

# PC400/420/430

# FC200/220

## **SERVICE HANDBOOK**

REVISION 0

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**FY8-23AV-000**

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## CHAPTER 1 MAINTENANCE AND INSPECTION

### A. Periodically Replaced Parts

The machine does not have parts which must be replaced on a periodical basis.

### B. Durables

The machine does not have parts which are classified as durables.

### C. Periodical Servicing

The machine does not have parts that require periodical servicing.

## D. Notes on Cartridge

The cartridge is affected by the environment, regardless of whether it is sealed or unsealed and installed in the machine or otherwise. Although the properties of the cartridge change over time independent of how many copies have been made, the degree of care taken for the cartridge affects how long it may remain stable.

### 1. Storing Sealed Cartridges

When storing the cartridge in a warehouse or workshop, make sure the place is controlled to the specifications shown in Table 1-1D.

- a. Avoid direct rays of the sun.
- b. Avoid areas subjected to appreciable vibration.
- c. Do not drop or subject it to impact.

Temperature	Normal (9/10 of period)		0° to 35°C/ 32° to 95°F
	Severe (1/10 of period)	High	35° to 40°C/ 95° to 104°F
		Low	-20° to 0°C/ -4° to 32°F
Temperature fluctuations (within about 3 min)			40° → 15°C/ 104° → 59°F -20°C → 25°C/ -4°F → 77°F
Humidity	Normal (9/10 of period)		35 to 85%RH
	Severe (1/10 of period)	High	85 to 95%RH
		Low	10 to 35%RH
Atmospheric pressure			460 to 760 mmHg (0.1 to 1 atm)

**Table 1-1D Temperature/Humidity Specifications**

Temperature	Humidity
-20° to 40°C/-4° to 104°F	90% or less

**Table 1-2D Transportation**



## 2. Storing and Handling Unsealed Cartridges

The photosensitive medium is an organic photoconductor (OPC), which is extremely susceptible to light. Since the cartridge also contains toner, you must be extra careful when storing or handling the cartridge. Make sure the user is aware of this fact and will handle the cartridge with care.

### a. Storing Unsealed Cartridges

- 1) Avoid areas subjected to strong rays of the sun. Do not keep it in a car even in a protective box; the inside may become extremely hot.
- 2) Avoid areas of high or low temperature/ humidity and areas where these elements tend to change rapidly (for example, near air conditioners or heaters).
- 3) Avoid areas where dust, ammonium gas, or gases from organic solvents tend to accumulate.
- 4) Keep the cartridge in a place 40°C or less.

### b. Handling the Cartridge

- 1) Before inserting the cartridge in the copier or if the toner starts to run short, hold the cartridge horizontally as shown in Figure 1-1, and rotate it in both directions about 90° to even out the toner inside it. Do not shake the cartridge or hold it in a different way; otherwise, toner may leak out the cartridge.

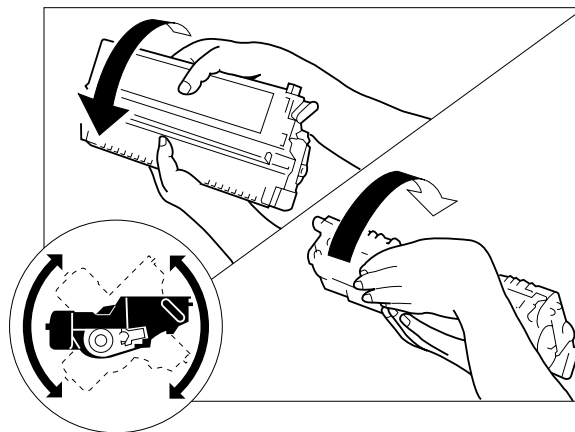
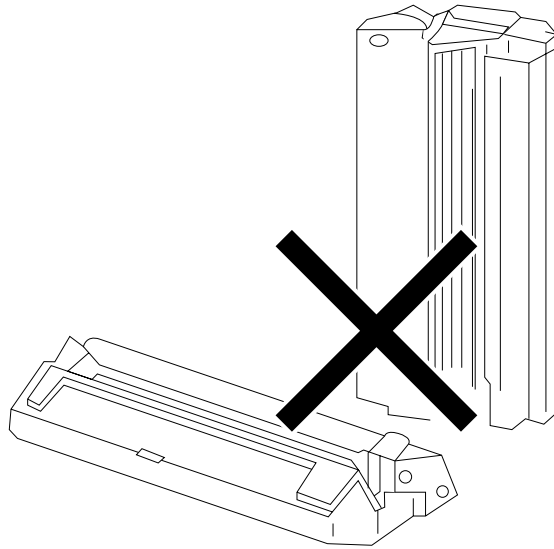


Figure 1-1D

- 2) Do not place the cartridge upright or upside down; do not shake it.



**Figure 1-2D**

- 3) Do not force open the shutter for the photosensitive drum cover found at the bottom of the cartridge; do not touch the surface of the photosensitive drum.

[ If the surface of the photosensitive drum has become soiled, wipe it using a flannel cloth coated with toner. Do not dry wipe it or use solvent. ]

- 4) Do not disassemble the cartridge.  
 5) Do not subject the cartridge to vibration or impact; in particular, do not force down the photosensitive drum from above the shutter for the drum cover.  
 6) Keep the cartridge out of reach of children.  
 7) The photosensitive drum is susceptible to light and, therefore, equipped with a light-blocking shutter; nevertheless, exposure to light for a long time can affect the drum, resulting in copies with white spots or vertical lines. Leave the copier alone for some time for possible recovery; to avoid residual memory, which results in white spots or vertical lines, however, keep the following in mind.

**Caution:**

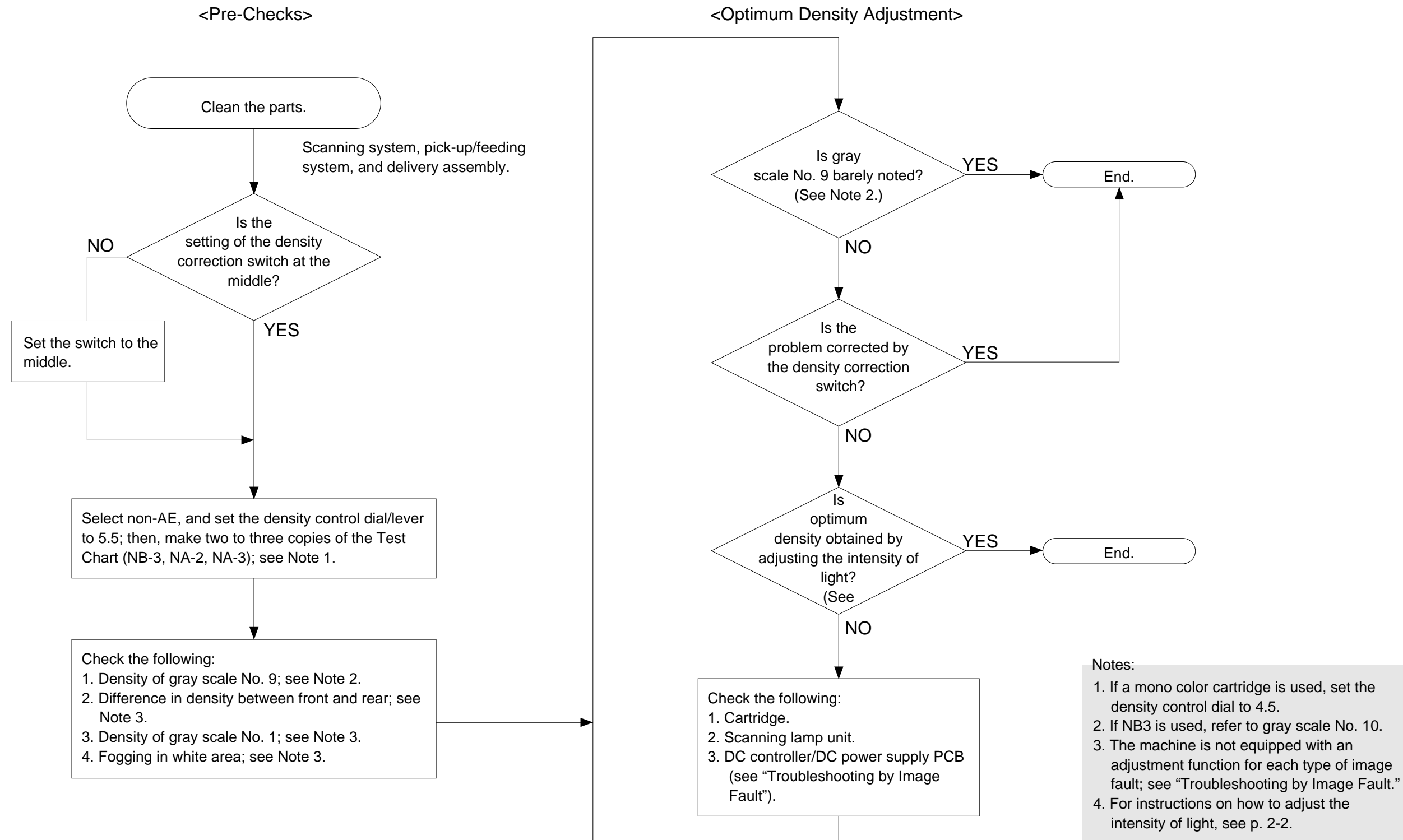
Work quickly when removing jams or replacing cartridges.

When the cartridge must be removed for work, be sure to put the cartridge in its storage box or cover it; do not leave it without protective measures once it is outside the copier.

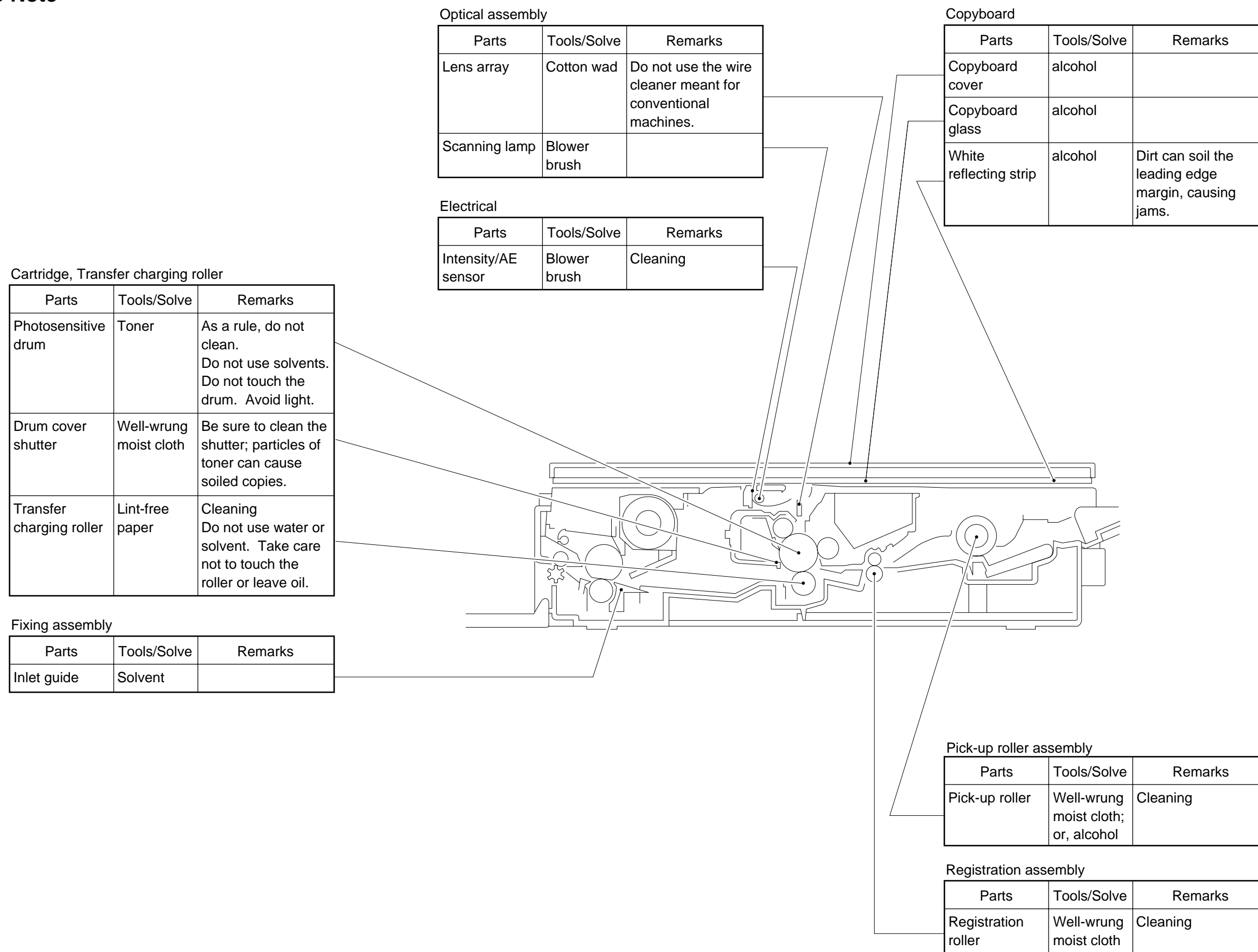
**Reference:**

The drum would recover to more or less its normal condition if left alone for five minutes in a dark place after exposure to an intensity of 1500 lux (about 5 minutes under general lighting). However, you must try to avoid any exposure. (The rays of the sun have intensities ranging between about 10000 and 30000 lux.)

## E. Image Adjustment Basic Procedure



## F. Points to Note



## CHAPTER 2 STANDARDS AND ADJUSTMENTS

### A. Mechanical

#### 1. Image Leading Edge Non-Image Width (position of white paint on back of glass)

The leading edge non-image width must be  $2.0 \pm 1.0$  mm when the Test Sheet is copied.

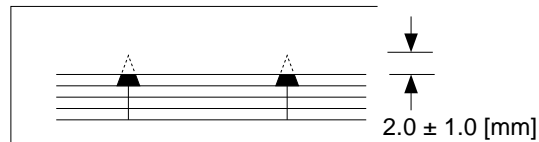


Figure 2-1A

The leading edge non-image width is determined by the position of the white paint found behind the copyboard glass.

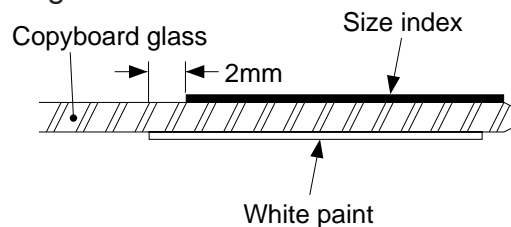


Figure 2-2A

#### 2. Image Leading Edge Margin (point of detection for registration)

The leading edge margin must be 0.2 to 5.0 mm when the Test Sheet is copied. To adjust, move the position of the registration cam.

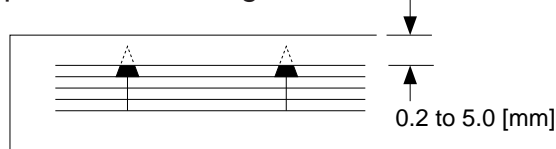


Figure 2-3A

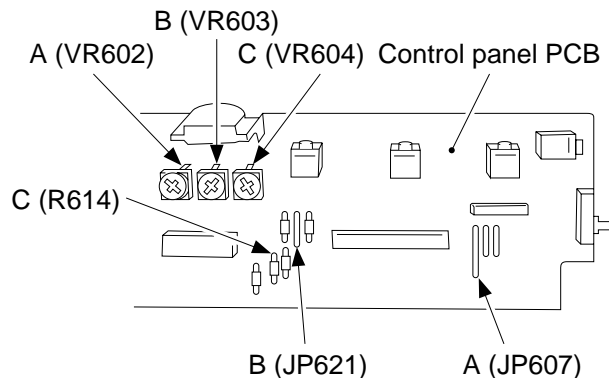
## B. Electrical

### Notes:

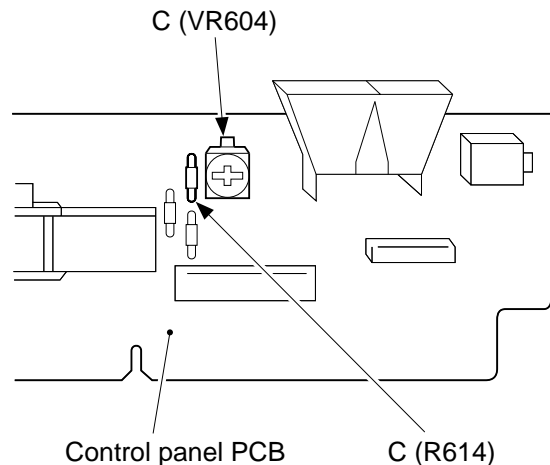
If you have replaced the scanning lamp unit, intensity sensor, AE sensor, or control panel PCB, you must adjust the three variable resistors on the control panel PCB (one, if PC400/FC200); you must, however, adjust them in the order of VR604, VR602, and VR603 (from intensity to AE).

### 1. Adjusting the Intensity (VR604)

- a. After Replacing the Control Panel PCB Only
  - 1) Disconnect the power plug, and detach the faulty control panel PCB.
  - 2) Set the meter to the '200 k' range, and measure C between the terminal of VR604 and the terminal of R614 on the detached control panel PCB; see Figure 2-1B.
  - 3) Likewise, measure C between the terminal of VR604 and the terminal of R614 on the new control PCB; then, turn VR604 so that the reading is the same as the measurement taken in step 2).
  - 4) In the case of the PC420/430/FC220, adjust VR602 (A between terminals of VR602 and JP607) and VR603 (Between terminals of VR603 and JP621); see Figure 2-1B.
  - 5) Attach the new control panel PCB to the copier.



**Figure 2-1B (PC420/430/FC220)**



**Figure 2-2B (PC400/FC200)**

b. After Replacing the Scanning Lamp Unit, Intensity Sensor, or AE Sensor

(Before Adjustment)

- If the scanning lamp has blackened, replace it.
- Clean the scanning system (lens array, lamp reflector, lamp).

- 1) Set the cartridge to the copier.
- 2) De-select AE, and set the copy density control lever/dial to the center.
- 3) Set the density correction switch (SW606) to the center (PC420/430/FC220).
- 4) Set the Test Sheet (NA3/NB3/NA2), and make a copy.
- 5) Check if the copy is free of fogging, and gray scale No. 9 (No. 10, if NB3) is somewhat visible.
  - If too dark,  
Turn VR604 on the control panel PCB clockwise slightly to increase the intensity.
  - If too light,  
Turn VR604 counterclockwise slightly to decrease the intensity.
- 6) Repeat steps 4) and 5) until the density is optimum.

**Notes:**

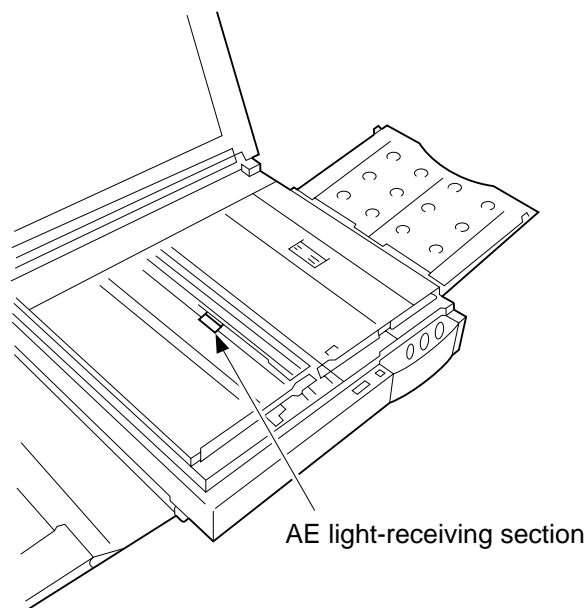
After adjusting the intensity, be sure to adjust the AE mechanism (PC420/430/FC220).

## 2. Adjusting the AE Mechanism (VR602, VR603)

(Before Adjustment)

- Obtain a newspaper whose text consists of fine print; do not use a section with photos or large characters.
- Make sure you have adjusted light intensity.

- 1) Switch the copier OFF.
- 2) Detach the control panel cover.
- 3) Turn VR602 and VR603 on the control panel PCB fully clockwise.
- 4) Place a newspaper over the AE light-receiving section of the copyboard, and close the copyboard cover.



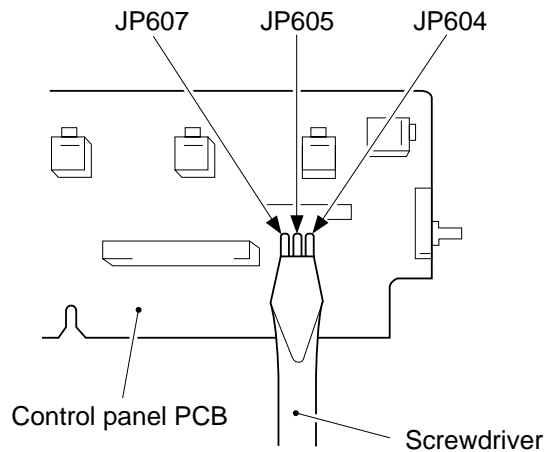
**Figure 2-3B**

- 5) Short the three jumper wires (JP604, JP605, JP607) on the control panel PCB at the same time using a screwdriver.

**Caution:**

Take adequate care not to short wires other than those specified.



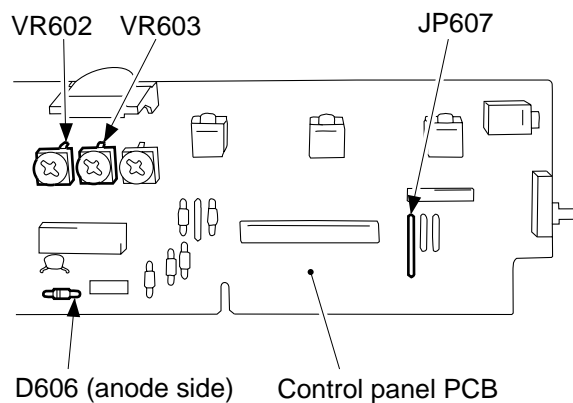


**Figure 2-4B**

- 6) While keeping the condition in step 5), switch the copier ON.
  - '0' is displayed, the scanning lamp goes ON, and the main motor starts to rotate.
- 7) Stop shorting the jumper wires.
- 8) Set the digital multimeter to the 20V DC range, and turn VR602 (AE offset adjustment) until the voltage between the anode side of the diode (D606; +) and JP607 (GND) is  $4.0 \pm 0.1$  V.

**Notes:**

You must use a Digital Multimeter when making adjustments in steps 8) and 10).



**Figure 2-5B**

- 9) Place about five sheets of blank copy paper.
- 10) Turn VR603 (AE gain adjustment) until the voltage between the anode side of the diode (D606; it) and JP607 (GND) is  $1.8 \pm 0.1$  V; see Figure 2-5B.
- 11) Switch the copier OFF.

**Notes:**

Make sure that the jumping wires are no longer shorted.

- 12) Switch the copier ON once again.
- 13) Set the density correction switch (SW606) to the center (of the three settings).
- 14) Make sure that the AE indicator is ON.
- 15) Set the newspaper used in step 4) on the copyboard once again; this time, move the newspaper to a different area.
- 16) Make a copy, and make sure that it is not foggy and has adequate text density.
  - If foggy,  
Turn VR602 clockwise slightly.
  - If text density is low,  
Turn VR602 counterclockwise slightly.
- 17) Repeat steps 15) and 16) until the density is optimum.

## CHAPTER 3 IMAGE TROUBLESHOOTING

### A. Making Initial Checks

#### 1. Site Environment

- a. The voltage of the power source must be within the specifications.
- b. Avoid areas subjected to dust or high temperature/humidity (near water faucets, water boilers, humidifiers) and areas near open fires.
- c. Avoid areas subjected to ammonium gas.
- d. Avoid direct rays of the sun; otherwise, provide curtains.
- e. Make sure the site is well ventilated.
- f. Make sure the floor is level.

Check the site to see if it meets the above requirements.

#### 2. Checking the Documents

You must first check to see if a particular problem may not be due to the document used.

- a. The copy density reading should be  $5.5 \pm 1.5$  (black)/ $4.5 \pm 1.5$  (color).
- b. Some backgrounds, i.e., yellow shades, tend to produce copies with poor contrast.
- c. Diazo copies or translucent documents tend to produce copies that may be mistaken for foggy copies.
- d. Documents prepared in light pencil tend to produce copies that may be mistaken for light copies.

**3. Checking the Copyboard Cover and Copyboard Glass for Dirt and Scratches**

If dirt is found, clean it using mild detergent or alcohol; if scratches are found, replace it.

**4. Checking the Lens Array for Dirt**

Check the lens array for dirt. If found, clean it using a cotton wad.

**5. Checking the Transfer Charging Roller**

Check the transfer charging roller for scratches or other abnormalities.

**6. Checking the Feeding Assembly**

Check the feeding assembly for dirt. If dirt is found, clean it with a moist cloth.

**7. Checking the Copy Paper**

- a. Check to see if paper of a type recommended by Canon is used.
- b. Check to make sure that the paper is not moist. Try paper fresh out of package.

**8. Checking the Durables**

**Checking the Cartridge**

White spots or vertical white lines tend to appear when the cartridge starts to run short of toner; see Figure 10-301A.

**Preface**

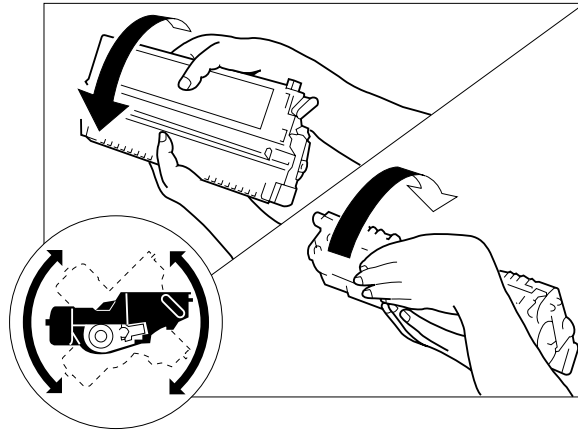
Thank you for purchasing a Canon copier. To ensure safe operation in order to familiarize yourself with its capabilities, please read this manual carefully before using this manual.

<p><b>▲ CAUTION:</b> In this manual, CAUTION indicates a procedure that could result in personal injury.</p>	<p>CAUTION indicates a procedure that could result in personal injury. Please read this manual carefully before using this manual.</p>
--	--

**Figure 3-1A**

Go over the following when this is noted.

- 1) Take out the cartridge from the copier, and rotate it several times.



**Figure 3-2A**

- 2) Set the cartridge back into the copier, and make copies.
  - a. If the copies are normal,
    - The user may use the cartridge for some time more; however, advise the user to procure a replacement cartridge.
  - b. If the copies fail to return to normal,
    - Replace the cartridge as described in “Replacing the Cartridge.”

## 9. Others

In winter, moving a machine from a cold storage room to a warm site can cause condensation inside the machine, leading to various problems.

- a. Condensation on the scanning system (glass, lens array, reflecting plate) causes dark images.
- b. When too cold, the photosensitive drum assumes a high electrical resistance, resulting in poor contrast.
- c. Condensation in the pick-up/feeding assembly can cause faulty paper transport.
- d. Condensation in the lower roller of the manual pick-up mechanism decreases friction, leading to pick-up failure.
- e. Condensation on the copyboard hinders its smooth movement.

When condensation is noted, dry wipe the parts.

The same holds true of the cartridge. After having moved the cartridge from a cold to warm room, leave it alone for about one to two hours before unpacking it.



## B. Samples of Image Faults

not available



## C. Troubleshooting by Image Fault

1. The copy is too light (halftone areas only).
2. The copy is too light (dark areas as well).
3. The copy is too light (extremely light overall).

Cause		Step	Checks	YES/NO	Remedies
Lens, Reflecting plate, Intensity sensor		1	Clean the lens, reflecting plate, and intensity sensor. Is the problem corrected?	YES	End.
/		2	Press the Copy Start key, and switch the copier OFF in the middle of operation; then, open the top cover. Is the toner image on the photosensitive drum more or less normal before transfer? (Be sure to check quickly to protect the drum against light.)	NO	Go to step 5.
		Transfer charging roller	3	Is the transfer charging roller normal?	NO
Transfer	Copy paper	4	Try paper fresh out of package. Is the copy density higher?	YES	1. The paper may be moist; advise the user on the correct method of storage. 2. Advise the user that the use of non-recommended paper may not bring about the best results.
Cartridge		5	Replace the cartridge. Is the problem corrected?	YES	End.
DC controller/DC power supply PCB				NO	Replace the DC controller/DC power supply PCB.

**4. The copy has uneven density (darker at front).**

**5. The copy has uneven density (lighter at front).**

Cause	Step	Checks	YES/NO	Remedies
Scanner	1	Clean the scanning lamp, reflecting plate, and lens. Is the problem corrected?	YES	End.
Cartridge, Scanning lamp	2	Press the Copy Start key, and switch the copier OFF in the middle of operation; then, open the top cover. Does the toner image on the photosensitive drum before transfer have uneven density?	YES	1. Replace the cartridge. 2. Replace the scanning lamp unit.
Transfer charging roller			NO	Check the transfer charging roller.

**6. The copy is foggy (overall).**

Cause	Step	Checks	YES/NO	Remedies
Scanner	1	Clean the scanning lamp, reflecting plate, and lens. Is the problem corrected?	YES	End.
Scanning lamp, Developing bias	2	Is continuity present between photosensitive drum PCB and grounding spring?	YES	1. Check if the scanning lamp goes ON normally. 2. Check the developing bias.
Grounding spring			NO	Check to make sure if the grounding spring is properly attached in front of the cartridge.

7. The copy is foggy (paper feed direction).  
 8. The copy has dark lines (paper feed direction, relatively narrow).  
 9. The copy has dark lines (paper feed direction, thin).

Cause	Step	Checks	YES/NO	Remedies
Scanner	1	Clean the scanning lamp, reflecting plate, and lens. Is the problem corrected?	YES	End.
Cartridge	2	Take out the cartridge, and put it back in. Is the problem corrected?	YES	End.
			NO	Replace the cartridge.

10. The copy has white spots (paper feed direction).  
 11. The copy has white lines (paper feed direction).

Cause	Step	Checks	YES/NO	Remedies
Fixing assembly	1	Press the Copy Start key, and switch the copier OFF in the middle of operation; then, open the top cover. Does the copy image have white spots or white lines before fixing?	NO	Check the fixing assembly.
Cartridge	2	Rotate the cartridge several times. Is the problem corrected?	YES	Advise the user that the cartridge is running short of toner.
Transfer charging roller	3	Is there foreign matter or scratches on the transfer charging roller?	YES	Remove the foreign matter, or replace the transfer charging roller.
Cartridge			NO	Replace the cartridge.

**12. The copy has white spots (cross feed direction).**

Cause	Step	Checks	YES/NO	Remedies
Copy paper	1	Is the copy paper of a type recommended by Canon?	NO	Try recommended paper; if the results are good, advise the user to use recommended paper.
	2	Try copy paper fresh out of package. Is the problem corrected?	YES	The copy paper may be moist; advise the user to store it wrapped.
Copyboard rail	3	Is the problem noted at the same position on all copies?	YES	Check the copyboard rail for foreign matter.
Scanning lamp, Developing bias			NO	Check the scanning lamp for flickering, and check the presence/absence of a developing bias.

**13. The back of the copy is soiled.**

Cause	Step	Checks	YES/NO	Remedies
/	1	Press the Copy Start key, and switch the copier OFF while the copy paper is moving through the feeding assembly. Is the back of the copy soiled?	NO	Go to step 3.
Transfer charging assembly	2	Is the transfer charging assembly soiled?	YES	1. Clean the transfer charging assembly. 2. Clean the registration roller. 3. Clean the pick-up guide plate. 4. Check the cartridge for leakage of toner.
Feeding assembly	3	Is the feeding assembly soiled?	YES	Clean the feeding assembly.
Delivery roller			NO	Clean the delivery roller.

**14. The copy has faulty fixing.**

Cause	Step	Checks	YES/NO	Remedies
Copy paper	1	Is the copy paper of a type recommended by Canon?	NO	Try paper of a recommended type; if the results are good, advise the user to use recommended paper.
Fixing film	2	Is the faulty fixing vertical and in the form of lines?	YES	Check the fixing film and pressure roller for scratches. If scratches are found, replace the fixing unit or roller.
DC controller/DC power supply PCB	3	Is the heater turned ON for control after copy operation is started?	YES	The control temperature for the fixing heater may be low; check the thermistor and DC controller/DC power supply PCB.
Fixing heater			NO	See "The fixing heater fails to operate."

**15. The copy has faulty leading edge registration (blank area much too wide).****16. The copy has faulty leading edge registration (blank area too wide).****17. The copy has faulty leading edge registration (no blank area).**

Cause	Step	Checks	YES/NO	Remedies
Registration cam	1	Move the registration cam on the copyboard left and right. Is there any change to the registration?	YES	Adjust the position of the registration cam.
Solenoid (SL1), DC controller/DC power supply PCB	2	Is the solenoid for registration (SL1) operating normally?	NO	1. Check the solenoid (SL1). 2. Check the DC controller/DC power supply PCB.
Pick-up roller	3	Is the copy paper of a type recommended by Canon?	YES	Check the pick-up roller.
Copy paper			NO	Try copy paper of a type recommended by Canon; if the results are good, advise the user to use recommended paper.

**18. The copy has a blurred image.**

Cause	Step	Checks	YES/NO	Remedies
Copyboard rail	1	Is the movement of the copyboard rail smooth?	NO	Replace the copyboard rail.
Copyboard drive assembly	2	Is the movement of the copyboard normal?	NO	Check the copyboard drive assembly; if a fault is found, replace the part.
Main motor assembly	3	Is the main motor assembly normal?	NO	Replace the main motor assembly.
Feeding assembly	4	Does the copy paper stop or jump near the transfer assembly?	YES	Remove the foreign matter or burrs from the feeding system.
Cartridge			NO	Replace the cartridge.

**19. The copy is foggy (cross feed direction).**

Cause	Step	Checks	YES/NO	Remedies
Scanning lamp	1	Does the scanning lamp flicker?	YES	Replace the scanning lamp unit.
Cartridge	2	Replace the cartridge. Is the problem corrected?	YES	End.
High-voltage transformer			NO	Check the high-voltage transformer (DC controller/DC power supply PCB).

**20. The copy has poor sharpness (focus).**

Cause	Step	Checks	YES/NO	Remedies
	1	Does the copy have an image which is too light at the same time?	YES	Correct the light image first.
Document	2	Is there a gap between the document and the copyboard glass?	YES	<ul style="list-style-type: none"> <li>• Check the copyboard glass to make sure it is not warped.</li> <li>• Advise the user how to place documents correctly.</li> </ul>
Lens	3	Is the lens off contact?	YES	Push the lens into place while taking great care not to scratch it.
Scanner	4	Clean the scanning lamp, reflecting plate, and lens. Is the problem corrected?	YES	End.
Cartridge			NO	Replace the cartridge.

**21. The copy is blank.**

Cause	Step	Checks	YES/NO	Remedies
Cartridge	1	Is the cartridge set in the copier?	NO	Set the cartridge in the copier.
	2	Does the cartridge have toner?	NO	Replace the cartridge.
	3	Has the seal been removed from the cartridge?	NO	Remove the seal.
	4	Set the cartridge in the copier, and close the copier. Does the drum cover shutter open without fail?	NO	Make adjustments so that the shutter opens smoothly.
Drum drive assembly	5	Is the drum drive gear rotating normally?	NO	Check the drum drive assembly.
High-voltage transformer	6	Are the primary charging terminal at the front left of the cartridge and the high-voltage terminal at the bottom of the copier in firm contact?	YES	Check the high-voltage transformer (DC controller/DC power supply PCB).
Terminals for primary charging, Cartridge			NO	1. Check the contact for electrical continuity. 2. Try replacing the cartridge.

**22. The copy is solid black.**

Cause	Step	Checks	YES/NO	Remedies
	1	Is the scanning lamp ON during copying operation?	YES	Check if the cartridge is set properly.
			NO	See "The scanning lamp fails to go ON."





## CHAPTER 4 TROUBLESHOOTING MALFUNCTIONS

### A. Troubleshooting Malfunctions

#### 1. $\delta V$ (self diagnosis; PC400/FC200)

Cause	Step	Checks	YES/NO	Remedies
	1	Switch the copier ON. Does the Jam indicator remain On for about 0.5 sec, and does the copier go OFF automatically thereafter?	YES	See 'E00'.
			NO	See the discussions on 'E2', 'E6', and 'E9'.

#### 2. E0

Cause	Step	Checks	YES/NO	Remedies
Thermistor (TH1)	1	Set the meter to the '12VDC' range, and wait until the fixing heater is sufficiently cool. Measure the voltage between J603-1 (+) and J603-2 (-). Is it about 3.2 V or more?	NO	Check the wiring from the DC controller/DC power supply PCB to the thermistor (TH1); if normal, replace the fixing assembly.
			NO	See "The fixing heater fails to operate."
DC controller/DC power supply PCB	3	Switch the copier ON, and make a copy. Measure the voltage between J603-1 and J603-2 once again. Is the voltage lower than that measured in step 1?	YES	Replace the DC controller/DC power supply PCB.
Fixing assembly			NO	Check the wiring from the DC controller/DC power supply PCB to the thermistor (TH1); if normal, replace the fixing assembly.

3. E2

Cause	Step	Checks	YES/NO	Remedies
Copyboard	1	Does the copying operation start with the copyboard at the left or right?	YES	Check the operation with the copyboard moved to the center; advise the user that this is not the copier's problem
	2	Does the copyboard move in reverse? In addition, does it move in reverse far too slowly?	NO	See "The copyboard fails to move."
DC controller/DC power supply PCB	3	Does the copyboard move in reverse after copying operation has started and move forward after it has reached the copyboard start position?	YES	Replace the DC controller/DC power supply PCB.
Copyboard drive assembly, Copyboard glass assembly			NO	1. Check the copyboard position sensor (Q902). 2. Try replacing the copyboard drive assembly. 3. Check the start position cam and reversal cam in the copyboard glass assembly.

4. E6

Cause	Step	Checks	YES/NO	Remedies
Control panel PCB	1	Replace the control panel PCB. Is the problem corrected?	YES	End.
DC controller/DC power supply PCB			NO	Check the harness from the control panel PCB to the DC controller/DC power supply PCB; if normal, replace/DC power supply PCB.

**5. E9**

Cause	Step	Checks	YES/NO	Remedies
DC controller/ DC power supply PCB	1	Replace the DC controller/DC power supply PCB. Is the problem corrected?	YES	End.
Power supply			NO	Advise the user that the frequency of the power supply is faulty.

**6. AC power is absent.**

Cause	Step	Checks	YES/NO	Remedies
Power plug	1	Is the power plug connected to the copier and the power outlet?	NO	Connect the power plug.
	2	Is 'E' code (PC420/430/FC220) or 'JAM' (PC400/FC200) indicated for about 0.5 sec after the power switch is turned ON and does the power turn OFF thereafter?	YES	See 'E0'.
Top cover, Delivery assembly cover	3	Are the top cover and delivery assembly cover closed properly?	NO	Close the top cover and delivery assembly cover.
Power supply voltage	4	Is the rated voltage present at the power outlet?	NO	Advise the user that the problem is not of the copier.
Door switch	5	Is the door switch (SW1,SW2) normal?	NO	Replace the door switch.
DC controller/ DC power supply PCB	6	Is the rated power supply voltage present between J103 and J104 on the DC controller/DC power supply PCB? (Set the meter to the 300V AC range).	YES	Replace the DC controller/DC power supply PCB.
Fixing assembly	7	Replace the fixing assembly. Is the problem corrected? (fixing heater error temperature detection circuit ON)	YES	End.
			NO	Replace the DC controller/DC power supply PCB.

**7. Pick-up fails.**

Cause	Step	Checks	YES/NO	Remedies
	1	Move the copyboard to the left until it stops, and open the top cover. Does the pick-up roller rotate when the door switch is turned ON and the Copy Start key is pressed at the correct pick-up timing?	YES	See "Pick-Up Assembly" in "Troubleshooting Feeding Faults."
Main motor (M1)	2	Is the main motor rotating?	NO	See "The main motor fails to rotate."
Pick-up sensor (Q131)	3	Does the copier operate normally when the pick-up sensor (Q131) is blocked with paper?	YES	Check the sensor lever.
Pick-up solenoid (SL1; PC420/430/FC220), Registration solenoid (SL1; PC400/FC200)	4	Set the meter to the '30VDC' range. Does the voltage between J201-6 (+) and J201-7 (-) on the DC controller/DC power supply PCB change to about 24 V at pick-up timing?	YES	Check the spring clutch in the registration assembly and pick-up assembly; if normal, replace the solenoid.
DC controller/ DC power supply PCB			NO	Check the wiring from the solenoid to the DC controller/DC power supply PCB; if normal, replace the DC controller/DC power supply PCB.

**8. The scanning lamp fails to go ON.**

Cause	Step	Checks	YES/NO	Remedies
Scanning lamp (LA1-LA8)	1	Is the scanning lamp unit attached correctly?	NO	Re-attach the lamp unit.
Scanning lamp (LA1-LA8)	2	Is the scanning lamp black?	YES	Replace the scanning lamp unit.
DC controller/DC power supply PCB	3	Is the connector of the scanning lamp connected firmly?	YES	Replace the DC controller/DC power supply PCB.
Connector			NO	Re-connect the connector.

**9. The main motor fails to rotate.**

Cause	Step	Checks	YES/NO	Remedies
Main motor (M1)	1	Set the meter to the '30VDC' range. Does the voltage between J903-1 (+) and J903-2 change from about 0 V to about 20 V according to the operation of the main motor?	YES	Replace the main motor.
DC controller/DC power supply PCB			NO	Check the wiring from the motor to the DC controller/DC power supply PCB; if normal, replace the DC controller/DC power supply PCB.

**10. The copyboard fails to move.**

Cause	Step	Checks	YES/NO	Remedies
Main motor (M1)	1	Is the main motor rotating?	NO	See "The main motor fails to rotate."
Copyboard, Copyboard drive assembly	2	Push the copyboard by hand. Does it move smoothly?	NO	Check the copyboard and copyboard drive assembly.
DC controller/DC power supply PCB	3	Set the meter to the '200Ω' range. Disconnect J902 from the copyboard drive solenoid, and measure the resistance between terminals of SL2. Is it about 120Ω?	YES	Check the wiring from the solenoid to the DC controller/DC power supply PCB; if normal, replace the DC controller/DC power supply PCB.
Copyboard drive solenoid (SL2)			NO	Check the solenoid (SL2).

**11. ⚡ (paper feeding normally)**

Cause	Step	Checks	YES/NO	Remedies
Copy paper	1	Are there pieces of copy paper in the delivery assembly or pick-up assembly?	YES	Remove the pieces of paper.
Sensor lever	2	Is the movement of the delivery sensor and pick-up sensor levers smooth?	NO	Correct the movement.
Delivery sensor PCB (Q801)	3	Replace the delivery sensor PCB. Does the copier operate normally?	YES	End.
DC controller/DC power supply PCB			NO	Check the wiring from the control panel PCB to the DC controller/DC power supply PCB; if normal, replace the DC controller/DC power supply PCB.

**12. ⚡ (at time of jam)**

Cause	Step	Checks	YES/NO	Remedies
Control panel PCB	1	Replace the control panel PCB. Does the indicator go ON?	YES	End.
DC controller/DC power supply PCB			NO	Replace the DC controller/DC power supply PCB.

**13. The fixing heater fails to operate.**

Cause	Step	Checks	YES/NO	Remedies
Heater (H1), Thermal fuse (FU2)	1	Is continuity present between terminals of the heater?	NO	Replace the fixing assembly.
Thermistor (TH1, TH2)	2	Is the resistance between the following terminals on the control panel PCB 0Ω or about 1.3 MΩ?  <div style="border: 1px solid black; padding: 5px; display: inline-block;">                     TH1   J603-1   ↔   J603-2                 </div>	YES	Replace the fixing assembly.
Fixing assembly	3	Replace the fixing assembly. Is the problem corrected?	YES	End.
DC controller/DC power supply PCB			NO	Replace the DC controller/DC power supply PCB.

# CHAPTER 5 TROUBLESHOOTING PAPER FEED PROBLEMS

## PROBLEMS

### A. Copy Paper Jams

Jams can be classified according to location within the copier:

- ① Pick-up assembly
- ② Separation/feeding assembly
- ③ Fixing/delivery assembly

The discussions that follow are organized with reference to these assemblies.

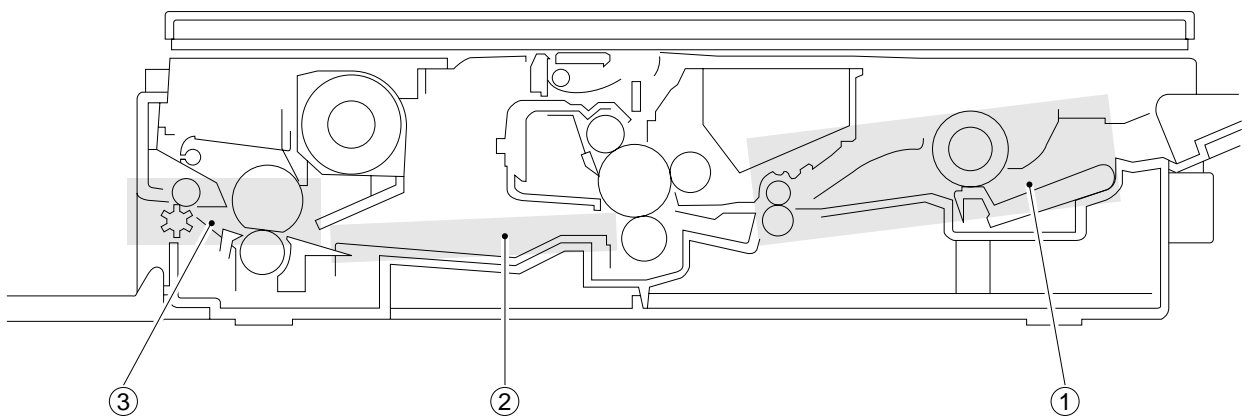


Figure 5-1A

### 1. Pick-Up Assembly

Cause	Step	Checks	YES/NO	Remedies
Copy paper	1	Try copy paper of a type recommended by Canon. Is the problem corrected?	YES	Advise the user to use recommended paper.
	2	Is the copy paper curled or wavy, or otherwise deformed?	YES	Replace the copy paper; advise the user on the correct method of storage.
Pick-up sensor lever	3	Is the movement of the pick-up sensor lever smooth?	NO	Adjust the movement of the pick-up sensor lever.
Spring (pick-up guide plate; PC420/430/FC220)	4	Check the movement of the pick-up guide plate found under the pick-up roller. Is its movement smooth?	NO	Check the position of the spring of the pick-up guide plate.
Pick-up roller	5	Is the pick-up roller deformed or worn?	YES	Replace the pick-up roller.
Spring (for pick-up control), Spring clutch (PC420/430/FC220)			NO	1. Check the spring. 2. Check the spring clutch.

### 2. Separation/Feeding Assembly

Cause	Step	Checks	YES/NO	Remedies
Copy paper	1	Try paper of a type recommended by Canon. Is the problem corrected?	YES	Advise the user to use recommended paper.
	2	Is the copy paper curled or wavy, or otherwise deformed?	YES	Replace the copy paper; advise the user on the correct method of storage.
Feeding assembly	3	Is foreign matter found in the feeding assembly?	YES	Remove the foreign matter.
Static eliminator	4	Is the static eliminator soiled with toner?	YES	Clean the static eliminator.
Registration roller	5	Is the registration roller worn, deformed, or soiled?	YES	If dirt is found, clean it using alcohol; if worn or deformed, replace it.
Spring (for registration control), Spring clutch (registration assembly)			NO	1. Check the spring. 2. Check the spring clutch in the registration assembly.



### 3. Fixing/Delivery Assembly

Cause	Step	Checks	YES/NO	Remedies
Separation/Feeding assembly	1	Are the copy image and the document matched correctly?	NO	Check the separation/feeding assembly.
Fixing assembly inlet guide	2	Is the inlet guide soiled with foreign matter or toner?	YES	Clean it.
Delivery sensor lever	3	Does the delivery sensor lever move smoothly?	NO	Correct it so that the lever moves smoothly.
Delivery roller assembly	4	Is the delivery sensor (Q801) PCB normal?	YES	Check the delivery roller assembly.
Delivery sensor PCB			NO	Replace the delivery sensor PCB.

## B. Feeding Faults

### 1. Double Feeding

Cause	Step	Checks	YES/NO	Remedies
Copy paper	1	Try copy paper of a type recommended by Canon.	YES	Advise the user to use recommended paper.
Separation pad	2	Check the movement of the pick-up guide plate. Is the movement smooth?	YES	Check the condition of the separation pad.
Spring (pick-up guide plate; PC420/430/FC220)			NO	Check the position of spring.

### 2. Wrinkles

Cause	Step	Checks	YES/NO	Remedies
Pick-up assembly, Registration roller	1	Switch the copier OFF while the copy paper is moving through the feeding assembly. Is the paper wrinkled at the time? Or, is it moving askew?	YES	Check the pick-up assembly. Check the registration roller.
Copy paper	2	Try paper fresh out of package. Is the problem corrected?	YES	The paper may be moist; advise the user on the correct method of storage. Also, advise the user to remove curling before feeding paper for a second time when making two-sided/overlay copies.
	3	Try copy paper of a type recommended by Canon.	YES	Advise the user to use recommended paper.
Fixing assembly	4	Is the inlet guide soiled with foreign matter or toner?	YES	Clean it using solvent.
			NO	Check the fixing assembly.

# CHAPTER 6 ARRANGEMENT AND FUNCTIONS OF ELECTRICAL PARTS

## A. Sensors and Solenoids

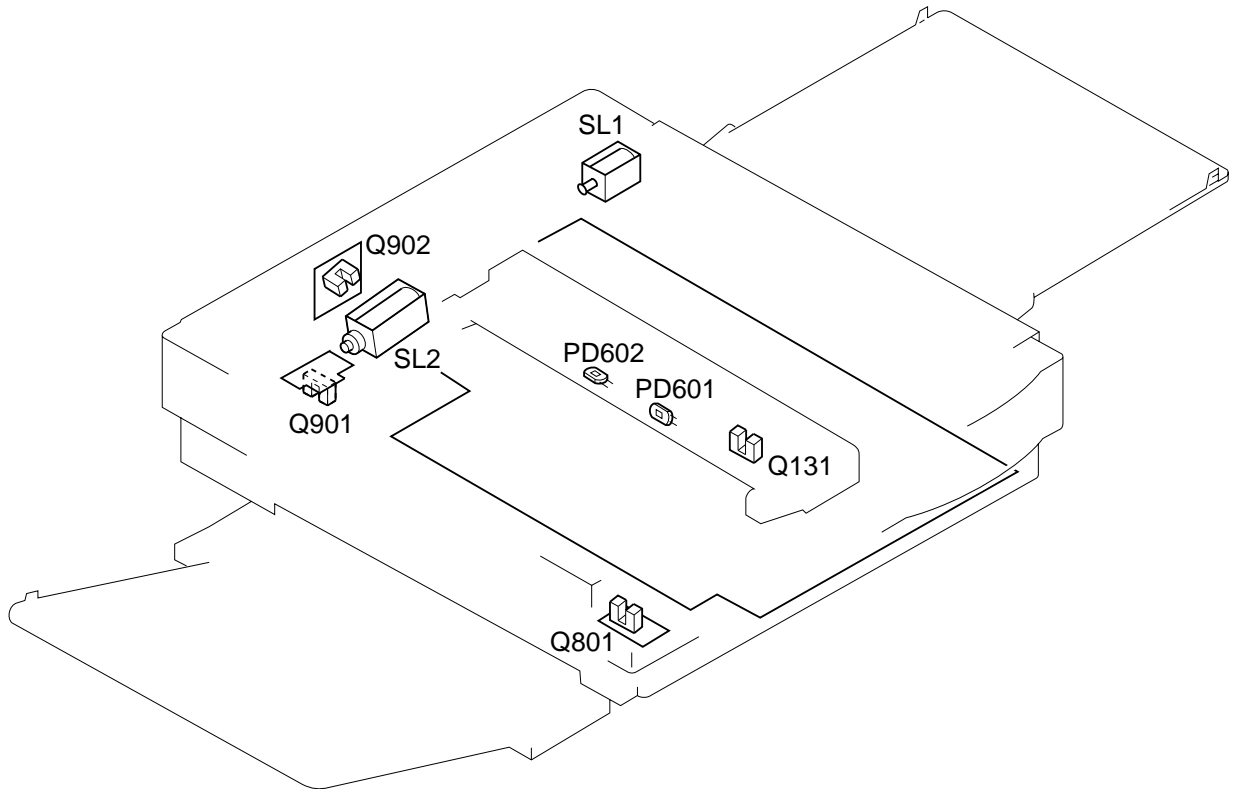
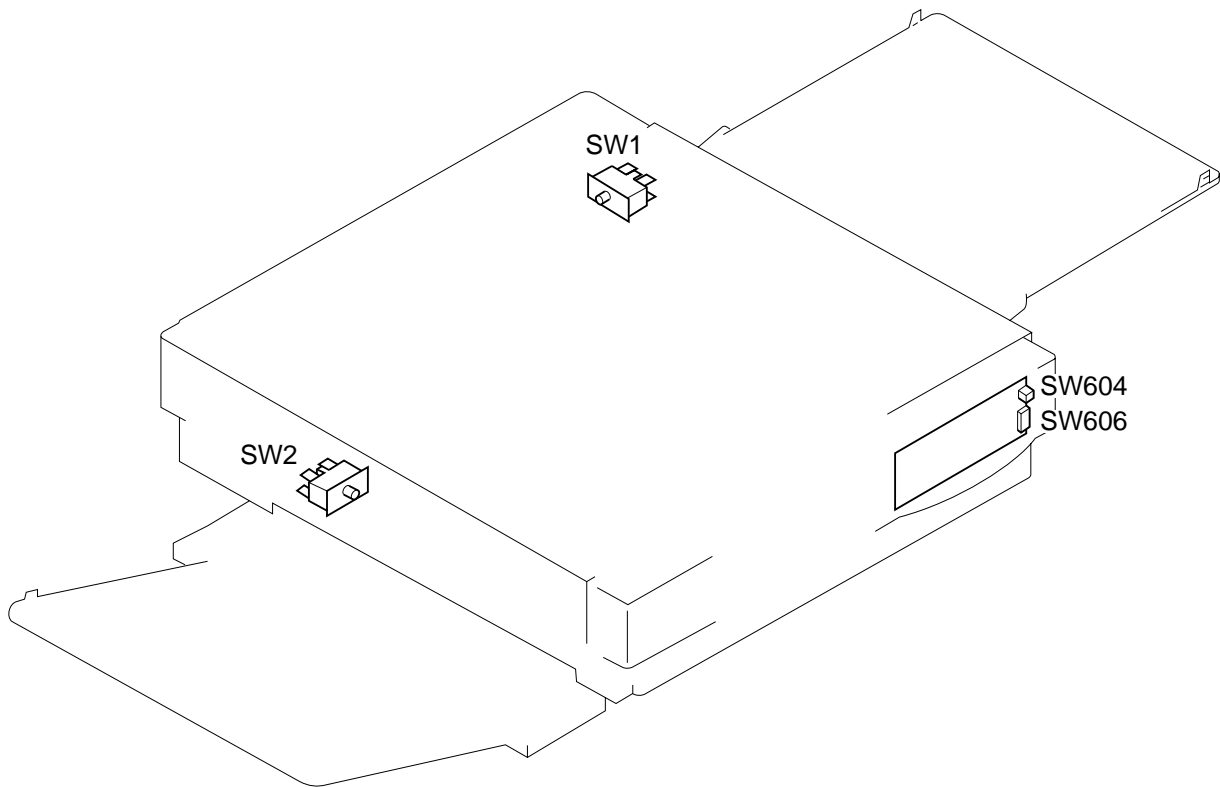


Figure 6-1A



6

Symbol	Name	Notation	Description
	Photointerrupter	Q131 Q801 Q901 Q902	Pick-up assembly paper sensor Delivery assembly paper sensor Motor rotation sensor Copyboard position sensor
	Photodiode	PD601 PD602	Intensity sensor AE sensor
	Solenoid	SL1 SL2	Pick-up/registration solenoid Copyboard drive solenoid

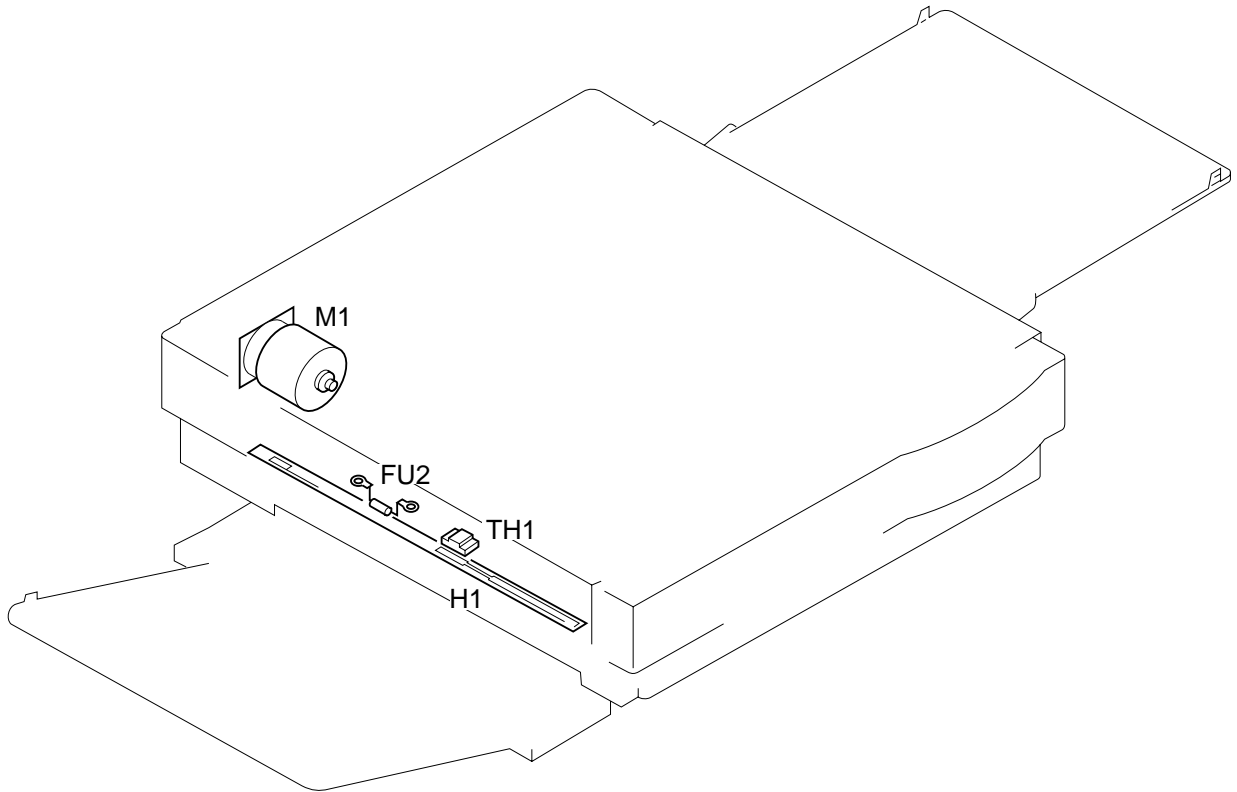
## B. Switches






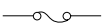
**Figure 6-1B**

Symbol	Name	Notation	Description
	Switch	SW1 SW2	Top cover switch Delivery assembly door switch
	Switch	SW604 SW606	Power switch Density 3-setting switch

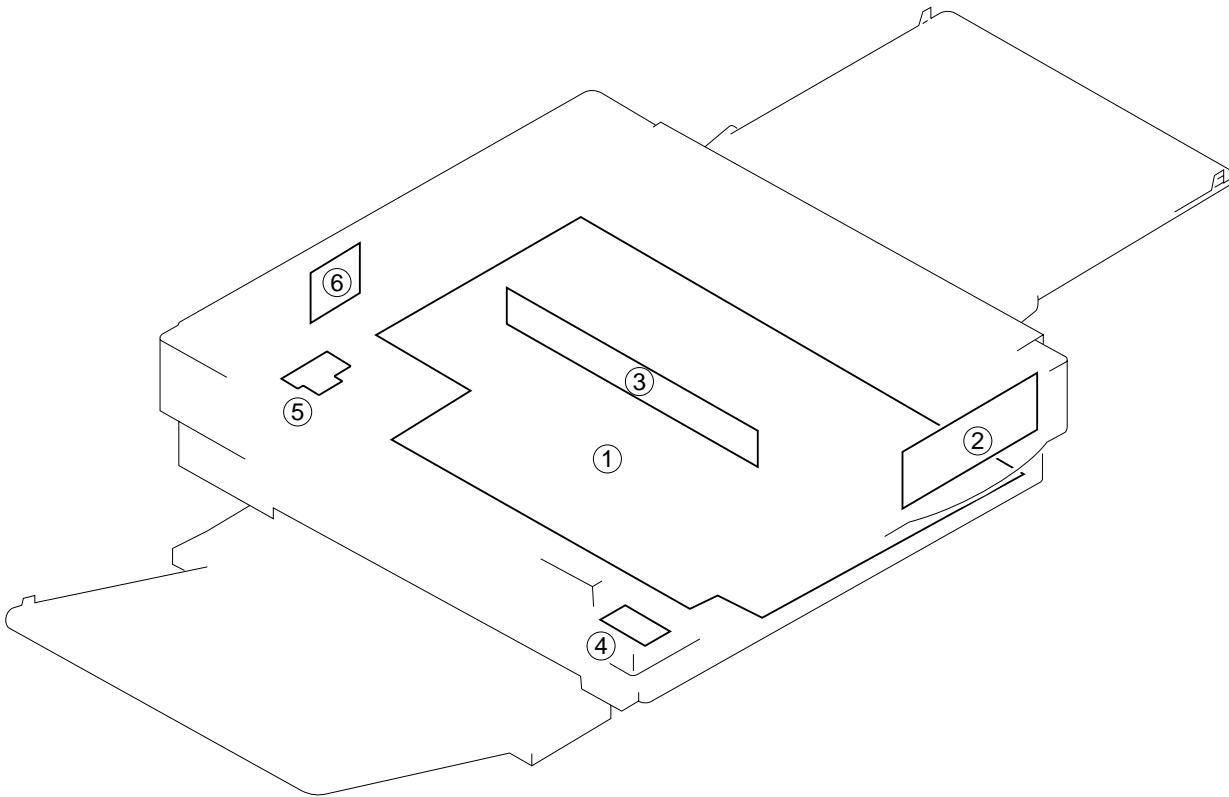
### C. Lamp, Heater, Motor, and Others



**Figure 6-1C**

Symbol	Name	Notation	Description
	Heater	H1	Fixing heater
	Motor	M1	Main motor
	Thermistor	TH1	Fixing heater temperature detection
	Thermal fuse	FU2	Fixing heater overheating detection

### D. Printed Circuit Board (PCB)



**Figure 6-1D**



Ref.	Name	Description
①	DC controller/DC power supply PCB	Controls sequence, supplies DC power, controls scanning lamp ON
②	Control panel PCB	Controls/displays copying operation
③	Scanning lamp PCB	Scanning lamp (LA1-LA8)
④	Delivery sensor PCB	Detects delivery
⑤	Motor rotation sensor PCB	Detects main motor rotation
⑥	Copyboard position sensor PCB	Detects copyboard position

### E. Variable Resistors (VR) and Check Pins by PCB

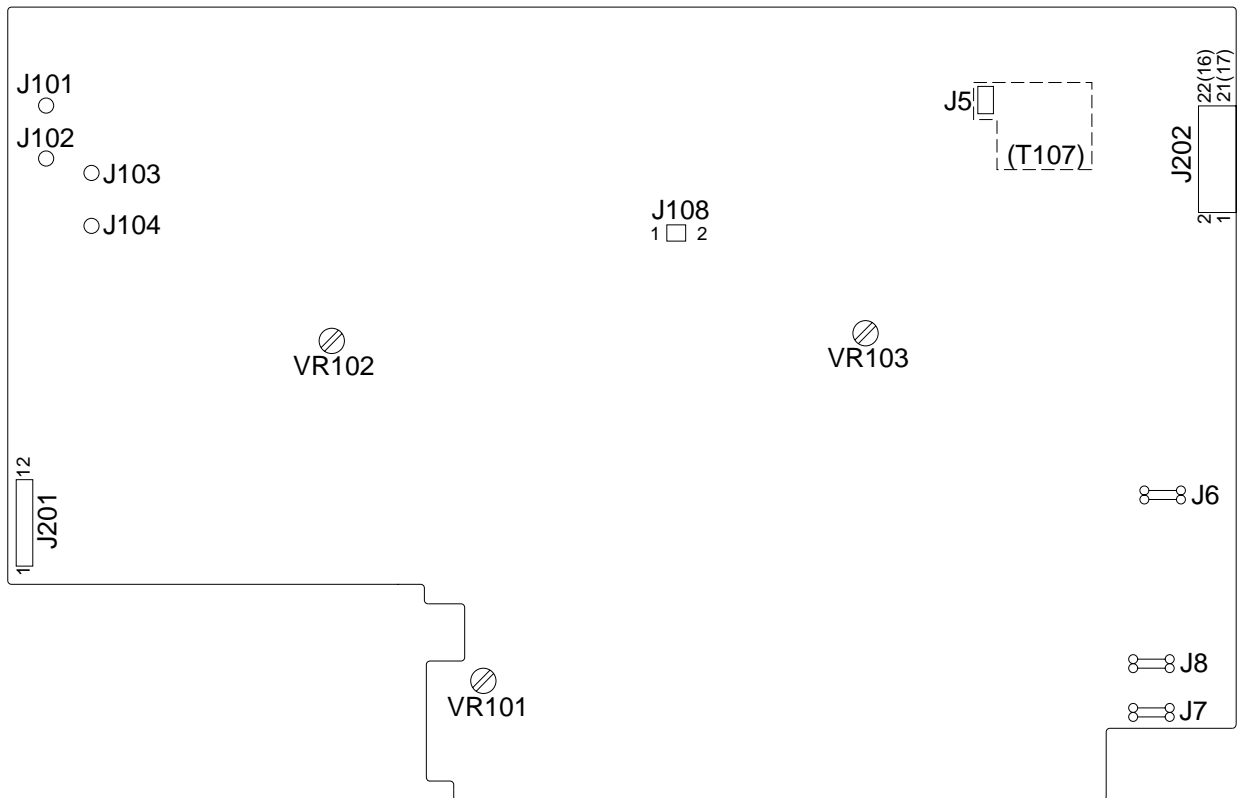
Of the variable resistors (VR) and check pins used in the copier, those used in the field are discussed herein.

Do not touch those VRs and check pins not discussed herein; they are for factory use only and require special tools and high precision for adjustment.

**Note:**

1. VRs that may be used in the field. .... 
2. VRs that must not be used in the field. .... 

#### 1. DC Controller/DC Power Supply PCB

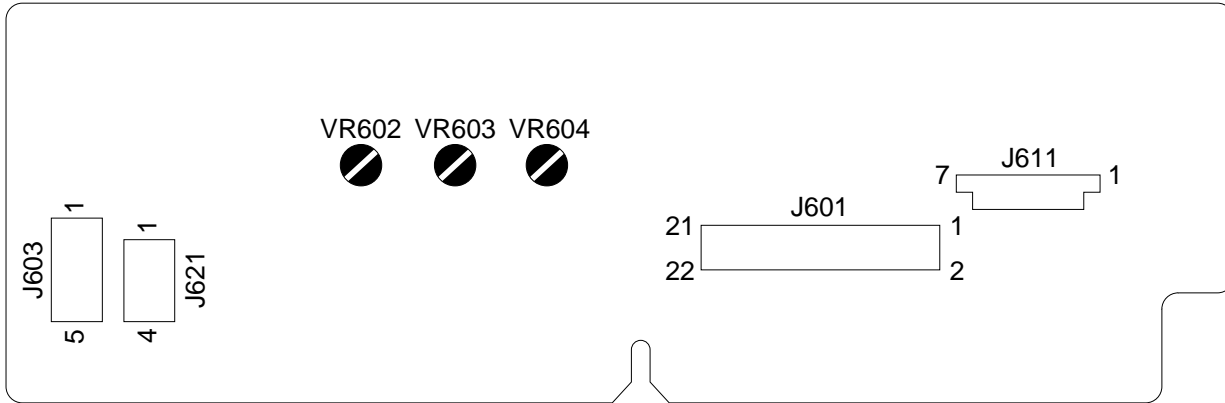


**Note:** The pin No. in parentheses refers to the PC400/FC200.

**Figure 6-1E**

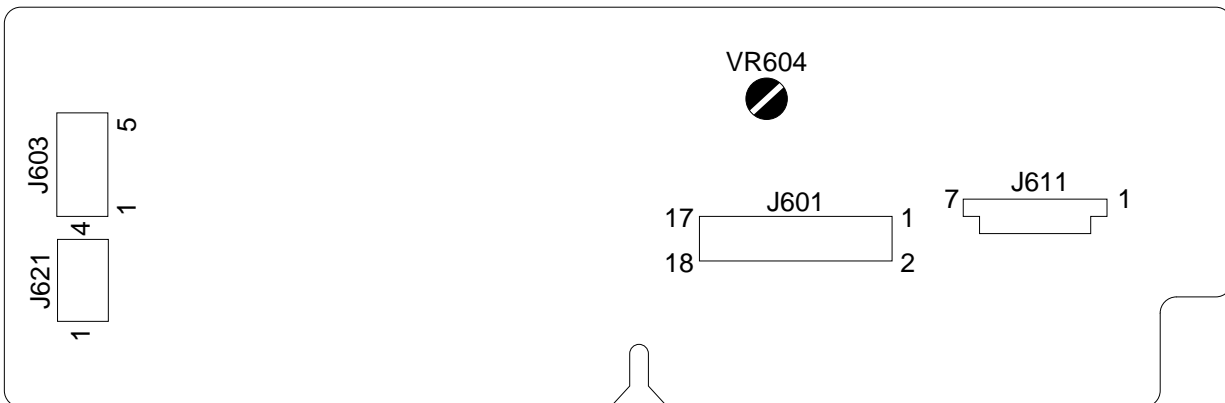
**2. Control Panel PCB**

a. PC420/430/FC220



**Figure 6-2E**

b. PC400/FC200



**Figure 6-3E**

VR	Description
VR602	Use it to adjust the AE offset (use it only after replacing the scanning lamp unit, intensity sensor, AE sensor, or control panel PCB).
VR603	Use it to adjust the AE gain (use it only after replacing the scanning lamp unit, intensity sensor, AE sensor, or control panel PCB).
VR604	Use it to adjust the light intensity (use it only after replacing the scanning lamp unit, intensity sensor, AE sensor, or control panel PCB).

**Table 6-1E**

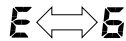



## CHAPTER 7 SELF DIAGNOSIS

The copier's microprocessor on the DC controller/DC power supply PCB is equipped with a self diagnostic mechanism that checks the condition of the machine; when the mechanism detects an error, it indicates an error code on the copy count display.

(The PC400/FC200 does not have a copy count display; it indicates an error condition by flashing the Jam indicator.)

'E6' is represented by alternating



Code	Cause	Description
 (Note)	<ul style="list-style-type: none"> <li>• Thermistor (TH1; faulty)</li> <li>• Fixing heater (H1; faulty)</li> <li>• DC controller/DC power supply (faulty)</li> </ul>	<ul style="list-style-type: none"> <li>• The temperature of the fixing heater is 215°C or more.</li> <li>• The temperature of the fixing heater does not reach 80°C within 2.5 sec after copying operation has started.</li> <li>• The temperature of the fixing heater lowers below 135°C after has reached 150°C.</li> <li>• The temperature of the fixing heater does not reach 150°C within 7.5 sec after copying operation has started.</li> <li>• The maximum supply power is detected for about 5 sec after the temperature of the fixing heater has reached 150°C.</li> </ul>

### Note:

If an error associated with 'E0' is detected, 'E' is displayed (PC420/430/FC220) or the Jam indicator (PC400/FC200) remains ON for about 0.5 sec; thereafter, the power goes out.

Code	Cause	Description
<b>E2</b>	<ul style="list-style-type: none"> <li>• Copyboard drive assembly (faulty operation)</li> <li>• Copyboard drive solenoid (SL2; faulty)</li> <li>• Copyboard position sensor PCB (Q902; faulty)</li> <li>• DC controller/DC power supply PCB (faulty)</li> </ul>	<ul style="list-style-type: none"> <li>• The copyboard position sensor (Q902) goes ON when copying operation starts.</li> <li>• The copyboard position sensor (Q902) is ON 0.8 sec after copying operation has started.</li> <li>• The copyboard position sensor (Q902) does not go ON within 5.5 sec after copying operation has started.</li> <li>• The copyboard does not reach the start position within a specific period of time, or it moves past the start position.</li> <li>• The copyboard position sensor (Q902) is ON 1.5 sec after the copyboard has started moving forward from the start position.</li> <li>• The copyboard position sensor (Q902) does not go ON 10.4 sec after the copyboard has started moving forward from the start position.</li> <li>• The copyboard position sensor (Q902) does not go ON 1.2 sec or 4.7 sec after the copyboard has started moving in reverse from the reversal position.</li> </ul>
<b>E6</b>	<ul style="list-style-type: none"> <li>• Control panel PCB (faulty)</li> <li>• DC controller/DC power supply PCB (faulty)</li> </ul>	<ul style="list-style-type: none"> <li>• The scanning lamp has remained for 2 sec continuously at such times as not prescribed.</li> </ul>
<b>E9</b>	<ul style="list-style-type: none"> <li>• Power supply frequency (error)</li> </ul>	<ul style="list-style-type: none"> <li>• The power supply frequency is higher than specified.</li> </ul>

**Note:**

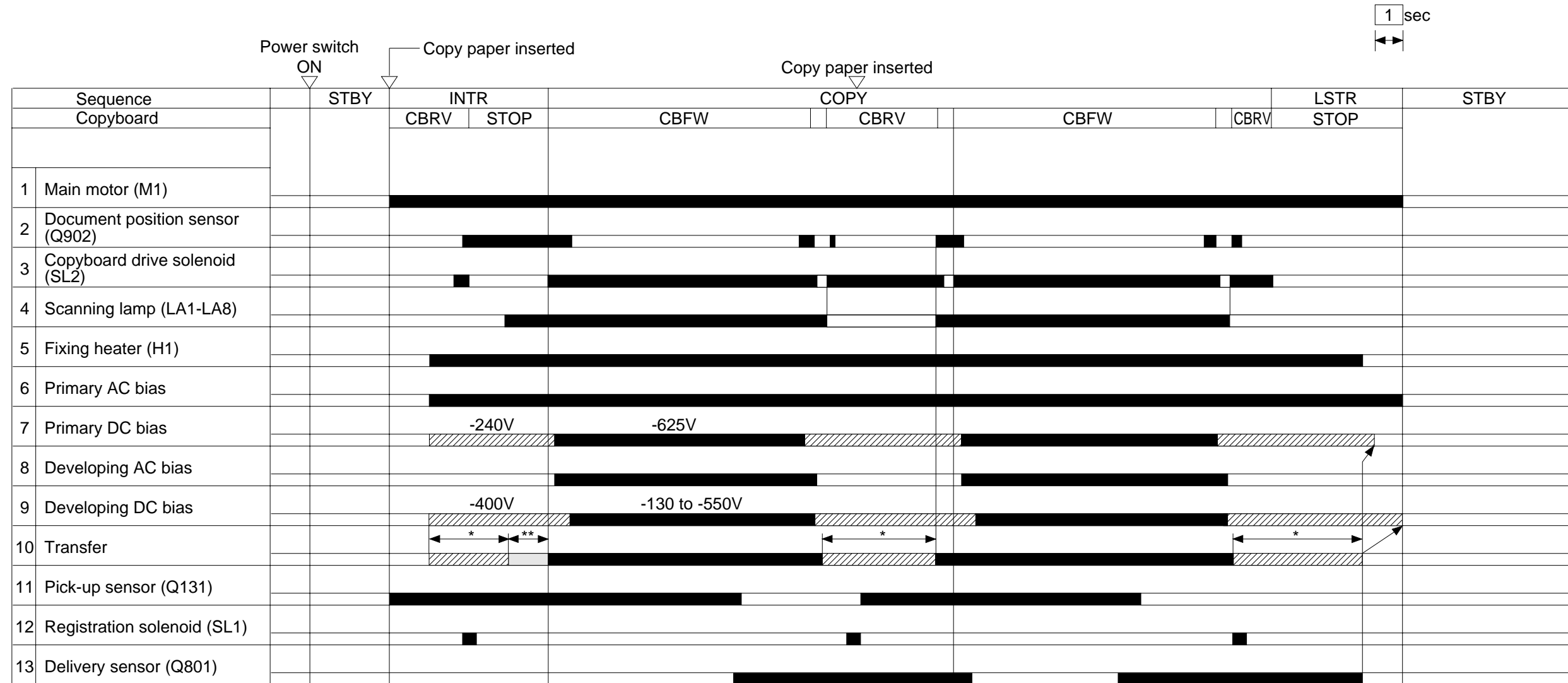
1. The copier does not use code 'E1', 'E3', 'E4', or 'E5'.
2. After self diagnosis has gone ON, the copier may be reset by switching it OFF and then ON.  

In the case of 'E0', however, the power is automatically turned OFF. To reset, disconnect the power plug once, open the upper cover, or wait about 5 minutes without any operation; during the period, the microprocessor remains powered and retains 'E0'.

This consideration is to prevent the user from resetting the machine easily when the thermistor may have blown; otherwise, the fixing heater would become overheated, damaging parts near it.
3. Activation of self diagnosis forces the fixing heater (H1) and main motor (M1) OFF.

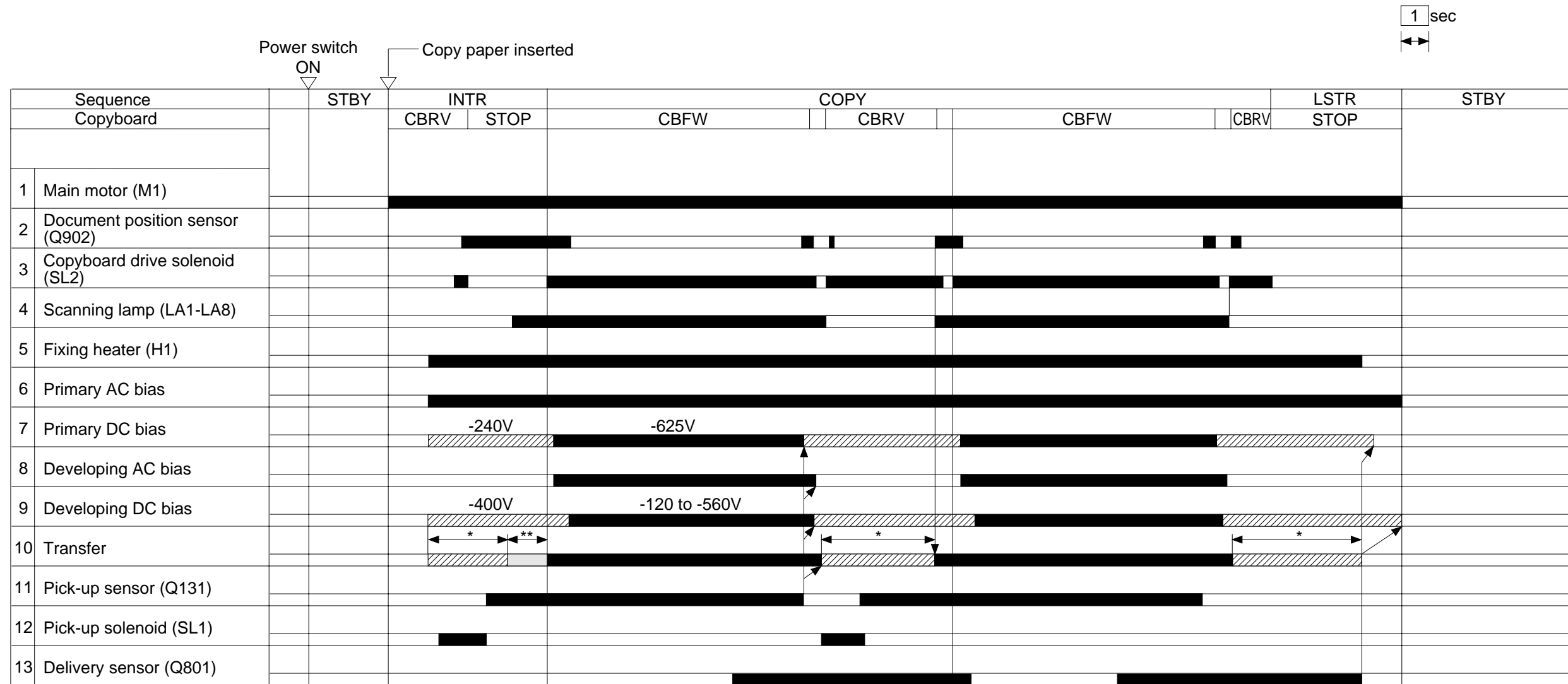
A. General Timing Chart

PC400/FC200 General Timing Chart  
(A4, 2 copies)



\* Cleaning mode.  
\*\* Measurement mode.

PC420/430/FC220 General Timing Chart  
(A4, 2 copies)



\* Cleaning mode.  
\*\* Measurement mode.

## B. Signals/Abbreviations List

What follows below is a list of signals and abbreviations used in the chapters of the manual and circuit diagrams.

The abbreviations within parentheses represent analog signals, which cannot be expressed in terms of '1' or '0'.

### 1. Signals

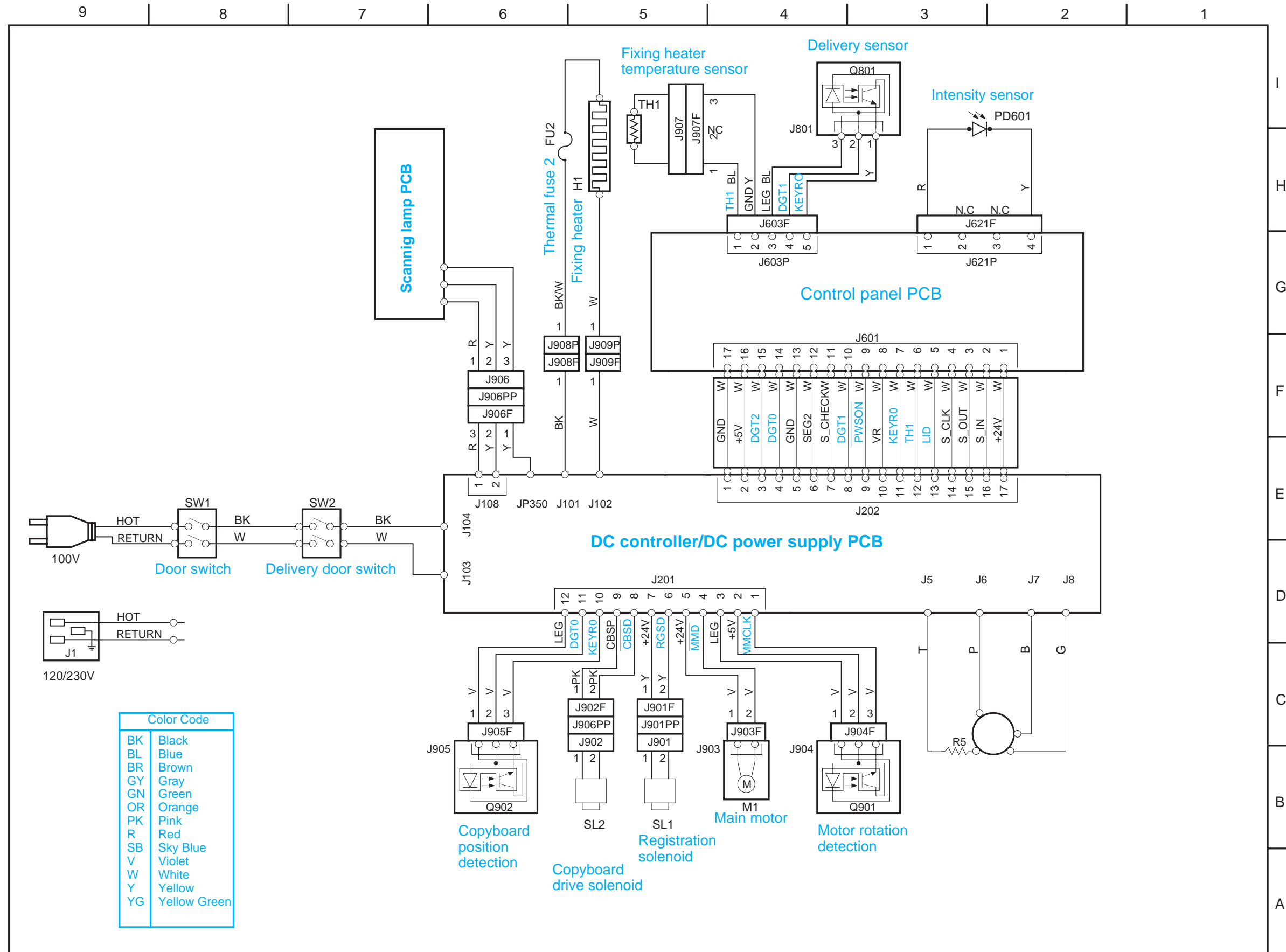
ACBTP	AC BIAS TIMING PULSE COMMAND
[AE]	AE SIGNAL
CBSD	COPYBOARD DRIVE SOLENOID DRIVE COMMAND
DCBPWM	DC BIAS CONTROL COMMAND
DCTPWM	TRANSFER DC BIAS CONTROL COMMAND
DGT0	OSCILLATION SIGNAL 0
DGT1	OSCILLATION SIGNAL 1
DGT2	OSCILLATION SIGNAL 2
HTRD	FIXING HEATER DRIVE COMMAND
HVPAC	PRIMARY AC BIAS ON COMMAND
HVPDC	PRIMARY DC BIAS ON COMMAND
HVPHO	PRIMARY DC BIAS HIGH OUTPUT COMMAND
HVTDC	TRANSFER DC BIAS ON COMMAND
KEYR0	RETURN SIGNAL 0
KEYR1	RETURN SIGNAL 1
LAPWM	LAMP DRIVE COMMAND
[LID]	LAMP INTENSITY DETECTION SIGNAL
MMCLK	MAIN MOTOR CLOCK PULSE SIGNAL
MMD	MAIN MOTOR DRIVE COMMAND
PWOFF	POWER OFF COMMAND
PWSON	POWER SWITCH ON SIGNAL
PUSD	PICK-UP ROLLER SOLENOID DRIVE COMMAND
RELAYED	RELAY DRIVE COMMAND
RGSD	REGISTRATION SOLENOID DRIVE COMMAND
[TH1]	THERMISTOR SIGNAL 1
TREV	TRANSFER REVERSE DC BIAS ON COMMAND
VPEAK	VOLTAGE PEAK DETECT SIGNAL
ZXDP	ZERO CROSS DETECTION SIGNAL

## 2. Abbreviations

INTR	INITIAL ROTATION
LSTR	LAST ROTATION
CBFW	COPYBOARD FORWARD
CBRV	COPYBOARD REVERSE
STBY	STANDBY

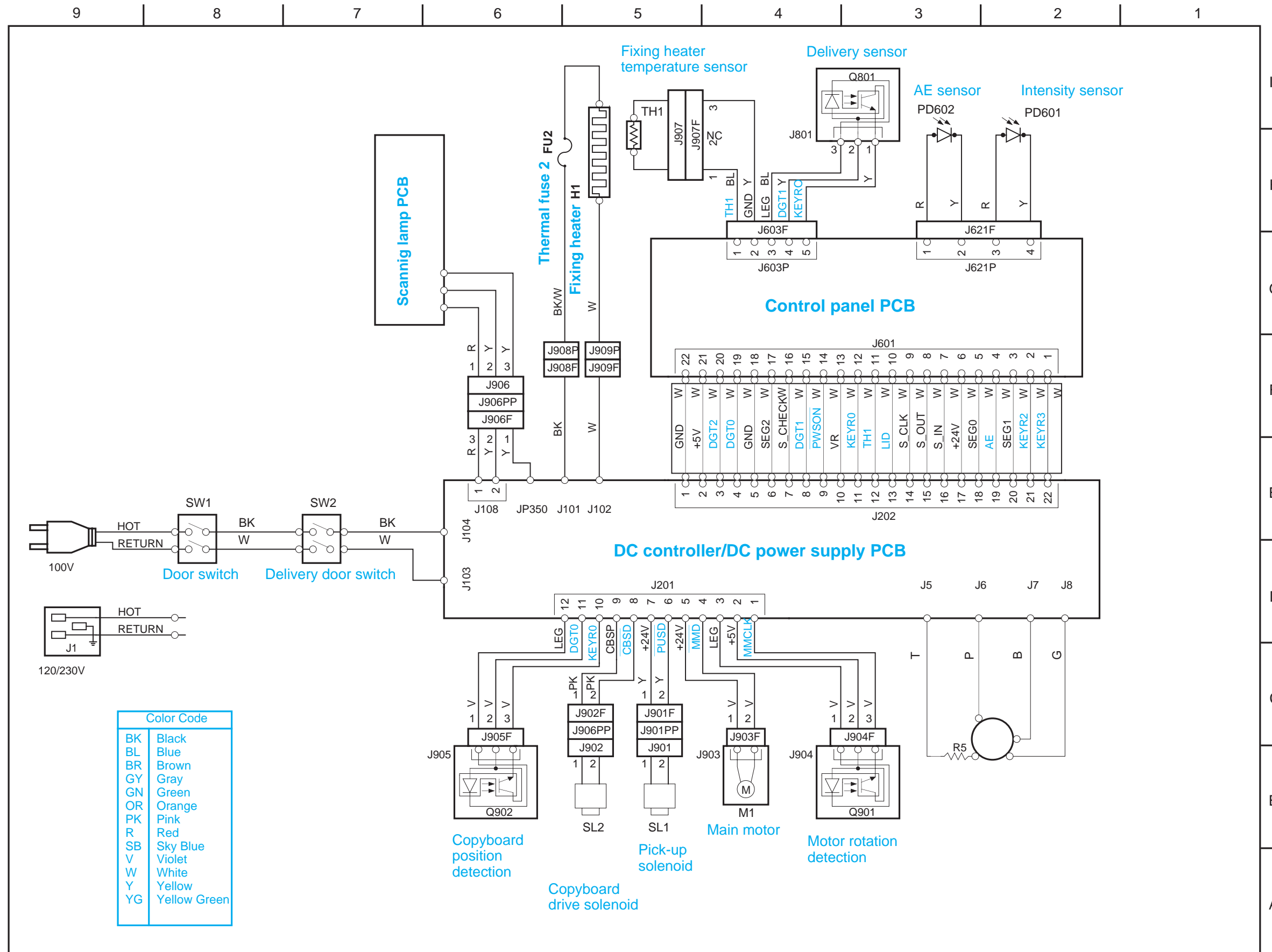
# C. General Circuit Diagram

PC400/FC200 GENERAL CIRCUIT DIAGRAM



Color Code	
BK	Black
BL	Blue
BR	Brown
GY	Gray
GN	Green
OR	Orange
PK	Pink
R	Red
SB	Sky Blue
V	Violet
W	White
Y	Yellow
YG	Yellow Green

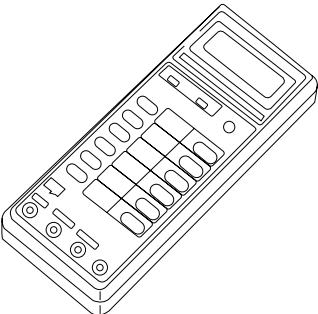
PC420/430/FC220 GENERAL CIRCUIT DIAGRAM





## D. Special Tools Table

What follows below is a table of special tools used for servicing the machine in addition to the standard tools set.

No.	Tool name	Tool Number	Shape	Category*	Remarks
1	Digital multimeter	CK-0552		B	For adjusting the AE mechanism.

\*The tools are categorized as follows:

- A: tools that must be carried by each service person.
- B: tools that must be carried by a group of about five service persons.
- C: tools that must be kept by each workshop.

## E. Solvents/Oils Table

No.	Name	Uses	Composition	Remarks
1	Alcohol	Cleaning: e.g., glass, plastic, rubber parts; external covers	Hydrocarbon (fluorine family) Alcohol Surface active agent	<ul style="list-style-type: none"> <li>• Do not bring near fire.</li> <li>• Procure locally.</li> <li>• Isopropyl alcohol may be substituted.</li> </ul>
2	Solvent	Cleaning: e.g., metal; oil or toner dirt	Hydrocarbon (fluorine/chlorine family) Alcohol	<ul style="list-style-type: none"> <li>• Do not bring near fire.</li> <li>• Procure locally.</li> </ul>
3	Heat-resisting grease	Lubricating: drive assemblies	Lithium soap (mineral oil family) Molybdenum bisulfate	<ul style="list-style-type: none"> <li>• CK-0427 (500 g/can)</li> </ul>
4	Lubricating oil		Mineral oil (paraffin family)	<ul style="list-style-type: none"> <li>• CK-0451 (100 cc)</li> </ul>
5	Lubricating oil		Mineral oil (paraffin family)	<ul style="list-style-type: none"> <li>• CK-0524 (100 cc)</li> </ul>

## F. Specifications

	Item	PC400/FC200	PC420/430/FC220
Type	Body	Portable (w/ grips)	
	Copyboard	Moving	
	Light source	Tungsten lamp of fuse type	
	Lens	Lens array	
	Photosensitive medium	OPC (24 dia.)	
System	Copying	Indirect electrostatic	
	Charging	Roller (direct charging)	
	Exposure	Slit (moving copyboard)	
	Copy density adjustment	Manual	Automatic (AE) or Manual
	Development	Dry	
	Pick-up	Manual tray	Multifeeder
	Separation	Curvature + Static eliminator	
	Cleaning	Blade	
	Fixing	Plane heater	
Performance	Document type	Sheet, Book, 3-D object (2 kg/4.4 lb max.)	
	Maximum document size	LTR/A4; LGL*	
	Reproduction ratio	1:1 ( $\pm 1.2\%$ )	
	Wait time	0 sec. (approx.; at 20°C/68°F)	
	First copy	22 sec. (LTR)	
	Continuous copying	Not available	1 to 9 copies or F
	Copying speed	4 copies/min. (approx.; A4R/LTR-R or smaller)	4 copies/min. (A4R/LTR-R or smaller) 3 copies/min.(LGL)
	Copy size	A4/LTR; LGL* max.; postcard min.	
	Copy paper type	52 to 128 g/m <sup>2</sup> , Tracing paper, Colored paper, OHP film, Postcard (vertical), Labels, Wrapping paper (63 g/m <sup>2</sup> )	
	Two-sided copying	<ul style="list-style-type: none"> <li>• Same edge orientation.</li> <li>• Copying on each side no more than twice.</li> </ul>	<ul style="list-style-type: none"> <li>• Paper of 64 to 128 g/m<sup>2</sup>.</li> </ul>
	Overlay copying	<ul style="list-style-type: none"> <li>• Paper of 64 to 128 g/m<sup>2</sup>.</li> </ul>	<ul style="list-style-type: none"> <li>• Copying on each side no more than three times.</li> </ul>
	Multifeeder tray	—	5 mm deep (about 50 sheets of A4, 80 g/m <sup>2</sup> )
	Copy tray	—	9 copies (approx.; A4/LTR, 80 g/m <sup>2</sup> )
Non-image width	2 mm (leading edge) A4: 0 mm (left/right) LTR/LGL: 2 mm (left/right)		
Auto power-off	Available (5 min, approx.)		

\*PC430 only.

		Item	PC400/FC200	PC420/430/FC220
Others	Operating environment	Temperature	7.5° to 32.5°C/45.5° to 90.5°F	
		Humidity	5% to 85%	
		Atmospheric pressure	810.6 hPa to 1013.3 hPa (0.8 to 1 atm)	
	Power supply		Serial numbers	
		120V, 60Hz	ZTG XXXXX (PC400:WHITE) ZTH XXXXX (PC400:GRAY)	NVD XXXXX (FC220:WHITE) ZTJ XXXXX (PC420:WHITE)
		230V, 50Hz	RTL/PTQ XXXXX (FC200:WHITE) UTP/UTQ	RTM/PTR XXXXX (FC220:WHITE) PTS XXXXX (FC220:WHITE) PTT XXXXX (FC220:WHITE)
	Power consumption	Maximum	0.7 kW or less	
		Standby	0.1 W (approx.; 5 min; reference only)	
		Continuous	0.2 kWh (reference only)	
	Noise	Copying	71 dB	Sound power level by ISO
		Standby	—	
	Ozone		0.01 ppm or less (average over 8 hr)	
	Dimensions	Width	14.1 in./359 mm	
		Depth	15.7 in./402 mm	
		Height	4.1 in./108 mm	
Weight (including cartridge)		16.6 lb/7.4 kg (approx.)		
Consumables	Copy paper	Keep wrapped to protect against humidity.		
	Cartridge	See CHAPTER 1.		

Prepared by  
OFFICE IMAGING PRODUCTS TECHNICAL SUPPORT DEPARTMENT 1  
OFFICE IMAGING PRODUCTS TECHNICAL SUPPORT DIVISION  
CANON INC.  
Printed in Japan

REVISION 0 (JAN. 1998) [23715]

5-1, Hakusan 7-chome, Toride-shi, Ibaraki 302 Japan

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