CS-2014

Copystar

PLAINP APERCOPIER

CS-2014

SERVICE MANUAL

Published in Feb.'98
19570962
Revision 2

CAUTION: DOUBLE-POLE / NEUTRAL FUSING

Service Manual

CS-2014

Safety precautions

This booklet provides safety warnings and precautions for our service personnel to ensure the safety of their customers, their machines as well as themselves during maintenance activities. Service personnel are advised to read this booklet carefully to familiarize themselves with the warnings and precautions described here before engaging in maintenance activities.

Safety warnings and precautions

Various symbols are used to protect our service personnel and customers from physical danger and to prevent damage to their property. These symbols are described below:

⚠**DANGER**: High risk of serious bodily injury or death may result from insufficient attention to or incorrect compliance with warning messages using this symbol.

⚠**WARNING**: Serious bodily injury or death may result from insufficient attention to or incorrect compliance with warning messages using this symbol.

⚠**CAUTION**: Bodily injury or damage to property may result from insufficient attention to or incorrect compliance with warning messages using this symbol.

Symbols

The triangle (△) symbol indicates a warning including danger and caution. The specific point of attention is shown inside the symbol.

 General warning.

 Warning of risk of electric shock.

 Warning of high temperature.

⃠ indicates a prohibited action. The specific prohibition is shown inside the symbol.

 General prohibited action.

 Disassembly prohibited.

● indicates that action is required. The specific action required is shown inside the symbol.

 General action required.

 Remove the power plug from the wall outlet.

 Always ground the copier.

1. Installation Precautions

⚠WARNING

- Do not use a power supply with a voltage other than that specified. Avoid multiple connections to one outlet: they may cause fire or electric shock. When using an extension cable, always check that it is adequate for the rated current. .....



- Connect the ground wire to a suitable grounding point. Not grounding the copier may cause fire or electric shock. Connecting the earth wire to an object not approved for the purpose may cause explosion or electric shock. Never connect the ground cable to any of the following: gas pipes, lightning rods, ground cables for telephone lines and water pipes or faucets not approved by the proper authorities. .....



⚠CAUTION:

- Do not place the copier on an infirm or angled surface: the copier may tip over, causing injury. .....



- Do not install the copier in a humid or dusty place. This may cause fire or electric shock. .....



- Do not install the copier near a radiator, heater, other heat source or near flammable material. This may cause fire. .....



- Allow sufficient space around the copier to allow the ventilation grills to keep the machine as cool as possible. Insufficient ventilation may cause heat buildup and poor copying performance. .....



- Always handle the machine by the correct locations when moving it. ....



- Always use anti-toppling and locking devices on copiers so equipped. Failure to do this may cause the copier to move unexpectedly or topple, leading to injury. .....



- Avoid inhaling toner or developer excessively. Protect the eyes. If toner or developer is accidentally ingested, drink a lot of water to dilute it in the stomach and obtain medical attention immediately. If it gets into the eyes, rinse immediately with copious amounts of water and obtain medical attention. .....



- Advice customers that they must always follow the safety warnings and precautions in the copier's instruction handbook. .....



2. Precautions for Maintenance

⚠WARNING

- Always remove the power plug from the wall outlet before starting machine disassembly. .....



- Always follow the procedures for maintenance described in the service manual and other related brochures. .....



- Under no circumstances attempt to bypass or disable safety features including safety mechanisms and protective circuits. .....



- Always use parts having the correct specifications. .....



- Always use the thermostat or thermal fuse specified in the service manual or other related brochure when replacing them. Using a piece of wire, for example, could lead to fire or other serious accident. .....



- When the service manual or other serious brochure specifies a distance or gap for installation of a part, always use the correct scale and measure carefully. .....



- Always check that the copier is correctly connected to an outlet with a ground connection. .....



- Check that the power cable covering is free of damage. Check that the power plug is dust-free. If it is dirty, clean it to remove the risk of fire or electric shock. .....



- Never attempt to disassemble the optical unit in machines using lasers. Leaking laser light may damage eyesight. .....



- Handle the charger sections with care. They are charged to high potentials and may cause electric shock if handled improperly. .....



⚠CAUTION

- Wear safe clothing. If wearing loose clothing or accessories such as ties, make sure they are safely secured so they will not be caught in rotating sections. .....



- Use utmost caution when working on a powered machine. Keep away from chains and belts. .....



- Handle the fixing section with care to avoid burns as it can be extremely hot. .....



- Check that the fixing unit thermistor, heat and press rollers are clean. Dirt on them can cause abnormally high temperatures. .....



- Do not remove the ozone filter, if any, from the copier except for routine replacement. .....



- Do not pull on the AC power cord or connector wires on high-voltage components when removing them; always hold the plug itself. .....



- Do not route the power cable where it may be stood on or trapped. If necessary, protect it with a cable cover or other appropriate item. .....



- Treat the ends of the wire carefully when installing a new charger wire to avoid electric leaks. .....



- Remove toner completely from electronic components. .....



- Run wire harnesses carefully so that wires will not be trapped or damaged. .....

- After maintenance, always check that all the parts, screws, connectors and wires that were removed, have been refitted correctly. Special attention should be paid to any forgotten connector, trapped wire and missing screws. .....



- Check that all the caution labels that should be present on the machine according to the instruction handbook are clean and not peeling. Replace with new ones if necessary. .....



- Handle greases and solvents with care by following the instructions below: .....
  - · Use only a small amount of solvent at a time, being careful not to spill. Wipe spills off completely.
  - · Ventilate the room well while using grease or solvents.
  - · Allow applied solvents to evaporate completely before refitting the covers or turning the main switch on.
  - · Always wash hands afterwards.



- Never dispose of toner or toner bottles in fire. Toner may cause sparks when exposed directly to fire in a furnace, etc. .....



- Should smoke be seen coming from the copier, remove the power plug from the wall outlet immediately. .....



3. Miscellaneous

⚠WARNING

- Never attempt to heat the drum or expose it to any organic solvents such as alcohol, other than the specified refiner; it may generate toxic gas. .....



CONTENTS

I THEORY AND CONSTRUCTION SECTION

1-1 Specifications
1-1-1 Specifications 1-1-1
1-2 Handling Precautions
1-2-1 Drum 1-2-1
1-2-2 Developer and toner 1-2-1
1-3 Mechanical Construction
1-3-1 Part names and their functions 1-3-1
1-3-2 Machine cross section 1-3-3
1-3-3 Drive system 1-3-4
1-3-4 Mechanical construction 1-3-5

II ELECTRICAL SECTION

2-1 Electrical Parts Layout
2-1-1 Electrical parts layout 2-1-1
2-2 Detection of Paper Misfeeds
2-2-1 Paper misfeed detection 2-2-1
2-2-2 Paper misfeed detection conditions 2-2-2
2-3 Operation of the PCB
2-3-1 Power source PCB 2-3-1
2-3-2 Main PCB 2-3-2
2-3-3 AVR PCB 2-3-3
2-3-4 Operation unit PCB 2-3-4

III SET UP AND ADJUSTMENT SECTION

3-1 Installation
3-1-1 Unpacking and installation 3-1-1
3-1-2 Setting initial copy modes 3-1-10
3-1-3 Installing the dehumidifier heater (optional, 120 V specifications only) 3-1-11
3-1-4 Installing the flicker resistor (optional, 240 V/50 Hz specifications only) 3-1-13
3-2 Simulation
3-2-1 Simulations 3-2-1
3-3 Assembly and Disassembly
3-3-1 Precautions for assembly and disassembly 3-3-1
3-3-2 Paper feed section 3-3-2
3-3-3 Main charging section 3-3-13
3-3-4 Exposure section 3-3-16
3-3-5 *Drum section (metric specification only)* 3-3-50
3-3-6 *Developing section (metric specification only)* 3-3-53
3-3-7 Transfer section 3-3-55
3-3-8 *Cleaning section (metric specification only)* 3-3-59
3-3-9 Fixing section 3-3-62

3-4 PCB Initial Setting
3-4-1 Replacing the main PCB 3-4-1
3-4-2 Adjustment-free variable resistors (VR) 3-4-3
3-5 Self-diagnostics
3-5-1 Self diagnostic function 3-5-1
3-6 Troubleshooting
3-6-1 Image formation problems 3-6-1
3-6-2 Paper misfeed 3-6-15
3-6-3 PCB terminal voltages 3-6-17
3-6-4 Electrical problems 3-6-25
3-6-5 Mechanical problems 3-6-31
3-7 Appendixes
Timing chart No. 1 3-7-1
Timing chart No. 2 3-7-2
Timing chart No. 3 3-7-3
Power source PCB 3-7-4
AVR PCB 3-7-5
Operation unit PCB 3-7-6
Main PCB 3-7-7
Connection diagram 3-7-8
Wiring diagram 3-7-9

I

THEORY AND CONSTRUCTION SECTION

1-1 Specifications

1-1-1 Specifications 1-1-1

1-1-1 Specifications

Type	Desktop
Copying system	Dry, indirect electrostatic system
Originals	Sheets, books and 3-dimensional objects Maximum size: Folio/$8\frac{1}{2}" \times 14"$
Original feed system	Fixed
Copy paper	Plain paper: 80 g/m^2 (metric), 75 g/m^2 (inch) for drawer feed 60 - 120 g/m^2 (metric), 75 g/m^2 (inch) for bypass feed Special paper: OHP film, letterhead and colored paper Note: Use the bypass for special paper.
Copying sizes	Maximum: Folio/$8\frac{1}{2}" \times 14"$ Minimum: A6R/$5\frac{1}{2}" \times 8\frac{1}{2}"$
Magnification ratios	70 - 141%, 1% increments Fixed ratios: Metric 1:1 6 1.0%, 1:1.410, 1:0.700 Inch 1:1 6 1.0%, 1:1.290, 1:0.780
Copy speeds	At 100% magnification: A4R/$8\frac{1}{2}" \times 11"$: 14 copies/min. A5R/$5\frac{1}{2}" \times 8\frac{1}{2}"$: 14 copies/min. Folio/$8\frac{1}{2}" \times 14"$: 12 copies/min.
First copy time	5.8 s or less (A4R/$8\frac{1}{2}" \times 11"$, 100% magnification, manual exposure)
Warm-up time	30 s or less (room temperature 20°C/68°F, 65%RH)
Paper feed system	Automatic feed from the paper drawer Capacity: 250 sheets of 80 g/m^2 (metric) or 75 g/m^2 (inch) Manual feed from the bypass section 1 sheet at a time
Multiple copying	1 - 99 copies
Photoconductor	OPC (drum diameter 30 mm)
Charging system	Single positive corona charging (drum potential: 820 V $^{+100\ V}_{-50\ V}$ DC)
Exposure system	Slit exposure
Lens	Fixed-focal lens, f: 190 mm, F: 7.2
Light source	Halogen lamp, 230 W
Developing system	Dry, magnetic brush Developer: 2-component, ferrite carrier and N27 T black toner Toner density control: toner sensor Toner replenishing: automatic from a toner cartridge
Transfer system	Single positive corona charging, +4.8 kV DC (reference)
Separation system	Curvature separation

Fixing system	Heat roller Heat source: halogen heater (910 W with 120 V supply, 1040 W with 240 V supply) Control temperature: 175°C/347°F (at normal ambient temperature) Abnormally high temperature protection devices: 135°C/275°F and 140°C/284°F thermostats Fixing pressure: 94 N
Charge erasing system	Exposure by cleaning lamp
Cleaning system	Cleaning blade
Functions	(1) Self-diagnostics (2) Simulation (3) Auto clear (30 - 270 s, in intervals of 30 s) (4) Auto start (5) Auto shutoff (15 - 240 min., in intervals of 15 min.) (6) Auto preheat/energy saving (5 - 45 min., in intervals of 5 min.) (7) Exposure adjustment (8) Auto exposure (9) Photo mode (10) Manual magnification selection (11) Fixed magnification (12) User exposure control (13) Paper empty detection (14) Toner empty detection (15) Paper jam detection (16) Copy number setting (17) Total counter
Power source	120 V AC, 60 Hz, max. 10.2 A 220 - 240 V AC, 50/60 Hz, 2.4 A (average)
Rated power consumption	1361 W (220 - 240 V) 1195 W (120 V)
Dimensions	515 (W) × 465 (D) × 320 (H) mm $20\frac{1}{4}$" (W) × $18\frac{5}{16}$" (D) × $12\frac{5}{8}$" (H)
Weight	Approx. 22 kg/48.5 lbs
Floor requirements	515 (W) × 465 (D) mm $20\frac{1}{4}$" (W) × $18\frac{5}{16}$" (D)
Accessories	Copy tray

1-2 Handling Precautions

1-2-1 Drum 1-2-1
1-2-2 Developer and toner 1-2-1

1-2-1 Drum

Note the following when handling or storing the drum.

- When removing the drum unit, never expose the drum surface to strong direct light.
- Keep the drum at an ambient temperature between –20°C/–4°F and 40°C/104°F and at a relative humidity not higher than 85% RH. Avoid abrupt changes in temperature and humidity.
- Avoid exposure to any substance which is harmful to or may affect the quality of the drum.
- Do not touch the drum surface with any object. Should it be touched by hands or stained with oil, clean it.
- If the machine is left open for more than 5 minutes for maintenance, remove the drum and store it in the drum storage bag (Part No. 78369020).

1-2-2 Developer and toner

Store the developer and toner in a cool, dark place. Avoid direct light, high humidity and temperature.

1-3 Mechanical Construction

1-3-1 Part names and their functions 1-3-1
1-3-2 Machine cross section 1-3-3
1-3-3 Drive system 1-3-4
1-3-4 Mechanical construction 1-3-5
(1) Paper feed section 1-3-5
(1-1) Paper feed from the paper drawer 1-3-7
(1-2) Paper feed from the bypass slot 1-3-8
(2) Main charging section 1-3-9
(3) Exposure section 1-3-12
(4) Developing section 1-3-18
(5) Transfer and separation section 1-3-26
(6) Cleaning section 1-3-29
(7) Charge erasing section 1-3-30
(8) Fixing and eject section 1-3-32

1-3-1 Part names and their functions

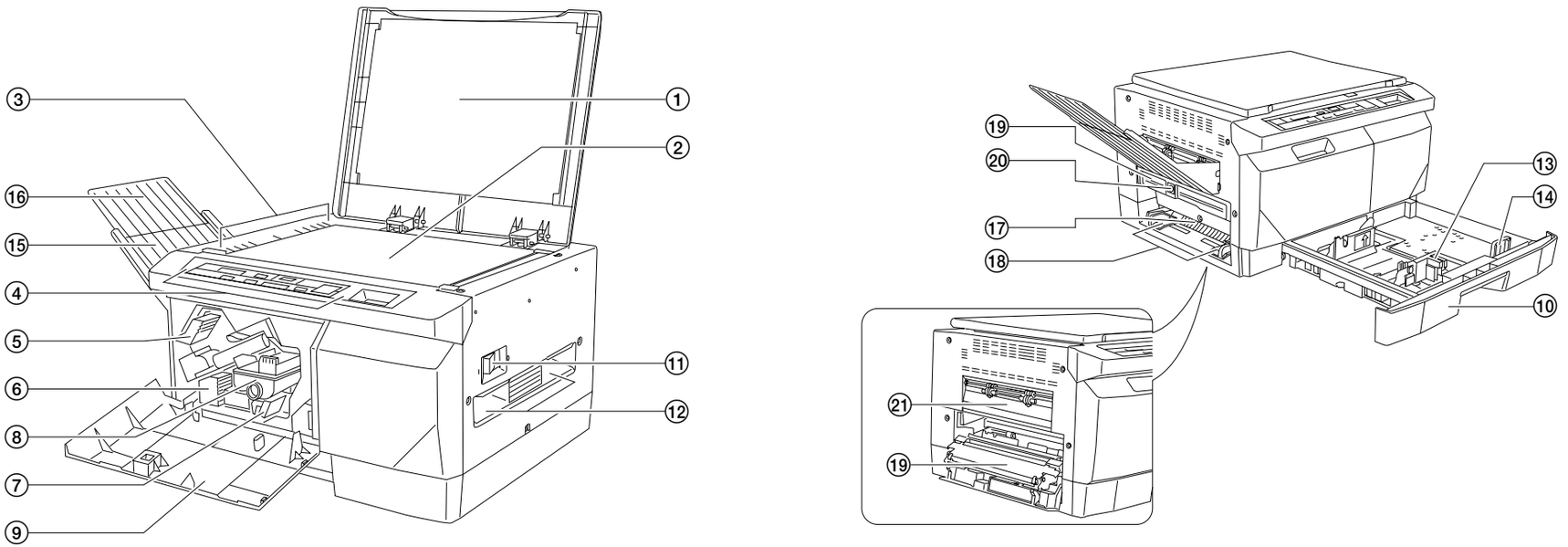
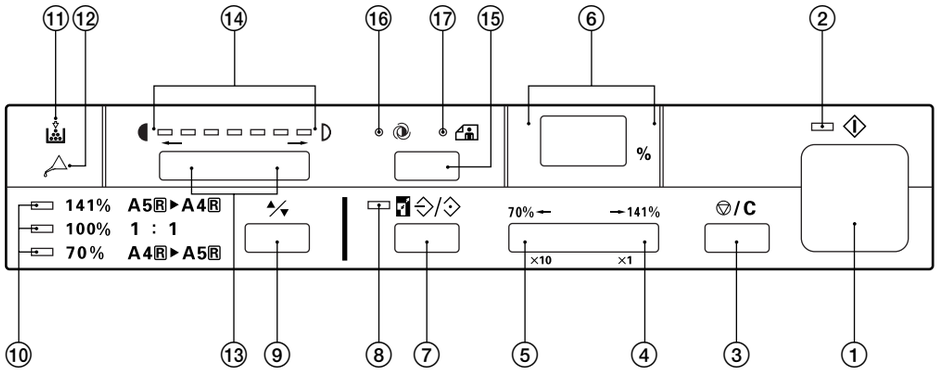


Figure 1-3-1

① Original holder
② Contact glass
③ Original size indicator
④ Operation panel
⑤ Drum unit
⑥ Developing unit
⑦ Developing unit release lever
⑧ Toner cartridge
⑨ Front cover
⑩ Paper drawer
⑪ Main switch
⑫ Grips
⑬ Width guide
⑭ Length guide
⑮ Copy tray
⑯ Auxiliary tray
⑰ Bypass section
⑱ Insertion guides
⑲ Release unit
⑳ Release unit button
㉑ Eject section cover

Metric



① Print key
② Copy start indicator
③ Stop/clear key
④ Quantity/zoom-up key
⑤ Quantity/zoom-down key
⑥ Copy quantity/magnification display
⑦ Zoom input/enter key
⑧ Zoom copy indicator
⑨ Copy size key
⑩ Fixed magnification indicators
⑪ Add toner indicator
⑫ Maintenance indicator (metric)
Replace unit indicator (inch)
⑬ Exposure adjustment keys
⑭ Exposure indicators
⑮ Exposure mode key
⑯ Auto exposure indicator
⑰ Photo original indicator

Inch

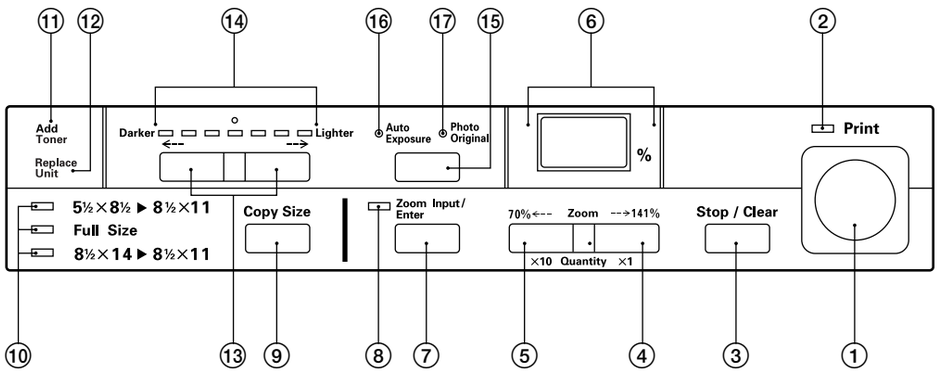


Figure 1-3-2 Operation panel

1-3-2 Machine cross section

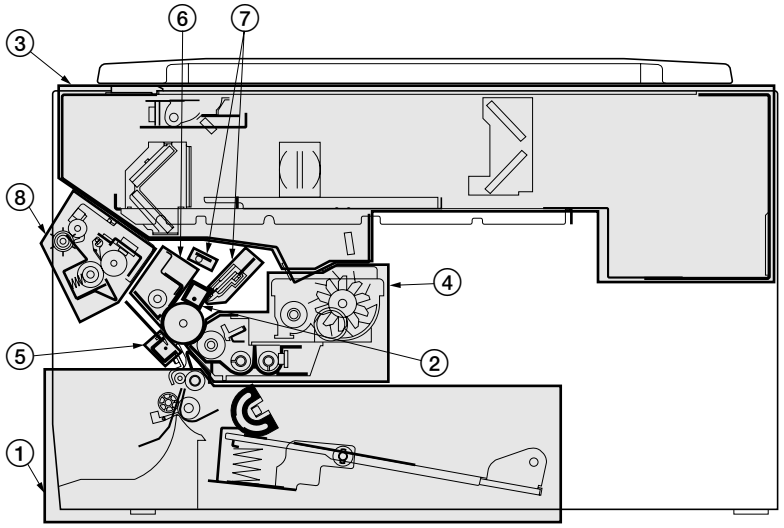
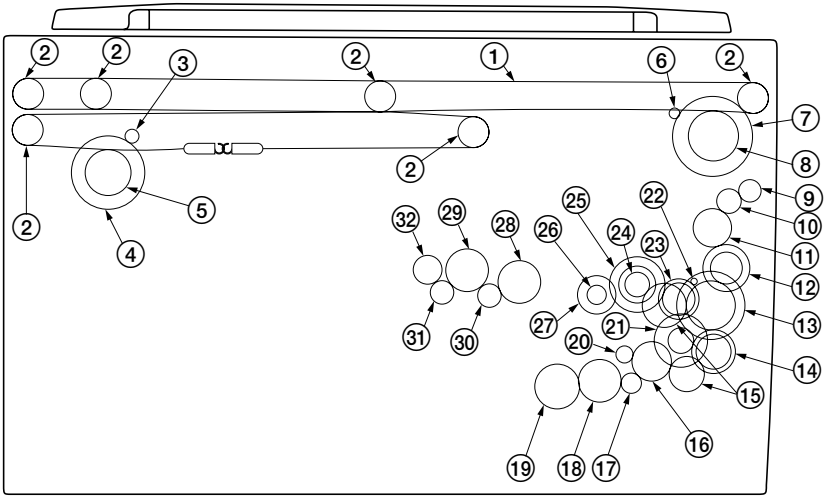


Figure 1-3-3 Machine cross section

① Paper feed section (page 1-3-5)
② Main charging section (page 1-3-9)
③ Exposure section (page 1-3-12)
④ Developing section (page 1-3-18)
⑤ Transfer and separation section (page 1-3-26)
⑥ Cleaning section (page 1-3-29)
⑦ Charge erasing section (page 1-3-30)
⑧ Fixing and eject section (page 1-3-32)

1-3-3 Drive system



As viewed from machine rear

Figure 1-3-4 Drive system

① Scanner wire
② Scanner wire pulley
③ Mirror motor gear
④ Scanner drive gear B
⑤ Scanner wire drum B
⑥ Scanner motor gear
⑦ Scanner drive gear 64
⑧ Scanner wire drum A
⑨ Eject roller gear
⑩ Idle gear 20
⑪ Fixing gear 32
⑫ Gear 27/38
⑬ Gear 41/56
⑭ Gear 30/35
⑮ Gear 28
⑯ Gear 33
⑰ Feed gear 16
⑱ Gear 35
⑲ Paper feed clutch gear
⑳ Registration gear 14
㉑ Gear 20/43
㉒ Drive motor gear
㉓ Gear 26/54
㉔ Drum drive gear
㉕ Gear 38/43
㉖ Developing drive gear
㉗ Gear 30
° Toner cartridge drive gear
㉙ Toner cartridge drive gear
㉚ Toner cartridge idle gear
㉛ Toner cartridge idle gear
㉜ Toner feed motor gear

1-3-4 Mechanical construction

(1) Paper feed section

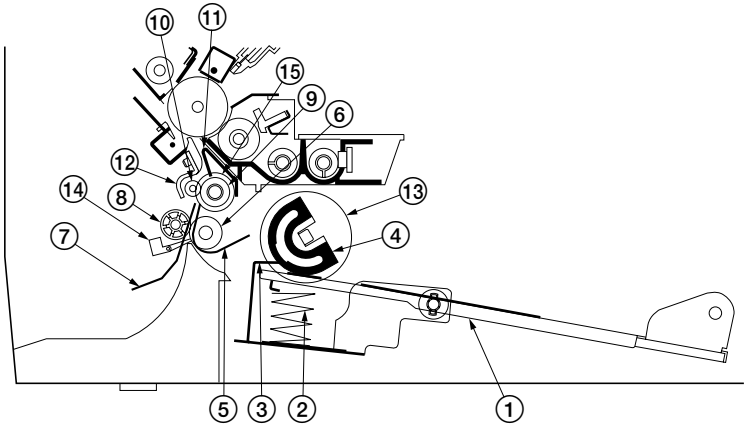


Figure 1-3-5 Paper feed section

① Drawer bottom plate
② Drawer spring
③ Front and rear drawer claws
④ Paper feed pulleys A and B
⑤ Feed roller guide
⑥ Feed roller
⑦ Bypass guide
⑧ Feed pulley
⑨ Right registration roller
⑩ Left registration roller
⑪ Upper pre-transfer guide
⑫ Pre-transfer guide
⑬ Paper feed clutch (PFCL)
⑭ Registration switch (RSW)
⑮ Registration clutch (RCL)

The paper feed section consists of the primary feed and secondary feed subsections. Primary feed conveys paper from the paper drawer or the bypass slot to the right and left registration rollers, at which point secondary paper feed takes place and the paper travels to the transfer section in sync with the exposure timing.

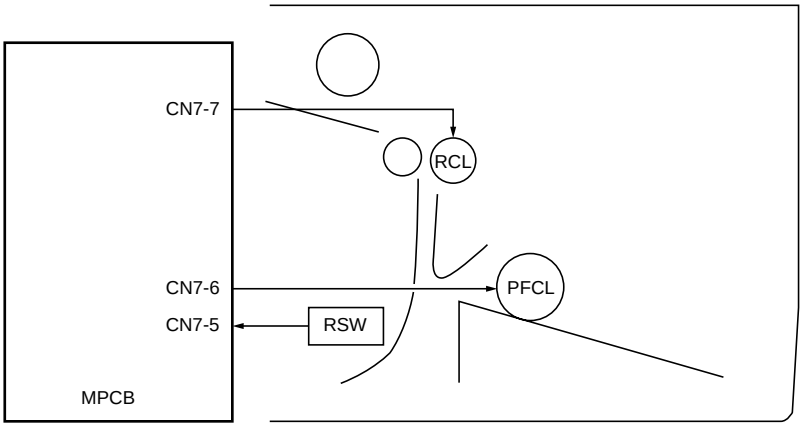
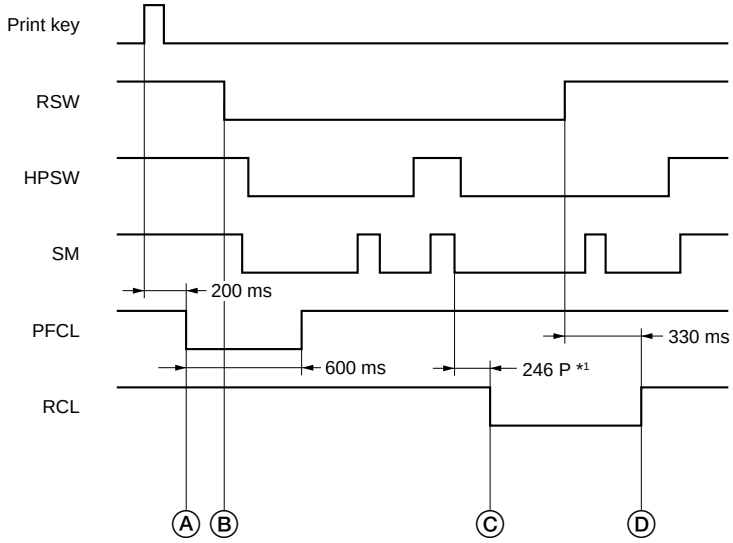


Figure 1-3-6 Paper feed section block diagram

(1-1) Paper feed from the paper drawer

The paper drawer consists of the drawer bottom plate, drawer springs and other components and can hold up to 250 sheets of copy paper.
Paper is fed out of the drawer by the rotation of paper feed pulleys A and B.



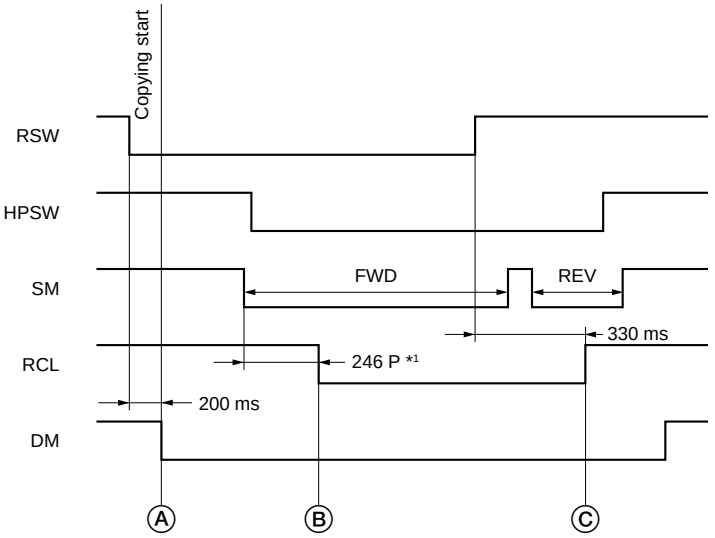
Auto exposure mode, A4R/8$^{1}/_{2}$" × 14" copy paper, magnification ratio 100%
*1 Varies depending on the setting by simulation 58.

Timing chart 1-3-1 Paper feed from the paper drawer

Ⓐ 200 ms after the print key has been pressed, the paper feed clutch (PFCL) turns on for 600 ms, rotating paper feed pulleys A and B to perform primary feed. Then the paper is fed to the right and left registration rollers by the rotation of the feed roller.
Ⓑ The leading edge of the paper turns the registration switch (RSW) on.
Ⓒ 246 pulses after the scanner has started scanning, the registration clutch (RCL) turns on and the right registration roller conveys the paper to start secondary feed.
Ⓓ 330 ms after the trailing edge of the paper has turned the registration switch (RSW) off, the registration clutch (RCL) turns off to complete secondary paper feed.

(1-2) Paper feed from the bypass slot

The bypass slot can hold one sheet of paper at one time.
Copying starts when the paper turns the registration switch (RSW) on and the paper is conveyed to the secondary paper feed section by the feed roller.



Manual exposure mode, A4R/8$^{1}/_{2}$" × 14" copy paper, magnification ratio 70%
*1 Varies depending on the setting by simulation 58.

Timing chart 1-3-2 Paper feed from the bypass slot

Ⓐ 200 ms after the leading edge of the paper has turned the registration switch (RSW) on, the drive motor (DM) turns on and the feed roller feeds the paper to start primary paper feed where the paper is fed to the right and left registration rollers.
Ⓑ 246 pulses after the scanner motor (SM) has started rotating forward, the registration clutch (RCL) turns on and the right registration roller conveys the paper to start secondary paper feed.
Ⓒ 330 ms after the trailing edge of the paper has turned the registration switch (RSW) off, the registration clutch (RCL) turns off to complete secondary paper feed.

(2) Main charging section

The main charging section consists of the drum and main charger. The drum is electrically charged uniformly by means of a grid to form a latent image on the surface.

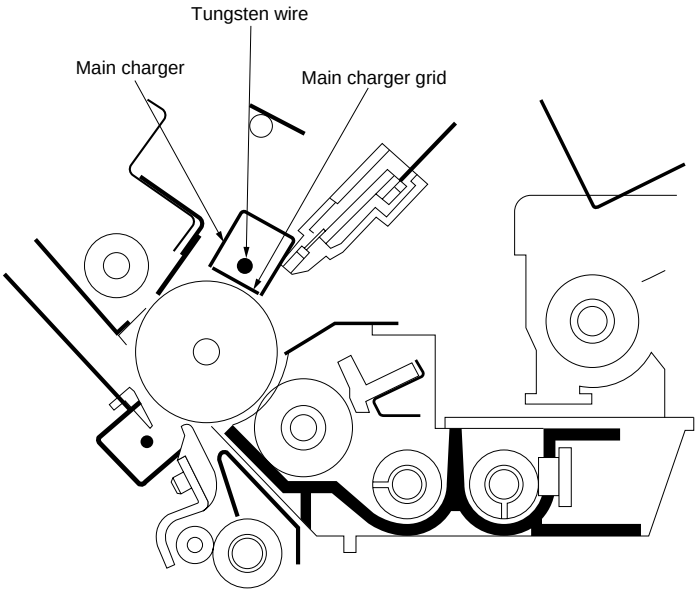


Figure 1-3-7 Main charging section

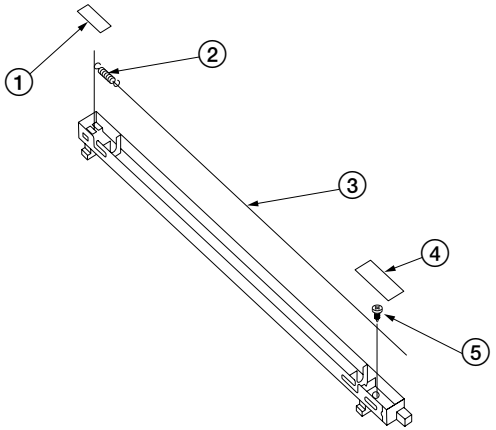


Figure 1-3-8 Main charger

① Main charger rear lid
② Charger spring
③ Charger wire
④ Main charger front lid
⑤ Charger wire retainer pin

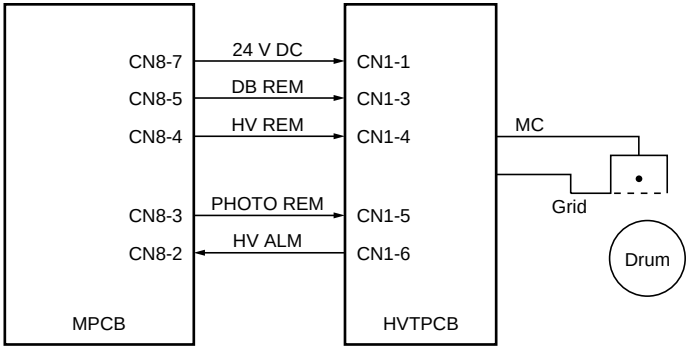
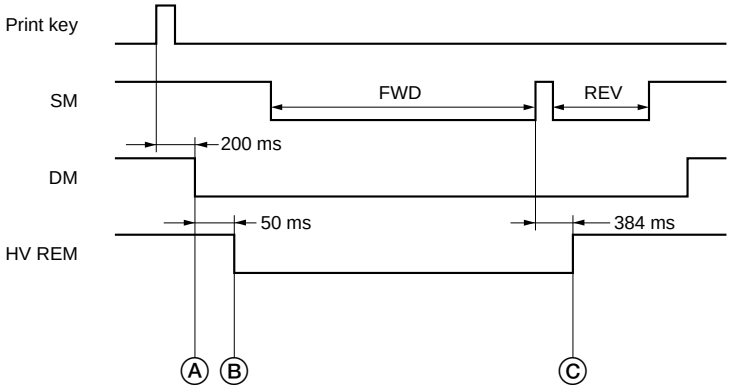


Figure 1-3-9 Main charging section block diagram



Manual exposure mode, A4R/8$^{1}/_{2}$" × 14" copy paper, paper feed from the paper drawer

Timing chart 1-3-3 Main charging

Ⓐ 200 ms after the print key has been pressed, the drive motor (DM) starts to rotate.
Ⓑ 50 ms after the drive motor (DM) has started to rotate, main charging (HV REM) starts.
Ⓒ 384 ms after the scanner motor (SM) has stopped rotating forward, main charging (HV REM) ends.

(3) Exposure section

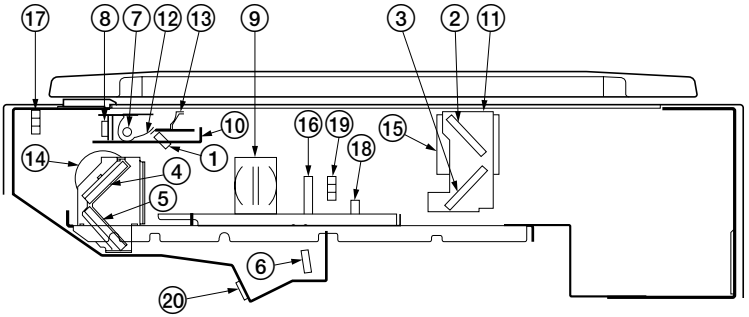


Figure 1-3-10 Exposure section

① Mirror 1
② Mirror 2
③ Mirror 3
④ Mirror 4
⑤ Mirror 5
⑥ Mirror 6
⑦ Halogen lamp (HL)
⑧ Optical section thermostat (TH3)
⑨ Lens
⑩ Light source unit 1
⑪ Light source unit 2
⑫ Main reflector
⑬ Auxiliary reflector
⑭ Scanner motor (SM)
⑮ Optical section fan motor (OPFM)
⑯ AE sensor (AES)
⑰ Home position switch (HPSW)
⑱ Lens home position switch (LHPSW)
⑲ Mirror home position switch (MHPSW)
⑳ Dust filter

This copier employs a slit exposure system with a fixed original table, and a halogen lamp (HL) as the light source.
The optical section consists of light source units 1 and 2. Light source unit 1 carries the halogen lamp and the main and auxiliary reflectors. Each unit travels from one side of the machine to the other along scanner rails at machine front and rear. When an enlargement or a reduction ratio is selected, the scanning speeds of the two light source units and the positions of the lens and mirrors 2 and 3 are changed, altering the distance between the original and the drum.
A cooling fan is installed to exhaust heat generated by the halogen lamp. If an abnormally high temperature is detected around light source unit 1, the optical section thermostat (TH3) shuts off the supply to the halogen lamp.

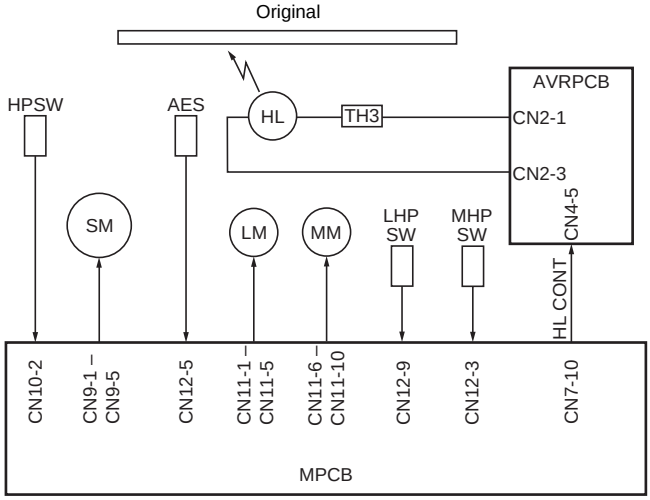
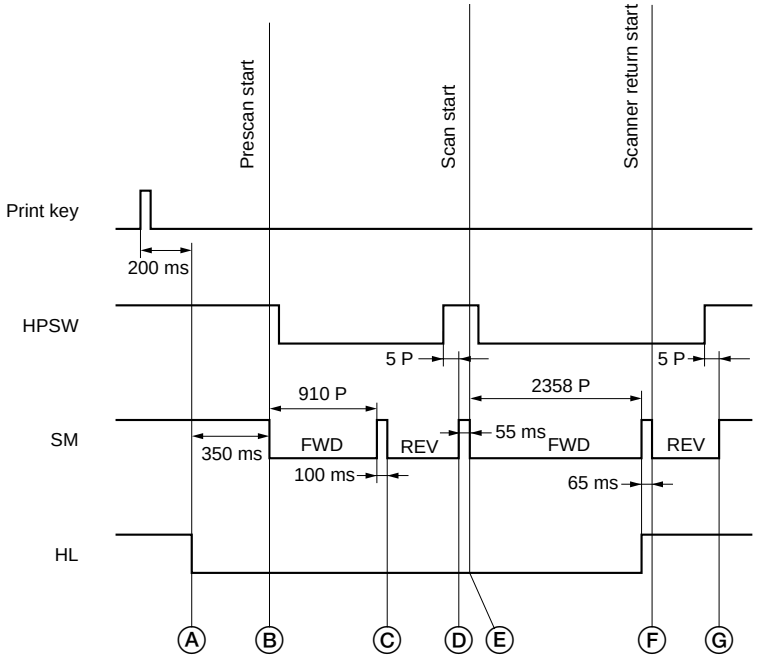


Figure 1-3-11 Exposure section block diagram



Auto exposure mode, A4R/8$^{1}/_{2}$" × 14" original

Timing chart 1-3-4 Scanner travel

Ⓐ 200 ms after the print key has been pressed, the halogen lamp (HL) lights at the intensity for prescan.
Ⓑ 350 ms after the halogen lamp (HL) has turned on, the scanner motor (SM) rotates forward for prescan.
Ⓒ After rotating forward for 910 pulses, the scanner motor (SM) pauses for 100 ms. It then reverses to return the scanner to the home position.
Ⓓ 5 pulses after the home position switch (HPSW) has been turned on, the scanner motor (SM) turns off and the scanner stops.
Ⓔ 55 ms after the scanner motor (SM) has turned off, it rotates forward again for scanning.
Ⓕ After rotating forward for 2358 pulses, the scanner motor (SM) pauses. At the same time, the halogen lamp (HL) turns off. 65 ms later, the scanner motor (SM) reverses to return the scanner to the home position.
Ⓖ 5 pulses after the home position switch (HPSW) has been turned on, the scanner motor (SM) turns off and the scanner stops.

Exposure control for manual exposure and photo modes

The halogen lamp light intensity for manual exposure and photo modes is calculated from the data obtained by running simulation 24. The number of exposure steps depends on the setting in simulation 96-1: 7 or 13 steps when set to “NORMAL MODE” and 19 or 25 steps when set to “SPECIAL AREA”. The exposure scale is wider for SPECIAL AREA than for NORMAL MODE.

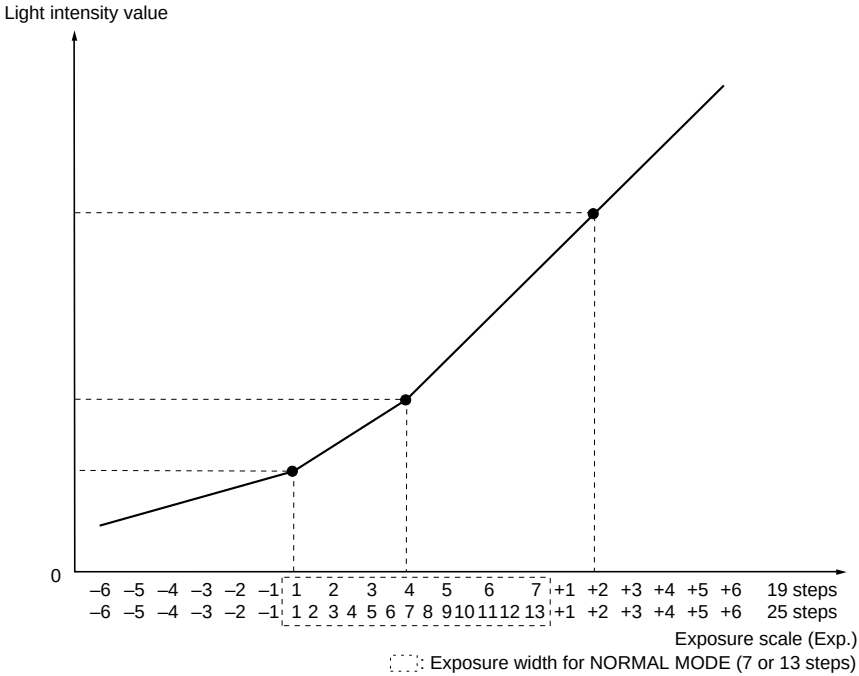


Figure 1-3-12 Exposure gradient setting for SPECIAL AREA

•Exposure control for manual exposure mode
The gradient is determined from the halogen lamp intensity values for Exp. 1, Exp. 4 or 7 and Exp. +2 set in simulation 24.
The exposure control between Exp. +2 and Exp. +6 is based on the gradient of the light intensity value between Exp. 4 or 7 and Exp. +2.
The gradient of the light intensity value between Exp. –6 and Exp. 1 is 2 per step.
•Exposure control for photo mode
The exposure for photo mode is controlled by setting the drum potential below that for manual exposure mode.

Exposure control for auto exposure mode

In auto exposure mode, the halogen lamp lights at the intensity set by simulation 28-1 to perform prescan. The exposure level to copy that particular original is determined by using the value read in by the AE sensor.

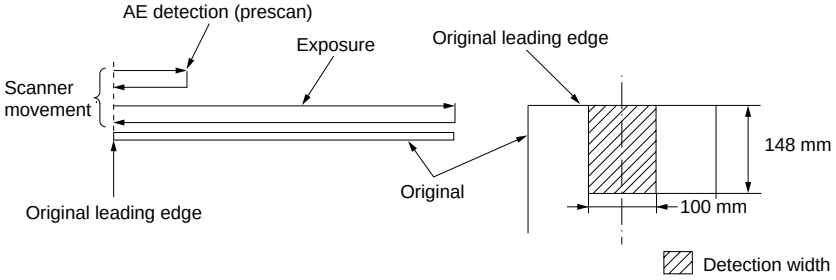


Figure 1-3-13 AE sensor detection width

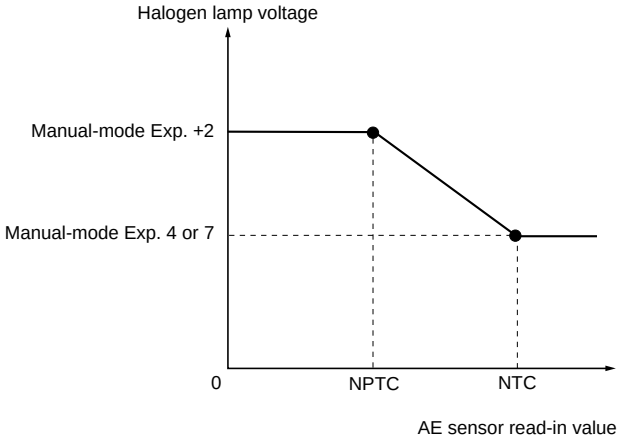


Figure 1-3-14 Exposure control for auto exposure mode

The halogen lamp voltage is controlled so that the lamp lights at the intensity for manual-mode Exp. 4 or 7 when the AE sensor read-in value is the NTC level and at the intensity for manual-mode Exp. +2 when the read-in value is the NPTC level when setting auto exposure values in simulation 28-2 and -3.
For read-in values below the NPTC level of simulation 28-3, the halogen lamp voltage is kept at a constant level so that the halogen lamp lights at the intensity for manual-mode Exp. +2. For read-in values above the NTC level of simulation 28-2, the halogen lamp voltage is kept at a constant level so that the halogen lamp lights at the intensity for manual-mode Exp. 4 or 7.

Light intensity correction for enlargement and reduction modes

The halogen lamp light intensity for enlargement and reduction modes is determined by the value for copying at 100% magnification and the correction values set by simulation 29.

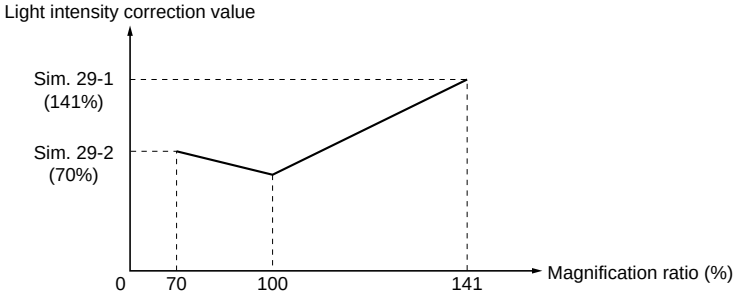


Figure 1-3-15 Correction of light intensity for enlargement and reduction modes

The correction values set by simulation 29 for reduction (70%) and enlargement (141%) copying are linked by a straight line through the value for 100% magnification, and the light intensity is corrected for individual magnification ratios according to the gradients. The gradients vary depending on the setting values in simulation 29.
The prescan light intensity for enlargement and reduction copying is increased by 0.1 as the magnification ratio changes by 1%. For copying at 70% the prescan light intensity is the 100% level plus 3; for 141%, the 100% level plus 4.1.

(4) Developing section

The developing section consists of the developing unit and toner cartridge.

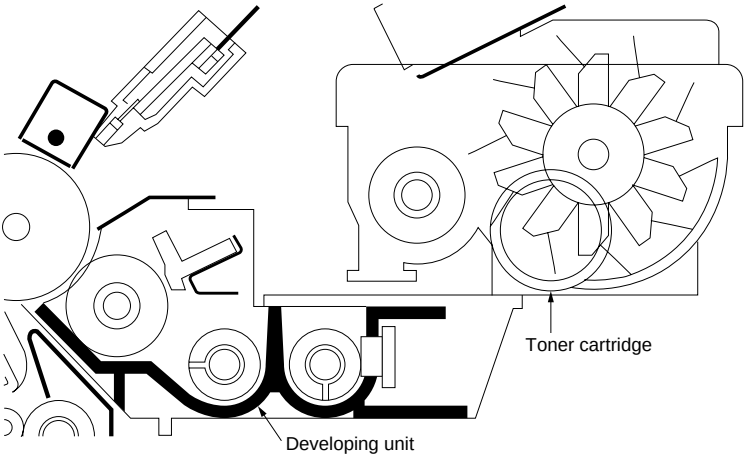


Figure 1-3-16 Developing section

The developing unit consists of the developing roller where a magnetic brush is formed, doctor blade and the developing spirals that agitate the developer.
Toner in the toner cartridge is mixed with residual toner recovered from the cleaning section, and the mixture is conveyed to the developing unit.

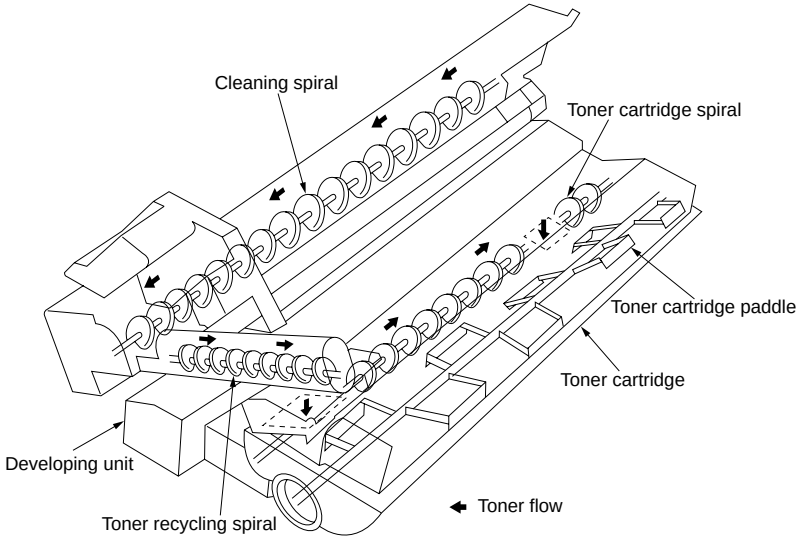
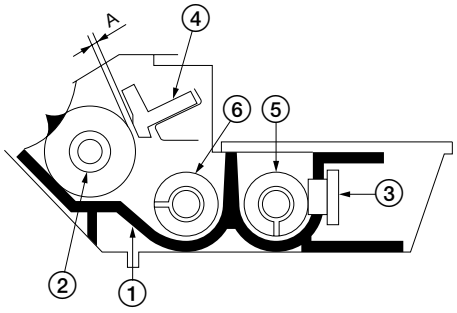


Figure 1-3-17 Toner recycling

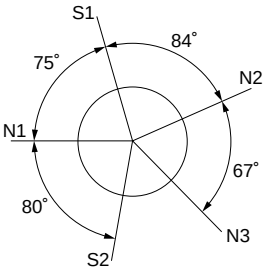
Formation of the magnetic brush

The developing roller consists of a magnet roller with five poles and a sleeve roller. Rotation of the sleeve roller around the magnet roller entrains developer, which in turn forms a magnetic brush at pole N1 on the magnet roller. The height of the magnetic brush is regulated by the doctor blade; the developing result is affected by the positions of the poles on the magnet roller and the position of the doctor blade.
The developing bias voltage generated by the high-voltage transformer PCB (HVTPCB) is applied to the developing roller to provide image contrast.



A: distance between the doctor blade and developing roller: 0.525 ± 0.025 mm

Magnetic poles on the magnet roller



N1: $850 \times 10^{-4} \pm 50 \times 10^{-4}$ T
N2: $500 \times 10^{-4} \pm 50 \times 10^{-4}$ T
N3: $450 \times 10^{-4} \pm 50 \times 10^{-4}$ T
S1: $880 \times 10^{-4} \pm 50 \times 10^{-4}$ T
S2: $900 \times 10^{-4} \pm 50 \times 10^{-4}$ T

Figure 1-3-18 Forming the magnetic brush

① Developing unit housing
② Developing roller
③ Toner sensor (TNS)
④ Doctor blade
⑤ Right developing spiral
⑥ Left developing spiral

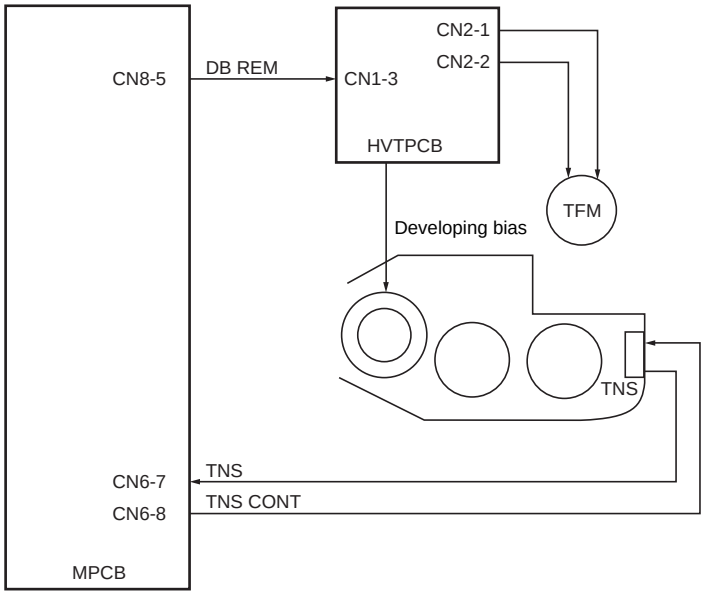


Figure 1-3-19 Developing section block diagram

Toner density is detected by the toner sensor (TNS).
The sensor section of the toner sensor detects the ratio of toner to carrier in the developer near it and converts it into a voltage. As more toner is used, the ratio of toner to carrier decreases, increasing the toner sensor output voltage.
When the ratio drops below the specified value, the increase in toner sensor output voltage triggers toner replenishing. When toner is added and the ratio of toner to carrier returns to normal, the toner sensor output voltage drops to the point where toner replenishing stops.

Toner density control

Toner density is controlled by switching the toner feed motor on and off, using as the reference the toner sensor output based on the toner sensor control voltage set when simulation 60 was executed while the developer was first supplied. The toner sensor output is also used to detect an empty toner cartridge.

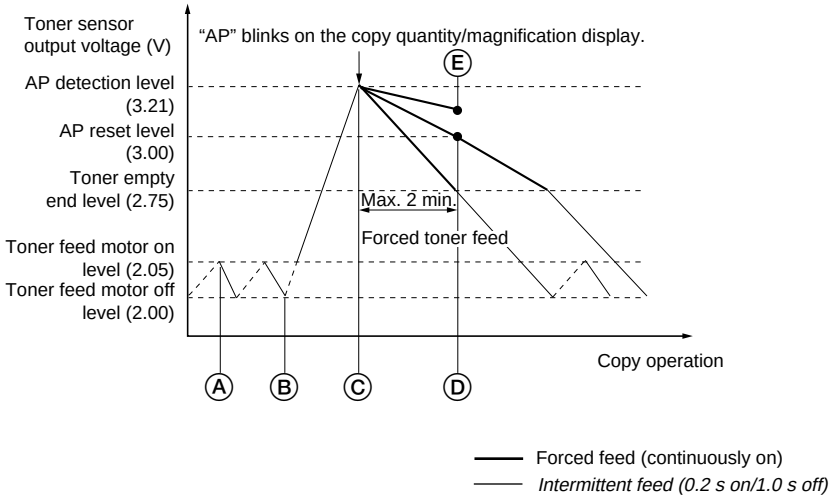


Figure 1-3-20 Toner density control

Ⓐ *When the toner sensor output voltage exceeds the toner feed motor on level, the toner feed motor intermittent feed (0.2 s on/1.0 s off) operation is carried out to feed the toner.*

Ⓑ When the toner is fed and the toner sensor output voltage falls below the toner feed motor off level, the intermittent feed operation is stopped.

Ⓒ When the toner in the toner cartridge runs low and, even though the toner intermittent feed operation is continued, the toner sensor output voltage rises above the AP detection level, "AP" blinks on the copy quantity/magnification display and the toner feed motor forced feed (continuously on) operation starts.

Ⓓ If the toner sensor output voltage falls to the AP reset level within the toner feed motor forced feed operation time (2 minutes max.), the copier returns to the ready state and continues the intermittent feed operation.

Ⓔ If the toner sensor output voltage does not fall to the AP reset level within 2 minutes after it has started to fall below the AP detection level, the add toner indicator lights.

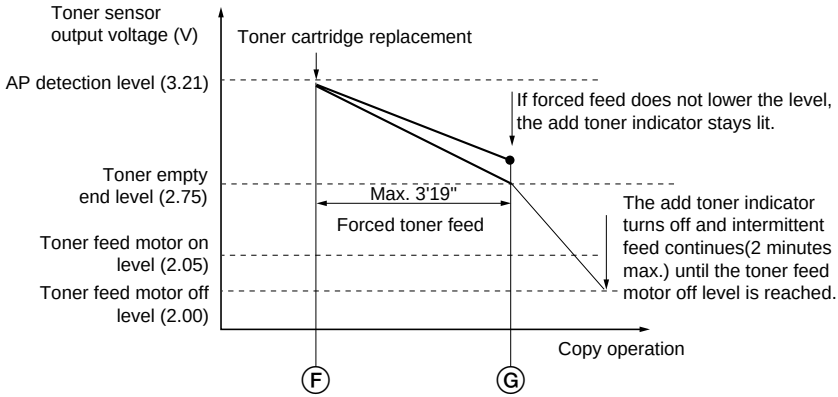


Figure 1-3-21

Ⓕ After the toner cartridge is replaced, “AP” blinks and the forced feed operation (continuously on) is started by turning the safety switch off and on. During forced feed, the toner is fed and when the toner sensor output voltage reaches the toner empty end level, “AP” on the copy quantity/magnification display goes out and the copier enters the ready state. Further intermittent feed operation is carried out for up to 2 minutes or until the toner sensor output voltage reaches the toner feed motor off level.

Ⓖ If the toner sensor output voltage does not reach the toner empty end level within the forced feed operation time, the add toner indicator stays lit even after the end of the forced feed operation time.

Controlling the toner sensor output voltage

When initializing the toner control level in simulation 60, the toner sensor control voltage (TNS CONT) is set so that the toner sensor output voltage (TNS) is 1.60 V DC.
The image density is subject to humidity changes and the developing unit drive time. To maintain the image density constant, the toner sensor output voltage (TNS) is corrected by the toner sensor control voltage (TNS CONT).

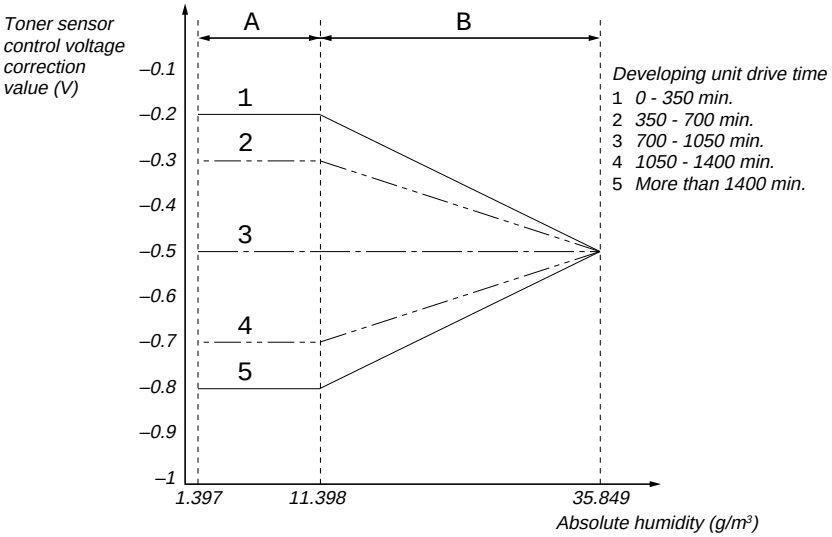


Figure 1-3-22 Correction based on the absolute humidity

A *The toner sensor control voltage correction value is kept constant when the absolute humidity is between 1.397 and 11.398 g/m³. The toner sensor control voltage correction value varies depending on the developing unit drive time (the total drive motor on time since the main switch was last turned on).*

B *The toner sensor control voltage correction value changes so that it is -0.5 V when the absolute humidity is 35.849 g/m³ when the absolute humidity is between 11.398 and 35.849 g/m³. The rate of change is constant and it varies depending on the developing unit drive time (the total drive motor on time since the main switch was last turned on).*

[Computing the absolute humidity]

The humidity sensor (HUMSENS) and external temperature thermistor (ETTH) are located on the humidity sensor PCB (HUMPCB). The humidity sensor (HUMSENS) converts the relative humidity detected by the humidity sensing element into a voltage and sends it to the main PCB (MPCB). The main PCB computes the absolute humidity based on this HUMSENS signal and the temperature (ETTH signal) detected by the external temperature thermistor.

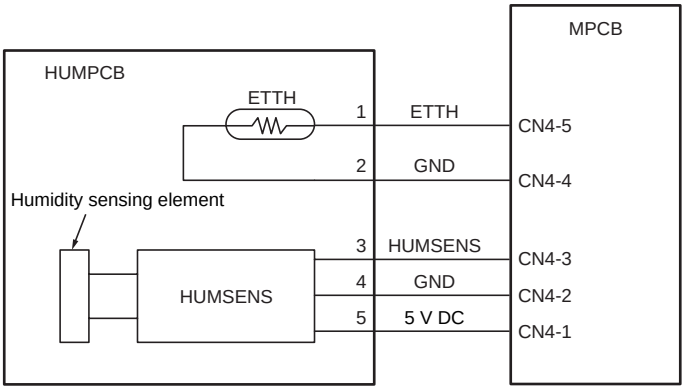


Figure 1-3-23 Absolute humidity computation block diagram

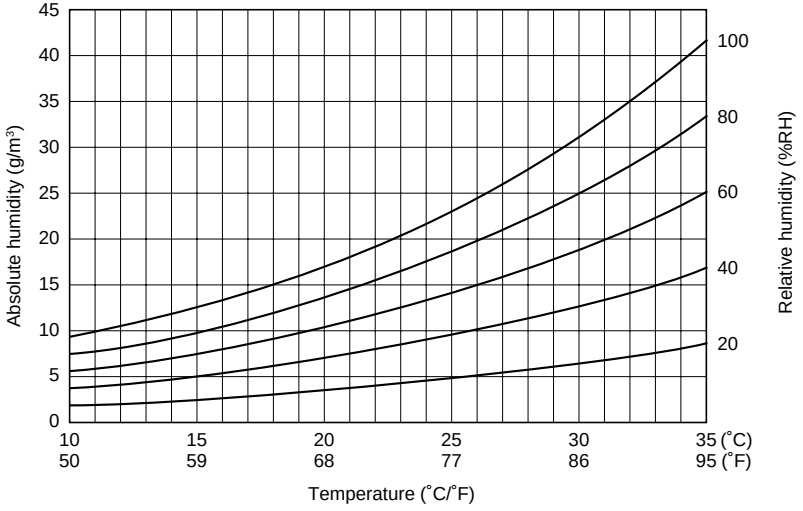


Figure 1-3-24 Absolute humidity vs. relative humidity

(5) Transfer and separation section

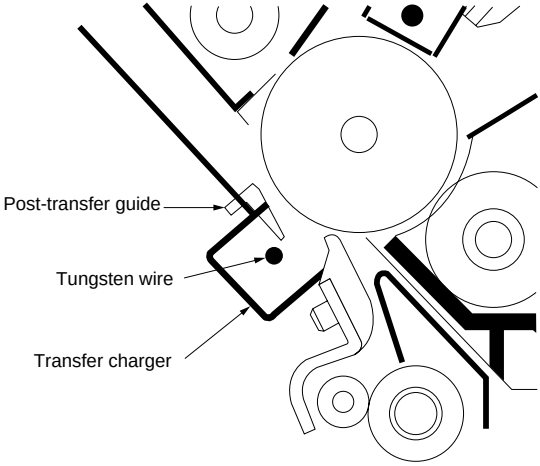


Figure 1-3-25 Transfer and separation section

The transfer and separation section consists of the transfer charger.
In the transfer charger, a high voltage generated by the high-voltage transformer PCB (HVTPCB) is applied across both ends of the tungsten wire for transfer charging and the toner image is transferred from the drum surface onto the paper.
After transfer, paper is separated from the drum by curvature separation under its own weight and by the post-transfer guide.

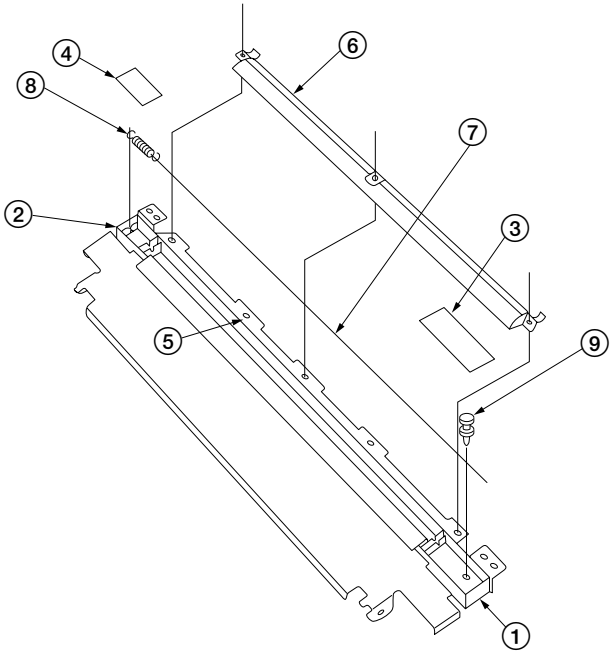


Figure 1-3-26 Transfer charger

① Front transfer housing
② Rear transfer housing
③ Transfer front lid
④ Transfer rear lid
⑤ Transfer charger shield
⑥ Pre-transfer guide
⑦ Charger wire
⑧ Charger spring
⑨ Charger wire retainer pin

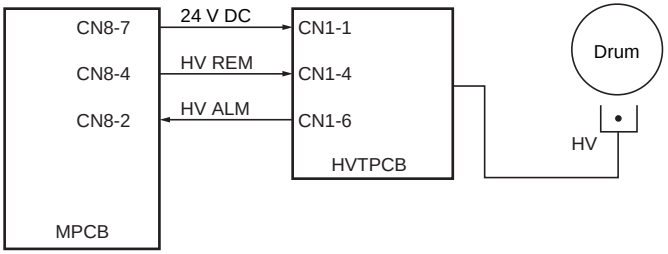
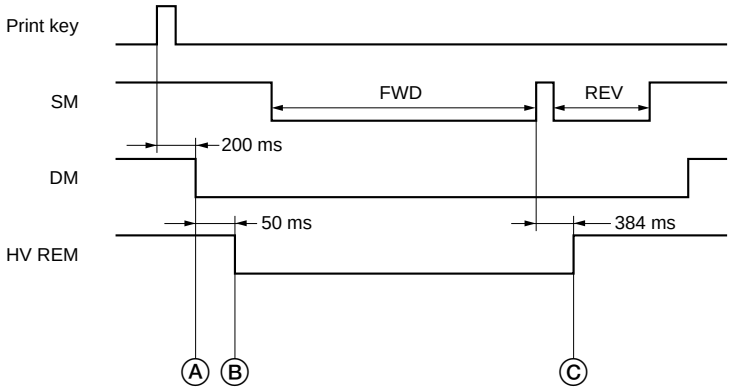


Figure 1-3-27 Transfer and separation section block diagram



Manual exposure mode, A4R/8$^{1}/_{2}$" × 14" copy paper, paper feed from the paper drawer

Timing chart 1-3-5 Transfer and separation

Ⓐ 200 ms after the print key has been pressed, the drive motor (DM) starts to rotate.
Ⓑ 50 ms after the drive motor (DM) has started to rotate, transfer charging (HV REM) starts.
Ⓒ 384 ms after the scanner motor (SM) has stopped rotating forward, transfer charging (HV REM) ends.

(6) Cleaning section

The cleaning section consists of the cleaning blade, which removes residual toner from the drum surface after transfer, and the cleaning spiral that carries the residual toner back to the toner cartridge.

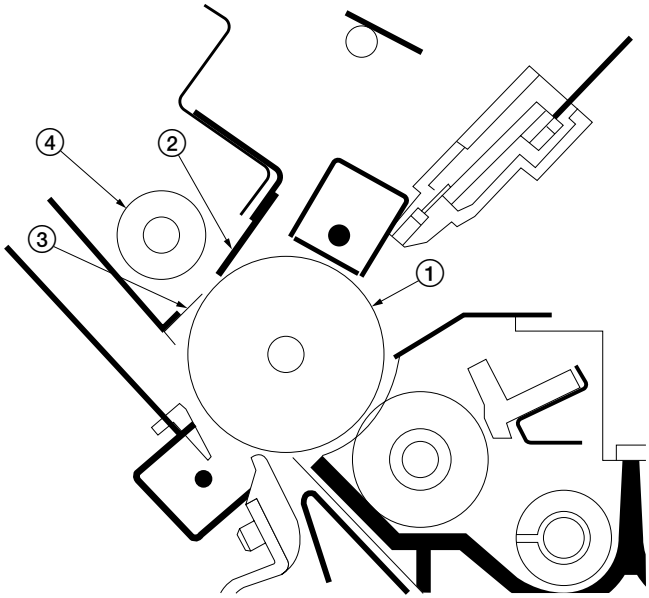


Figure 1-3-28 Cleaning section

① Drum
② Cleaning blade
③ Lower cleaning blade
④ Cleaning spiral

(7) Charge erasing section

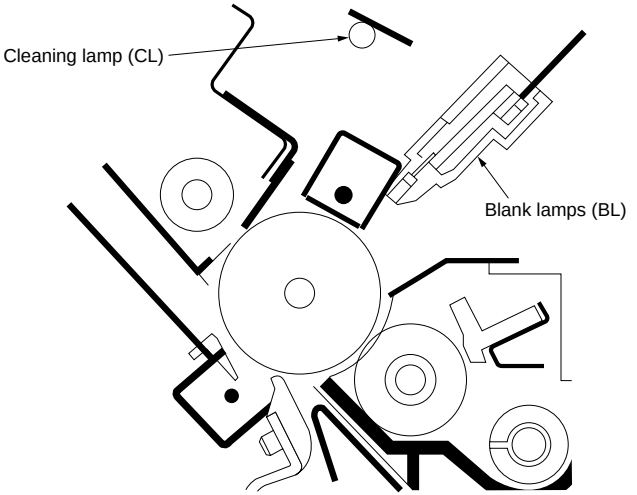


Figure 1-3-29 Charge erasing section

The charge erasing section consists of the blank lamps (BL) and the cleaning lamp (CL).
The blank lamps (BL) are 28 LEDs. All the LEDs light to create leading edge and trailing edge blank cut margins. During exposure, the required number of the 28 blank lamps on both sides are lit depending on the paper size and the magnification ratio, removing charge from the sections of the copy where no image is to be formed.
The cleaning lamp (CL) removes residual charge from the drum surface.

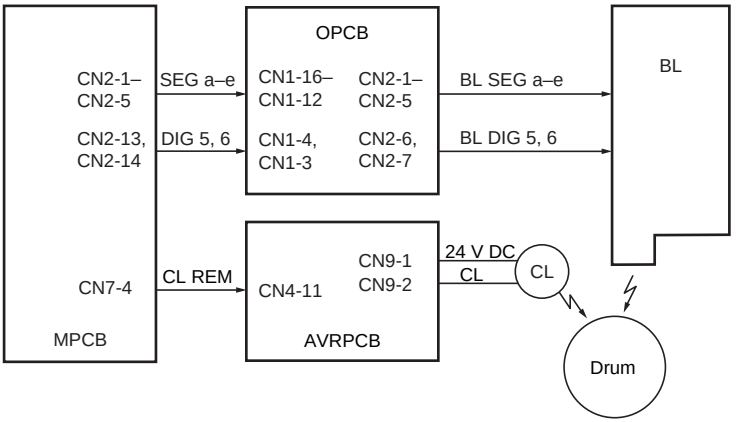
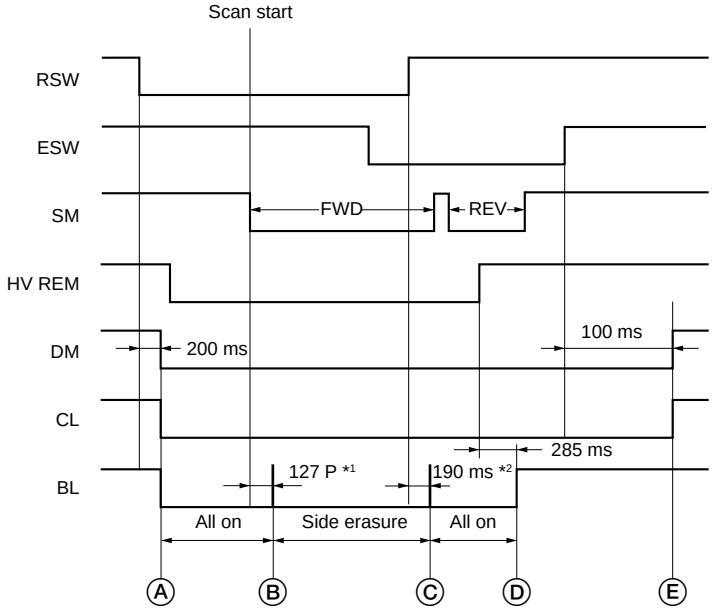


Figure 1-3-30 Charge erasing section block diagram



Bypass feed, manual exposure mode, A4R/8$^{1}/_{2}$" × 14" copy paper, magnification ratio 70%
*1 Varies depending on the magnification ratio and the setting by simulation 54.
*2 Varies depending on the setting by simulation 59.

Timing chart 1-3-6 Charge erasing

Ⓐ 200 ms after the registration switch (RSW) has been turned on by the paper inserted to the bypass, the drive motor (DM), the cleaning lamp (CL) and all the blank lamps (BL) turn on.
Ⓑ 127 pulses after the scanner has started scanning, the required number of blank lamps (BL) light depending on the paper size and the magnification ratio, removing unnecessary charge in the non-image forming area.
Ⓒ 190 ms after the trailing edge of the paper has turned the registration switch (RSW) off, all the blank lamps (BL) turn on.
Ⓓ 285 ms after the main charging (HV REM) has completed, the blank lamps (BL) turn off.
Ⓔ 100 ms after the paper has been ejected and the eject switch (ESW) has been turned off, the drive motor (DM) and the cleaning lamp (CL) turn off at the same time.

(8) Fixing and eject section

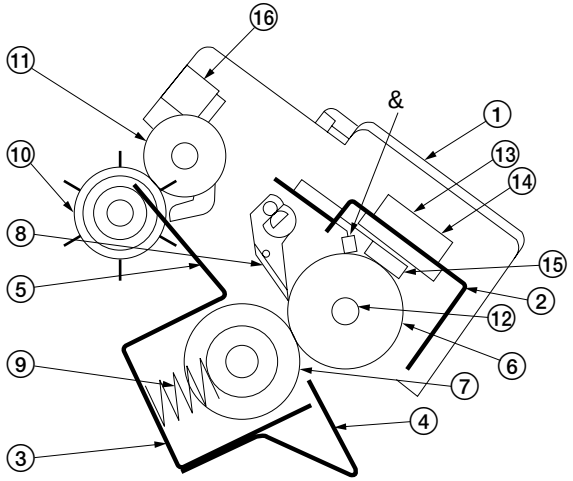


Figure 1-3-31 Fixing and eject section

① Fixing unit cover
② Fixing unit upper housing
③ Fixing unit lower housing
④ Fixing entrance guide
⑤ Eject guide
⑥ Heat roller
⑦ Press roller
⑧ Heat roller separation claws
⑨ Fixing pressure springs
⑩ Eject pulley
⑪ Eject roller
⑫ Fixing heater (H)
⑬ Fixing unit thermostat 1 (TH1)
⑭ Fixing unit thermostat 2 (TH2)
⑮ Fixing unit thermistor (FTH)
⑯ Eject switch (ESW)
& *Fixing blade*

The fixing and eject section consists of the parts shown in Figure 1-3-31. When the paper reaches the fixing section after the transfer process, it passes through the gap between the press roller and heat roller, which is heated by the fixing heater (H). Pressure is applied by the fixing pressure springs so that toner on the paper is melted and fused onto the paper.
When the fixing process is completed, the paper is separated from the heat and press rollers by the heat roller separation claws and is ejected out of the copier by the rotation of the eject pulley and eject roller.

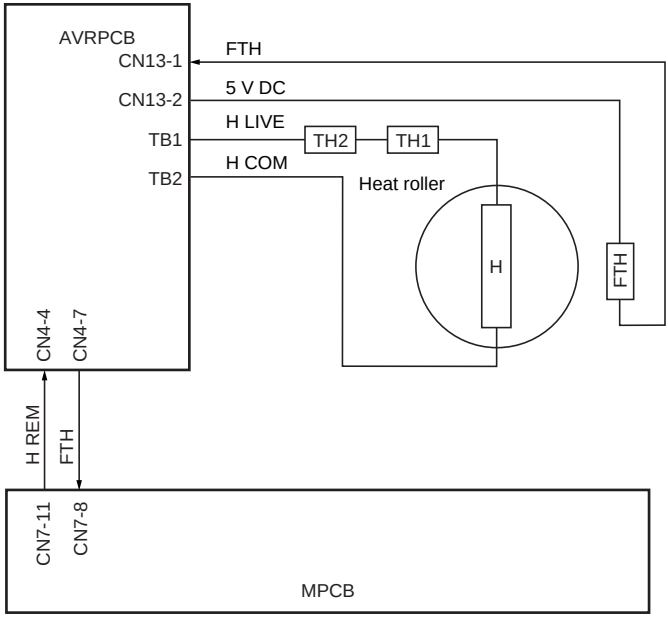


Figure 1-3-32 Fixing section block diagram

Heating the heat roller and detecting temperature

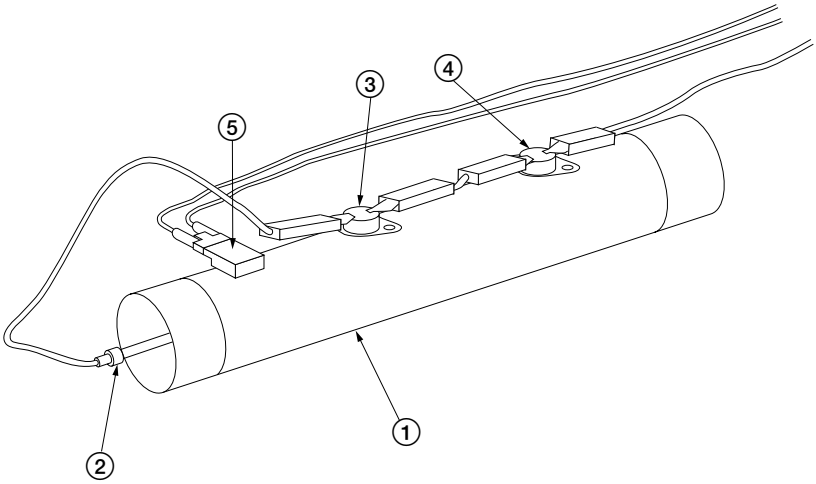
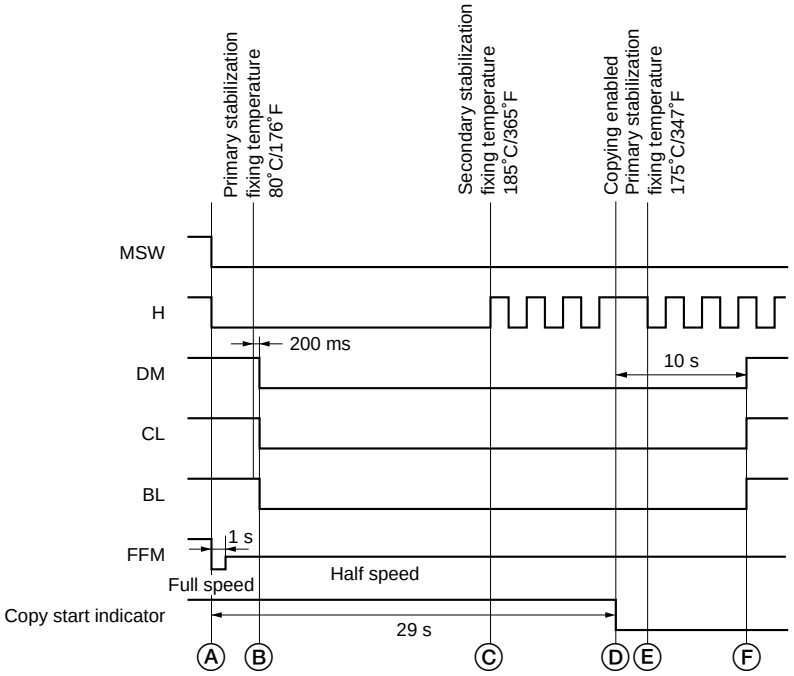


Figure 1-3-33 Heating the heat roller and detecting temperature

① Heat roller
② Fixing heater (H)
③ Fixing unit thermostat 1 (TH1)
④ Fixing unit thermostat 2 (TH2)
⑤ Fixing unit thermistor (FTH)

The heat roller is heated by the fixing heater (H) inside it; its surface temperature is detected by the fixing unit thermistor (FTH) and is regulated by the fixing heater turning on and off. If the fixing section becomes abnormally hot, either the fixing unit thermistor detects it or fixing unit thermostat 1 or 2 (TH1 or TH2) operates, in each case shutting the power to the fixing heater off.

Fixing temperature control



Timing chart 1-3-7 Fixing temperature control

Ⓐ When the main switch (MSW) is turned on the fixing heater (H) turns on to heat the heat roller. The fixing fan motor (FFM) rotates at full speed for 1 s and then at half speed.

Ⓑ 200 ms after the fixing temperature has reached 80°C/176°F, the drive motor (DM), cleaning lamp (CL) and blank lamps (BL) turn on to start primary stabilization.

Ⓒ When the fixing temperature reaches 185°C/365°F, secondary stabilization is achieved. The fixing heater (H) is then turned on and off as required to keep the fixing temperature at 185°C/365°F.

Ⓓ After secondary stabilization, copying is enabled and the copy start indicator lights if the time from the main switch (MSW) being turned on has reached the following:
29 s if the temperature detected by the fixing unit thermistor is 10°C/50°F or above and the external temperature is 15°C/59°F or above when the main switch (MSW) is turned on;
44 s if the temperature detected by the fixing unit thermistor is below 10°C/50°F or the external temperature is below 15°C/59°F when the main switch (MSW) is turned on;
5 s if the temperature detected by the fixing unit thermistor is 80°C/176°F or above when the main switch is turned on.

Ⓔ After copying has been enabled, the fixing temperature falls to 175°C/347°F and the copier enters the standby state. The fixing heater (H) is then turned on and off as required to keep the fixing temperature at 175°C/347°F.

Ⓕ 10 s after the copy start indicator has lit, the drive motor (DM) turns off.

• Correcting the fixing temperature control
The fixing temperature is changed according to the temperature detected by the external temperature thermistor (ETTH) on the humidity sensor PCB (HUMPCB).
When the temperature detected by the thermistor is 32°C/89.6°F or above, the fixing temperature is 175°C/347°F during standby and 180°C/356°F during copying.
When the temperature detected by the thermistor is below 32°C/89.6°F, the fixing temperature is 175°C/347°F during standby and 185°C/365°F during copying.

Paper separation

Paper is separated in the fixing section by the separation claws as shown in Figure 1-3-34.

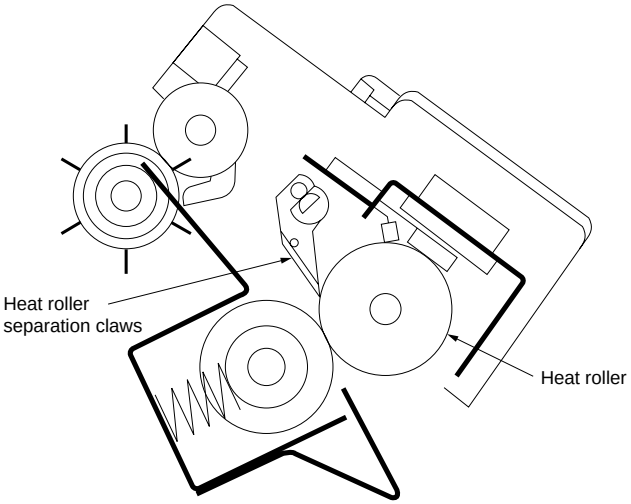


Figure 1-3-34 Paper separation

II

ELECTRICAL SECTION

2-1 Electrical Parts Layout

2-1-1 Electrical parts layout 2-1-1

2-1-1 Electrical parts layout

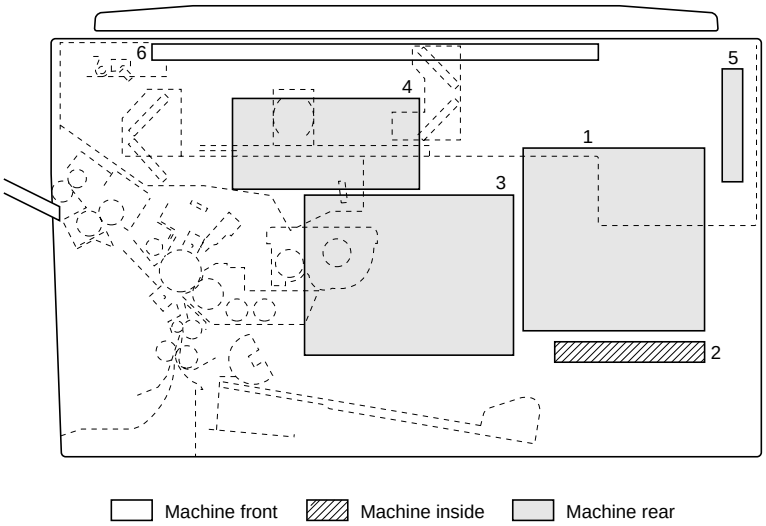


Figure 2-1-1 Layout of electrical parts: PCBs

1. Main PCB (MPCB) ..... Controls the other PCBs and electrical components.
2. Power source PCB (PSPCB) ..... Generates 24 V and 5 V DC; supplies AC to the AVR PCB; contains the safety switch and noise filter.
3. AVR PCB (AVRPCB) ..... Controls the halogen lamp and fixing heater.
4. High-voltage transformer PCB (HVTPCB) ... Performs main charging; generates developing bias and high voltage for transfer charging.
5. Humidity sensor PCB (HUMPCB)..... Detects absolute humidity.
6. Operation unit PCB (OPCB) ..... Consists of operation keys and display LEDs.

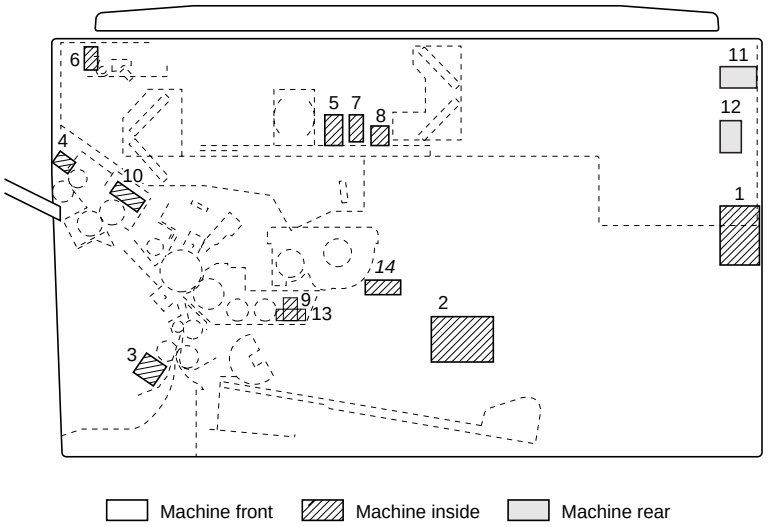


Figure 2-1-2 Layout of electrical parts: switches and sensors

1. Main switch (MSW) ..... Turns the AC power on and off.
2. Safety switch (SSW) ..... Breaks the safety circuit when the front cover or release unit is opened, and resets paper jam detection.
3. Registration switch (RSW) ..... Controls the secondary paper feed start timing.
4. Eject switch (ESW) ..... Detects a paper jam in the fixing section.
5. AE sensor (AES) ..... Detects the original density.
6. Home position switch (HPSW) ..... Detects the scanner in the home position.
7. Mirror home position switch (MHPSW) ..... Detects mirrors 2 and 3 in the home positions.
8. Lens home position switch (LHPSW) ..... Detects the lens in the home position.
9. Toner sensor (TNS) ..... Detects the toner density in the developing section.
10. Fixing unit thermistor (FTH) ..... Detects the heat roller temperature.
11. Humidity sensor (HUMSENS) ..... Detects the external humidity.
12. External temperature thermistor (ETTH) ..... Detects the external temperature.
13. Developing unit fuse* (DEVF) ..... Blows to differentiate between old and new developing units.
14. Toner cartridge detection switch (TCDSW) ..... Detects the presence or absence of the toner cartridge.

* Standard equipment only for 120 V, 220 V and 240 V specifications.

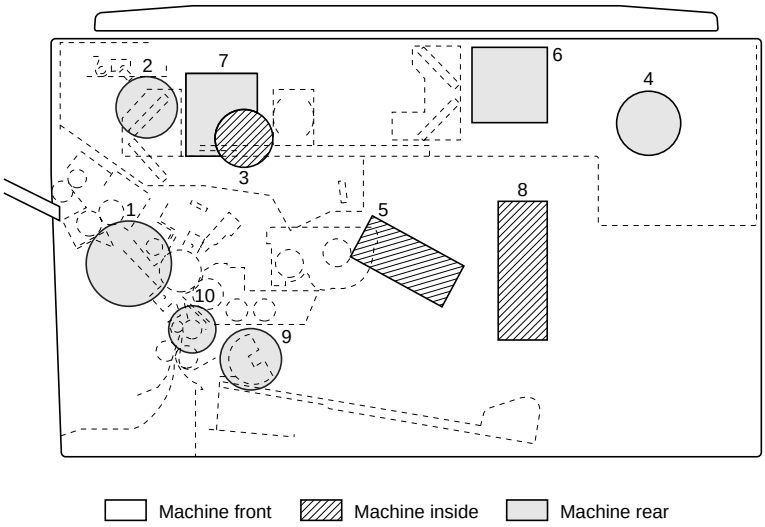


Figure 2-1-3 Layout of electrical parts: motors and clutches

1. Drive motor (DM) ..... Drives the machine.
2. Scanner motor (SM) ..... Drives the optical system.
3. Lens motor (LM) ..... Drives the lens.
4. Mirror motor (MM) ..... Drives mirrors 2 and 3.
5. Toner feed motor (TFM) ..... Replenishes toner.
6. Optical section fan motor (OPFM) ..... Cools the optical system.
7. Fixing unit fan motor (FFM) ..... Cools the fixing section.
8. Internal cooling fan motor (ICFM) ..... Cools the machine interior.
9. Paper feed clutch (PFCL) ..... Performs primary paper feed from the paper drawer.
10. Registration clutch (RCL) ..... Performs secondary paper feed.

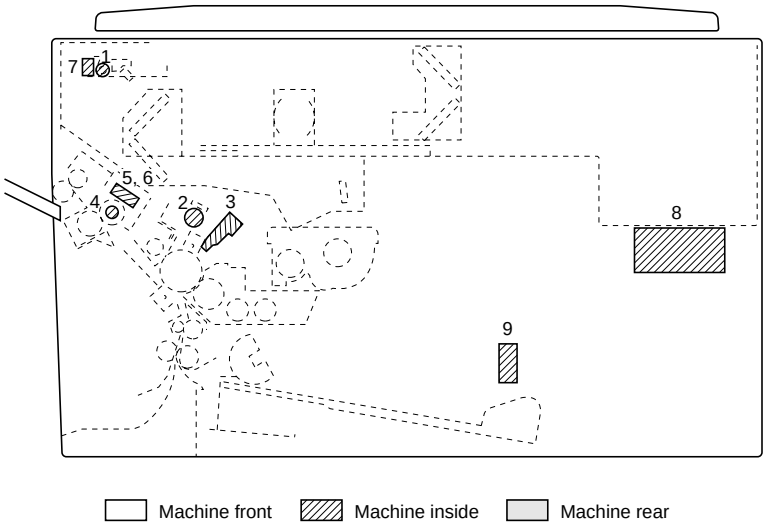


Figure 2-1-4 Layout of electrical parts: other electrical parts

1. Halogen lamp (HL) ..... Performs exposure.
2. Cleaning lamp (CL) ..... Removes residual charge from the drum surface.
3. Blank lamps (BL) ..... Remove charge from non-image forming areas of the drum surface.
4. Fixing heater (H) ..... Heats the heat roller.
5. Fixing unit thermostat 1 (TH1) ..... Prevents overheating in the fixing section.
6. Fixing unit thermostat 2 (TH2) ..... Prevents overheating in the fixing section.
7. Optical section thermostat (TH3) ..... Prevents overheating in the optical system.
8. Total counter (TC) ..... Displays the total number of copies produced.
9. Dehumidifying heater (DH)* ..... Dehumidifies the machine interior.

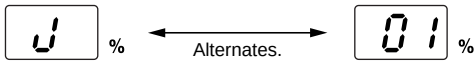
* Option available only for 120 V specifications.

2-2 Detection of Paper Misfeeds

2-2-1 Paper misfeed detection 2-2-1
2-2-2 Paper misfeed detection conditions 2-2-2

2-2-1 Paper misfeed detection

When a paper jam occurs, the copier immediately stops copying and the copy quantity/ magnification display on the operation unit shows PF, J01, J02 or J03 indicating the location of the jam. The letter J and the number alternates on the display.
To remove paper jammed in the copier, open the release unit, drawer or eject section cover.
The paper misfeed detection can be reset by opening and closing the front cover or release unit to turn the safety switch off and back on.



PF: No paper feed (or, no paper present in the drawer)
J01: paper jam in the fixing section
J02: paper jam in the eject section
J03: paper jam in the registration section

Figure 2-2-1 Misfeed location indication

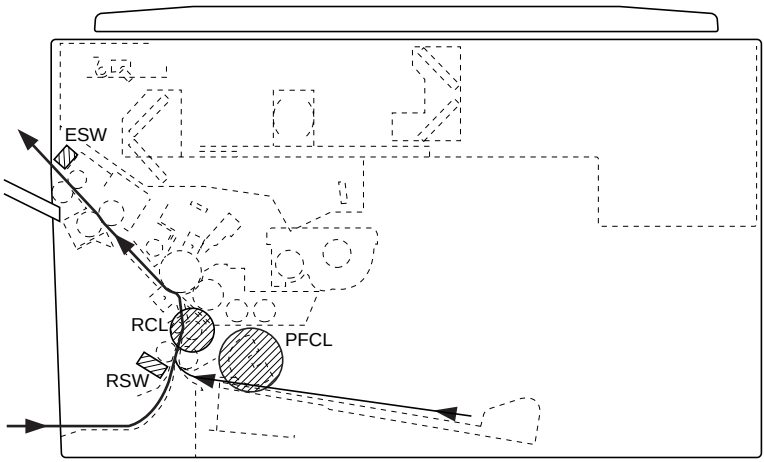
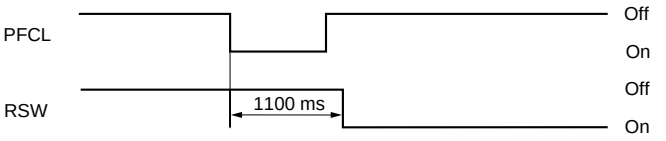


Figure 2-2-2 Misfeed detection

2-2-2 Paper misfeed detection conditions

No paper feed (PF)

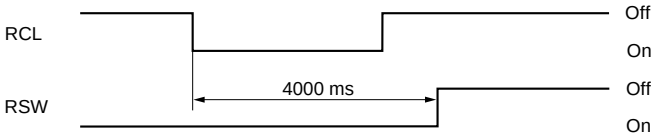
- The registration switch (RSW) does not turn on within 1100 ms after the paper feed clutch (PFCL) has turned on during drawer paper feed.



Timing chart 2-2-1

Paper jam in the registration section (J03)

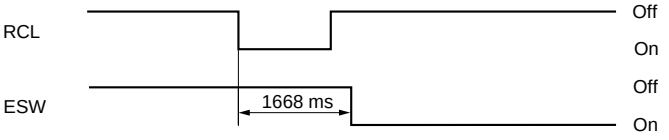
- The registration switch (RSW) does not turn off within 4000 ms after the registration clutch (RCL) has turned on.



Timing chart 2-2-2

Paper jam in the fixing section (J01)

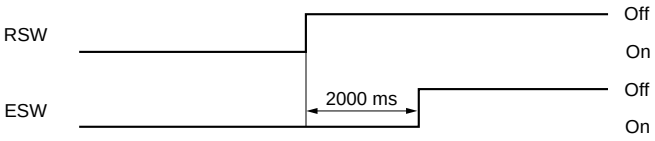
- The eject switch (ESW) does not turn on within 1668 ms after the registration clutch (RCL) has turned on.



Timing chart 2-2-3

Paper jam in the eject section (J02)

- The eject switch (ESW) does not turn off within 2000 ms after the registration switch (RSW) has turned off.



Timing chart 2-2-4

2-3 Operation of the PCB

2-3-1 Power source PCB 2-3-1
2-3-2 Main PCB 2-3-2
2-3-3 AVR PCB 2-3-3
2-3-4 Operation unit PCB 2-3-4

2-3-1 Power source PCB

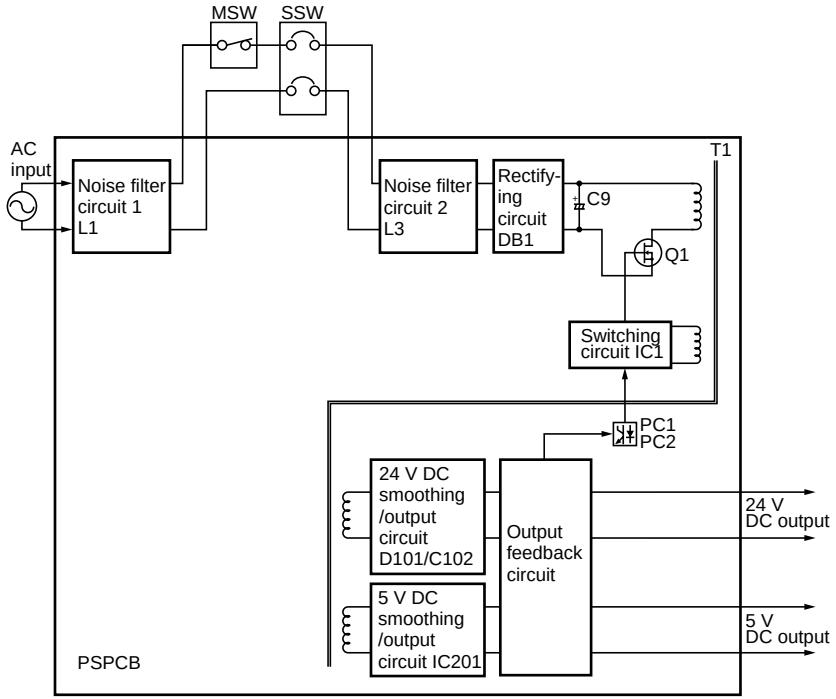


Figure 2-3-1 Power source PCB block diagram

The power source PCB (PSPCB) consists of the circuit blocks shown in Figure 2-3-1 and converts the AC input into stable 5 V and 24 V DC outputs.
Noise filter circuit 1 consists of choke coil L1, a resistor and capacitor. These attenuate external noise and prevent noise generated by the electrical components from escaping out of the copier via the AC line. Noise filter circuit 2 attenuates any external noise that has passed through noise filter circuit 1 and prevents the switching noise generated in the power source PCB from escaping out via the AC line. The AC input is full-wave rectified by diode bridge DB1 and then smoothed by smoothing capacitor C9. The switching circuit turns FET Q1 on and off via switching control IC1, turning current to the primary coil of switching transformer T1 on and off. The 24 V DC smoothing/output circuit converts the potential induced across the secondary coil of T1 into a stable 24 V DC output via diode D101 and smoothing capacitor C102. The 5 V DC smoothing/ output circuit converts the potential induced across the other secondary coil of T1 into a stable 5 V DC output via regulator IC201. Switching control IC1 regulates the 24 V DC supply by controlling the switching operation of FET Q1 depending on the signal fed back by the output feedback circuit via photocoupler PC1. If an overvoltage occurs on the 24 V or 5 V DC output, the output feedback circuit sends that information to switch control IC1 via photocoupler PC2, inhibiting IC1.

2-3-2 Main PCB

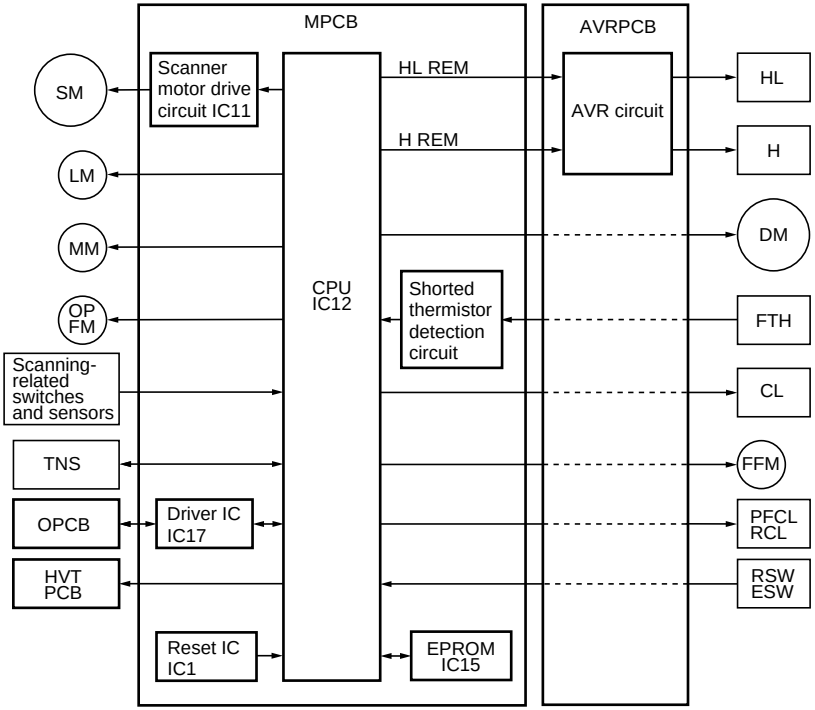


Figure 2-3-2 Main PCB block diagram

The main PCB (MPCB) consists of the CPU and control circuits that regulate the electrical components during the copying process.
Based on the control programs in EPROM IC15, CPU IC12 controls the overall copier system: the drive motor, scanning-related motors, switches and sensors, toner sensor (TNS), clutches and switches in the paper feed, registration and eject sections; and sends out MC and TC remote signals to the high-voltage transformer PCB (HVTPCB). The halogen lamp (HL) and the fixing heater (H) are also controlled by the main PCB via the AVR PCB (AVRPCB).

2-3-3 AVR PCB

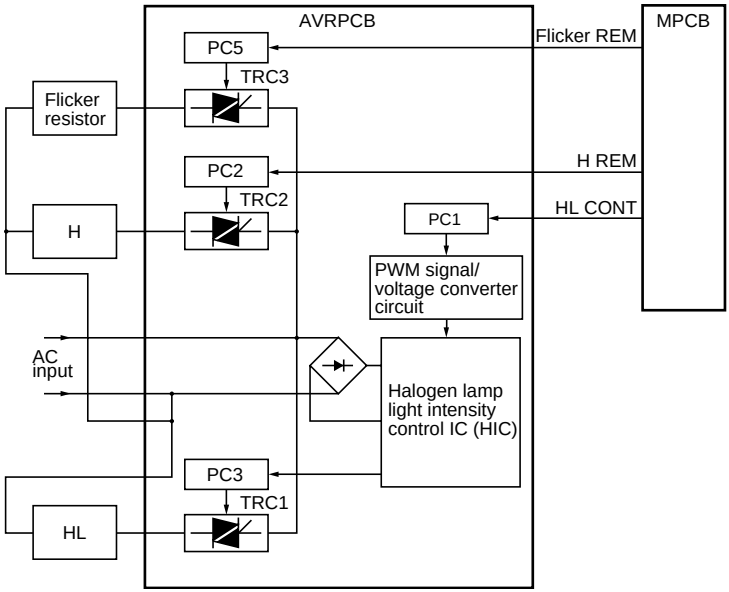


Figure 2-3-3 AVR PCB block diagram

The AVR PCB (AVRPCB) consists of two major sections: the halogen lamp control section with the PWM signal/voltage converter circuit and halogen lamp light intensity control IC (HIC), and the switching section with triacs TRC1, TRC2 and TRC3 that turn the fixing heater (H), flicker resistor* and halogen lamp (HL) on and off.
Control signal H REM from the main PCB turns photocoupler PC2 on when low. This applies a trigger voltage to the gate of triac TRC2, causing it to conduct and allow current to flow to the fixing heater (H) to turn it on. The flicker resistor* limits the surge generated by the fixing heater (H) being turned on. The Flicker REM signal from the main PCB turns photocoupler PC5 on when low. This applies a trigger voltage to the gate of triac TRC3, causing it to conduct and allow current to the flicker resistor to operate it. The halogen lamp (HL) light intensity is controlled by control signal HL CONT from the main PCB. HL CONT is a PWM signal turned on and off at a duty ratio set by the halogen lamp light intensity data. This signal is converted into a voltage by the PWM signal/voltage converter circuit and is output to the halogen lamp light intensity control IC (HIC). This adjusts the phase of the trigger which turns photocoupler PC3 on, based on the halogen lamp light intensity data converted into a voltage, using an internal zero-crossing signal as a reference. The phase-shifted trigger applied to the gate of triac TRC1 changes the amount of current flowing to the halogen lamp (HL), regulating the halogen lamp light intensity.

* For 230 V specifications and optional for 240 V specifications.

2-3-4 Operation unit PCB

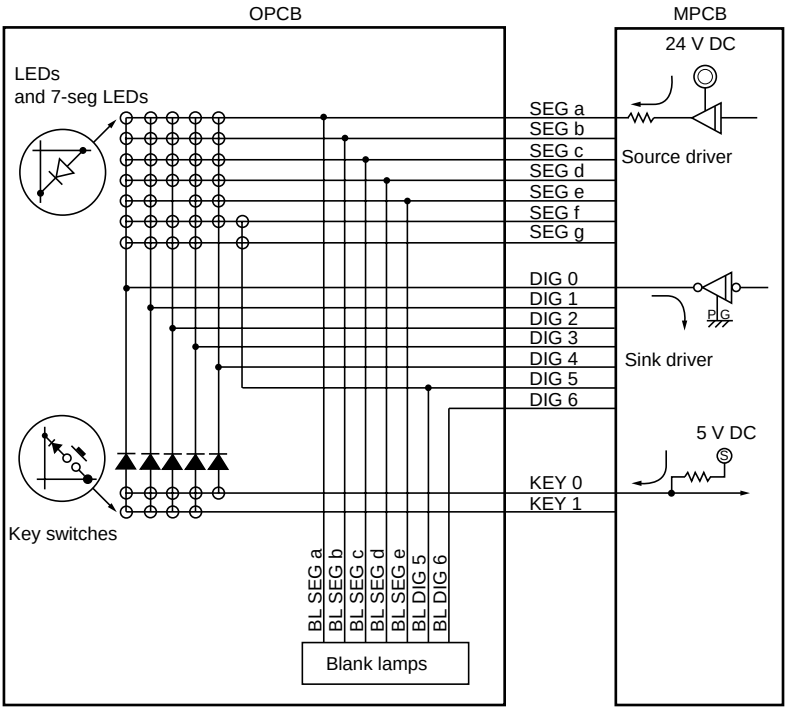


Figure 2-3-4 Operation unit PCB block diagram

The operation unit PCB (OPCB) consists of LEDs, 7-segment LEDs and key switches arranged in matrix.
To light an LED or 7-segment LED, the main PCB (MPCB) turns on one of the source drivers for lines SEG a to SEG g to allow current to the line on which the LED or 7-segment LED to be lit is present. Scan signals which go low in sequence are constantly output to the sink drivers for lines DIG 0 to DIG 5, so current flows through the LED for which the two signals are low simultaneously.
The status of key switches is detected by return signals KEY 0 and KEY 1. When none of the keys on the operation panel is pressed, each line of return signals KEY 0 and KEY 1 is pulled high to 5 V DC by the main PCB (MPCB). The main PCB (MPCB) outputs scan signals that go low in sequence to the sink drivers for lines DIG 0 to DIG 4, so when a key is pressed, the key switch conducts and the return signal goes low due to the scan signal. The main PCB (MPCB) identifies the specific key by the location of the point where the line emitting the scan signal and the line with the low return signal meet.
The operation unit PCB (OPCB) also controls the blank lamps which are 28 LEDs. To light the blank lamps, the main PCB (MPCB) turns on the source drivers for lines BL SEG a to BL SEG e to allow current to the lines on which the blank lamps to be lit are

present. Scan signals which go low in sequence are constantly output to the sink drivers for lines BL DIG 5 and BL DIG 6, so current flows through the LEDs for which the both signals are low simultaneously.

III

SET UP AND ADJUSTMENT SECTION

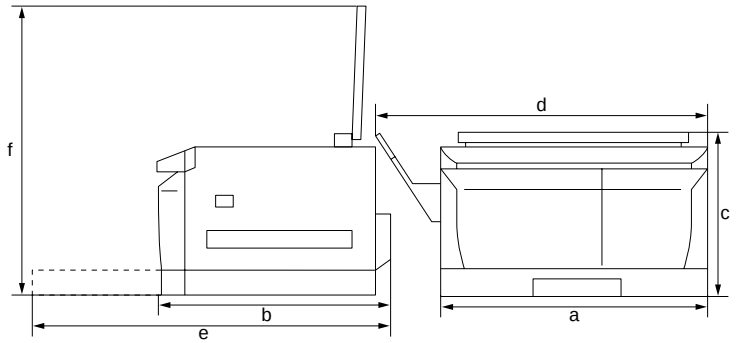
3-1 Installation

3-1-1 Unpacking and installation 3-1-1
(1) Installation environment 3-1-1
(2) Installation procedure 3-1-2
3-1-2 Setting initial copy modes 3-1-10
3-1-3 Installing the dehumidifier heater (optional, 120 V specifications only) 3-1-11
3-1-4 Installing the flicker resistor (optional, 240 V/50 Hz specifications only) 3-1-13

3-1-1 Unpacking and installation

(1) Installation environment

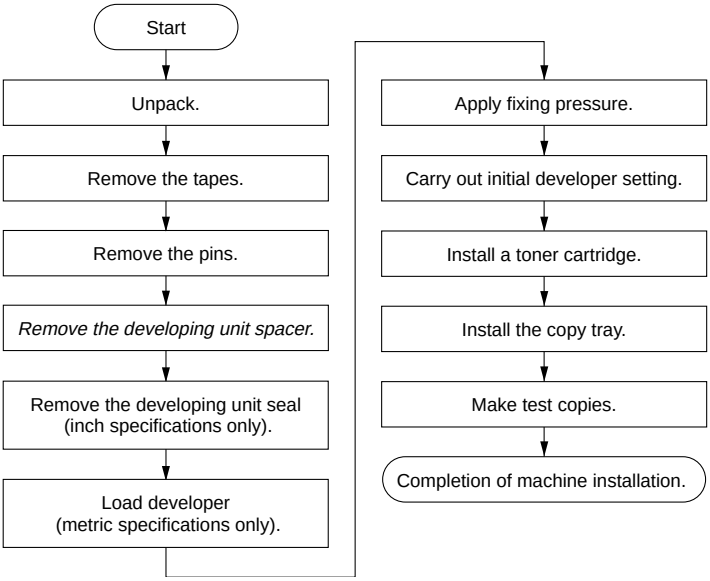
1. Temperature and humidity: 10°C/50°F to 35°C/95°F, 15 - 85% RH
2. Power supply: 120 V AC, 12 A, 220 - 240 V AC, 8 A
3. Power source frequency: 50/60 Hz ± 0.3%
4. Installation location
   - Avoid direct sunlight or bright lighting. Make sure that the photoconductor will not be exposed to direct sunlight or other strong light when removing paper jams.
   - Avoid extremes of temperature and humidity, abrupt ambient temperature changes, and hot or cold air directly hitting the machine.
   - Avoid dust and vibration.
   - Choose a surface capable of supporting the weight of the machine.
   - Place the machine on a level surface (maximum allowable inclination: 1°).
   - Avoid airborne substances that may adversely affect the machine or degrade the photoconductor, such as mercury, acidic and alkaline vapors, inorganic gases, NOx, SOx gases and chlorine-based organic solvents.
   - Select a room with good ventilation.
5. Allow sufficient access for proper operation and maintenance of the machine.
   Machine front: 1000 mm/39 3/8" Machine rear: 100 mm/3 15/16"
   Machine right: 100 mm/3 15/16" Machine left: 300 mm/11 13/16"



a: 515 mm/20 1/4" c: 320 mm/12 5/8" e: 780 mm/30 11/16"
b: 465 mm/18 5/16" d: 775 mm/30 1/2" f: 660 mm/26"

Figure 3-1-1 Installation dimensions

(2) Installation procedure



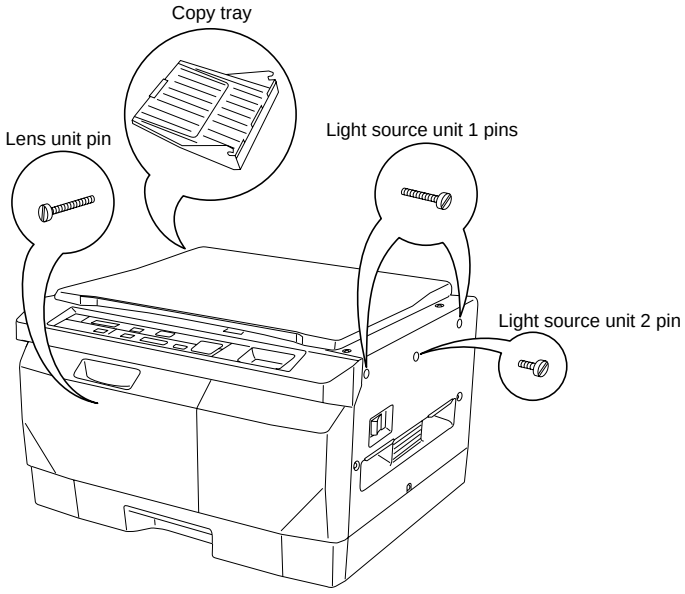


Figure 3-1-2

Unpack.

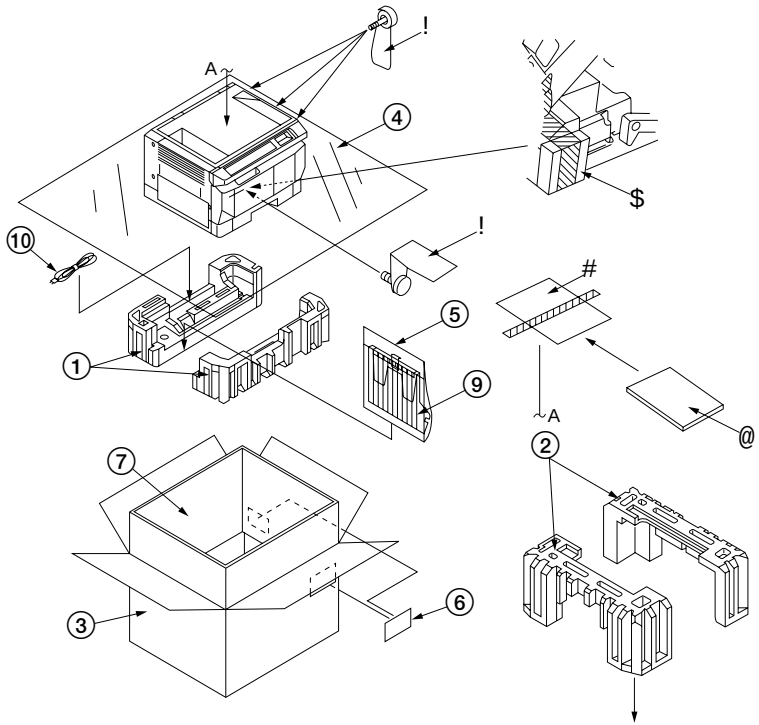


Figure 3-1-3 Unpacking

①	Bottom pads	⑧	Copier
②	Top pads	⑨	Copy tray
③	Outer case	⑩	Power cord
④	Plastic sheet	!	*Tag*
⑤	Plastic bag	@	*Instruction handbook*
⑥	Bar code labels	#	*Plastic bag*
⑦	Inner frame	$	*Developing unit spacer*

Remove the tapes.

1. Remove the tapes holding the original holder.

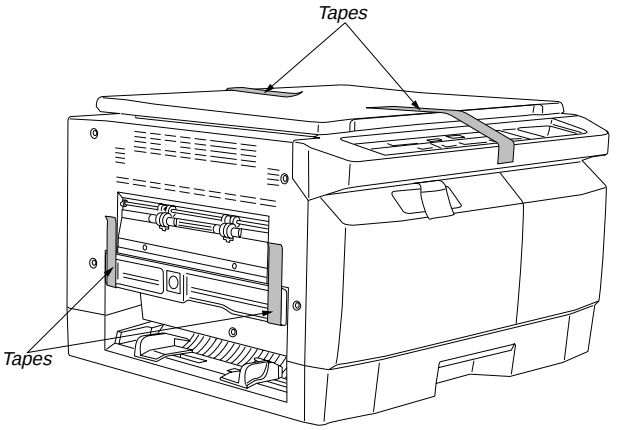


Figure 3-1-4

Remove the pins.

1. Remove the tapes holding the two light source unit 1 pins and one light source unit 2 pin on the machine right, and remove these pins.

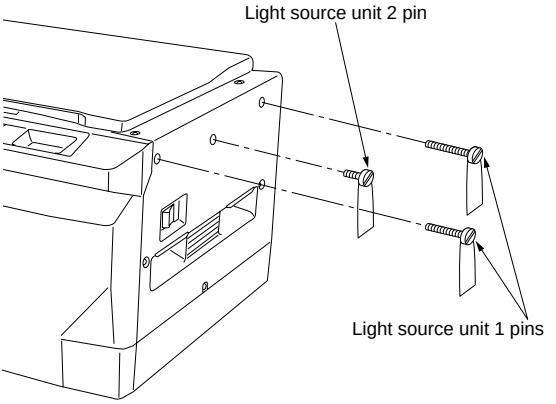


Figure 3-1-5

2. Open the front cover, and remove the tape holding the lens unit pin and then the pin.

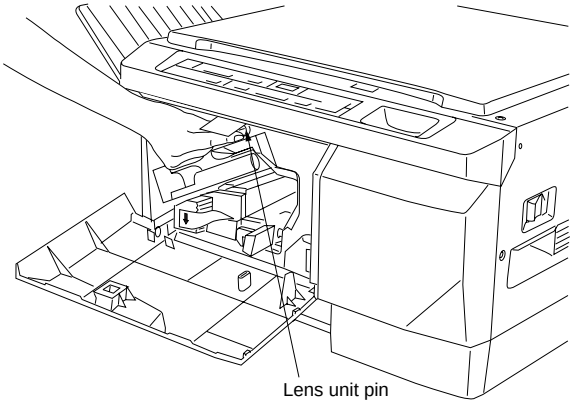


Figure 3-1-6

Remove the developing unit spacer.

1. Remove the tape and the developing unit spacer from the developing unit.

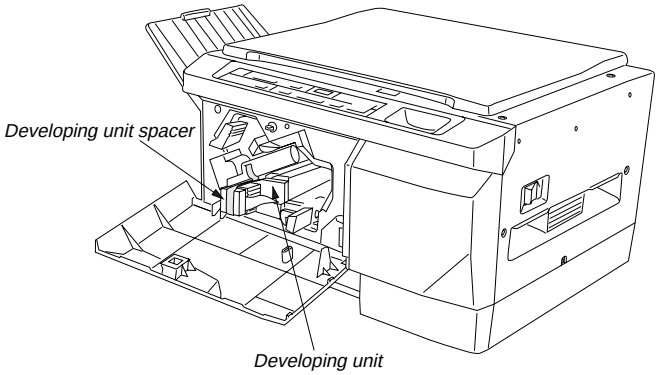


Figure 3-1-6-1

Remove the developing unit seal (inch specifications only).

1. While holding the developing unit, peel off the developing unit seal.

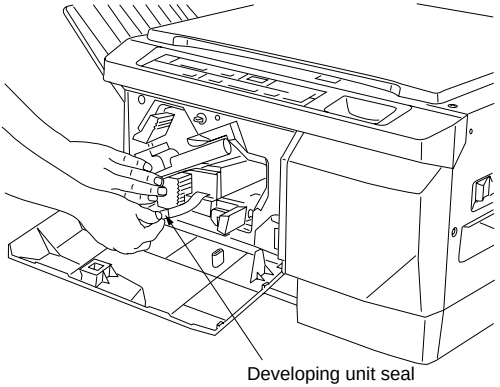


Figure 3-1-7

This page is intentionally left blank.

Load developer (metric specifications only).

1. Unlock the developing unit release lever and take out the developing unit.
   Important: Place the developing unit on a level surface.

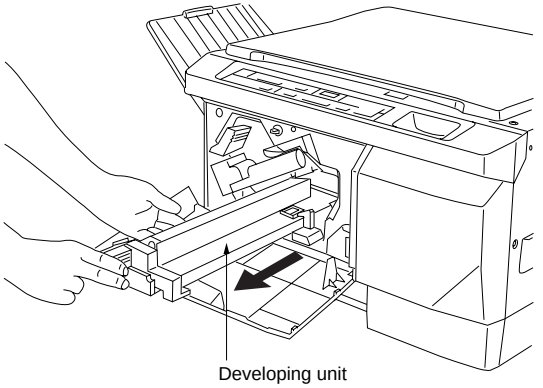


Figure 3-1-8

2. Remove the developing unit cover from the developing unit by pulling it in the direction of the arrow (four screws).

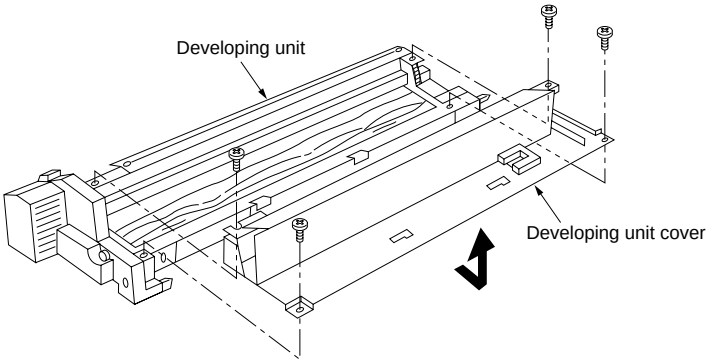


Figure 3-1-9

3. Shake the developer bottle well.
4. While turning the gear in the direction of the arrow, pour developer into the developing unit so that it covers the entire developing roller uniformly.

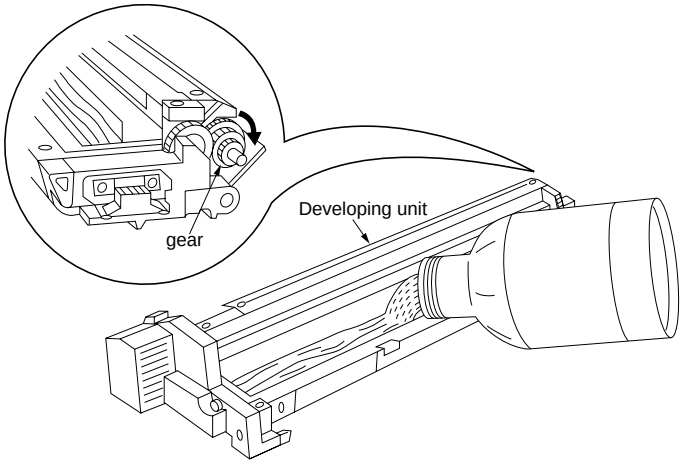


Figure 3-1-10

5. Refit the developing unit cover.
6. Reinsert the developing unit into the copier and lock the developing unit release lever.

Apply fixing pressure.

1. Press the release unit button to open the unit.

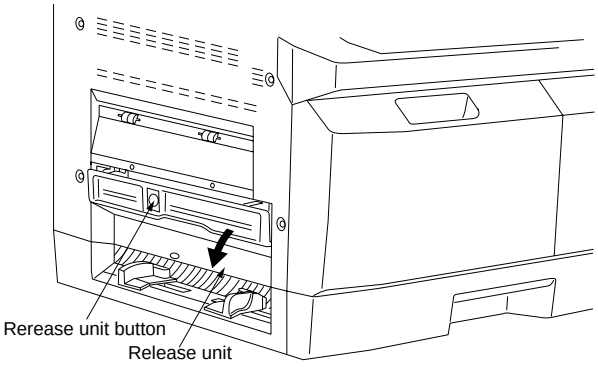


Figure 3-1-11

2. Close the release unit. The fixing pressure is applied.
3. Close the front cover.

Carry out initial developer setting.

• Inch specifications

1. Plug the power cord into the copier and the wall outlet.
2. Turn the main switch on. The copier starts its drive and automatically carries out initial developer setting. It takes about 2 minutes.
3. *Turn the main switch off and back on while pressing the print and stop/clear keys.*
4. *Press the stop/clear key to enter simulation mode within 2 s after " Ξ " has been displayed on the copy quantity/magnification display.*

• Metric specifications

1. Plug the power cord into the copier and the wall outlet.
2. While pressing the print key and the stop/clear key at the same time, turn the main switch on.
3. Within 2 s after the copy quantity/magnification display shows " Ξ ", press the stop/clear key to enter simulation mode.
4. Enter 60 with the quantity/zoom-up or -down key and press the print key.
5. Press the print key. After about 2 minutes, the toner control voltage is automatically set and the value is indicated as shown below: the integer is indicated by the fixed magnification indicators or auto exposure indicator, and decimals are shown on the copy quantity/magnification display (See page 3-2-2).
   Example

   If the value is 2.35 V

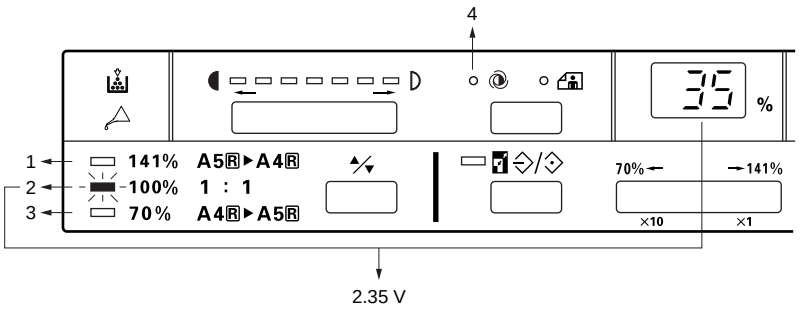


Figure 3-1-12

6. Press the stop/clear key.

Setting the destination.

1. *Enter 93 with the quantity/zoom-up or -down keys and press the print key.*
2. *Change the setting with the quantity/zoom-up or down keys.*

Setting	*Contents*
0	*Metric, excluding Spain, Belgium, Peru, Australia and New Zealand*
1	*Inch, excluding the Philippines*
2	*Spain*
3	*Belgium*
4	*Peru, Australia and New Zealand*
5	*The Philippines*

3. *Press the print key. The new setting is stored.*
4. *Press the stop/clear key.*
5. *Enter 01 with the quantity/zoom-up or -down keys and press the print key. The simulation mode is exited.*

This page is intentionally left blank.

Install a toner cartridge.

1. Open the front cover.
2. Shake the new toner cartridge well and insert it into the copier.

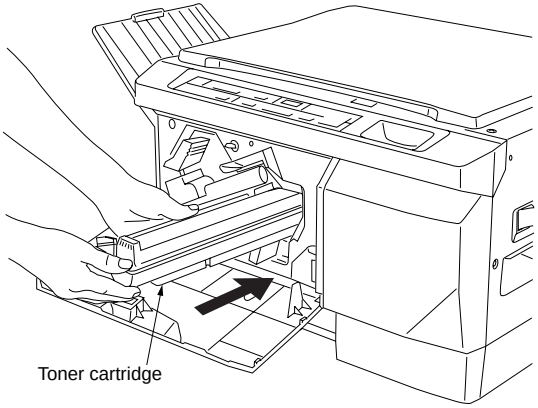


Figure 3-1-13

3. Close the front cover.

Install the copy tray.

1. Install the copy tray to the eject section of the copier.

Make test copies.

1. Place paper in the paper drawer and make test copies.

Completion of machine installation.

3-1-2 Setting initial copy modes

Factory settings are as follows:

Sim. No.	Contents	Factory setting
85	Selecting between auto preheat on/off	On
89	*Setting the presence of the flicker resistor*	*Not installed*
91	Setting operation under the toner empty condition	20 copies
92	Selecting between auto start on/off	On
93	Setting the destination	Metric
96	Setting the memory switch	7 steps
98	Setting the maintenance method	User
99	Selecting between E2000-compliant function on/off	No

3-1-3 Installing the dehumidifier heater (optional, 120 V specifications only)

• Required parts
Dehumidifier heater (P/N 36727460)
Heater primary wire (P/N 19560010)
Binding taptight screw, M3 × 6 (P/N B3023060)

Procedure
1. Remove the right and rear covers.
2. Unplug all the connectors on the power source PCB and remove the PCB from the copier (two screws).

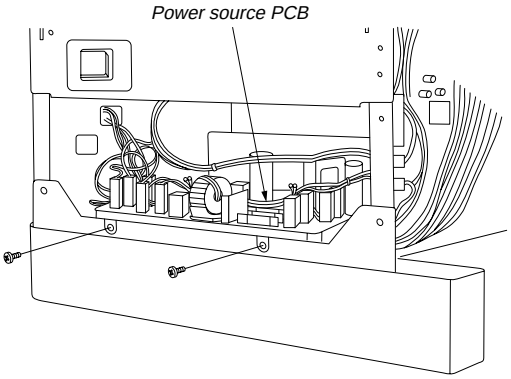


Figure 3-1-14

3. Fit the dehumidifier heater to the copier with the two M3 × 6 binding taptight screws.

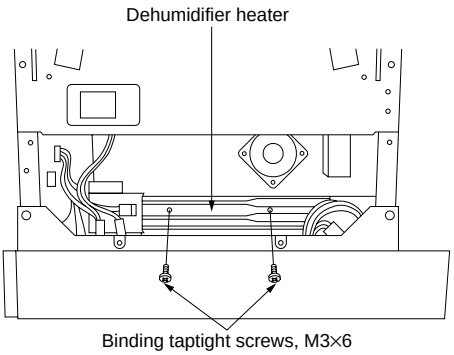


Figure 3-1-15

4. Remove the copier primary wire from the AVR PCB and connect the heater primary wire in place of it.

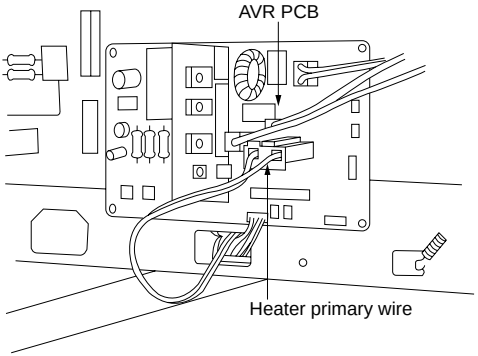


Figure 3-1-16

5. Plug the 2-pin connector of the heater primary wire into the dehumidifier heater.

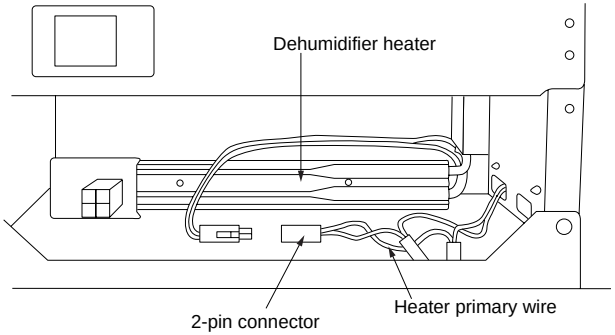


Figure 3-1-17

6. Refit all the removed parts.

3-1-4 Installing the flicker resistor (optional, 240 V/50 Hz specifications only)

• Required parts
Resistor wire (P/N 19527230)
Resistor, 10Ω 40 W (P/N 36727600)
Resistor, 10Ω 40 W 157 (P/N 36727610)
Wire saddle, WS-2NS (P/N M2109010)
Binding S tight screw, M4 × 6 (P/N B3024060)

Procedure

1. *Remove the right and rear covers.*
2. *Unplug all the connectors on the power source PCB and remove the power source PCB from the copier (two screws).*

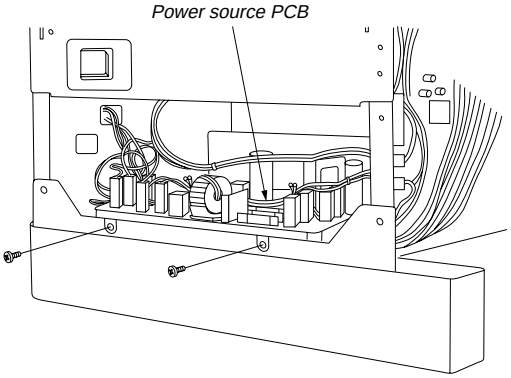


Figure 3-1-18

3. *Connect the resistor wire to the 10Ω 40 W resistor and 10Ω 40 W 157 resistor.*

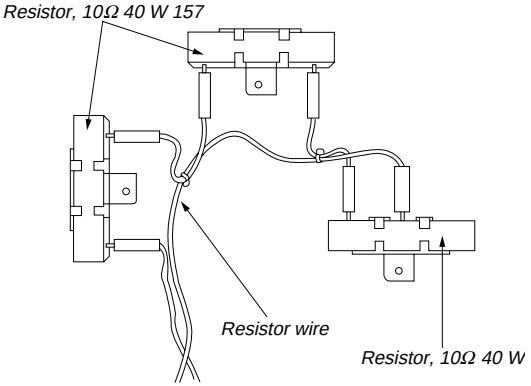


Figure 3-1-19

4. *Attach the 10Ω 40 W and 10Ω 40 W 157 resistors to the copier with one M4 × 6 binding S tight screw each.*
5. *Attach the wire saddle WS-2NS to the copier and pass the resistor wire through it.*

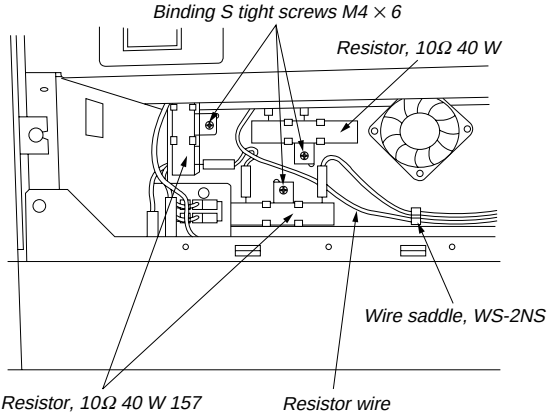


Figure 3-1-20

6. *Pass the resistor wire through the cutout in the copier and connect the 4-pin connector to CN3 on the AVR PCB.*

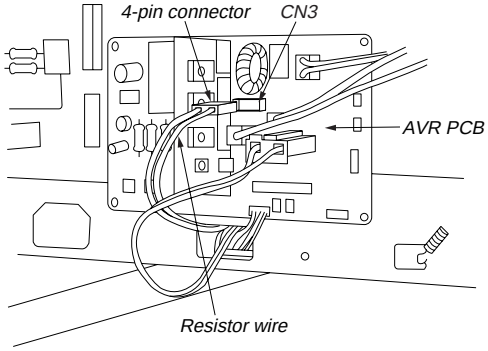


Figure 3-1-21

7. *Refit the removed parts.*
8. *Turn the main switch on and change the setting of simulation 89 to 1 (installed).*

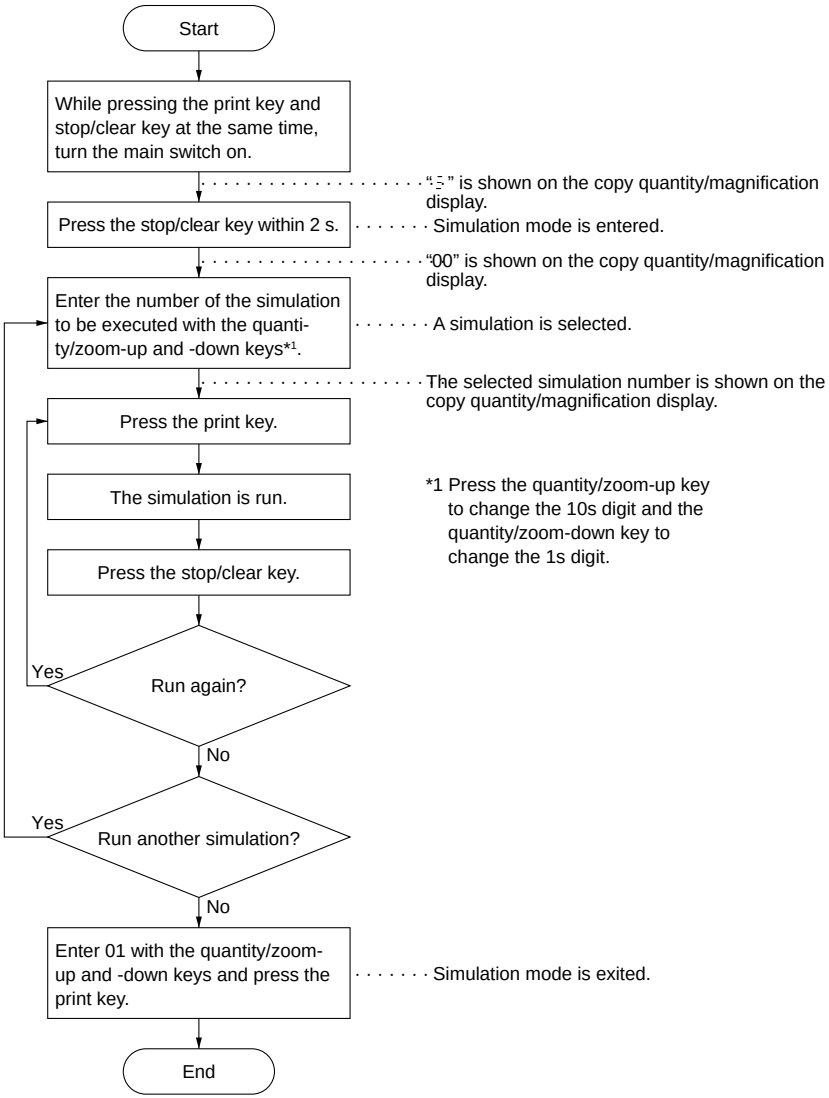
3-2 Simulation

3-2-1 Simulations 3-2-1
(1) Running a simulation 3-2-1
(2) Simulation list 3-2-4
(3) Contents of simulations 3-2-5

3-2-1 Simulations

The copier is equipped with a simulation function which can be used to check and adjust the operation of copier components.

(1) Running a simulation



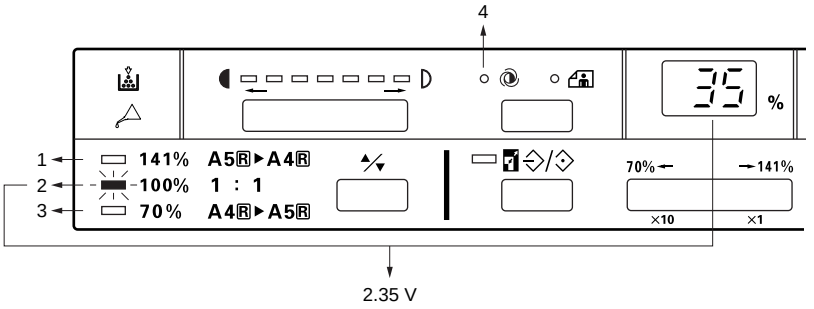
• Indication of the set values

When a set value includes decimals, it is indicated as shown below: the integer is shown by the fixed magnification indicators or auto exposure indicator, and decimals are shown on the copy quantity/magnification display.

Example

If the value is 2.35 V

Metric



Inch

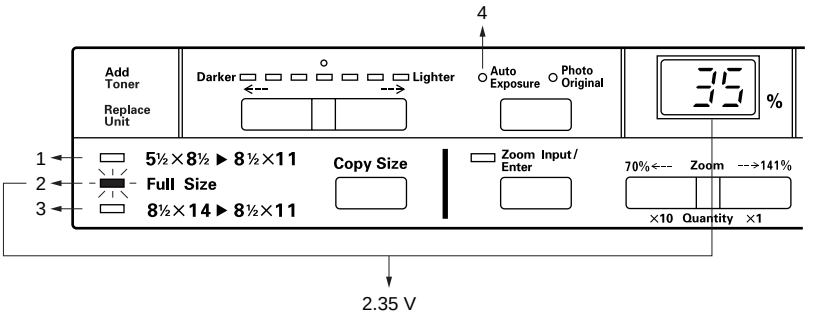
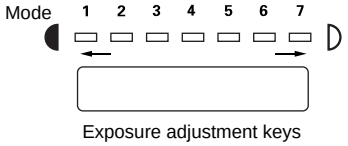


Figure 3-2-1

• **Indication of the selected mode**
In a simulation with multiple modes, one of the exposure indicators lights to show the selected mode. Use the exposure adjustment keys to change the modes.

Metric



Inch

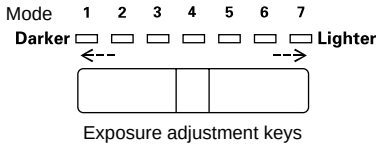


Figure 3-2-2

(2) Simulation list

Section	Sim. No.	Simulation contents	Default
All	01	Exiting simulation mode	——
	02	Copying without paper	——
	08	Setting shipping defaults	——
Paper feed/ conveying	10	Turning the drive motor on	——
	11	Checking switch operation	——
	54	Adjusting the leading edge margin	——
	57	Adjusting the trailing edge blank cut timing	——
	58	Adjusting the leading edge registration timing	——
	59	Adjusting the trailing edge margin	——
Optical	20	Turning the halogen lamp on	——
	24	Setting the exposure amount	——
	25	Adjusting lateral magnification	——
	26	Adjusting longitudinal magnification	——
	27	Making fine adjustment to image focus	——
	28	Adjusting the auto exposure	——
	29	Adjusting exposure amount for enlargement/ reduction mode	——
Charging	*33*	*Setting the drum potential*	——
Cleaning	42	Making a blank lamp test copy	——
Fixing	47	Setting the fixing temperature	——
Operation panel	50	Lighting all the LEDs on the operation panel	——
Developing	60	Initializing the toner control level	——
	62	Checking/setting the toner control voltage	——
	67	Checking ambient temperature and humidity	——
Memory initialize	70	Initializing the backup memory	——
Counts	71	Checking/setting the maintenance cycle	30000
	73	Checking/clearing the maintenance count	Cleared

Section	Sim. No.	Simulation contents	Default
Copy modes	85	Selecting between auto preheat on/off	On
	89	*Setting the presence of the flicker resistor*	*Not installed*
	91	Setting operation under the toner empty condition	20 copies
	92	Selecting between auto start on/off	On
	93	Setting the destination	Metric
	96	Setting the memory switch	7 steps
	98	Setting the maintenance method	User
	99	Selecting between E2000-compliant function on/off	No

This page is intentionally left blank.

(3) Contents of simulations

Sim. No.	Description
01	**Exiting simulation mode** **Description** Exits simulation mode and returns to normal mode. **Purpose** Used when ending simulation mode. **Method** Press the print key. The copier returns to normal mode.
02	**Copying without paper** **Description** Makes copies without feeding paper. **Purpose** To check general machine operation. **Method** 1. Put a plain white A4 original in place. 2. Open the drawer. 3. Select copy modes and press the print key to start copying. The copier operates according to the selected modes. **Completion** Press the stop/clear key. Copying operation stops.
08	**Setting shipping defaults** **Description** Moves the scanner to the shipping position. **Purpose** To be run before moving the machine. **Method** Press the print key. **Important:** Since this simulation clears the maintenance count, run simulation 73 and check it beforehand. **Completion** Press the stop/clear key.

<table>
<tr><th>Sim. No.</th><th>Description</th></tr>
<tr><td>10</td><td>
Turning the drive motor on

Description
Operates the drive motor.

Purpose
To check the drive system operation.

Method
Press the print key. The drive motor, cleaning lamp and developing bias are turned on, and the fixing unit fan motor rotates at full speed.

Completion
Press the stop/clear key. The fixing unit fan motor slows to half speed and the other components are turned off.
</td></tr>
<tr><td>11</td><td>
Checking switch operation

Description
Shows the status of the registration and eject switches.

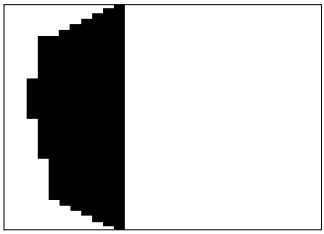
Purpose
To check if the registration and eject switches are defective.

Method
Turn each switch on and off manually. The copy quantity/magnification display shows the status of the switch.

<table>
<tr><td></td><td>On</td><td>Off</td></tr>
<tr><td>Registration switch</td><td>01</td><td>00</td></tr>
<tr><td>Eject switch</td><td>10</td><td>00</td></tr>
</table>

Completion
Press the stop/clear key.
</td></tr>
</table>

Sim. No.	Description
20	**Turning the halogen lamp on** **Description** Lights the halogen lamp. **Purpose** To check the halogen lamp operation. **Method** 1. Select an exposure level with the exposure adjustment keys. 2. Press the print key. The halogen lamp lights at the selected intensity for 15 s. **Completion** Press the stop/clear key. The halogen lamp is turned off.
24	**Setting the exposure amount** **Adjustment** See page 3-3-37.
25	**Adjusting lateral magnification** **Adjustment** See page 3-3-45.
26	**Adjusting longitudinal magnification** **Adjustment** See page 3-3-49.
27	**Making fine adjustment to image focus** **Adjustment** See page 3-3-32.
28	**Adjusting the auto exposure** **Adjustment** See page 3-3-41.
29	**Adjusting exposure amount for enlargement/reduction mode** **Adjustment** See page 3-3-42.

Sim. No.	Description
33	***Setting the drum potential*** ***Description*** *Sets the drum potential.* ***Purpose*** *To be run when adjusting the developing bias.* ***Method*** *Press the print key. The drum potential setting starts.* ***Completion*** *Press the stop/clear key.*
42	**Making a blank lamp test copy** **Description** Lights the blank lamps. **Purpose** To check blank lamp operation. **Method** 1. Load a sheet of the maximum size. 2. Open the original holder. 3. Press the zoom input/enter key. Test copy mode is entered. 4. Press the print key. The blank lamps light in a preset order and the pattern shown below is printed to check operation.  **Figure 3-2-3** **Completion** Press the stop/clear key.

<table>
<tr><th>Sim. No.</th><th>Description</th></tr>
<tr><td>47</td><td>
Setting the fixing temperature

Description
Changes the fixing heater control value to adjust the fixing temperature.

Purpose
To be run when a fixing problem occurs.

Setting
1. Select the mode to be set with the exposure adjustment keys. The current setting for that mode is indicated by the combination of lighting of one of the fixed magnification indicators or the auto exposure indicator and the figures on the copy quantity/magnification display.
<table>
<tr><th>Mode</th><th>Contents</th><th>Setting range</th><th>Initial value</th></tr>
<tr><td>1</td><td>Standby</td><td>1.70 to 4.45 V</td><td>3.98 V (175°C)</td></tr>
<tr><td>2</td><td>Fixing (secondary) stabilization</td><td>3.41 to 4.45 V</td><td>4.15 V (185°C)</td></tr>
<tr><td>3</td><td>During copying</td><td>3.41 to 4.45 V</td><td>4.15 V (185°C)</td></tr>
<tr><td>4</td><td>During ejection</td><td>3.41 to 4.45 V</td><td>4.21 V (189°C)</td></tr>
<tr><td>5</td><td>Fixing drive start</td><td>0.39 to 4.45 V</td><td>1.05 V (80°C)</td></tr>
</table>
2. Change the setting with the quantity/zoom-up and -down keys. Changing the value by one changes the temperature by 0.6°C when the fixing temperature is 180°C and 0.3°C when it is 80°C.
3. Press the print key. The new setting is stored.

Completion
Press the stop/clear key.
</td></tr>
<tr><td>50</td><td>
Lighting all the LEDs on the operation panel

Description
Lights all the LEDs on the operation panel.

Purpose
To check the operation of the LEDs on the operation panel.

Method
Press the print key. All the LEDs on the operation panel light.

Completion
Press the stop/clear key. The LEDs turn off.
</td></tr>
</table>

Sim. No.	Description
54	**Adjusting the leading edge margin** **Adjustment** See page 3-3-7.
57	**Adjusting the trailing edge blank cut timing** **Adjustment** See page 3-3-9.
58	**Adjusting the leading edge registration timing** **Adjustment** See page 3-3-5.
59	**Adjusting the trailing edge margin** **Adjustment** See page 3-3-11.
60	**Initializing the toner control level (metric specifications only)** **Description** Sets the toner control voltage automatically. **Purpose** To be run during machine setup or after replacing developer or the developing unit. **Method** Press the print key. The drive motor turns on and aging is carried out for about 2 minutes. The toner control voltage is automatically set and the value is indicated by the combination of lighting of one of the fixed magnification indicators or the auto exposure indicator and the figures on the copy quantity/magnification display. **Completion** Press the stop/clear key.

Sim. No.	Description
62	**Checking/setting the toner control voltage** **Description** Checks the initial toner control voltage automatically set by simulation 60, or sets the toner control voltage. **Purpose** To be run after replacing the main PCB. **Method** Press the print key. The current setting is indicated by the combination of lighting of one of the fixed magnification indicators or the auto exposure indicator and the figures on the copy quantity/magnification display. **Setting** 1. Change the value with the quantity/zoom-up and -down keys. Setting range: 0.00 to 5.00 V Reference: 3.00 V 2. Press the print key. The drive motor turns on and the new toner control voltage is indicated by the combination of lighting of one of the fixed magnification indicators or the auto exposure indicator and the figures on the copy quantity/magnification display. **Completion** Press the stop/clear key.
67	**Checking ambient temperature and humidity** **Description** Displays ambient temperature and humidity. **Purpose** To check if the humidity sensor has a problem. **Method** 1. Press the print key. 2. Select the mode to be checked with the exposure adjustment keys. Mode 1: temperature Mode 2: relative humidity Mode 3: absolute humidity **Completion** Press the stop/clear key.

Sim. No.	Description
70	**Initializing the backup memory** **Description** Initializes the contents of the backup memory. **Purpose** To be run after replacing the main PCB. **Method** *1. Press the print key.* *2.* Press the exposure mode key. The following data in memory is initialized.

Sim No.	Contents	Initial data
24	Exposure amount	
	Manual Exp. 4	62
	Manual Exp. 1	–18
	Manual Exp. +2	30
25	Lateral magnification (lens travel distance)	
	100% copy	0
	Enlargement copy	0
	Reduction copy	0
26	Longitudinal magnification	13
27	Fine adjustment of image focus	
	Lens home position for enlargement copy	0
	Lens home position for reduction copy	0
	Mirror home position for enlargement copy	0
	Mirror home position for reduction copy	0
	Lens home position for 100% copy	32
	Mirror home position for 100% copy	32
28	Auto exposure	
	Prescan exposure amount	80
	NTC level	3.50 V
	NPTC level	2.00 V
29	Enlargement/reduction-mode exposure amount	
	Enlargement copy	0
	Reduction copy	1
47	Fixing temperature	
	Standby	3.90 V
	Fixing (secondary) stabilization	4.05 V
	During copying	4.05 V
	During ejection	4.21 V
	Fixing drive start	1.05 V
54	Leading edge margin	
	100% copy	131
	Enlargement copy	140
	Reduction copy	127
57	Trailing edge blank cut timing	84

Sim. No.	Description
70 (cont.)	

Sim No.	Contents	Initial data
58	Leading edge registration timing	
	100% copy	108
	Enlargement copy	121
	Reduction copy	91
59	Trailing edge margin	95
62	Toner control voltage	3.00 V
71	Maintenance cycle	30000
73	Maintenance count	Cleared
85	Auto preheat	On
89	*Setting the presence of the flicker resistor*	*Not installed*
91	Operation under toner empty condition	20 copies
92	Auto start	On
93	Destination	Metric
96	Memory switch setting	7 steps
98	Maintenance method	User
99	E2000-compliant function	No

Completion

Press the stop/clear key. After running simulation 70, run the above simulations and reenter the settings recorded on the simulation label.

Sim. No.	Description
71	**Checking/setting the maintenance cycle** **Description** Checks/sets the maintenance cycle. **Purpose** To be run after replacing the main PCB. **Method** Press the print key. The current setting is shown on the copy quantity/ magnification display. Mode 1: 100,000s and 10,000s digits Mode 2: 1,000s and 100s digits Mode 3: 10s and 1s digits **Setting** 1. Select the mode to be set with the exposure adjustment keys. 2. Change the setting with the quantity/zoom-up and -down keys. Setting range: 0 to 999999 Reference: 30000 3. Press the print key. The new setting is stored. **Completion** Press the stop/clear key.

Sim. No.	Description
73	**Checking/clearing the maintenance count** **Description** Checks/resets the maintenance count. **Purpose** To be run after replacing the drum and developing units, or before and after replacing the main PCB or running simulation 08 (Setting shipping defaults). **Method** Press the print key. The current count is shown on the copy quantity/ magnification display. Mode 1: 100,000s and 10,000s digits Mode 2: 1,000s and 100s digits Mode 3: 10s and 1s digits **Setting** 1. Select the mode to be set with the exposure adjustment keys. 2. Change the value with the quantity/zoom-up and -down keys. Setting range: 0 to 999999 Reference: 0 To clear the count, set every digit to 0. 3. Press the print key. The new setting is stored. **Completion** Press the stop/clear key.

Sim. No.	Description
85	**Selecting between auto preheat on/off** **Description** Turns the auto preheat function on/off. **Purpose** To be set according to user request. **Setting** 1. Change the setting with the quantity/zoom-up and -down keys. 0: Auto preheat function off 1: Auto preheat function on 2. Press the print key. The new setting is stored. **Completion** Press the stop/clear key.
89	***Setting the presence of the flicker resistor (240 V/50 Hz specifications only)*** ***Description*** *Sets the presence of the flicker resistor.* ***Method*** *To be run after the installation of the optional flicker resistor.* ***Setting*** *1. Change the setting with the quantity/zoom-up or -down keys.* *0: Flicker resistor not installed* *1: Flicker resistor installed* *Reference: 0* *2. Press the print key. The new setting is stored.* ***Completion*** *Press the stop/clear key.*

Sim. No.	Description
91	**Setting operation under the toner empty condition** **Description** Sets the maximum number of copies that can be made under the toner empty condition. **Purpose** To be set according to user request. **Setting** 1. Change the setting with the quantity/zoom-up and -down keys. Setting range: 0 to 199 Reference: 20 2. Press the print key. The new setting is stored. **Completion** Press the stop/clear key.

This page is intentionally left blank.

<table>
<tr><th>Sim. No.</th><th>Description</th></tr>
<tr><td>92</td><td>
Selecting between auto start on/off

Description
Turns the auto start function on/off.

Purpose
To be set according to user request.

Setting
1. Change the setting with the quantity/zoom-up and -down keys.
0: Auto start function off
1: Auto start function on
2. Press the print key. The new setting is stored.

Completion
Press the stop/clear key.
</td></tr>
<tr><td>93</td><td>
Setting the destination

Description
Sets the destination of the machine.

Purpose
To be run after replacing the main PCB or machine installation.

Setting
1. Change the setting with the quantity/zoom-up and -down keys.

<table>
<tr><th>Setting</th><th>Contents</th></tr>
<tr><td>0</td><td>Metric, excluding Spain, Belgium, Peru, Australia and New Zealand</td></tr>
<tr><td>1</td><td>Inch, excluding the Philippines</td></tr>
<tr><td>2</td><td>Spain</td></tr>
<tr><td>3</td><td>Belgium</td></tr>
<tr><td>4</td><td>Peru, Australia and New Zealand</td></tr>
<tr><td>5</td><td>The Philippines</td></tr>
</table>
2. Press the print key. The new setting is stored.

Completion
Press the stop/clear key.
</td></tr>
</table>

Sim. No.	Description
96	***Setting the memory switch*** ***Description*** *Sets the number of exposure steps for manual mode and the copy limit.* ***Purpose*** *To change the number of exposure steps for manual mode or the copy limit. The limit can be set to any number between 1 and 99.* ***Setting*** *1. Select the mode with the exposure adjustment keys.* *Mode 1: Setting the number of exposure steps for manual mode* *Mode 2: Setting the copy limit* *2. Change the setting with the quantity/zoom-up and -down keys.* *• Mode 1* *0: 7 steps* *1: 13 steps* *Initial value: 0* *• Mode 2* *Setting range: 1 - 99* *Initial value: 99* *The setting in mode 2 indicates the limit to the number of copies that can be set on the operation panel. The operation of the quantity/zoom-up key (10s digit) and quantity/zoom-down key (1s digit) is restricted as in the following examples.* *• When the setting (the copy limit) is 1*

	Copy quantity display
1s digit	*1*
10s digit	*none (not available)*

<table>
<tr><th>Sim. No.</th><th>Description</th></tr>
<tr><td>96 (cont.)</td><td>

• When the setting (the copy limit) is 5

	Copy quantity display
1s digit	*1 → 2 → 3 → 4 → 5*
10s digit	*none (not available)*

• When the setting (the copy limit) is 10

	Copy quantity display
1s digit	*1 → 2 → 3 → 4 → 5 → 6 → 7 → 8 → 9* *0 is displayed only when the 10s digit is 1.*
10s digit	*none → 1* *1 can be selected only when the 1s digit is 1.*

• When the setting (the copy limit) is 25

	Copy quantity display
1s digit	*1 → 2 → 3 → 4 → 5 → 6 → 7 → 8 → 9 → 0* *0 cannot be selected when there is no tens digit.* *When the 10s digit is 2, only numbers between 0 and 5 can be selected.*
10s digit	*none → 1 → 2* *2 can be selected only when the 1s digit is between 0 and 5.*

• When the setting (the copy limit) is 50

	Copy quantity display
1s digit	*1 → 2 → 3 → 4 → 5 → 6 → 7 → 8 → 9 → 0* *0 cannot be selected when there is no tens digit.*
10s digit	*none → 1 → 2 → 3 → 4 → 5* *5 can be selected only when the 1s digit is 0.*

</td></tr>
</table>

Sim. No.	Description
96 (cont.)	*• When the setting (the copy limit) is 99*

	Copy quantity display
1s digit	*→ 1 → 2 → 3 → 4 → 5 → 6 → 7 → 8 → 9 → 0 →* *0 cannot be selected when there is no tens digit.*
10s digit	*→ none → 1 → 2 → 3 → 4 → 5 → 6 → 7 → 8 → 9 →*

3. Press the print key. The new setting is stored.

Completion

Press the stop/clear key.

Sim. No.	Description
98	***Setting the maintenance method (available in Peru, Australia and New Zealand only)*** **Description** Sets whether the machine is to be serviced by the user or by service personnel. **Purpose** To be set according to user request. **Setting** 1. Change the setting with the quantity/zoom-up and -down keys. 0: User maintenance 1: Service maintenance 2. Press the print key. The new setting is stored. **Completion** Press the stop/clear key.

This page is intentionally left blank.

3-3 Assembly and Disassembly

3-3-1 Precautions for assembly and disassembly 3-3-1
(1) Precautions 3-3-1
3-3-2 Paper feed section 3-3-2
(1) Detaching and refitting paper feed pulleys A and B 3-3-2
(2) Replacing the feedshift films 3-3-4
(3) Adjustments after installing roller and clutches 3-3-5
(3-1) Adjusting leading edge registration timing 3-3-5
(3-2) Adjusting the leading edge margin 3-3-7
(3-3) Adjusting the trailing edge blank cut timing 3-3-9
(3-4) Adjusting the trailing edge margin 3-3-11
3-3-3 Main charging section 3-3-13
(1) Replacing the charger wire 3-3-13
3-3-4 Exposure section 3-3-16
(1) Detaching and refitting the halogen lamp 3-3-16
(2) Detaching and refitting the optical section thermostat 3-3-17
(3) Adjusting the positions of the light adjusters 3-3-18
(4) Detaching and refitting the scanner wires 3-3-19
(4-1) Detaching the scanner wires 3-3-19
(4-2) Installing the scanner wires 3-3-21
(5) Adjusting longitudinal image squareness (inclination of light source 2) 3-3-30
(6) Adjusting lateral image squareness (height of light source 2) 3-3-31
(7) Making fine adjustment to image focus 3-3-32
(7-1) Adjusting the mirror home position for 100% copying 3-3-33
(7-2) Adjusting the mirror home position for enlargement mode 3-3-35
(7-3) Adjusting the mirror home position for reduction mode 3-3-36
(8) Setting the exposure amount 3-3-37
(9) Adjusting the auto exposure 3-3-41
(10) Adjusting exposure amount for enlargement /reduction mode. 3-3-42
(10-1) Adjusting exposure amount for enlargement mode (141%) 3-3-43
(10-2) Adjusting exposure amount for reduction mode (70%) 3-3-44
(11) Adjusting lateral magnification (correcting the lens travel distance) 3-3-45
(11-1) Correcting the lens travel distance for 100% copying 3-3-46
(11-2) Correcting the lens travel distance for enlargement copying 3-3-47
(11-3) Correcting the lens travel distance for reduction copying 3-3-48
(12) Adjusting longitudinal magnification (scanning speed) 3-3-49

3-3-5 *Drum section (metric specification only)* 3-3-50
(1) Detaching and refitting the drum 3-3-50
(2) Cleaning the drum 3-3-52
3-3-6 *Developing section (metric specification only)* 3-3-53
(1) Replacing developer 3-3-53
(2) Adjusting the formation position of the magnetic brush (reference) *3-3-54-1*
(3) Adjusting developing bias voltage (reference) *3-3-54-2*
3-3-7 Transfer section 3-3-55
(1) Replacing the charger wires 3-3-55
3-3-8 *Cleaning section (metric specification only)* 3-3-59
(1) Replacing the cleaning blade 3-3-59
(2) Detaching and refitting the lower cleaning blade 3-3-61
3-3-9 Fixing section 3-3-62
(1) Detaching and refitting the fixing heater 3-3-62
(2) *Detaching and refitting the fixing unit thermistor* 3-3-65
(3) Detaching and refitting fixing thermostats 1 and 2 3-3-66
(4) Detaching and refitting the press roller 3-3-67
(5) Detaching and refitting the heat roller 3-3-69
(6) Detaching and refitting the heat roller separation claws 3-3-71
(7) Detaching and refitting the fixing blade *3-3-72*

3-3-1 Precautions for assembly and disassembly

(1) Precautions

- Be sure to turn the main switch off and disconnect the power plug before starting disassembly.
- When handling PCBs, do not touch connectors with bare hands or damage the board.
- Do not touch any PCB containing IC's with bare hands or any object prone to static charge.
- Use only the specified parts to replace the fixing unit or optical section thermostats. Never substitute simple wire or similar for thermostats since the copier may be seriously damaged. When installing a thermostat, ensure the correct clearance, if specified, using a thickness gauge.
- Use the following testers when measuring voltages:
  Hioki 3200
  Sanwa MD-180C
  Sanwa YX-360TR
  Beckman TECH300
  Beckman DM45
  Beckman 330 (capable of measuring RMS values)
  Beckman 3030 (capable of measuring RMS values)
  Beckman DM 850 (capable of measuring RMS values)
  Fluke 8060A (capable of measuring RMS values)
  Arlec DMM1050
  Arlec YF1030C
- Prepare the following as test originals:
  1. NTC (new test chart)
  2. NPTC (newspaper test chart)
  3. Blue graph paper

3-3-2 Paper feed section

(1) Detaching and refitting paper feed pulleys A and B
Clean or replace paper feed pulleys A or B as follows.

Procedure
1. Detach the drawer.
2. Detach the rear cover.
3. Release the lever of the paper feed clutch with a straight screwdriver in the direction of the arrow.

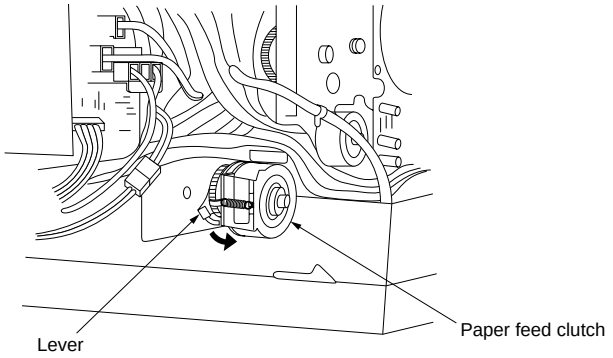


Figure 3-3-1

4. Turn the paper feed shaft to an angle of 180 degrees where paper feed pulleys A and B can be seen.

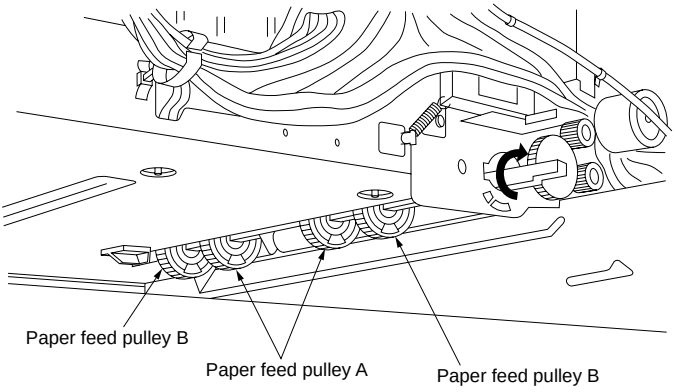


Figure 3-3-2

5. Remove the paper feed pulley unit: push it toward the machine rear and pull it out of the bushing toward the machine front.

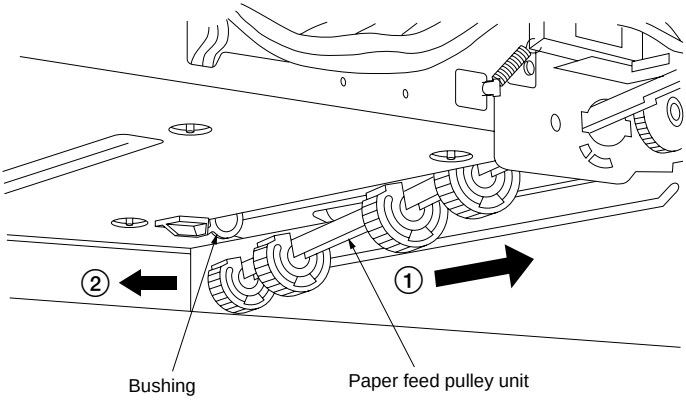


Figure 3-3-3

6. Remove each screw and then paper feed pulleys A and B from the paper feed pulley unit.

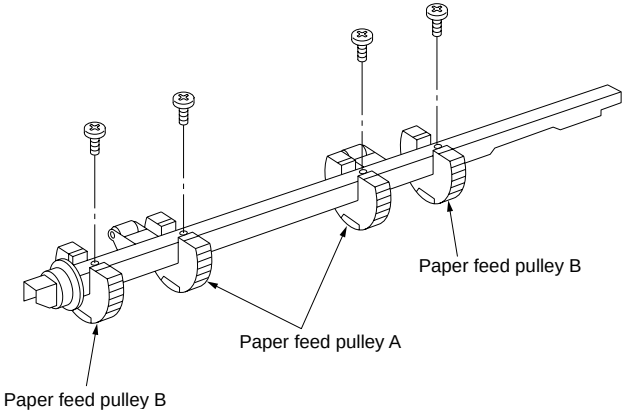


Figure 3-3-4

7. Clean or replace paper feed pulleys A and B. When installing a new pulley, be sure that the white film surfaces are facing the machine front.
8. Refit all the removed parts.

(2) Replacing the feedshift films

Replace the feedshift films as follows.

Procedure

1. Open the front cover and take the toner cartridge out of the copier.
2. Unlock the developing unit release lever and remove the developing unit and drum unit.
3. Remove the left, right, front left and front right covers.
4. Remove the E-ring holding the release unit shaft and detach the unit in the direction of the arrow in the figure.

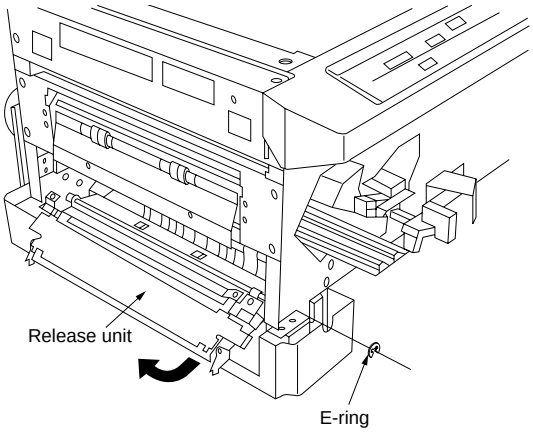


Figure 3-3-5

5. Replace the feedshift films by aligning their edges with the line ⓐ shown in the figure.

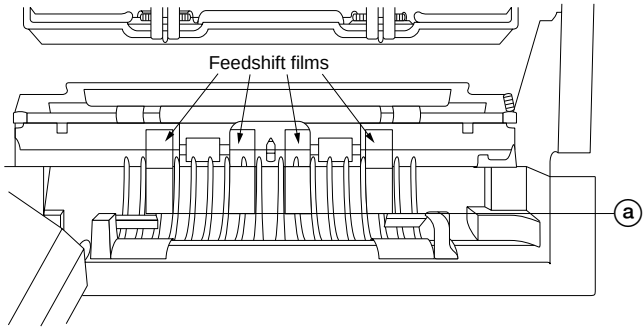
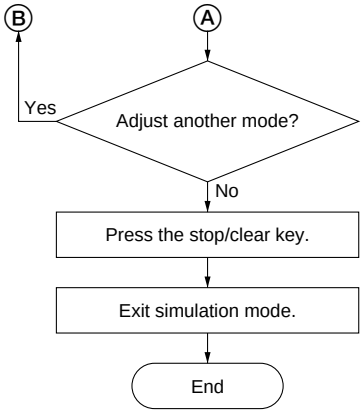


Figure 3-3-6

6. Refit all the removed parts.



Setting range: 89 to 249
Reference:
108 for 100% copy
121 for enlargement copy
91 for reduction copy
Change per step: 0.12 mm
Increasing the value makes the timing of the second paper feed earlier, and reducing it makes the timing later.

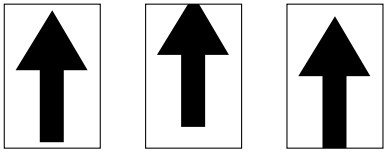
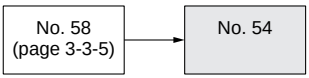


Figure 3-3-7

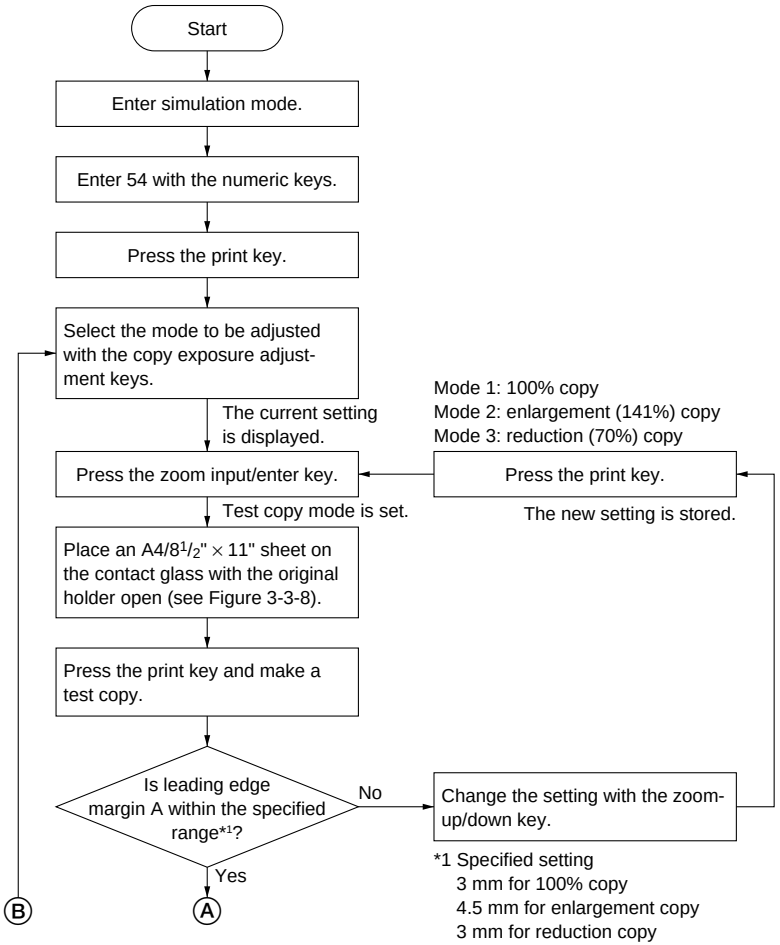
(3-2) Adjusting the leading edge margin

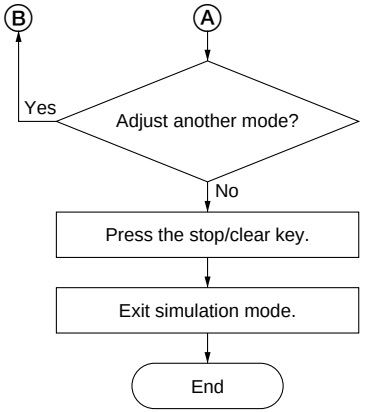
Adjust the leading edge margin as follows if it is not within the specified range.



Important: Before starting this adjustment, ensure the above simulations have been completed.

Procedure





Setting range: 25 to 167
References:
131 for 100% copy
140 for enlargement copy
127 for reduction copy
Change per step: 0.12 mm
Increasing the value makes the margin wider, and reducing it makes the margin narrower.

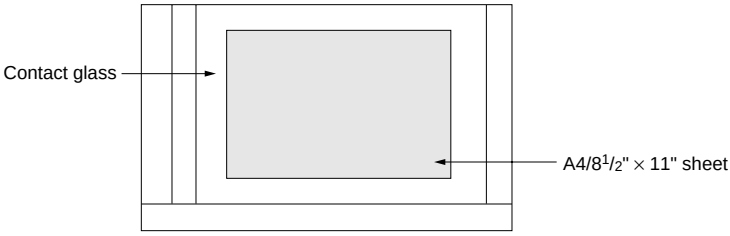
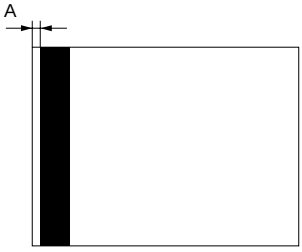


Figure 3-3-8

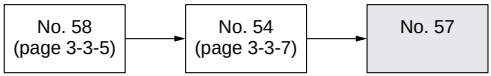


A: Use a scale to measure accurately.

Figure 3-3-9

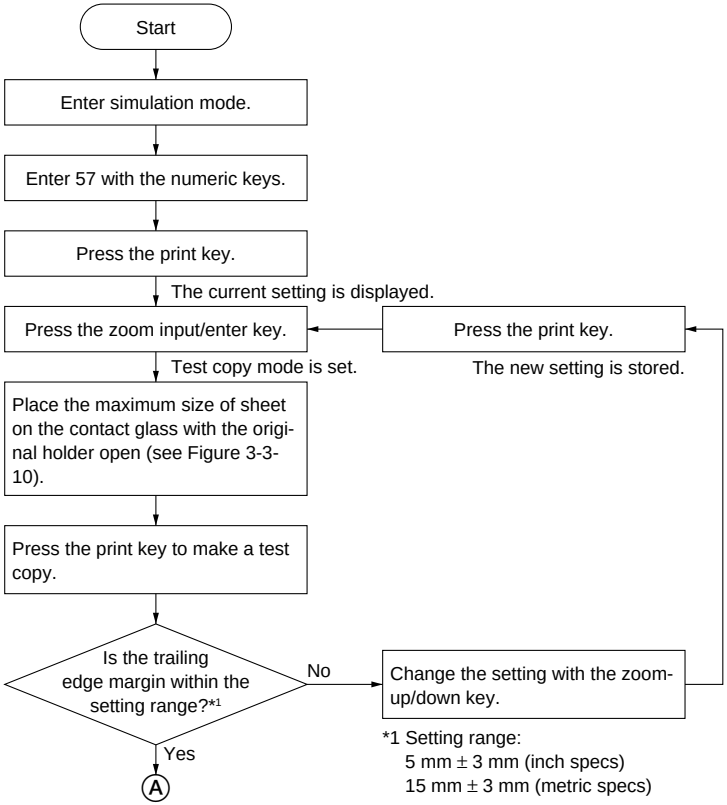
(3-3) Adjusting the trailing edge blank cut timing

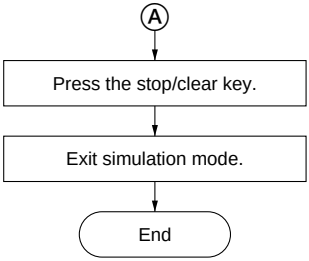
Adjust the trailing edge blank cut timing as follows if the trailing edge margin is not 5 ± 3 mm (inch specs) or 15 ± 3 mm (metric specs).



Important: Before starting this adjustment, ensure the above simulations have been completed.

Procedure





Setting range: 0 to 84
Reference: 84
Change per step: 0.12 mm
Increasing the value makes the margin wider, and decreasing it makes the margin narrower.

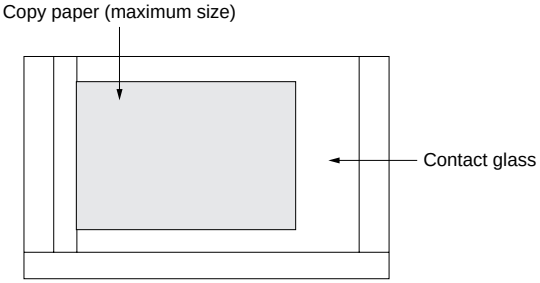
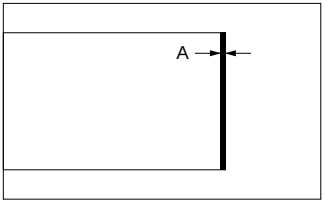


Figure 3-3-10

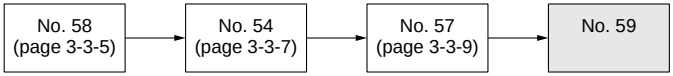


A: Use a scale to measure accurately

Figure 3-3-11

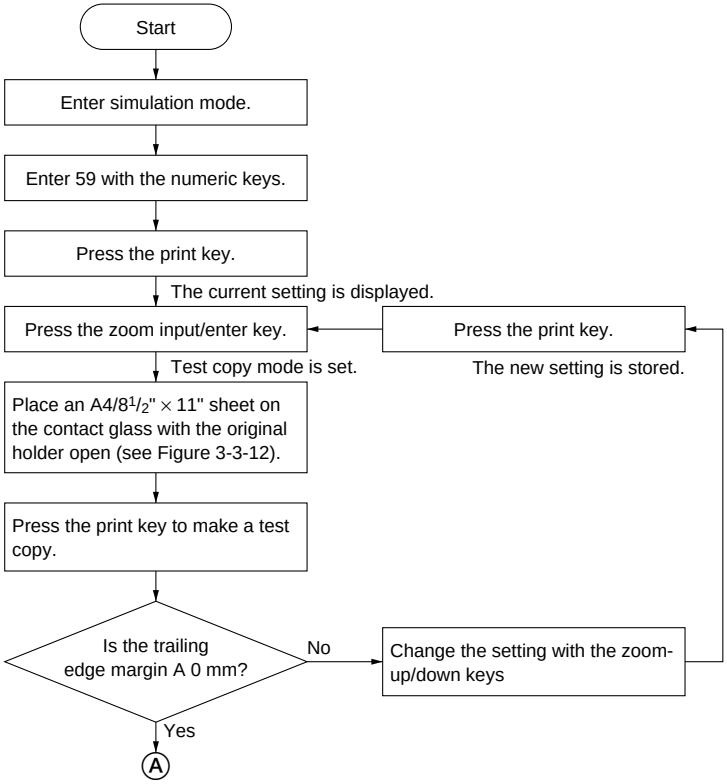
(3-4) Adjusting the trailing edge margin

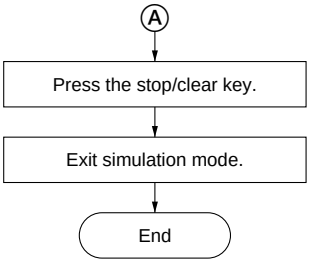
Adjust the trailing edge margin as follows if it is not 0 mm.



Important: Before starting this adjustment, ensure the above simulations have been completed.

Procedure





Setting range: 10 to 110
Reference: 95
Change per step: 0.2 mm
Increasing the value makes the margin wider, and decreasing it makes the margin narrower.

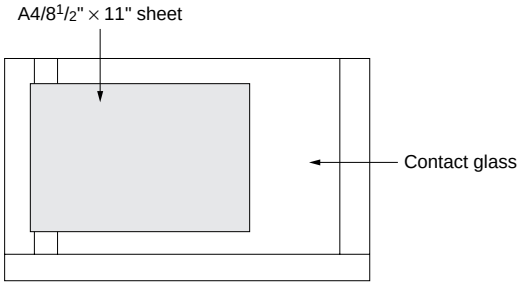


Figure 3-3-12



A: Use a scale to measure accurately.

Figure 3-3-13

3-3-3 Main charging section

(1) Replacing the charger wire

Take the following procedure when the charger wire is broken or to be replaced.

Precautions

- Use the specified tungsten wire for the charger wire.
- The part of the wire wrapped around the charger spring must not protrude from the charger housing.
- The cut end of the charger wire must not protrude more than 2 mm from under the charger wire retainer pin.
- Use a clean, undamaged tungsten charger wire.
- Keep the charger wire taut by ensuring that the charger spring is under tension.
- Clean the main charger shield first with a damp cloth and then with a dry cloth when replacing the charger wire.

Caution: Do not use organic solvents such as alcohol or thinner to clean the main charger.

Procedure

1. Open the front cover and take the toner cartridge out of the copier.
2. Unlock the developing unit release lever and remove the developing unit and drum unit.
3. Remove the screw and main charger retainer.

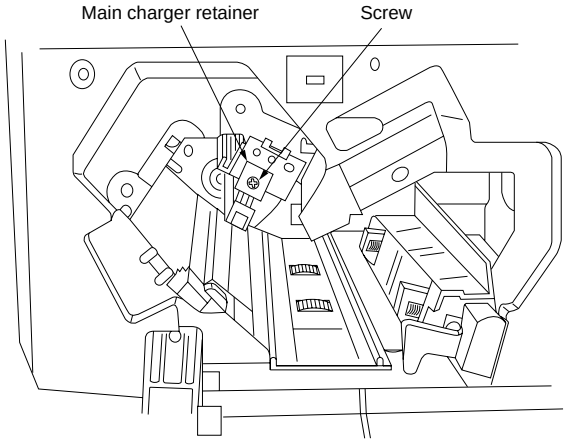


Figure 3-3-14

4. Remove the main charger.
5. Remove the main charger front and rear lids with a straight screwdriver.
6. Remove the charger wire retainer pin and charger spring, then the charger wire.

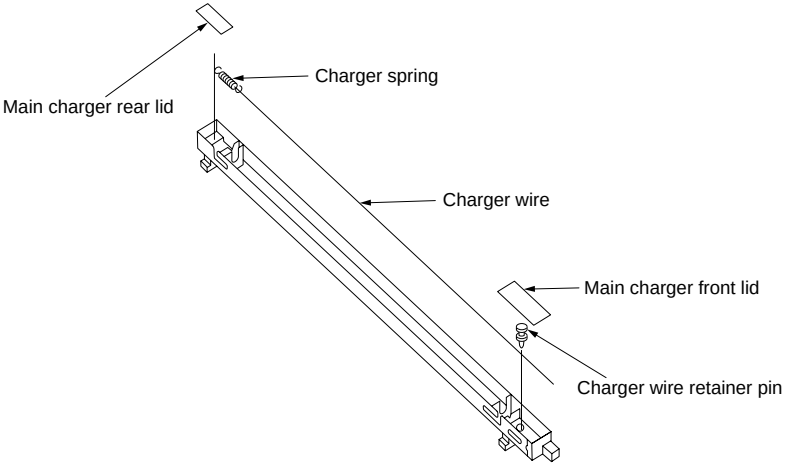


Figure 3-3-15

7. Wind the new tungsten wire at least five turns around one end of the charger spring.
   • The length of the cut wire must be less than 2 mm.
8. Hook the other end of the charger spring onto the main charger terminal of the main charger rear housing.

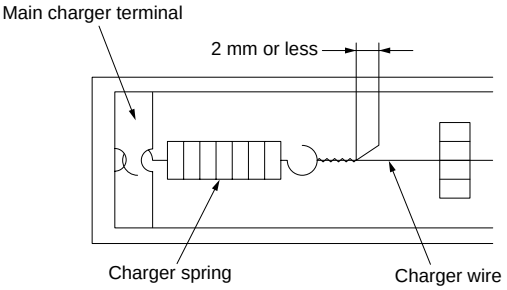


Figure 3-3-16

9. Run the wire through the notch in the main charger front and rear housing and pull it tight so that the distance from the end of the charger spring to the notch in the main charger rear housing is between 7 and 9 mm.

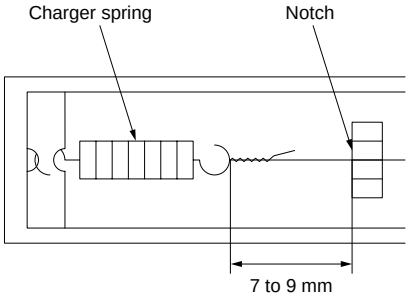


Figure 3-3-17

10. Insert the retainer pin into the main charger front housing to fix the charger wire
11. Cut off the excess wire under the retainer pin so less than 2 mm protrudes.

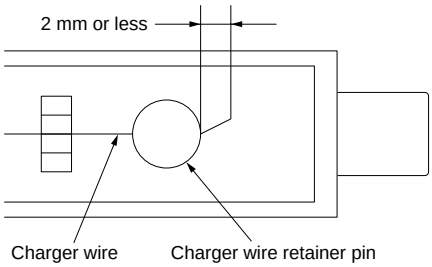


Figure 3-3-18

12. Refit the front and rear lids to the main charger.
    - Ensure that the larger lid is refit to the front housing and smaller lid to the rear housing.
13. Refit all the removed parts.

3-3-4 Exposure section

(1) Detaching and refitting the halogen lamp
Clean or replace the halogen lamp as follows.

Procedure
1. Remove the rear and right covers, then the contact glass.
2. Move light source unit 1 to the cutout in the copier rear.
3. Press the lamp terminal at the copier rear in the direction of the arrow and remove it from the halogen lamp.
4. Remove the halogen lamp from the cutout in the copier rear.
   • When removing the lamp, touch only the ceramic parts.

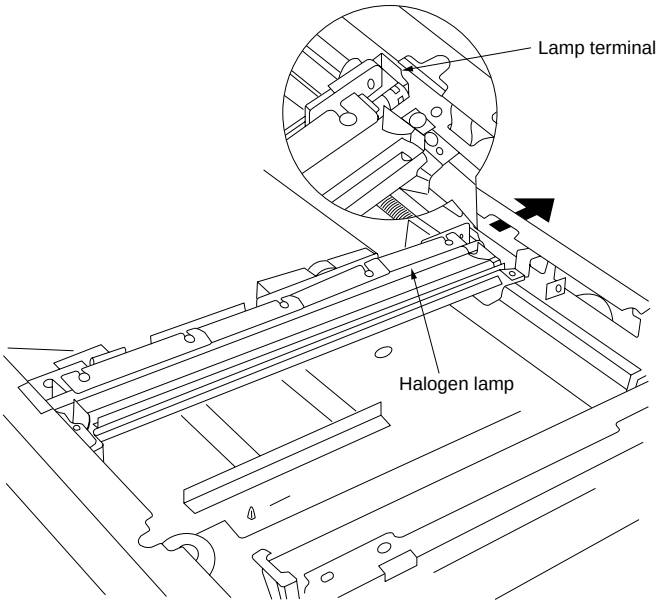


Figure 3-3-19

5. Clean or replace the halogen lamp.
   • When replacing the halogen lamp, ensure that the projection of the lamp is facing up so that it does not come in contact with the other parts such as the reflectors.
6. Refit all the removed parts.

(2) Detaching and refitting the optical section thermostat

Check or replace the optical section thermostat as follows.

Caution: Use the specified thermostat for replacement. Do not substitute a simple wire or similar; otherwise, the copier will be seriously damaged.

Procedure

1. Remove the right cover, then the contact glass.
2. Remove the fast-on terminals of the optical section thermostat.
3. Check for continuity across the terminals using a tester.
4. If none, remove the two screws and then the optical thermostat, and fit a new thermostat.

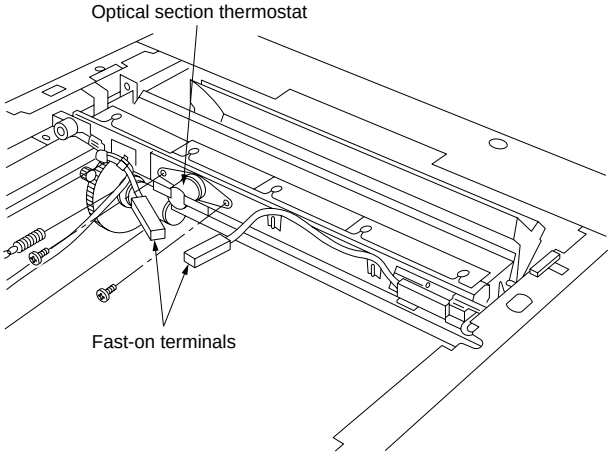


Figure 3-3-20

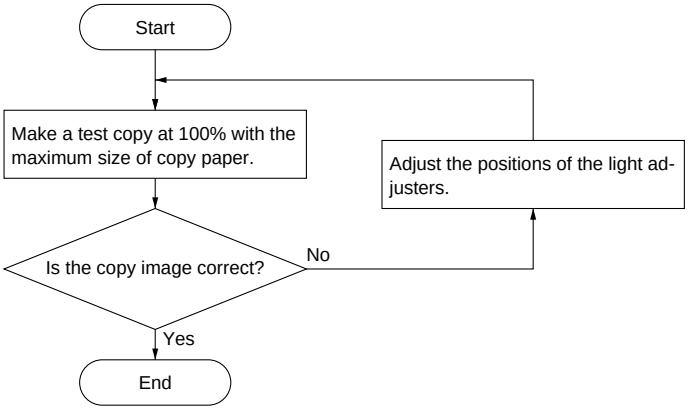
5. Refit all the removed parts.

(3) Adjusting the positions of the light adjusters

Perform the following adjustment after refitting or replacing the light adjusters, or if the copy image is abnormally light or dark on one side.

- Before starting this adjustment, be sure that the main and transfer charges, mirrors and dust filter are not stained with toner.

Procedure



- If the copy image is not correct on the machine front, adjust the light adjuster on the machine rear.
- If the copy image is not correct on the machine rear, adjust the light adjuster on the machine front.
- Moving an adjuster to the machine right (⇨) makes the copy image darker, and moving it to the machine left (➡) makes the copy image lighter.

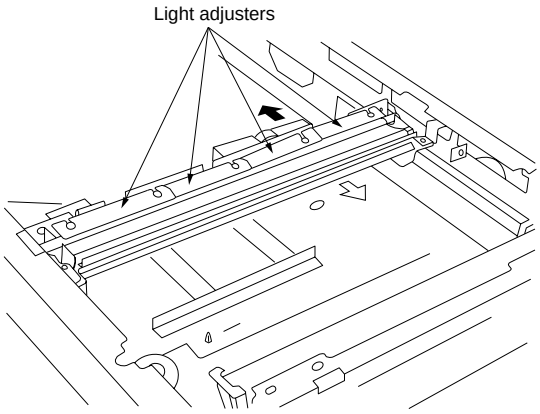


Figure 3-3-21

(4) Detaching and refitting the scanner wires

Perform the following steps when a scanner wire is broken or to be replaced.

Important: After replacing a scanner wire, proceed to “(5) Adjusting longitudinal image squareness” (see page 3-3-30) and “(7) Making fine adjustment to image focus” (see page 3-3-32).

(4-1) Detaching the scanner wires

Procedure

1. Remove the rear, right and left covers, then the contact glass.
2. Remove the front left and front right covers, then the operation unit.
3. Remove the screw holding the scanner feed wire and remove the feed wire connector.

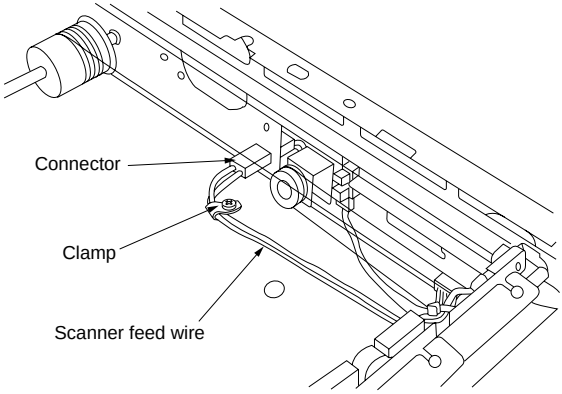


Figure 3-3-22

4. Remove the scanner feed wire from the feed wire guide.

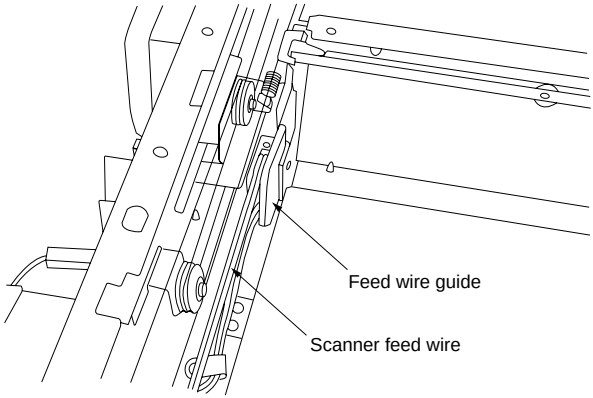


Figure 3-3-23

5. Remove each two screws and then the wire retainers on the front and rear of light source unit 1.
6. Remove light source unit 1 from the copier.

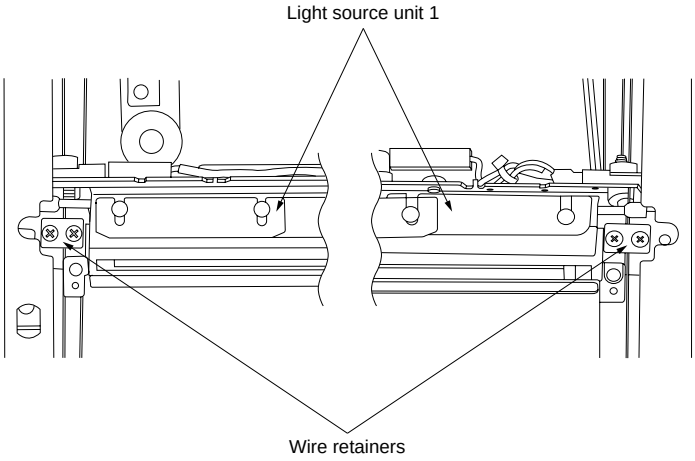


Figure 3-3-24

7. Unhook the springs on the ends of each scanner wire and remove the scanner wires from each pulley.

(4-2) Installing the scanner wires

Required installation jig
- Scanner wire drum clips (P/N 75700330)

Procedure
1. Take the fixing unit out of the copier (see page 3-3-62).
2. Remove the eight screws and then the upper left reinforcement plate from the copier.

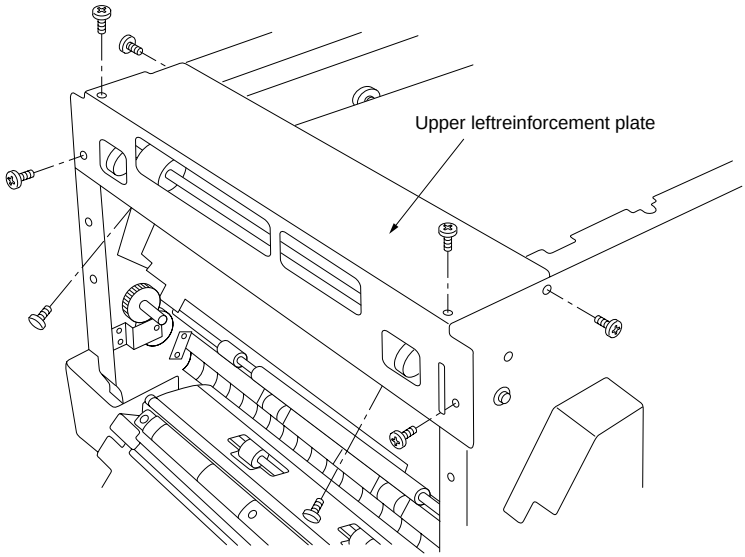


Figure 3-3-25

3. Remove the two screws and then the scanner motor from the scanner motor mount.

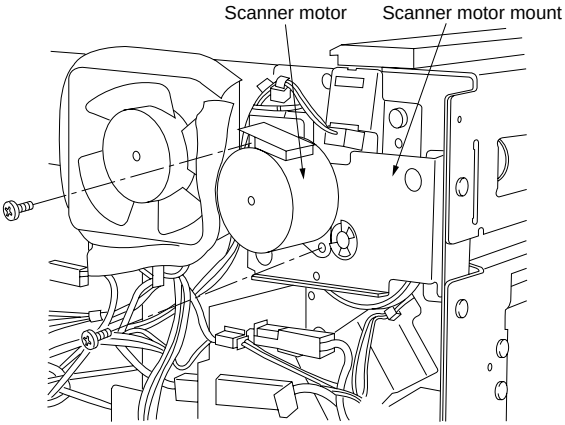


Figure 3-3-26

4. Remove the E-ring, bushing and the four screws, and then detach the scanner motor mount from the copier.

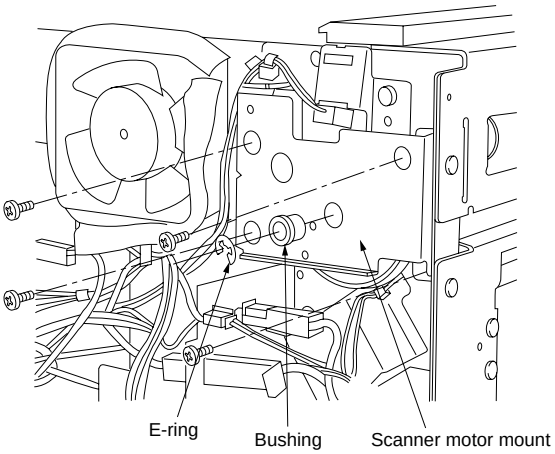


Figure 3-3-27

5. Remove the screw and then scanner drive gear 64 from the copier.

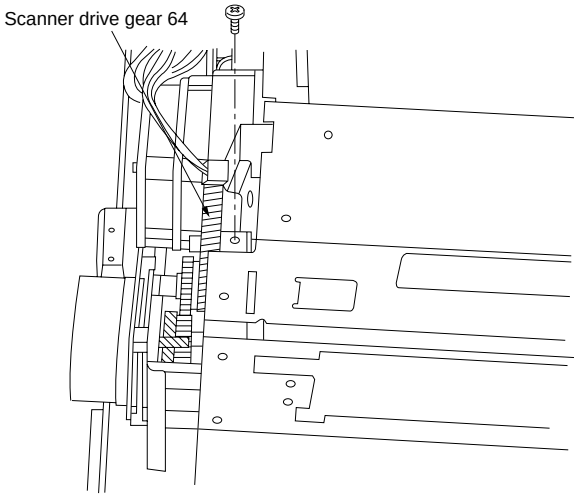


Figure 3-3-28

6. Remove the E-ring and bushing on the copier front, and then detach scanner wire drum A from the copier.

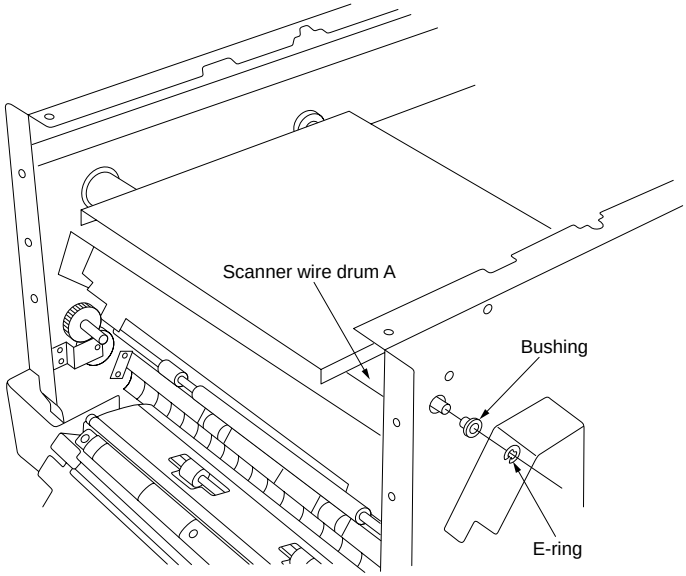


Figure 3-3-29

7. Fit a new scanner wire to scanner wire drum A (on the machine front) as follows. Numbers in circles correspond with those in Figure 3-3-30.
   ① Holding the scanner wire by the ball furthest from an end, with that longer end on the right side of the machine and the other end on the left, insert the ball into the hole in scanner wire drum A.
   ② Run the shorter end of the scanner wire six times around the drum toward the machine outside.
   ③ Run the longer end of the wire three times around the drum toward the machine inside.
   ④ Hold the scanner wire in place with the scanner wire drum clip.

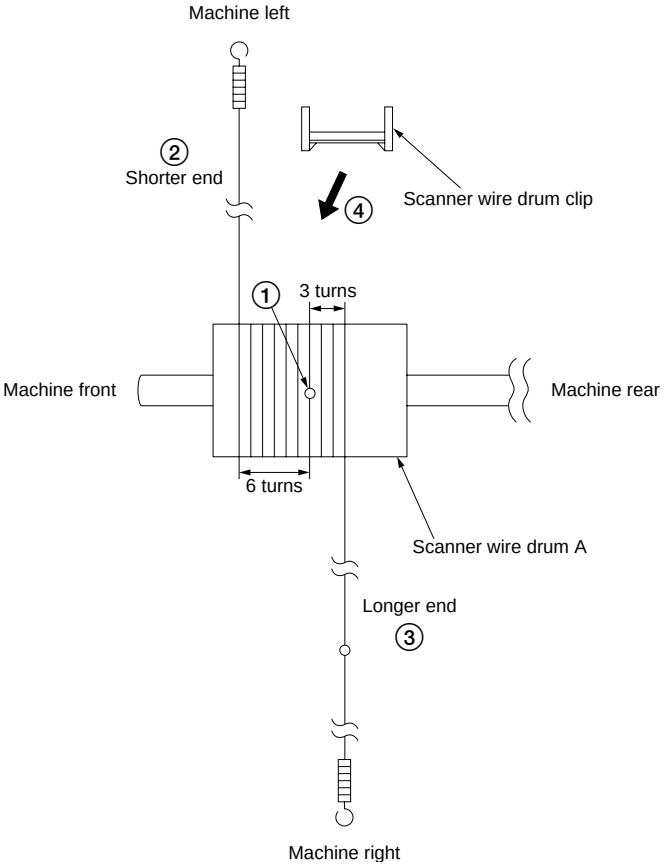


Figure 3-3-30

8. Install the new scanner wire to the scanner wire drum A (on the machine rear) as follows. Numbers in circles correspond with those in Figure 3-3-31.
   ① Holding the scanner wire with the ball furthest from an end, with that longer end from the ball on the right side of the machine and the other end on the left, insert the ball into the hole in scanner wire drum A.
   ② Run the shorter end of the scanner wire six times around the drum toward the machine outside.
   ③ Run the longer end of the wire three times around the drum toward the machine inside.
   ④ Hold the scanner wire in place with the scanner wire drum clip.

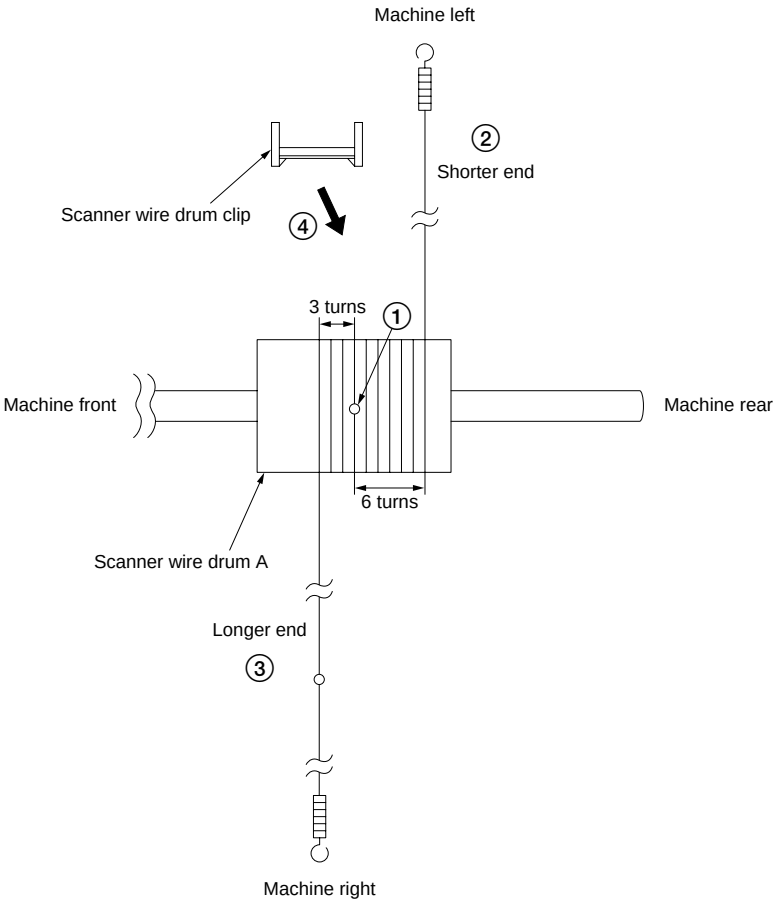


Figure 3-3-31

9. Refit the scanner wire drum A to the copier.
10. Refit scanner drive gear 64, the bushing, scanner motor mount and upper left reinforcement plate.
11. Remove the two screws holding the optical fan motor.

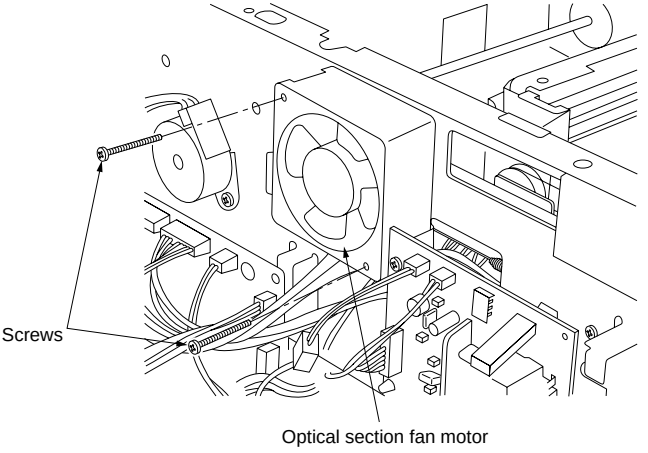


Figure 3-3-32

12. Move light source unit 2 to the copier center and hold it with the two screws removed from the optical section fan motor.

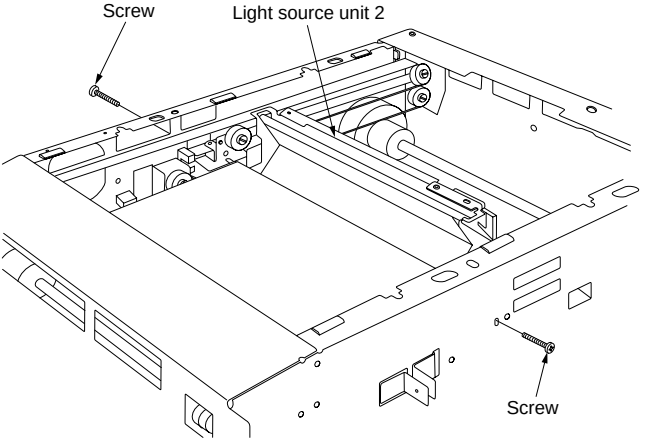


Figure 3-3-33

13. Route the scanner wire on the machine front around each pulley as follows. Numbers in circles correspond with those in Figure 3-3-34.
    - ① Loop the shorter end of the scanner wire around the inner groove in the pulley on the left side of the machine from bottom to top.
    - ② Loop the wire around the outer groove in the pulley of light source unit 2 from top to bottom.
    - ③ Loop the wire around the inner groove in the pulley in the center of the machine from top to bottom.
    - ④ Hook the spring on the end of the wire temporarily onto its holder on the right side of the machine.
    - ⑤ Loop the longer end of the wire around the inner groove in the pulley of the upper right side of the machine from bottom to top.
    - ⑥ Loop the wire around the inner groove in the pulley of light source unit 2 from top to bottom and then thread wire ⓒ between wires ⓐ and ⓑ from top to bottom.
    - ⑦ Loop the wire around the inner groove in the pulley of the lower right of the machine from top to bottom.
    - ⑧ Run the wire twice toward the inside of scanner wire drum B and insert the ball into the hole in the drum.
    - ⑨ Run the wire another two turns around the drum.
    - ⑩ Unhook the spring from its holder in step ④ and hook the two springs together.

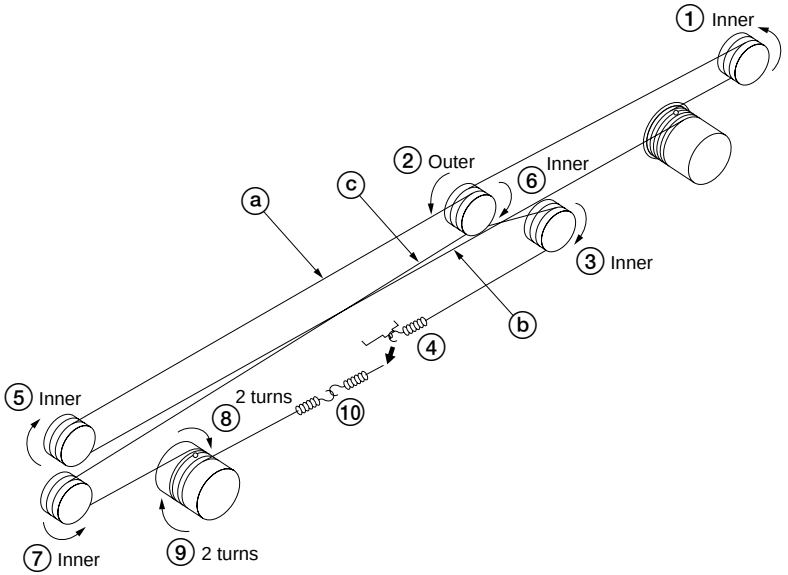


Figure 3-3-34

14. Route the scanner wire on the machine rear around each pulley as follows.
    Numbers in circles correspond with those in Figure 3-3-35.
    ① Loop the shorter end of the scanner wire around the inner groove in the pulley on the left side of the machine from bottom to top.
    ② Loop the wire around the outer groove in the pulley of light source unit 2 from top to bottom.
    ③ Loop the wire around the inner groove in the pulley in the center of the machine from top to bottom.
    ④ Hook the spring on the end of the wire temporarily onto its holder on the right side of the machine.
    ⑤ Loop the longer end of the wire around the inner groove in the pulley of the upper right side of the machine from bottom to top.
    ⑥ Loop the wire around the inner groove in the pulley of light source unit 2 from top to bottom, and then thread wire ⓒ between wires ⓐ and ⓑ from top to bottom.
    ⑦ Loop the wire around the inner groove in the pulley of the lower right of the machine from top to bottom.
    ⑧ Run the wire twice toward the inside of scanner wire drum B and insert the ball into the hole in the drum.
    ⑨ Run the wire another two turns around the drum.
    ⑩ Unhook the spring from its holder in step ④ and hook the two springs together.

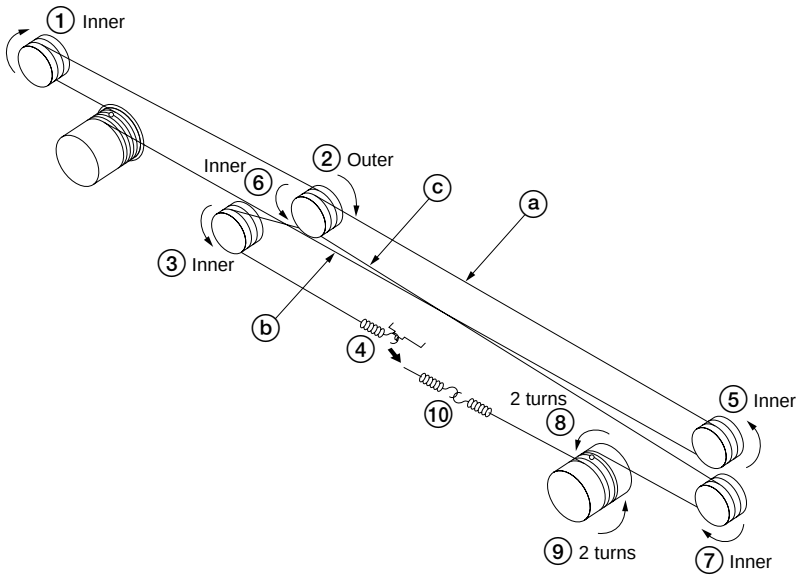


Figure 3-3-35

15. Remove the front and rear scanner wire drum clips from scanner wire drum A.
16. Remove the screw holding light source unit 2 and refit the optical section fan motor.
17. Turn scanner wire drum A and move light source unit 2 all the way toward the machine right.
18. Turn scanner wire drum B until the screw on the front side of the drum can be seen through the cutout in the upper right reinforcement plate.

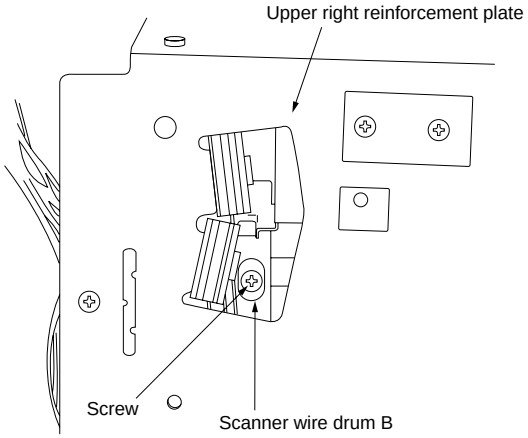


Figure 3-3-36

19. Mount light source unit 1 onto the front and rear scanner rails.
    • When mounting, ensure that the scanner wire on the top is above light source unit 1.
20. Run the scanner feed wire along the feed wire guide and refit it to the connector on the machine rear. Refit the clamp to hold the scanner feed wire.
    • Be sure that the scanner feed wire is not twisted.
21. Move light source unit 1 all the way toward the machine right and refit the wire retainers.
22. Refit all the removed parts.
23. Perform “(5) Adjusting longitudinal image squareness” (see 3-3-30) and “(7) Making fine adjustment to image focus” (see 3-3-32).

(5) Adjusting longitudinal image squareness (inclination of light source 2)
Make the following adjustment after replacing the scanner wires, or if the copy image is longitudinally skewed (longitudinal squareness is not obtained).

Procedure

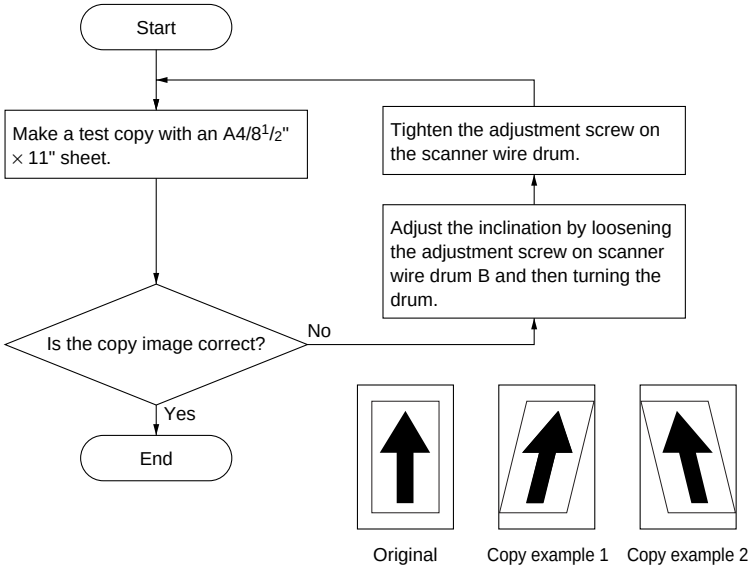


Figure 3-3-37

- To correct an image as in copy example 1, turn scanner wire drum B in the direction of the black arrow (➡).
- To correct an image as in copy example 2, turn scanner wire drum B in the direction of the white arrow (⇨).

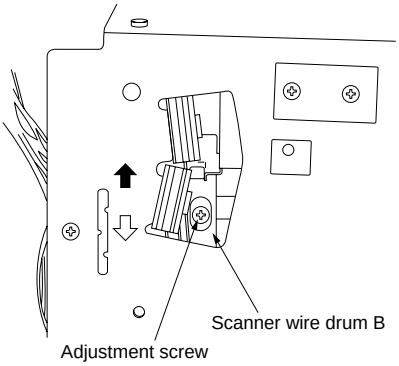


Figure 3-3-38

(6) Adjusting lateral image squareness (height of light source 2)
Make the following adjustment if the copy image is laterally skewed (lateral squareness is not obtained).

Procedure

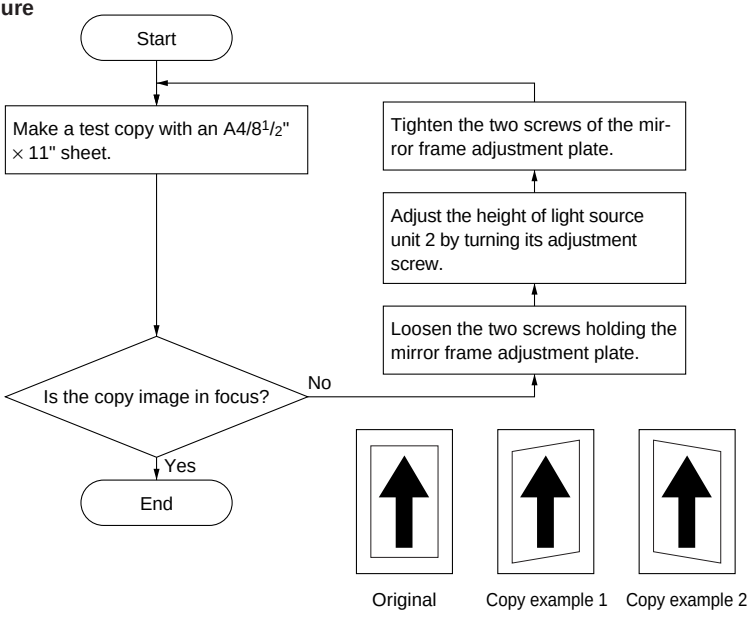


Figure 3-3-39

- To correct an image as in copy example 1, turn the adjustment screw clockwise.
- To correct an image as in copy example 2, turn the adjustment screw counterclockwise.

Important: Paint-lock the adjustment screw of light source 1 after adjustment.

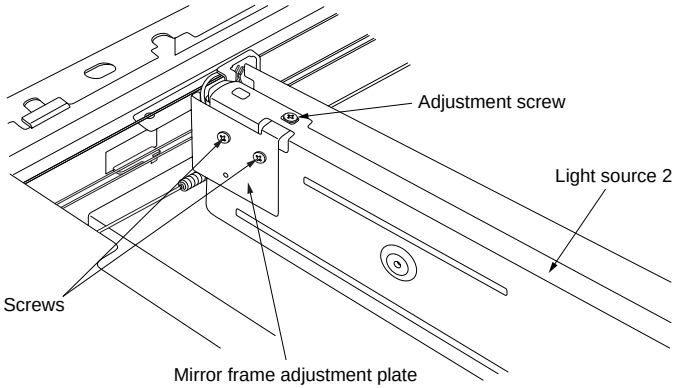
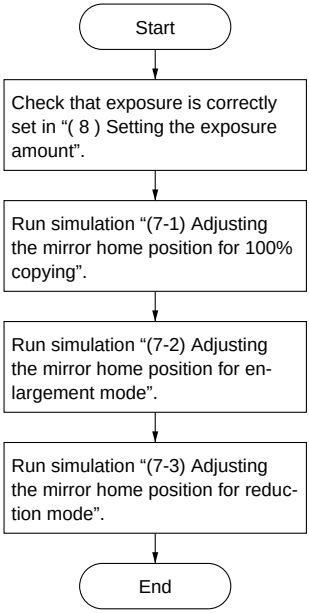


Figure 3-3-40

(7) Making fine adjustment to image focus

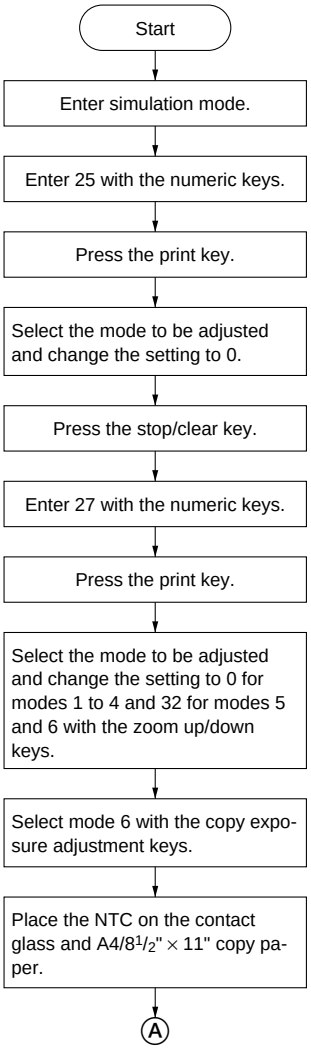
Perform the following adjustment after replacing the optical wires, or if the entire copy image is out of focus.

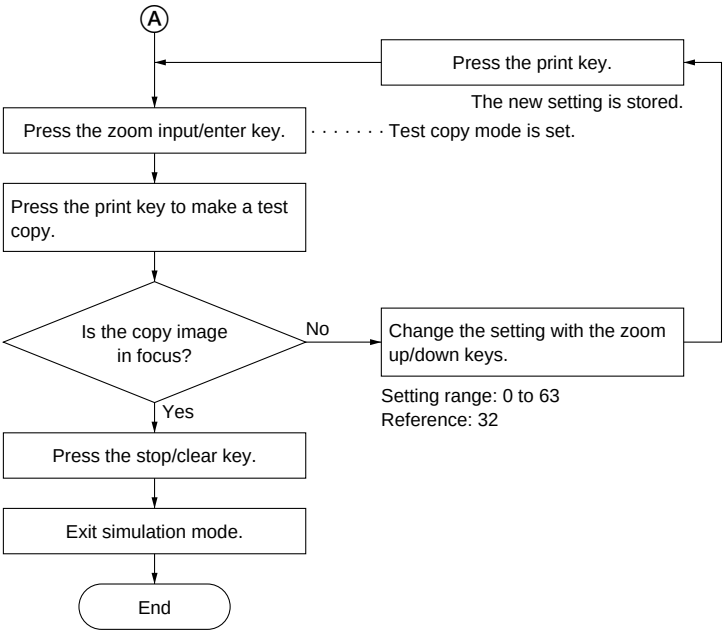
Mode setting procedure



(7-1) Adjusting the mirror home position for 100% copying

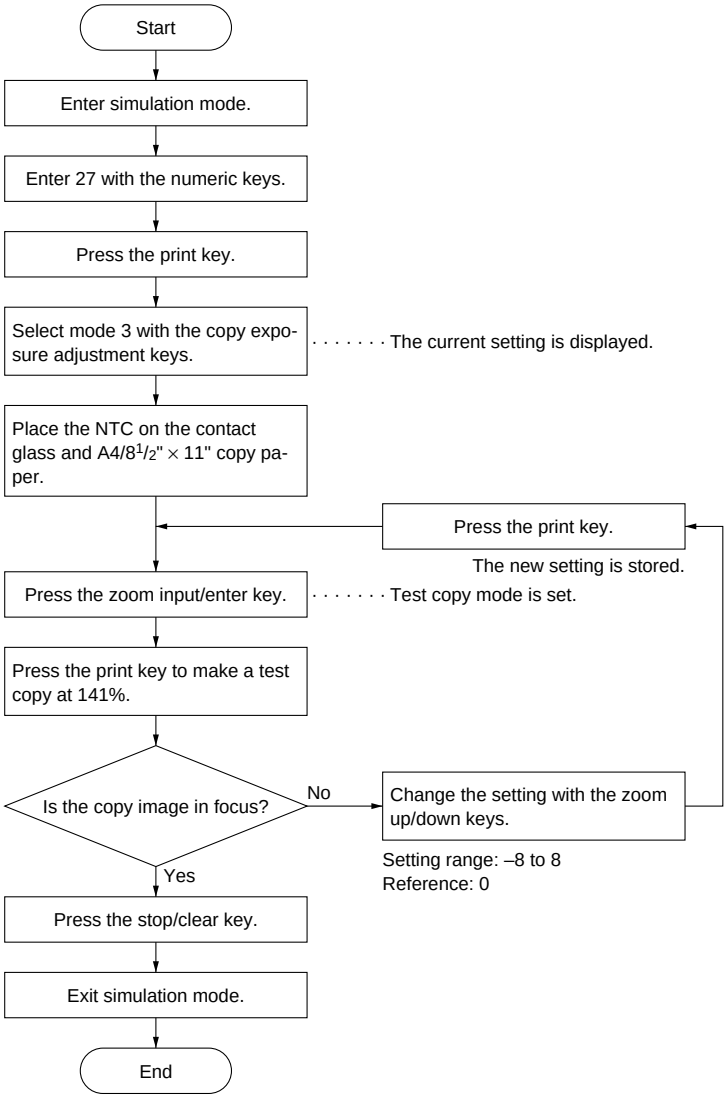
Procedure




A
Press the print key.
The new setting is stored.
Press the zoom input/enter key.
Test copy mode is set.
Press the print key to make a test copy.
Is the copy image in focus?
No
Change the setting with the zoom up/down keys.
Setting range: 0 to 63
Reference: 32
Yes
Press the stop/clear key.
Exit simulation mode.
End

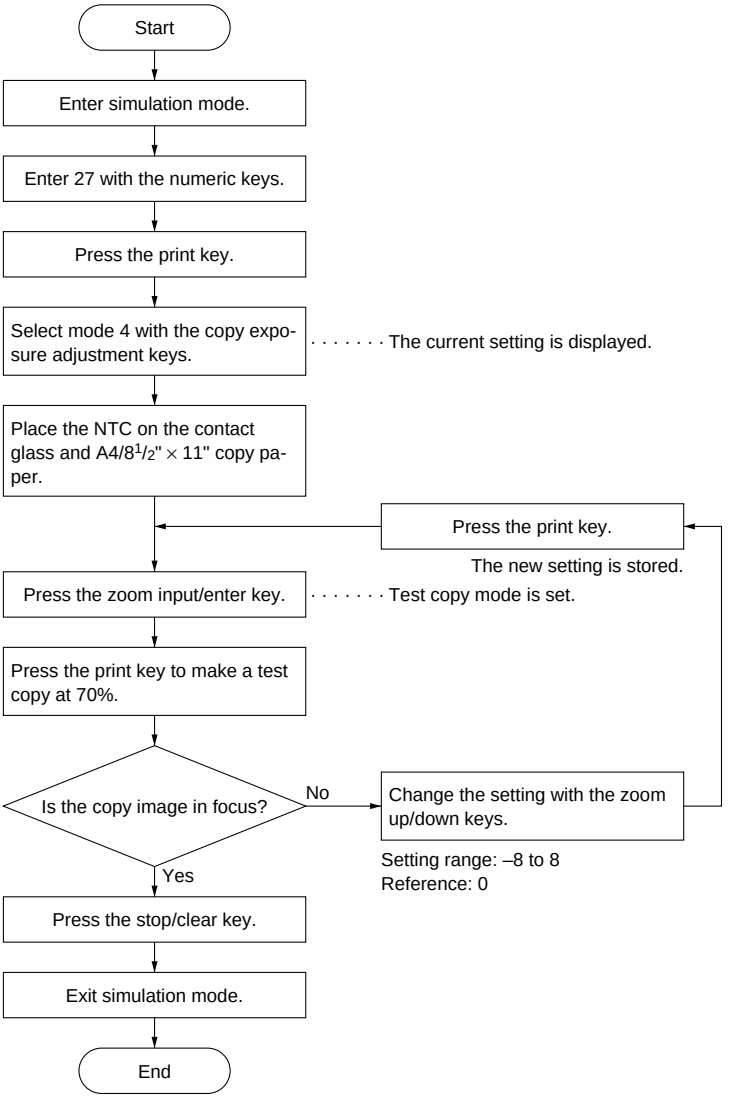
(7-2) Adjusting the mirror home position for enlargement mode

Procedure



(7-3) Adjusting the mirror home position for reduction mode

Procedure



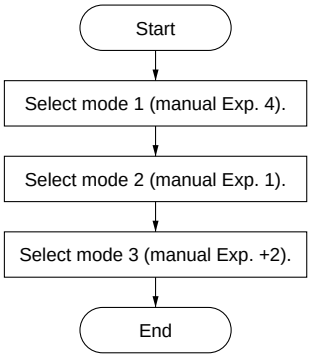
(8) Setting the exposure amount

Perform the following adjustment when the drum is replaced.

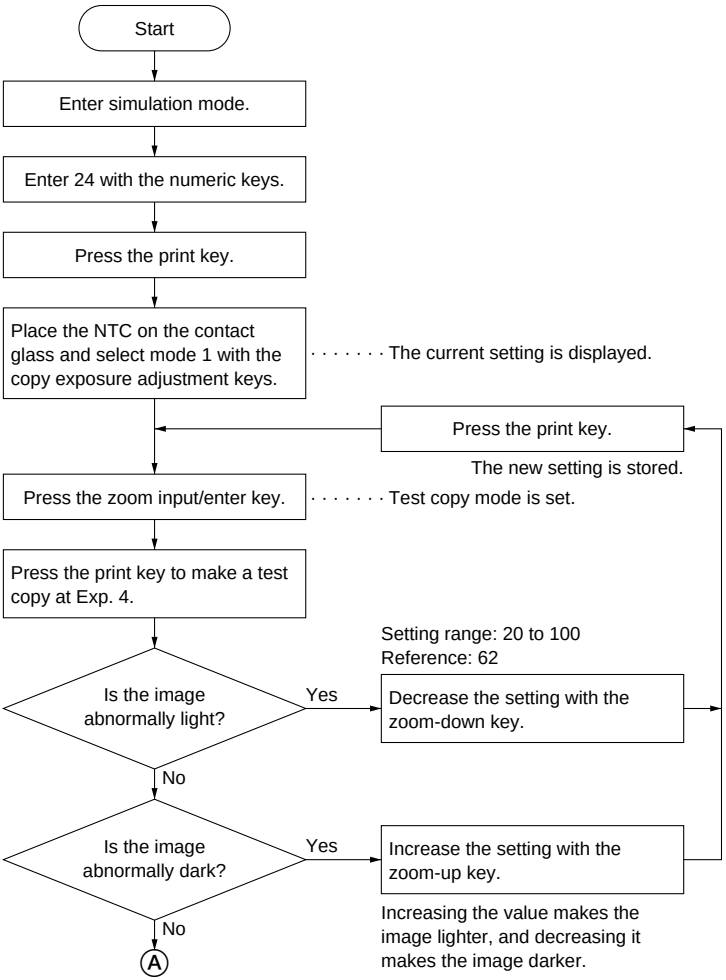
Precautions

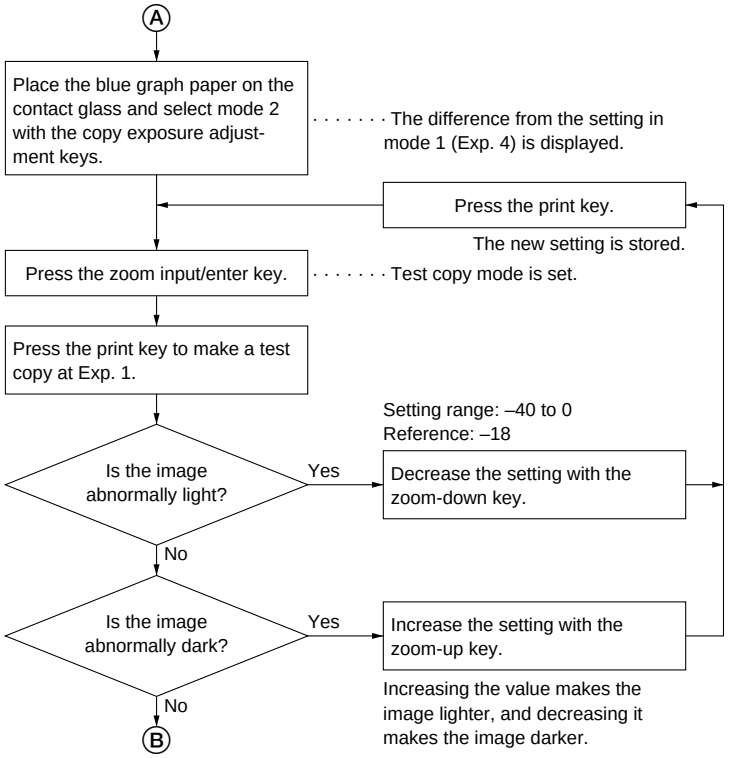
- Check that the developer density is correct.
- Check that the halogen lamp has not deteriorated.
- Clean the optical system.
- Never touch controls VR1, VR2 or VR3 on the AVR PCB.

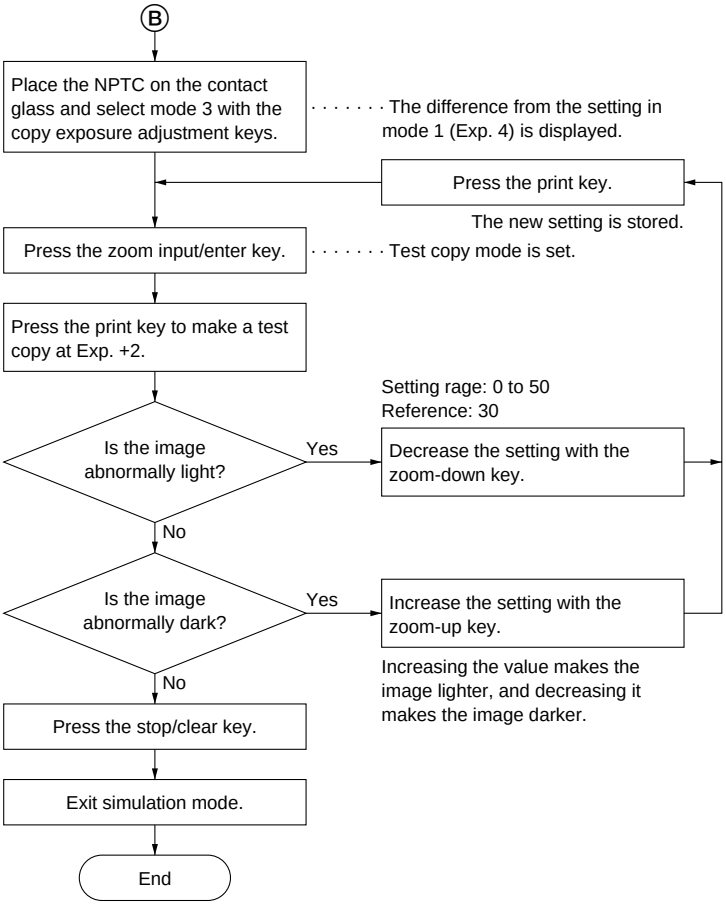
Mode setting procedure



Procedure

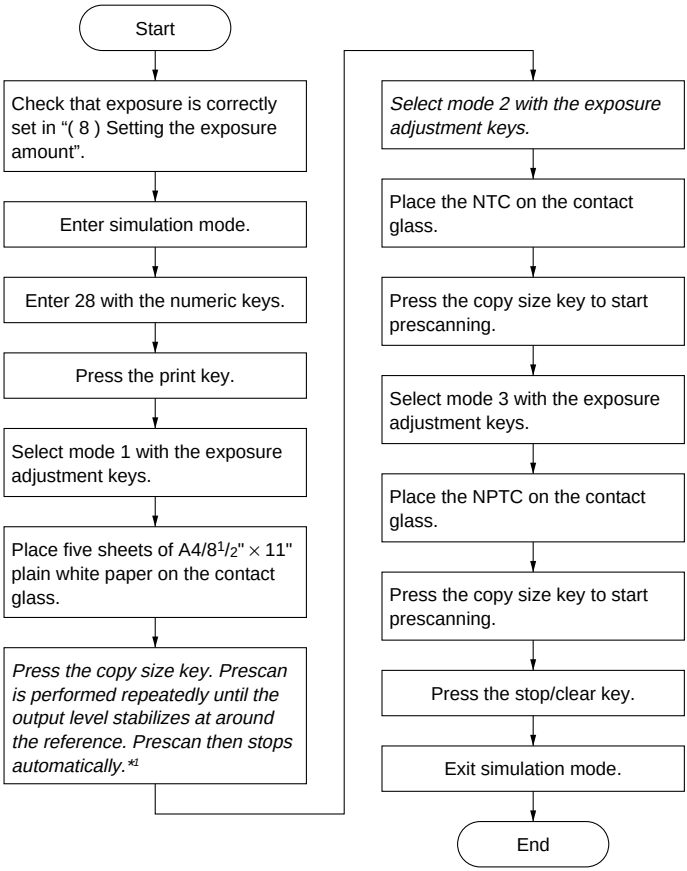

Start
Enter simulation mode.
Enter 24 with the numeric keys.
Press the print key.
Place the NTC on the contact glass and select mode 1 with the copy exposure adjustment keys.
The current setting is displayed.
Press the print key.
The new setting is stored.
Press the zoom input/enter key.
Test copy mode is set.
Press the print key to make a test copy at Exp. 4.
Setting range: 20 to 100
Reference: 62
Is the image abnormally light?
Yes
Decrease the setting with the zoom-down key.
No
Is the image abnormally dark?
Yes
Increase the setting with the zoom-up key.
No
Increasing the value makes the image lighter, and decreasing it makes the image darker.
A


A
Place the blue graph paper on the contact glass and select mode 2 with the copy exposure adjustment keys.
The difference from the setting in mode 1 (Exp. 4) is displayed.
Press the print key.
The new setting is stored.
Press the zoom input/enter key.
Test copy mode is set.
Press the print key to make a test copy at Exp. 1.
Setting range: –40 to 0
Reference: –18
Is the image abnormally light?
Yes
Decrease the setting with the zoom-down key.
No
Is the image abnormally dark?
Yes
Increase the setting with the zoom-up key.
No
Increasing the value makes the image lighter, and decreasing it makes the image darker.
B


B
Place the NPTC on the contact glass and select mode 3 with the copy exposure adjustment keys.
The difference from the setting in mode 1 (Exp. 4) is displayed.
Press the print key.
The new setting is stored.
Press the zoom input/enter key.
Test copy mode is set.
Press the print key to make a test copy at Exp. +2.
Setting rage: 0 to 50
Reference: 30
Is the image abnormally light?
Yes
Decrease the setting with the zoom-down key.
No
Is the image abnormally dark?
Yes
Increase the setting with the zoom-up key.
No
Increasing the value makes the image lighter, and decreasing it makes the image darker.
Press the stop/clear key.
Exit simulation mode.
End

(9) Adjusting the auto exposure

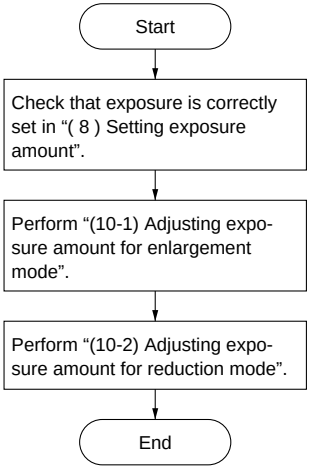
Procedure



*1 When the AE sensor or exposure lamp is broken, prescanning is repeated until the stop/clear key is pressed.

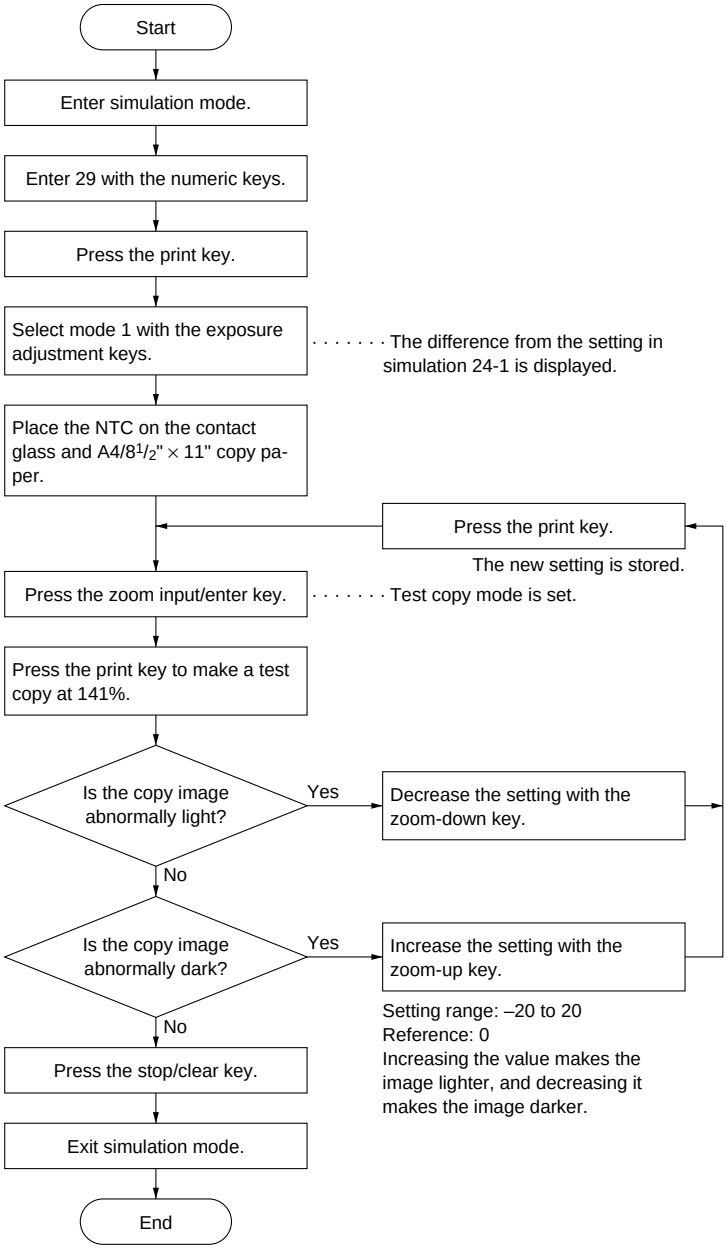
(10) Adjusting exposure amount for enlargement/reduction mode
Make the following adjustment when replacing the main PCB or drum.

Mode setting procedure



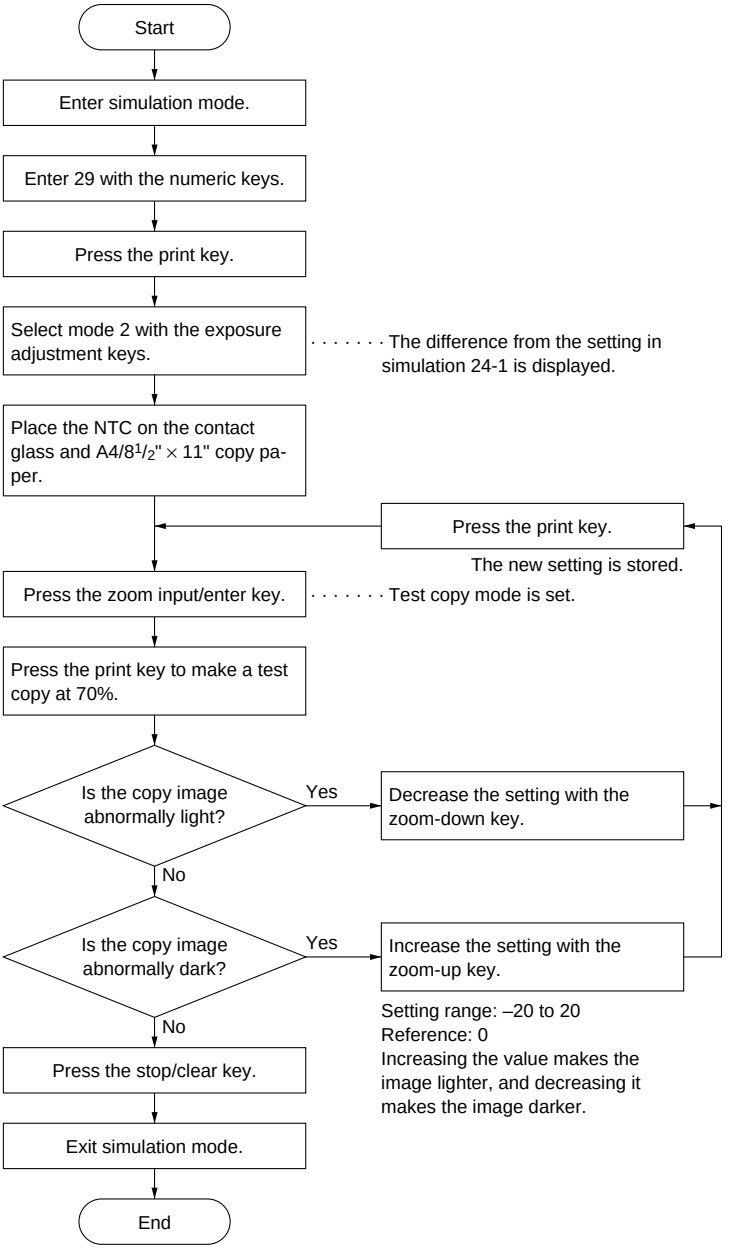
(10-1) Adjusting exposure amount for enlargement mode (141%)

Procedure



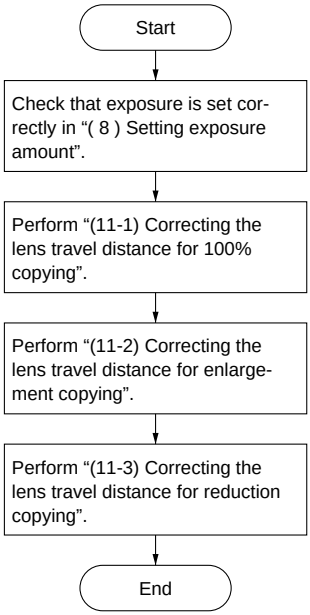
(10-2) Adjusting exposure amount for reduction mode (70%)

Procedure



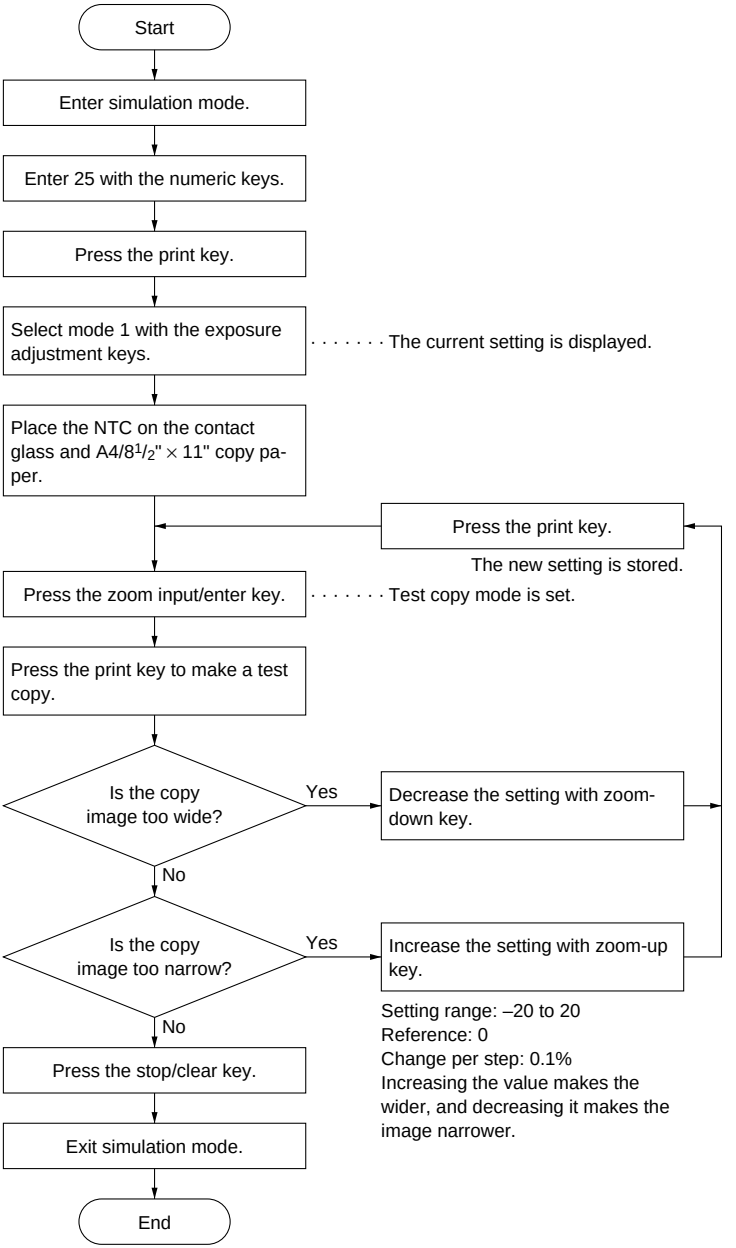
(11) Adjusting lateral magnification (correcting the lens travel distance)
Make the following adjustment if the lateral magnification is not correct.

Mode setting procedure



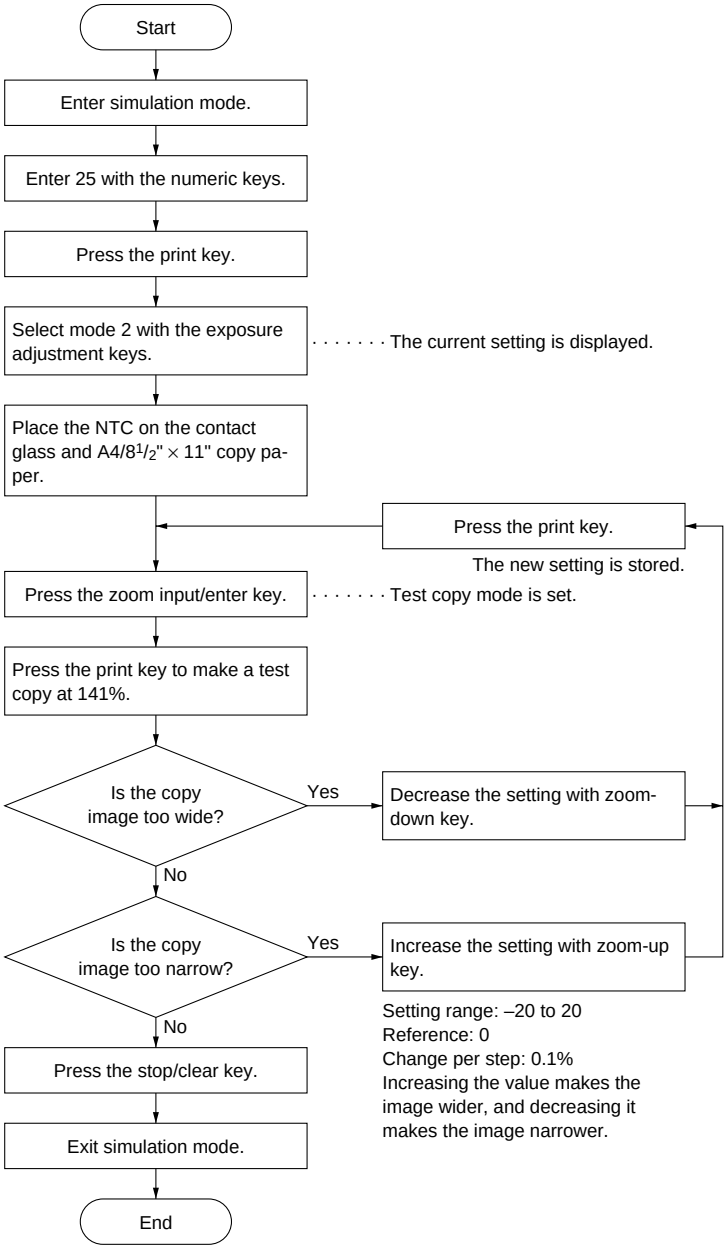
(11-1) Correcting the lens travel distance for 100% copying

Procedure



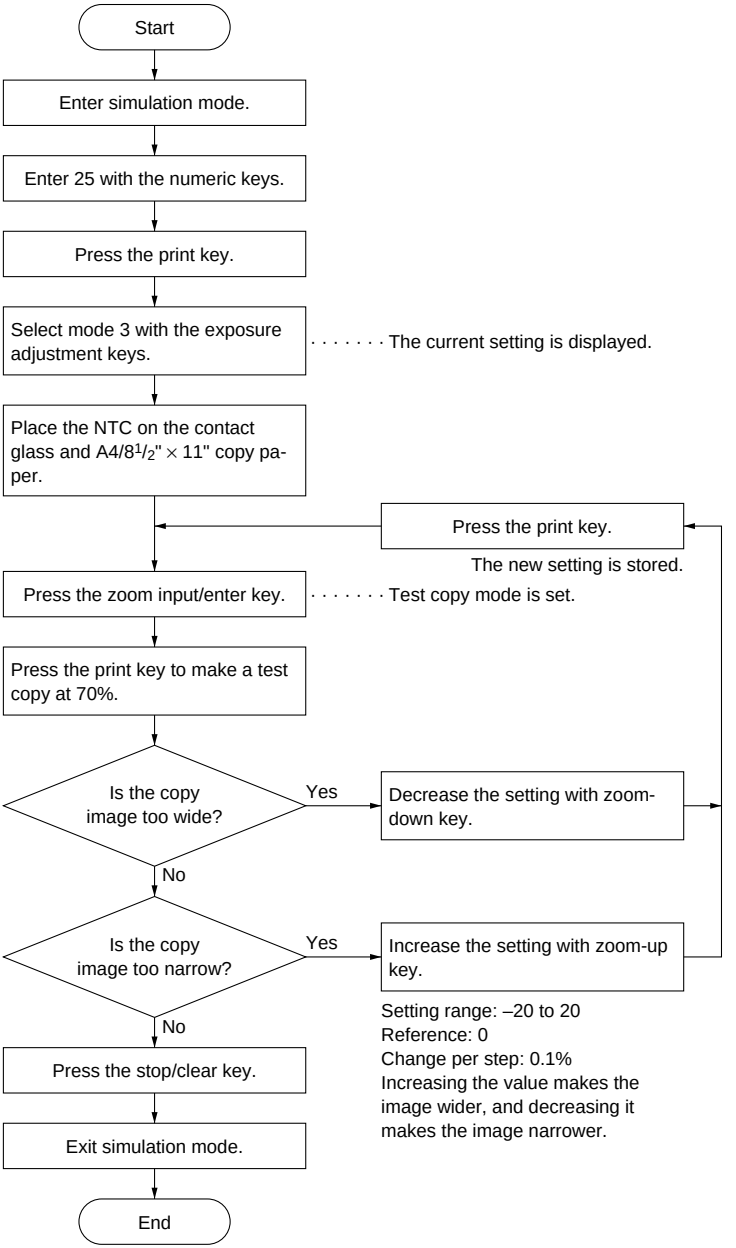
(11-2) Correcting the lens travel distance for enlargement copying

Procedure



(11-3) Correcting the lens travel distance for reduction copying

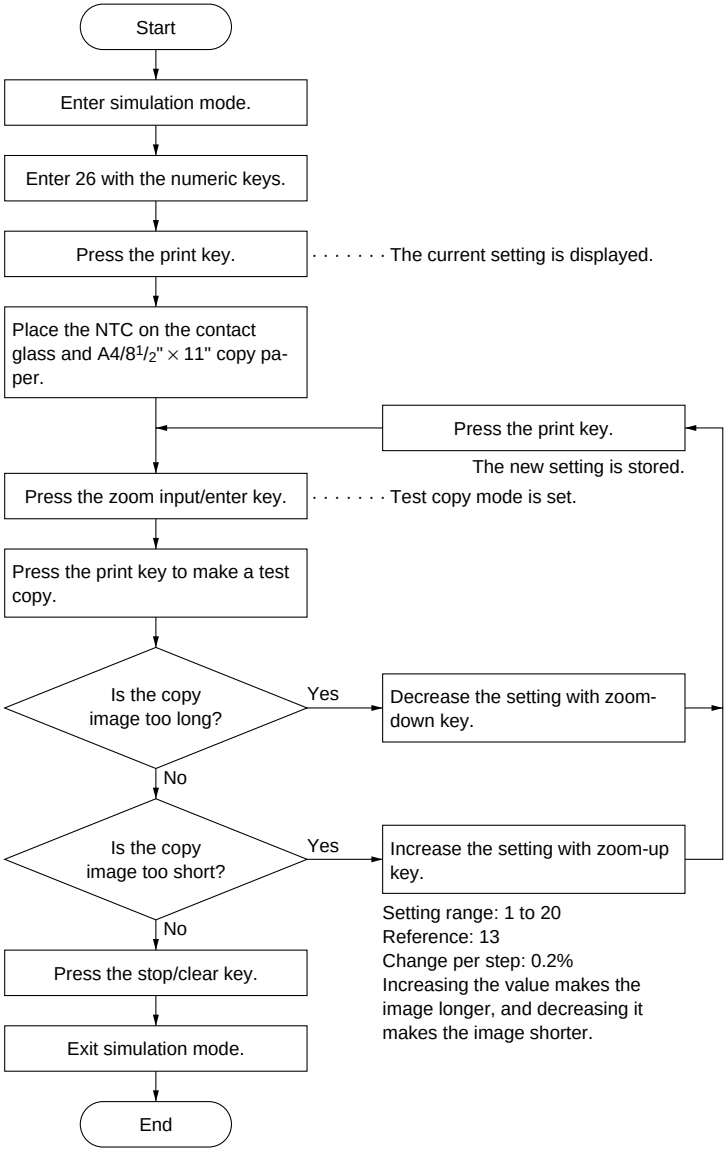
Procedure



(12) Adjusting longitudinal magnification (scanning speed)

Perform the following adjustment if the longitudinal magnification is not correct.

Procedure



3-3-5 Drum section (metric specification only)

(1) Detaching and refitting the drum
Perform the following steps when cleaning or replacing the drum.

Precautions
- Avoid direct sunlight and strong light when detaching and refitting the drum.
- Hold the drum at the ends and never touch the drum surface.
- After removing the drum, keep it in the drum case or storage bag to protect the surface from light.

Procedure
1. Open the front cover and take the toner cartridge out of the copier.
2. Unlock the developing unit release lever and detach the developing unit and drum unit.
3. Remove the screw and then the drum pin from the drum unit.
4. Detach the drum from the drum unit.
5. Remove the bushing from the drum and pull out the drum shaft.

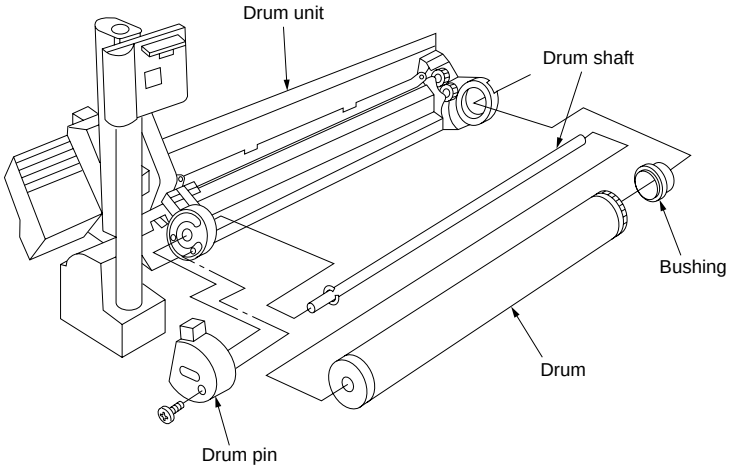


Figure 3-3-41

6. Replace the drum.
7. Refit all the removed parts.
   - When refitting the drum pin, ensure that it is inserted correctly into the drum shaft so that the D-cut part of the pin corresponds with that of drum shaft.

(2) Cleaning the drum

Clean the drum as follows when an image problem occurs, or if the drum is dirty.

Precautions

- Avoid direct sunlight and strong light when cleaning the drum.
- Dust in the air and from the cleaning pad may damage the drum during operation. Avoid working in dusty place.
- Clean the drum entirely even if it is only dirty locally.
- Do not clean the drum with alcohol, thinner or other organic solvent.

Required supplies

- Polishing cloth: specified synthetic cotton
- Toner

Procedure

1. Detach the drum (see page 3-3-50).
2. Apply a polishing cloth to the drum and gently wipe the drum taking care not to damage the surface.
3. Apply toner to another cloth and wipe the drum surface with it in the same manner.
4. Refit the drum.
5. Refit all the removed parts and let the copier stand for 30 minutes.
6. Make a test copy and check the image.

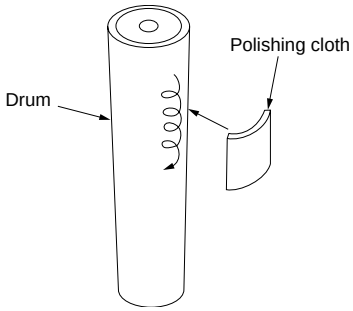


Figure 3-3-42

3-3-6 Developing section (metric specification only)

(1) Replacing developer

Perform the following steps when replacing developer.

Important: When replacing developer, place the developing unit on a level surface.

Procedure

1. Open the front cover and take the toner cartridge out of the copier.
2. Unlock the developing unit release lever and detach the developing unit.
3. Remove the four screws and then the developing cover from the developing unit by pulling the cover in the direction of the arrow in the figure.

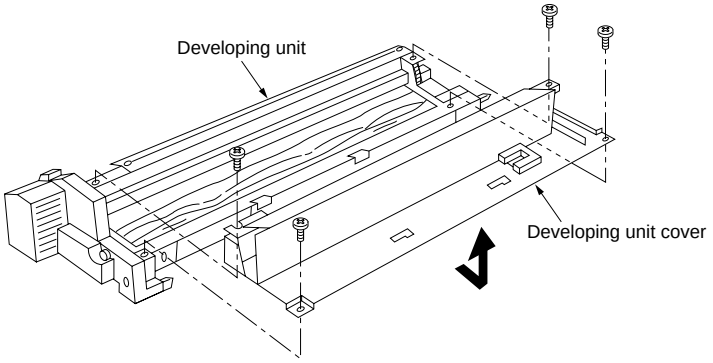


Figure 3-3-43

4. Remove the old developer from the developing unit.
5. Shake the new developer bottle well to agitate the developer.
6. Pour the new developer evenly into the developing unit while turning the gear in the direction of the arrow in the figure.

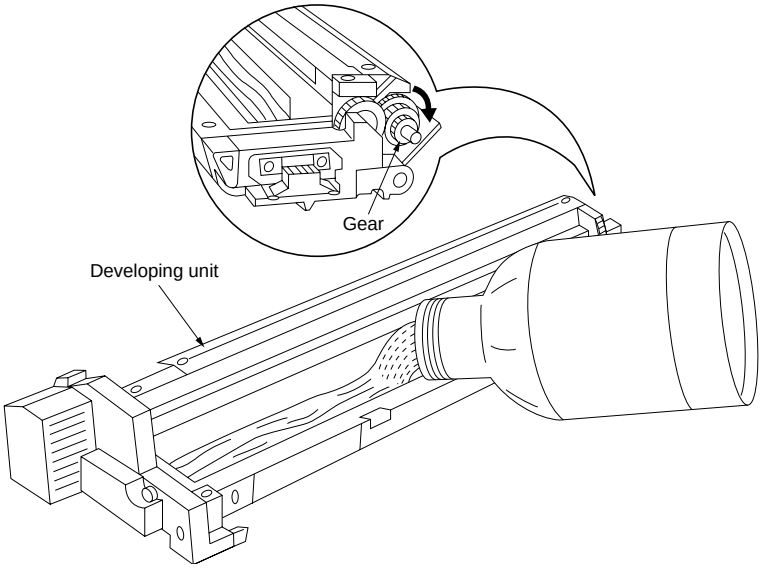


Figure 3-3-44

7. Refit all the removed parts.
8. Turn the main switch on while pressing the print key and stop/clear key.
9. 2 s or less after " $\bar{\bar{1}}$ " is shown on the copy quantity/magnification display, press the stop/clear key to enter simulation mode.
10. Enter 60 with the copy quantity/zoom-up or -down keys and press the print key.
11. Press the print key. The toner control voltage is set automatically.
12. Press the stop/clear key.
13. Enter 01 with the copy quantity/zoom-up or -down keys and press the print key to exit the simulation mode.

(2) Adjusting the formation position of the magnetic brush (reference)
Check or adjust when the image density is too light or a background is visible.
Note: *Check if the amount of the developer is correct before the adjustment.*

Procedure
1. *Open the front cover and remove the toner cartridge.*
2. *Unlock the developing unit release lever and remove the developing unit.*
3. *Remove the developing unit terminal cover from the developing unit (two screws).*

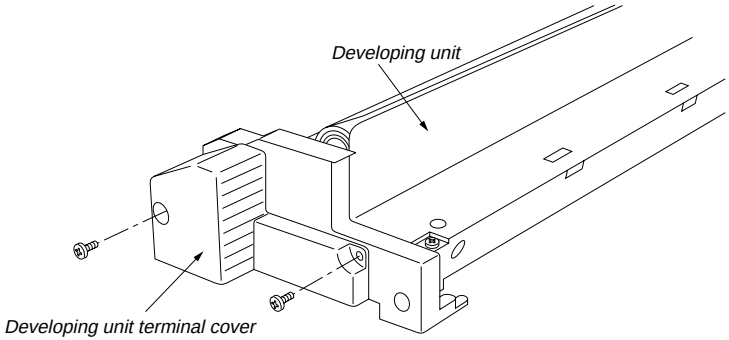


Figure 3-3-44-1

4. *Loosen the screw holding the developing roller retainer. Adjust the developing roller shaft using a scale so that the distance between the top of the magnetic brush and the bottom of the developing unit housing is 12.5 mm (reference value).*

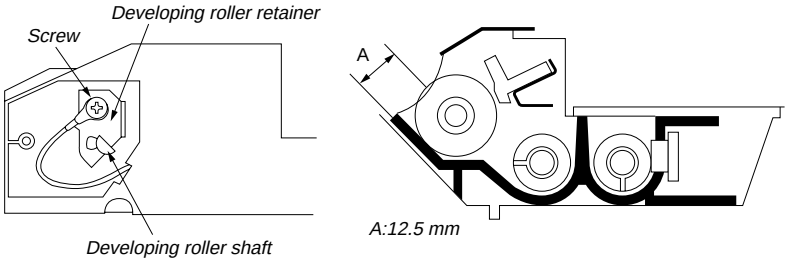


Figure 3-3-44-2

5. *Refit the removed parts.*
6. *Make a test copy and check the copy image.*

(3) Adjusting developing bias voltage (reference)

Make the following adjustment if VR DB on the high voltage PCB has been accidentally turned. Be sure to turn VR DB only when absolutely necessary.

Adjustment tools

• Tester

Procedure

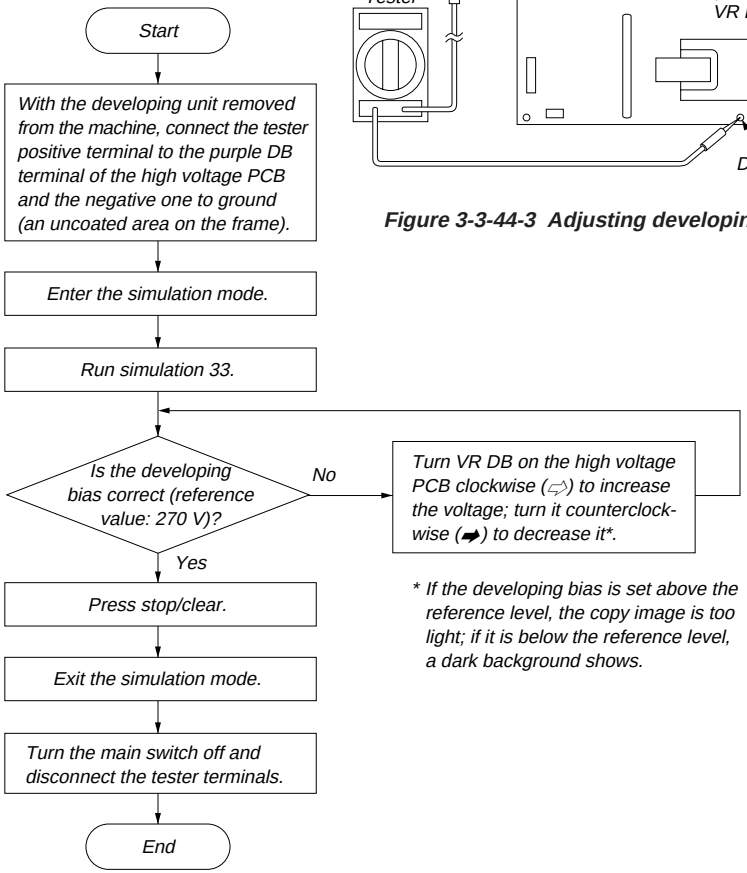


Figure 3-3-44-3 Adjusting developing bias

** If the developing bias is set above the reference level, the copy image is too light; if it is below the reference level, a dark background shows.*

3-3-7 Transfer section

(1) Replacing the charger wires

Perform the following steps when the transfer charger wire is broken or is to be replaced.

Precautions

- Use the specified tungsten wire for the charger wire.
- The part of the wire wrapped around the charger spring must not protrude from the charger housing.
- The cut end of the charger wire must not protrude more than 2 mm from under the charger wire retainer pin.
- Use a clean, undamaged tungsten charger wire.
- Keep the charger wire taut by ensuring the charger spring is under tension.
- Clean the transfer charger shield first with a damp cloth and then with a dry cloth when replacing the charger wire.

Caution: Do not clean the transfer charger shield with alcohol, thinner or other organic solvent.

Procedure

1. Open the release unit.
2. Loosen the pins on the front and rear of the release unit.

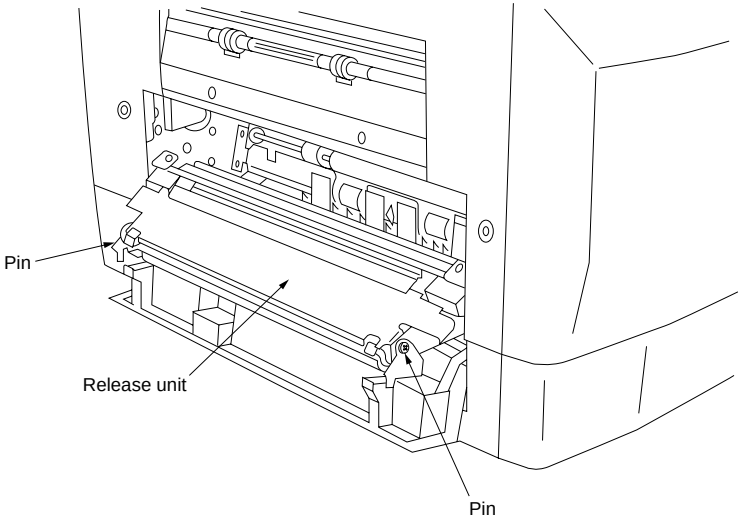


Figure 3-3-45

3. Remove the connector of the transfer unit and detach the unit.

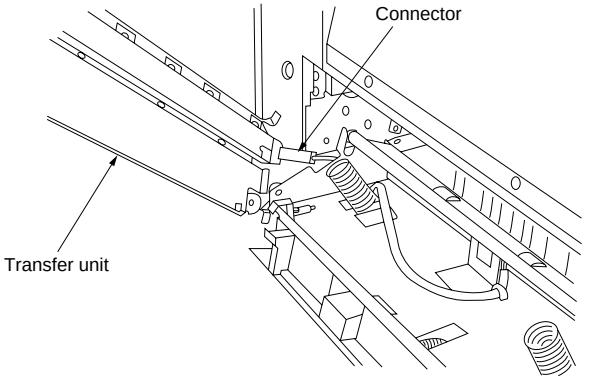


Figure 3-3-46

4. Remove the three screws and then the pre-transfer guide from the transfer unit.
5. Remove the screw holding each of the front and rear transfer stoppers and then detach the stoppers from the transfer unit.
6. Remove the transfer charger front and rear transfer lids with a straight screwdriver.
7. Remove the charger wire retainer pin and charger spring, then the charger wire.

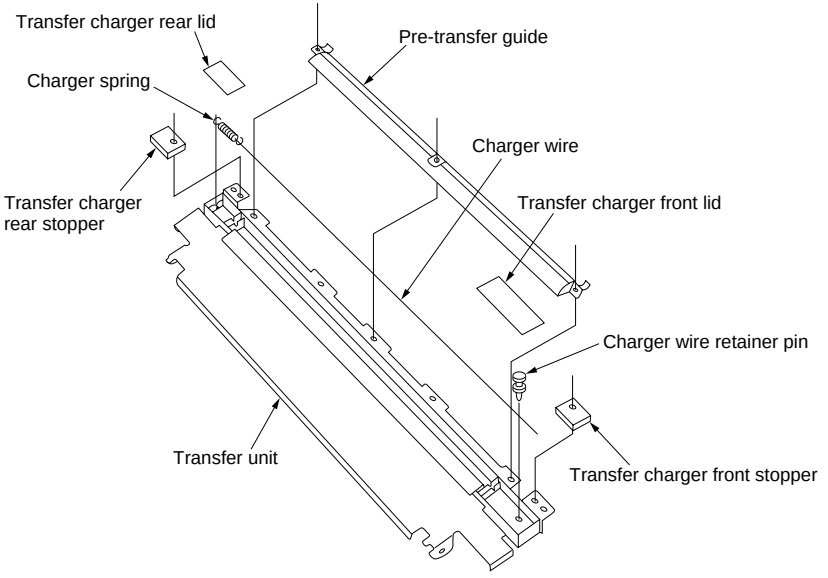


Figure 3-3-47

8. Wind the new tungsten wire at least five turns around one end of the charger spring.
   • The length of the cut wire must be less than 2 mm.
9. Hook the other end of the charger spring to the transfer charger terminal of the transfer charger rear housing.

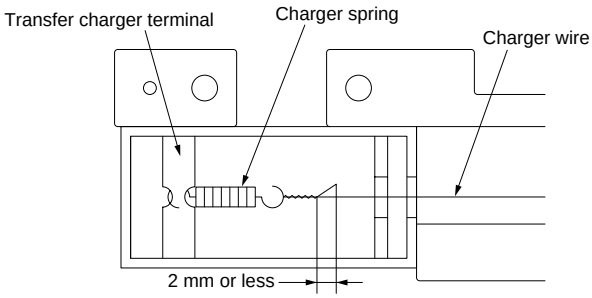


Figure 3-3-48

10. Run the wire through the notch in the charger wire retainer pin and pull it tight so that the distance from the end of the charger spring to the notch in the main charger rear housing is between 6 and 8 mm.

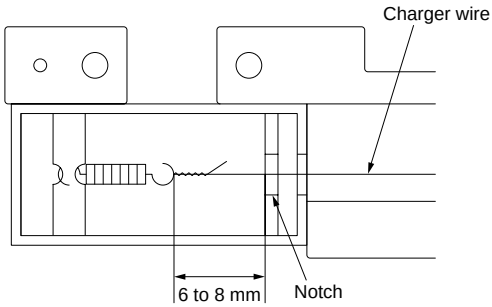


Figure 3-3-49

11. Press the retainer pin into the projection of the main charger front housing, so holding the charger wire with it.
12. Cut off the excess wire under the retainer pin so less than 2 mm protrudes.

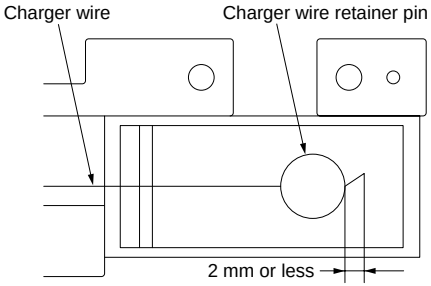


Figure 3-3-50

13. Refit the front and rear lids to the transfer charger.
    - Ensure that the larger lid is refitted to the front housing and smaller lid to the rear housing.
14. Refit all the removed parts.

3-3-8 Cleaning section (metric specification only)

(1) Replacing the cleaning blade

Replace the cleaning blade as follows.

Procedure

1. Open the front cover and take the toner cartridge out of the copier.
2. Unlock the developing unit release lever and detach the developing unit and drum unit.
3. Detach the drum from the drum unit (see page 3-3-50).
4. Remove the two screws and then the upper cleaning cover from the drum unit.

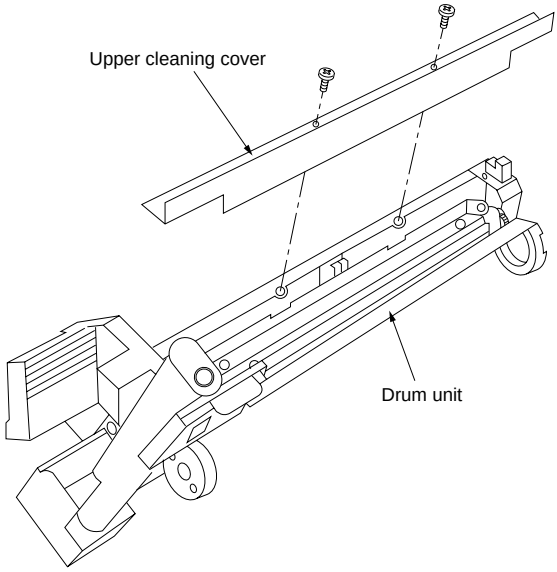


Figure 3-3-51

5. Remove the two screws and then the cleaning upper cover from the drum unit.

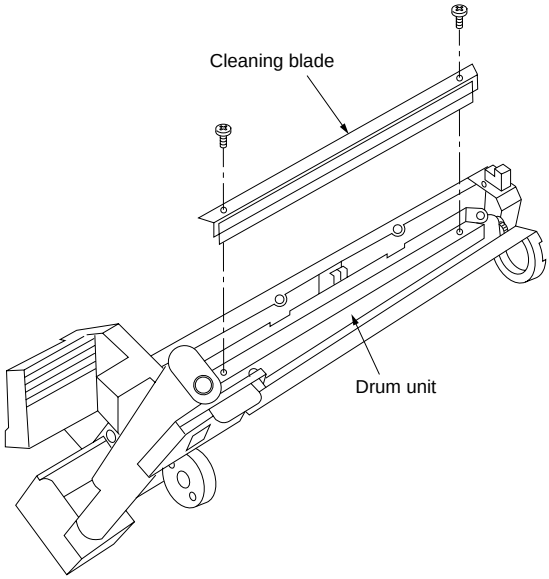


Figure 3-3-52

6. Replace the cleaning blade.
   - When fitting the cleaning blade, ensure that the projections of the drum unit are seated in the positioning holes in the cleaning blade.
7. Refit all the removed parts.

(2) Detaching and refitting the lower cleaning blade
Replace the lower cleaning blade as follows.

Procedure
1. Open the front cover and take the toner cartridge out of the copier.
2. Unlock the developing unit release lever and detach the developing unit and drum unit.
3. Detach the drum from the drum unit (see page 3-3-50).
4. Remove the two screws and then the lower cleaning blade from the drum unit.

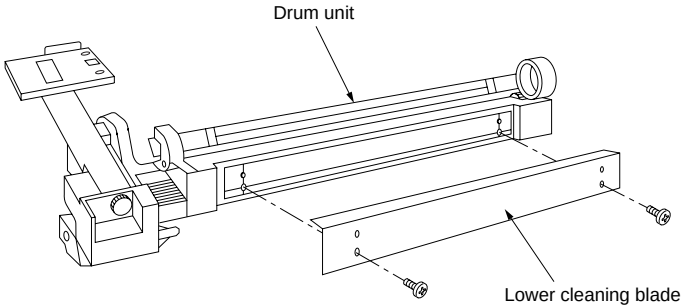


Figure 3-3-53

5. Replace the cleaning blade.
   • When fitting the lower cleaning blade, ensure that the projections of the drum unit are seated in the positioning holes in the cleaning blade.
6. Refit all the removed parts.

3-3-9 Fixing section

(1) Detaching and refitting the fixing heater
Check or replace the fixing heater as follows.

Procedure
1. Detach the left cover.
2. Remove the four connectors of the fixing unit from the copier.
3. Remove the four screws and then the fixing unit from the copier.

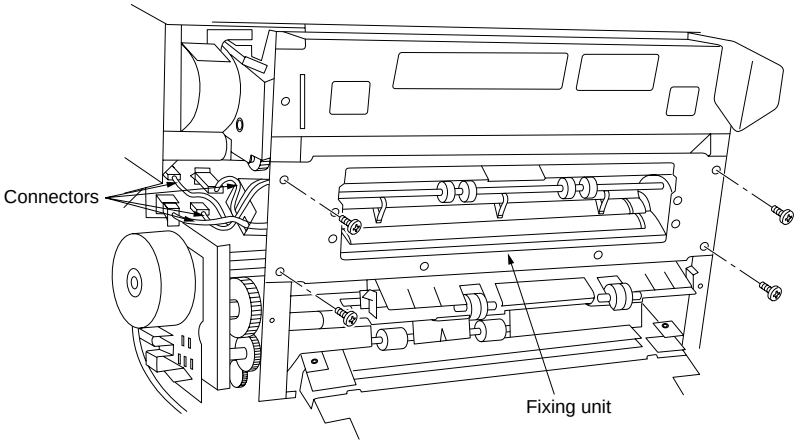


Figure 3-3-54

4. Remove the four screws and then the copy tray attachment from the fixing unit.

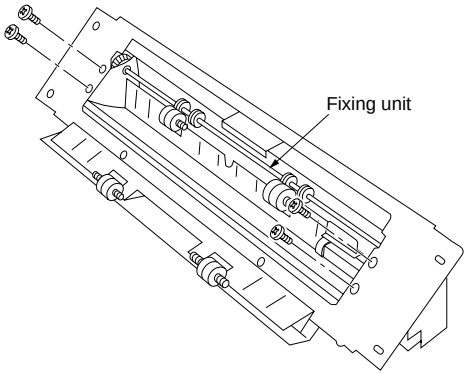


Figure 3-3-55

5. Remove the two screws and then the fixing unit cover from the fixing unit.

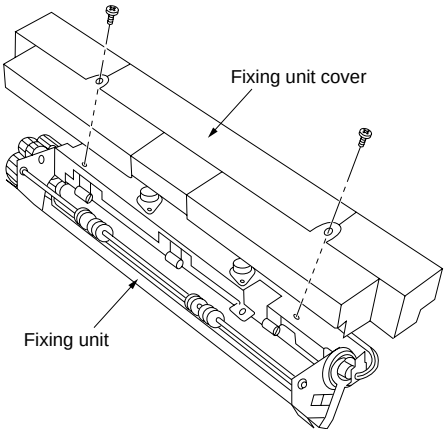


Figure 3-3-56

6. Remove the fixing unit connector from fixing thermostat 1 (on the copier front).
7. Remove the screw holding each of the front and rear heater mounts, and then detach them from the fixing unit.

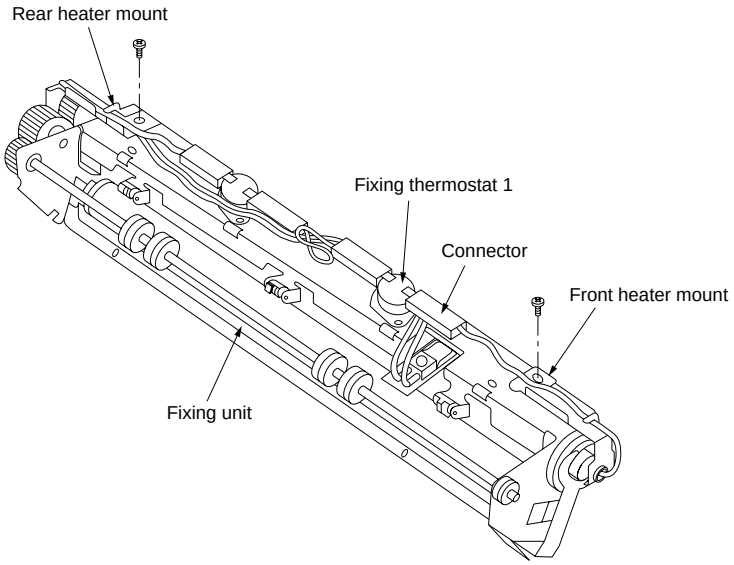


Figure 3-3-57

8. Pull the fixing heater out via the front of the fixing unit.
9. Check or replace the fixing heater.
10. Refit all the removed parts.

(2) *Detaching and refitting the fixing unit thermistor*

Check, clean or replace the fixing unit thermistor as follows.

Procedure

1. Take the fixing unit out of the copier (see page 3-3-62).
2. Remove the copy tray attachment and fixing unit cover from the fixing unit (see page 3-3-63).
3. *Remove the screw and then the fixing unit thermistor from the fixing unit.*

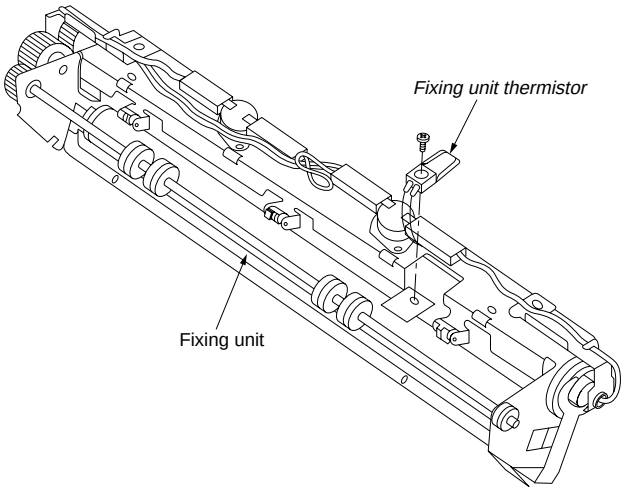


Figure 3-3-58

4. *Check, clean or replace the fixing unit thermistor.*
5. Refit all the removed parts.

(3) Detaching and refitting fixing thermostats 1 and 2

Check or replace thermostats 1 and 2 as follows.

Caution: Use the specified thermostat for replacement. Do not substitute a simple wire or similar; otherwise, the copier will be seriously damaged.

Procedure

1. Take the fixing unit out of the copier (see page 3-3-62).
2. Remove the copy tray attachment and fixing unit cover from the fixing unit (see page 3-3-63).
3. Remove the connectors of the fixing heater, fixing heater wire and thermostat relay wire from fixing thermostats 1 and 2.
4. Remove the two screws holding each of the fixing thermostats and then remove the thermostats from the fixing unit.

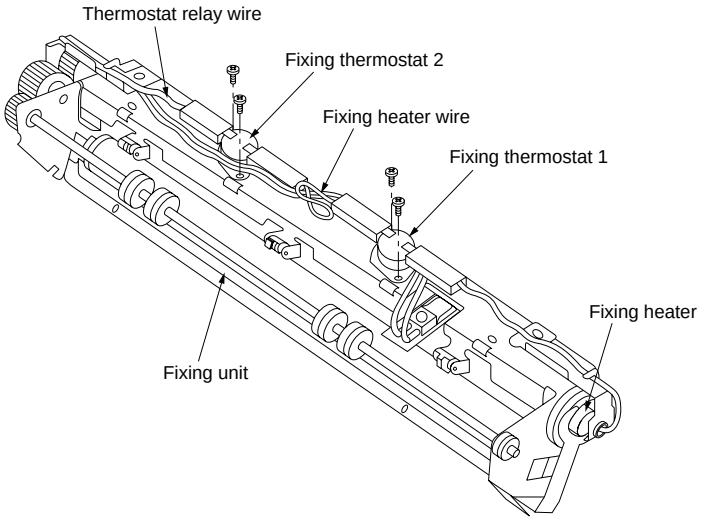


Figure 3-3-59

5. Check or replace fixing thermostat 1 and 2.
   - When fitting, check the temperature indications on the thermostats and fixing stay, and install the thermostats in the correct positions.
6. Refit all the removed parts.

(4) Detaching and refitting the press roller

Clean or replace the press roller as follows.

Procedure

1. Take the fixing unit out of the copier (see page 3-3-62).
2. Remove the copy tray attachment from the fixing unit (see page 3-3-63).
3. *Remove the fixing unit lower housing and heat roller grounding plate from the fixing unit (two screws).*

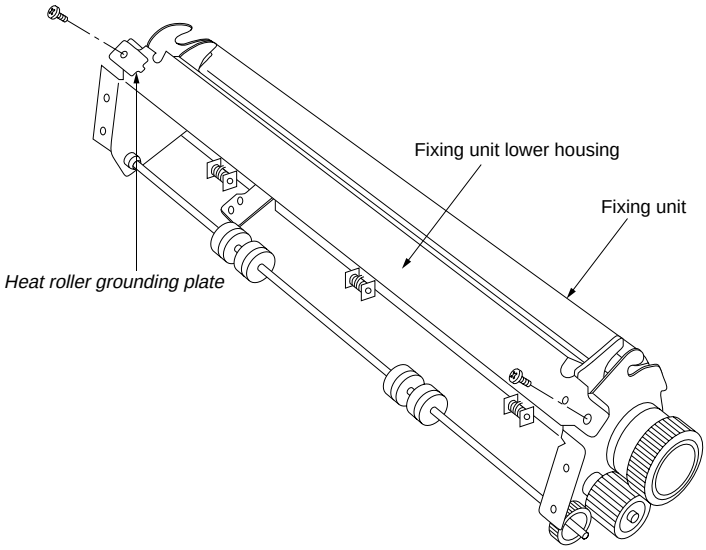


Figure 3-3-60

4. Remove the screw and then the fixing entrance guide from the fixing unit lower housing.
5. Remove the press roller from the fixing unit lower housing.

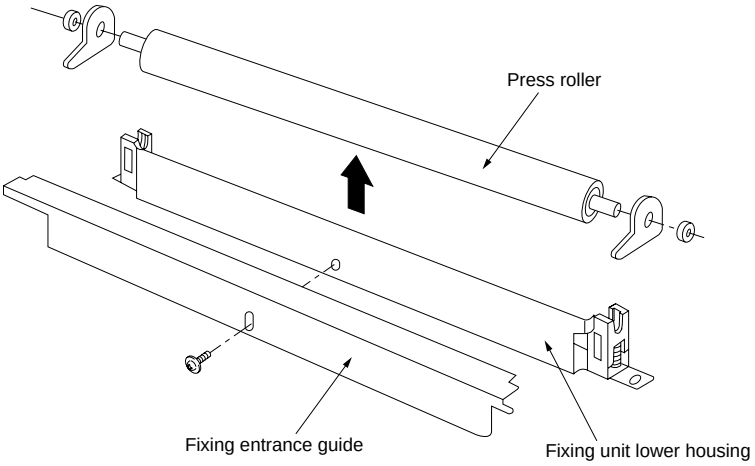


Figure 3-3-61

6. Clean or replace the press roller.
7. Refit all the removed parts.
   - Press the fixing entrance guide all the way down while refitting it.

(5) Detaching and refitting the heat roller
Clean or replace the heat roller as follows.

Procedure
1. Take the fixing unit out of the copier (see page 3-3-62).
2. Remove the copy tray attachment, fixing unit cover and fixing unit lower housing from the fixing unit (see page 3-3-63, 67).
3. Remove the three heat roller separation claws from the fixing unit (see page 3-3-71).
4. Remove the E-ring and then idle gear 20 from the fixing unit.

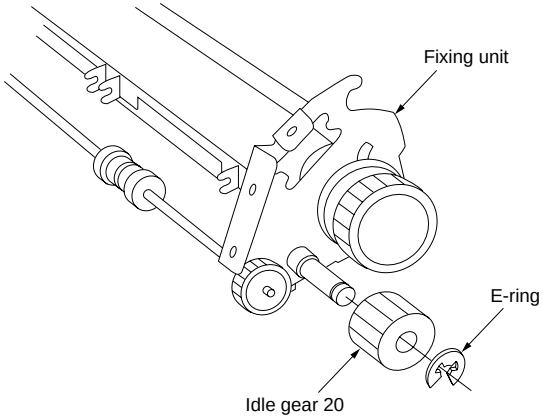


Figure 3-3-62

5. Remove the heat roller stopper on the rear of the fixing unit rear, then fixing gear 32 and the heat roller bushing.
6. Remove the heat roller stopper on the front of the fixing unit front and then detach the heat roller bushings.
7. Remove the heat roller from the fixing unit.

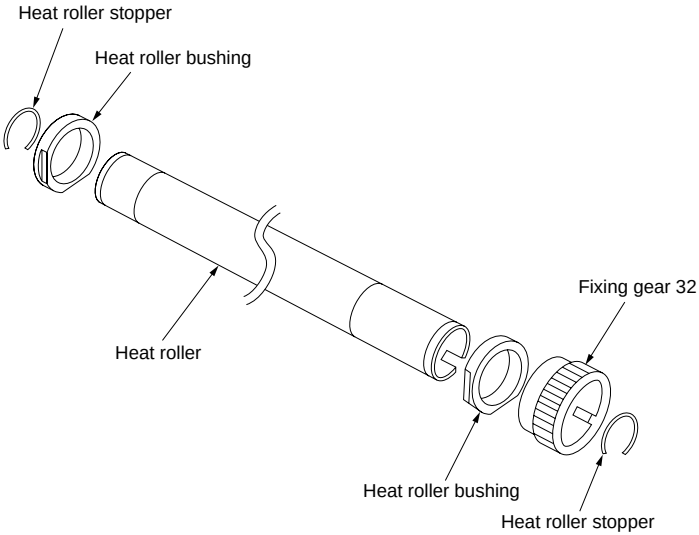


Figure 3-3-63

8. Clean or replace the heat roller.
9. Refit all the removed parts.

(6) Detaching and refitting the heat roller separation claws
Check, clean or replace the heat roller separation claws as follows.

Procedure
1. Take the fixing unit out of the copier (see page 3-3-62).
2 Remove the copy tray attachment and fixing unit cover from the fixing unit (see page 3-3-63).
3. Orient the heat roller separation claws in the direction of the arrows in the figure, and then detach them.

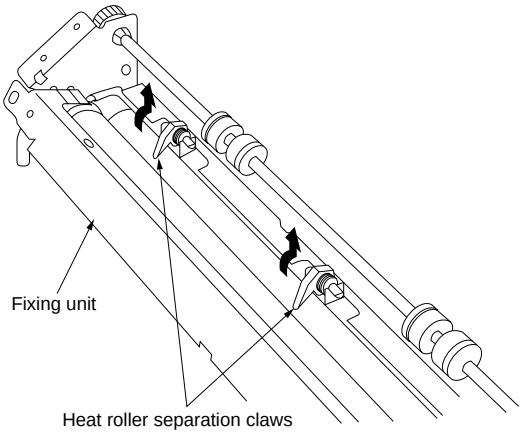


Figure 3-3-64

4. Check, clean and replace the heat roller separation claws.
5. Refit all the removed parts.

(7) Detaching and refitting the fixing blade

Perform the following procedure when checking, cleaning or replacing the fixing blade.

Procedure

1. *Take the fixing unit out of the copier (see page 3-3-62).*
2. *Remove the copy tray attachment and fixing unit cover from the fixing unit (see page 3-3-63).*
3. *Remove the screw and then the fixing unit thermistor from the fixing unit.*
4. *Remove the fixing unit thermistor and fixing blade from the fixing unit (one screw).*

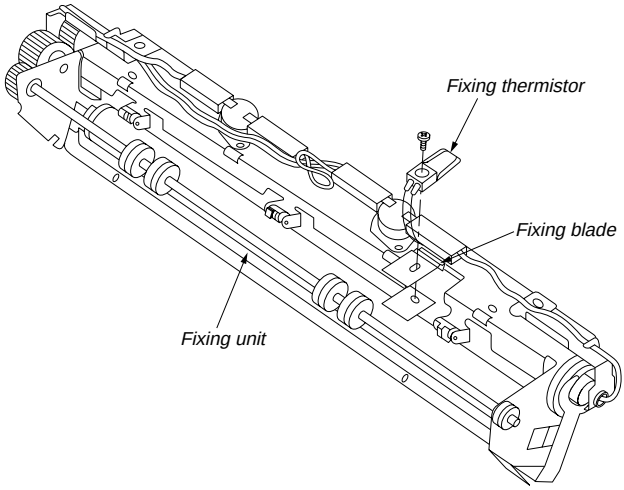


Figure 3-3-65

4. *Check, clean or replace the fixing blade.*
   When refitting the fixing blade, make sure that the blade is in contact with the heat roller.
5. *Refit all the removed parts.*

3-4 PCB Initial Setting

3-4-1 Replacing the main PCB 3-4-1
3-4-2 Adjustment-free variable resistors (VR) 3-4-3

3-4-1 Replacing the main PCB

After replacing the main PCB, remove the EEPROM from the old main PCB and fit it to the new main PCB. If the new EEPROM is used, perform the following steps.

Procedure

- Before removing the old EEPROM:
  1. Record the user settings of the following items which must be reentered after replacement.
     - Exposure mode
     - Manual exposure adjustment
     - Auto exposure adjustment
     - Auto shutoff on/off
     - Auto shutoff time
     - Auto preheat time
     - Preheat recovery time
     - Auto clear on/off
     - Auto clear time
  2. Enter simulation mode.
  3. Run simulation 73 and record the maintenance count.
  4. Exit simulation mode.
  5. Turn the main switch off and unplug the power cord.
  6. Replace the EEPROM with the new one.

• After installing the new EEPROM:

7. Insert the power plug and turn the main switch on.
8. Enter simulation mode.
9. Run simulation 70.
10. Run simulation 93 to select the destination.
11. Run the following simulations to check or reenter the data recorded on the simulation label.

Sim. No.	Contents
24	Setting the exposure amount
25	Adjusting lateral magnification
26	Adjusting longitudinal magnification
27	Making fine adjustment to image focus
28	Adjusting the auto exposure
29	Adjusting exposure amount for enlargement/reduction mode
47	Setting the fixing temperature
54	Adjusting the leading edge margin
57	Adjusting the trailing edge blank cut timing
58	Adjusting the leading edge registration timing
59	Adjusting the trailing edge margin
62	Checking/setting the toner control voltage
71	Checking/setting the maintenance cycle
73	Checking/clearing the maintenance count
85	Selecting between auto preheat on/off
89	*Setting the presence of the flicker resistor*
91	Setting operation under the toner empty condition
92	Selecting between auto start on/off
96	Setting the memory switch
98	Setting the maintenance method (available in Peru only)
99	Selecting between E2000-compliant function on/off

12. Exit simulation mode.
13. Reenter the contents of the user settings recorded in step 1.

3-4-2 Adjustment-free variable resistors (VR)

The variable resistors listed below are set at the factory prior to shipping and cannot be adjusted in the field.

- AVR PCB: VR1, VR2, VR3
- High-voltage transformer PCB: VRDB, VRDC

3-5 Self-diagnostics

3-5-1 Self diagnostic function 3-5-1
(1) Self diagnostic display 3-5-1

3-5-1 Self-diagnostic function

(1) Self-diagnostic display

This unit is equipped with a self-diagnostic function. When it detects a problem with itself, it disables copying and displays “C” and a two digit number between 01 and 76 alternately on the copy quantity/magnification display in the operation unit, indicating the nature of the problem.

After removing the problem, the self-diagnostic function can be reset by opening and closing the front cover or release unit to turn the safety switch off and back on.

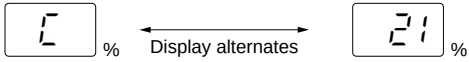


Figure3-5-1 Service call code display

Self diagnostic codes

Code	Contents	Remarks	
		Causes	Check procedures/corrective measures
C01	**Backup memory data problem** • Abnormal data is written on the EEPROM (IC8).	Backup memory data problem.	Turn the main switch off and on, then run simulation 70 and re-enter the backup memory contents.
		Defective main PCB or EEPROM (IC8).	If C01 persists after re-entering the backup memory contents, replace the main PCB or EEPROM (IC8).
C02	**EEPROM write problem** • The copier does not enter RDY state more than 1 s after starting to write data to EEPROM (IC8).	Defective Main PCB.	Replace the main PCB and check for correct operation.
		Defective EEPROM (IC8).	Replace the EEPROM (IC8) and check for correct operation.
C21	**Drive motor problem** • The drive motor alarm signal (DM ALM) is detected more than 2 s after the drive motor has been turned on.	Defective rotation control circuit in the drive motor.	Replace the drive motor.
		Poor contact in the connector terminals.	Check for continuity across the connector terminals. If none, replace them.
		Defective drive transmission system.	Check if rollers and gears rotate smoothly. If not, grease the bushings and gears. Check for broken gears and replace if any.
		Defective main PCB.	Replace the main PCB and check for correct operation.
C30	**Scanner motor problem** • The home position switch does not turn off within 5 s after the scanner motor has started forward rotation. • The home position switch does not turn on within 7 s after the scanner motor has started reverse rotation.	Broken scanner motor coil.	Check for the continuity across the scanner motor coil. If none, replace the scanner motor.
		Defective home position switch.	Check if CN10-2 on the main PCB goes high when the home position switch is on and goes low when the switch is off. If not, replace the home position switch.
		Poor contact in the home position switch connector terminals.	Check for continuity across the home position switch connector terminals. If none, replace them.

Code	Contents	Remarks	
		Causes	Check procedures/corrective measures
C30	**Scanner motor problem** • The home position switch does not turn off within 5 s after the scanner motor has started forward rotation. • The home position switch does not turn on within 7 s after the scanner motor has started reverse rotation.	Loose scanner drive belt.	Reinstall the scanner drive belt and adjust the tension.
		Loose scanner wire.	Reinstall the wire.
		Loose screws holding the scanner wire retainers.	Retighten the screws and adjust the image focus.
		Defective main PCB.	Replace the main PCB and check for correct operation.
C41	**Lens motor problem** • The lens home position switch does not turn on or off within 5 s after initial operation has started.	Defective lens motor.	Check for continuity across the coil. If none, replace the lens motor.
		Defective lens home position switch.	Check if CN12-9 on the main PCB goes high when the lens home position switch is on and goes low when the switch is off. If not, replace the lens home position switch.
		Poor contact in the lens home position switch connector terminals.	Check for continuity across the connector terminals. If none, replace them.
		Defective main PCB.	Replace the main PCB and check for correct operation.
C42	**Mirror motor problem** • The mirror home position switch does not turn on or off within 4 s after initial operation has started.	Defective mirror motor.	Check for continuity across the coil. If none, replace the mirror motor.
		Defective mirror home position switch.	Check if CN12-3 on the main PCB goes high when the mirror home position switch is on and goes low when the switch is off. If not, replace the mirror home position switch.
		Poor contact in the mirror home position switch connector terminals.	Check for continuity across the connector terminals. If none, replace them.
		Defective main PCB.	Replace the main PCB and check for correct operation.

Code	Contents	Remarks	
		Causes	Check procedures/corrective measures
C50	**Main/transfer high-voltage problem** • The high-voltage alarm signal (HV ALM) is detected more than 2 s after the main high-voltage output has been turned on.	Broken main charger wire.	Check the charger wire visually. If it is broken, replace it.
		The main charger leaks.	Check the main charger housing. If it is dirty, clean it.
		Broken transfer charger wire.	Check the transfer charger wire visually. If it is broken, replace it.
		The transfer charger leaks.	Check the transfer charger housing. If it is dirty, clean it.
		Defective high-voltage transformer PCB.	Detach the main or transfer charger assembly; if C50 persists, replace the high-voltage transformer PCB.
		Defective main PCB.	Replace the main PCB and check for correct operation.
C61	**Broken fixing heater filament** • The fixing stabilization temperature is not reached within 60 s after fixing control has started. • The fixing temperature drops below 80°C/176°F (fixing unit thermistor output voltage: 1.06 V DC) after having reached the stabilization level.	Broken fixing heater filament.	Check for continuity. If none, replace the fixing heater.
		Fixing heater installed incorrectly.	Check the fixing heater and reinstall if necessary.
		Fixing unit thermostats 1 and 2 triggered.	Check for continuity. If none, replace fixing unit thermostats 1 and 2.
		Fixing unit thermistor installed incorrectly.	Check the fixing unit thermistor and reinstall if necessary.
		Defective main PCB.	Replace the main PCB and check for correct operation.

Code	Contents	Remarks	
		Causes	Check procedures/corrective measures
C63	**Broken fixing unit thermistor wire** • The fixing unit thermistor output voltage does not exceed 0.039 V DC within 7 s after fixing control has started with the fixing temperature remaining below 100°C/212°F (fixing unit thermistor output voltage: 1.71 V DC).	Broken fixing unit thermistor.	Measure the resistance. If it is ∞ Ω, replace the fixing unit thermistor.
		Poor contact in the fixing unit thermistor connector terminals.	Check for continuity across the connector terminals. If none, replace them.
		Defective main PCB.	Replace the main PCB and check for correct operation.
C64	**Shorted fixing unit thermistor/ abnormally high temperature** • The fixing temperature exceeds 250°C/ 482°F (fixing unit thermistor output voltage: 4.73 V DC).	Shorted fixing unit thermistor.	Measure the resistance. If it is 0 Ω, replace the fixing unit thermistor.
		Defective main PCB.	Replace the main PCB and check for correct operation.
C74	**Broken external temperature thermistor wire** • The external temperature thermistor output is below 0.3 V DC.	Poor contact in the humidity sensor PCB connectors.	Check that the connectors are inserted properly.
		Broken external temperature thermistor wire.	Measure the resistance across the external temperature thermistor. If it is ∞ Ω, replace the humidity sensor PCB.
		Defective main PCB.	Replace the main PCB and check for correct operation.

Code	Contents	Remarks	
		Causes	Check procedures/corrective measures
C75	**Shorted external temperature thermistor** • The external temperature thermistor output is above 4.3 V DC.	Shorted external temperature thermistor.	Measure the resistance across the external temperature thermistor. If it is 0 Ω, replace the humidity sensor PCB.
		Defective main PCB.	Replace the main PCB and check for correct operation.
C76*	**Developing unit fuse problem** • The developing unit fuse does not blow within 2 s of power being applied to it, just before the developing unit initialization ends.	Poor contact in the connector.	Check the contacts.
		Defective developing unit fuse.	Replace the developing unit fuse and check for correct operation.

* Only for 120 V, 220 V and 240 V specifications.

3-6 Troubleshooting

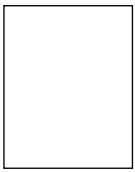
3-6-1 Image formation problems 3-6-1
(1) No image (entirely white). 3-6-3
(2) No image (entirely black). 3-6-4
(3) Image is too light. 3-6-5
(4) Background is visible. 3-6-5
(5) A white line appears longitudinally. 3-6-6
(6) A black line appears longitudinally. 3-6-6
(7) A black line appears laterally. 3-6-7
(8) One side of the copy image is darker than the other. 3-6-8
(9) Black dots appear on the image. 3-6-8
(10) Image is blurred. 3-6-9
(11) The leading edge of the image is consistently misaligned with the original. 3-6-9
(12) The leading edge of the image is sporadically misaligned with the original. 3-6-10
(13) Paper creases. 3-6-10
(14) Offset occurs. 3-6-11
(15) Black lines appear on both sides of the image in reducation copies. 3-6-12
(16) Image is partly missing. 3-6-12
(17) Fixing is poor. 3-6-13
(18) Image is out of focus. 3-6-13
(19) Image is not square longitudinally. 3-6-13
(20) Image is not square laterally. 3-6-14
(21) Image is partially missing laterally. 3-6-14
3-6-2 Paper misfeeds 3-6-15
(1) A paper jam in the registration section is detected as soon as the main switch is turned on (J03 appears). 3-6-15
(2) A paper jam in the eject section is detected as soon as the main switch is turned on (J02 appears). 3-6-15
(3) A paper jam in the paper drawer is detected during copying (PF appears). 3-6-15
(4) A paper jam in the registration section is detected during copying (J03 appears). 3-6-16
(5) A paper jam in the fixing section is detected during copying (J01 appears). 3-6-16
(6) A paper jam in the eject section is detected during copying (J02 appears). 3-6-16
3-6-3 PCB terminal voltages 3-6-17
(1) Power source PCB 3-6-17
(2) Main PCB 3-6-19
(3) AVR PCB 3-6-22
(4) Operation unit PCB 3-6-24

3-6-4 Electrical problems 3-6-25
(1) The machine does not operate when the main switch is turned on. 3-6-25
(2) The drive motor does not operate (C21). 3-6-25
(3) The scanner motor does not operate (C30). 3-6-25
(4) The lens motor does not operate (C41). 3-6-26
(5) The mirror motor does not operate (C42). 3-6-26
(6) The toner feed motor does not operate. 3-6-26
(7) The optical section fan motor does not operate. 3-6-26
(8) The fixing unit fan motor does not operate. 3-6-27
(9) The internal cooling fan motor does not operate. 3-6-27
(10) The paper feed clutch does not operate. 3-6-27
(11) The registration clutch does not operate. 3-6-27
(12) The halogen lamp does not light. 3-6-28
(13) The halogen lamp does not turn off. 3-6-28
(14) The cleaning lamp does not light. 3-6-28
(15) The fixing heater does not turn on (C61, C63). 3-6-28
(16) The fixing heater does not turn off (fixing unit thermostat triggered, C64). 3-6-28
(17) Main charging does not take place (C50). 3-6-29
(18) Transfer charging does not take place (C50). 3-6-29
(19) No developing bias is output. 3-6-29
(20) A paper jam is indicated as soon as the main switch is turned on. 3-6-30
(21) Others. 3-6-30
3-6-5 Mechanical problems 3-6-31
(1) No primary paper feed. 3-6-31
(2) No secondary paper feed. 3-6-31
(3) Skewed paper feed. 3-6-31
(4) The scanner does not travel. 3-6-31
(5) Multiple sheets of paper are fed at one time. 3-6-31
(6) Paper jams. 3-6-31
(7) Toner drops on the paper conveying path. 3-6-31
(8) Abnormal noise is heard. 3-6-32

3-6-1 Image formation problems

Contents

(1) No image (entirely white).



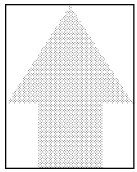
See page 3-6-3.

(2) No image (entirely black).



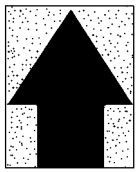
See page 3-6-4.

(3) Image is too light.



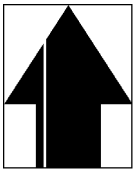
See page 3-6-5.

(4) Background is visible.



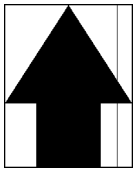
See page 3-6-5.

(5) A white line appears longitudinally.



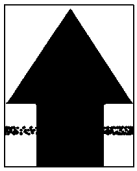
See page 3-6-6.

(6) A black line appears longitudinally.



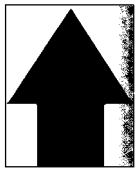
See page 3-6-6.

(7) A black line appears laterally.



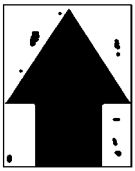
See page 3-6-7.

(8) One side of the copy image is darker than the other.



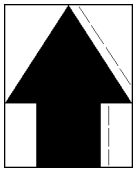
See page 3-6-8.

(9) Black dots appear on the image.



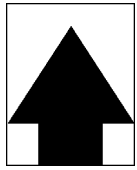
See page 3-6-8.

(10) Image is blurred.



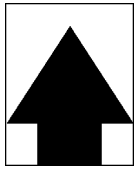
See page 3-6-9.

(11) The leading edge of the image is consistently misaligned with the original.



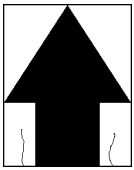
See page 3-6-9.

(12) The leading edge of the image is sporadically misaligned with the original.



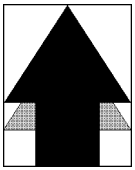
See page 3-6-10.

(13) Paper creases.



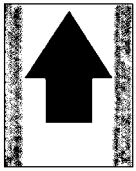
See page 3-6-10.

(14) Offset occurs.



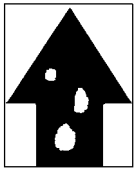
See page 3-6-11.

(15) Black lines appear on both sides of the image in reduction copies.



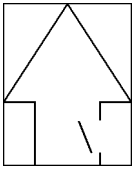
See page 3-6-12.

(16) Image is partly missing.



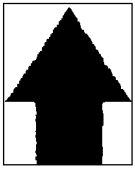
See page 3-6-12.

(17) Fixing is poor.



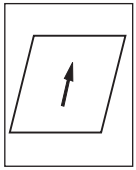
See page 3-6-13.

(18) Image is out of focus.



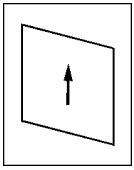
See page 3-6-13.

(19) Image is not square longitudinally.



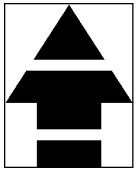
See page 3-6-13.

(20) Image is not square laterally.



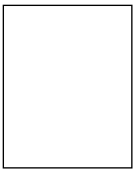
See page 3-6-14.

(21) Image is partially missing laterally.



See page 3-6-14.

(1) No image (entirely white).



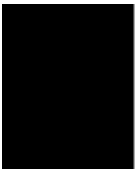
Causes

1. No original present.
2. No main charging.
3. No transfer charging.
4. All blank lamps on.
5. Developing section not driven.

Causes	Check procedures/corrective measures
1. No original present.	Place an original in the correct position.
2. No main charging.	
A. Broken main charger wire.	Replace the wire.
B. Leaking main charger housing.	Clean the main charger housing.
C. The connector terminals of the high-voltage transformer PCB make poor contact.	Check for continuity across the terminals. If none, replace them.
D. Defective main PCB.	Run simulation 33 and check if CN8-4 on the main PCB goes low. If not, replace the main PCB.
E. Defective high-voltage transformer PCB.	If main charging does not take place during simulation 33 after the main PCB has been found to be normal, replace the high-voltage transformer PCB.
3. No transfer charging.	
A. Broken transfer charger wire.	Replace the wire.
B. Leaking transfer charger housing.	Clean the transfer charger housing.
C. The connector terminals of the high-voltage transformer PCB make poor contact.	Check for continuity across the terminals. If none, replace them.
D. Defective main PCB.	Run simulation 33 and check if CN8-4 on the main PCB goes low. If not, replace the main PCB.
E. Defective high-voltage transformer PCB.	If transfer charging does not take place during simulation 33 after the main PCB has been found to be normal, replace the high-voltage transformer PCB.
4. All blank lamps on.	Run simulation 42 and if the check pattern copy is not obtained, replace the main PCB.
5. Developing section not driven.	Check the gears driving the developing section and replace any broken gears.

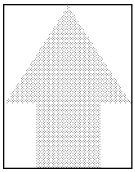
(2) No image (entirely black).

Causes
1. Broken halogen lamp filament.
2. Halogen lamp fails to light.



Causes	Check procedures/corrective measures
1. Broken halogen lamp filament.	Take the halogen lamp out of the unit and check for continuity across the terminals. If none, replace it (see page 3-3-16).
2. Halogen lamp fails to light.	
A. The optical section thermostat is triggered.	Check for continuity. If none, replace the thermostat after determining the cause (see page 3-3-17).
B. The connector terminals of the AVR PCB make poor contact.	Check for continuity across the terminals. If none, replace them.
C. Defective main PCB.	Run simulation 20 and check if CN7-10 on the main PCB remains low. If it does, replace the main PCB.
D. Defective AVR PCB.	If the halogen lamp does not light during simulation 20 after the main PCB has been found to be normal, replace the AVR PCB.

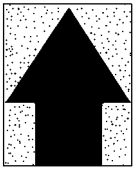
(3) Image is too light.



Causes
1. Insufficient toner.
2. Deteriorated developer.
3. Misadjusted developing section.
4. Dirty or deteriorated drum.

Causes	Check procedures/corrective measures
1. Insufficient toner.	If the add toner indicator is on, replace the cartridge.
2. Deteriorated developer.	Check the number of copies made with the current developer. If it has reached the specified limit, replace the developer.
3. Misadjusted developing section.	Adjust the developing section.
4. Dirty or deteriorated drum.	Clean the drum. If the maintenance level has been reached, replace it (see page 3-3-50).

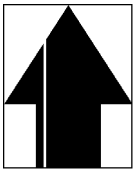
(4) Background is visible.



Causes
1. Dirty optical section.
2. Deteriorated developer.

Causes	Check procedures/corrective measures
1. Dirty optical section.	Clean the main and auxiliary reflectors, mirrors and other parts in the optical section.
2. Deteriorated developer.	Check the number of copies made with the current developer. If it has reached the specified limit, replace the developer.

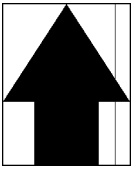
(5) A white line appears longitudinally.



Causes
1. Dirty or flawed main charger wire.
2. Foreign matter in the developing section.
3. Flawed drum.

Causes	Check procedures/corrective measures
1. Dirty or flawed main charger wire.	Clean the main charger wire. If the wire is flawed, replace it.
2. Foreign matter in the developing section.	Check if the magnetic brush is formed uniformly. If not, replace the developer.
3. Flawed drum.	Replace the drum (see page 3-3-50).

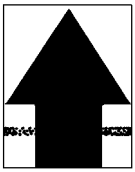
(6) A black line appears longitudinally.



Causes
1. Dirty optical section.
2. Dirty or flawed drum.
3. Deformed or worn cleaning blade.
4. Dirty or flawed main charger grid.

Causes	Check procedures/corrective measures
1. Dirty optical section.	Clean the mirrors, dust filter and other parts in the optical section.
2. Dirty or flawed drum.	Clean the drum or, if it is flawed, replace it (see page 3-3-50).
3. Deformed or worn cleaning blade.	Check visually if the edge of the cleaning blade is deformed or worn. If it is, replace (see page 3-3-59).
4. Dirty or flawed main charger grid.	Replace the main charger grid.

(7) A black line appears laterally.

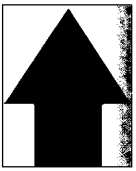


Causes
1. Flawed drum.
2. Poor developing bias wire contact.
3. Dirty developing section.
4. No developing bias output.

Causes	Check procedures/corrective measures
1. Flawed drum.	Check the drum visually. If it is flawed, replace it (see page 3-3-50).
2. Poor developing bias wire contact.	Check for poor developing bias wire contact.
3. Dirty developing section.	Clean any part contaminated with toner or carrier in the developing section.
4. No developing bias output.	
A. Shorted developing bias wire or it makes poor contact.	Check the developing bias wire. If there is any problem, replace it.
B. Defective main PCB.	Run simulation 10 and check if CN8-5 on the main PCB goes low. If not, replace the main PCB.
C. Defective high-voltage transformer PCB.	If no developing bias voltage is output during simulation 10 after the main PCB has been found to be normal, replace the high-voltage transformer PCB.

(8) One side of the copy image is darker than the other.

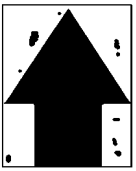
Causes
1. Unevenly distributed halogen lamp light.
2. Dirty optical section.
3. Dirty main charger wire or grid.



Causes	Check procedures/corrective measures
1. Unevenly distributed halogen lamp light.	Adjust the positions of the light adjusters (see page 3-3-18).
2. Dirty optical section.	Clean the mirrors, dust filter and any other dirty parts in the optical section.
3. Dirty main charger wire or grid.	Check if the main charger wire or grid is dirty. If it is, replace it.

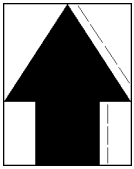
(9) Black dots appear on the image.

Causes
1. Dirty or flawed drum.
2. Dirty contact glass.
3. Deformed cleaning blade.



Causes	Check procedures/corrective measures
1. Dirty or flawed drum.	Clean the drum or, if it is flawed, replace it (see page 3-3-50).
2. Dirty contact glass.	Clean the contact glass.
3. Deformed cleaning blade.	Replace the cleaning blade if it is deformed (see page 3-3-59).

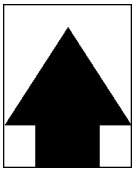
(10) Image is blurred.



Causes
1. Scanner moving erratically.
2. Foreign matter on the scanner rail.
3. Deformed press roller.
4. Drive system problem.

Causes	Check procedures/corrective measures
1. Scanner moving erratically.	Adjust the tension of the scanner wire (see page 3-3-19).
2. Foreign matter on the scanner rail.	Check visually and remove, if any.
3. Deformed press roller.	Check visually and replace (see page 3-3-67).
4. Drive system problem.	Check the gears and belts. Grease the gears or readjust the belt tension if necessary.

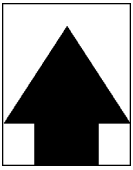
(11) The leading edge of the image is consistently misaligned with the original.



Causes
1. Misadjusted leading edge registration.

Causes	Check procedures/corrective measures
1. Misadjusted leading edge registration.	Readjust the leading edge registration timing (see page 3-3-5).

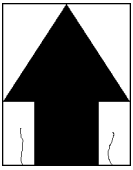
(12) The leading edge of the image is sporadically misaligned with the original.



Causes
1. Registration clutch is installed or operating incorrectly.

Causes	Check procedures/corrective measures
1. Registration clutch is installed or operating incorrectly.	Check the installation position and operation of the registration clutch.

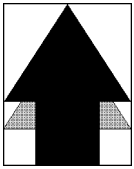
(13) Paper creases.



Causes
1. Paper curled.
2. Paper damp.
3. Defective fixing pressure springs.

Causes	Check procedures/corrective measures
1. Paper curled.	Check the paper storage conditions.
2. Paper damp.	Check the paper storage conditions.
3. Defective fixing pressure springs.	Replace the fixing pressure springs.

(14) Offset occurs.

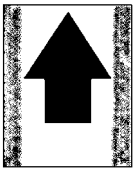


Causes
1. Cleaning blade installed in the wrong position.
2. Defective cleaning blade.
3. Cleaning lamp fails to light.
4. Abnormally high heat roller control temperature.

Causes	Check procedures/corrective measures
1. Cleaning blade installed in the wrong position.	Check the installation position of the cleaning blade and correct it, if necessary (see page 3-3-59).
2. Defective cleaning blade.	Replace the cleaning blade.
3. Cleaning lamp fails to light.	
A. The connector terminals of the cleaning lamp make poor contact.	Check for continuity across the terminals. If none, replace them.
B. Defective cleaning lamp.	Check for one-way continuity across all the LEDs comprising the cleaning lamp. If none, replace the cleaning lamp.
C. Defective main PCB.	Force CN7-4 on the main PCB to go low and check if the cleaning lamp lights. If it does, replace the main PCB.
4. Abnormally high heat roller control temperature.	Check if the fixing unit thermistor is installed correctly.

(15) Black lines appear on both sides of the image in reduction copies.

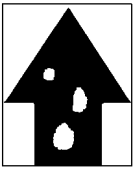
Causes
1. Dirty blank lamps.
2. Defective blank lamps.
3. Defective main PCB.



Causes	Check procedures/corrective measures
1. Dirty blank lamps.	Clean the blank lamps.
2. Defective blank lamps.	Check for one-way continuity across all the LEDs comprising the blank lamps. If none, replace the blank lamp unit.
3. Defective main PCB.	Check for signal level changes on the main PCB. Replace the main PCB if necessary.

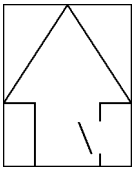
(16) Image is partly missing.

Causes
1. Paper damp.
2. Paper creased.
3. Drum condensation.
4. Flawed drum.



Causes	Check procedures/corrective measures
1. Paper damp.	Check the paper storage conditions.
2. Paper creased.	Change the paper.
3. Drum condensation.	Clean the drum (see page 3-3-52).
4. Flawed drum.	Replace the drum (see page 3-3-50).

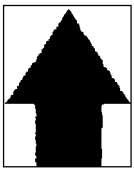
(17) Fixing is poor.



Causes
1. Wrong paper.
2. Defective fixing pressure springs.
3. Flawed press roller.

Causes	Check procedures/corrective measures
1. Wrong paper.	Check if the paper meets specifications.
2. Defective fixing pressure springs.	Replace the fixing pressure springs.
3. Flawed press roller.	Replace the press roller (page 3-3-67).

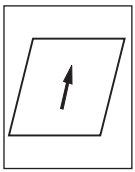
(18) Image is out of focus



Causes
1. Incorrect focus adjustment.

Causes	Check procedures/corrective measures
1. Incorrect focus adjustment.	Adjust the focus of the image (see page 3-3-32).

(19) Image is not square longitudinally.

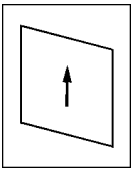


Causes
1. The horizontal alignment of light source unit 2 is adjusted incorrectly.

Causes	Check procedures/corrective measures
1. The horizontal alignment of light source unit 2 is adjusted incorrectly.	Adjust the longitudinal squareness of the image (see page 3-3-30).

(20) Image is not square laterally.

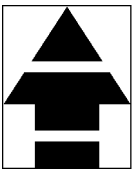
Causes
1. The vertical alignment of light source unit 2 is adjusted incorrectly.



Causes	Check procedures/corrective measures
1. The vertical alignment of light source unit 2 is adjusted incorrectly.	Adjust the lateral squareness of the image (see page 3-3-31).

(21) Image is partially missing laterally.

Causes
1. Registration clutch incorrectly installed or malfunctioning.
2. Paper feed clutch incorrectly installed or malfunctioning.



Causes	Check procedures/corrective measures
1. Registration clutch incorrectly installed or malfunctioning.	Check and correct the clutch installation condition and its operation.
2. Paper feed clutch incorrectly installed or malfunctioning.	Check and correct the clutch installation condition and its operation.

3-6-2 Paper misfeeds

Problem	Causes/check procedures	Corrective measure
(1) A paper jam in the registration section is detected as soon as the main switch is turned on (J03 appears).	A piece of paper torn from copy paper is caught around the registration switch.	Check visually and remove it, if any.
	Defective registration switch.	With 5 V DC present at CN5-1 on the AVR PCB, check if CN5-2 on the AVR PCB remains low when the registration switch is turned on and off. If it does, replace the registration switch.
(2) A paper jam in the eject section is detected as soon as the main switch is turned on (J02 appears).	A piece of paper torn from copy paper is caught around the eject switch.	Check visually and remove it, if any.
	Defective eject switch.	With 5 V DC present at CN11-1 on the AVR PCB, check if CN11-3 on the AVR PCB remains low when the eject switch is turned on and off. If it does, replace the eject switch.
(3) A paper jam in the paper drawer is detected during copying (PF appears).	Paper in the drawer is extremely curled.	Change the paper.
	Check if the front or rear claws inside the paper drawer are deformed.	Remedy if deformed.
	Check if the springs inside the paper drawer are deformed.	Remedy if deformed.
	Check if paper feed pulleys A and B are deformed.	Replace if deformed.
	Defective registration switch.	With 5 V DC present at CN5-1 on the AVR PCB, check if CN5-2 on the AVR PCB goes low when the registration switch is turned on. If not, replace the registration switch.
	Check if the paper feed clutch malfunctions.	Remedy if necessary.
	Electrical problem with the paper feed clutch.	See page 3-6-27.

Problem	Causes/check procedures	Corrective measure
(4) A paper jam in the registration section is detected during copying (J03 appears).	Check if the contact between the feed rollers and feed pulleys is correct.	Remedy if necessary.
	Check if the contact between the right and left registration rollers is correct.	Remedy if necessary.
	The registration clutch malfunctions.	Check and remedy.
	Electrical problem with the registration clutch.	See page 3-6-27.
(5) A paper jam in the fixing section is detected during copying (J01 appears).	Check if the contact between the right and left registration rollers is correct.	Remedy if necessary.
	Defective eject switch.	With 5 V DC present at CN11-1 on the AVR PCB, check if CN11-3 on the AVR PCB goes low when the eject switch is turned on. If not, replace the eject switch.
	The registration clutch malfunctions.	Check and remedy.
	Electrical problem with the registration clutch.	See page 3-6-27.
(6) A paper jam in the eject section is detected during copying (J02 appears).	Check if the press roller is extremely dirty or deformed.	Clean or replace the press roller (see page 3-3-67).
	Check if the heat roller separation claws are extremely dirty or deformed.	Clean or replace the heat roller separation claws (see page 3-3-71).
	Check if the contact between the eject rollers and pulleys is correct.	Remedy if necessary.

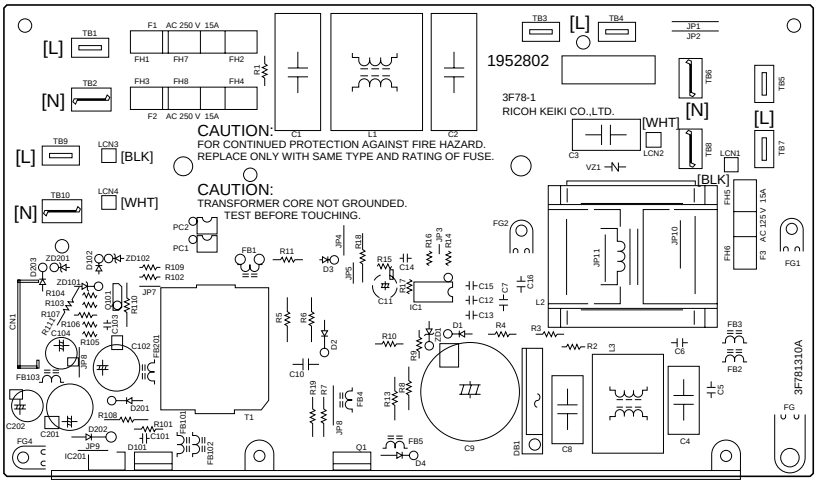
3-6-3 PCB terminal voltages

Precautions

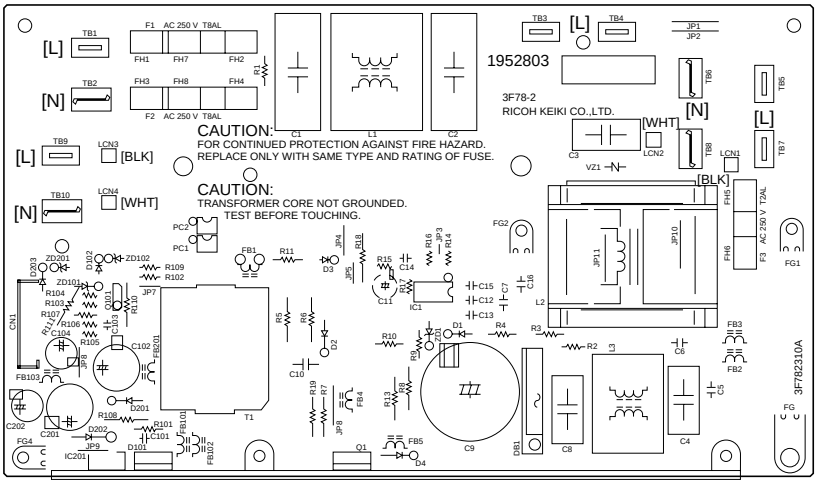
- When handling PCBs, do not touch connectors with bare hands or damage the board.
- Do not touch any PCB containing ICs with bare hands or any object prone to static charge.
- Store PCBs wrapped in aluminum foil, conductive sponge rubber or similar material.

(1) Power source PCB

120 V specifications



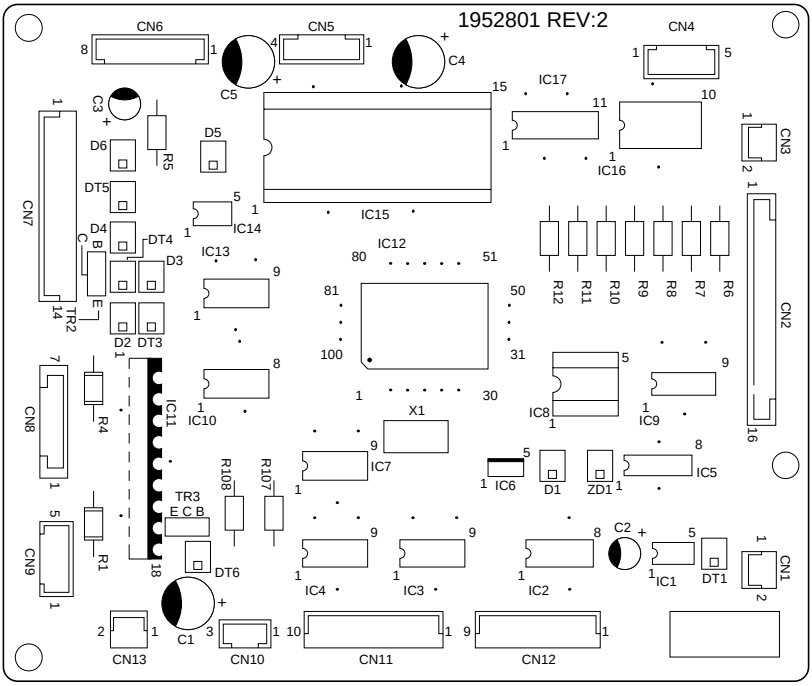
220 - 240 V specifications



Terminals (CN)		Voltage	Remarks
TB1	TB2	120 V AC 220 - 240 V AC	AC supply, input
TB3	TB2	120 V AC 220 - 240 V AC	AC supply for MSW, output
TB4	TB2	120 V AC 220 - 240 V AC	AC supply, input
TB5	TB6	120 V AC 220 - 240 V AC	AC supply for SSW, output
TB7	TB8	120 V AC 220 - 240 V AC	AC supply, input
TB9	TB10	120 V AC 220 - 240 V AC	AC supply for AVRPCB and DH*, output
1-1 1-2 1-7 1-8	1-3 1-4 1-5 1-6	24 V DC 24 V DC 5 V DC 5 V DC	24 V DC supply for MPCB, output 24 V DC supply for AVRPCB, output 5 V DC supply for MPCB, output 5 V DC supply AVRPCB, output

* Option available only for 120 V specifications.

(2) Main PCB



Terminals (CN)		Voltage	Remarks
1-1	5-2	24 V DC	24 V DC supply for MSW, output
1-2	5-2	24 V DC	MSW on/off, output
2-1	5-2	24/0 V DC (pulse)	OPCB LED lighting signal, output (SEG a)
2-2	5-2	24/0 V DC (pulse)	OPCB LED lighting signal, output (SEG b)
2-3	5-2	24/0 V DC (pulse)	OPCB LED lighting signal, output (SEG c)
2-4	5-2	24/0 V DC (pulse)	OPCB LED lighting signal, output (SEG d)
2-5	5-2	24/0 V DC (pulse)	OPCB LED lighting signal, output (SEG e)
2-6	5-2	24/0 V DC (pulse)	OPCB LED lighting signal, output (SEG f)
2-7	5-2	24/0 V DC (pulse)	OPCB LED lighting signal, output (SEG g)
2-8	5-2	24/0 V DC (pulse)	OPCB scan sink, output (DIG 0)
2-9	5-2	24/0 V DC (pulse)	OPCB scan sink, output (DIG 1)
2-10	5-2	24/0 V DC (pulse)	OPCB scan sink, output (DIG 2)
2-11	5-2	24/0 V DC (pulse)	OPCB scan sink, output (DIG 3)
2-12	5-2	24/0 V DC (pulse)	OPCB scan sink, output (DIG 4)
2-13	5-2	24/0 V DC (pulse)	OPCB scan sink, output (DIG 5)
2-14	5-2	24/0 V DC (pulse)	OPCB scan sink, output (DIG 6)
2-15	5-3	0/5 V DC (pulse)	OPCB return, input (KEY 0)

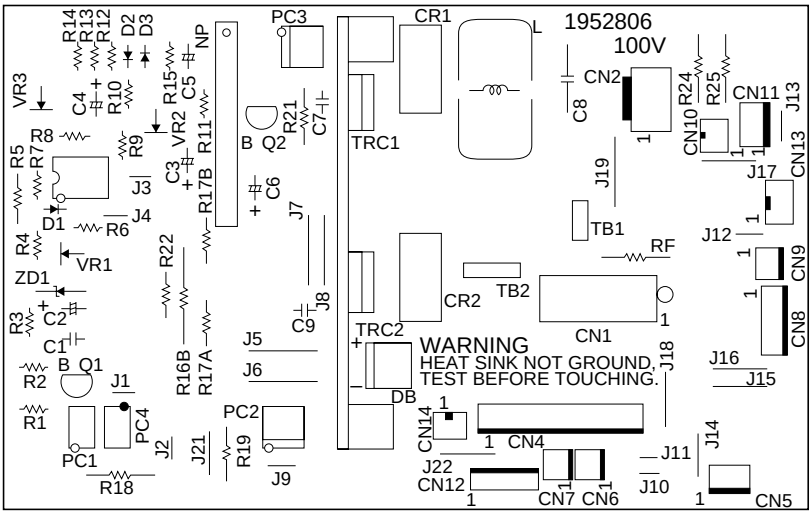
Terminals (CN)		Voltage	Remarks
2-16	5-3	0/5 V DC (pulse)	OPCB return, input (KEY 1)
3-1	5-2	24 V DC	24 V DC supply for TC, output
3-2	5-2	0/24 V DC	TC on/off, output
4-1	4-2	5 V DC	5 V DC supply for HUMPCB, output
4-3	4-4		HUMPCB humidity detection voltage, input
4-5	4-4		HUMPCB temperature detection voltage, input
5-1	5-2	24 V DC	24 V DC supply, input
5-4	5-3	5 V DC	5 V DC supply, input
6-1	6-2	0/24 V DC	TCDSW on/off, input
6-3	6-6	24 V DC	24 V DC supply for DEVF, output*1
6-4	6-6	0/24 V DC	Developing unit new/old differentiation signal, input
6-5	6-6	24 V DC	24 V DC supply for TNS, output
6-7	6-6		TNS detection voltage, input
6-8	6-6		TNS control voltage, output
7-1	5-3	0/5 V DC	Zero-cross signal for AVR PCB, output
7-2	5-2	24/0 V DC	Flicker resistor on/off, output*2
7-3	5-3	5 V DC	5 V DC supply for AVRPCB, output
7-4	5-2	0/24 V DC	CL on/off, output
7-5	5-3	0/5 V DC	RSW on/off, input
7-6	5-2	0/24 V DC	PFCL on/off, output
7-7	5-2	0/24 V DC	RCL on/off, output
7-8	5-3		FTH detection voltage, input
7-9	5-3	0/5 V DC	ESW on/off, input
7-10	5-2	0/24 V DC (pulse)	HL light intensity control PWM, output
7-11	5-2	0/24 V DC	H on/off, output
7-12	5-2	0/24 V DC	DM ALM, input
7-13	5-2	0/24 V DC	DM on/off, output
7-14	5-2	0/12/24 V DC	FFM and ICFM full speed/half speed/off, output
8-1	8-6	0/24 V DC	TFM on/off, output
8-2	8-6	0/12 V DC	HVTPCB main/transfer charging ALM, input
8-3	8-6	0/12 V DC	HVTPCB PHOTO, output
8-4	8-6	0/12 V DC	HVTPCB main/transfer charging on/off, output
8-5	8-6	0/24 V DC	HVTPCB developing bias on/off, output
8-7	8-6	24 V DC	24 V DC supply for HVTPCB, output
9-1	5-2	0/24 V DC (pulse)	SM coil energization pulse, output (SM B)
9-2	5-2	0/24 V DC (pulse)	SM coil energization pulse, output (SM $\overline{B}$)
9-3	5-2	0/24 V DC (pulse)	SM coil energization pulse, output (SM A)
9-4	5-2	0/24 V DC (pulse)	SM coil energization pulse, output (SM $\overline{A}$)

*1 Standard equipment only for 120 V, 220 V and 240 V specifications.
*2 For 230 V specifications and optional for 240 V specifications.

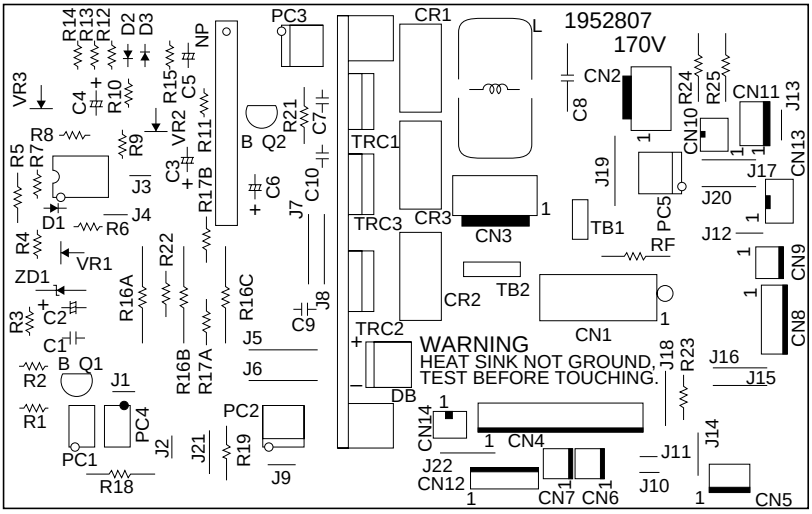
Terminals (CN)		Voltage	Remarks
9-5	5-2	24 V DC	24 V DC supply for SM, output
10-1	10-3	5 V DC	5 V DC supply for HPSW, output
10-2	10-3	5/0 V DC	HPSW on/off, input
11-1	5-2	0/24 V DC (pulse)	LM coil energization pulse, output (LM ϕ2)
11-2	5-2	0/24 V DC (pulse)	LM coil energization pulse, output (LM ϕ1)
11-3	5-2	0/24 V DC (pulse)	LM coil energization pulse, output (LM ϕ3)
11-4	5-2	24 V DC	24 V DC supply for LM, output
11-5	5-2	0/24 V DC (pulse)	LM coil energization pulse, output (LM ϕ4)
11-6	5-2	0/24 V DC (pulse)	MM coil energization pulse, output (MM ϕ2)
11-7	5-2	0/24 V DC (pulse)	MM coil energization pulse, output (MM ϕ1)
11-8	5-2	0/24 V DC (pulse)	MM coil energization pulse, output (MM ϕ3)
11-9	5-2	24 V DC	24 V DC supply for MM, output
11-10	5-2	0/24 V DC (pulse)	MM coil energization pulse, output (MM ϕ4)
12-1	12-2	5 V DC	5 V DC supply for MHPSW, output
12-3	12-2	5/0 V DC	MHPSW on/off, input
12-4	12-6	24 V DC	24 V DC supply for AES, output
12-5	12-6		AES detection voltage, input
12-7	12-8	5 V DC	5 V DC supply for LHPSW, output
12-9	12-8	5/0 V DC	LHPSW on/off, input
13-1	5-2	24 V DC	24 V DC supply for OPFM, output
13-2	5-2	0/24 V DC	OPFM on/off, output

(3) AVR PCB

120 V specifications



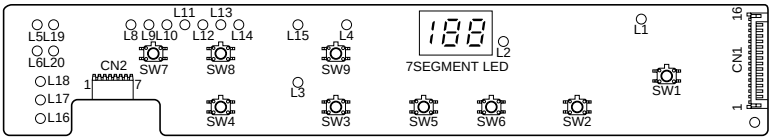
220 - 240 V specifications



Terminals (CN)		Voltage	Remarks
TB1	TB2	120 V AC 220 - 240 V AC	AC supply for H, output
1-1	1-2	120 V AC 220 - 240 V AC	AC supply, input
2-1	2-3		HL control voltage, output
3-1	3-4	220 - 240 V AC	220 - 240 V AC supply for flicker resistor, output*
4-1	12-2	0/12/24V V DC	FFM full speed/half speed/off, output
4-2	12-2	0/24 V DC	DM on/off, input
4-3	12-2	0/24 V DC	DM ALARM, output
4-4	12-2	0/24 V DC	H on/off, input
4-5	12-2	0/24 V DC (pulse)	HL light intensity control PWM, input
4-6	12-3	0/5 V DC	ESW on/off, output
4-7	12-3		FTH detection voltage, output
4-8	12-2	0/24 V DC	RCL on/off, input
4-9	12-2	0/24 V DC	PFCL on/off, input
4-10	12-3	0/5 V DC	RSW on/off, output
4-11	12-2	0/24 V DC	CL on/off, input
4-12	12-3	5 V DC	5 V DC supply, input
4-13	12-2	24/0 V DC	Flicker resistor on/off, input*
4-14	12-3	0/5 V DC	Zero-cross signal, input
5-1	5-3	5 V DC	5 V DC supply for RSW, output
5-2	5-3	0/5 V DC	RSW on/off, input
6-1	12-2	24 V DC	24 V DC supply for PFCL, output
6-2	12-2	0/24 V DC	PFCL on/off, output
7-1	12-2	24 V DC	24 V DC supply for RCL, output
7-2	12-2	0/24 V DC	RCL on/off, output
8-2	8-1	24 V DC	24 V DC supply for DM, output
8-3	8-1	0/24 V DC	DM on/off, output
8-4	8-1	0/24 V DC	DM ALM, input
9-1	12-2	24 V DC	24 V DC supply for CL, output
9-2	12-2	0/24 V DC	CL on/off, output
10-1	12-2	24 V DC	24 V DC supply for FFM, output
10-2	12-2	0/12/24 V DC	FFM full speed/half speed/off, output
11-1	11-2	5 V DC	5 V DC supply for ESW, output
11-3	11-2	0/5 V DC	ESW on/off, input
12-1	12-2	24 V DC	24 V DC supply, input
12-4	12-3	5 V DC	5 V DC supply, input
13-1	12-3		FTH detection voltage, input
13-2	12-3	5 V DC	5 V DC supply for FTH, output
14-1	12-2	24 V DC	24 V DC supply for ICFM, output
14-2	12-2	0/12/24 V DC	ICFM full speed/half speed/off, output

* For 230 V specifications and optional for 240 V specifications.

(4) Operation unit PCB



Terminals (CN)		Voltage	Remarks
1-1	MPCB	0/5 V DC (pulse)	MPCB return, output (KEY 1)
1-2	5-3	0/5 V DC (pulse)	MPCB return, output (KEY 0)
1-3		24/0 V DC (pulse)	Scan sink, input (DIG 6)
1-4		24/0 V DC (pulse)	Scan sink, input (DIG 5)
1-5		24/0 V DC (pulse)	Scan sink, input (DIG 4)
1-6		24/0 V DC (pulse)	Scan sink, input (DIG 3)
1-7		24/0 V DC (pulse)	Scan sink, input (DIG 2)
1-8		24/0 V DC (pulse)	Scan sink, input (DIG 1)
1-9		24/0 V DC (pulse)	Scan sink, input (DIG 0)
1-10		24/0 V DC (pulse)	LED lighting signal, input (SEG g)
1-11		24/0 V DC (pulse)	LED lighting signal, input (SEG f)
1-12		24/0 V DC (pulse)	LED lighting signal, input (SEG e)
1-13		24/0 V DC (pulse)	LED lighting signal, input (SEG d)
1-14		24/0 V DC (pulse)	LED lighting signal, input (SEG c)
1-15		24/0 V DC (pulse)	LED lighting signal, input (SEG b)
1-16		24/0 V DC (pulse)	LED lighting signal, input (SEG a)
2-1	MPCB	5/0 V DC (pulse)	BL LED lighting source, output (BL SEG a)
2-2	5-3	5/0 V DC (pulse)	BL LED lighting source, output (BL SEG b)
2-3		5/0 V DC (pulse)	BL LED lighting source, output (BL SEG c)
2-4		5/0 V DC (pulse)	BL LED lighting source, output (BL SEG d)
2-5		5/0 V DC (pulse)	BL LED lighting source, output (BL SEG e)
2-6		0/5 V DC (pulse)	BL scan sink, output (BL DIG 5)
2-7		0/5 V DC (pulse)	BL scan sink, output (BL DIG 6)

3-6-4 Electrical problems

Problem	Causes	Check procedures/corrective measures
(1) The machine does not operate when the main switch is turned on.	No electricity at the power outlet.	Measure the input voltage.
	The power cord is not plugged in properly.	Check the contact between the power plug and the outlet.
	The front cover or release unit is not closed completely.	Check the front cover and release unit.
	Broken power cord.	Check for continuity. If none, replace the cord.
	Defective main switch.	Check for continuity across the contacts. If none, replace the main switch.
	Blown fuse in the power source PCB.	Check for continuity. If none, remove the cause of blowing and replace the fuse.
	Defective safety switch.	Check for continuity across the contacts of the safety switch. If none, replace the switch.
	Defective power source PCB.	With AC present, check for 24 V DC at CN1-1 and CN1-2 on the power source PCB and 5 V DC at CN1-7 and CN1-8. If none, replace the power source PCB.
(2) The drive motor does not operate (C21).	Poor contact in the drive motor connector terminals.	Check for continuity across the connector terminals. If none, replace them.
	Defective main PCB.	Run simulation 10 and check if CN7-13 on the main PCB goes low. If not, replace the main PCB.
	Broken drive motor gear.	Check visually and replace the drive motor if necessary.
(3) The scanner motor does not operate (C30).	Broken scanner motor coil.	Check for continuity across the coil. If none, replace the scanner motor.
	Poor contact in the scanner motor connector terminals.	Check for continuity across the connector terminals. If none, replace them.
	Defective main PCB.	Run simulation 21 and check if the motor drive coil energization pulse signals are output at CN9-1, -2, -3 and -4 on the main PCB. If not, replace the main PCB.

Problem	Causes	Check procedures/corrective measures
(4) The lens motor does not operate (C41).	Broken lens motor coil.	Check for continuity across the coil. If none, replace the lens motor.
	Poor contact in the lens motor connector terminals.	Check for continuity across the connector terminals. If none, replace them.
	Defective main PCB.	Run simulation 23 and check if the motor drive coil energization pulse signals are output at CN11-1, -2, -3 and -5 on the main PCB. If not, replace the main PCB.
(5) The mirror motor does not operate (C42).	Broken mirror motor coil.	Check for continuity across the coil. If none, replace the mirror motor.
	Poor contact in the mirror motor connector terminals.	Check for continuity across the connector terminals. If none, replace them.
	Defective main PCB.	Run simulation 23 and check if the motor drive coil energization pulse signals are output at CN11-6, -7, -8 and -10 on the main PCB. If not, replace the main PCB.
(6) The toner feed motor does not operate.	Broken toner feed motor coil.	Check for continuity across the coil. If none, replace the toner feed motor coil.
	Poor contact in the toner feed motor connector terminals.	Check for continuity across the connector terminals. If none, replace them.
	Defective main PCB.	Run simulation 10 and check if CN8-1 on the main PCB goes low. If not, replace the main PCB.
(7) The optical section fan motor does not operate.	Broken optical section fan motor coil.	Check for continuity across the coil. If none, replace the optical section fan motor.
	Poor contact in the optical section fan motor connector terminals.	Check for continuity across the connector terminals. If none, replace them.
	Defective main PCB.	Run simulation 20 and check if CN13-2 on the main PCB goes low. If not, replace the main PCB.

Problem	Causes	Check procedures/corrective measures
(8) The fixing unit fan motor does not operate.	Broken fixing unit fan motor coil.	Check for continuity across the coil. If none, replace the fixing unit fan motor.
	Poor contact in the fixing unit fan motor connector terminals.	Check for continuity across the connector terminals. If none, replace them.
	Defective main PCB.	Run simulation 10 and check if CN7-14 on the main PCB goes low. If not, replace the main PCB.
(9) The internal cooling fan motor does not operate.	Broken internal cooling fan motor coil.	Check for continuity across the coil. If none, replace the internal cooling fan motor.
	Poor contact in the internal cooling fan motor connector terminals.	Check for continuity across the connector terminals. If none, replace them.
	Defective main PCB.	Run simulation 10 and check if CN14-2 on the main PCB goes low. If not, replace the main PCB.
(10) The paper feed clutch does not operate.	Broken paper feed clutch coil.	Check for continuity across the coil. If none, replace the paper feed clutch.
	Poor contact in the paper feed clutch connector terminals.	Check for continuity across the connector terminals. If none, replace them.
	Defective main PCB.	Run simulation 02 and check if CN7-6 on the main PCB goes low. If not, replace the main PCB.
(11) The registration clutch does not operate.	Broken registration clutch coil.	Check for continuity across the coil. If none, replace the registration clutch.
	Poor contact in the registration clutch connector terminals.	Check for continuity across the connector terminals. If none, replace them.
	Defective main PCB.	Run simulation 02 and check if CN7-7 on the main PCB goes low. If not, replace the main PCB.

Problem	Causes	Check procedures/corrective measures
(12) The halogen lamp does not light.	Broken halogen lamp filament.	Check for continuity. If none, replace the halogen lamp (see page 3-3-16).
	Optical section thermostat triggered.	See page 3-6-4.
	Poor contact in the AVR PCB connector terminals.	
	Defective main PCB.	
	Defective AVR PCB.	
(13) The halogen lamp does not turn off.	Defective main PCB.	If the HL CONT (PWM) signal is always output from CN7-10 on the main PCB, replace the main PCB.
	Defective AVR PCB.	If the halogen lamp does not turn off when HL CONT (PWM) is not output to CN4-5 on the AVR PCB, replace the AVR PCB.
(14) The cleaning lamp does not light.	Defective cleaning lamp.	Check for one-way continuity across all the LEDs comprising the cleaning lamp. If none, replace the cleaning lamp.
	Poor contact in the cleaning lamp connector terminals.	Check for continuity across the connector terminals. If none, replace them.
	Defective main PCB.	Run simulation 10 and check if CN7-4 on the main PCB goes low. If not, replace the main PCB.
(15) The fixing heater does not turn on (C61, C63).	Broken fixing heater wire.	Check for continuity. If none, replace the fixing heater (see page 3-3-62).
	Fixing unit thermostat 1 or 2 triggered.	Check for continuity across the thermostat. If none, remove the cause of blowing and replace the fixing unit thermostat.
	Broken fixing unit thermistor.	Measure the resistance. If it is $\infty\Omega$, replace the fixing unit thermistor.
(16) The fixing heater does not turn off (fixing unit thermostat triggered, C64).	Dirty sensor part of the fixing unit thermistor.	Check visually and clean the thermistor sensor part.
	Defective AVR PCB.	If the fixing heater stays on with CN4-4 on the AVR PCB high, replace the AVR PCB.
	Defective main PCB.	If CN7-11 on the main PCB is always low, replace the main PCB.

Problem	Causes	Check procedures/corrective measures
(17) Main charging does not take place (C50).	Broken main charger wire.	Check visually and replace the main charger wire if it is broken (see page 3-3-13).
	Leaking main charger housing.	See page 3-6-3.
	Poor contact in the high-voltage transformer PCB connector terminals.	
	Defective main PCB.	
	Defective high-voltage transformer PCB.	
(18) Transfer charging does not take place (C50).	Broken transfer charger wire.	Check visually and replace the transfer charger wire if it is broken (see page 3-3-55).
	Leaking transfer charger housing.	See page 3-6-3.
	Poor contact in the high-voltage transformer PCB connector terminals.	
	Defective main PCB.	
	Defective high-voltage transformer PCB.	
(19) No developing bias is output.	Poor contact in the developing bias wire.	Check the developing bias wire for poor contact.
	Poor contact in the high-voltage transformer PCB connector terminals.	Check for continuity across the connector terminals. If none, replace them.
	Defective high-voltage transformer PCB.	Run simulation 10. If no developing bias is output while CN1-3 on the high-voltage transformer PCB goes low, replace the high-voltage transformer PCB.
	Defective main PCB.	Run simulation 10 and check if CN8-5 on the main PCB goes low. If not, replace the main PCB.

Problem	Causes	Check procedures/corrective measures
(20) A paper jam is indicated as soon as the main switch is turned on.	A piece of paper torn from copy paper is caught around the registration or eject switch.	Check visually and remove, if any.
	Defective registration switch.	With 5 V DC present at CN5-1 on the AVR PCB, if CN5-2 on the AVR PCB remains low when the registration switch is turned on and off, replace the registration switch.
	Defective eject switch.	With 5 V DC present at CN11-1 on the AVR PCB, if CN11-3 on the AVR PCB remains low when the eject switch is turned on and off, replace the eject switch.
(21) Others.	Wiring is broken, shorted or makes poor contact.	Check for continuity. If none, repair.
	Noise.	Locate the source of noise and remove.

3-6-5 Mechanical problems

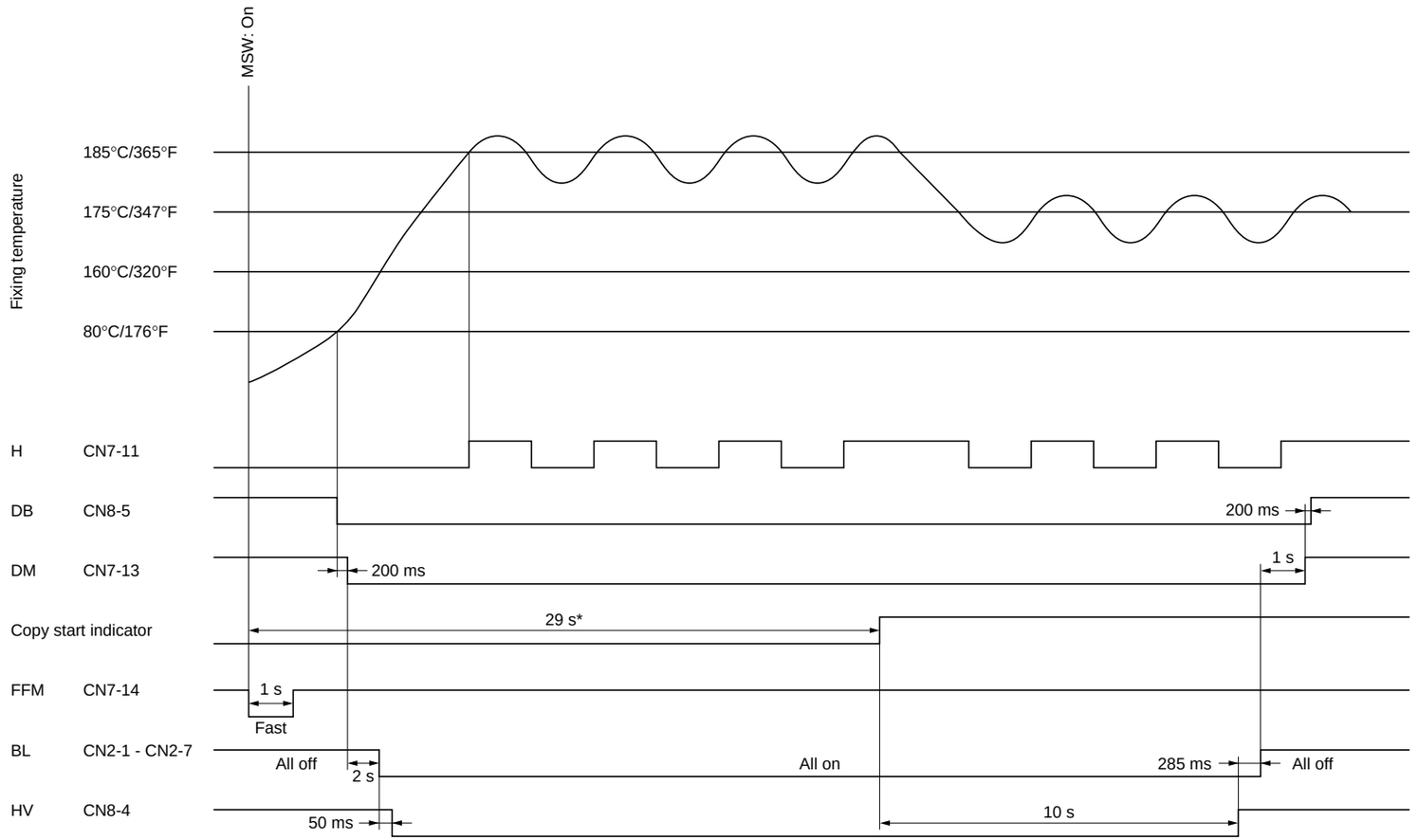
Problem	Causes/check procedures	Corrective measure
(1) No primary paper feed.	Check if the surfaces of paper feed pulleys A & B, feed roller and pulley are dirty with paper powder.	Clean with isopropyl alcohol.
	Electrical problem with the paper feed clutch.	See page 3-6-27.
(2) No secondary paper feed.	Check if the surfaces of the feed roller and pulley, right and left registration rollers are dirty with paper powder.	Clean with isopropyl alcohol.
	Electrical problem with the registration clutch.	See page 3-6-27.
(3) Skewed paper feed.	Check if the front or rear claws inside the paper drawer are deformed.	Remedy if deformed.
	Check if the springs inside the paper drawer are deformed.	Remedy or replace if deformed.
(4) The scanner does not travel.	Check if the scanner wires are loose.	Reinstall the scanner wires (see page 3-3-19).
	Electrical problem with the scanner motor.	See page 3-6-25.
(5) Multiple sheets of paper are fed at one time.	Check if the front or rear claws inside the paper drawer are deformed.	Remedy if deformed.
	Check if the paper is curled.	Change the paper.
(6) Paper jams.	Check if the paper is extremely curled.	Change the paper.
	Check if the front or rear claws inside the paper drawer are deformed.	Remedy if deformed.
	Check if the springs in the paper drawer are deformed.	Remedy if deformed.
	Check if the press roller is extremely dirty or deformed.	Clean or replace the press roller (see page 3-3-67).
	Check if the heat roller separation claws are extremely dirty or deformed.	Clean or replace the heat roller separation claws (see page 3-3-71).
(7) Toner drops on the paper conveying path.	Check if the developing unit is extremely dirty.	Clean the developing unit.

Problem	Causes/check procedures	Corrective measure
(8) Abnormal noise is heard.	Check if the rollers and gears operate smoothly.	Grease the bushings and gears.
	Check if the paper feed clutch and registration clutch are installed correctly.	Remedy.

3-7 Appendixes

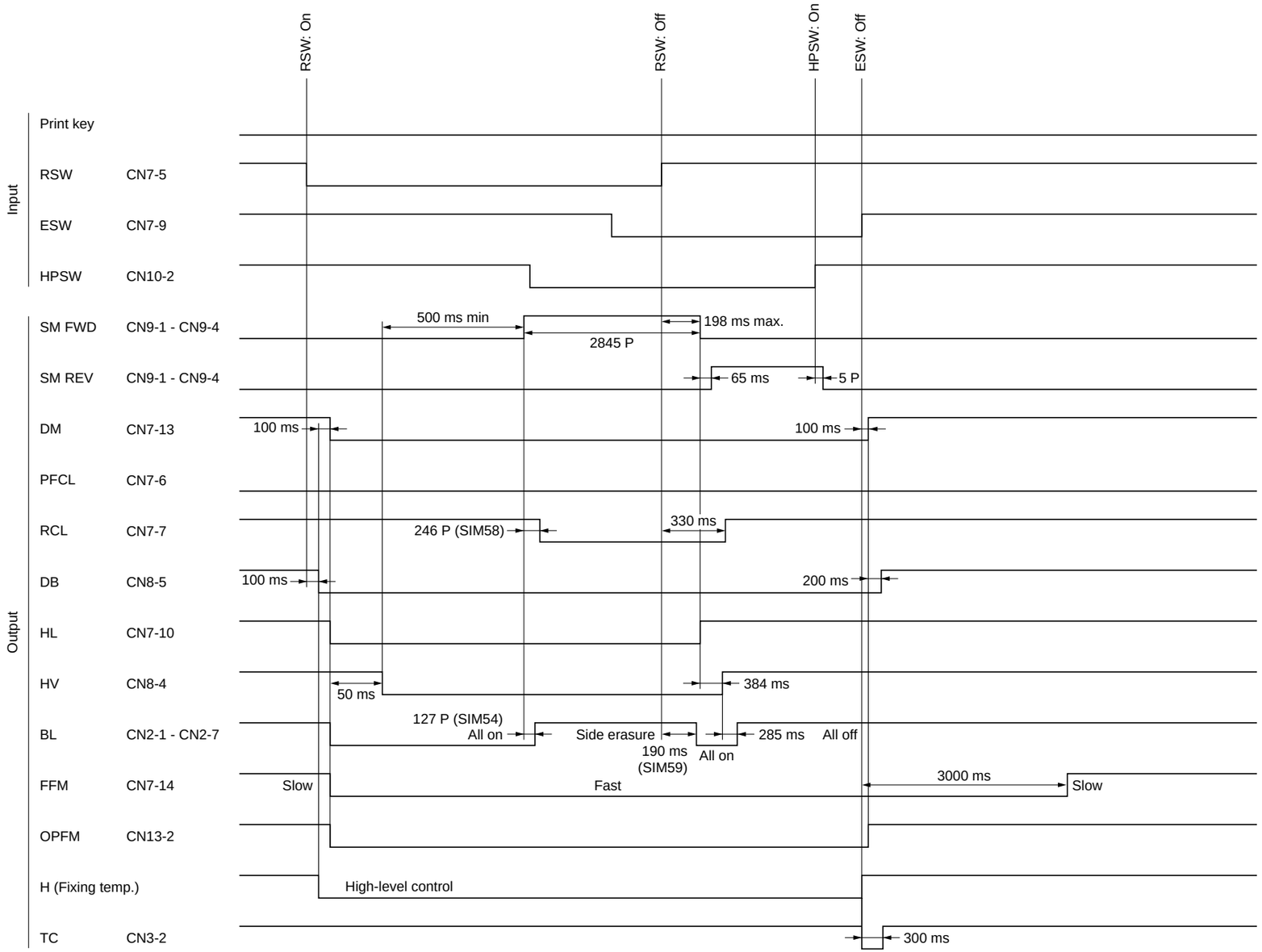
Timing chart No. 1 3-7-1
Timing chart No. 2 3-7-2
Timing chart No. 3 3-7-3
Power source PCB 3-7-4
AVR PCB 3-7-5
Operation unit PCB 3-7-6
Main PCB 3-7-7
Connection diagram 3-7-8
Wiring diagram 3-7-9

Timing chart No. 1 The main switch is turned on when the fixing temperature (as measured by the fixing unit thermistor) is higher than 12°C/53.6°F and the machine internal temperature (as meassured by the drum thermistor) is higher than 15°C/59°F

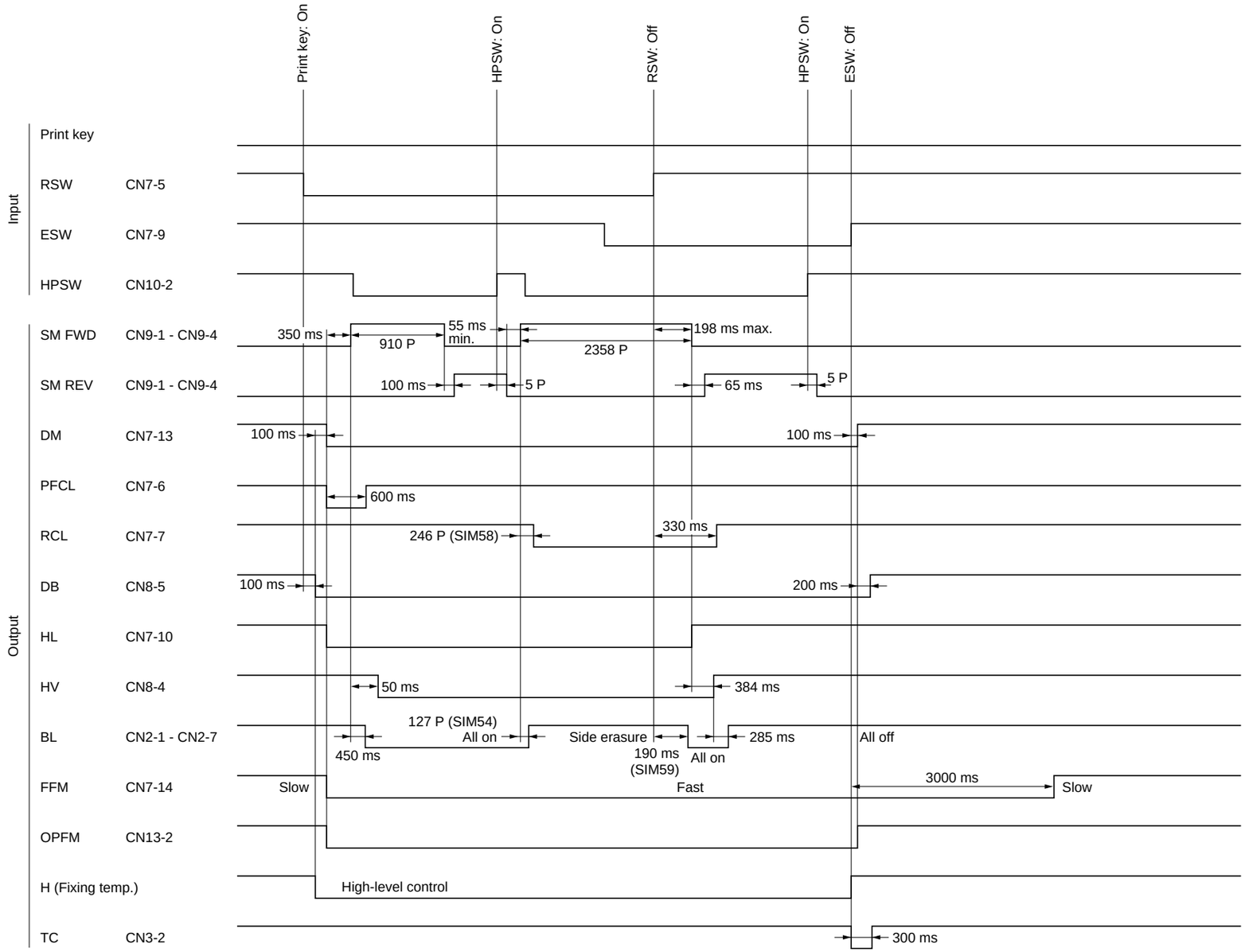


* If, when the main switch is turned on
FTH temperature ≥ 10°C/50°F and ambient temperature ≥ 15°C/59°F: 29 s
FTH temperature < 10°C/50°F or ambient temperature < 15°C/59°F: 44 s
FTH temperature ≥ 80°C/176°F: 5 s

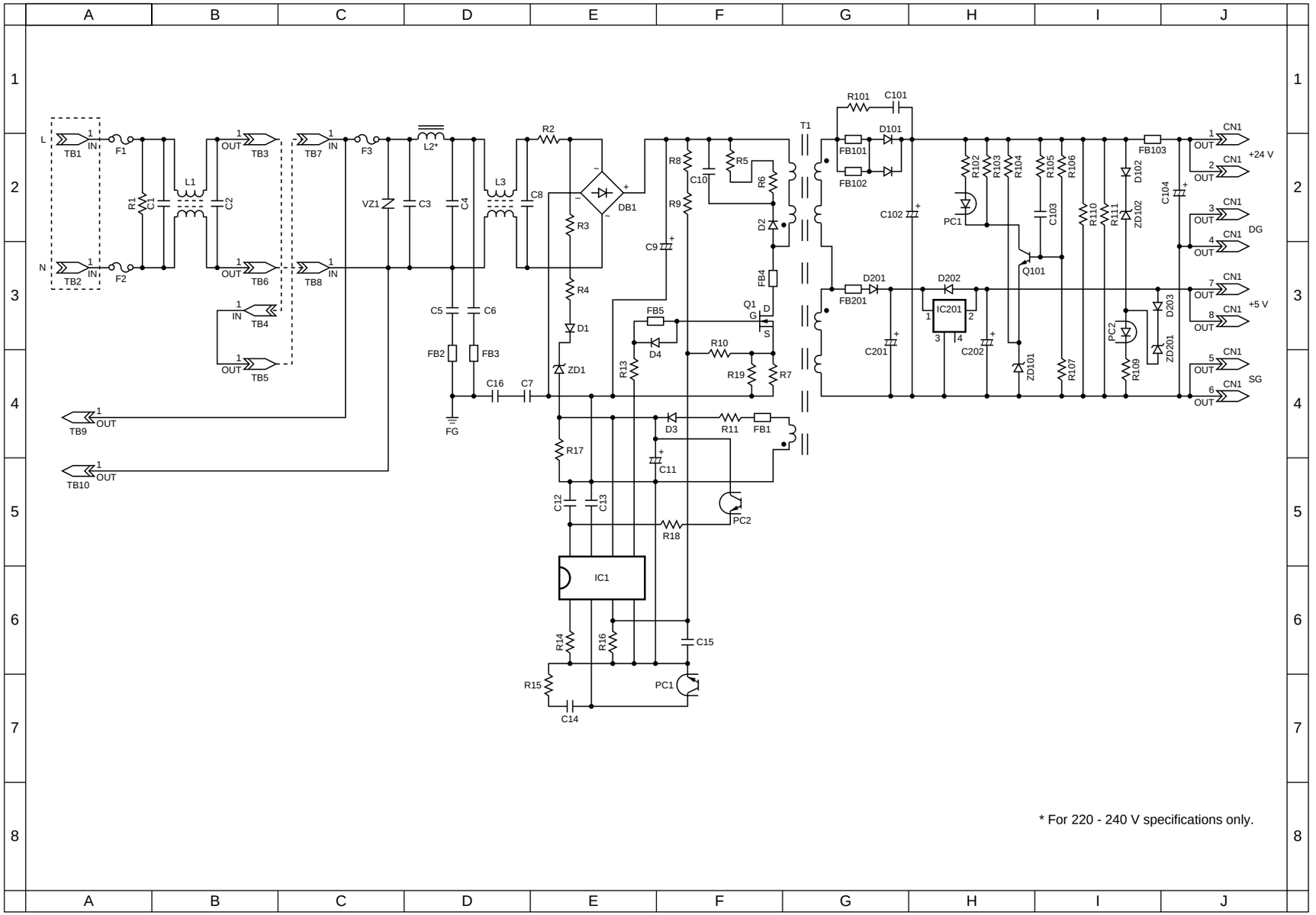
Timing chart No. 2 A single copy (70% magnification ratio, bypass feed, A4R/8$^{1}/_{2}$" × 14" paper)



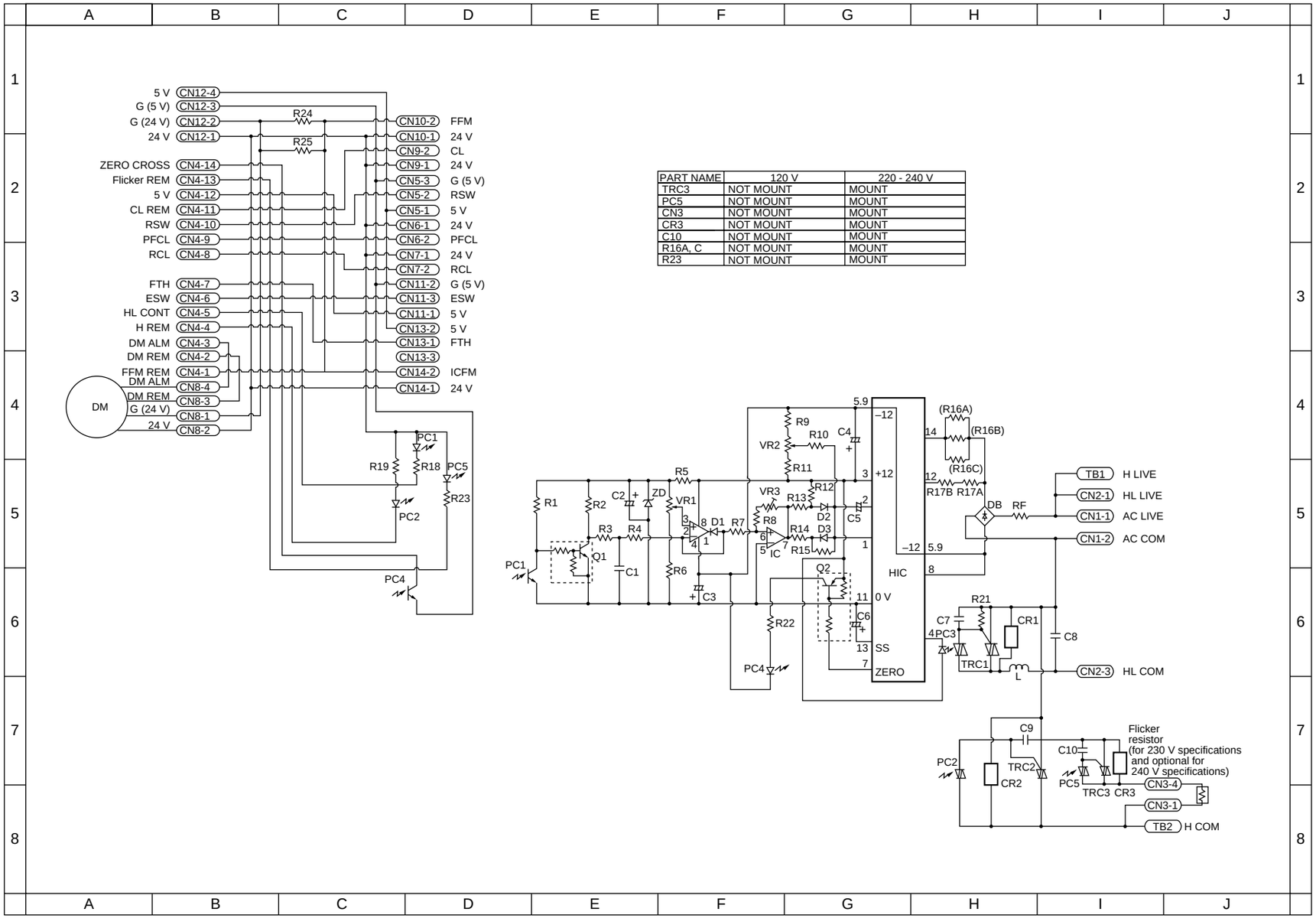
Timing chart No. 3 A single copy (100% magnification ratio, drawer feed, A4R/8$^{1}/_{2}$" × 14" paper, AE)



Power source PCB

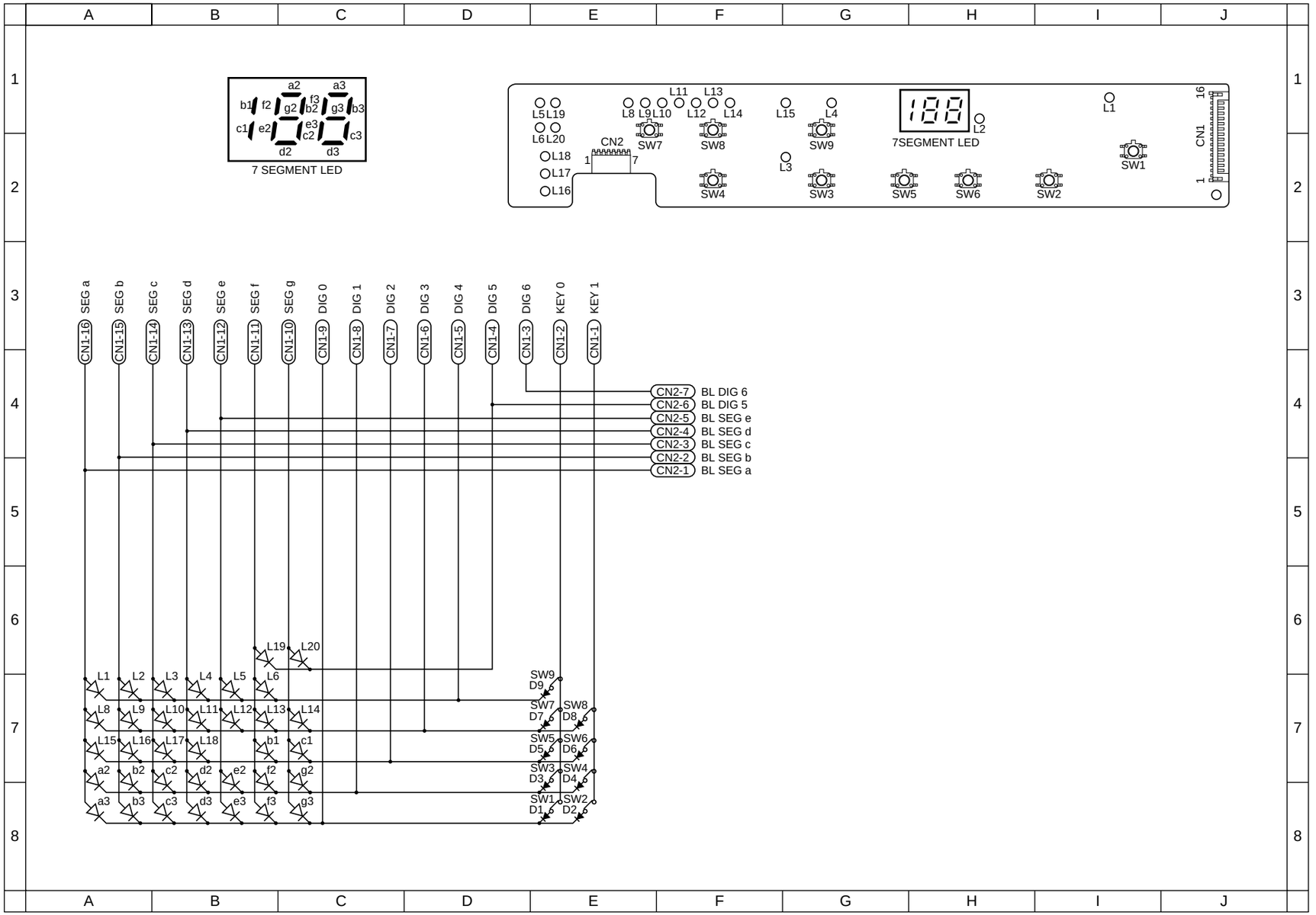


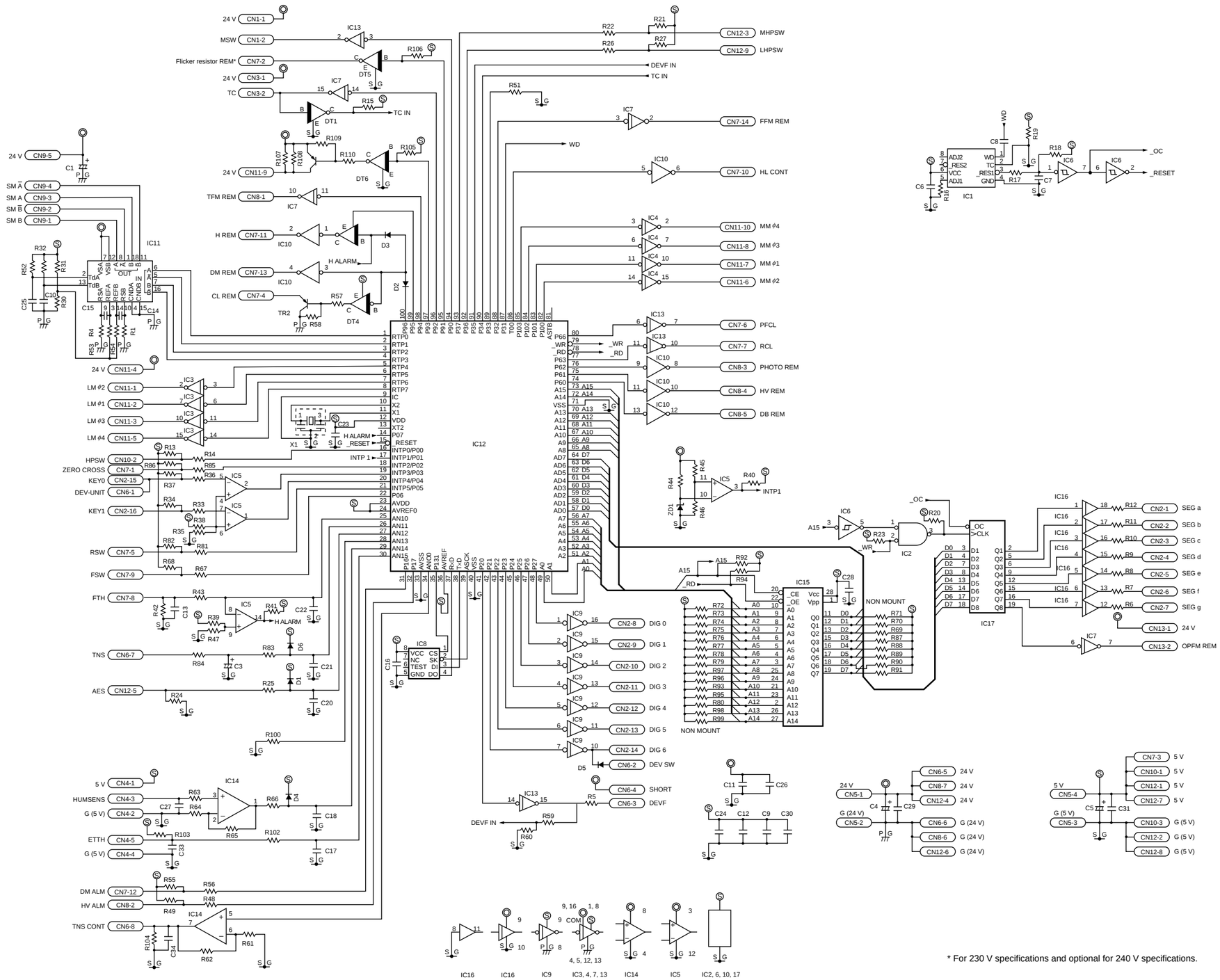
AVR PCB



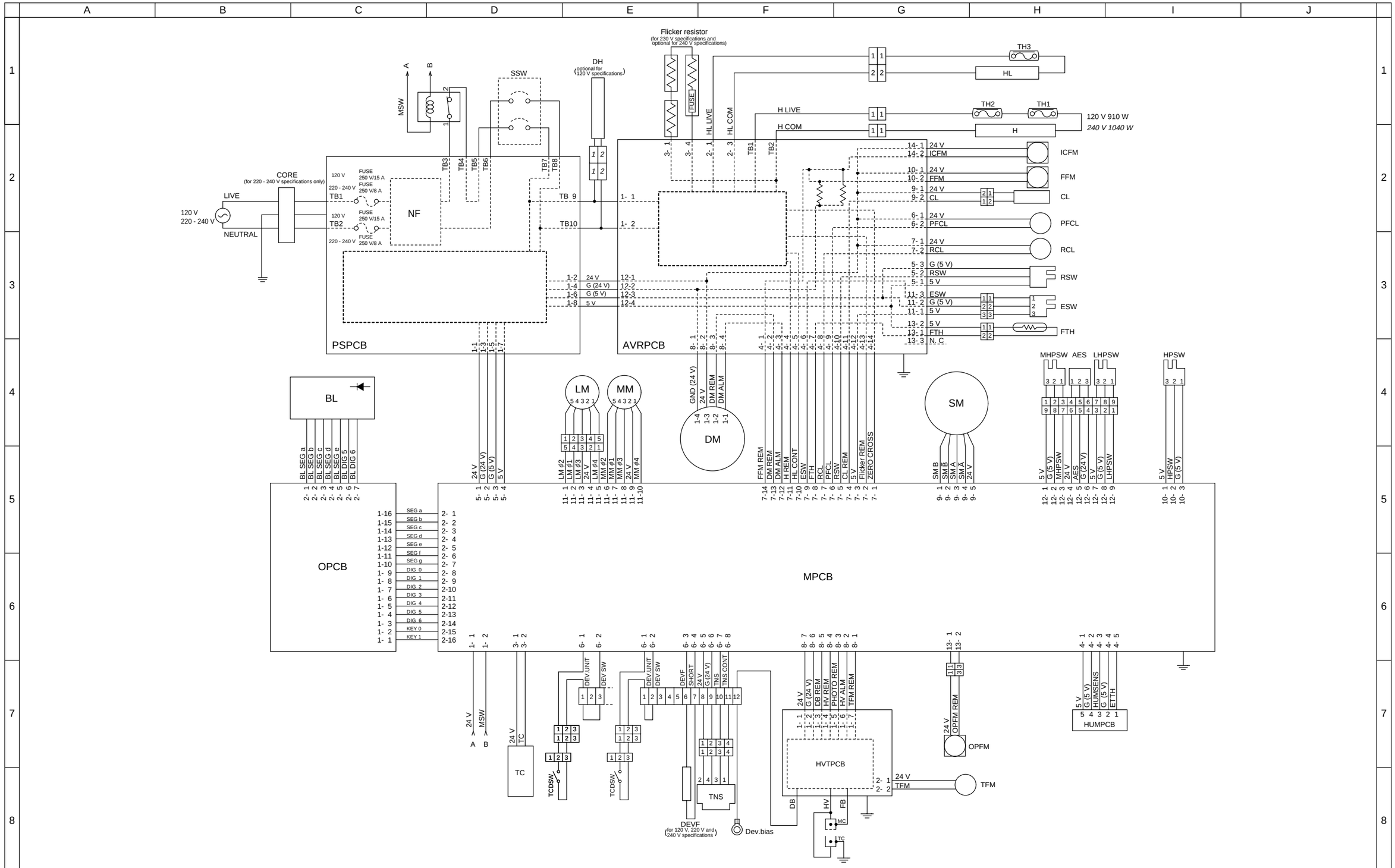
PART NAME	120 V	220 - 240 V
TRC3	NOT MOUNT	MOUNT
PC5	NOT MOUNT	MOUNT
CN3	NOT MOUNT	MOUNT
CR3	NOT MOUNT	MOUNT
C10	NOT MOUNT	MOUNT
R16A, C	NOT MOUNT	MOUNT
R23	NOT MOUNT	MOUNT

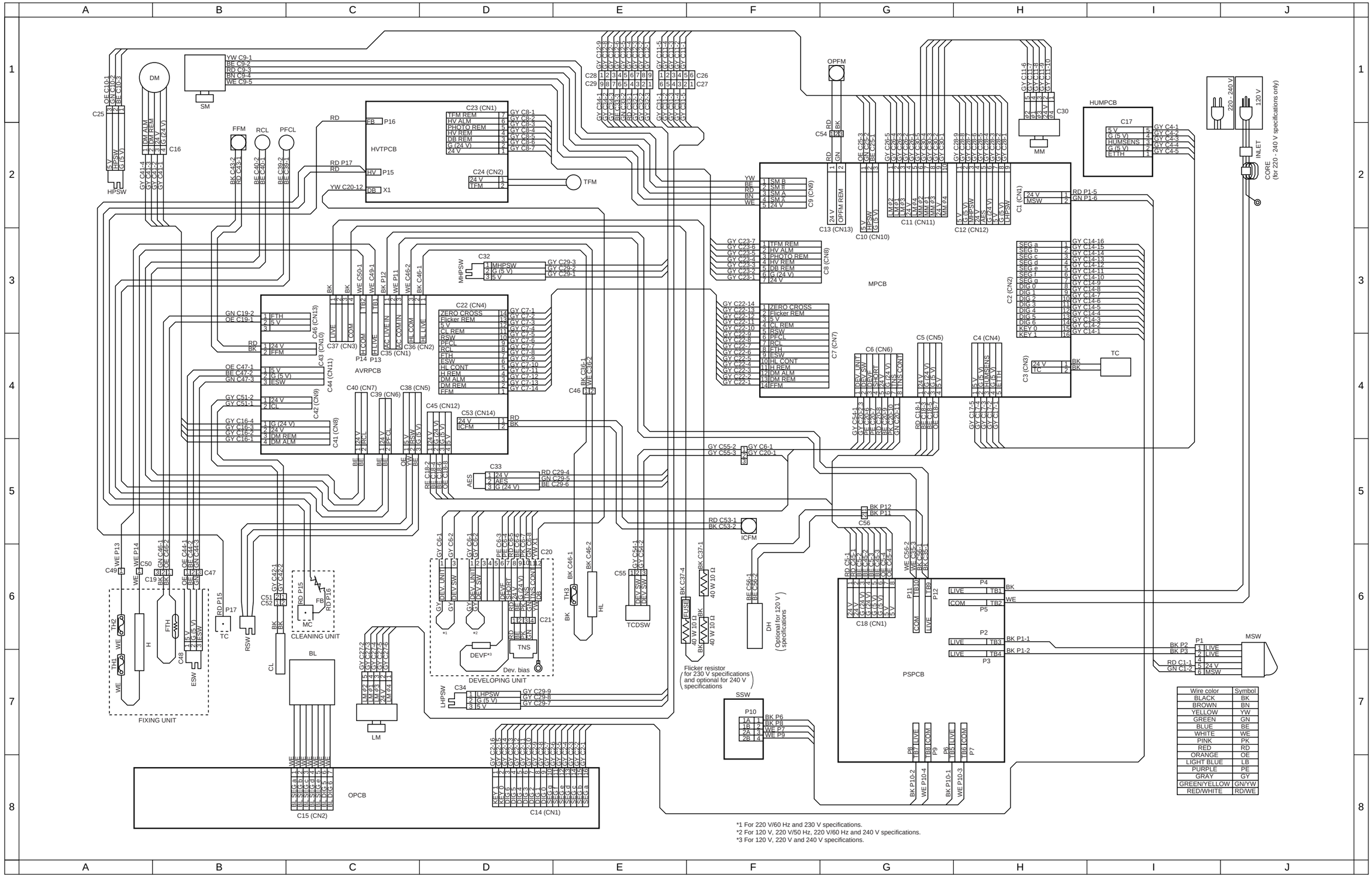
Operation unit PCB





* For 230 V specifications and optional for 240 V specifications.


Flicker resistor
(for 230 V specifications and optional for 240 V specifications)
DH
(optional for 120 V specifications)
SSW
MSW
A
B
FUSE
HL LIVE
HL COM
H LIVE
H COM
TH3
HL
TH2
TH1
H
120 V 910 W
240 V 1040 W
CORE
(for 220 - 240 V specifications only)
LIVE
NEUTRAL
120 V
220 - 240 V
TB1
TB2
FUSE 250 V/15 A
FUSE 250 V/8 A
NF
TB3
TB4
TB5
TB6
TB7
TB8
TB 9
TB10
PSPCB
AVRPCB
TB1
TB2
14- 1 24 V
14- 2 ICFM
ICFM
10- 1 24 V
10- 2 FFM
FFM
9- 1 24 V
9- 2 CL
CL
6- 1 24 V
6- 2 PFCL
PFCL
7- 1 24 V
7- 2 RCL
RCL
5- 3 G (5 V)
5- 2 RSW
5- 1 5 V
RSW
11- 3 ESW
11- 2 G (5 V)
11- 1 5 V
ESW
13- 2 5 V
13- 1 FTH
13- 3 N. C
FTH
1-2 24 V
1-4 G (24 V)
1-6 G (5 V)
1-8 5 V
12-1
12-2
12-3
12-4
BL
BL SEG a
BL SEG b
BL SEG c
BL SEG d
BL SEG e
BL DIG 5
BL DIG 6
LM
MM
LM ø2
LM ø1
LM ø3
24 V
LM ø4
MM ø2
MM ø1
MM ø3
24 V
MM ø4
GND (24 V)
24 V
DM REM
DM ALM
DM
FFM REM
DM REM
DM ALM
H REM
HL CONT
ESW
FTH
RCL
PFCL
RSW
CL REM
5 V
Flicker REM
ZERO CROSS
SM
SM B
SM B
SM A
SM A
24 V
MHPSW
AES
LHPSW
HPSW
5 V
G (5 V)
MHPSW
24 V
AES
G (24 V)
5 V
G (5 V)
LHPSW
HPSW
G (5 V)
OPCB
SEG a
SEG b
SEG c
SEG d
SEG e
SEG f
SEG g
DIG 0
DIG 1
DIG 2
DIG 3
DIG 4
DIG 5
DIG 6
KEY 0
KEY 1
MPCB
24 V
MSW
TC
DEV UNIT
DEV SW
TCDSW
DEVF
SHORT
TNS
TNS CONT
DEVF
(for 120 V, 220 V and 240 V specifications)
Dev.bias
DB REM
HV REM
PHOTO REM
HV ALM
TFM REM
HVTPCB
DB
HV
FB
MC
TC
OPFM REM
OPFM
TFM
HUMSENS
ETH
HUMPCB



Wire color	Symbol
BLACK	BK
BROWN	BN
YELLOW	YW
GREEN	GN
BLUE	BE
WHITE	WE
PINK	PK
RED	RD
ORANGE	OE
LIGHT BLUE	LB
PURPLE	PE
GRAY	GY
GREEN/YELLOW	GN/YW
RED/WHITE	RD/WE

A division of MITA COPYSTAR AMERICA, INC.

Headquarters:
225 Sand Road, P.O. Box 40008
Fairfield, New Jersey 07004-0008
TEL : (201) 808-8444
FAX : (201) 882-6000

Northeastern Region:
225 Sand Road, P.O. Box 40008
Fairfield, New Jersey 07004-0008
TEL : (201) 808-8444
FAX : (201) 882-4401

Midwestern Region:
225 Spring Lake Drive,
Itasca, Illinois 60143
TEL : (630) 250-7447
FAX : (630) 250-8787

Western Region:
14101 Alton Parkway,
P.O.Box 57006, Irvine,
California 92618-7006
TEL : (714) 457-9000
FAX : (714) 457-9119

Southeastern Region:
1500 Oakbrook Drive,
Norcross, Georgia 30093
TEL : (770) 729-9786
FAX : (770) 729-9873

Southwestern Region:
2825 West Story Road,
Irving, Texas 75038-5299
TEL : (972) 550-8987
FAX : (972) 570-4704

Dallas Parts Distribution Center & National Training Center:
2825 West Story Road,
Irving, Texas 75038-5299
TEL : (972) 659-0055
FAX : (972) 570-5816

©1996 MITA INDUSTRIAL CO., LTD.

Printed in U.S.A.