M 60

SERVICE MANUAL

GENERAL

1 SPECIFICATIONS

Type	:	Desk Top Copier with Stationary Platen
Photoconductor	:	Organic Photoconductor
Copying System	:	Electrostatic Dry Powdered Image Transfer to Plain Paper
Paper Feeding System	:	2-Way Feeding Paper Cassette (100 sheets) Manual Feed Table (1 sheet)
Exposure System	:	Mirror Scanning, Slit Exposure
Developing System	:	Dual Component System
Charging System	:	Single-Wire DC Negative Corona with Scorotron System
Image Transfer System	:	Visible Image Transfer by means of a Single-Wire DC Negative Corona with Corotron System
Paper Separating System	:	Natural Separation from the small-diameter PC Drum because of the inherent strength in paper, grounded discharge comb
Ozone Removal	:	By means of Ozone Filter
Fusing System	:	Heat Rollers
Paper Charge Neutralization	:	Charge Neutralizing Brush
Maximum Original Size	:	A4 lengthwise
Types of Originals	:	Sheets, books, and three-dimensional objects weighing up to 3kg

Copy Paper

		Paper Cassette	Manual Feed Table
Copy Medium	Plain Paper (60 to 90 g/m^2)	O	O
	Recycled Paper (60 to 90 g/m^2)	O	O
	Special Paper (OHP and others)	—	O
	Thick Paper (91 to 120 g/m^2)	—	O
Copy Paper Size		A4L and A5C	A4L to A6L

O: Permissible; —: Not permissible
L : Lengthwise; C : Crosswise

Multiple Copies	:	1 to 49 copies (Count-Down System)
Warming-up Time	:	15 sec. or less when the ambient temperature is 23°C and with rated power voltage
Auto Clear Time	:	60 ±2 sec.
First Copy Time	:	9 sec. or less (A4 Lengthwise)
Continuous Copy Speed	:	7 copies/min. or more (A4 Lengthwise)
Magnification Ratio	:	x1.000 ±0.005
Lens	:	Through Lens (F=8. f=160 mm)
Exposure Lamp	:	Halogen Frost Tube Lamp
Fusing Temperature	:	185°C (Standby and Multicopy Mode) 190°C (Single Copy Mode)

Power/Current Consumption

Exposure Lamp (Rating)	Heater Lamp (Rating)	Max. Power Consumption	Max. Current Consumption
160V 215W	230V 950W	1335W	6.4A

Power Requirements : 230V, 50Hz

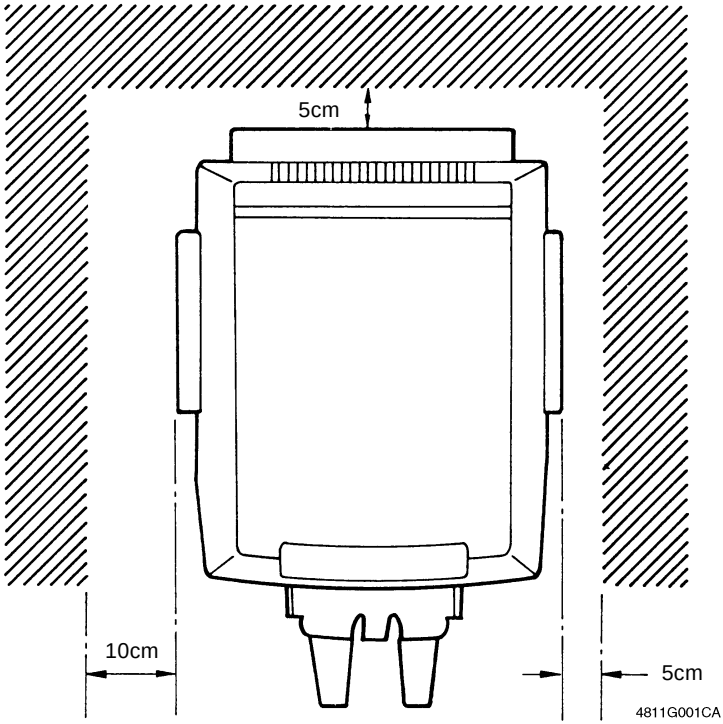
Environmental Conditions

Temperature	Humidity	Ambient Illumination	Levelness
10 to 30 °C with a fluctuation of 10°C or less per hour	15% to 85%RH with a fluctuation of 20%RH or less per hour	3000 lux or less	1° (5.25mm/300mm)

Dimensions	:	Width ..... 478 mm Depth ..... 556 mm (Excluding Paper Cassette) Height ..... 285 mm
Weight	:	19.3 kg (including Paper Cassette, Imaging Module, Starter and Toner)
Standard Accessories	:	Toner Bottle Starter Bottle Paper Cassette Installation Set

2 SPACE REQUIREMEMTS

- To ensure easy access and maintain high performance of the copier, the following clearances must be provided, especially at the rear and left sides where there are exhaust ducts.



3 PRECAUTIONS FOR INSTALLATION

Installation Site

To ensure safety and utmost performance of the copier, the copier should NOT be used in a place:

- Where it will be subject to extremely high or low temperature or humidity.
- Which is exposed to direct sunlight.
- Which is in the direct air stream of an air conditioner, heater or ventilator.
- Which has poor ventilation.
- Where ammonia gas might be generated.
- Which does not have a stable, level floor.
- Where it will be subject to sudden fluctuations in either temperature or humidity.
- Which is near any kind of heating device.
- Where it may be splashed with water.
- Which is dirty or where it will receive undue vibration.
- Which is near volatile flammables or curtains.

Power Source

Use an outlet with a capacity of 230V, 10A or more.

- If any other electrical equipment is sourced from the same power outlet, make sure that the capacity of the outlet is not exceeded.
- Use a power source with little voltage fluctuations.
- Never connect by means of a multiple socket any other appliances or machines to the outlet being used for the copier.
- Make the following checks at frequent intervals:
  - Is the power plug abnormally hot?
  - Are there any cracks or scrapes in the cord?
  - Has the power plug been inserted fully into the outlet?
- Ensure that the copier does not ride on the power cord or communications cable of other electrical equipment, and that it does not become wedged into or underneath the mechanism.

Grounding

To prevent receiving electrical shocks in the case of electrical leakage, always ground the copier.

- Connect the grounding wire to:
  - The ground terminal of the outlet.
  - A grounding contact which complies with the local electrical standards.
- Never connect the grounding wire to a gas pipe, the grounding wire for a telephone, or a water pipe.

4 PRECAUTIONS FOR USE

To ensure that the copier is used in an optimum condition, observe the following precautions.

- Never place a heavy object on the copier or subject the copier to shocks.
- Insert the power plug all the way into the outlet.
- Do not attempt to remove any panel or cover which is secured while the copier is making copies.
- Do not turn OFF 'O' the Power Switch while the copier is making copies.
- Provide good ventilation when making a large number of copies continuously.
- Never use flammable sprays near the copier.
- If the copier becomes inordinately hot or produces abnormal noise, turn it OFF 'O' and unplug it.
- Do not turn ON 'I ' the Power Switch at the same time when you plug the power cord into the outlet.
- When unplugging the power cord, do not pull on the cord; hold the plug and pull it out.
- Do not bring any magnetized object near the copier.
- Do not place a vase or vessel containing water on the copier.
- Use care not to drop paper clips, staples, or other small pieces of metal into the copier.

Operating Environment

The operating environmental requirements of the copier are as follows.

- Temperature: 10°C to 30°C with a fluctuation of 10°C per hour
- Humidity: 15% to 85% RH with a fluctuation of 20% RH per hour

Power Requirements

The power source voltage requirements are as follows.

- Voltage Fluctuation: AC 230V
  ±10% (Copying performance assured)
  −15% (Paper feeding performance assured)
- Frequency Fluctuation: 50 Hz ±0.3%

5 HANDLING OF THE CONSUMABLES

Before using any consumables, always read the label on its container carefully.

- Use the right toner. The applicable copier model name is indicated on the carton of Toner Bottles.
- Paper is apt to be easily damaged by dampness. To prevent absorption of moisture, store paper, which has been removed from its wrapper but not loaded into the Drawer, in a sealed plastic bag in a cool, dark place.
- Keep consumables out of the reach of children.
- Do not touch the PC Drum with bare hands.
- Store the paper, toner, and other consumables in a place free from direct sunlight and away from any heating apparatus.
- The same sized paper is of two kinds, short grain and long grain. Short grain paper should only be fed through the copier crosswise, long grain paper should only be fed lengthwise.
- If your hands become soiled with toner, wash them with soap and water immediately.
- Do not throw away any used consumables (PC Drum, starter, toner, etc.). They are to be collected.

NOTE

Do not burn, bury in the ground, or throw into the water any consumables (PC Drum, starter, toner, etc.).

6 SERVICE INSTRUCTIONS

Service Precautions

When servicing the copier, observe the following precautions.

- Unplug the copier from the power outlet before attempting to disassemble the copier.
- While power is being supplied to the copier, never unplug or plug in the connectors, including those on PWBs.
- When running the copier with the Covers removed, be careful not to allow your clothing and shirt sleeves to be caught in the Timing Belt or other revolving parts.
- Do not use flammable sprays near the copier while it is in operation.
- Do not bring your watch near the Imaging Module.
- Because there are two in-line fuses, even if one of these blows, there may still be a danger of electric shock.

Precautions for Handling the PWBs with MOS ICs

When handling the PWBs with MOS (Metal Oxide Semiconductor) ICs, observe the following precautions.

During transportation and storage:

- The PWBs must not be indiscriminately removed from the protective conductive bags.
- Do not store or place PWBs in a location exposed to direct sunlight.
- When a PWB is removed from the copier, do not place it in a location subject to static electricity or on a plastic or vinyl bag.
- Do not touch the pins of the IC with bare hands.

During replacement:

- When unplugging connectors from the PWB, make sure that the power cord has been unplugged.
- When removing the PWB from its conductive case or bag, do not touch the IC pins or the printed pattern. Hold only onto the edges of the Board.
- When plugging connectors to the PWB, be sure that the power cord has been unplugged.

During checking:

- Avoid checking the IC directly with a tester. Check the connectors on the board to determine whether the board is operational.
- Never strap pins of an IC with a metal tool.
- If any devices on the PWB must be touched with bare hands, be sure to ground your body.

Precautions for Handling the Imaging Module (IM)

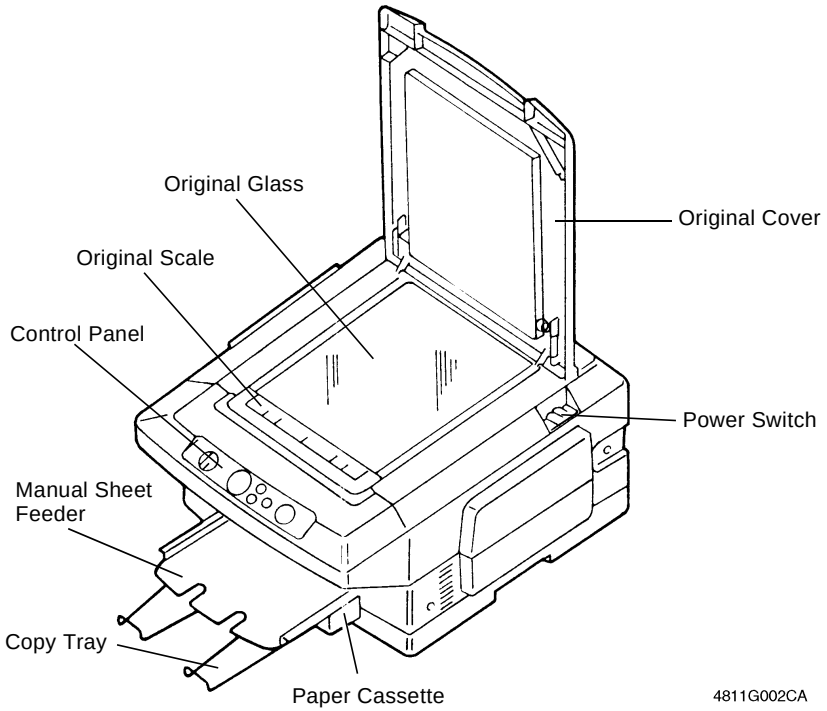
During transportation and storage:

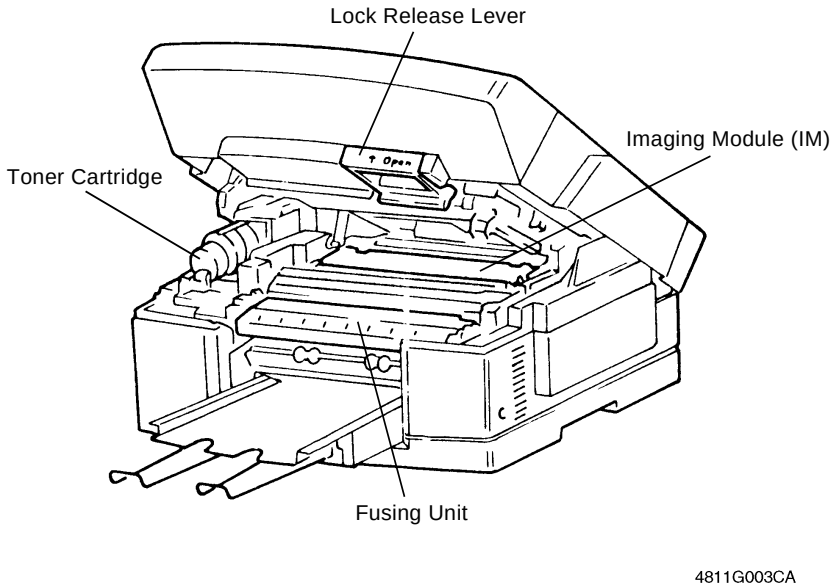
- Use the specified package for transportation and storage of the IM.
- Storage temperature for the IM is –20°C to +40°C.
- Avoid leaving the IM in a car for a long time during hot weather.

During handling:

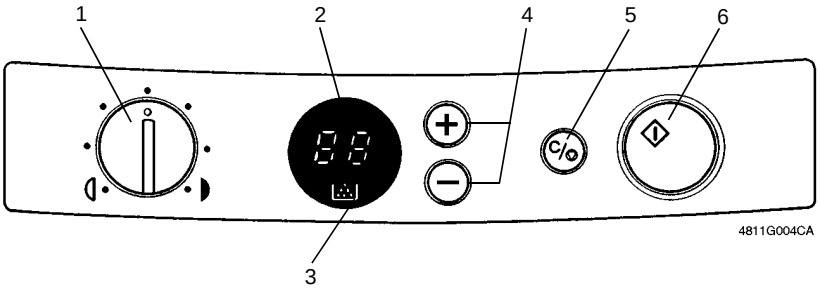
- When the IM has been removed from the copier, immediately store it in the dedicated package or protective cloth.
- The PC Drum exhibits great light fatigue and the recovery time is quite long. Do not, therefore, subject it to light for a long time.
- Do not touch the surface of the PC Drum with bare hands or stain it with oil or grease.
- Use utmost care not to damage the surface of the PC Drum.

7 PARTS IDENTIFICATION





8 CONTROL PANEL



1. Exposure Control Knob

- Turn to set the exposure level.

2.Multi-Functional Display

- Shows the following information:
  - Warming-up state ... Blinking "1"
  - Number of Copies set to be made ... "1" to "49"
  - Paper Empty ... "P"
  - Paper Jam..."PJ"
  - Copier opened ... "U5"
  - Trouble Code ... "C or E" and trouble Code number
  - Function Mode
    ... "F" and function mode number
  - Adjustment Mode
    ... "A" and adjustment mode number
  - End of drum life
    ... Displays the PC Drum life... "du" / "Su"
  - Copy Counter
    ... Displays the number of copies made

For more information, see the Function/Adjustment Mode Section.

3. Add Toner Indicator

- Lights up when toner in the Toner Cartridge runs out, prompting the user to replace the Toner Cartridge with a new one.

4. Up/Down Keys

- Whether they are used with the Clear/Stop Key or not, the Up and Down Keys have the following four functions:
  - Sets the number of copies to be made
    Press the Up Key (⊕) to increment the number of copies to be made by 1, with the exception that the number "49" changes to "1".
    Press the Down Key (⊖) to decrement the number of copies to be made by 1, with the exception that the number "1" changes to "49".
  - Displays the Copy Counter.
  - Provisional processing for drum life display (Credit Function)
  - Switches between the function and adjustment modes and selects the required mode.

  For more information, see the Function/Adjustment Mode Section.

5. Clear/Stop Key

- When not used with the Up and Down Keys, the Clear/Stop Key has the following three functions:
  - Stops a multi-copy process.
    By pressing this key during a multi-copy process, "1" appears on the Multi-Functional Display and the copier stops as soon as the paper comes out of the copier. After the copier has stopped, the Multi-Functional Display shows the remaining number of copies to be made.
  - Clears the number of copies set
    The set number of copies to be made is reset to "1".
  - Stops/clears the function/adjustment mode.

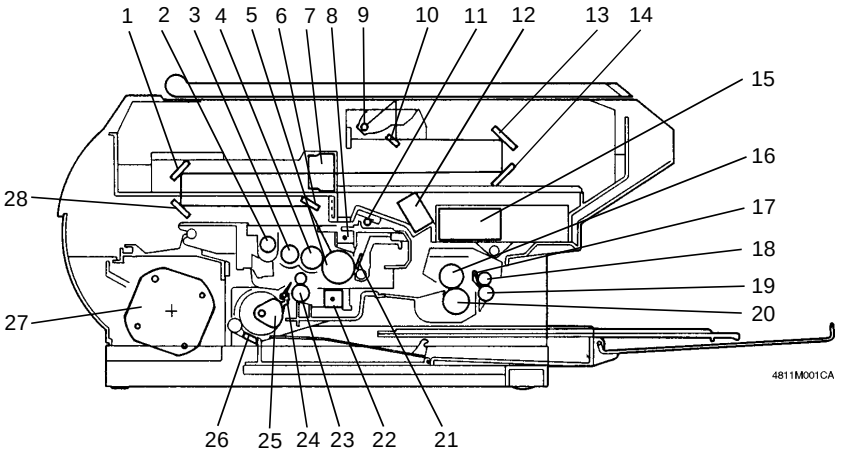
  For more information, see the Function/Adjustment Mode Section.

6. Start Key

- Starts the Copy/Function Mode.

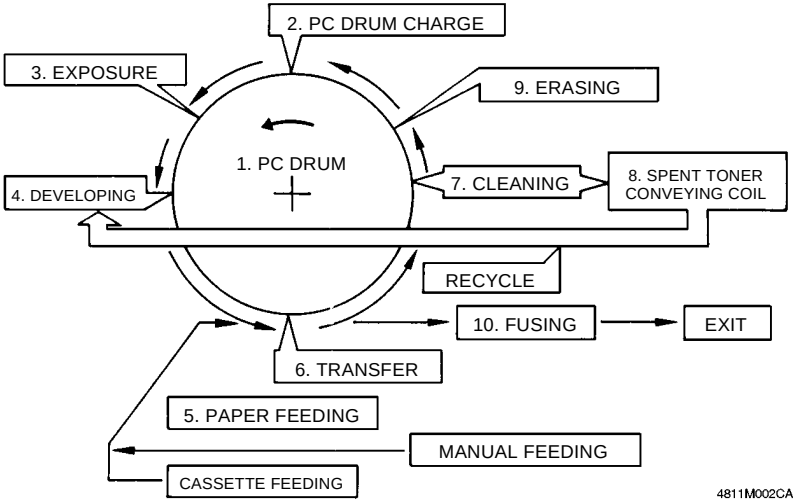
MECHANICAL/ ELECTRICAL

1 CROSS-SECTIONAL VIEW



1. 4th Mirror
2. 2nd Developer Mixing Screw
3. 1st Developer Mixing Screw
4. Sleeve/Magnet Roller
5. PC Drum
6. 6th Mirror
7. Lens
8. PC Drum Charge Corona
9. Exposure Lamp
10. 1st Mirror
11. Erase Lamp
12. Ozone Filter
13. 2nd Mirror
14. 3rd Mirror
15. Scanner Cooling Fan Motor
16. Upper Fusing Roller
17. Paper Exit Switch
18. Paper Exit Rolls
19. Paper Exit Roller
20. Lower Fusing Roller
21. Cleaning Blade
22. Image Transfer Corona
23. Synchronizing Roller
24. Paper Leading Edge Sensor
25. Paper Feed Roller
26. Paper Separator Pad
27. Main Drive Motor
28. 5th Mirror

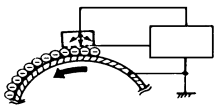
2 COPY PROCESS



1. PC Drum

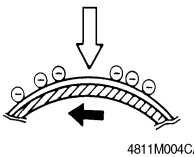
- The PC Drum is an aluminum cylinder coated with a photosensitive semiconductor. It is used as the medium on which a visible developed image of the original is formed.

2. PC Drum Charge



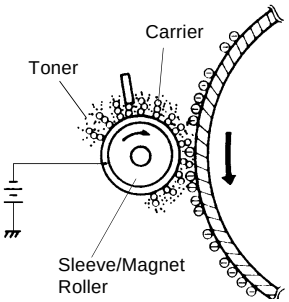
- The PC Drum Charge Corona Unit is equipped with a single wire and a Scorotron Grid. The negative corona emission from the wire is used to charge the surface of the PC Drum. The Scorotron Grid functions to control the potential of that charge and to ensure that the charge level is maintained evenly across the entire surface of the PC Drum.

3. Exposure



- Light from the Exposure Lamp striking the white and halftone areas of the original is reflected onto the PC Drum. The level of the negative charges on the surface of the PC Drum which are struck by light is reduced in accordance with the intensity of that light. Charges remaining on the surface of the PC Drum form the electrostatic latent image.

4. Developing



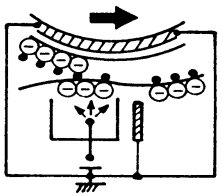
1140M004

- When carrier and toner are mixed together, the toner becomes positively charged triboelectrically. Being supplied by the Sleeve/Magnet Roller, the positively charged toner is attracted onto the electrostatic latent image changing it to a visible, developed image.
- A DC negative bias voltage is applied to the Sleeve/Magnet Roller to prevent toner from being attracted onto those areas of the PC Drum which correspond to the background areas of the original.

5. Paper Feeding

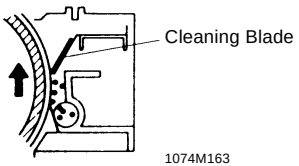
- The Paper Cassette can accommodate up to 100 pieces of A4L or A5C paper.
- Manual feed copying is possible only for one sheet at a time.

6. Transfer


4811M005CA

- In the image transfer process, a DC negative corona emission is applied to the underside of the paper thereby attracting the positively charged toner onto the surface of the paper to form a visible, developed image of the original.

7. Cleaning



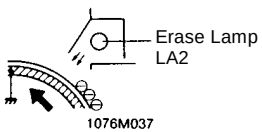
1074M163

- The residual toner left on the surface of the PC Drum after completion of image transfer is scraped off by the Cleaning Blade.
- Toner scraped off by the Cleaning Blade is collected by the Spent Toner Conveying Coil.

8. Spent Toner Conveying Coil

- The Spent Toner Conveying Coil rotates to transfer toner to the Developing Unit through the Toner Recycling Coil.

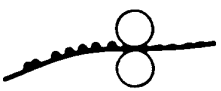
9. Erasing



1076M037

- Light from the Erase Lamp neutralizes any surface potential remaining on the surface of the PC Drum after cleaning.

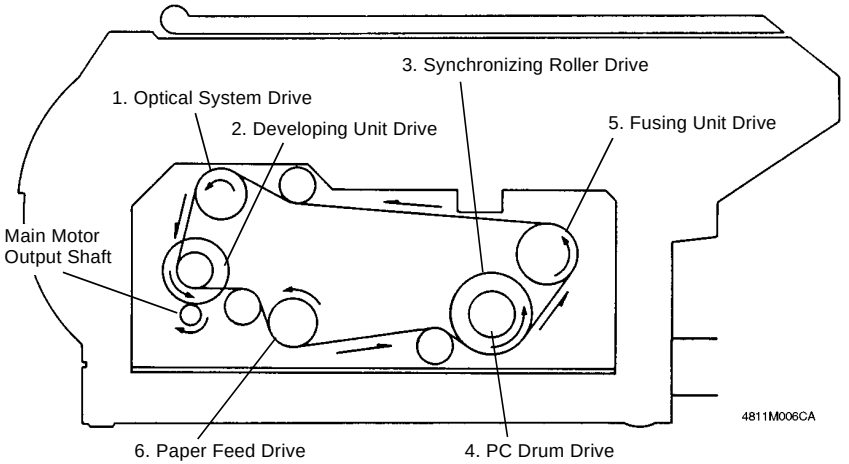
10. Fusing


1076M038

- The developed image is permanently fused to the paper by a combination of heat and pressure applied by the Upper and Lower Fusing Rollers.

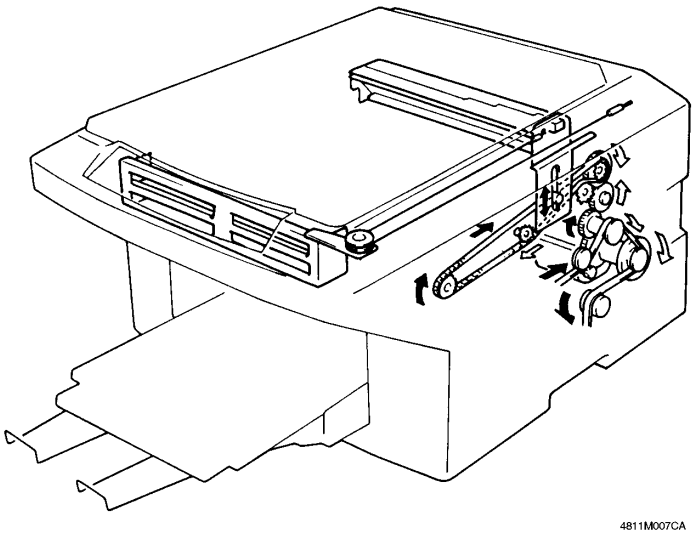
3 DRIVE SYSTEM

Main Belt Drive

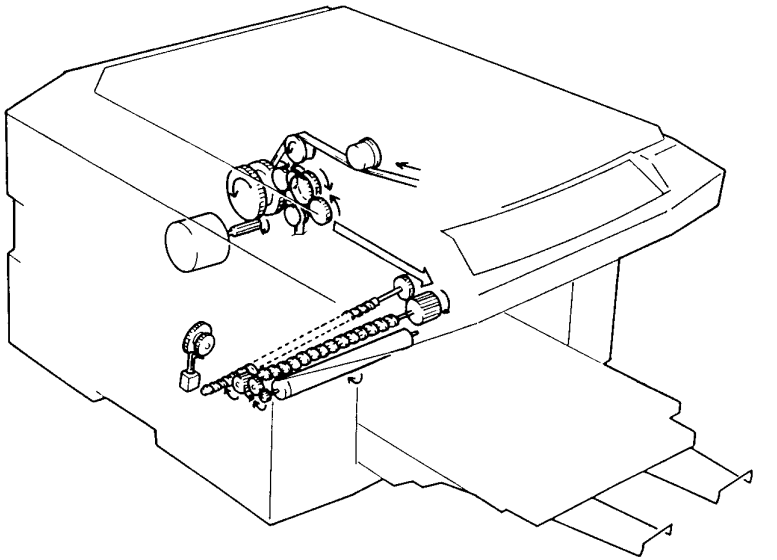


* This copier uses the Main Motor (M1) to drive most of the copy process mechanisms. The driving force of the Main Motor is transmitted to those mechanisms mainly by the Main Belt Drive. The drive mechanisms are shown below.

1. Optical System Drive

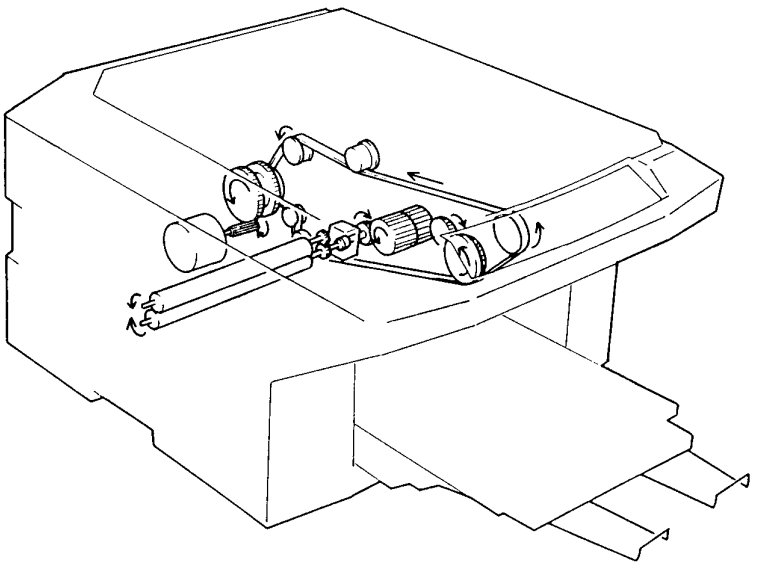


2. Developing Unit Drive



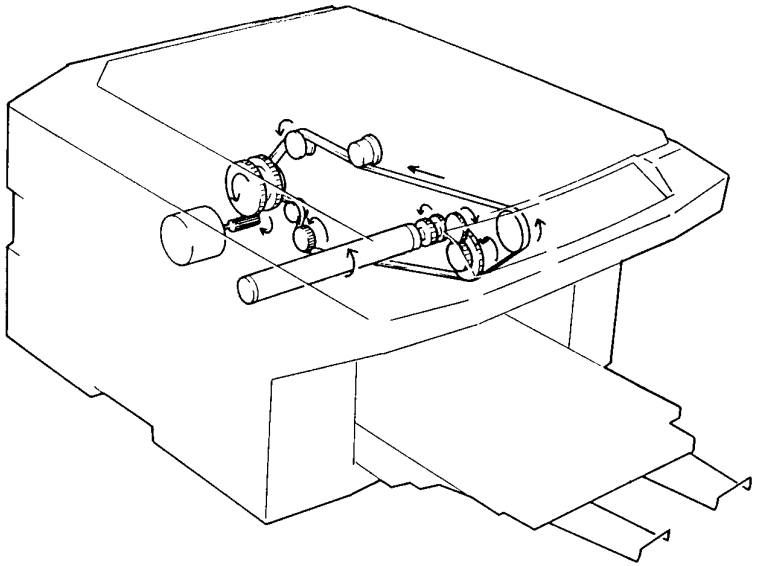
4811M008CA

3. Synchronizing Roller Drive



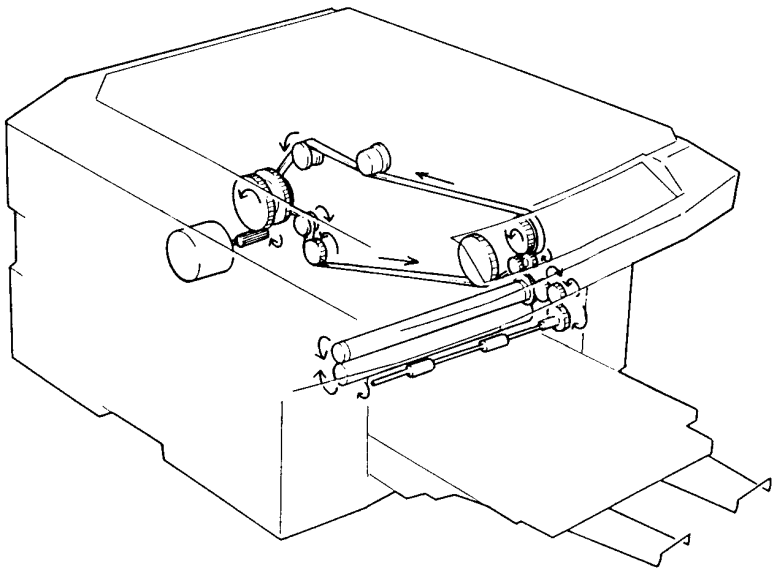
4811M009CA

4. PC Drum Drive



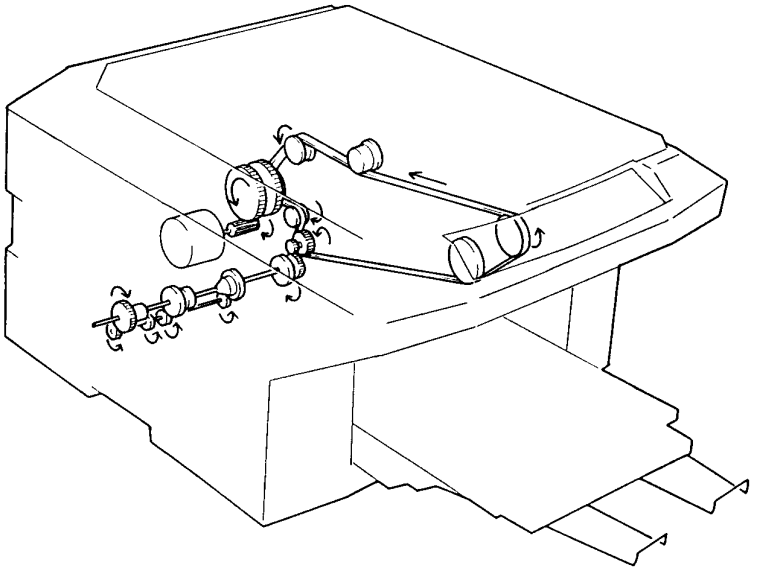
4811M010CA

5. Fusing Unit Drive



4811M011CA

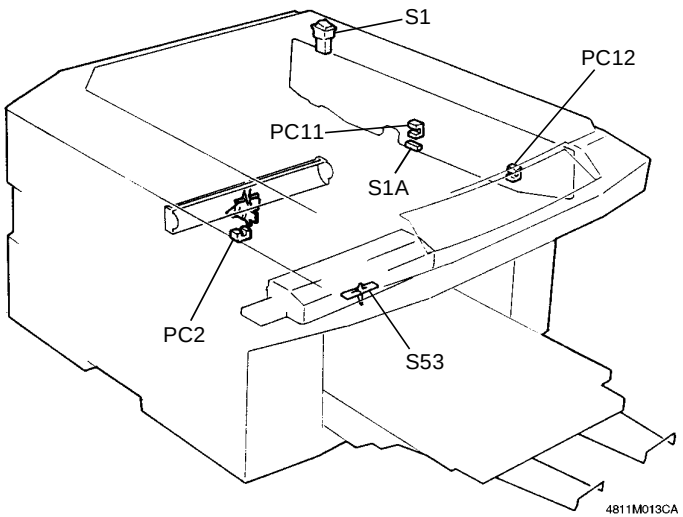
6. Paper Feed Drive



4811M012CA

4 SWITCHES AND SENSORS

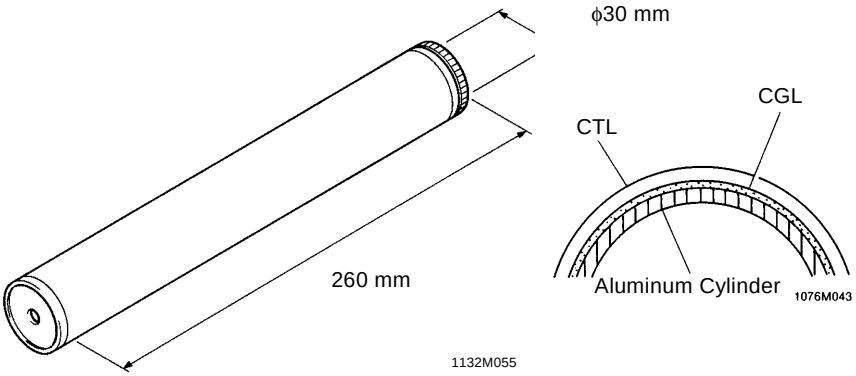
Symbol	Name	Function	Signal
S1	Power Switch	Turns ON and OFF all supply of power to the copier	
S1A on PWB-A	Open Detecting Switch	Detects that the Upper Half of the Unit is open.	
PC11 (B1) on PWB-A	Scanner Home Position Sensor	Detects the home position of the Scanner and the timing of feed start.	
PC12 (B2) on PWB-A	Scanner Synchronizing Position Sensor	Detects the scan position of the Scanner and timing at which the Synchronizing Rollers are started.	
PC2	Paper Leading Edge Sensor	Detects the leading and trailing edges of a sheet of paper and serves also as a jam sensor.	[L] : No Paper Present [H] : Paper Present
S53	Paper Exit Switch	Detects the leading and trailing edges of a sheet of paper and serves also as a jam sensor.	[L] : No Paper Present [H] : Paper Present



5 IMAGING MODULE (IM)

- This copier is equipped with what we call an Imaging Module, or IM, which integrates a Toner Replenishing mechanism, Developing mechanism, PC Drum, PC Drum Charge Corona, Image Transfer Corona, Cleaning Unit, and Toner Recycling mechanism into one assembly. The life of the IM is 25,000 copies.

5-1. PC DRUM



5-1-1. PC Drum

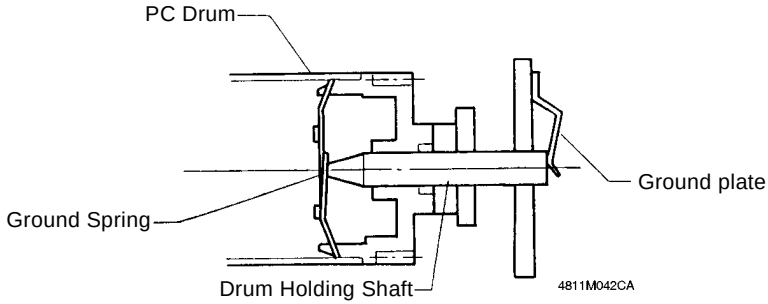
- The OPC, or Organic Photoconductor Drum used in this copier is small in diameter (30 mm), ensuring good paper separation. It consists of two distinct organic photoconductive layers on an aluminum alloy base: the outer layer is called the Carrier Transport Layer (CTL) and the inner the Carrier Generating Layer (CGL).
- During the period of initial use, this Organic Photoconductor has a glossy, wine-red surface. Since, however, the degree of hardness of this surface is rather low, faint lines corresponding to the edges of the paper will appear around the surface of the Drum after several tens of copies have been made. These lines will, however, in no way affect image quality.
- This photoconductor exhibits greatest light fatigue after being exposed to strong short and long wavelength light over an extended period of time. It is therefore necessary to protect the Drum with a Drum Cloth immediately after the IM has been removed from the copier.

5-1-2. PC Drum Drive

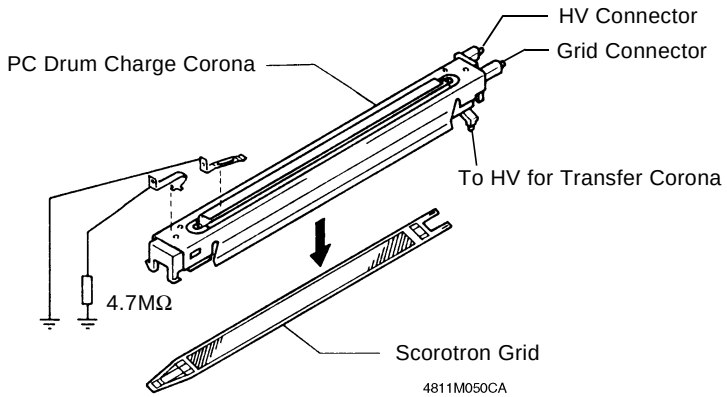
- The PC Drum is driven from the Main Motor via the gears, belts and pulleys. For details, see Section 3. DRIVE SYSTEM.

5-1-3. Grounding of the PC Drum

- The PC Drum is grounded through its Ground Spring, Drum Holding Shaft, Ground Plate and Harness to the Ground Plate of the Copier.



5-2. PC DRUM CHARGING



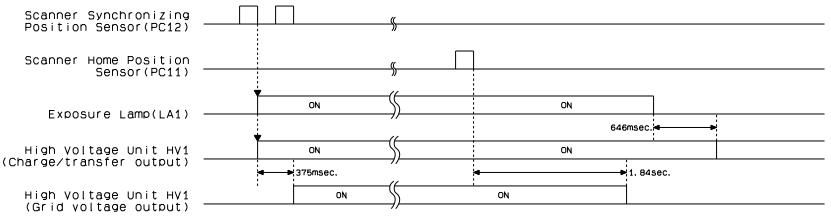
5-2-1. PC Drum Charge Corona

- The PC Drum Charge Corona in this copier is equipped with a Scorotron Grid which ensures that an even charge is deposited across the entire surface of the PC Drum.

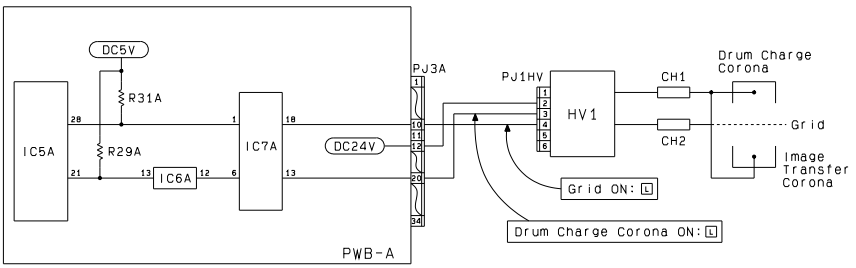
5-2-2. Drum Charging ON/OFF Control

- Charging of the PC Drum is controlled by whether the Scorotron Grid is grounded or not.
- After the Start Key is depressed, the Scanner moves from its home position to its synchronizing position. When it has passed the Scanner Synchronizing Position Sensor once, the charge/transfer output (-7kVDC) of the High Voltage Unit switches on, causing the Drum Charge Corona Wire to start giving a corona emission to the PC Drum. At this point, the PC Drum is not yet charged since the Grid is grounded.
- 375 msec. after the charge/transfer output of the High Voltage Unit switches on, the grid voltage output (-630VDC) of the High Voltage Unit switches on to start charging the PC Drum.
- The Scanner then starts a scanning motion. 1.84 sec. after the Scanner has blocked the light of the Scanner Home Position Sensor once, the grid voltage output of the High Voltage Unit switches off, completing the charging of the PC Drum. The charge/transfer output switches off 646 msec. after the Exposure Lamp goes off.

Time Chart



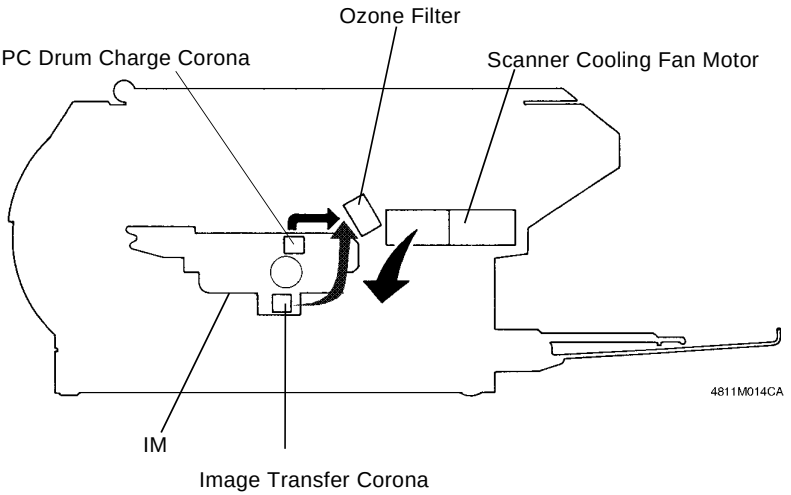
4811T13M



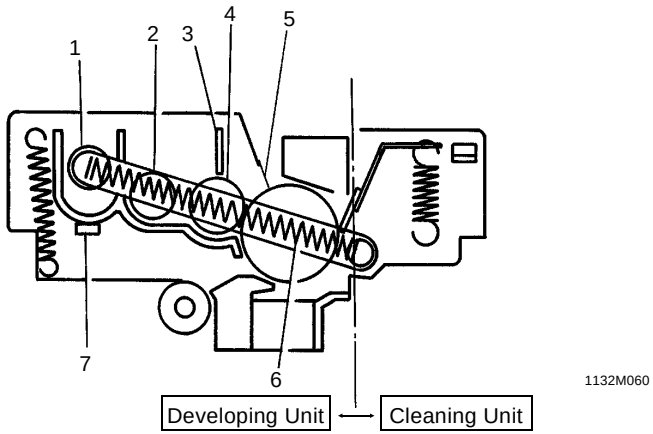
4811C01MCA

5-2-3. Ozone Filter

- Ozone produced by the PC Drum Charge Corona and Image Transfer Corona is absorbed by the Ozone Filter located to the front of the IM from the air being drawn out of the copier by Scanner Cooling Fan Motor M2.



5-3. DEVELOPMENT



5-3-1. Developing Unit: Components and Their Functions

1. **2nd Developer Mixing Screw**
   This Screw rotates to transport toner and starter onto the 1st Developer Mixing Screw.
2. **1st Developer Mixing Screw**
   This screw rotates to supply toner and starter transported from the 2nd Developer Mixing Screw onto the Sleeve/Magnet Roller.
3. **Doctor Blade**
   This Blade regulates the height of the developer brush on the surface of the Sleeve Roller.
4. **Sleeve/Magnet Roller**
   The outer Sleeve Roller rotates, while the inner Magnet Roller remains stationary. As the Sleeve Roller rotates, it conveys the developer to the point of development where the toner is attracted onto the electrostatic latent image.
5. **Toner Scattering Prevention Mylar**
   This Mylar strip is in light contact with the surface of the PC Drum, thus effectively stopping any airborne toner and carrier from floating up into the copier.
6. **Toner Recycling Coil**
   This Coil rotates to carry the toner which has been scraped off the surface of the PC Drum by the Cleaning Blade to the 2nd Developer Mixing Screw.
7. **ATDC Sensor**
   This Sensor detects the toner-to-carrier ratio of the developer.

5-3-2. Developer/Toner Flow

- As the Developing Unit is energized, developer and toner flow through the Developer Chamber as follows.

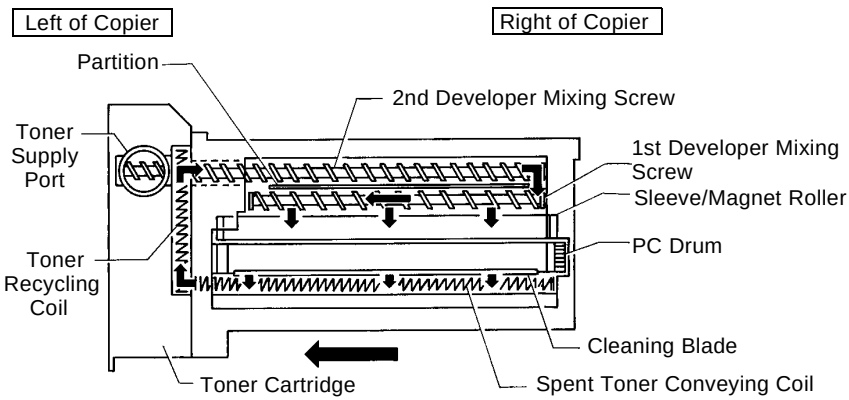
The starter and toner are fed through the Toner Supply Port from the Starter Cartridge and Toner Cartridge, respectively.

The replenished toner merges with the developer and they are mixed and agitated as they are fed from the left to right end. The ATDC Sensor located under the 2nd Developer Mixing Screw near the left end of the Unit detects the ratio of toner and carrier composing the developer. The Partition between the 2nd and 1st Developer Mixing Screws prevents the developer being conveyed by the 2nd Developer Mixing Screw from entering the 1st Developer Mixing Screw before it has been conveyed all the way to the right end of the Unit.

As the 1st Developer Mixing Screw rotates, the developer is, while being agitated, conveyed from the right end to the left. During that time, developer which is adhering to the Sleeve/Magnet Roller is carried to the point of development by the rotating Sleeve Roller.

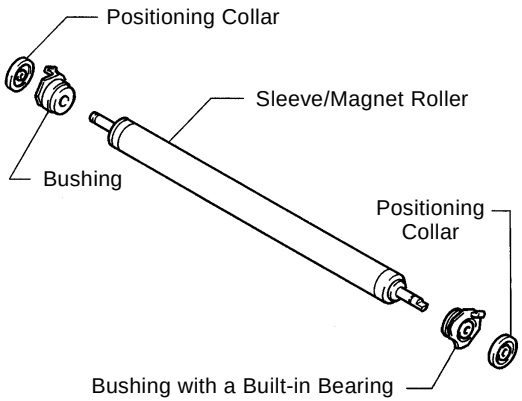
After development, residual toner on the surface of the PC Drum is scraped off by the Cleaning Blade and conveyed by the Spent Toner Conveying Coil onto the Toner Recycling Coil.

At the left of the Unit, the toner is conveyed by the Toner Recycling Coil again onto the 2nd Developer Mixing Screw.



5-3-3. Sleeve/Magnet Roller

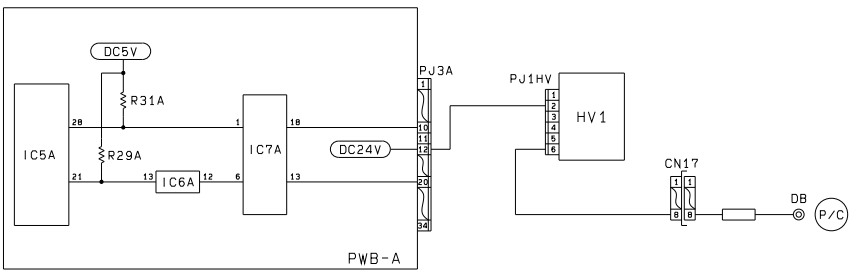
- The Magnet Roller is made up of five magnets asymmetrically packed as shown in the illustration on the next page.
- The Sleeve Roller, onto which developer is attracted by the magnetic fields of force set up by the poles of the Magnet Roller, rotates clockwise to convey the developer toward the point of development.
- The amount of developer being conveyed toward the point of development is strictly regulated by the height of the gap between the Doctor Blade and the surface of the Sleeve Roller. Developer which has passed through the gap is conveyed to the point of development. After development, the carrier and remaining toner are conveyed back into the Developer Chamber.



1132M062

◆ Developing Bias

- A bias voltage of about -170V is applied to the Sleeve Roller to prevent toner from being attracted onto the non-image areas on the surface of the PC Drum. Bias voltage is ON, if Power Switch is ON.



4811C02MCA

5-3-4. Function of Each Magnet

N3B : This pole causes the developer brush on the surface of the Sleeve Roller to stand up straight so that it's height will be regulated evenly by the Doctor Blade.

S2A, S2B : These two poles cause the developer bristles on the surface of the Sleeve Roller to stand up straight so that their height will be regulated evenly by the Doctor Blade.

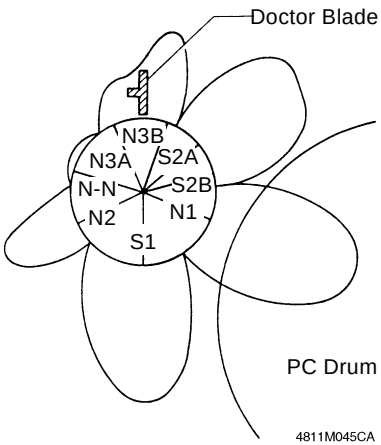
N1 : This is the principal pole and its lines of magnetic flux at the point of development are perpendicular to the surface of the PC Drum. Therefore, when toner is attracted to the latent image, the carrier is firmly held onto the Sleeve Roller.

S1 : The height between the N1 and S1 poles is held low to ensure that the developer is easily recycled.

N2 : The developer is prevented from moving out toward the photoconductor by this pole and falls off the Sleeve Roller to be recycled toward the Screws.

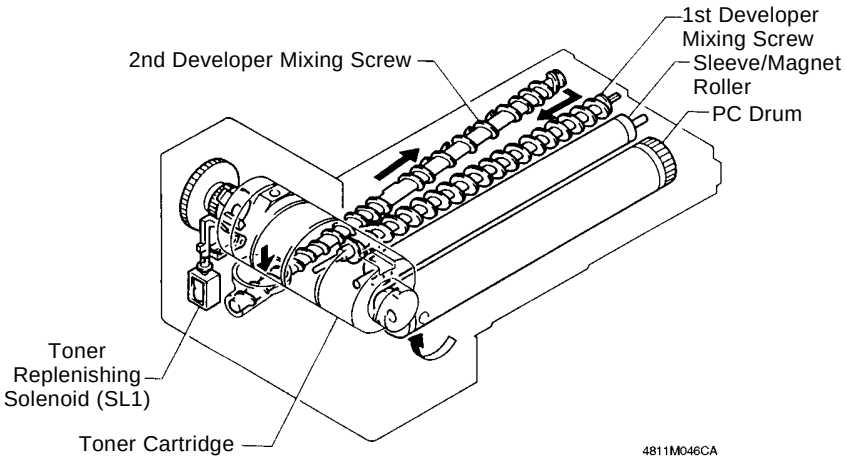
N-N : As the developer approaches the N-N pole, it falls into the 1st Developer Mixing Screw for recycling.

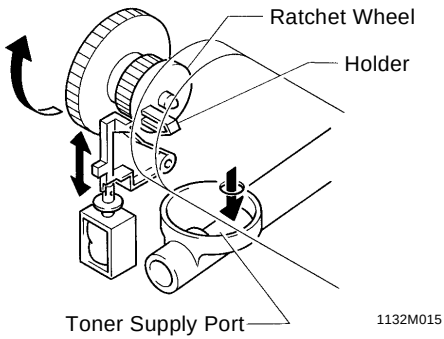
N3A : The agitated developer is attracted onto the surface of the Sleeve Roller to form a developer brush.



5-3-5. Toner Replenishing Mechanism

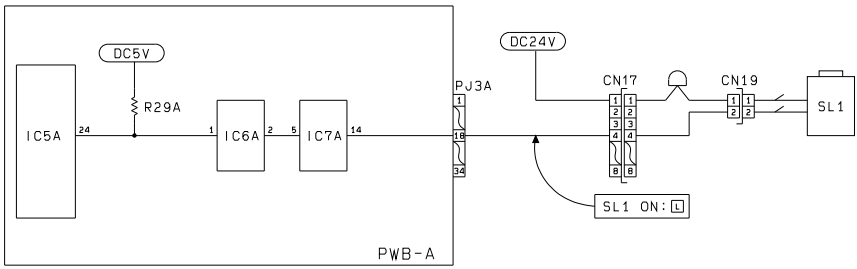
- Toner is supplied from the Toner Cartridge installed in the Toner Cartridge Holder.
- When the CPU determines that the toner to carrier ratio as detected for each copy by the ATDC Sensor has fallen below a predetermined level, Toner Replenishing Solenoid SL1 is energized.
- When Toner Replenishing Solenoid SL1 is energized, the Pawl of the Solenoid is disengaged from the Ratchet Wheel. This results in drive being transmitted to the Ratchet Wheel. This results in drive being transmitted to the Holder and the Toner Cartridge coupled to the Holder rotates one complete turn together with the Holder. As a result, toner is supplied through the Toner Supply Port and conveyed by the 2nd Developer Mixing Screw to the Developer Chamber.





5-3-6. Toner Replensishing Control

- When the CPU determines that the toner to carrier ratio is below the predetermined level as a result of ATDC detection, the output of PJ3A-18 on PWB-A switches Low upon termination of the ATDC detection. This energizes the Toner Replenishing Solenoid (SL1) to replenish toner once.
- If the CPU determines that the toner to carrier ratio is below the predetermined level five or more consecutive times (copies), toner is replenished three times when the next copy is made.
- The amount of toner replenished in each toner replenishing sequence is 30mg or more.

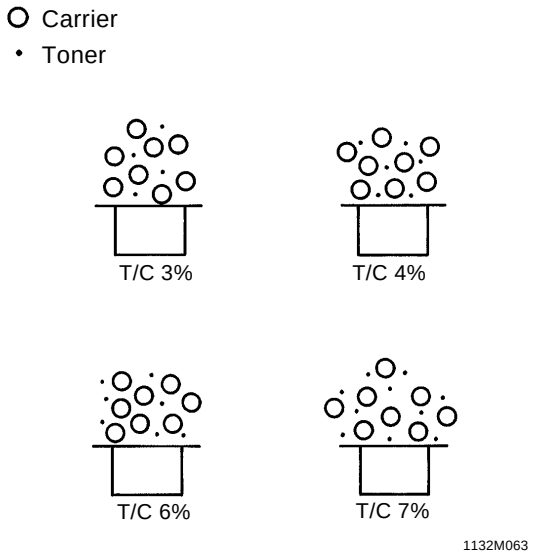


4811C03MCA

5-3-7. ATDC Detection

- The ratio of toner to carrier in the developer is detected by a magnetic flux sensor. The output of this sensor is used to control toner replenishment so that a stabilized toner to carrier ratio is maintained. This means that copies having a stabilized image density will be produced.
- The ATDC Sensor is located on the bottom side of the Developing Unit directly under the 2nd Developer Mixing Screw. The developer being conveyed by the 2nd Developer Mixing Screw passes over the top of the Sensor. As the toner in the developer is consumed during development, the amount of carrier increases. This change in the toner to carrier ratio results in a change in the magnetic flux. This in turn is converted to a corresponding voltage VC to be applied to the ATDC-Sensor and the value stored in the EEPROM.
- The reference voltage of the ATDC Sensor is set so that the toner to carrier ratio is maintained at 5.0%. By comparing the applied voltage with this reference value, the EEPROM determines the current toner to carrier ratio of the developer.

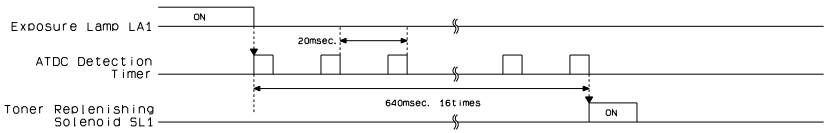
For more information, see the Function/Adjustment Mode Section.



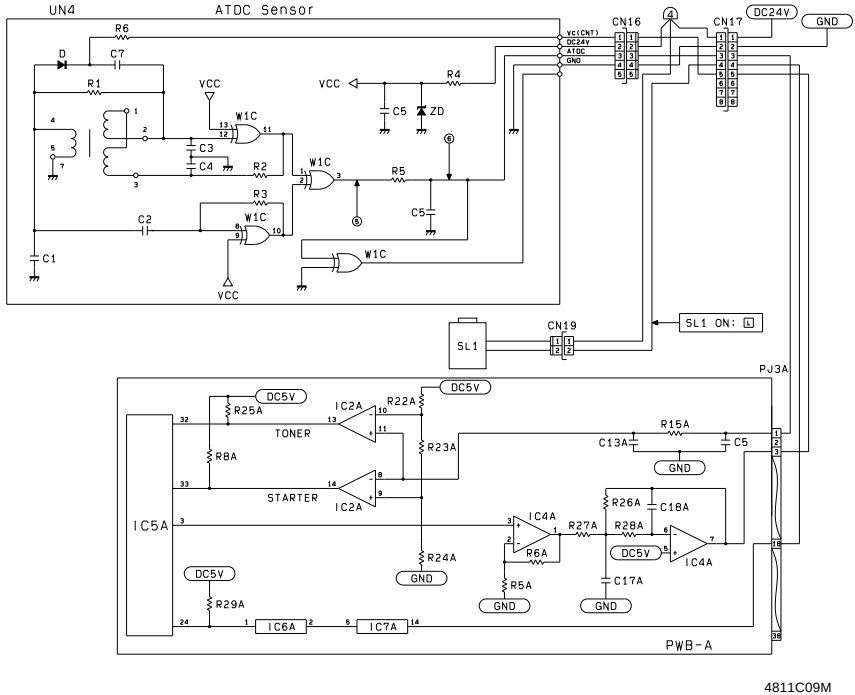
5-3-8. ATDC Detection Control

- ATDC detection is started as soon as the Exposure Lamp (LA1) turns off after the scan is over, and is performed 16 times during 640 msec. at intervals of 20 msec.. If the ratio of toner to carrier is determined to be less than the set value eight or more times, the Toner Replenishing Solenoid (SL1) is energized to replenish toner.

Time Chart



4811T11M



4811C09M

5-3-9. ATDC Automatic Adjustment

- Since this copier is shipped from the factory without the IM being charged with the starter, the reference voltage of the ATDC Sensor must be adjusted when setting up the machine at the user. After this copier is switched on by the user and has then warmed up, the Micro Controler enters the ATDC automatic adjustment mode to adjust the control voltage VC of the ATDC Sensor after pressing the Copy Key.
- When the IM has been changed, therefore, the EEPROM must also be changed.

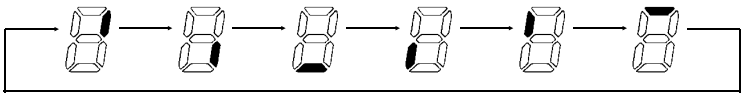
Automatic Adjustment Operation and Control Sequence

When the power is switched on and the copier has warmed up, "UF" is displayed on the Control Panel.

Raise the Upper Half of the Unit, remove the seal of the starter bottle, and close the Upper Half.

Depress the Copy Key.

The starter charge mode starts and the Starter is supplied to the Developer. The Toner Replenishing Solenoid SL1 is energized every 1.77 sec. At this time, the bars of the 7-Segment Display change from one to another as shown below:



Whether developer has been supplied to the Developer Chamber is verified. For the verification procedure, the ATDC Sensor output voltage is detected as:

0.5V or higher

Less than 0.5V

Starter charge mode failure detected: E1 is shown.

repeat one times

ATDC automatic adjustment mode starts.

Verification is made to see if the average of the voltage readings falls within the ATDC adjusting range

The ATDC control voltage is stored in EEPROM.

The copier is ready to make a copy.

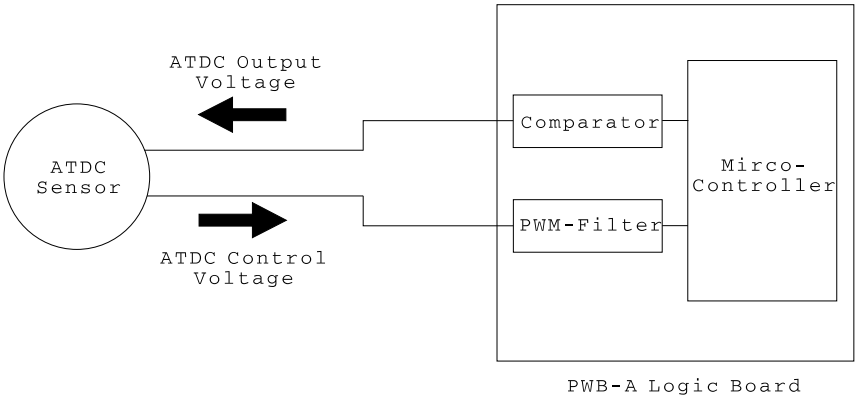
ATDC automatic adjustment failure: E2 is shown.

repeat one times

* This mode can be restarted even after "E2" has been displayed.

5-3-10. ATDC Automatic Adjustment Control

- In the ATDC automatic adjustment mode, the ATDC Sensor will be adjusted to the 8% starter. After calculation the 5% toner to carrier ratio value will be stored in the EEPROM. This alignment is running automatically and adjusts the complete system (ATDC- Sensor and Logic Board).



4811C10M

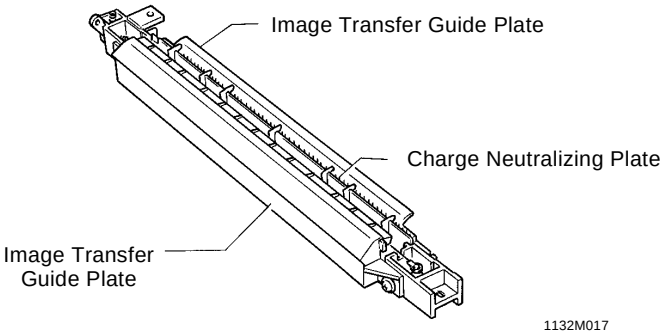
5-3-11. Toner Empty Detecting Mechanism

- Since the design feature of this copier dictates that the Developing Unit must be built compactly, the conventional toner empty detecting mechanism using a reed switch and lever cannot be employed. The ATDC Sensor is therefore used to detect the toner- empty condition.
- The ATDC Sensor detects the toner to carrier ratio of the developer each time a copy is made. There is an ATDC Counter used that counts 14 consecutive copies made with a toner to carrier ratio less than the level set in the Adjustment mode.
- Unlike other copiers, this machine will allow you to make as many copies as you want after the Add Toner indicator starts blinking. Also, there is no toner end recovery sequence for this machine.

5-4. IMAGE TRANSFER

5-4-1. Image Transfer Corona

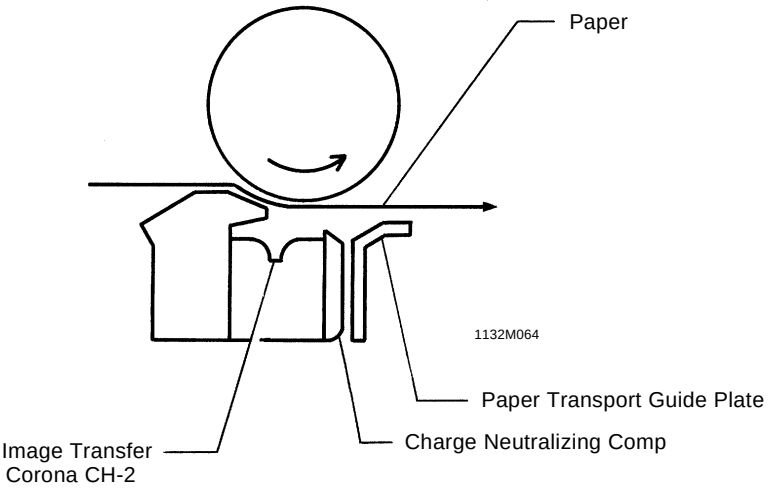
- The Image Transfer Corona deposits negative charges onto the underside of the sheet of paper passing under the PC Drum to effect transfer of the visible toner image from the surface of the PC Drum to the surface of the paper.



5-4-2. Image Transfer Corona ON/OFF Control

- The Image Transfer Corona is switched on/off in synchronization with the ON/OFF of the PC Drum Charge Corona.

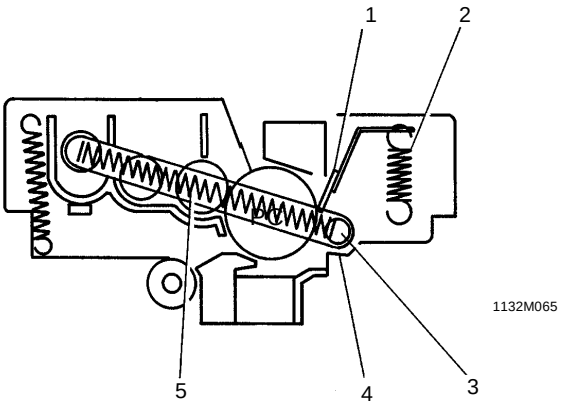
5-5. SEPARATION



5-5-1. Separation

- Paper being fed through the copier adheres to the surface of the PC Drum because of the charge applied to its underside by Image Transfer Corona CH-2. This charge is neutralized by the Charge Neutralizing Comp to help the paper separate from the surface of the PC Drum easily. Further, the small diameter of the PC Drum (ϕ30 mm) aids separation because of the inherent strength in the paper.

5-6. CLEANING UNIT



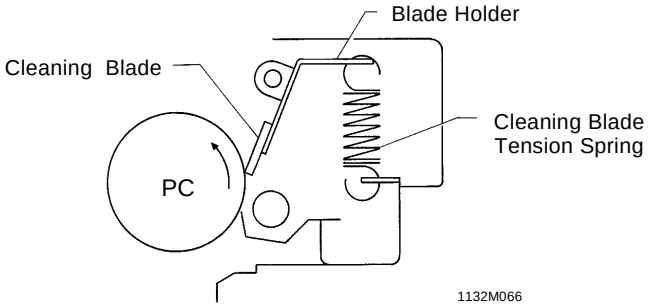
5-6-1. Construction of the Cleaning Unit

1. **Cleaning Blade**
   Scrapes any residual toner off the surface of the PC Drum.
2. **Cleaning Blade Tension Spring**
   Presses the Cleaning Blade tightly against the surface of the PC Drum.
3. **Spent Toner Conveying Coil**
   Rotates to convey the toner scraped off the surface of the PC Drum by the Cleaning Blade to the Toner Recycling Coil.
4. **Toner Anti-Spill Mylar**
   Prevents the toner scraped off the surface of the PC Drum by the Cleaning Blade from falling down onto the surface of the copy paper or the Paper Transport Guide Plate.
5. **Toner Recycling Coil**
   Recycles the toner scraped off the surface of the PC Drum to the Developing Unit.

5-6-2. Cleaning Blade Pressure Mechanism

- The Cleaning Blade is installed in the Cleaning Unit at an angle shown in the illustration and is pressed against the surface of the PC Drum in opposition to the direction of rotation of the PC Drum.

Where the Cleaning Blade is Pressed Tightly up Against the Surface of the PC Drum:



5-6-3. Toner Recycling Mechanism

- This copier is not equipped with a Spent Toner Collecting Bottle. Rather, it employs a toner recycling mechanism which recycles the toner scraped off the surface of the PC Drum by the Cleaning Blade back to the Developer Chamber.

Residual toner is scraped off the surface of the PC Drum by the Cleaning Blade.

↓

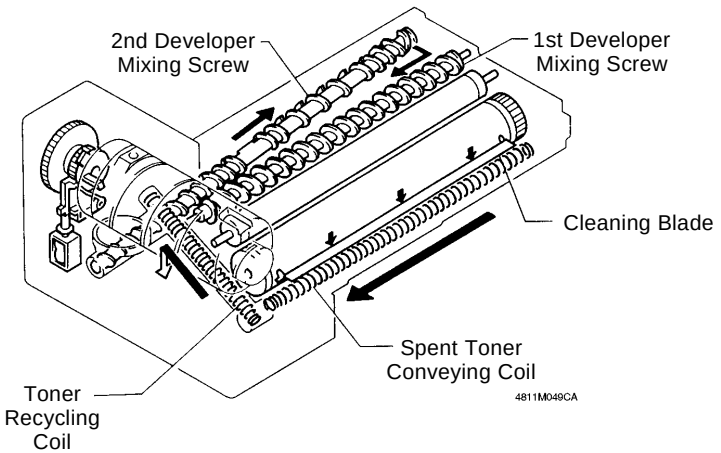
The toner is conveyed by the Spent Toner Conveying Coil to the Toner Recycling Coil.

↓

The spent toner fed to the Toner Recycling Coil is again conveyed onto the 2nd Developer Mixing Screw.

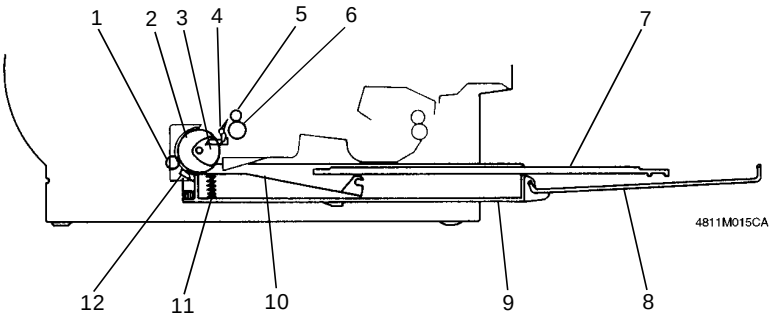
↓

The spent toner in the Developer Chamber, being mixed with fresh toner replenished from the Toner Cartridge, is conveyed onto the 1st Developer Mixing Screw and then onto the surface of the PC Drum by the Sleeve/Magnet Roller.



6 PAPER FEEDING SECTION

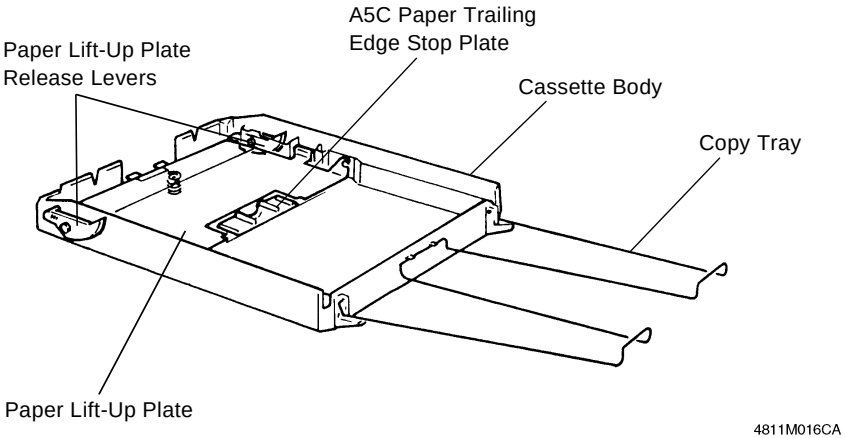
6-1. Components



1. Paper Feed Rolls
2. Paper Feed Roller
3. Paper Take-Up Roller
4. Paper Leading Edge Sensor PC2
5. Upper Synchronizing Roller (at IM)
6. Lower Synchronizing Roller
7. Manual Sheet Feeder/Cassette Cover
8. Copy Tray
9. Paper Cassette
10. Paper Lift-Up Plate
11. Spring
12. Paper Separator Pad

6-2. Paper Cassette

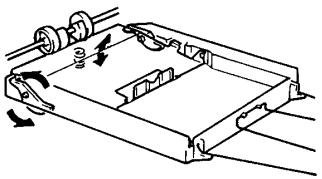
- In this Cassette, approximately 100 pieces (80g/m^2) of A4L or A5C paper can be loaded. Note that when A5C paper is to be loaded, the A5C paper trailing edge stop plate must be raised.



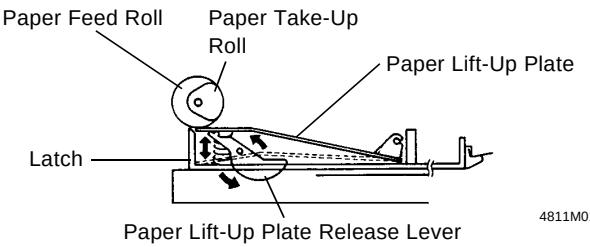
4811M016CA

6-3. Paper Life-Up Plate Release Mechanism

- When the Cassette is set into position in the copier, the projections of the copier frame push the Latches which hold the Paper Lift-Up Plate Release Levers, unlocking the Paper Lift-Up Plate Release Levers. The spring forces the Paper Lift-Up Plate up, pressing the paper stack up against the Paper Feed Rolls and making the top sheet of paper ready to be fed.
- When the Cassette is pulled out of the copier, the copier lower frame causes the Paper Lift-Up Plate Release Levers to be raised and then locked so that paper can be replenished.



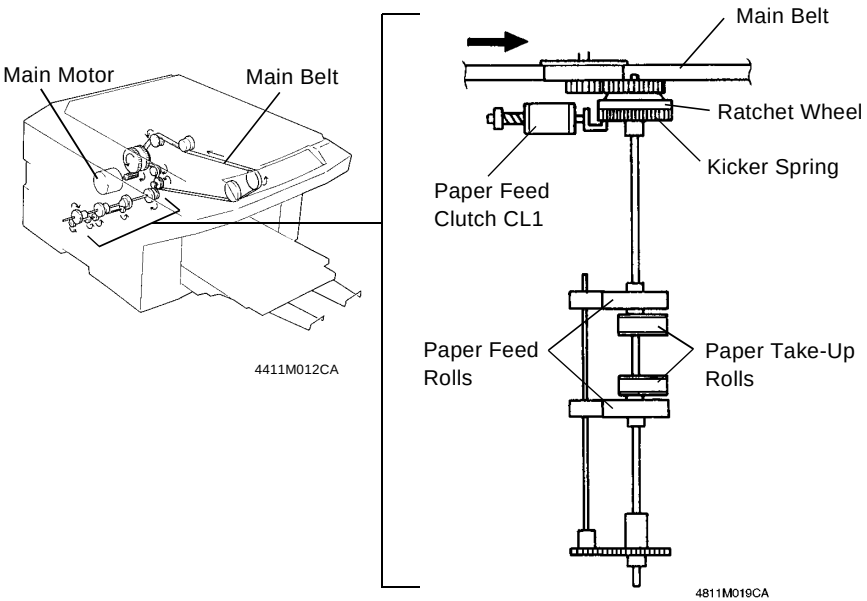
4811M017CA



4811M018CA

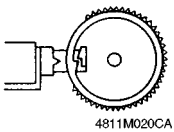
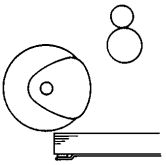
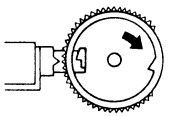
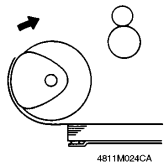
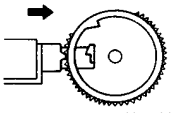
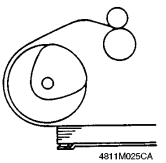
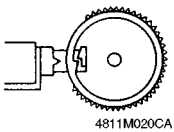
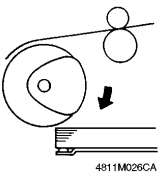
6-4. Paper Take-Up/Feed Mechanism

- Paper is fed by the Paper Feed Rolls and Paper Take-Up Rolls which are driven from the Main Motor. The rotation of the Paper Feed Rolls and Paper Take-Up Rolls are started and stopped by the Paper Feed Clutch (CL1).
- When the Ratchet Wheel is secured by the Paper Feed Clutch (CL1), the Kicker Spring contained in the Ratchet Wheel prevents the drive from the Main Motor from being transmitted to the Paper Feed Rolls and Paper Take-Up Rolls to stop them.
- The Ratchet Wheel has the inner and outer ratchets which work differently from each other. For details, see the next page.



◆ Paper Feeding Cycle

- The following table shows the operations of the Rolls, Ratchet Wheel and other parts in a paper feeding cycle. A temporary stop in the paper feeding cycle is made for the Paper Take-Up/Feed Mechanism to stand by for the start of the scan process (Synchronizing Roller rotation).

	Step	Ratchet Wheel	Rolls and Paper	Operation
1	Home position	 4811M020CA	 4811M023CA	The inner ratchet of the Ratchet Wheel is locked to stop the Paper Feed Rolls and Paper Take-Up Rolls .
2	Feeding	 4811M021CA	 4811M024CA	The Paper Feed Clutch CL1 is energized, then de-energized once to disengage the inner ratchet. The Paper Feed Rolls and Paper Take-Up Rolls then rotate to feed the top sheet of paper.
3	Temporary stop	 4811M022CA	 4811M025CA	After the paper has reached the Synchronizing Rollers and formed a loop, the Paper Feed Clutch CL1 is energized to lock the outer ratchet, stopping the Paper Feed Rolls and Paper Take-Up Rolls.
4	Home position return	 4811M020CA	 4811M026CA	After the Synchronizing Rollers have started rotation, the Paper Feed Clutch CL1 is de-energized 450ms later, whereby the Paper Feed Rolls and Paper Take-Up Rolls resume rotating and are then stopped by the inner ratchet at the home position.

◆ Paper Feeding Control

- The Paper Feed Clutch (CL1) is energized when PJ3A-22 on PWB-A switches Low, and is de-energized when the PJ3A-22 switches High. The Clutch is energized and de-energized in the following sequence:

Depress the Start Key.

↓

The Paper Feed Clutch (CL1) is energized for 200 msec. to disengage the inner ratchet, thereby starting paper feeding.

↓

The leading edge of the paper reaches the Paper Leading Edge Sensor (PC2).

↓

The Paper Feed Clutch (CL1) is energized to engage the outer ratchet, whereby paper feeding is stopped until the start of a scan.

↓

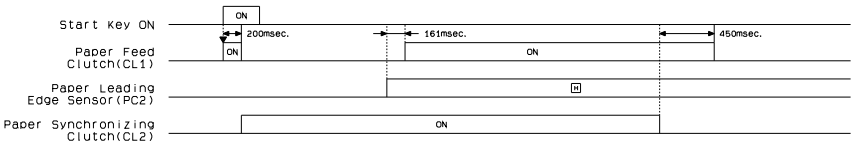
The Paper Synchronizing Clutch (CL2) is de-energized to resume paper transfer.

↓ 450 msec.

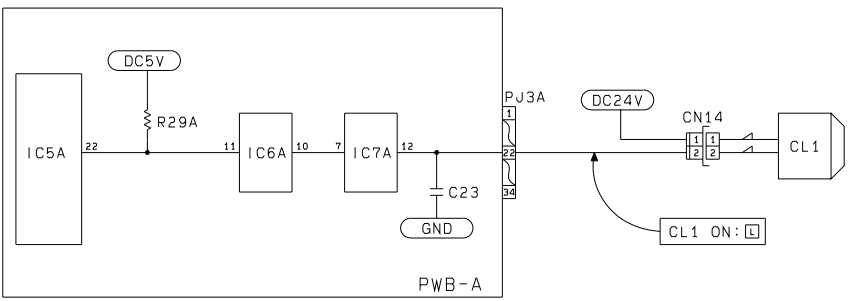
The Paper Feed Clutch (CL1) is de-energized to disengage the outer ratchet, resuming the paper feeding cycle.

↓

The inner ratchet causes the Paper Take-Up Rolls and Paper Feed Rolls to stop at the home position.



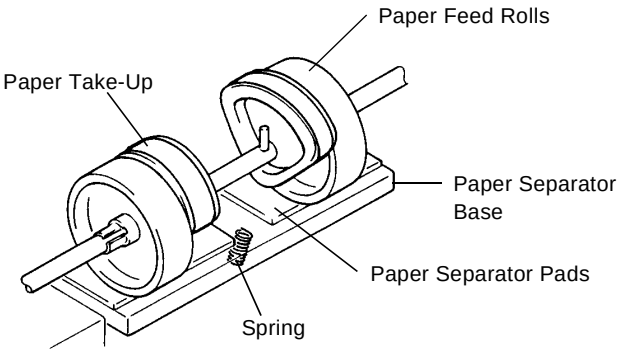
4811T12M



4811C05MCA

6-5. Paper Separation Mechanism

- To ensure that only the top sheet of paper is fed in from the Cassette, this Mechanism separates the top sheet of paper from the second one by means of the Paper Take-Up Rolls and Paper Separator Pads.
- The Paper Separator Pads are applied to the Paper Separator Base which is pressed up against the Paper Feed Rolls by the Spring. At the time of paper feeding, the Paper Take-Up Rolls rotate to produce frictional force to take up and feed only the top sheet. If several sheets of paper are going to be fed, the Paper Take-Up Rolls take up only the top one and the Paper Separator Pads prevent the other sheets from being fed.

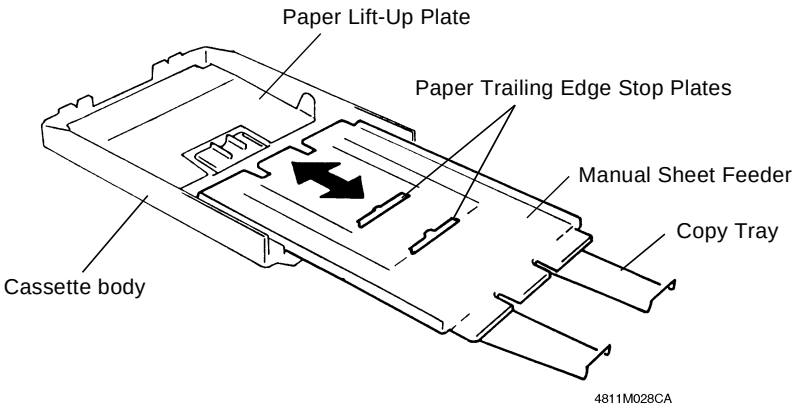


6-6. Paper Empty Detection

- This copier is not equipped with a paper empty sensor. The absence of paper is detected if no sheet of paper reaches the Paper Leading Edge Sensor PC2 from when the Paper Take-Up Rolls have started rotating until when the Scanner reaches the Scanner Synchronizing Position Sensor (PC12). "P" is displayed on the Control Panel to indicate paper empty detection.

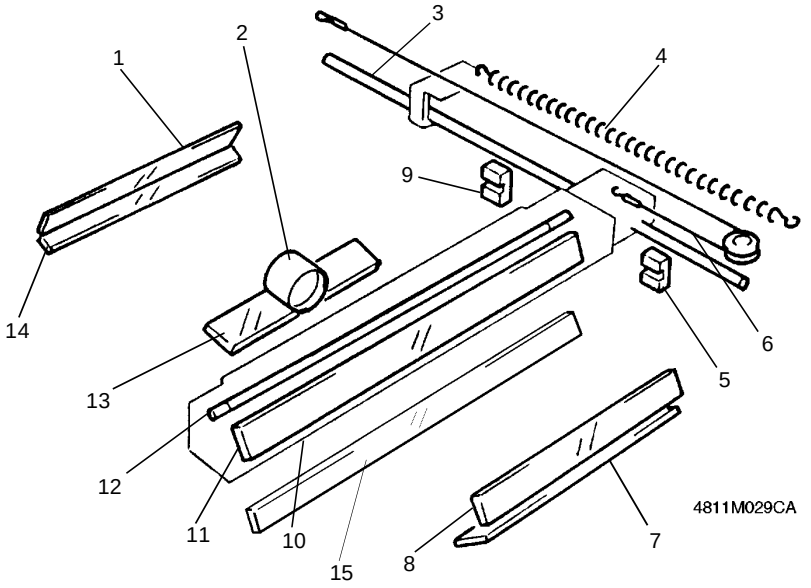
6-7. Manual Feeding

- The Cassette has Manual Sheet Feeder grooves at the top on the left and right side, in which the Manual Sheet Feeder slides. For manual feeding, push the Manual Sheet Feeder into the grooves. The Paper Lift-Up Plate Release Levers are then pushed down to stop paper feeding from the Cassette, enabling sheets of paper to be fed manually.
- The manual paper feeding is under the same control as the cassette paper feeding.
- The Manual Sheet Feeder has the A5L and A6C Paper Trailing Edge Stop Plates. When either of these paper types is to be fed manually, raise the corresponding Stop Plate.



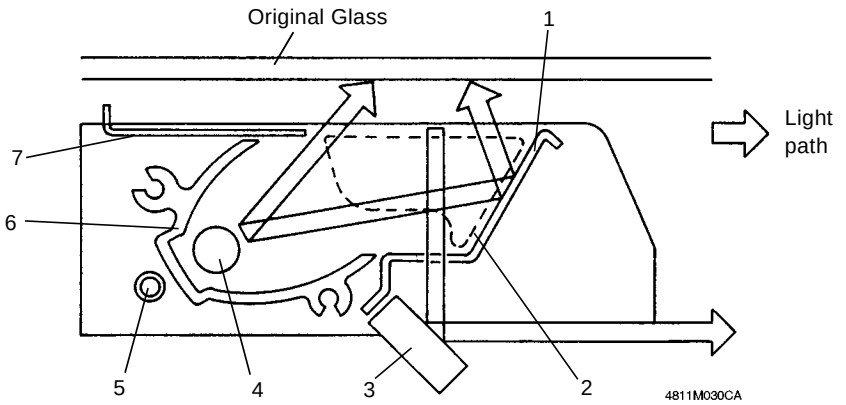
7 OPTICAL SECTION

7-1. Components



1. 4th Mirror
2. Lens
3. Carriage Shaft
4. Return Spring
5. Scanner Synchronizing Position Sensor (on PWB-A)
6. 2nd/3rd Mirrors Carriage Drive Cable
7. 3rd Mirror
8. 2nd Mirror
9. Scanner Home Position Sensor (on PWB-A)
10. Scanner
11. 1st Mirror
12. Exposure Lamp
13. Lens Holder
14. 5th Mirror
15. 6th Mirror

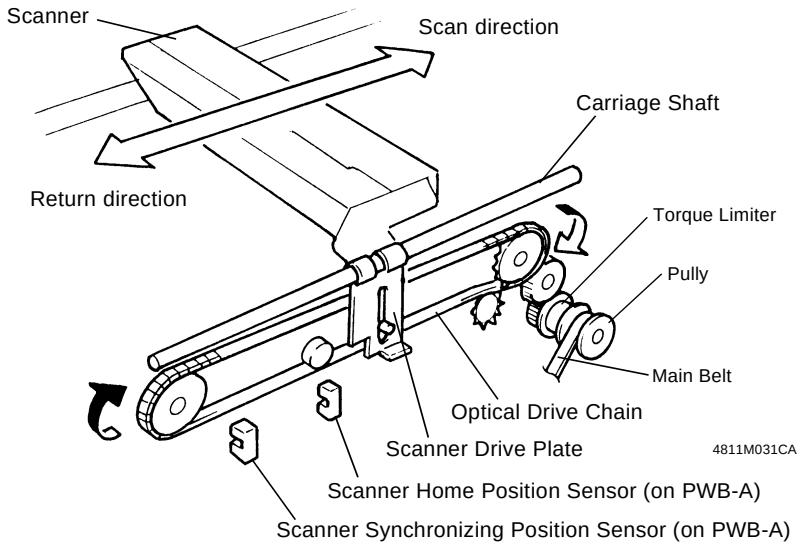
7-2. Scanner

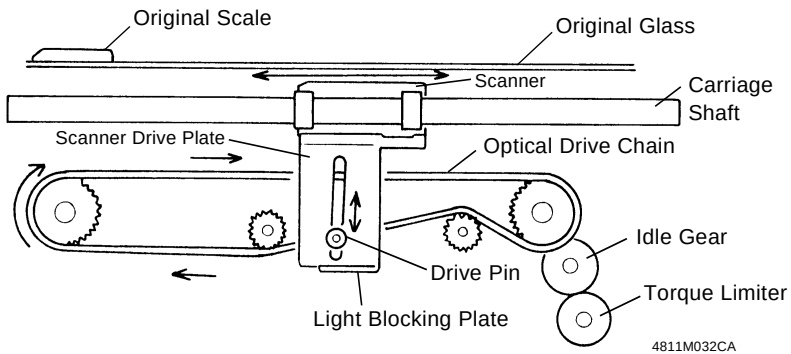


1. Auxiliary Reflector
   - To prevent the emergence of a shadow on a copy, the Auxiliary Reflector reflects the light of the Exposure Lamp onto the original which does not make complete contact with the Original Glass surface, such as a book.
2. Intensity Correction Mirror
   - The intensity of the light emitted by Exposure Lamp is slightly attenuated at the very ends, which is corrected by the Intensity Correction Mirrors fitted on the front and rear ends of the Scanner.
3. 1st Mirror
   - The 1st Mirror reflects the light from the original surface to the 2nd/3rd Mirrors.
4. Exposure Lamp
   - This copier uses a halogen frost lamp for the Exposure Lamp. The intensity of the light emitted by the Exposure Lamp varies symmetrically around the center of the Lamp, it is lower at the center and higher (about 15%) at the left and right side.
5. Exposure Lamp Thermal Fuse
   - Exposure Lamp Thermal Fuse becomes electrically open if the temperature in the area surrounding the Main Reflector exceeds 139°C thus cutting off the circuit to the Exposure Lamp.
6. Main Reflector
   - The Main Reflector ensures that light from the Exposure Lamp exposes all areas of the original
7. Aperture Plate
   - The Aperture Plate regulates the amount of the Exposure Lamp light striking the surface of the original, ensuring even light distribution.

7-3. Scanner Drive Mechanism

- The Scanner is held by the Carriage Shaft on one end and is driven by the Scanner Drive Plate and Optical Drive Chain.
- The drive from the Main Motor is transmitted to the Optical Drive Chain via the gears, pulleys and belts. Without any clutches and the like in these transmission paths, the Scanner is designed to move horizontally as the Main Motor rotates. If the scanner is accidentally blocked, the torque limiter will be actuated to avoid damages of the scanner.(For the transmission of drive from the Main Motor, see Section 3. DRIVE SYSTEM.)
- The Scanner Drive Plate is slotted to engage with the Drive Pin on the Optical Drive Chain. As the Chain rotates, the Scanner moves horizontally along the Carriage Shaft to carry out a scan motion (return motion).
- The Scanner Drive Plate has the Light Blocking Plate for the Scanner Home Position Sensor and Scanner Synchronizing Position Sensor which are used to detect the position of the Scanner.





7-4. Sensors in the Optical Section

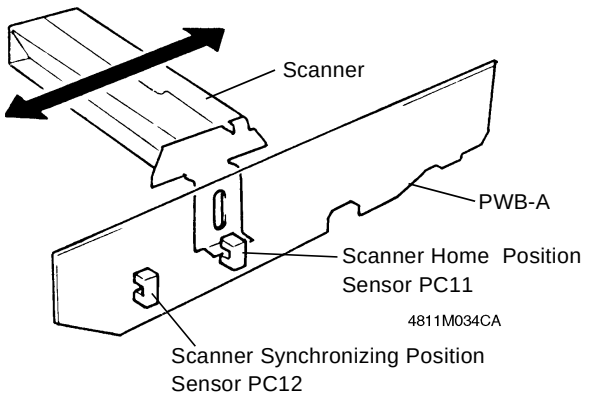
- The Optical Section has the Scanner Home Position Sensor and Scanner Synchronizing Position Sensor. These Optical Sensors are mounted on PWB-A and their lights are blocked by the Light Blocking Plate of the Scanner.
- Paper feeding start, Synchronizing Roller rotation start and other timings depend largely on the position of the Scanner which is designed to move horizontally as the Main Motor rotates, as described in the preceding section. Hence, the Optical Sensors are used to detect the position of the Scanner, thereby detecting reference signals for overall control of the copier.

● Scanner Home Position Sensor (PC11)

- Detects the home position of the Scanner.
- Also detects the reference signals for the following operations:
  - Paper Synchronizing Clutch energization (for sheets of paper from the second one on in a multi-copy process)
  - Main Motor ON
  - Grid voltage output OFF
  - Toner replenishing operation (for replenishing operation of three replenishing cycles and one copy cycle)

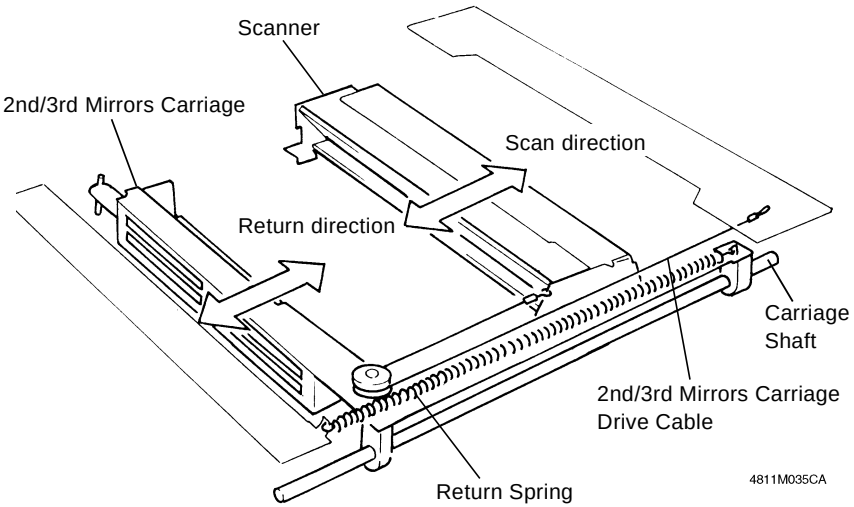
● Scanner Synchronizing Position Sensor (PC12)

- Detects the scan position to provide the reference timing for the scan motion.
- Also detects the reference signals for the following operations:
  - Exposure Lamp ON
  - High Voltage Unit energization
  - Grid voltage output ON
  - Paper Synchronizing Clutch de-energization (Synchronizing Roller rotation start)
  - Toner replenishing operation (for replenishing operation of three replenishing cycles and one copy cycle)



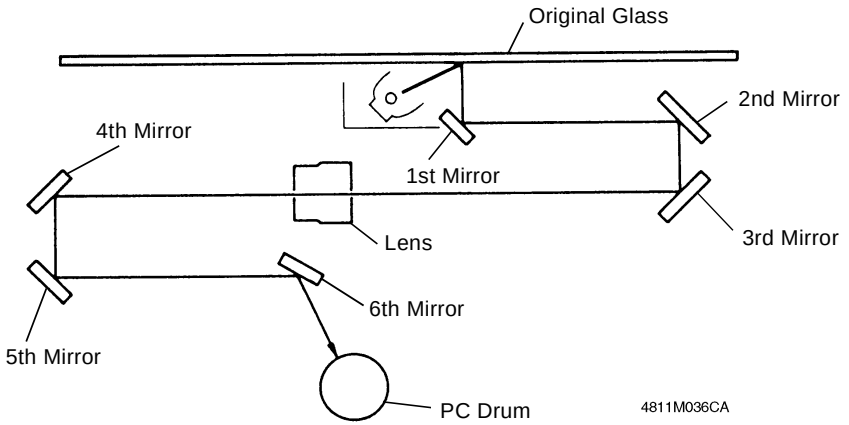
7-5. 2nd/3rd Mirrors Carriage

- The 2nd and 3rd Mirrors are mounted at 90° to each other and therefore the angle of reflection of the light beam between the two Mirrors is 180°.
- The 2nd/3rd Mirrors Carriage moves during the scan motion at a speed half of the Scanner's, thereby keeping constant the conjugation distance between the Original Glass and the surface of PC Drum.
- The 2nd/3rd Mirrors Carriage is held by the Carriage Shaft on one end and is driven by the 2nd/3rd Mirrors Carriage Drive Cable and Return Spring.
- When the Scanner moves in the scan direction, the 2nd/3rd Mirrors Carriage Drive Cable is drawn by the Scanner and the 2nd/3rd Mirrors Carriage moves in the scan direction at a speed half of the Scanner's.
- When the Scanner moves in the return direction, the 2nd/3rd Mirrors Carriage Drive Cable slackens and the 2nd/3rd Mirrors Carriage moves in the return direction by the force of the Return Spring.



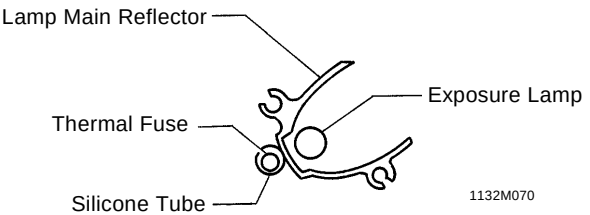
7-6. 4th/5th/6th Mirrors

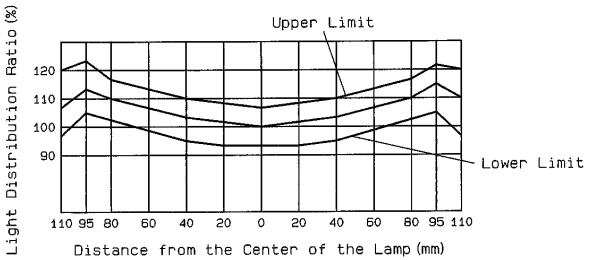
- The 4th and 5th Mirrors are mounted at right angles to each other. After the reflected light has passed through the Lens, it strikes the 4th and 5th Mirrors and is reflected onto the 6th Mirror.
- The 6th Mirror reflects the light from the 5th Mirror onto the PC Drum at the reflection angle of 115 degrees.



7-7. Exposure Lamp

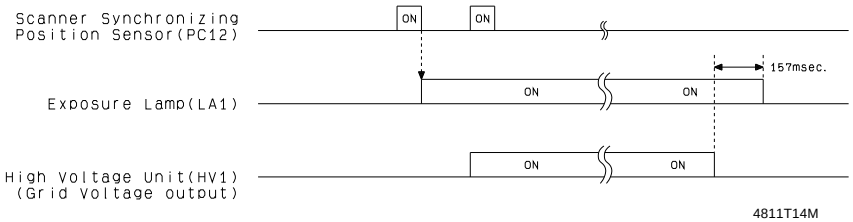
- This copier uses a halogen frost lamp for the Exposure Lamp. The intensity of the light emitted by the Exposure Lamp varies symmetrically around the center of the Lamp.
- Provided at the back side of the Lamp Main Reflector is a Thermal Fuse that prevents the temperature surrounding the Lamp Main Reflector from going excessively high (141°C, 10A).





7-8. Exposure Lamp ON/OFF Control

- The Exposure Lamp (LA1) turns on when the Scanner, which has moved to the scan starting position, passes the Scanner Synchronizing Position Sensor (PC12) once.
- The Lamp turns off 157 msec. after the grid voltage output of the High Voltage Unit (HV1) switches off.



7-9. Exposure Lamp Voltage Control

- The position of the Exposure Control Knob on the control panel, as it is turned into different positions, determines the Exposure Lamp voltage.

Turn the Exposure Control Knob as required to set the exposure level.

↓

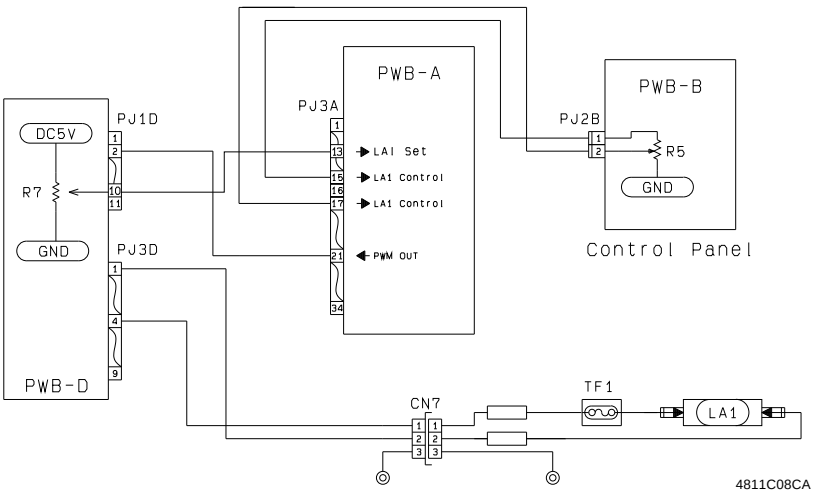
The exposure level is sent from PJ2B-2 to PWB-A.

↓

The exposure level entered into PJ3A-17 on PWB-A and is converted in a sinewave cutting pulse signal within PWB-A and outputted from PJ3A-21 to the Power Board PWB-D.

↓

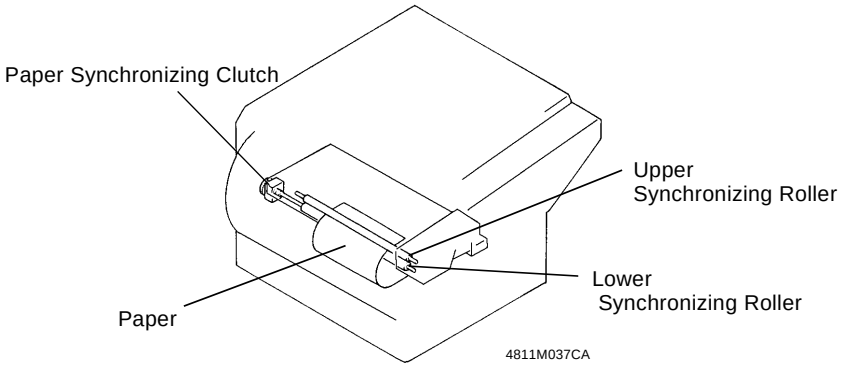
The average voltage of the Exposure Lamp changes according to the signal level entered into PJ1D-2 on PWB-D to provide the proper Exposure Lamp light intensity.



8 SYNCHRONIZING ROLLERS

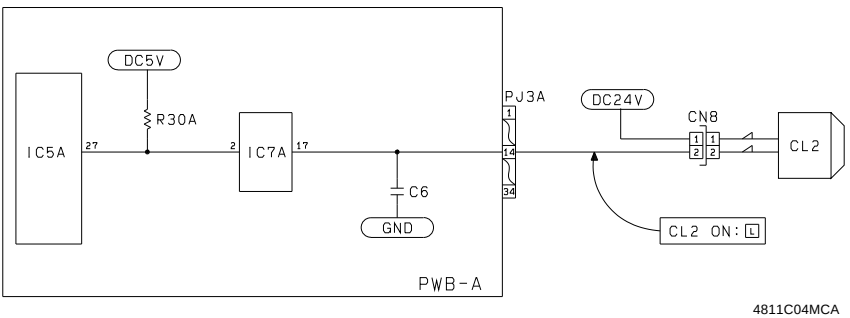
8-1. Function of the Synchronizing Rollers

- The Synchronizing Rollers make correction for any skewed sheet of paper transferred by the Paper Feed/Take-Up Rolls. After this, the Synchronizing Rollers match the leading edge of an image on the PC Drum with that of the paper.
- The Synchronizing Rollers are driven by the Main Motor via the Paper Synchronizing Clutch. The Rollers rotate when the Paper Synchronizing Clutch (CL2) is de-energized, and stop when the Clutch is energized.



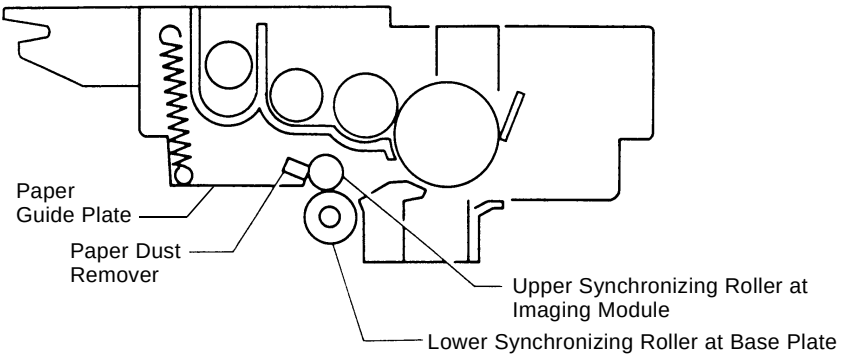
8-2. Synchronizing Roller Rotation Control

- The rotation of the Synchronizing Rollers is started:
  1) As soon as the Start Key is depressed if a copy is to be made on the first sheet of paper; or
- The rotation of the Synchronizing Rollers is stopped:
- 535 msec. after the Scanner, that has moved to the scan starting position, has passed the Scanner Synchronizing Position Sensor (PC12) to the front.
  1) 200 msec. after the Start key is depressed



8-3. Paper Dust Remover

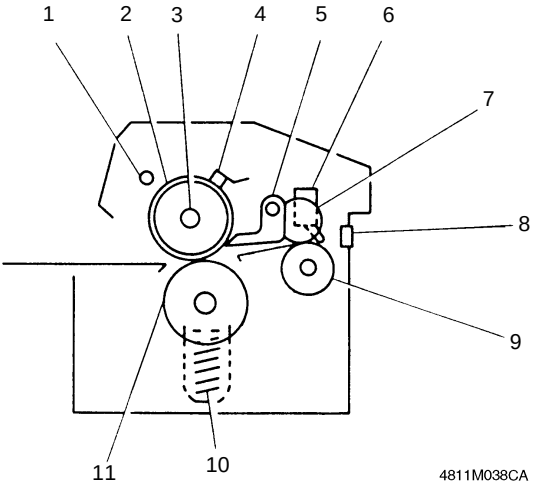
- The Paper Dust Remover is installed so that it makes contact with the Upper Synchronizing Roller. Since the Upper Synchronizing Roller is covered with an insulating tube, triboelectric charging occurs as the Roller rotates in contact with the Paper Dust Remover. As paper is then fed between the Synchronizing Rollers, the charges on the tube attract the paper dust from the paper. This dust is then transferred onto the Paper Dust Remover.



4811M033CA

9 FUSING UNIT AND PAPER EXIT

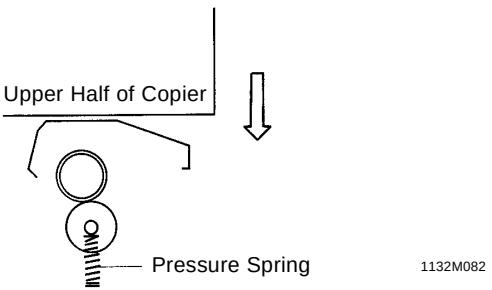
9-1. Components



1. Fusing Roller Thermal Fuse TF1 (167°C, 10A)
2. Upper Fusing Roller
3. Fusing Roller Heater Lamp H1
4. Fusing Roller Thermistor TH1
5. Paper Separator Finger
6. Paper Exit Switch S53
7. Paper Exit Rolls
8. Paper Neutralizing Brush
9. Paper Exit Roller
10. Pressure Spring
11. Lower Fusing Roller

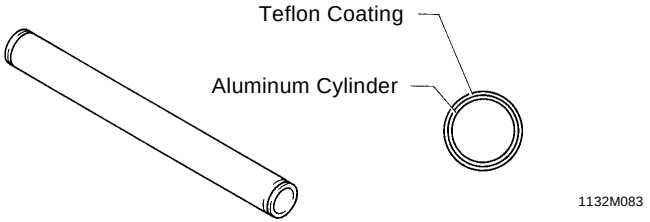
9-2. Fusing Roller Compression Mechanism

- The Fusing Unit and Paper Exit are divided into the upper and lower halves. When the Upper Half of the copier is swung down into the locked position, it presses the Upper Fusing Unit so that the Upper and Lower Fusing Units are pressed together.
- The Pressure Springs located under the left and right ends of the Lower Fusing Roller Shaft exert an upward force on the Lower Fusing Roller. This results in an overall pressure of 9.5 kg being applied between the two Rollers.



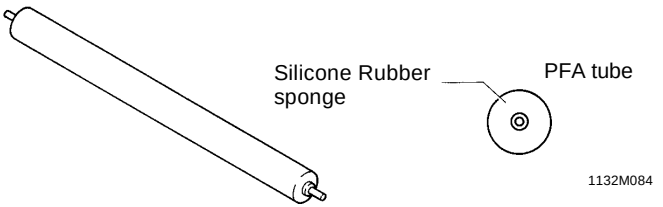
9-3. Upper Fusing Roller

- The Upper Fusing Roller is teflon-coated to improve fusing performance and enhance toner repellency and static-free performance. Because of its excellent toner repellency, the Roller can prevent the production of offsets with a small amount of silicone oil applied.



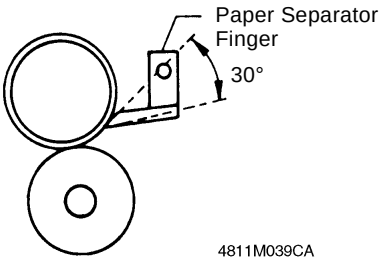
9-4. Lower Fusing Roller

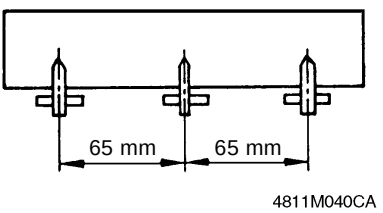
- The Lower Fusing Roller is of low hardness and therefore offers a wider width of contact between the Upper and Lower Fusing Rollers.
- The Lower Fusing Roller is made of silicone sponge coated with a thin PFA-Tube
- no silicone oil is applied by roll or felt. The system is self cleaning



9-5. Paper Separator Fingers

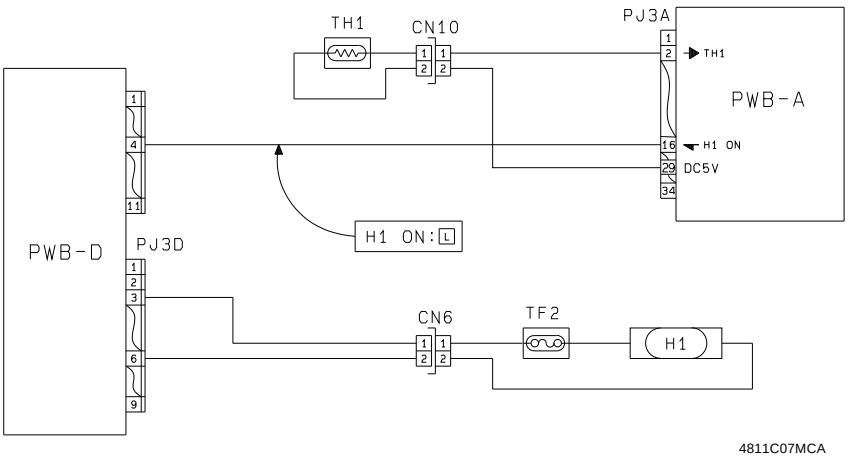
- The Paper Separator Fingers prevent the copy paper from winding around the Upper Fusing Roller.
- Since the original is aligned at the center in this copier, the Fingers are located as shown below.





9-6. Fusing Temperature Control

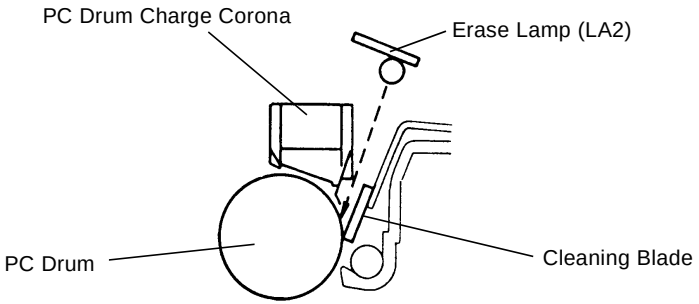
- The Fusing Roller Thermistor (TH1) in contact with the surface of the Upper Fusing Roller detects the temperature of that surface and enters that temperature to PJ3A-2 on PWB-A.
- In accordance with the analog voltage from the Fusing Roller Thermistor (TH1), PWB-A outputs a signal from PJ3A-16 to PWB-D to keep the temperature of the Upper Fusing Roller at a predetermined value. This signal switches the Heater Lamp on/off to control the temperature.
- This fusing temperature is designed to 185^{o}C and possible to change in adjustment mode. For more information, see the Function/Adjustment Mode Section.
- The measuring circuit on PWB-A is preadjusted at each board and the value documented at the A3-label on each board. In case of replacing PWB-A this value must be transferred to the EEPROM of the old PWB-A.



10 ERASE LAMP

10-1. Erase Lamp

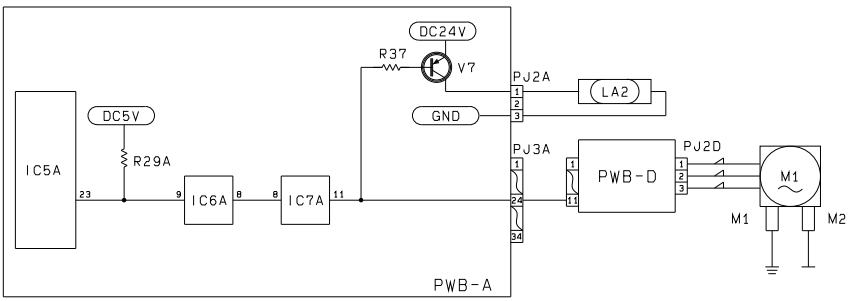
- The Erase Lamp (LA2) consists of an array of eight tungsten lamps mounted on the PWB. It lights up to neutralize any residual potential on the surface of the cleaned PC Drum to enable even charging.



4811M041CA

10-2. Erase Lamp ON/OFF Control

- The Erase Lamp (LA2) is turned on/off in synchronization with the rotation of the Main Motor (M1). The Lamp is lit when 24VDC is output from PJ2A-1 on PWB-A.

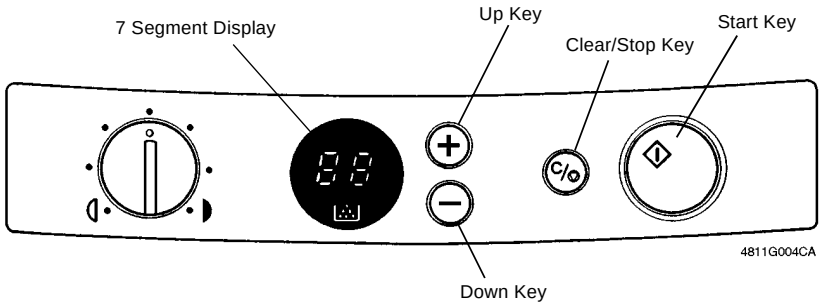


4811C06MCA

FUNCTION/ ADJUSTMENT MODE

1 FUNCTION MODE AND ADJUSTMENT MODE

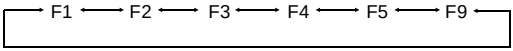
- To put this Copier into the function mode or adjustment mode, use an appropriate combination of the Keys on the Control Panel. The modes can be used for troubleshooting and adjustments.



1-1. Function Mode

◆ Switching to the function mode

1. Turn the POWER Switch OFF.
2. Hold down the Up Key (⊕) and Down (⊖) Key on the Control Panel at the same time and turn the POWER Switch ON. In this state, wait (about 7 seconds) until " F " appears on the 7-Segment Display.
3. When the Display has shown " F ", depress the Up or Down key to switch from one function mode to another as shown below:

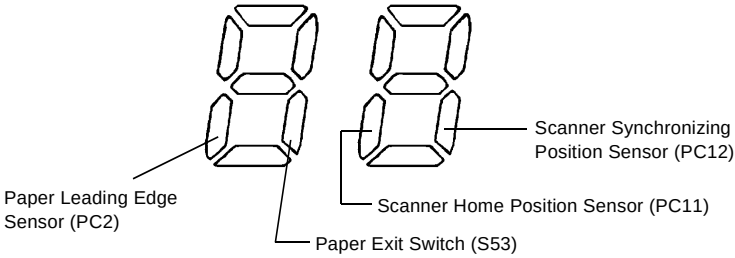


4. Depress the Start Key to start the operation of the corresponding function mode. Depress the Clear/Stop Key to stop the operation. After the function mode has stopped, depress the Clear/Stop Key again to erase the function number and keep only " F " displayed.
5. To return from the function mode to the normal mode, turn the POWER Switch OFF and back ON again, or swing open the Upper Half of the Copier.

◆ Explanation of the Function Mode

F1: Paper Passage Test

- This mode is used to pass sheets of paper to carry out a copy cycle. Note that an image is not produced in this mode because the High Voltage Unit output is switched on but the grid output is off (grounded). The Copy Counters are not incremented, either.
- In this function mode, the Paper Leading Edge Sensor (PC2), Paper Exit Switch (S53), Scanner Home Position Sensor (PC11) and Scanner Synchronizing Position Sensor (PC12) can be checked. When any of the Sensors become active, the corresponding bar of the 7-Segment Display on the Control Panel is lit to indicate that the Sensor is normal. The relationships between the 7-Segment Display bars and the sensors are as follows:



F2: High Voltage Adjustment (Factory Use Only)

- In this mode, the charge/transfer output, grid output and bias output of the High Voltage Unit are switched on for 20 seconds. This mode is only used in the factory to adjust the outputs of the High Voltage Unit.

F3: Exposure Adjustment

- In this mode, the Exposure Lamp (LA1) turns on for 20 seconds. This mode is used for the adjustment of the maximum Lamp voltage. For details, see the Dis/Reassembly, Adjustment Part.

F4: Paper Leading Edge Adjustment

- This mode is used to vary the start timing of Synchronizing Roller rotation to match the leading edge of paper with that of an image.
  For more information, see the Dis/Reassembly, Adjustment Section.

F5: Missing Image Adjustment

- This mode is used to vary the grid output timing of the High Voltage Unit (HV1) to adjust the missing width at the leading edge of an image.
  For more information, see the Dis/Reassembly, Adjustment Section.

F9: Continuous Running

- This mode is used to perform a copy cycle without passing any sheet of paper. Note that the High Voltage Unit outputs, Exposure Lamp ON and jam detection control operations are not performed in this mode.

F : Display Test

- This mode is used to check the Display. When only " F " is being displayed on the Control Panel, depress the Start Key to enter this mode. The 7-Segment Display bars and Toner Empty LED are all lit, indicating that the Display is normal.

◆ Elements Energized in the Test Mode

The following electrical parts are energized/deenergized in the corresponding function modes:

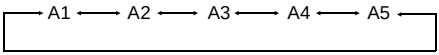
Element	F1	F2	F3	F4	F5	F9
Paper Feed Clutch	O	—	—	—	—	—
Paper Synchronizing Clutch	O	—	—	—	—	—
Main Motor	O	—	—	—	—	O
HV Charge/Transfer Output	—	O	—	—	—	—
HV Grid Output	—	O	—	—	—	—
HV Bias Output	O	O	—	—	—	O
Temperature Control	O	O	O	O	O	O
Exposure Lamp	O	—	O	—	—	—
Scanner Check	O	—	—	—	—	O

O : energized
— : deenergized

1-2. Adjustment Mode

◆ Switching to the adjustment mode

1. Turn the POWER Switch OFF.
2. Hold down the Up Key (⊕) and Down Key (⊖) on the Control Panel at the same time and turn the POWER Switch ON. In this state, wait (about 7 seconds) until " F " appears on the 7-Segment Display.
3. When the Display has shown " F ", hold down the Clear/Stop Key and depress the Down Key (⊖). In this state, wait (about 7 seconds) until " A " appears on the 7-Segment Display.
4. When the Display has shown " A ", depress the Up or Down key to switch from one adjustment mode to another as shown below:



5. Depress the Start Key to start the operation of the corresponding adjustment mode and display the set value.
6. Depress the Up or Down Key to change the adjustment values.

   * After changing the adjustment value with the Up/Down Key, depress the Start Key to write the new adjustment value to the EEPROM, completing the adjustment.
   Depress the Clear/Stop Key to keep the old adjustment value stored intact without writing the new adjustment value to the EEPROM.

7. To return from the adjustment mode to the normal mode, turn the POWER ON/OFF Switch to OFF and back ON again, or swing open the Upper Half of the Copier.

◆ Explanation of the Adjustment Mode

A1: ATDC level setting

- Allows changing the ATDC set value (toner to carrier ratio) as indicated below:

7-Segment Display	Set Value (Toner to Carrier Ratio)	7-Segment Display	Set Value (Toner to Carrier Ratio)
1	3%	6	5.5% (*)
2	3.5%	7	6%
3	4%	8	6.5%
4	4.5%	9	7%
5	5%	* : Factory setting	

A2: Fusing temperature setting

- Allows the set value of fusing temperature to be changed between 181°C and 199°C in increments of 1°C, as indicated below:

7-Segment Display	Set Temperature (°C)	7-Segment Display	Set Temperature (°C)
–9	181°C	1	191°C
–8	182°C	2	192°C
≀	≀	≀	≀
–2	188°C	8	198°C
–1	189°C	9	199°C
0	190°C (*)	* : Factory setting	

A3: Reference fusing temperature setting (Factory Use Only)

- Only used in the factory to set the reference value of the fusing temperature.

A4: Paper loop setting (Factory Use Only)

- Only used in the factory to adjust the degree of a paper loop formed before the Synchronizing Rollers.

A5: ATDC reference voltage setting (Factory Use Only)

- Only used in the factory to set the reference voltage of the ATDC Sensor.

2 OTHER INFORMATION

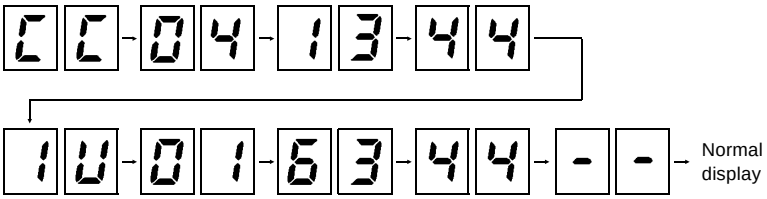
2-1. Copy Counters

- This Copier has two Copy Counters: Total Copy Counter and IM Copy Counter, each of which shows the number of copies made on the 7-Segment Display.
- Each Counter is incremented when a sheet of paper leaves the Paper Exit Rollers after the termination of the copy cycle. The Counter value is written to the EEPROM.

◆ Displaying the Copy Counter Values

- After the Copier has warmed up, depress the Up Key (⊕) and Clear/Stop Key at the same time. This displays the counter types and corresponding count values in two digits in the following sequence:

Display example: The total number of copies made = 41344, the number of IM copies made= 16344



CC ..... Total Copy Counter value

IU ..... IM Copy Counter value

2-2. Drum Life Display

- The Imaging Module (IM) life is about 25000 copies. On this Copier, the drum life is displayed on the basis of the IM Copy Counter value written to the EEPROM to alert the user to the replacement of the IM.
- This Copier has the Credit Function which allows copies to be made on a further 50 sheets of paper for the time being if the drum life has been reached.

◆ Displaying the Drum Life

When the IM Counter reaches 24000 copies, the 7-Segment Display shows the set number of copies and " dU " alternately.

↓

When the IM Counter reaches 25000 copies, the 7-Segment Display shows " dU ", the machine is stopped, and the copy cycle is disabled.

↓

In the copy disabled state, depress the Clear/Stop Key and Down Key (⊖) at the same time to enable copies to be made on 50 sheets of paper for the time being. At this time, the 7-Segment Display shows the set number of copies and " 5U " alternately (Credit Function).

↓

When the IM Counter reaches 25050 copies, the 7-Segment Display shows " 5U ", the machine is stopped completely, and the copy cycle is disabled.

DIS/REASSEMBLY, ADJUSTMENT

1 SERVICE INSTRUCTIONS

1-1. Precautions for Disassembly/Adjustment

Observe the following precautions whenever servicing the copier.

- Be sure to unplug the copier from the power outlet before attempting to service the copier.
- While power is being supplied to the copier, do not attempt to remove/install the print jacks from/to the P.W. Boards or unplug/plug in the connectors.
- If the copier is run with Its Covers removed, use care not to allow your clothing to be caught In revolving parts such as the Timing Belt.
- Do not use flammable spray around the copier in operation.
- The Developing Unit generates strong magnetic force. Do not bring it near a cathode-ray tube or watch.
- When handling the P.W. Boards with MOS ICs, observe 1-2." Instructions for Handling the PWBs with MOS ICs."
- It should be noted that fuses are used with double-pole/neutral wires.
- If it becomes necessary to replace fuses and thermal fuses, be sure to use ones of the following ratings.

PWB-C	PWB-D			—	—
F1	F1	F2	F3	TF1	TF2
250 V T3.15 A	250 V T630 mA	250 V T6.3 A #	250 V T6.3 A #	141 °C 10 A 250 V	167 °C 10 A 250 V

 # special high current type (ceramic)

1-2. Instructions for Handling the PWBs with MOS ICs

The following precautions must be observed when handling P.W. Boards with MOS (Metal Oxide Semiconductor) ICs.

During Transportation/Storage:

- During transportation or when in storage, new P.W. Boards must not be indiscriminately removed from their protective conductive bags.
- Do not store or place P.W. Boards in a location exposed to direct sunlight.
- When it becomes absolutely necessary to remove a Board from its conductive bag or case, always place it on its conductive mat in an area as free as possible from static electricity.
- Do not touch the pins of the ICs with your bare hands.

During Replacement:

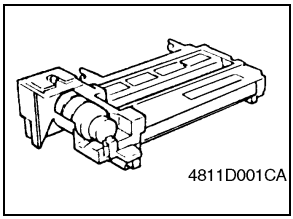
- Before unplugging connectors from the P.W. Boards, make sure that the power cord has been unplugged from the power outlet.
- When removing a Board from its conductive bag or conductive case, do not touch the pins of the ICs or the printed pattern. Place it in position by holding only the edges of the Board.
- Before plugging connectors into the Board, make sure that the power cord has been unplugged from the power outlet.

During Inspection:

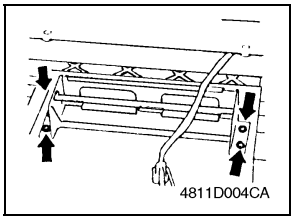
- Avoid checking the IC directly with a multimeter; use connectors on the Board.
- Never create a closed circuit across IC pins with a metal tool.
- When it is absolutely necessary to touch the ICs and other electrical components on the Board, be sure to ground your body.

1-3. Parts which must not be touched

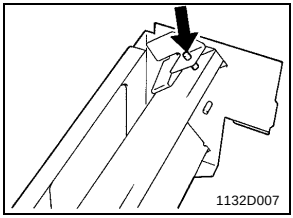
During the disassembly, reassembly, or adjustment job, do not attempt to remove or adjust the following parts:



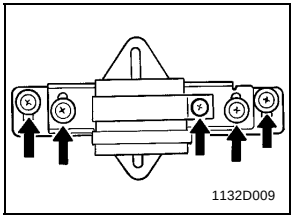
1. All screws of IM



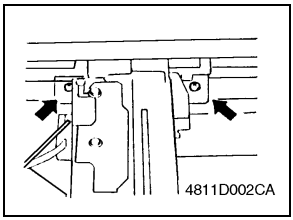
2. Positioning screws on the 4th/5th Mirrors Assy



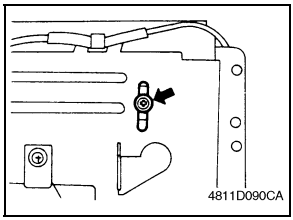
3. 4th Mirror angle adjusting screw



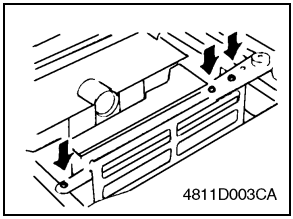
4. Lens positioning screws



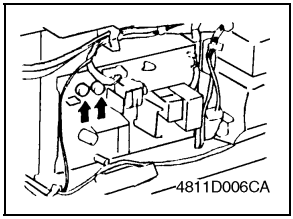
5. Scanner angle adjusting screws



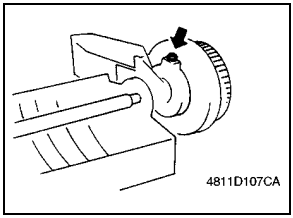
6. Distance between 1st and 2nd Slider by adjusting screw of drive cable



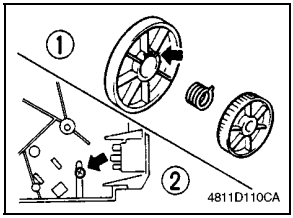
7. 2nd/3rd Mirrors Assy securing screws and angle adjusting screw



8. Two variable resistors on HV1



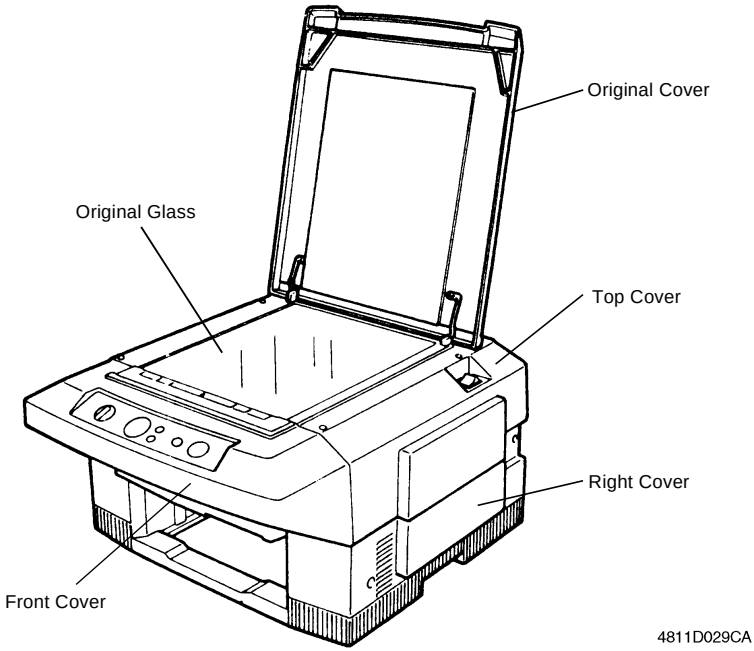
9. Stop ring adjusting screw at paper feeding unit

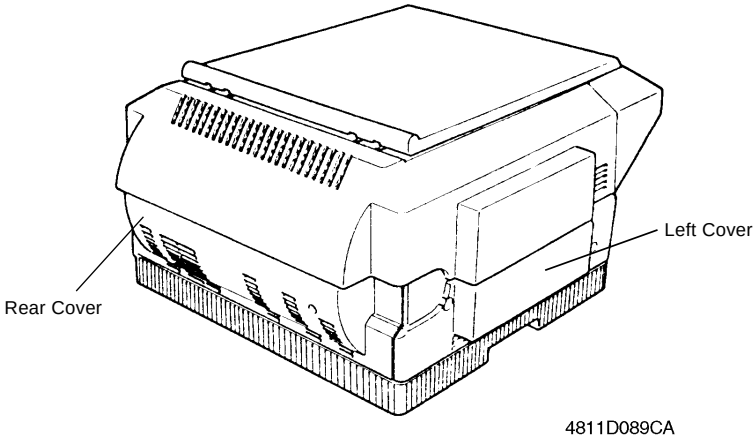


10. Paper feeding segment position by
    1. Slit for kick spring
    2. Fixing at slot in gear plate

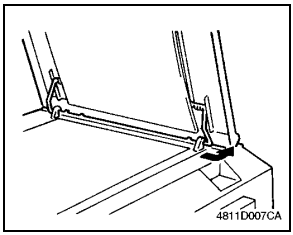
2 DISASSEMBLY

2-1. Identification of Covers



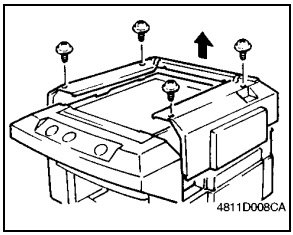


2-2. Removal of the Original Cover



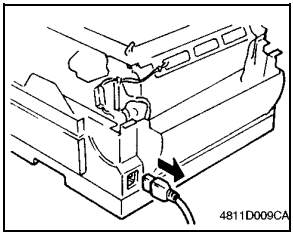
1. Raise the Original Cover. While swinging out the metal fitting serving as the axis of the Original Cover, further raise and remove the Original Cover.

2-3. Removal of the Top Cover

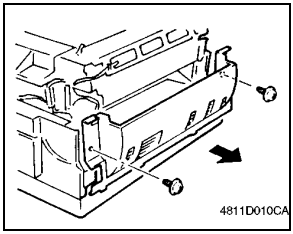


1. Remove the Original Cover.
2. Remove four screws and the Top Cover.

2-4. Removal of the Rear Cover

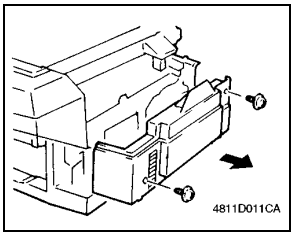


1. Remove the Original Cover and Top Cover.
2. Disconnect the power cord plug.



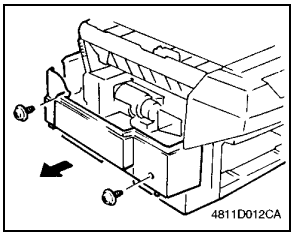
3. Remove two screws and the Rear Cover.

2-5. Removal of the Right Cover



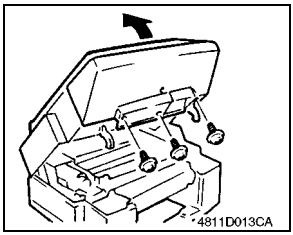
1. Remove the Original Cover and Top Cover.
2. Remove two screws and the Right Cover.

2-6. Removal of the Left Cover

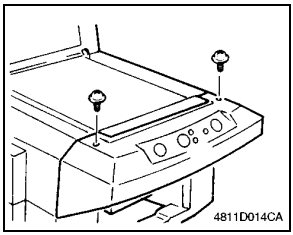


1. Remove the Original Cover and Top Cover.
2. Remove two screws and the Left Cover.

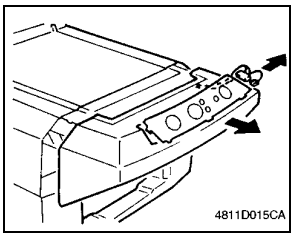
2-7. Removal of the Front Cover and Operation Panel



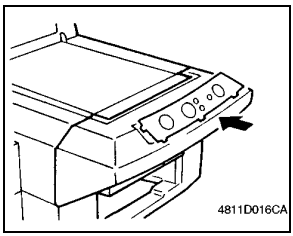
1. Swing up the Upper Half of the Unit and remove three screws that secure the Front Cover.



2. Close the Upper Half and remove two screws that secure the Front Cover.



3. Slide the Front Cover slightly forward,remove Operation Panel by pressing panel from the rear at upper center position and unplug the two Connectors of the Operation Panel., and remove the Front Cover.

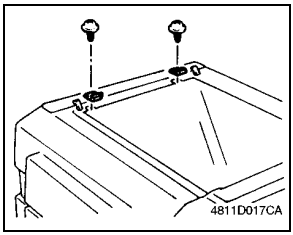


Reassembling Procedure

1. Guide thew harness for the operation Panel through the hole for the panel in the Front Cover and press the Operation Panel inside the hole in the Front Cover.

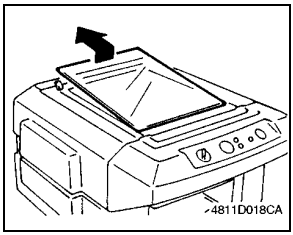
2. Slide the Front Cover to the machine. Pay attention for not squeezing the harness of the Operation Panel between cover and optic frame (hold down harness).

2-8. Removal of the Original Glass



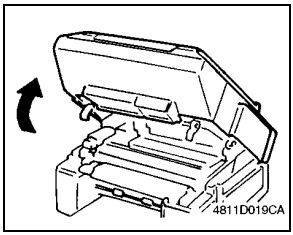
1. Remove the Original Cover.
2. Remove two screws that secure the Original Glass, and remove the Original Glass Holders.

   * When the Upper Cover has already been removed, the Original Glass can be removed by merely loosening the two screws.

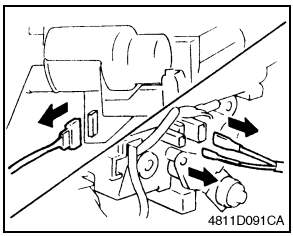


3. Slightly lift the Original Glass and slide it back to remove.

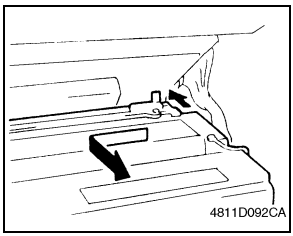
2-9. Removal of the Imaging Module



1. Swing up the Upper Half of the Unit.

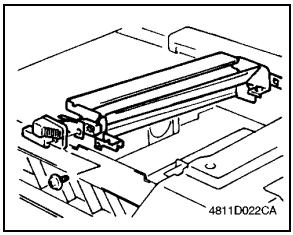


2. Hold up the Imaging Module and disconnect the two fastened terminals (HV; right side) and one connector (left side; under toner bottle holder).



3. Slightly lift the Imaging Module, hold down the Securing Lever, slide the Imaging Module to the left and pull it out to the front.

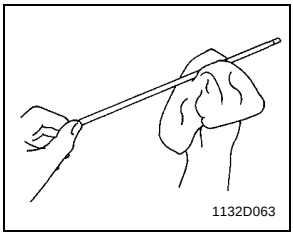
2-10. Removal of the Exposure Lamp



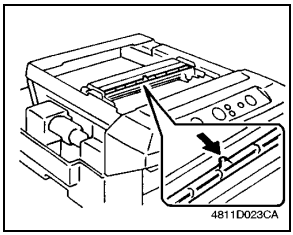
1. Remove the Original Cover, Upper Cover and Original Glass.
2. Slightly raise the left-hand side of the Scanner and remove the one screw that secures the Exposure Lamp Terminal Cover.
3. Remove the Exposure Lamp.

NOTE

Wear gloves to handle the Glass Tube of the Exposure Lamp.



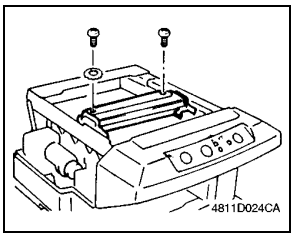
4. Wipe the Lamp with a soft cloth dampened with alcohol.



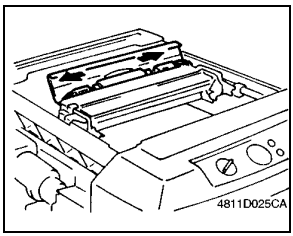
5. When reinstalling the Exposure Lamp, face the protrusion of the Lamp toward the Lamp Reflector Opening and make sure that the Lamp Terminal fits securely in the Terminal on the right of the Scanner.

   Check the light homogeneity and distribution on copy (refer to 3-1)

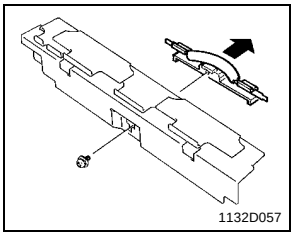
2-11. Removal of the Exposure Lamp Thermal Fuse



1. Remove the Original Cover, Top Cover and Original Glass.
2. Remove two screws and the Aperture Plates Assy.

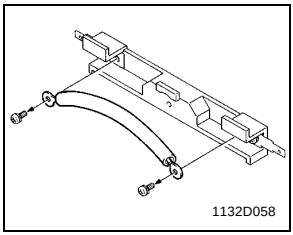


3. Unplug the two Connectors of the Exposure Lamp Thermal Fuse Holder.



4. Remove one screw and the Exposure Lamp Thermal Fuse Holder.

   * When the Exposure Lamp Thermal Fuse Holder cannot be removed easily, unplug the Connector of the right-hand side Exposure Lamp Terminal.

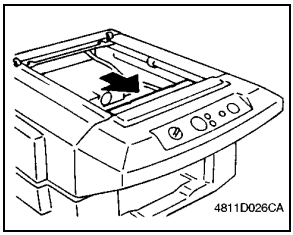


5. Remove two screws from the Exposure Lamp Thermal Fuse Holder and remove the Exposure Lamp Thermal Fuse.

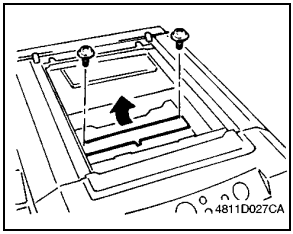
ATTENTION

Make sure that thermofuse is in contact with the fuse holder and the lamp reflector.

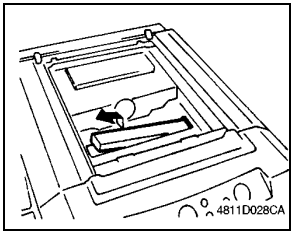
2-12. Removal of the Ozone Filter



1. Switch on the copier and pull out the cassette.
2. Depress the Start Key. When the Scanner comes near the bottom of the Original Scale, turn off the Power Switch.

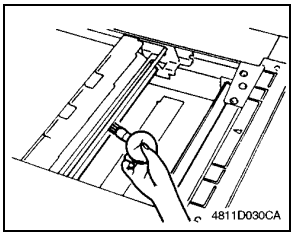


3. Remove the Original Cover, Top Cover and Original Glass.
4. Remove two screws and the Ozone Filter Cover.



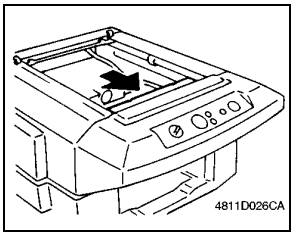
5. Lift the left-hand side of the Ozone Filter and slide the Ozone Filter to the left to remove.

2-13. Cleaning of the Mirrors and Lens



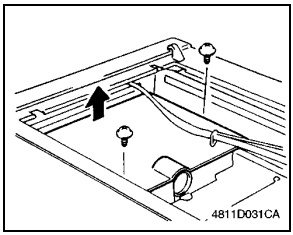
1. Remove the Original Cover and Original Glass.
2. Dust the 1st, 2nd and 3rd Mirrors with a blower brush.

> ***NOTE***
>
> *Any Mirror that has a thick coat of dust and/or dirt needs to be wiped with a soft cloth after it has been cleaned with the blower brush.*

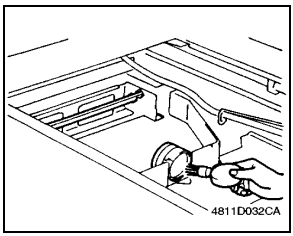


3. Switch on the copier and pull the cassette out.
4. Depress the Start Key. When the Scanner comes near the bottom of the Original Scale, turn off the Power Switch.

> ***NOTE***
>
> *Use extreme care with the Scanner when it is in motion.*

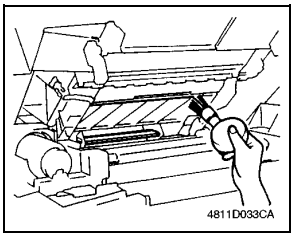


5. Remove two screws and the Lens Cover.



6. Dust the Lens and 4th Mirror with the blower brush.

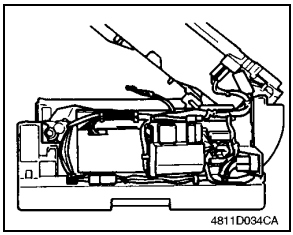
> ***NOTE***
>
> *The Lens or Mirror that has a thick coat of dust and/or dirt needs to be wiped with a soft cloth after it has been cleaned with the blower brush.*



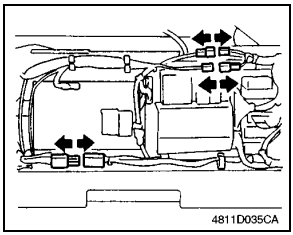
7. Swing up the Upper Half of the Unit and dust the 5th and 6th Mirrors with the blower brush.

> ***NOTE***
>
> *Any Mirror that has a thick coat of dust and/or dirt needs to be wiped with a soft cloth after it has been cleaned with the blower brush.*

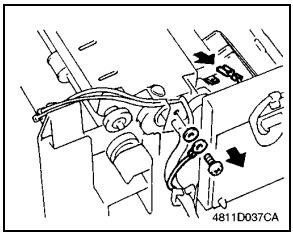
2-14. Removal of the Gear Drive Unit



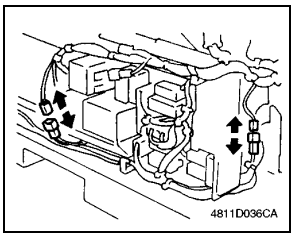
1. Remove the Original Cover, Upper Cover and Rear Cover.
2. Remove the Imaging Module and Power Cord.



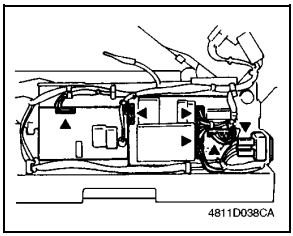
3. Unplug the three Connectors used for the Paper Exit Switch, Fusing Thermistor and Heater Lamp, and remove the Harness from the Wire Saddle.



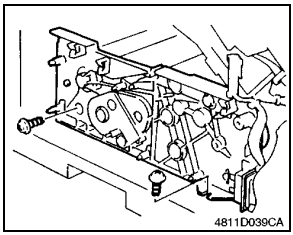
4. Remove the Ground Wire of the Fusing Unit and the Ground Wire of the Pre-Fusing Guide Plate.



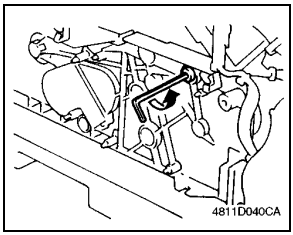
5. Unplug the two Connectors used for the Paper Synchronizing Clutch and Paper Take-Up Solenoid.



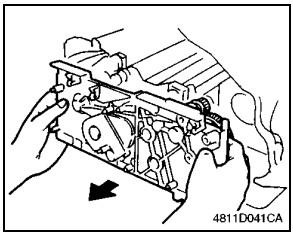
6. Unplug the four Connectors on the Power Board, the three Connectors of the Outlet and the one connector on the High Voltage Unit, and remove them from the Wire Saddle.
7. Remove the Power Board and High Voltage Unit.



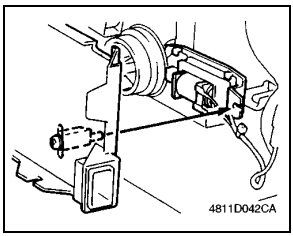
8. Remove two screws that secure the Drive Unit.



9. Loosen the hexagon screw (Inbus 4 mm) on the Upper-Lower Half Coupling Shaft.

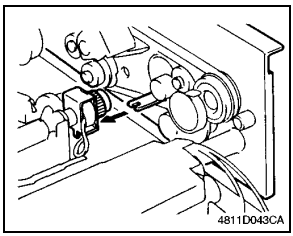


10. Hold to the front the gear meshing with the Main Motor Output Shaft and pull out the Drive Unit to the front to remove.



NOTE

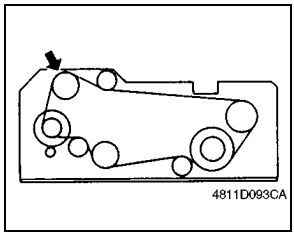
When reinstalling the Drive Unit, engage the Paper Feed Clutch Mounting Plate with the Adjusting Shaft of the Drive Unit.



NOTE

When reinstalling the Drive Unit, engage the projection of the Paper Synchronizing Clutch with the Securing Portion of the Drive Unit.

2-14-1. Exchange of Torque Limiter

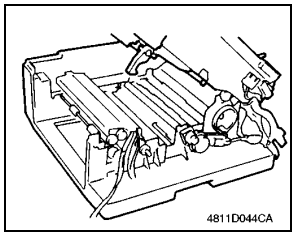


1. Follow steps as for the removal of the Gear Drive Unit (refer 2-14)
2. Pull Torque Limiter from axle at the left, upper position.

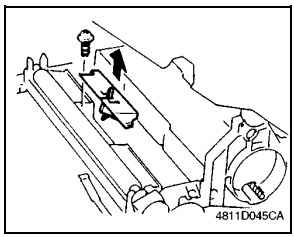
NOTE

Take care not to loose the steel balls, if disassembling the Torque Limiter.

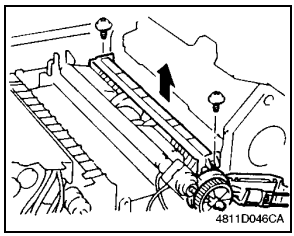
2-15. Removal of the Paper Feeding Unit



1. Remove the Original Cover, Top Cover, Rear Cover, Right Cover (refer 2-2 to 2-5) and Gear Drive Unit (refer 2-14).

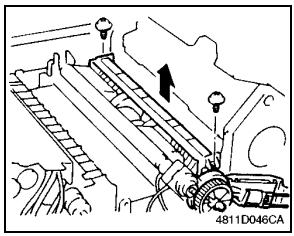


2. Remove one screw and the Actuator of the Paper Leading Edge Sensor and the Guide Plate.

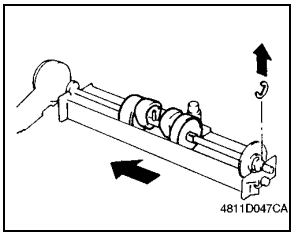


3. Remove two screws and the Paper Feed Unit.

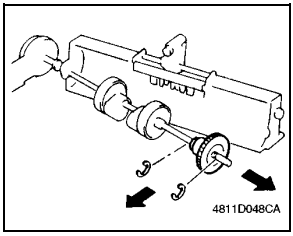
2-15-1. Removal of the Paper Take-Up Roll and Paper Feed Roll



1. Remove two screws and the Paper Feed Unit.



2. Remove the E-ring and slide the shaft with Paper Take-Up Rolls to the inside.

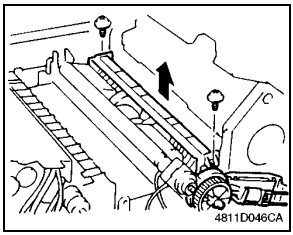


3. Remove the E-rings on both ends of the One-Way Gear and remove the One-Way Gear.

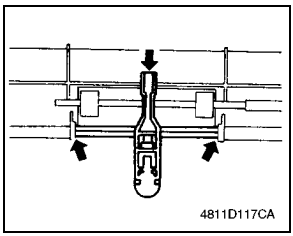
NOTE

At this time, use care not to drop the pin.

2-15-2. Removal of Paper Feed Rolls and Counter Pressure Axle



1. Remove two screws and the Paper Feed Unit.



2. Remove while holder by clipping out at the top and than press the Counter Pressure Axle at one side down.

NOTE

At this time, use care not to loose the spring.

3. Remove pressure bracket from shaft by pulling.

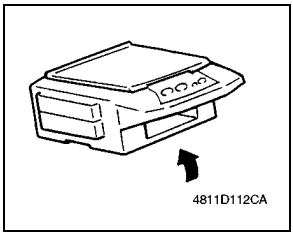
Remark: For assembling go back the same steps. The spring should be assembled when clipping in the holder.

2-15-3. Removal of pressure bracket and separation pad

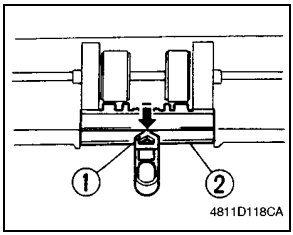
To exchange this parts there are two ways:

A: To fllow steps as shown in 2-15-2.
B: To disassemble this part from the cassette port.

> ***NOTE***
>
> *It is not necessary to remove Drive Unit.*



1. Remove Power Plug and Cassette.
2. Lift-Up machine until it's supported by the Rear Cover. Take care, not to push machine accidentally.



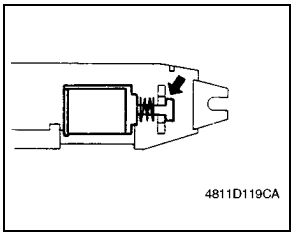
3. Press back the fork part (1) near the separation pad (2) .
   Press the separation pad upwards and pull the fork part to the front.
4. Now forcely pull the separation pad to the front side.

> ***NOTE***
>
> *At this time, use care not to loose the spring.*

2-15-4. Removal of Feeding Clutch

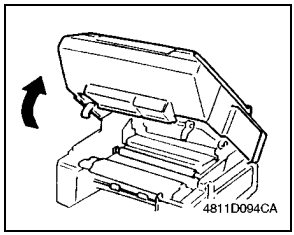
Exchange of feeding clutch parts is not possible, because a special factory adjusting was made for stop ring and segment position (refer to 1-3-9 and 1-3-10). In this case the whole feeding unit must be exchanged.

2-15-5. Removal of solenoid for Feeding Clutch

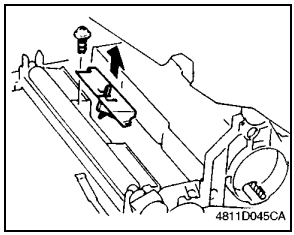


1. Remove Gear Drive Unit
   (It is not necessary to remvoe the Paper Feeding Unit)
2. Clip off anchor pin from slider and remove solenoid.

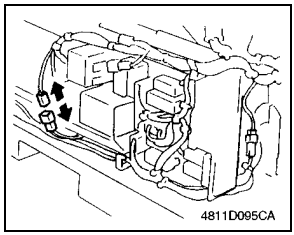
2-16. Removal of the Timing Roller Assy and Timing Clutch



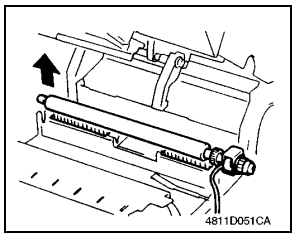
1. Remove the Original Cover, Top Cover and Right Cover. Open machine and remove IM.



2. Remove one screw, the Actuator of the Paper Leading Edge Sensor, and the Guide Plate.



3. Unplug the connector for the paper synchronizing (timing) Clutch.
4. Loosen the PWB-D and shift the connector of the clutch back through the hole in the gear plate.



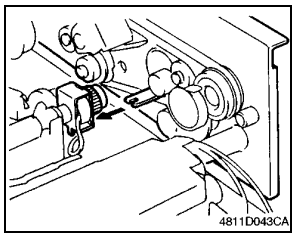
5. Remove the Synchronizing Roller Assy.

NOTE

When reinstalling the Assy, use care not to mar the mylar.

NOTE

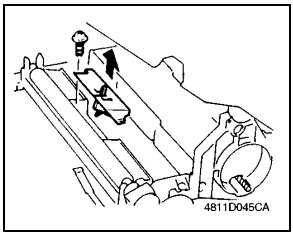
When reinstalling the Assy, securely engage the protrusions at the bushings of the Synchronizing Roller Assy with the holes in the Frame.



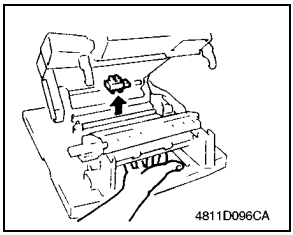
NOTE

When reinstalling Assy engage the projection of the timing clutch with the scanning position of the Gear Drive Unit.

2-16-1. Removal of Photointerupter PC2

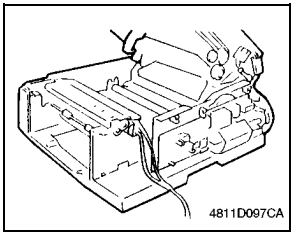


1. Remove Imaging Module and Cassette.
2. Remove the one screw and remove the Actuator of the Paper Leading Edge Sensor and the Guide Plate.



3. PC2 is located under the guide plate and must be clipped off from the cassette port of the vase plate.

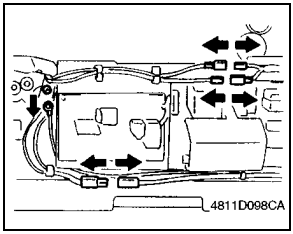
2-17. Disassembly of the Fusing Unit



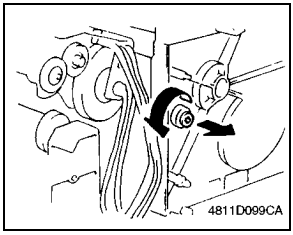
1. Remove the Top Cover, Upper Cover, Right Cover and IM.

NOTE

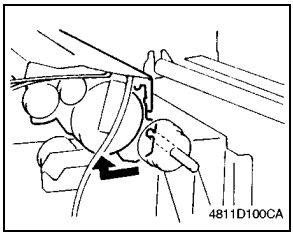
The Fusing Unit may be removed without removing the Drive Unit. When the Drive Unit is not removed, the Fusing Unit cannot be reinstalled easily. At this time, reinstall the Fusing Unit securely using care not to damage the washer.



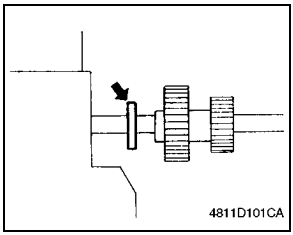
2. Remove screw of ground cable.
3. Unplug connector for Heater Lamp.
4. Unplug connectors for Thermistor and Exit Switch.
5. Remove HV-Unit from gear plate.



6. Loosen axle with hexagon screw (3mm) at front of gear plate.
7. Pull off axle about 8mm.



8. Shift Fuser at right side.
   A: 10mm to the front
   B: 3mm upwards
   Then shift whole fusing unit.
   C: 3mm to the left

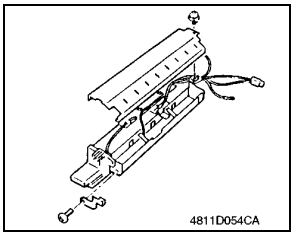


NOTE

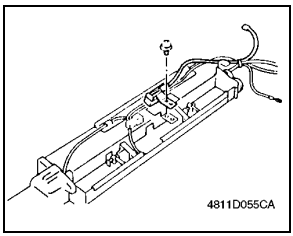
When assembling take care for the washer near double gear.

1. It is located between frame and gear.

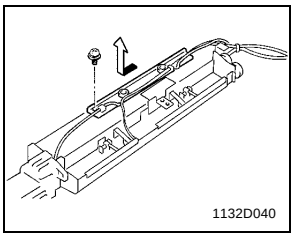
2. When pressing in axle the washer may block



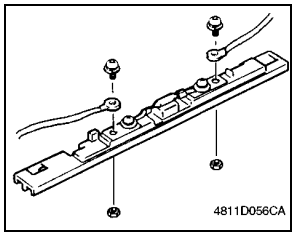
9. Remove one screw and the plastic part which retains the Fusing Unit Upper Cover.
10. Remove one screw and the Fusing Unit Upper Cover.



11. Remove one screw and the Thermistor.

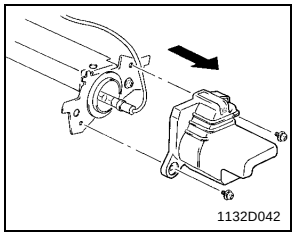


12. Remove one screw and the Fusing Roller Thermal Fuse Mounting Plate.



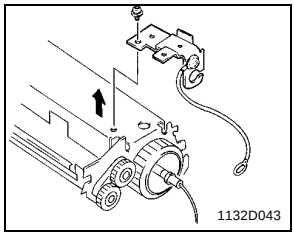
13. Remove two screws and both Terminals of the Heater Lamp.

> ***NOTE***
>
> *At this time, use care not to drop the nuts.*

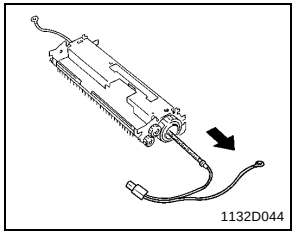


14. Remove two screws and the Left Fusing Unit Cover.

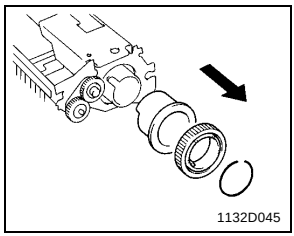
> ***NOTE***
>
> *When reinstalling the Cover, make sure that the end of the Heater Lamp fits securely in the Bearing of the Cover.*



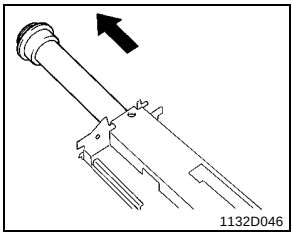
15. Remove one screw and the Heater Lamp Holder.



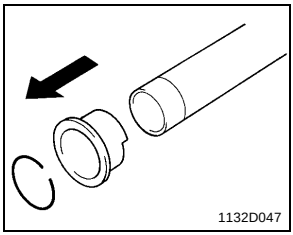
16. Pull out the Heater Lamp.



17. Snap off the C-ring and remove the gear and bearing.

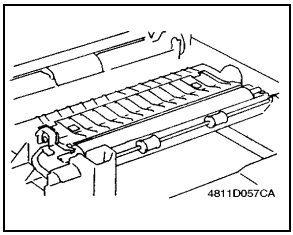


18. Pull out the Upper Fusing Roller.

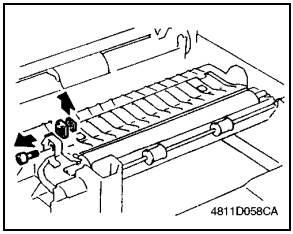


19. Snap off the C-ring and remove the bearing.

2-18. Removal of the Lower Fusing Roller



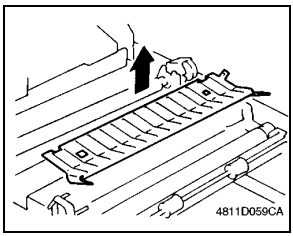
1. Repeat steps 1 to 4 in Section 2-17.
2. Remove the Right Cover.



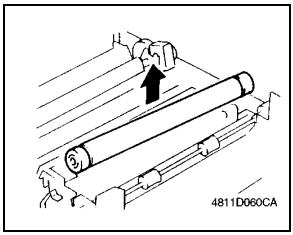
3. Remove one screw (axle) shown and shift the Guide Plate stopper upwards (also at the opposite side).

NOTE

At this time, use care not to lose the plate nut.

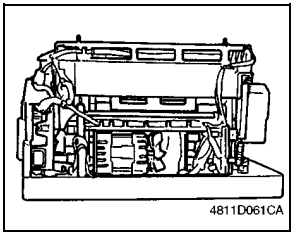


4. Remove the Pre-Fusing Guide Plate.

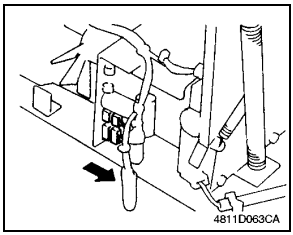


5. Remove the Lower Fusing Roller together with the Bearings.

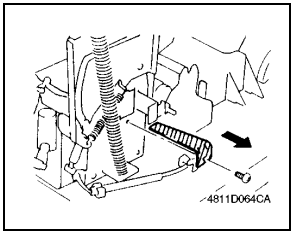
2-19. Removal of the Switching Power Supply PWB-C



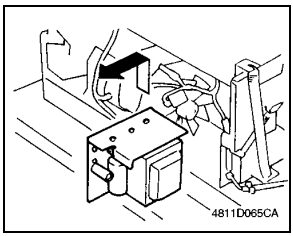
1. Remove the Original Cover, Top Cover, Rear Cover and Left Cover.



2. Disconnect the two Connectors from the Switching Power Bord.

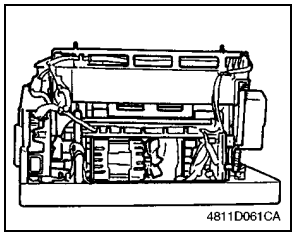


3. Remove one screw shown and the sheet metal that holds the Switching Power Board.

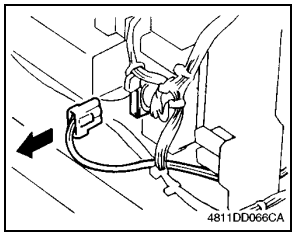


5. Slightly lift up the motor cover with one hand and with the other lift the Switching Power Board and pull it out to the front to remove.

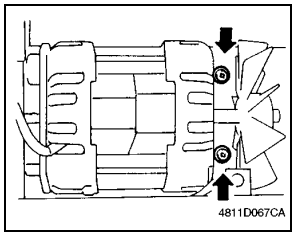
2-20. Removal of the Main Drive Motor



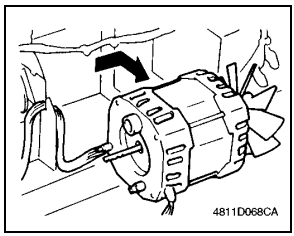
1. Remove the Original Cover, Top Cover, Rear Cover and Right Cover.



2. Unplug the Connector of the Main Motor on the Power Board.

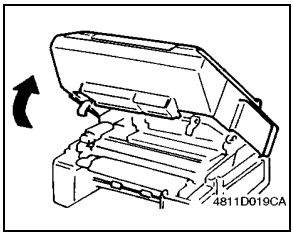


3. Remove two screws which secure the Main Motor.

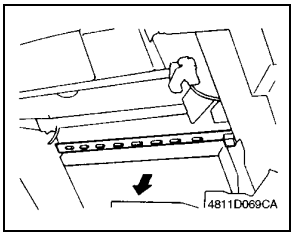


4. Slightly lift up the motor cover, slide the Main Motor to the right and pull it out to the front to remove.

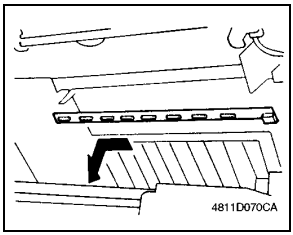
2-21. Removal of the Erase Lamp



1. Swing up the Upper Half of the Unit.



2. Pull and simultaneously bent the PWB carefully until tip of the positioning pin.

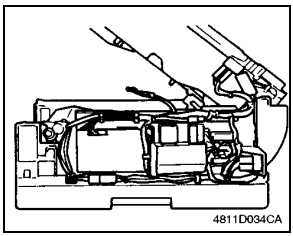


3. Now slide the Erase Lamp to the left and remove the Connector on the Logic Board.
4. Slide the Erase Lamp to the right to remove.

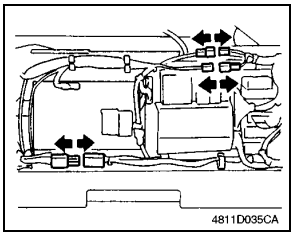
NOTE

At this time, use care not to break the Erase Lamp.

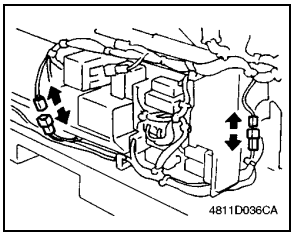
2-22. Exchange of PWB-D



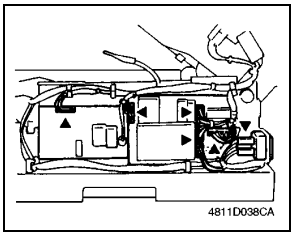
1. Remove the Power Cord.
2. Remove the Original Cover, Top Cover and Rear Cover.



3. Unplug the three Connectors used for the Paper Exit Switch, Fusing Thermistor and Heater Lamp, and remove the Harness from the Wire Saddle.

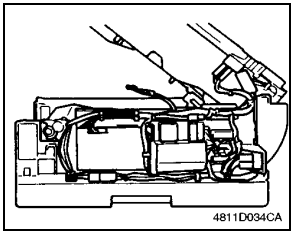


4. Unplug the two Connectors used for the Paper Synchronizing Clutch and Paper Take-Up Solenoid.

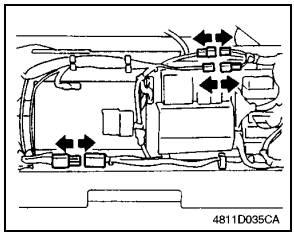


5. Unplug the four Connectors on the Power Board, the three Connectors of the Outlet and the one connector on the High Voltage Unit, and remove them from the Wire Saddle.
6. Remove the Power Board and High Voltage Unit.
7. Exchange PWB and connect to the harness.
8. Adjust the maximum exposure voltage following 3-5.
9. Reassemble covers.

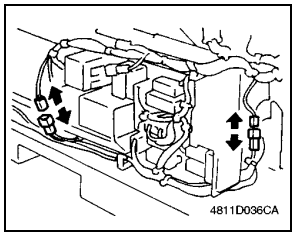
2-23. Exchange of High Voltage Unit



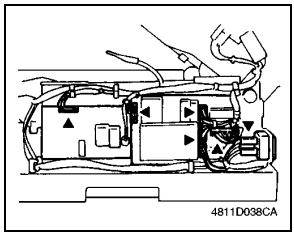
1. Remove the Power Cord.
2. Remove the Original Cover, Top Cover and Rear Cover.



3. Unplug two High Voltage Connectors from the Imaging Module.



4. Unplug the two Connectors used for the Paper Synchronizing Clutch and Paper Take-Up Solenoid.



6. Unplug one Connector form the High Voltage Unit.
7. Remove the Power Board and High Voltage Unit.

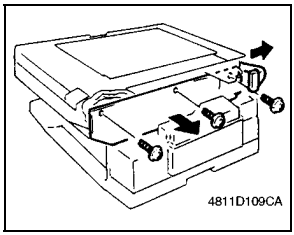
Remark: Adjustment not necessary. Part is preadjustted.

8. Loosen high voltage unit from holding pins. Pull power board slightly to the front at left upper corner and remove two high voltage cables from the cable channel behind the board.

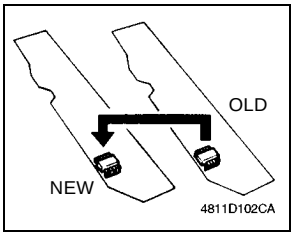
NOTE

When assembling take care for correct positioning/ squeeze of HV-cables to Imaging Module.

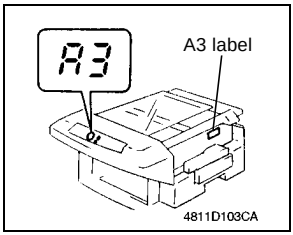
2-24. Exchange of PWB-A



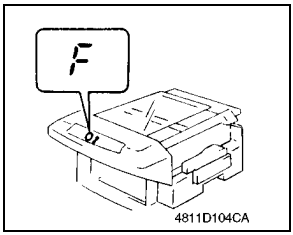
1. Remove Original Cover, TOP Cover and Front Cover. Remove PWB-A.



2. Exchange EEPROM from OLD to the NEW PWB-A.
3. Reassemble PWB-A and connect to harnesses and reinstall the Front Cover.

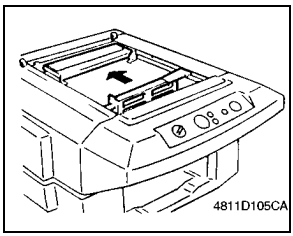


4. Plug in Power Cord and enter Adjusting Mode A3. Read value on A3-label of new PWB-A and put in this value to panel.

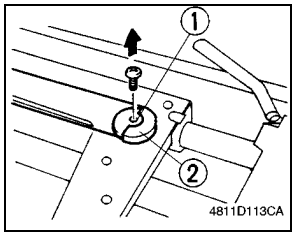


5. Enter the Function Mode.
   5.1. Make Display Test F.
   5.2. Make Passing Test F1.
6. Assemble Housing Covers.
7. Check Leading Edge Registration and Leading Edge Width following 3-3 and 3-4.
   It is not OK, change by using Function Mode F4/F5.

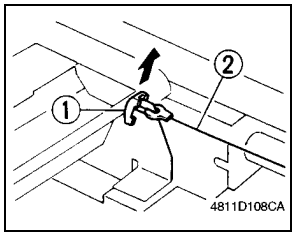
2-25. Exchange of Wire Rope at Scanner Sliders



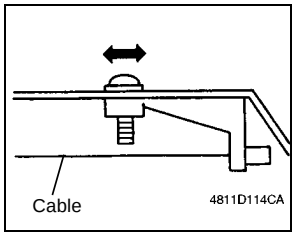
1. Remove Cassette, Start machine until 2nd slider is not located under the front glass plate holder and stop by Switching OFF Main Switch.
2. Remove Original Cover and Top Cover.
3. Secure 2nd slider against force of back-pulling spring.



4. Remove screw (1) which fixes the turning roll (2) for drive cable to the 2nd slider.



5. Pull upwards plastic part (1) at 1st slider at the right side which also secures the Auxiliary Reflector.
6. Remove the ring at cable end (2) from bracket of 1st slider.



7. Carefully mark the position of the cable holder which is fixed at the rear glass plate holder within 0.1mm.

NOTE

The position of the rear cable holder is a important optical adjustment item.

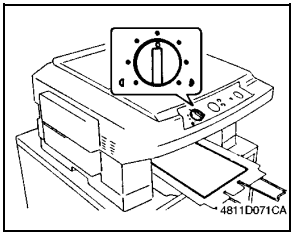
8. Open the screw and remove cable from holder.

3 ADJUSTMENT

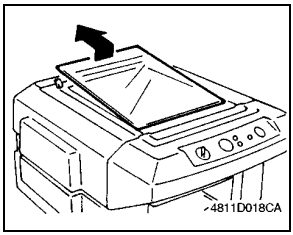
3-1. Adjustment of the Image Density

Should uneven image density occur in the feeding direction, make the following checks first, then make the necessary adjustment.

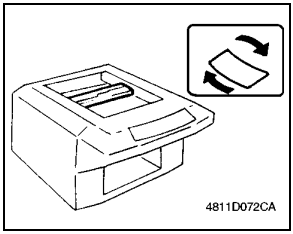
- Clean the PC Drum Charge Corona, Grid Mesh, and Image Transfer Corona Wire.
- Clean the Mirrors and Lens.
- Check that the protrusion in the Exposure Lamp faces upward.
- Check that the Cleaning Blade is in good condition.



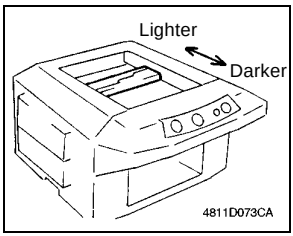
1. Set the Exposure Control Knob to the center and make a copy on A4 paper.



2. Remove the Original Glass.



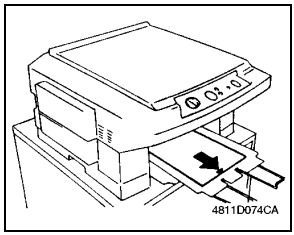
3. Turn the copy around to reverse its leading and trailing edges, and place it on top of the copier so that its trailing edge faces the Aperture Plates.



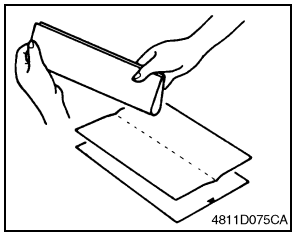
4. Adjust the Aperture Plates as necessary to correct any unevenness on the copies.

   * Slide the Aperture Plates to the front to make the image darker, and to the back to make it lighter.

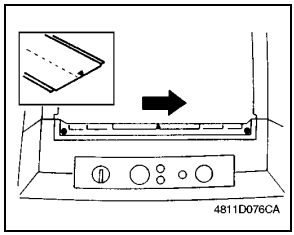
3-2. Adjustment of the Paper Feeding Center Alignment



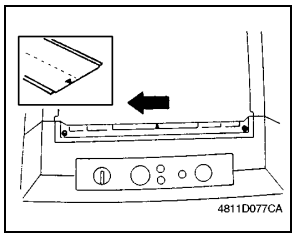
1. Align the center of a Chart with that of the Scale and make a copy.



2. Fold the copy in half and check to see if the fold matches the centerline of the copy.



3-1. If the copy looks as shown on the left, loosen the two screws securing the Original Scale and move it in the direction of the arrow.

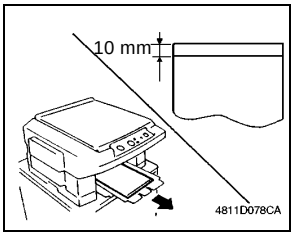


3-2. If the copy looks as shown on the left, loosen the two screws securing the Original Scale and move it in the direction of the arrow.

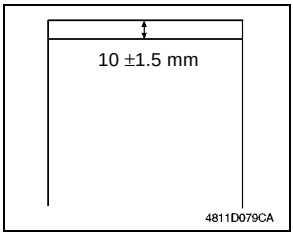
NOTE

Take care not to move original scale to the front or to the rear to avoid skewed image.

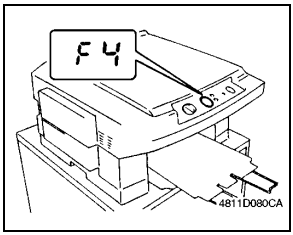
3-3. Adjustment of the Image Leading Edge



1. Draw a line 10 mm away from its leading edge across the entire width of a sheet of paper and make a copy.



2. Measure the distance between the leading edge and the line of the copy. (When this distance is 10 ±1.5 mm, no adjustment is required.)



3. After turning the Power Switch OFF, hold down the Up and Down Keys and turn the Power Switch ON to start up the function mode, and select the F4 mode.
4. Depress the Start Key and check the data. Standard value is 50. The factory setting is shown on a label at the top of the right cover which can be seen when opening machine.

5-1. If the measurement in step 2 is greater than 10 mm, choose the needed Correction Distance from the table below and add its step value to the data value given in step 4 using the Up/Down Key.

5-2. If the measurement in step 2 is less than 10 mm, choose the needed Correction distance from the table below and subtract its step value from the data value given in step 4 using the Up/Down Key.

6. Depress the Start Key to write the corrected data to the EEPROM. Check copy. If this is ok, correkt the value on the label.

7. Check leading edge erase width at last copies and correct following 3-4.

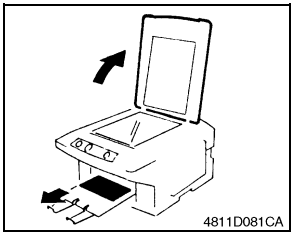
Table for Conversion into the Correction Step (1 step/0.17 mm, correction range: 1 to 99)

Step	Correction Distance	Step	Correction Distance	Step	Correction Distance	Step	Correction Distance
1	0.17 mm	11	1.87 mm	21	3.57 mm	31	5.27 mm
2	0.34 mm	12	2.04 mm	22	3.74 mm	32	5.44 mm
3	0.51 mm	13	2.21 mm	23	3.91 mm	33	5.61 mm
4	0.68 mm	14	2.38 mm	24	4.08 mm	34	5.78 mm
5	0.85 mm	15	2.55 mm	25	4.25 mm	35	5.95 mm
6	1.02 mm	16	2.72 mm	26	4.42 mm	·	·
7	1.19 mm	17	2.89 mm	27	4.59 mm	·	·
8	1.36 mm	18	3.06 mm	28	4.76 mm	·	·
9	1.53 mm	19	3.23 mm	29	4.93 mm	97	16.49 mm
10	1.70 mm	20	3.40 mm	30	5.10 mm	98	16.66 mm

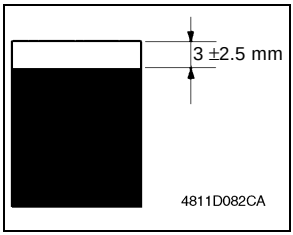
3-4. Adjustment of the Leading Edge Erase Width

IMPORTANT

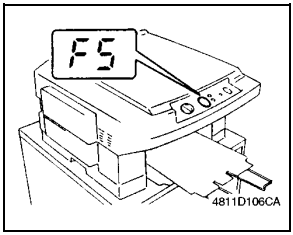
This adjustment must be made after the Image Leading Edge adjustment has been completed.



1. Raise the Original Cover and make a solid black copy.



2. Measure the erase width at the leading edge of the copy. (When this width is 3 ±2.5 mm, no adjustment is required.)



3. After turning the Power Switch OFF, hold down the Up and Down Keys and turn the Power Switch ON to start up the function mode, and select the F5 mode.
4. Depress the Start Key and check the data. Standard value is 50. The factory setting is shown on a label at the top of the right cover which can be seen when opening machine.

5-1. If the measurement in step 2 is greater than 3 ±2.5 mm, choose the needed Correction Distance from the table below and subtract its step value from the data value given in step 4 using the Up/Down Key.

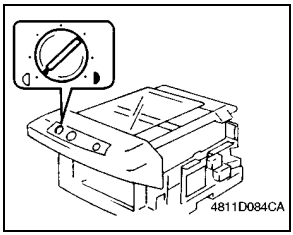
5-2. If the measurement in step 2 is less than 3 ±2.5 mm, choose the needed Correction Distance from the table below and add its step value from the data value given in step 4 using the Up/Down Key.

6. Depress the Start Key to write the corrected data to the EEPROM. Check copy. If this is ok, correkt the value on the label.

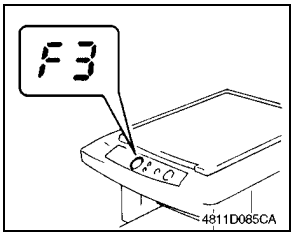
Table for Conversion into the Correction Step (1 step/0.17 mm, correction range: 1 to 99)

Step	Correction Distance	Step	Correction Distance	Step	Correction Distance	Step	Correction Distance
1	0.17 mm	11	1.87 mm	21	3.57 mm	31	5.27 mm
2	0.34 mm	12	2.04 mm	22	3.74 mm	32	5.44 mm
3	0.51 mm	13	2.21 mm	23	3.91 mm	33	5.61 mm
4	0.68 mm	14	2.38 mm	24	4.08 mm	34	5.78 mm
5	0.85 mm	15	2.55 mm	25	4.25 mm	35	5.95 mm
6	1.02 mm	16	2.72 mm	26	4.42 mm	·	·
7	1.19 mm	17	2.89 mm	27	4.59 mm	·	·
8	1.36 mm	18	3.06 mm	28	4.76 mm	·	·
9	1.53 mm	19	3.23 mm	29	4.93 mm	97	16.49 mm
10	1.70 mm	20	3.40 mm	30	5.10 mm	98	16.66 mm

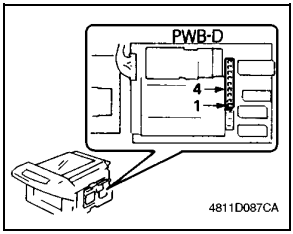
3-5. Adjustment of the Maximum Exposure Lamp Voltage



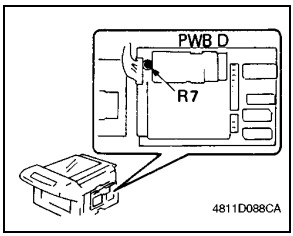
1. Remove the Original Cover, Top Cover and Right Cover.
2. Turn the Exposure Control Knob full counterclockwise. (Maximum light position)



3. Hold down the Up and Down Keys and turn the Power Switch to ON start up the function mode, and select the F3 mode.



4. Connect a RMS multimeter across Terminals 1 and 4 of PJ3D on the Power Board and depress the Start Key.



5. Turn Variable Resistor R7 on the Power Board to adjust the Exposure Lamp voltage to 147 (+2) V_{eff}.

4 REFRESH OF MACHINE AFTER 25000 COPIES

4-1. Cleaning of Paper Feeding Section

Remove the Power Cord, Pressure Bracket at paper feeding following 2-15-3.
Clean corcs and mylar with soft piece of cloth soaked with Isopropyl alcohol.
Shift rubber of the paper feeding segments on the plastic holding to a new position (about 10 mm).
Reassemble Pressure Bracket.

4-2. Remove covers

Remove Original-, Top-, Left-, Right- and Rear Cover and the Imaging Module following 2-1 to 2-9.

NOTE

Don't forget to remove the Suspension Bracket from the old Imaging Module and assemble to the new Imaging Module. (See Parts Manual FIG. 7 Page 14)

4-3. Cleaning of machine

Clean the whole machine including all covers and Original Glass Plate from Paper Dust and Toner Dust.

4-4. Replacement of Ozone Filter

See chapter 2-12 (D-8).

4-5. Cleaning of Timing Roller

Clean the Timing Roller and the Mylars with a piece of soft cloth soaked with Isopropyl Alcohol.

4-6. Cleaning of Optics Section

Clean all mirrors (6), erase lamp, lamp reflector and the Platen Glass with a piece of soft cloth soaked with glass cleaner.

4-7. Replacement of Imaging Module

Remove Suspension Bracket from the old Imaging Module and assemble to the new one. Insert new Imaging Module following 2-9.

NOTE

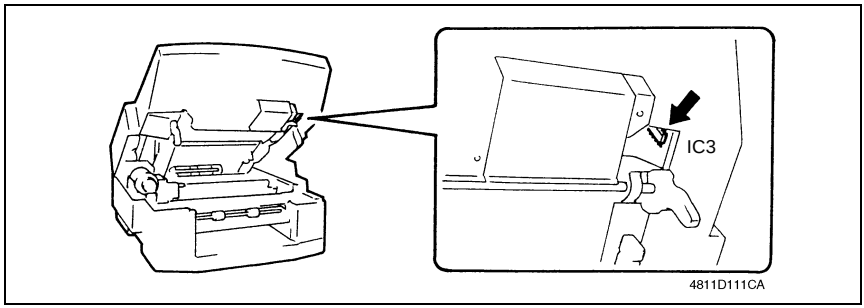
Do not forget to remove the sealing tape from the Starter Bottle.

4-8. Exchange of EEPROM IC3 on PWB-A

- Plug Power Cord in and switch machine ON.
- Display shows "du" or "SU".
- Open the machine.
- Display shows "U5".
- Remove old EEPROM IC3 on PWB-A carefully.
- Insert new EEPROM IC3 from Renovating Unit.

NOTE

Take care to position EEPROM nose upwards.



- Close machine.
- Display shows "UF".
- Starter filling must now be initiated by pressing the copy key.
- Wait approx. five minutes until display shows "1".
- Open machine and remove empty starter bottle.
- Shake toner bottle well, remove sealing tape and insert toner bottle.
- Close machine, unplug power cord and reassemble all covers.
- After plugging power cord in and switching power ON machine will be ready to copy.

TROUBLESHOOTING

General Precautions

1. When servicing this copier with its covers removed, use utmost care to prevent your hands, clothing, and tools from being caught in revolving parts.
2. Before attempting to replace parts and unplugging connectors, make sure that no power is being supplied from the copier.
3. When creating a closed circuit and measuring a voltage across connector pins specified in the text, be sure to use the green wire (GND).
4. Keep all disassembled parts in good order and keep tools under control so that none will be lost or damaged.

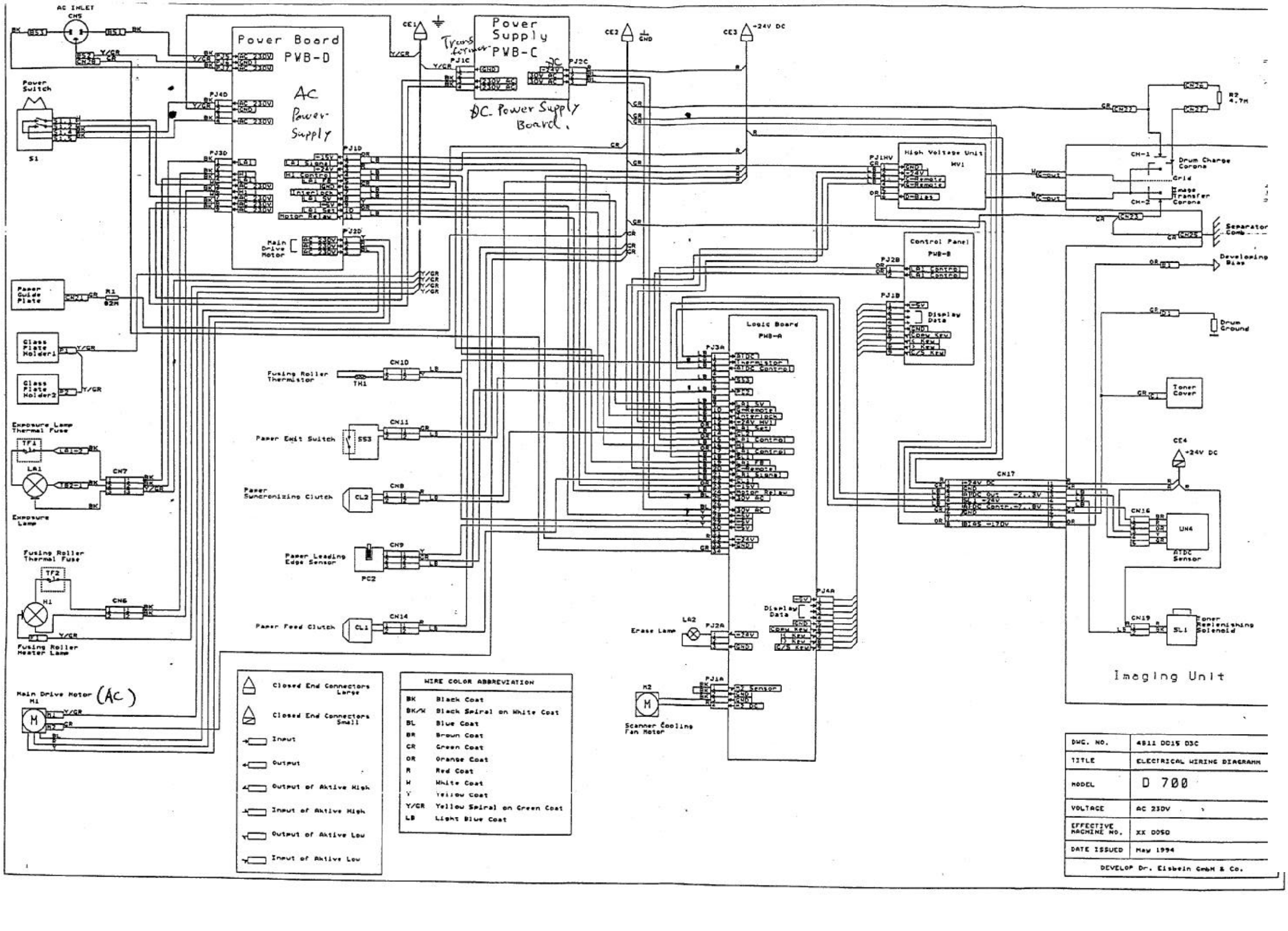
Reading the Text

1. If a component on a PWB or any other functional unit including a motor is defective, the text only instructs you to replace the whole PWB or functional unit and does not give troubleshooting procedure applicable within the defective unit.
2. The text assumes that there are no breaks in the harnesses and all connectors are plugged into the right positions.

1 TROUBLESHOOTING FOR "C" AND "E" - INDICATION

E1	:	- no starter or wrong starter detected after starter filling - developing unit failure - ATDC sensor failure - PWB-A failure
E2	:	- wrong starter detected after starter filling - ADTC sensor control voltage exceeded after starter filling - developing unit failure - ATDC sensor failure - PWB-A failure
C1 Scanner fan	:	- scanner fan not connected, check "PJ1" on PWB-A - PWB-A failure
C4 Exposure lamp malfunction	:	- exposure lamp failure - exposure lamp not connected - power supply to exposure lamp interrupted - connector "CN7" of exposure lamp harness not connected - connector "LA1-2" of exposure lamp harness not connected - connector "TB3-1" of exposure lamp harness not connected - malfunction of exposure lamp thermal fuse "TF1" - exposure lamp control circuit failure - PWB-A and/or PWB-D failure
C5 Warm-up malfunction	:	- temperatur in fusing unit does not achieve 185^{o}C within 30 sec. after power on - connector "PJ3" on PWB-D not connected - connector "CN6" of fusing unit harness not connected - failure of fusing unit thermal fuse "TF1" - thermistor "TH1" short-circuited - thermistor "TH1" not connected, check "CN10" of harness - failure of fusing unit heater lamp - failure of power supply to fusing unit - malfunction in control circuit of fusing unit heater lamp - PWB-A and/or PWB-D failure

C6 Scanner/motor malfunction or timing failure	:	- motor does not start when start key is pressed - scanner does not reach the two sensors within specified timing - motor not deactivated after end of copy cycle - connector "PJ2" on PWB-D not connected - motor power supply interrupted - motor failure - motor overheating error - motor control circuit failure - PWB-A and/or PWB-D failure
C7 Low-temperature error	:	- after warm-up the fusing unit temperature falls below 138ºC - connector "PJ3" on PWB-D not connected - failure of fusing unit thermal fuse "TF1" - thermistor "TH1" failure - failure of fusing unit heater lamp - power supply to fusing unit interrupted - malfunction in control circuit of fusing unit heater lamp - PWB-A and/or PWB-D failure
C8 Over-temperature error	:	- fusing unit temperature is 220ºC for 2 sec. - thermistor "TH1" short-circuited - failure in control circuit of fusing unit heater lamp - PWB-A and/or PWB-D failure
CP EEPROM malfunctions (IC3 on PWB-A)	:	- EEPROM not connected - EEPROM not properly connected - EEPROM failure - error in EEPROM write/read routine - PWB-A failure


AC INLET
CN5
Power Board
PWB-D
AC
Power
Supply
Power Supply
PWB-C
Transformer
DC Power Supply
Board.
CE1
CE2
CE3
+24V DC
GND
Power
Switch
S1
PJ1D
PJ2D
Main
Drive
Motor
Paper
Guide
Plate
R1
82M
Glass
Plate
Holder1
Glass
Plate
Holder2
Exposure Lamp
Thermal Fuse
TF1
LA1
CN7
Exposure
Lamp
Fusing Roller
Thermal Fuse
TF2
H1
CN6
Fusing Roller
Heater Lamp
Main Drive Motor (AC)
M1
Fusing Roller
Thermistor
TH1
CN10
Paper Exit Switch
SS3
CN11
Paper
Synchronizing Clutch
CL2
CN8
Paper Leading
Edge Sensor
PC2
CN9
Paper Feed Clutch
CL1
CN14
Logic Board
PWB-A
PJ3A
PJ4A
PJ2A
LA2
Erase Lamp
M2
Scanner Cooling
Fan Motor
PJ1A
High Voltage Unit
HV1
PJ1HV
Control Panel
PWB-B
PJ2B
PJ1B
Display
Data
CN17
CN16
UN4
ATDC
Sensor
CN19
SL1
Toner
Replenishing
Solenoid
CH-1
CH-2
Drum Charge
Corona
Grid
Image
Transfer
Corona
Separator
Comb
Developing
Bias
Drum
Ground
Toner
Cover
R2
4.7M
Imaging Unit
Closed End Connectors Large
Closed End Connectors Small
Input
Output
Output of Aktive High
Input of Aktive High
Output of Aktive Low
Input of Aktive Low
WIRE COLOR ABBREVIATION
BK Black Coat
BK/W Black Spiral on White Coat
BL Blue Coat
BR Brown Coat
GR Green Coat
OR Orange Coat
R Red Coat
W White Coat
Y Yellow Coat
Y/GR Yellow Spiral on Green Coat
LB Light Blue Coat
DWG. NO. 4811 DC15 03C
TITLE ELECTRICAL WIRING DIAGRAMM
MODEL D 700
VOLTAGE AC 230V
EFFECTIVE MACHINE NO. XX 0050
DATE ISSUED May 1994
DEVELOP Dr. Eisbein GmbH & Co.