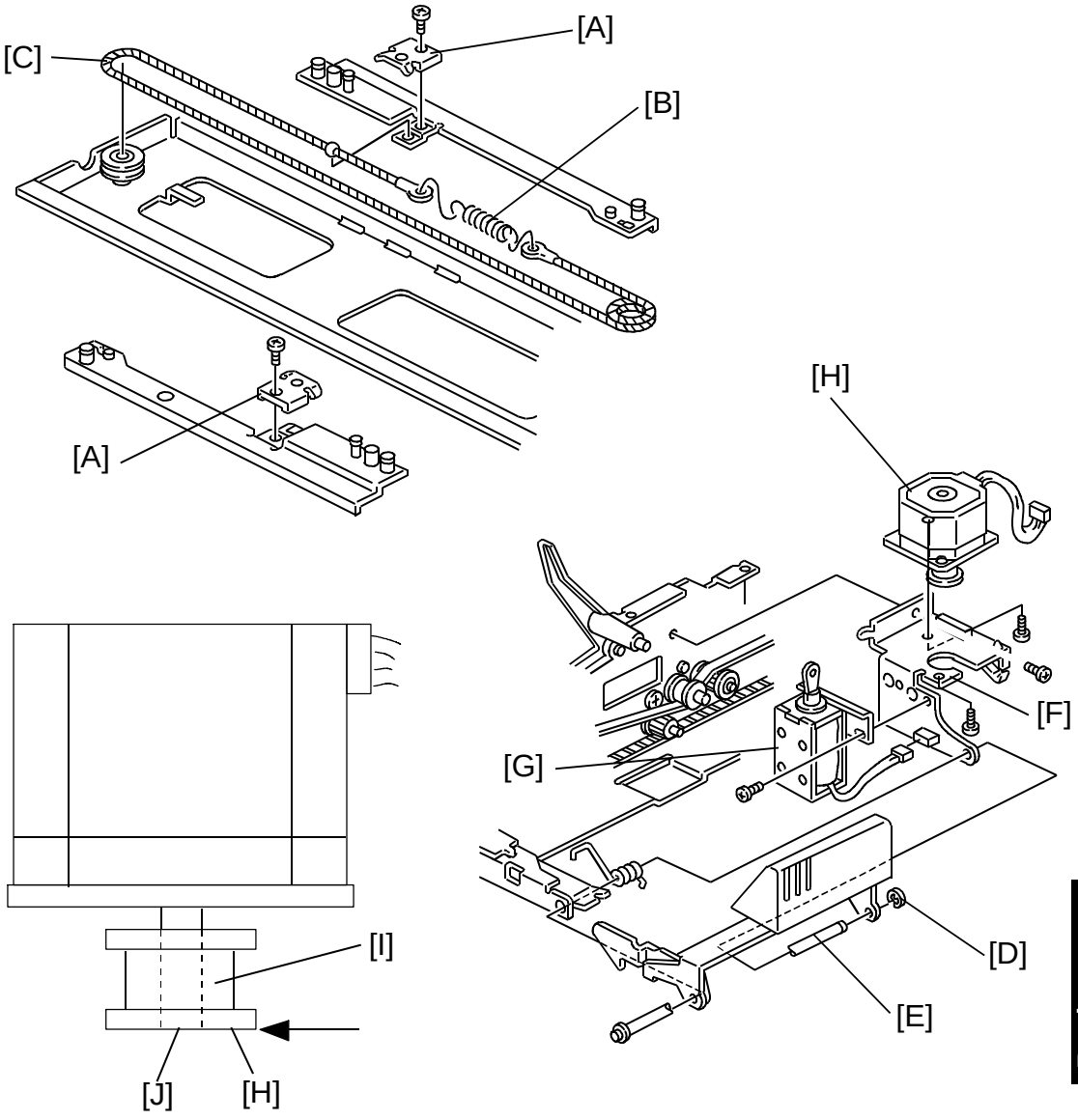



1. Take out the duplex unit. (Refer to the duplex unit removal.)
2. Remove the duplex front cover (3 screws).
3. Slide the lever [A] to the rear then open the separation belt unit [B].
4. Remove the lower separation guide plate [C] (2 screws).
5. Remove the pressure arm [D] (1 snap-ring).
6. Remove the harness cover [E] (1 screw).
7. Remove the two connectors [F].
8. Remove the upper stay [G] (4 screws, 1 connector).




9. Remove the positioning roller drive gear [A] (1 E-ring).
10. Remove the bushing [B] (1 E-ring).
11. Remove the positioning roller assembly [C].
12. Remove the front jogger fence [D] and the rear jogger fence [E] (1 screw each).
13. Remove the duplex tray [F] (3 screws and a connector).

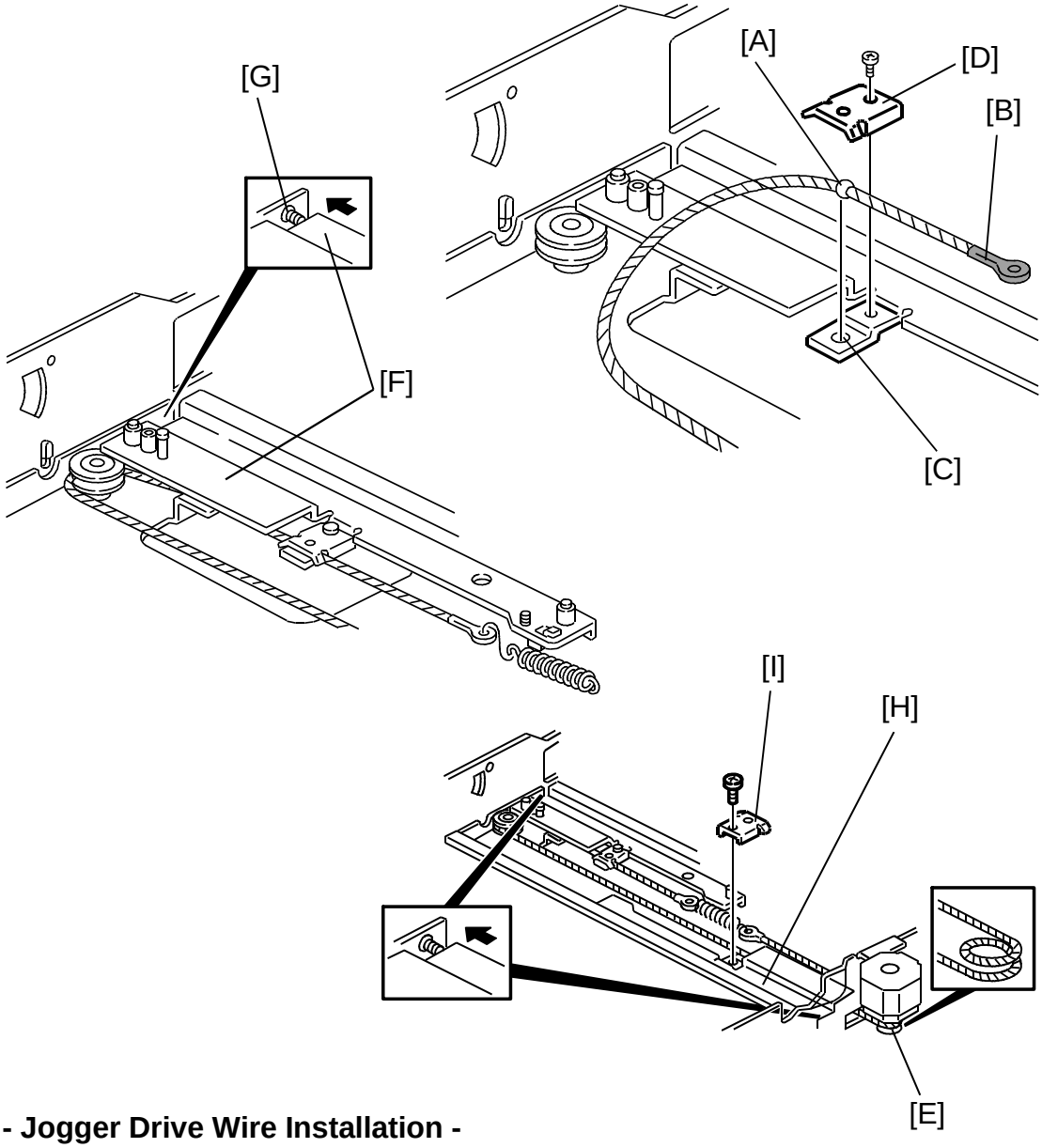
    **NOTE:** To release the hooks [G], slide the duplex tray to the upper left as shown.




14. Remove the drive wire stoppers [A].
15. Unhook the tension spring [B] and remove the drive wire [C].
16. Remove the E-ring [D] and slide the shaft [E] to the left.
17. Remove the jogger motor bracket [F] (1 screw).
18. Remove the pressure arm solenoid [G] (1 screw).
19. Replace the jogger motor [H] (2 screws).

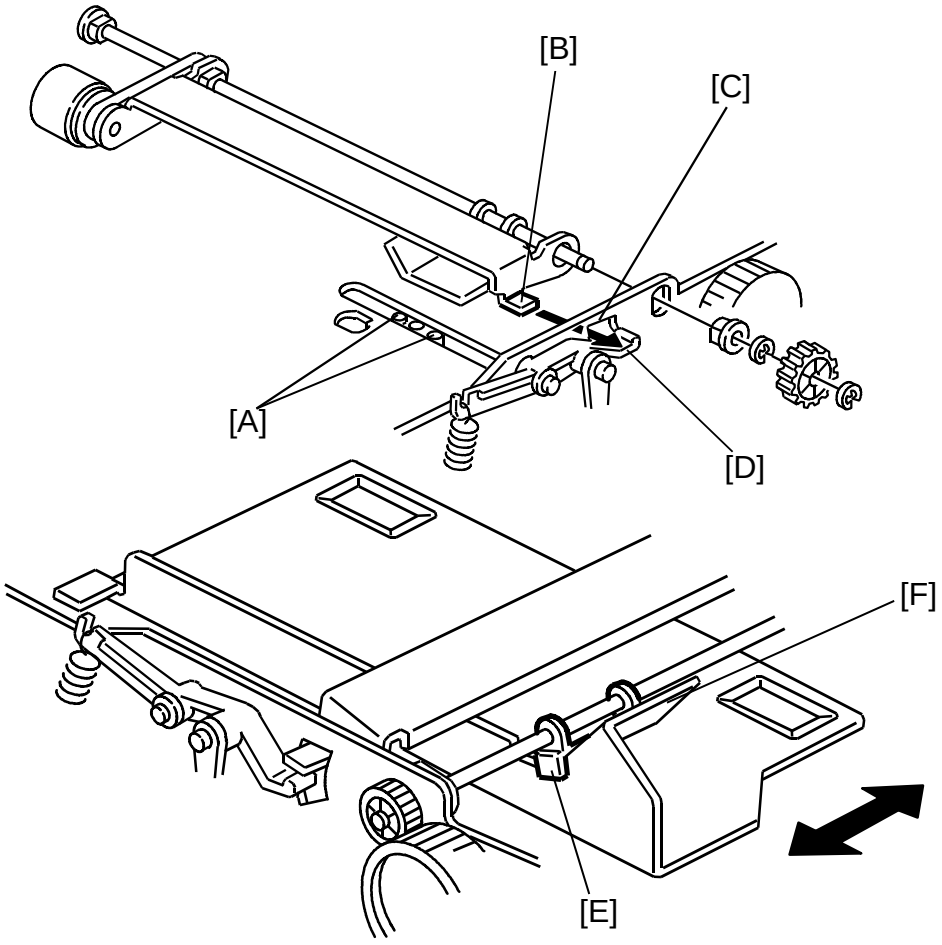
    **NOTE:** When installing the drive pulley [I] to the jogger motor shaft, align the shaft head [J] with the pulley head [H].

20. Re-assemble the duplex unit.




**- Jogger Drive Wire Installation -**

1) Set the bead [A] which is closer to the red colored hook [B] in the hole [C] and install the stopper [D] (1 screw).
2) Round the drive wire twice around the drive motor pulley [E] as shown.
3) Move the rear jogger fence bracket [F] to the rear end position (until the bracket [F] touches the screw [G]) and keep this condition.
4) Under the above condition, place the front jogger fence bracket [H] to the front end position (until the bracket [H] touches the front screw).
5) Install the stopper [I] to fix the front jogger fence bracket with the wire.




**NOTE:** 1) When installing the jogger fences, confirm if the two positioning pins [A] are correctly set in the two holes on the side fences after the screw is set.

2) When installing the positioning roller assembly, insert the plate [B] in the hole [C] on the rear frame, then set the plate on the lever [D].

3) When installing the rear paper press mylar, set the hook [E] to the rear jogger fence [F] as shown so that the mylar moves together with the jogger fence [F].

4) After installing the jogger fences, manually move the jogger fences [F] to confirm that they move smoothly.

5) After re-assembling the duplex unit, manually pull the plungers of the positioning roller solenoid and the pressure arm solenoid to confirm that the positioning roller assembly and the pressure arm move up and down correctly.

6) After re-assembling the duplex unit, adjust the jogger fence width so that the distance between both side fences become 1mm wider than the paper size, when paper is set on the duplex tray.
(1 SP adjustment mode – PAGE 10.)

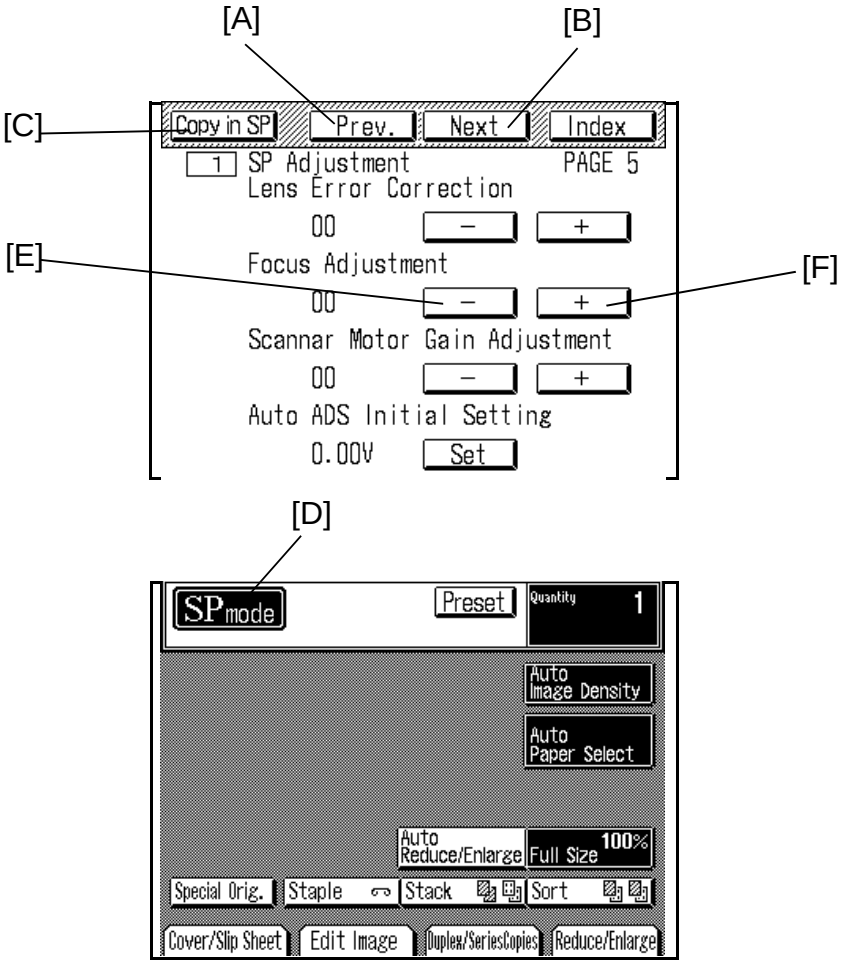
# 8.6 COPY QUALITY ADJUSTMENT

## 8.6.1 SP Adjustment Mode

The copy quality adjustments in the table below can be performed by using the appropriate [1] SP Adjustment mode.

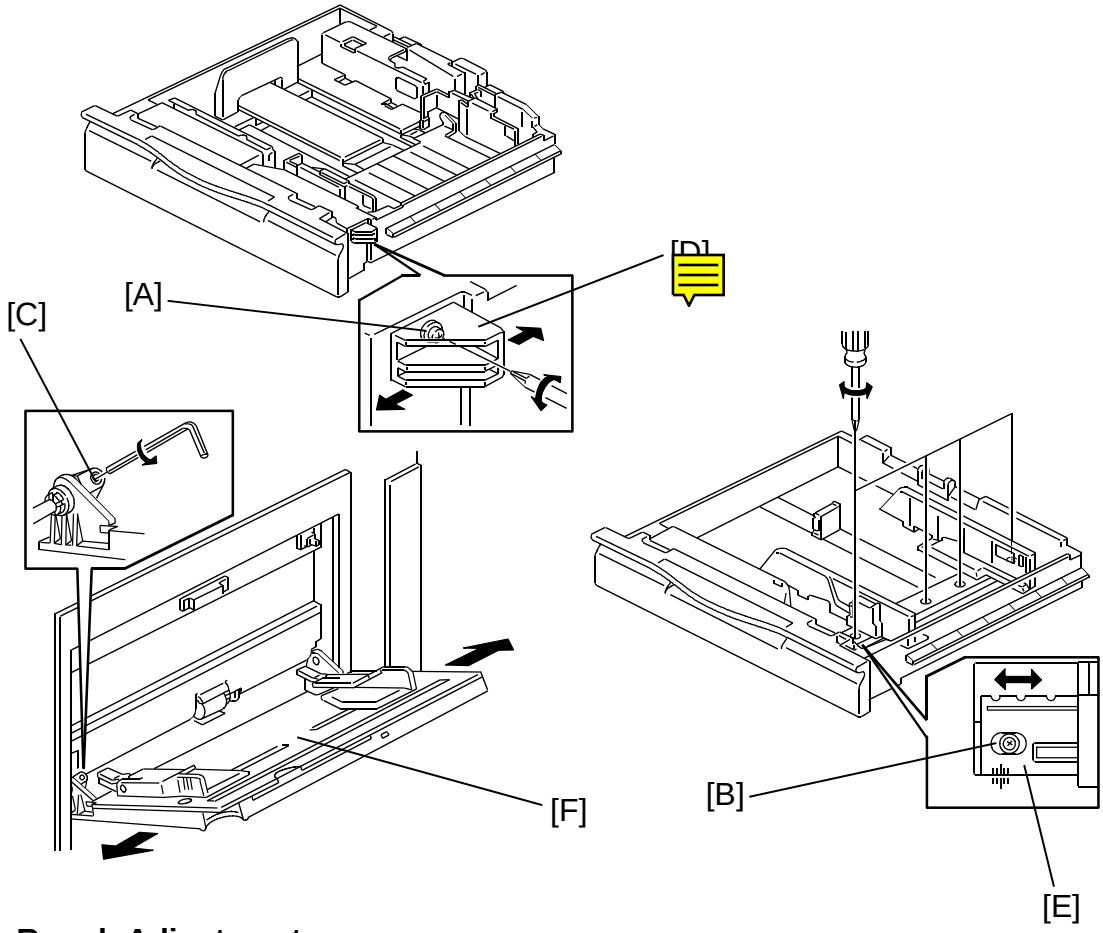
| Item | SP Adjustment – PAGE | Standard | Change Amount/1 step | Default |
|---|---|---|---|---|
| Leading edge registration | 3 | 0 ± 2 mm | 0.5 mm | 00 |
| Leading edge erase margin | 3 | 3.5 ± 2.5 mm | 0.5 mm | 00 |
| Vertical magnification | 3 | 100 ± 1% | 0.1% | 00 |
| Horizontal magnification | 3 | 100 ± 1% | 0.1% | 00 |
| Side to side registration | 4 | 0 ± 2 mm | 0.1% | 00 |
| Focus in full size | 5 | — | 0.1% | 00 |
| Focus in enlarge/ reduce (Lens error correction) | 5 | — | 0.1% | 00 |

**NOTE:** When performing multiple adjustments, perform the items in order from top to bottom.
Perform each adjustment as explained in the next pages.




1. Enter SP mode (refer to Service Program Access Procedure) and access 1 SP Adjustment mode.
2. Access the appropriate page by touching the "Prev." [A] or "Next" [B] key.
3. Touch the "Copy in SP" key [C] then select the proper copy mode.
4. Make a copy of the OS-A3 chart.
5. Confirm if copy quality is within the adjustment standard.
6. If the copy quality is not correct, touch the "SP Mode" key [D] at the left upper corner of the LCD panel.
7. Touch the – key [E] or the + key [F] to change the data, then repeat steps 3 to 6 until the copy quality becomes within the adjustment standard.
8. Exit the SP mode.

### 8.6.2 Side-to-side Registration Adjustment




**– Rough Adjustment –**

1. Loosen the screws [A] for the tandem tray or built-in LCT, [B] for 550 sheets fixed tray or universal tray, or [C] for by-pass feed tray.
2. Move the tray position by moving parts [D], [E] and [F] of the trays.

**– Fine Adjustment –**

1. Enter SP mode (refer to the service program access procedure) and access the side to side registration adjustment mode ( 1 SP Adjustment – PAGE 4).
2. Adjust side-to-side registration for each feed station by changing the SP mode data.

   **NOTE:** Copies can be made in SP mode. Touch "Copy in SP" key to select the paper feed station.
   Adjustment standard: Less than ± 2 mm difference between original and copy.

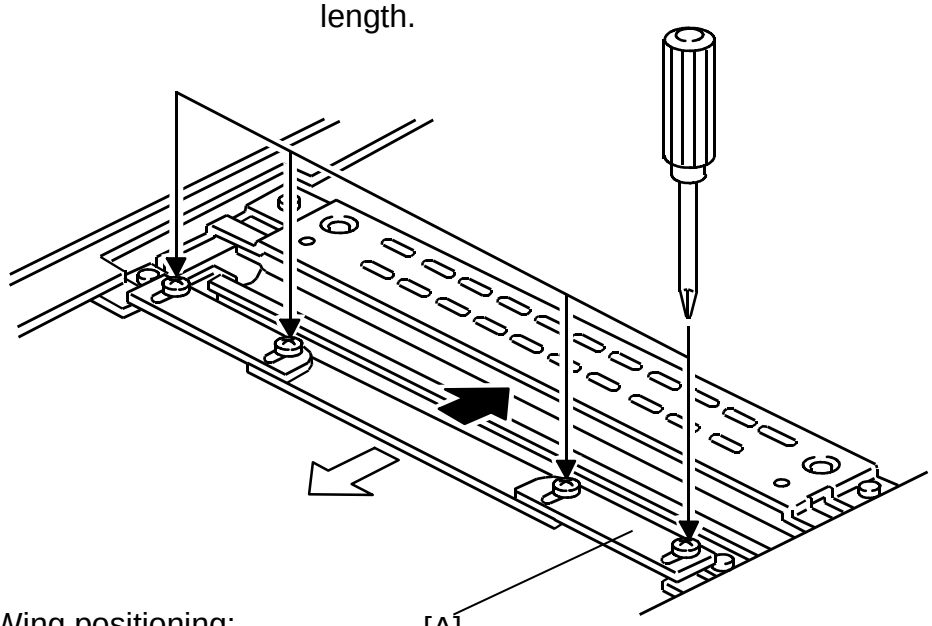
### 8.6.3 Uneven Exposure Adjustment

When: If the exposure is uneven.

Purpose: To maintain even exposure.

Adjustment standard: The side-to-side variation of the gray scales on the test chart should be less than one level.

How: Change the position of the exposure lamp or exposure adjustment wings to make light intensity from the exposure lamp even across its length.



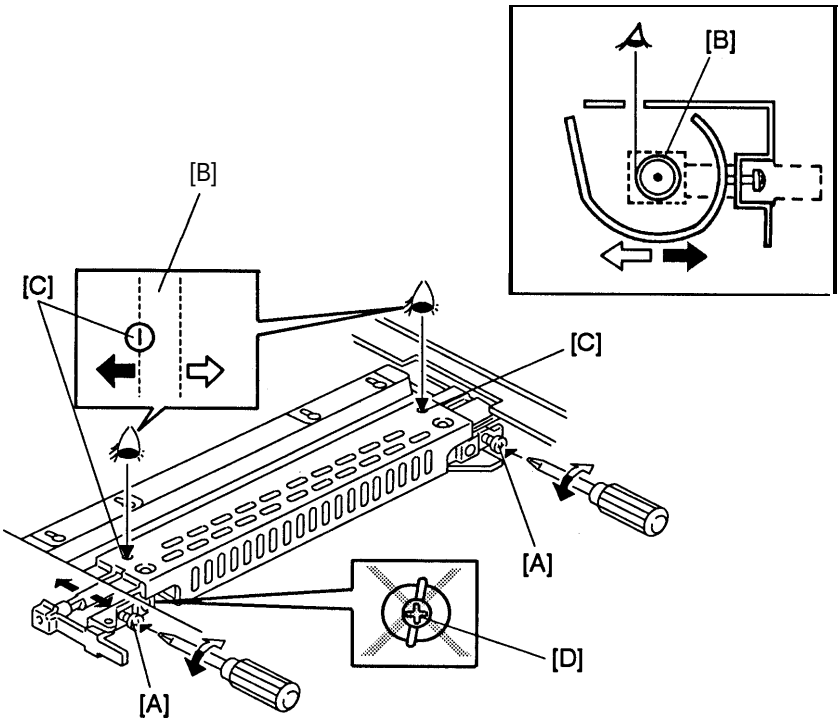

Wing positioning:

Image turns darker.

Image turns lighter.

1. Remove the exposure glass. (See Exposure Glass Removal.)
2. Position the adjustment wings [A] so that the side-to-side copy image density variation is within the adjustment standard.
3. Turn on the main switch and enter SP mode, then perform the process control data initial setting ( 1 SP Adjustment – PAGE 1).

**NOTE:** If uneven density is not solved by this adjustment, proceed to the steps 4 and 5 in the next page.




4. Turn the screw [A] to correct the position of the filament. The **left edge** of the exposure lamp [B] should be directly beneath the center of the sight hole [C] in the reflector cover.

**CAUTION: Do not touch the screw [D].**

5. Turn on the main switch and enter SP mode, then perform the process control data initial setting ( 1 SP Adjustment - PAGE 1).

### 8.6.4 Image Density Adjustment

When: The copy image density is already adjusted to the standard level at the factory, and process control maintains copy image density until the next PM. If the customer asks you to adjust the image density, it can be done by using the User Tool mode.

Purpose: To adjust the copy image density.

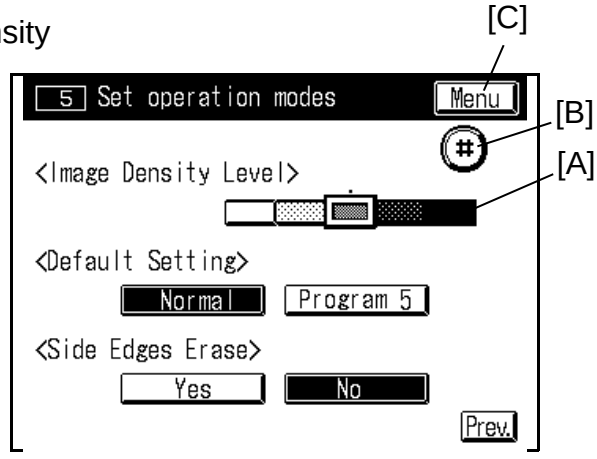
How: The User Tool "image density level" mode changes the development bias voltage.

1. Enter User Tool mode and access [5] Set operation modes.
2. Press the [Next] key once.
3. Select the appropriate image density level (5 steps).

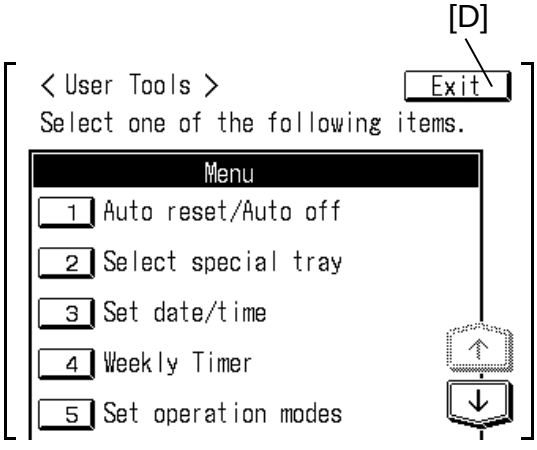
   **adjustment:**

   1) Press the appropriate ID level key [A].
   2) Press the enter key [B].

4. Press the "Menu" key [C].




5. Press the "Exit" key [D] to exit User Tool mode.



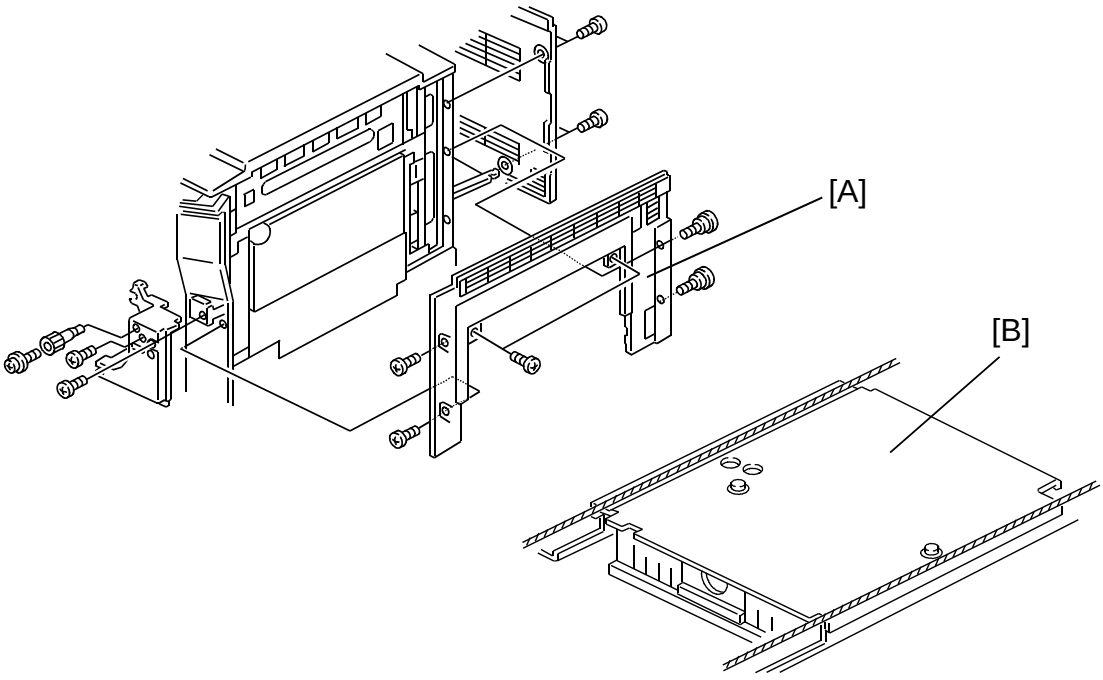

6. Check copy quality.

### 8.6.5 Scanner Height Adjustment

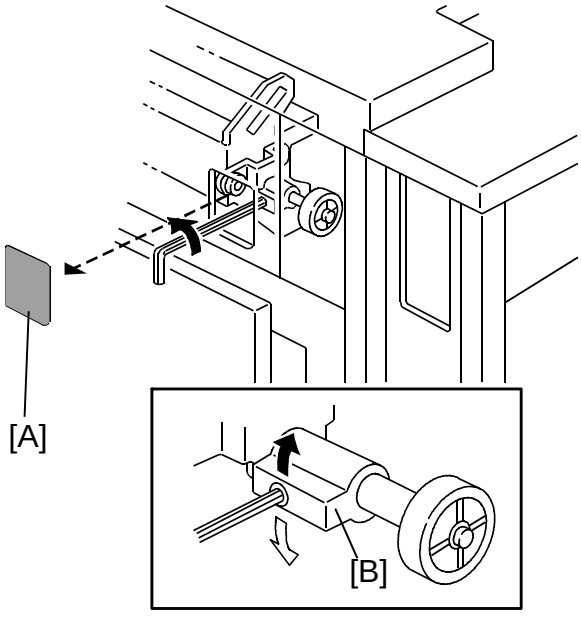
When: If optically skewed images appear after adjusting the 1st and 2nd scanner positions.

Purpose: To maintain a proper copy image.

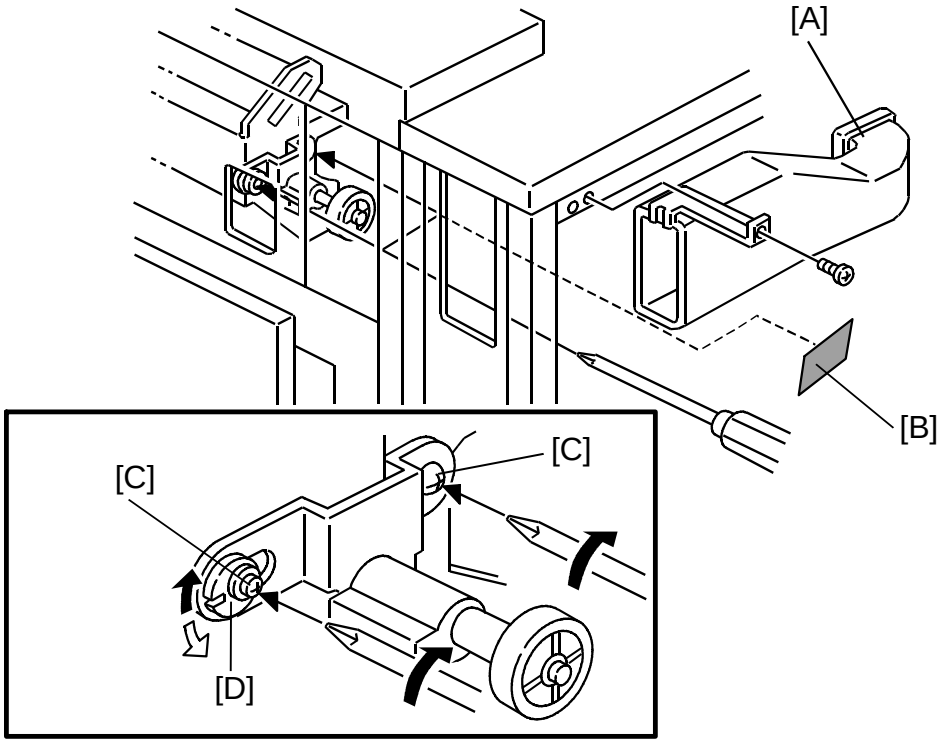
How: Turn the 3rd scanner height adjusting cam. This changes the 3rd scanner's height.




1. Remove the upper right cover [A]. (Refer to the upper right cover removal.)
2. Remove the lens unit cover [B].
3. Move the third scanner to the far right position.




4. Peel off the cover seal [A].
5. Loosen the Allen screw on the adjusting cam [B].
6. Adjust the third scanner height by turning the adjusting cam. (This is a fine adjustment.)




7. If a fine adjustment is insufficient, make a rough adjustment then make the fine adjustment again.

**- Rough adjustment -**

1) Remove the air inlet duct [A](1 screw).
2) Peel off the cover seal [B].
3) Loosen the screws [C].
4) Rotate the rough adjustment cam [D], as shown, to adjust the third scanner height.

   Black arrow ---- Raise the rear side

   White arrow ---- Lower the rear side

**NOTE:** Normally the cut out of the adjustment cam is at nine o'clock.

5) Tighten the screw [C] after the adjustment.

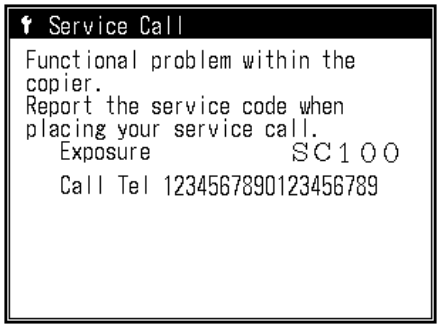
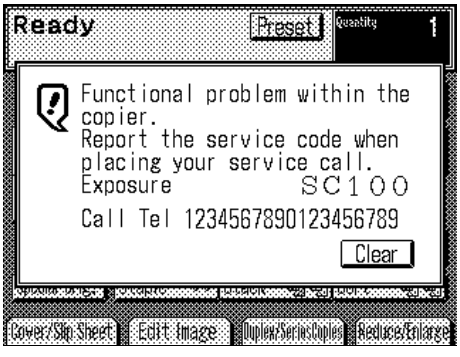
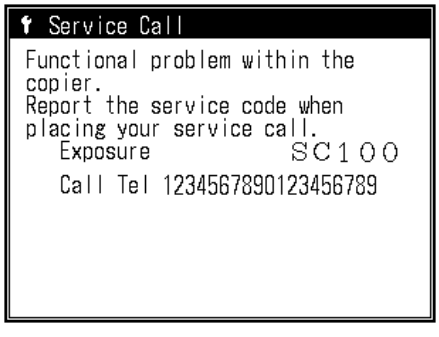
# SECTION 6

# TROUBLESHOOTING

# 1. SERVICE CALL CONDITIONS

## 1.1 SUMMARY

There are 4 levels of service call conditions.

| Level | Definition | Display |
|---|---|---|
| A | The SC can only be reset by service representative (see note in the next page) to prevent the machine from being damaged. The copier cannot be operated at all. | SC display will not be canceled.   |
| B | The copier can be operated as usual except for the unit related to the service call. | If the related function is selected, this display appears.   |
| C | Only the SC counter is incremented. The copier can be operated as usual. | SC will not be displayed. |
| D | The SC can be reset by turning main switch off and on if the SC is caused by misdetection. |   |

**NOTE:** 1) If the problem is related to electrical circuit boards, first disconnect then reconnect the connectors before replacing the PCBs.

2) If the problem is related to motor lock, first check the mechanical load before replacing motors or sensors.

3) To reset the SC of "Level: A", enter SP mode then turn off and on the main switch.

4) When an SC condition occurs while in SP mode, the display does not indicate the SC number. You can recognize the SC condition because in this condition, you cannot exit the SP mode by touching the [Quit] key.
If this occurs, confirm the SC number as follows:

1. Perform the same procedure to duplicate the SC condition.
2. Enter "Copy in SP" mode. You can see the SC number on the display. You can also confirm the SC number by checking the increment of the SP mode SC counter ([6] Jam/SC Counter – PAGE 1).

## 1.2 EXPOSURE

### SC101 - Exposure lamp malfunction - abnormal On/Off

**Definition: [level: A]**
During the lamp off condition, the optics control board detects a lamp voltage.

**Possible causes**

- Exposure lamp open
- Triac shorted
- Exposure lamp thermoswitch open
- Optics control board defective

### SC103 - Power source frequency detection error

**Definition: [level: D]**
Detects frequencies out of the 45Hz to 65Hz range.

**Possible causes:**

- Abnormal power source
- Electrical noise
- AC drive board defective
- Optics control board defective

### SC104 - Exposure lamp malfunction - abnormal off

**Definition: [level: D]**
The scanner start signal is received even if the main relay off condition is detected.

**Possible causes:**

- Main relay defective
- Communication error between the main control board and the optics control board because of a poor harness connection.
- Optics control board defective

## 1.3 SCANNER

### SC120 - Scanner home position sensor abnormal - stays off

**Definition: [level: D]**
The scanner home position sensor does not detect the on condition even if the scanner returns home.

**Possible causes:**

- Scanner home position sensor defective
- Optics control board defective

### SC121 - Scanner home position sensor abnormal - stays on

**Definition:** [**level: D]**
The scanner home position sensor does not detect the off condition even if the scanner leaves the scanner home position sensor by 120 mm.

**Possible causes:**
- Scanner home position sensor defective
- Scanner motor defective
- Scanner HP sensor short

### SC125 - Low scanner speed

**Definition: [level: D]**
The scanner speed, detected by the optics control board through the encoder, is lower than the specified speed.

**Possible causes:**
- Scanner drive motor defective
- Optics Control Board defective

### SC126 - High scanner speed

**Definition: [level: D]**
The scanner speed, detected by the optics control board through the encoder, is higher than the specified speed.

**Possible causes:**
- Scanner drive motor defective
- Optics control board defective

### SC127 - Scanner drive motor encoder failure

**Definition: [level: D]**
Scanner rotating direction detected by the optics control board through the encoder is opposite to the specified direction.

**Possible causes:**
- Scanner drive motor defective
- Optics control board defective

## 1.4 LENS MAGNIFICATION

### SC140 - Lens vertical home position sensor abnormal - stays off

**Definition: [level: D]**
When the lens returns to the home position, the lens vertical home position sensor does not detect the on condition for 2 seconds or more, and more than twice.

**Possible causes:**
- Lens vertical home position sensor shorted
- Lens vertical drive motor defective
- Optics control board defective

### SC141 - Lens vertical home position sensor abnormal - stays on

**Definition: [level: D]**
When the lens returns to the home position, the lens vertical home position sensor does not detect the off condition for 3.5 seconds or more, and more than twice.

**Possible causes:**
- Lens vertical home position sensor open
- Lens vertical drive motor defective
- Optics control board defective

### SC142 - Lens horizontal home position sensor abnormal - stays off

**Definition: [level: D**]
When the lens returns to the home position, the lens horizontal home potion sensor does not detect the on condition for 1.7 seconds or more, and more than twice.

**Possible causes:**
- Lens horizontal home position sensor short
- Lens horizontal drive motor defective
- Optics control board defective

### SC143 - Lens horizontal home position sensor abnormal - stays on

**Definition: [level : D]**
When the lens leaves from the home position, the lens horizontal home potion sensor does not detect the off condition for 2.3 seconds or more, and more than twice.

**Possible causes:**
- Lens horizontal home position sensor open
- Lens horizontal drive motor defective
- Optics control board defective

### SC144 - 3rd scanner home position sensor abnormal - stays off

**Definition: [level: D]**
When the 3rd scanner returns to the home position, the 3rd scanner home position sensor does not detect the on condition for 1.2 seconds or more, and more than twice.

**Possible causes:**
- 3rd scanner home position sensor shorted
- 3rd scanner drive motor defective
- Optics control board defective

### SC145 - 3rd scanner home position sensor abnormal - stays off

**Definition: [level: D]**
When the 3rd scanner leaves from the home position the 3rd scanner home position sensor does not detect the off condition for 2.0 seconds or more, and more than twice.

**Possible causes:**
- 3rd scanner home position sensor open
- 3rd scanner drive motor defective
- Optics control board defective

### SC146 - Abnormal magnification operation

**Definition: [level: D]**
The lens vertical drive motor or the lens horizontal drive motor move for no apparent reason in the ready condition.

**Possible causes:**
- Lens vertical drive motor defective
- Lens horizontal drive motor defective
- 3rd scanner drive motor defective
- Optics control board defective

## 1.5 OPTICS THERMISTOR

### SC190 - Optics thermistor open

**Definition: [level: D]**
The optics thermistor is open.

**Possible causes:**
- Optics thermistor open

**NOTE:** When the optics thermistor is shorted, no SC code is indicated. The exhaust fan rotates quickly and continuously.

### SC191 - Scanner motor thermistor open

**Definition: [level: D]**
The scanner motor thermistor is open.

**Possible causes:**
- Scanner drive motor defective

## 1.6 MAIN CHARGE

### SC302 - Charge corona leakage

**Definition: [level: D]**
The charge power pack detects a charge corona leakage (output: 0V) for 4.8 msec, or detects the output to be more than 7 kV, 10 times in one job.

**Possible causes:**
- Main charge corona unit defective
- Main charge power pack defective
- High voltage control board defective

### SC303 - Charge corona wire cleaner failure

**Definition: [level: C]**
The current of the charge corona wire cleaner drive motor is over the specified current within 4 seconds after the cleaner motor starts.
The charge corona wire cleaner does not move back to the end block within 30 seconds.

**Possible causes:**
- Charge corona wire cleaner drive motor defective
- Insufficient lubrication for the charge corona wire cleaner drive mechanism (G501 grease)
- High voltage control board defective

## 1.7 DEVELOPMENT

### SC341 - Development motor locked

**Definition: [level: D]**
Development motor lock signal stays low more than 1 second in development motor on condition.

**Possible causes:**
- Extra load in the development unit
- Development motor defective
- Main control board defective

### SC342 - Toner collection motor locked

**Definition: [level: D]**
The toner collection sensor output does not change (OFF → ON or ON → OFF) for more than 2.55 seconds in the toner collection motor on condition.

**Possible causes:**
- Toner collection sensor defective
- Toner collection motor defective
- Toner clog in the toner collection pipe

### SC343 - Toner collection bottle at improper position

**Definition: [level: D]**
Toner bottle set switch is off and the front door is closed.

**Possible causes:**
- Toner collection bottle set switch defective
- Toner collection bottle is set incorrectly

## 1.8 PROCESS SENSOR

### SC351 - Abnormal Vsg Detection (Vsg > 4.2V)

**Definition: [level: C]**
The detected Vsg value is over 4.2 V.

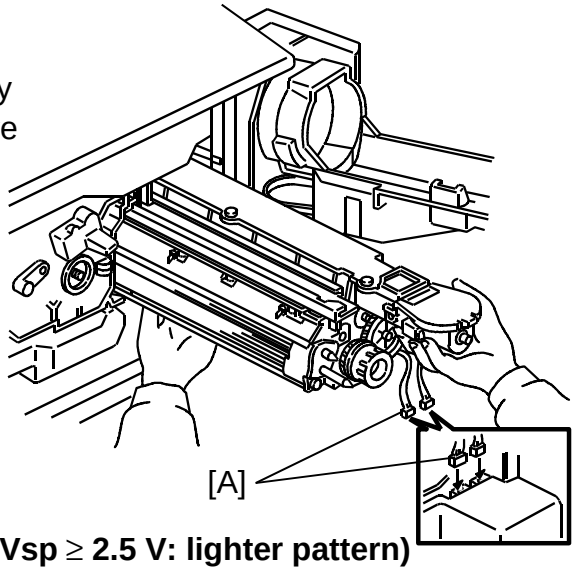
**Possible causes:**
- ID sensor defective
- Main control board defective

### SC352 - Incomplete TD sensor initial setting

**Definition: [level: C]**
The output voltage of the TD sensor is higher than 2.6 V or lower than 2.4 V during the developer initial setting mode.
VOUT to get 2.5 V for the TD sensor output is higher than 10 V or lower than 2 V.

**Possible causes:**

- Connector [A] not set correctly
- Toner density sensor defective
- Abnormal toner concentration




### SC353 - Abnormal Vsp Detection (Vsp ≥ 2.5 V: lighter pattern)

**Definition: [level: C]**
Vsp is 2.5 V or higher.

**Possible causes:**

- ID sensor defective
- OPC drum
- High voltage control board defective
- Poor contact of the development bias terminal

### SC354 - Abnormal Vsg detection (Vsg ≤2.5 V)

**Definition: [level: C]**
Vsg is 2.5 V or less.

**Possible causes:**

- ID sensor defective
- OPC drum
- Dirty charge corona casing
- Quenching lamp defective
- Erase lamp defective
- Cleaning blade defective
- Dirty ID sensor

### SC355 - Abnormal VTD detection (VTD ≥ 4 V)

**Definition: [level: C]**
VTD is 4 V or higher.

**Possible causes:**
- Toner density sensor defective
- Toner concentration too low

### SC356 - Abnormal VTD detection (VTD < 0.5 V)

**Definition: [level: C]**
VTD is less than 0.5 V.

**Possible causes:**
- Toner density sensor defective
- Toner concentration is too high

### SC357 - Abnormal Vsp detection (Vsp/Vsg ≥ 25%)

**Definition: [level: C]**
Vsp/Vsg is 25% or higher.

**Possible causes:**
- ID sensor defective
- OPC drum
- Dirty ID sensor

### SC358 - Abnormal Vsp detection (Vsp/Vsg < 2.5%)

**Definition: [level: C]**
Vsp/Vsg is less than 2.5%.

**Possible causes:**
- ID sensor defective
- OPC drum
- Toner scattering

### SC361 - Incomplete drum potential sensor calibration

**Definition: [level: C]**
When the process control initial setting is performed and a development bias of -100 V or -800 V is applied to the drum shaft, the drum potential voltage is out of these ranges:
$0.1 \leq V\text{-}100 \leq 0.7$ [V] or $2.7 \leq V\text{-}800 \leq 4.2$ [V].

**Possible causes:**
- Drum potential sensor defective
- High voltage control board defective
- Drum shaft terminal not grounded
- OPC drum
- Main charge corona unit defective

### SC364 - Abnormal $V_D$ detection

**Definition: [level: C]**
$V_D$ is out of specification ($V_R + 770 \pm 20$ V).

**Possible causes:**
- Drum potential sensor defective
- OPC drum
- Main charge corona unit defective

### SC365 - Abnormal $V_L$ detection

**Definition: [level: C]**
$V_L$ is out of specification ($V_R + 140 \pm 20$ V).

**Possible causes:**
- Drum potential sensor defective
- OPC drum
- Main charge corona unit defective
- Optics too dirty

## 1.9 TRANSFER CURRENT

### SC402 - Transfer current leakage

**Definition: [level: D]**
When the transfer power pack output voltage exceeds 4.5 KV for 200 msec or more, the output current is multiplied by 0.8. If this condition occurs 11 time in  a row, an SC is displayed.

**Possible causes:**
- Transfer belt defective
- Transfer power pack defective
- Poor contact at transfer bias roller, discharge plate terminals
- High voltage control board defective

## 1.10 DRUM

### SC440 - Abnormal main motor speed

**Definition: [level: D]**
Lock signal stays low in the main motor on condition for 1.0 second or more.

**Possible causes:**
- Main motor defective

### SC442 - Drum thermistor open

**Definition: [level: D]**
The drum thermistor is open.

**Possible causes:**
- Drum thermistor defective

## 1.11 PAPER FEED

### SC500 - Abnormal manual feed drive motor speed

**Definition: [level : D]**
Lock signal stays low in the manual feed motor on condition for 1.0 second or more.

**Possible causes:**

- Manual feed motor defective

### SC501 - Abnormal paper feed drive motor speed

**Definition: [level: D]**
Lock signal stays low in the paper feed motor on condition for 1.0 second or more.

**Possible causes:**

- Paper feed motor defective
- Paper feed control board defective

### SC502 - Abnormal 1st lift motor movement

**Definition: [level: B]**
The 1st lift sensor detects high condition for 10 seconds or more after the 1st lift motor starts. The first time, after the paper tray is opened and closed, the 1st lift motor starts again. If the above condition occurs twice, this SC is displayed.

**Possible causes:**

- 1st lift sensor shorted
- 1st lift motor defective
- Paper feed control board defective

### SC503 - Abnormal 2nd lift motor movement

**Definition: [level: B]**
The 2nd lift sensor detects the high condition for 10 seconds or more after the 2nd lift motor starts. The first time, after the paper tray is opened and closed, the 2nd lift motor starts again. If the above condition occurs twice, this SC is displayed.

**Possible causes:**

- 2nd lift sensor shorted
- 2nd lift motor defective
- Paper feed control board defective

### SC504 - Abnormal 3rd lift motor (1.5 K LCT motor for A096 copier) movement

**Definition: [level: B]**
The 3rd lift sensor detects the high condition for 10 seconds or more after the 3rd lift motor starts. The first time, after the paper tray is opened and closed, the 3rd lift motor starts again. If the above condition occurs twice, this SC is displayed.

**Possible causes:**
- 3rd lift sensor shorted
- 3rd lift motor (1.5 K LCT motor for A096 copier) defective
- Paper feed control board defective

### SC506 - Abnormal 3.5 K LCT motor movement

**Definition: [level: B]**
The LCT lift sensor detects the low condition for 10 seconds or more after the LCT motor starts. The first time, after the LCT cover is opened and closed, the LCT motor starts again. If the above condition occurs twice, this SC is displayed.

**Possible causes:**
- LCT motor defective
- LCT lift sensor shorted

### SC507 - Abnormal 3.5 K LCT feed motor movement

**Definition: [level: B]**
The LCT feed motor is locked for 1 second or more after this motor starts.

**Possible causes:**
- LCT feed motor defective

### SC508 - Abnormal tandem rear fence drive motor movement

**Definition: [level: B]**
It takes 10 seconds or more for the rear fence return sensor to detect the on condition after the rear fence drive motor starts.
It takes 10 seconds or more for the rear fence home position sensor to detect the on condition after this fence starts moving to the home position.
When the tray is set, the rear fence return sensor and the rear fence the home position sensor are on.

**Possible causes:**
- Rear fence drive motor defective
- Rear fence HP sensor defective
- Rear fence return sensor defective

**SC510 - Abnormal tandem side fence home position detection - stays off**

**Definition: [level: B]**
When the side fence goes back to the home position or the side fence drive motor works to open the fence, the side fence positioning sensor does not detect the on condition for 5 seconds or more.

**Possible causes:**
- Side fence drive motor defective
- Side fence positioning sensor open

**SC511 - Abnormal tandem side fence home position detection - stays on**

**Definition: [level: B]**
When the side fence goes back to the home position or the side fence drive motor works to close the fence, the side fence positioning sensor stays on for 5 seconds.

**Possible causes:**
- Side fence drive motor defective
- Side fence positioning sensor shorted

## 1.12 DUPLEX

**SC520 - Abnormal fusing/duplex drive motor movement**

**Definition: [level: D]**
The lock signal stays low for 1.0 second after the fusing/duplex drive motor starts.

**Possible causes:**
- Fusing/duplex drive motor defective

**SC522 - Abnormal jogger home position sensor detection - stays off**

**Definition: [level: B]**
The jogger home position sensor does not detect the on condition for 5 seconds or more after the fusing/duplex drive motor starts.

**Possible causes:**
- Jogger motor defective
- Jogger HP sensor open

**SC523 - Abnormal jogger home position sensor detection - stays on**

**Definition: [level: B]**
The jogger home position sensor does not detect the off condition for 1 second after its sensor detects the on condition in the initializing mode.

**Possible causes:**
- Jogger drive motor defective
- Jogger HP sensor shorted

## 1.13 FUSING

**SC541 - Fusing thermistor open**

**Definition: [level: A]**
Detects the fusing thermistor open condition for 2 msec or more after turning the main switch on.

**Possible causes:**
- Fusing thermistor open
- Optics control board defective

**SC542 - Start key stays red**

**Definition: [level: A]**
The fusing temperature does not reach the specified temperature after 5 minutes from turning the main switch on.

**Possible causes:**
- Fusing lamp defective
- AC Drive board defective
- Fusing thermistor defective

**SC543 - Fusing overheat (detected by the main control board)**
**SC544 - Fusing overheat (detected by the optics control board)**

**Definition: [level: A]**
The fusing temperature stays over 231 °C for 5 seconds.

**Possible causes:**
- AC drive board defective
- Fusing thermistor defective
- Optics control board defective
- Main control board defective

**SC545 - Low fusing temperature (detected by the main control board)**
**SC546 - Low fusing temperature (detected by the optics control board)**

**Definition: [level: A]**
The fusing temperature stays lower than 100 °C for 5 seconds after the machine becomes ready.

**Possible causes:**
- Fusing thermistor defective
- AC drive board defective
- Fusing lamp open
- Main control board defective
- Optics control board defective

**SC547 - Fusing lamp continuously lit**

**Definition: [level: A]**
Fusing lamp continuously lights for 70 seconds after the machine becomes ready. However, if the door is open, paper jams, or the fusing unit is out of position, the ready condition is canceled and the main relay opens.

**Possible causes:**
- AC drive board

**SC548 - Unstable fusing temperature**

**Definition: [level: A]**
If the fusing temperature changes by 21 °C/second four times in 1 minute, this SC is displayed.

**Possible causes:**
- AC drive board defective
- Thermistor defective

## 1.14 SYSTEM CONTROL

**SC600 - Communication error (main control board and operation panel)**

**Definition: [level: D]**
The main control board does not communicate with the operation panel.

**Possible causes:**
- Main control board defective
- Operation panel defective
- Harness defective

### SC601 - Communication error (main control board and optics control board)

**Definition: [level: D]**
The main control board does not communicate with the optics control board.

**Possible causes:**
- Main control board defective
- Optics control board defective
- Harness defective

### SC602 - Communication error (main control board and high voltage control board)

**Definition: [level: D]**
The main control board does not communicate with the high voltage control board.

**Possible causes:**
- Main control board defective
- High voltage control board defective
- Harness defective

### SC603 - Main control board malfunction (CPU)

**Definition: [level: D]**
Communication to the main control board is not completed.

**Possible causes:**
- Main control board defective

### SC620 - Communication error (main control board and DJF/RDH main board)

**Definition: [level: B]**
The main board does not communicate with the DJF/RDH main board.

**Possible causes:**
- Main control board defective
- DJF/RDH main board defective
- Harness defective
- Fiber optics defective

**SC621 - Communication error (main control board and sorter staplers (A374/A377)/finisher main board)**

**Definition: [level: D]**
The main control board does not communicate with the sorter stapler (A374/A377)/finisher main board.

**Possible causes:**
- Main control board defective
- Sorter stapler(A374/A377)/finisher main board defective
- Harness defective
- Fiber optics defective

## 1.15 DUAL JOB FEEDER

**SC700 - Abnormal DJF/RDH feed-in motor movement**
**SC701 - Abnormal DJF/RDH transport belt motor movement**
**SC702 - Abnormal DJF/RDH feed out motor movement**
**SC703 - Abnormal RDH inverter motor movement**

**Definition: [level: B]**
Encoder pulse is not detected by the DJF main board in the main motor on condition. The first time, a jam occurs. The second time, an SC is displayed.

**Possible causes:**
- DJF feed motor defective
- DJF transport motor defective
- DJF feed out motor defective
- DJF inverter motor defective

## 1.16 FINISHER / SORTER STAPLER

**SC730 - Abnormal *transport motor (A374, A377 sorter staplers / A379 finisher) movement**

**Definition: [level: D]**
When the encoder pulse is not detected by the SS (or finisher) main board for 200 msec after the *transport motor starts, a jam is displayed. If this occurs twice, an SC is displayed.

**Possible causes:**
- *Transport motor

| | A374 Sorter Stapler | A377 Sorter Stapler | A379 Finisher |
|---|---|---|---|
| * | Roller drive motor | Main motor | Transport drive motor |

### SC731 - Abnormal bin drive (lift) motor movement (A374, A377 sorter staplers)

**Definition: [level: B]**
If the wheel sensor (bin lift timing sensors) is not off after 2 seconds from when the bin drive (lift) motor stars, jam "R2" is indicated.
If the wheel sensor (bin lift timing sensors) is not on after 2 seconds from when the wheel sensor (bin lift timing sensors) detects off, jam "R2" is indicated.
If the condition above occurs twice, an SC is displayed.

**Possible causes:**
- Wheel sensor (bin lift timing sensors) defective
- Bin drive (Lift) motor defective

### SC732 - Tray shift motor (A379 Finisher)

**Definition: [level: B]**
The shift tray half turn sensor does not detect the on condition for 2 seconds after the finisher tray shift motor starts.
The first time, a jam is indicated. The 2nd time, an SC is displayed.

**Possible causes:**
- Tray shift motor defective
- Shift tray half turn sensor defective

### SC733 - Shift tray lift motor (A379 finisher)

**Definition: [level: B]**
The stack height sensor 1 or 2 do not detect the on condition for the specified time after the finisher shift tray lift motor.

**Possible causes:**
- Shift tray lift motor defective
- Stack height sensor 1 or 2 defective

### SC735 - Abnormal jogger motor movement (A374, A377 sorter staplers / A379 Finisher)

**Definition: [level: B]**

When the jogger moves back to the home position, the jogger home position sensor does not detect the on condition within 650 pulses. Then, a jam is indicated.
When the jogger moves from the home position forward, and moves back to the home position, the jogger home position sensor does not detect the on condition within 100 pulses. Then, a jam is indicated.
If the above condition occurs twice, an SC is displayed.

**Possible causes:**

- Jogger motor defective
- Jogger home position sensor defective

### SC737 - Abnormal gripper motor movement (A374, A377 sorter staplers)

**Definition: [level: B]**

When the gripper moves to the staple position, the gripper home position sensor does not detect the on condition. Then a jam is indicated.
When the gripper moves from the staple position to the bin position, the gripper home position sensor does not detect the on condition within 1070 pulses. Then a jam is indicated.
When the gripper moves to the home position, the gripper home position sensor does not detect the on condition within 1.25 seconds. Then a jam is indicated.
When the gripper moves from the home position forward, and moves back to the home position, the gripper home position does not detect the on condition within 500 msec or more. Then a jam is indicated.
If the above condition occurs twice, an SC is displayed.

**Possible causes:**

- Gripper motor defective
- Gripper home position sensor defective

### SC738 - Abnormal staple motor movement (A374, A377 sorter staplers)

**Definition: [level: B]**
The staple home position sensor does not detect the on condition within 600 msec after the motor starts. Then a jam is indicated. If this occurs twice, this SC is displayed.

**Possible causes:**
- Staple unit (staple motor) defective
- Staple is jammed in the staple unit.

### SC740 - Abnormal staple unit drive motor movement (A377 sorter stapler / A379 finisher)

**Definition: [level: B]**
The staple unit home position sensor does not detect the on condition when the staple unit is in the home position. A jam is indicated.
The staple unit home position sensor does not detect the on condition (within 1640 pulses) when the staple unit moves to the home position. A jam is indicated.
The staple unit home position sensor does not detect the on condition (within 280 pulses) when the staple unit moves forward from the home position and moves back to the home position. A jam is indicated.
If the above condition occurs twice, this SC is displayed.

**Possible causes:**
- Staple unit drive motor defective
- Staple unit home position sensor defective

### SC741 - Abnormal bin rear plate motor movement (A377 sorter stapler)

**Definition: [level: B]**
When the rear bin plate is open, the bin rear plate open sensor does not detect the on condition for 750 msec or more after the motor starts. Then a jam is indicated.
When the rear bin plate is closed, the bin rear plate home position sensor does not detect the on condition for 750 msec or more after the motor starts. Then a jam is indicated.
In the initial condition, the bin rear plate open sensor does not detect the on condition for 1.25 seconds or more after the motor starts. Then a jam is indicated.
If the above condition occurs twice, this SC is displayed.

**Possible causes:**
- Bin rear plate drive motor defective
- Bin rear plate open sensor defective
- Bin rear plate home position sensor defective

**SC742 - Abnormal stack feed out motor movement (A379 finisher)**

**Definition: [level: B]**
No encoder pulses is detected for 500 msec. or more.

**Possible causes:**
- Stack feed out motor defective

## 1.17 OTHERS

**SC900 - Total counter failure (staying in the off condition)**

**Definition: [level: D]**
The total counter stays in the off condition.

**Possible causes:**
- Total counter defective

**SC901 - Total counter failure (staying in the on condition)**

**Definition: [level: D]**
The total counter stays in the on condition.

**Possible causes:**
- Total counter defective

**SC full used toner bottle**

**Definition: [level: A]**
The toner overflow switch is activated.

**Possible causes:**
- Toner collection bottle is full
- Toner overflow switch defective

**NOTE:** Clear the SC full used toner bottle as follows:

1. While the main switch is on, open the front doors then take out the toner collection bottle (used toner bottle).
2. Remove the toner collection bottle then empty and clean the bottle.
3. Install the empty toner collection bottle.
4. Close the front doors.

# 2. ELECTRICAL COMPONENT DEFECTS

## 2.1 SENSORS

**NOTE:** All photo-interrupters go low (GND) when the actuator interrupts the gap between the LED and the photo transistor.

| Component (Symbol) | CN | Condition | Symptom (when the main switch turns on) |
|---|---|---|---|
| Scanner HP (S-1) | 512-1 | Open | SC125 is displayed |
| | | Shorted | SC121 is displayed |
| Platen Cover Position-1 (S-2) | 512-7 | Open | APS and AMS do not function correctly. |
| | | Shorted | – |
| Platen Cover Position-2 (S-3) | 518-1 | Open | "Original is on the glass" indicator is displayed even if the original on the glass has already been removed. |
| | | Shorted | – |
| Lens vertical HP (S-4) | 512-5 | Open | SC141 is displayed |
| | | Shorted | SC140 is displayed |
| Lens Horizontal HP (S-5) | 513-1 | Open | SC143 is displayed |
| | | Shorted | SC142 is displayed |
| 3rd Scanner HP (S-6) | 511-1 | Open | SC145 is displayed |
| | | Shorted | SC144 is displayed |
| By-Pass Paper End (S-7) | 108-A5 | Open | "Paper end" indicator is not displayed even if there is no paper on the by-pass feed table. |
| | | Shorted | "Paper end" indicator is displayed even if paper is set on the by-pass feed table. |
| Guide Plate Position (S-8) | 108-B9 | Open | "Guide plate open" indicator is not displayed even if the guide plate is open. |
| | | Shorted | "Guide plate open" indicator is displayed even if the guide plate is closed. |
| Jogger HP (S-9) | 112-A10 | Open | Jogger motor locks (SC522 counts up) |
| | | Shorted | Jogger motor locks (SC523 counts up) |
| Vertical Transport (S-10) | 108-A2 | Open | – |
| | | Shorted | – |
| Duplex Exit (S-11) | 112-A8 | Open | "Paper Jam T" indicator is displayed even if there is no paper. |
| | | Shorted | Whenever a duplex copy is made, "Paper Jam T" occurs. |

| Component (Symbol) | CN | Condition | Symptom (when the main switch turns on) |
|---|---|---|---|
| Duplex Entrance Sensor (S-12) | 112-A7 | Open | "Paper Jam T" indicator is displayed even if there is no paper. |
| | | Shorted | Whenever a duplex copy is made, "Paper Jam T" occurs. |
| Duplex Paper End (S-13) | 112-A9 | Open | "Copies left in the duplex tray...." indicator is displayed even if there is paper in the duplex tray. |
| | | Shorted | Only one rear side copy is made regardless of the quantity of copies. |
| Duplex Transport (S-14) | 109-A4 | Open | "Paper Jam T" indicator is displayed even if there is no paper. |
| | | Shorted | Whenever a duplex copy is made, "Paper Jam T" occurs. |
| Exit (S-15) | 109-A2 | Open | "Paper Jam E" indicator is displayed even if there is no paper. |
| | | Shorted | Whenever the copy is fed out, "Paper Jam D" occurs. |
| Fusing Exit (S-16) | 109-B7 | Open | "Paper Jam D" indicator is displayed even if there is no paper. |
| | | Shorted | Whenever a copy is made, "Paper Jam C and D" occurs. |
| Paper Guide (S-17) | 109-B4 | Open | – |
| | | Shorted | Whenever a duplex copy is made, "Paper Jam T" occurs. |
| Auto Image Density (S-18) | 507-1 | Open | Image density will be abnormal. |
| | | Shorted | |
| Original Length-1 (S-19) | 508-8, 9, 10 | Open | The CPU cannot properly detect original size. APS and AMS do not function correctly. |
| | | Shorted | |
| Original Length-2 (S-20) | 509-3, 4, 5 | Open | The CPU cannot properly detect original size. APS and AMS do not function correctly. |
| | | Shorted | |
| Original Width (S-21) | 508-3, 4, 5 | Open | The CPU cannot properly detect original size. APS and AMS do not function correctly. |
| | | Shorted | |
| By-Pass Paper Size (S-22) | 114-6 | Open | The CPU recognizes that the paper width is 319 mm regardless of the side fence position. |
| | | Shorted | The CPU recognizes that the paper width is 100 mm regardless of the side fence position. |
| Toner Density (S-23) | 114-3 | Open | Machine quits auto toner supply mode and enters fixed supply mode. |
| | | Shorted | |

| Component (Symbol) | CN | Condition | Symptom (when the main switch turns on) |
|---|---|---|---|
| Registration (S-24) | 108-A7 | Open | "Paper Jam C" indicator is displayed even if there is no paper. |
| | | Shorted | Whenever a copy is made, "Paper Jam C" occurs. |
| Toner End (S-25) | 108-B14 | Open | Toner is added even if there is too much toner in the toner hopper. |
| | | Shorted | Toner is not supplied even if there is no toner in the toner hopper. |
| Auto-Response (S-26) | 113-B3 | Open | The machine does not exit "Screen Saver" mode even if an operator approaches the machine. |
| | | Shorted | "Screen Saver" mode does not work. |
| Drum Potential (S-27) | 110-10 | Open | Machine quits auto process control and enters fixed toner supply mode. |
| | | Shorted | |
| Image Density (S-28) | 111-3 | Open | Machine quits auto toner supply mode and enters detect mode. |
| | | Shorted | |
| 1st Paper End (S-29) | 401-A5 | Open | "Paper end" indicator is not displayed even if there is no paper on the paper tray. |
| | | Shorted | "Paper end" indicator is displayed even if paper is set. |
| 1st Paper Near End (S-30) | 412-A2 | Open | "Paper near end" indicator is not displayed even if the tray is almost empty. |
| | | Shorted | "Paper near end" indicator is displayed even if there is enough paper on the paper tray. |
| 1st Paper Feed (S-31) | 402-A1 | Open | Whenever paper is fed, it is folded. |
| | | Shorted | "Paper jam A" indicator is displayed even if there is no paper. |
| 2nd Paper Near End (S-32) | 412-A5 | Open | "Paper near end" indicator is not displayed even if the tray is almost empty. |
| | | Shorted | "Paper near end" indicator is displayed even if there is enough paper on the paper tray. |
| 1st Lift (S-33) | 401-A2 | Open | "Add paper" indicator is displayed even if there is paper on the tray. |
| | | Shorted | The tray bottom plate locks at the upper position. |
| 2nd Paper End (S-34) | 401-B5 | Open | "Paper end" indicator is not displayed even if there is no paper on the paper tray. |
| | | Shorted | "Paper end" indicator is displayed even if paper is set. |
| Toner Collection Motor (S-35) | 412-B5 | Open | SC342 is displayed. |
| | | Shorted | |

| Component (Symbol) | CN | Condition | Symptom (when the main switch turns on) |
|---|---|---|---|
| 2nd Lift (S-36) | 401-B2 | Open | "Add paper" indicator is displayed even if there is paper on the tray. |
| | | Shorted | The tray bottom plate locks at the upper position. |
| 3rd Lift (S-37) | 403-A2 | Open | "Add paper" indicator is displayed even if there is paper on the tray. |
| | | Shorted | The tray bottom plate locks at the upper position. |
| 3rd Paper Near End (A095 copier only) (S-38) | 412-A8 | Open | "Paper near end" indicator is not displayed even if the tray is almost empty. |
| | | Shorted | "Paper near end" indicator is displayed even if there is enough paper on the paper tray. |
| 3rd Paper End (S-39) | 403-A5 | Open | "Paper end" indicator is not displayed even if there is no paper on the paper tray. |
| | | Shorted | "Paper end" indicator is displayed even if paper is set. |
| 3rd Paper Feed (S-40) | 402-A8 | Open | Whenever paper is fed, it is folded. |
| | | Shorted | "Paper jam A" indicator is displayed even if there is no paper. |
| 2nd Paper Feed (S-41) | 402-B1 | Open | Whenever paper is fed, it is folded. |
| | | Shorted | "Paper jam A" indicator is displayed even if there is no paper. |
| Base Plate Down (A096 copier only) (S-42) | 404-A10 | Open | The bottom plate lift lever locks at the lowest position. |
| | | Shorted | The bottom plate is not lowered when paper on the left tray shifts to the right tray and paper is set in the improper position. |
| Side Fence Positioning (A096 copier only) (S-43) | 404-A13 | Open | SC510 is displayed |
| | | Shorted | SC511 is displayed |
| Rear Fence Return (A096 copier only) (S-44) | 404-B10 | Open | When the rear fence reaches the return position, the rear plate locks there then SC508 is displayed. |
| | | Shorted | SC508 is displayed. |
| Rear Fence HP (A096 copier only) (S-45) | 404-B6 | Open | SC508 is displayed. |
| | | Shorted | When the rear fence reaches the return position, SC508 is displayed. |

| Component (Symbol) | CN | Condition | Symptom (when the main switch turns on) |
|---|---|---|---|
| Left Tandem Paper End (A096 copier only) (S-46) | 404-B12 | Open | The rear fence moves back and forth continuously. |
| | | Shorted | The paper on the left tray is not moved to the right tray. |
| LCT Near End (A096 copier only) (S-47) | 412-A7 | Open | "Paper near end" indicator is not displayed even if the tray is almost empty. |
| | | Shorted | "Paper near end" indicator is displayed even if there is enough paper on the paper tray. |
| Tray Down (A096 copier only) (S-48) | 403-B2 | Open | When the bottom plate is lowered, it locks at the lowest position. |
| | | Shorted | "Paper end" indicator is displayed even if there is paper on the tray. |
| Tray Paper End (A096 copier only) (S-49) | 412-A11 | Open | The bottom plate raises & lowers even if no paper is set. |
| | | Shorted | The bottom plate does not raise even if paper is set on the tray. |

## 2.2 SWITCHES

| Component | CN No. | Condition | Symptom |
|---|---|---|---|
| By-Pass Table (SW-1) | 108-B11 | Open | "Open the by-pass tray" indicator is displayed even if the by-pass tray is opened. Print key stays red. |
| | | Shorted | By-pass feed motor continuously turns. |
| Front Door Safety (SW-2) | – | Open | "Close the door" indicator lights even if the front door is closed. |
| | | Shorted | Copier does not turn off when the front doors are open. |
| 1st Tray Set (A095 copier only) (SW-3) | 407-B8 | Open | When the 1st tray is selected, SC502 is displayed. |
| | | Shorted | The 1st tray cannot be selected even if the 1st tray is set in the machine. |
| 2nd Paper Size (SW-4) | 407-A2 ~ A6 | Open | The CPU cannot detect proper paper size, and misfeeds may occur when a copy is made. |
| | | Shorted | |
| Toner Overflow (SW-5) | 412-B9 | Open | SC "Full Used Toner Bottle" indicator lights even if the toner bottle is not full. |
| | | Shorted | SC "Full Used Toner Bottle" indicator does not light even if the toner bottle becomes full. |
| Toner Collection Bottle Set (SW-6) | 412-B7 | Open | No caution is displayed on the LCD even if the toner collection bottle is set incorrectly. |
| | | Shorted | SC343 is displayed. |
| Lower Front Door Safety (SW-7) | 410-1 | Open | Whenever paper is fed from the tray unit, SC501 is displayed. |
| | | Shorted | — |
| 3rd Tray Set (A095 copier only) (SW-8) | 407-B1 | Open | When the 3rd tray is selected, SC504 is displayed. |
| | | Shorted | The 3rd tray cannot be selected even if the 3rd tray is set in the machine. |
| Main (SW-9) | — | Open | The copier does not turn on. |
| | | Shorted | The copier does not turn off. |
| Tray Down (A096 copier only) (SW-10) | 402-B14 | Open | The 3rd tray bottom plate stays at the lowest position. |
| | | Shorted | The 3rd tray bottom plate stays at the highest position. |

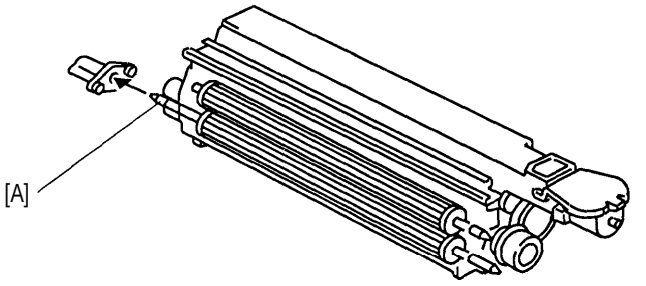
## 2.3 FUSES

### 2.3.1 DC Power Supply Board

| Component | Condition | Symptom |
|---|---|---|
| FU801 (125 V, 10 A) | Open | Power is not provided when the main switch is on (No indicator displayed on the operation panel). |
| FU802 (125 V, 5 A) | Open | Power is not provided when the main switch is on (No indicator displayed on the operation panel). |
| FU803 (125 V, 6.3 A) | Open | When the 3rd feed station is selected, SC504 is displayed. |
| FU804 (125 V, 6.3 A) | Open | When the main switch is turned on, SC900 is displayed. |
| FU805 (125 V, 6.3 A) | Open | When each feed station is selected, the following indication is displayed:<br>1st: SC510<br>2nd: Add Paper<br>3rd: SC504<br>When the paper is fed from the By-pass feed table, SC342 is displayed. |
| FU806 (125 V, 6.3 A) | Open | When the 3rd feed station is selected, SC504 is displayed.<br>DJF (RDH) and Sorter Stapler (Finisher) do not operate. |

**NOTE 8:** Development Unit

(1) Lubricate the bias terminal (sleeve roller shaft) [A] with Grease: KS660:SHIN-ETSU




**CAUTION: Use only conductive grease, otherwise bias voltage will not be properly applied to development rollers.**



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